

## **Supply Side Models of Intermediation Behavior:**

### **Preliminary Empirical Evidence from Nigerian Commercial Banks**

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#### **Abstract**

This study was aimed at econometrically investigating the determinants of the supply side intermediation performance of commercial banks as revealed by their behavioral patterns in the face of the effects of the factors. A total of twelve econometric models were constructed. Selected models were estimated and analysed using the linear least squares method applied on annual Nigerian data from 1970-1999. The results reveal positive and significant relationships between the indicators of the supply side financial intermediation (Total deposit ratio; time, savings, and foreign currency deposit ratio, and demand deposit ratio) and the pricing implications of the deposit money market (deposit rates of interest), foreign exchange market (foreign exchange rates), and the treasury money market (treasury bills rates). The respective deposit-output ratios were also revealed to be positive functions of the socio-political trends in the country (measured by the socio-political trends index); but negative functions of the loans and advances market rate of interest. An obvious implication is that developments and forces at play in the country's money market, foreign exchange market, and socio-political climate influence commercial banks' performance in their funds mobilization bid. It was also underscored by the analysis that in the face of challenges presented by these environments or markets, the banks exhibit such attitudes that are consistent with aggressive marketing, profit-maximization, and /or prudential behaviors, depending on the prevailing circumstances.

**Key Words:** Supply Side Models, Financial Intermediation, Funds Mobilization Behavior, Commercial Banks, Deposit-Output Model

#### **Introduction**

Financial intermediation relates to the process whereby the financial institutions, creating financial assets within the framework of the financial markets, bring together the surplus economic units (SEUs) and the deficit economic units (DEUs) in order to resolve their financial imbalance by means of a price-related compensation mechanism called interest rates. There are two sides to a given financial intermediation process: the inflow side and the outflow side. The inflow or the supply side concerns itself with the activities involved in mobilizing funds from the surplus agents in the economy.

In this area, financial institutions carry out the depository and/or treasury functions; generating deposits and saving of various types and magnitude from savers and paying agreed interest amount. The outflow or demand side involves channeling the pooled financial resources to the deficit economic units for a fee (interest amount) agreed ab initio. The inflow side, thus, characterizes the funds mobilization or financing function, while the outflow is referred to as the funds utilization or investment function.

The creditable performance of these intermediation functions is believed by finance and economic experts to affect the overall performance of the economy in terms of aggregate output. For instance, efficient lending and investments operations by commercial banks would cause growth in the country's GDP. Similarly, mobilization of excess funds and savings from surplus economic agents would pool resources and make them ready for gainful allocation in the economy. Thus, what the banks lend or invest will be a function of what they mobilized in the supply side intermediation function. Invariably, a country's output performance must depend, in part, on the general intermediation performance of the banks. Whereas a plethora of studies have been conducted to address the determinant of the demand side intermediation almost to a satiation level (such as those of Cooney, 1997; Muoghalu and Ezirim 2002; Ezirim and Emenyonu, 1997; Makinde, 1991; and Udegbulam, 1992), only a few addressed the supply side with evidence from Nigeria. The need for more empirical studies to explain the behavior of financial institutions, notably commercial banks, in the face of the interplay of certain forces environment to them is rife. It is on this premise that this study is embarked upon to investigate the determinants of the supply side intermediation performance in a bid to bring out how they behave in response to their effects.

## **Some Theoretical Issues And Modeling**

### **Supply Side Financial Intermediation Clarified**

The supply side of the financial intermediation function represents the financing function of a typical financial institution. Financing function, according to finance theory, is the function of the firm geared toward the sourcing and/or raising of funds from alternative sources in such a cost-effective and time-efficient manner as to enable the firm to achieve its objectives. Thus, four elements are cardinal in the financing function of firms: the alternative sources, the cost implications, time-efficiency, and objective criterion of the firm, e.g. maximization of owners' wealth. Efficiency in the conduct of financing function is attained when the business unit mobilizes funds from convenient sources that guarantee the attainment of cost effectiveness and time efficiency (Ezirim, 1996). For our purpose in this study, financing function would represent the funds mobilization function of the financial institutions. This function is known as the supply side of the institution's intermediation function. The culmination of the funds' mobilization effort of a typical depository institution is the total portfolio of the various types of

deposits (alternative sources of funds) generated by the financial intermediary (Ezirim, 1999, 2003). Funds are mobilized by the help of institutional and non-institutional arrangements, instruments and facilities provide by the financial markets.

The complex whole or congeries of the financial markets, institutions, and instruments in a given economy is known as the financial superstructure (Goldsmith, 1969; Odedokun, 1987). In our context however, it is taken to mean the most important institutional divides such as commercial banks and other deposit money banks, and insurance companies that operate in the financial markets to assist in the creation of financial instruments. Banks for instance create financial instruments in their depository function. For the banks, the major types of deposits are the savings, time, and foreign currency deposits, and current account or demand deposits. These make up the total deposit portfolio of banks (or simply, total deposits).

#### **Determinants of Funds Mobilization Effort and Relationships**

The level of the deposit portfolio is postulated to depend on the rates of interest paid on each type of deposit ( $R^D$ ) and other macroeconomic factors. A notable factor that affects the ability of economic agents to save, and hence the level of deposits among the financial institutions, is the disposable income ( $Y^D$ ) of the economic agents. This is the remainder of income after applying tax to the total income of the agents. A proxy for the income of economic agents in a country is the per-capita income ( $Y^P$ ). By implication, the income tax rate ( $R^Y$ ) prevailing in the country is also an important factor of influence. Perhaps a much more influencing factor in the realm of taxes as argued in Ezirim (1999) is the withholding tax ( $R^{Wt}$ ) on interest rates paid by banks to their depositors. It is reasoned that higher withholding tax rates reduce the willingness of relevant agents in depositing money with banks. Economic units are naturally averse to taxation generally. Apart from these, it is postulated that the aggregate level of economic activity (GDP), which determines the standard of living and welfare of the citizenry, would go a long way to determining the ability of economic units to make deposit with the financial institutions. A buoyant economy with high GDP has a promise of boosting deposits than a poor one. If the level of economic activity grows, it is expected that savings would generally grow. Ajakaiye and Odusola (1995) advance the ratio of foreign savings to GDP as an important variable posing an influence on the level of financial savings. In as much as we recognize the huge leakages in an economy like Nigeria by way of the activities of economic looters (and paradoxically, genuine foreign investors to other economies), we think that it is difficult to measure this variable. We, however, believe that a positive force attracting these Nigerian investors to invest in other countries is the strength of the foreign economy proxied by the strength of their currency. The relationship between Nigeria's local currency and the foreign currency is defined as the exchange rate. By implication, the foreign exchange rate (FER) prevailing in the country becomes a factor of

influence on the level of deposits generated by the financial superstructure. Putting these together, we can hypothesize that the funds' mobilization effort (FME) represented by the level of deposits (D) is a function of such factors as the deposit rate of interest (DRI), Per-capita income ( $Y^P$ ), the average rate of tax on income ( $R^{YT}$ ), the rate of withholding tax ( $R^{WT}$ ) on interest on deposit, the level of aggregate economic activity (GDP), and the exchange rate prevailing in the country (FER). The ensuing relationships can be represented functionally as:

$$D_t = f(DRI_t, Y_t^P, R_t^{YT}, R_t^{WT}, GDP_t, FER_t) \dots\dots\dots(1)$$

Where, variables are as previously defined. Making  $D_t$  and GDP to be homogeneous with respect to the total financial savings (TFS) of the country, expression (1) becomes:

$$(D/TFS)_t = f(DRI_t, Y_t^P, R_t^{YT}, R_t^{WT}, (GDP/TFS)_t, FER_t) \dots\dots (2)$$

and suppose we redefine  $(D/TFS)_t = D_t^T$ ; and  $(GDP/TFS)_t = GDP_t^T$ , we can then represent (2) operationally as:

$$D_t^T = a_0 + a_1DRI_t + a_2Y_t^P + a_3R_t^{YT} + a_4R_t^{WT} + a_5GDP_t^T + a_6FER_t + U_t \dots\dots(3)$$

$a_1 > 0, a_2 > 0, a_3 < 0, a_4 < 0, a_5 > 0, a_6 > 0.$

Some economic analysts believe that what is really important in determining the level of deposits in the financial institutions is not essentially the ratio of GDP to total financial savings, instead it is the growth rate of the GDP (g) that should enter into the arguments (See Ezirim, 1999; Alasia, 2003). This being the case, expression (3) can be rewritten as:

$$D_t^T = b_0 + b_1DRI_t + b_2Y_t^P + b_3R_t^{YT} + b_4R_t^{WT} + b_5g + b_6FER_t + E_t \dots\dots(4)$$

$b_1 > 0, b_2 > 0, b_3 < 0, b_4 < 0, b_5 > 0, b_6 > 0.$

Noteworthy however, is that the findings of the above analysts do not confirm the inclusion of the growth-rate in GDP as a very significant explanatory variable of funds' mobilization efforts of commercial banks in developing countries, such as Nigeria.

Further suggestions have been made to the effect of incorporating such variables as the lending rate of interest (LRI), money market rates (treasury bill rate), and the prevailing socio-political trends (SPT) in the country. These are considered more appropriate in a model that has total deposits-to-total output as dependent variable than in the models constructed above. The results of Ezirim (1999) and Alasia's (2003) studies equally support this position. A more encompassing model can be specified to incorporate many more factors such as institutional ratio (IR), institutional habit (IH) and institutional density (ID) as defined in Ezirim (2003). Adding these to the six already identified in expressions (3) and (4) above would result in an equation with at least 10 predictors. Such a model would be over-

parameterized and as such inadvisable in view of the possibility of encountering obvious econometric problems such as multicollinearity, serial correlation, and heteroscedasticity. Thus restricted models become more amenable to easy econometric manipulations. Studies on the effects of environmental factors on financial intermediation by financial institutions have shown that the application of the ratio of deposits to output as regressand in typical financial intermediation models have yielded more consistent and reliable estimates than other regressands ( see for instance Ezirim, 1999, 2002, 2003; and Alasia, 2003). This study will equally utilize the deposit-output-ratio instead of such variables as deposit-total financial savings ratio, or the growth in deposit over time for the purposes of our modeling.

### **The Deposit Output Model: Alternative Consideration**

A previous consideration in defining the dependent variable of the supply side models earlier developed in this paper relates total deposits to the total national savings (TNS) of the country, and somewhat has the aggregate output (Q) or related terms as included arguments. It was basically an attempt at determining the commercial banks' share of aggregate national savings. The essence of the intermediation activities of financial institutions, savings mobilization inclusive, is to positively and significantly impact macro-economic magnitudes, such as aggregate output, for the ultimate growth and development of the economy. This much has been argued in Ojo (1984), Odedokun (1987), Ezirim and Emenyonu (1997), and Ezirim (1999, 2003). Thus, commercial banks' intermediation activities must be related to aggregate output or other economic indicators as the case may be. In our present consideration, the results of operations at the supply side or inflow side of the intermediation function (i.e. total deposits) would be related to total output. This relationship expressing the ratio of total deposits to total output of the country (TD/GDP) indicates the extent to which commercial banks assist in financing aggregate output, and hence growth of the economy. The deposit-output ratio (DQR) is posited to be a true representative of the supply side intermediation performance as it affects the economy.

A critical question that has to be addressed, *inter alia*, would relate to the effect of the forces at play in the financial environment or general economy on the DQR. This suggests that the determinants of the funds mobilization behavior of a typical financial institution can be viewed from the environmental angle. We can identify such financial market environments as: the money and capital markets environments, where the deposit rates, lending rates, and treasury bills rates 'rule the roost'. We can also identify the foreign exchange market environment with the foreign exchange rates as the critical variable. A notable environment that affects the financial markets operations in Nigeria is the socio-political environment. It has been shown by previous studies that this environment considerably affects the demand or outflow side of the intermediation function of the financial superstructure (See

Cookey, 1997a, 1997b; Ezirim, 1999; and Ezirim, Muoghalu, and Emenyonu, 2002). This cannot be posited for the supply or inflow side with same degree of confidence since, to the best of the authors' knowledge, not many studies have addressed the issue adequately.

Making appeals to both theoretical underpinnings and previous empirical studies such as the works of Ndekwa (1991), Uchendu (1993), Ikhida (1993), Ajakaiye and Odusola (1995), and Ezirim (1999), we can underscore five prominent factors as the major predictors of the funds mobilization behaviour of commercial banks. These would include the deposit rate of interest (DRI), lending rate of interest (LRI), the treasury bills rate (TBR), foreign exchange rates (FER), and the socio-political trend index (STI). Functionally, we can represent the ensuing relationship as:

$$DQR_t = f(DRI_t, TBR_t, FER_t, STI_t, LRI_t, \dots) \dots \dots \dots (5)$$

where variables are as earlier defined. A careful look at (5) above would indicate that the L.H.S. (Left, hypotheneus, and side or simply left-hand side) represents the banking habit of the country. This is so following the definition in Ezirim and Muoghalu (2001) that the ratio of total deposits to total output of country measures of the country's banking habit. Invariably, the R.H.S. (right, hypothesis and side or simply the right hand side) can be seen as the determinants of the banking habit. A basic question that needs be addressed relates to the direction and nature of relationship between the DQR and the identified explanatory variables. This requires the determination of the sign implication of their relationships. Taking the predictors in turn, it is postulated that a positive relationship must exist between DQR and DRI. This is not difficult to see, since increases in deposit rates spur depositors and treasury customers of commercial banks to increase their deposits in order to reap higher income. Given that output does not immediately increase at a proportion higher than the total deposits, the DQR will continue to increase. However, the essential point here is that higher deposit rates attract more deposits to the banks, and vice versa. What happens in the money market equally affects the funds mobilization efforts of commercial banks? These banks are major institutional investors in the money market. They dominate the treasury bills market, which is, perhaps, the most important segment of the Nigerian money market, from the investment point of view. Parts of the sourced funds by banks are channeled to treasury investments. When the treasury bills rate increases, it is natural for these banks to increase their holding of the money market instrument, *ceteris paribus*. This behaviour is reversed in case of lower rates. Thus we can identify a positive relationship between TBR and DQR.

Commercial banks are key players in the Nigerian foreign exchange market. In fact, apart from being intermediaries, they have been accused of being more of traders than intermediaries, in their craze for maximum possible profits (see Ezirim, 1999; Ezirim, Muoghalu, and Emenyonu, 2002). These two

positions (traders and intermediaries) equally create a tendency where higher rates of foreign exchange, which implies higher profits, would cause the banks to be more aggressive in funds sourcing. The tendency is for deposits relative to output to increase as the foreign exchange rates increase. The relationship is also positive. The same type of relationship can equally be defined for the socio-political trend index. It has been argued that when stability, congeniality, and peace prevail in a country, intermediation activities would be boosted. The converse is true as well. Thus, a positive relationship should exist between DQR and STI. On the other hand, the relationship between LRI and DQR can be positive or negative depending on the circumstances. In the first instance, the prospects of receiving higher income by virtue of possible higher lending rates would cause bankers to increase their deposit mobilization activity and if possible step up deposit rates in order to source more funds. This would mean a positive relationship between LRI and DQR. However, higher lending rates can equally discourage prime customers from bringing more of their savings as deposits to the banks, since when they come for loans, they are given high rates. It is either they go to other banks who promise lower lending rates or channel their funds into investments other than deposits. If this argument is taken, then the relationship between the DQR and LRI can be either positive or negative. Having defined these a priori sign expectations, we can explicitly rewrite equation (5) linearly as:

$$DQR_t = \omega_0 + \omega_1 DRI_t + \omega_2 TBR_t + \omega_3 FER_t + \omega_4 STI_t + \omega_5 LRI_t + U_t \quad \dots (6)$$

$\omega_1, \omega_2, \omega_3, \omega_4 > 0; \omega_5 >/< 0; \text{ and } \omega_{is} \text{ are parameters.}$

Assuming, it is contended that both the deposit rates (DRI) and lending rates (LRI) are money market variables, and thus undermining the inclusion of the TBR rate, the above expression will reduce to:

$$DQR_t = \varphi_0 + \varphi_1 DRI_t + \varphi_2 FER_t + \varphi_3 STI_t + \varphi_4 LRI_t + E_t \quad \dots\dots\dots(7)$$

where  $\varphi_1, \varphi_2, \varphi_3 > 0; \varphi_4 >/< 0$  are parameters.

This argument is not as plausible as that in expression (6) since these activities namely, deposits mobilization, lending, and investment in money market instruments are independent activities that are carried out by commercial banks.

**The Effects of Previous Supply Side Performances**

It does not immediately appear, quite clearly, that the previous period's deposits would affect the current level of deposits. However, they do have some effect through the channel of rollovers. It is both theoretically and practically true that some depositors who do not immediately have the need to utilize their deposits at the expiration of the duration earlier agreed may want to 'roll over' their deposits to another period. This automatically becomes an "addition" to the level of deposits for the next period. The roll-over practice has become a veritable way of retaining, maintaining, and or generating funds by financial institutions especially when certain attractive features; such as increase

in deposit rates, availability of up-front payment of interest charges, and attachment of possible credit assistance condition; are present.

In view of the rollover effect argument made earlier, the present levels of deposit to a reasonable degree must depend on the previous levels of deposits among other factors. This being the case, the adjustment principle of Nerlove (1958) can be invoked. This however is not suggested in this study by the author, since the resultant partial adjustment model may initially pose some multicollinearity, auto-correlation, and heteroscedasticity problems. Thus, we do not include the resultant lagged independent variable ( $DQR_{t-1}$ ) as argument in the models. Secondly, roll-overs constitute only a part of the previous deposits and not the whole. As a result, we cannot freely assume that the totality of the lagged DQR variable should enter as an argument in the model. Thirdly, we lack enough empirical evidence and theoretical support to prove that the concerned financial institutions behave in the same manner in their funds' mobilization activities as they do in their funds utilization operations. We can only add that non-linear specifications of the models (1) through (7) can be derived as in (Ezirim, 1999).

**Portfolio Considerations of Supply Side Models**

For policy implications, a portfolio analysis can be made using each of the major types of deposits namely, savings (SD), current or demand (DD), and time-deposits (TD), applied econometrically to all or some of the above factors. Thus, assume we hypothesize that each of these types of deposits are a function of the predictors identified in expressions (5) and (6) above. This being the case we have the following equations:

$$SD_t = f(DRI_t, TBR_t, FER_t, STI_t, LRI_t) \dots\dots\dots (8)$$

$$DD_t = f(DRI_t, TBR_t, FER_t, STI_t, LRI_t) \dots\dots\dots (9)$$

$$TD_t = f(DRI_t, TBR_t, FER_t, STI_t, LRI_t) \dots\dots\dots (10)$$

In Nigeria, the recent trends in financial data reporting by the monetary authorities (the Central Bank) favor two broad classification of the total deposit portfolio. The first category group time deposits, savings deposits, and domiciliary account deposits together. Domiciliary accounts are accounts operated and held in foreign currencies. The second classification is the current account or demand deposits. Putting these into consideration, equations (8) through (10) decomposes to two explicit equations:

$$TSDR = \alpha_0 + \alpha_1 DRI_t + \alpha_2 TBR_t + \alpha_3 FER_t + \alpha_4 STI_t + \alpha_5 LRI_t + U_t$$

$$\alpha_1, \alpha_2, \alpha_3, \alpha_4 > 0; \alpha_5 > / < 0 \dots\dots\dots (11)$$

$$DDR = \beta_0 + \beta_1 DRI_t + \beta_2 TBR_t + \beta_3 FER_t + \beta_4 STI_t + \beta_5 LRI_t + E_t$$

$$\beta_1, \beta_2, \beta_3, \beta_4 > 0; \beta_5 > / < 0. \dots\dots(12)$$

Where TSDR is the time-savings-domiciliary-account-deposit-output ratio, DDR is the demand-deposits-output ratio,  $\alpha_{is}$  and  $\beta_{is}$  are parameters, and other variables are as previously defined.

## **Empirical Evidence And Analysis Of Results**

### **Preliminary Information**

For the purposes of this study, our estimation covers only the deposit-output models and their portfolio considerations. The specified predictors are basically those that characterize the environmental angle. This would mean estimating models (6), (7), (11), and (12) above. Further studies by the author would handle the estimation of other supply side models that can be derived from the arguments postulated in the sections prior to expression (5). For one thing there might be the need to first factor out the relevant variables that would best explain the deposit/National savings index. In estimating the four selected models, use has been made of the linear least squares method. Log-linear least squares were also attempted by the authors, but preliminary results confirmed earlier findings by Ezirim (1999) and Alasia (2003) that the relation between DQR and its regressors is more linear than log-linear. Data relating to total deposits of commercial banks; time, savings, foreign currency domiciliary accounts deposits; and demand deposits of commercial banks; GDP of Nigeria, average deposit rates of interest; average lending rates of interest of commercial banks, average dollar/Naira exchange rates; and treasury bills rates are sourced from the Central Bank of Nigeria Statistical Bulletin and Annual Reports / Statement of Accounts for various years. The socio-political trend index is adapted from the previous studies by Udegbulam (1992), Cookey (1997), Ezirim (1999), and Ezirim, Emenyonu and Muoghalu (2002). In these studies, the STI was used to represent the cumulative number of major coups, political and social disturbances over the years treated in a sort of refined dummy manipulations. It must be added that in all the studies that the STI was applied; its behavior has been very consistent and reliable. Thus we have no misgivings in applying it to this study. The sourced data are basically annual time-series for a period covering 1970-1999, which are programmed using the SPSS software credited to Norusis (1988). The summary statistics of the collected data is shown in Table 1; while the estimation results are summarized on Tables 2, 3 and 4 respectively. As in table 1, the mean of the explanatory variables are 5.18, 9.64, 14.14, 7.2, and 11.73 for the DRI, TBR, LRI, STI, and FER while their standard deviation are 4.75, 6.24, 8.29, 3.95, and 24.42 respectively. For the three dependent variables their mean values are 33.47, 37.49, and 29.44 for the TDQR, TSDR, and DDR, while their standard deviations are 49.98, 55.72, and 44.36 respectively. The number of observations in each case is 30 (See Table 1).

Table 1: Descriptive Statistics of Commercial Banks Deposits and Selected Socio-Economic Indicators of Nigeria.

Variables	Mean	Standard Deviation	Number of Observations
Total Deposit Output (TDQR)	33.4667	49.9834	30
Time Savings Domiciliary Accounts Deposit Ratio (TSDR)	37.4893	55.7217	30
Demand Deposit Ratio (DDR)	29.4440	44.36	30
Deposit rate of Interest DRI)	5.1777	4.7504	30
Treasury Bills Rate (TBR)	9.6410	6.2441	30
Lending Rate of Interest (LRI)	14.1403	8.2933	30
Socio-political Trend Index (STI)	7.2000	3.9514	30
Foreign Exchange Rate (FER)	11.7307	24.4236	30

Source: SPSS Computer Print-out

### Global Utility of the Models

The results of the estimation as depicted on Table 2 lend testimony to the overall usefulness or utility of the models constructed. For one thing in both models (6 and 7), the coefficients of multiple regression are 0.990 and 0.988 respectively, indicating that the degree of relationship existing between the supply side of the financial intermediation function of commercial banks relative to aggregate output (DQR) and the identified predictors is at least 98.8%. Further, the computed adjusted coefficients of multiple determinations are 0.997 and 0.973 respectively. By implication, the model significantly explains a good proportion of the variations in the total deposit-total output ratio (DQR). This suggests a reasonable level of explanatory ability to the model. The interactions and or effects of the predictors jointly account for over 97% of the changes in DQR. We are 95% confident in taking the above position judging by the F-ratios of 4.86\* and 10.79\*\* for models 11 and 12, which are significant at 5% and 1% levels respectively. That the models fit the data generated relatively well ascribes a reasonable measure of utility to them. For models 11 and 12, the global statistics describing the effects of the explanatory variables on the individual components of the total deposit portfolio, namely time, savings, and foreign currency deposits, on one part, and demand deposits on the other hand, respectively, showed good estimates as well. The coefficients of regression of 0.985 and 0.986 indicated the existence of high level of relationship between the variables. The adjusted R-squared statistics were 0.964 and 0.966 respectively. The F-ratios of 154.697 and 165.859 are all

significant at 1% level demonstrating a good fit of data utilized. Furthermore, as buttressed in Table 2, the Durbin-Watson (D.W.) statistics are 2.18, 1.9, 2.13, and 2.22 for models 6, 7, 11 and 12 respectively. These values indicate that we cannot accept a hypothesis of no autocorrelation at this preliminary level, putting into consideration the effects of the relatively large sample and few predictors. Also, the nature of the data is another factor of interest. They were basically in the form of rates. This was expected to reduce some attendant econometric problems. Based on these, we are not restrained from taking the next step: analyzing the relative effects of the explanatory variables.

Table 2: Global Statistics of the Estimated Models

<b>Statistics</b>	<b>Model 6</b>	<b>Model 7</b>	<b>Model 11</b>	<b>Model 12</b>
Coefficients of Regression (R)	0.990	0.988	0.985	0.986
Adjusted R-Squared ( $R^2$ )	0.977	0.973	0.964	10.966
F-Equation (F)	4.86*	10.79**	154.697**	165.839**
Durbin-Watson Statistic (DW)	2.18	1.9	2.126	2.222

\*\* Represents significance at 1%, \* Represents significance at 5%.

#### **Analysis of Relative Effects of predictors on total DQR Model**

A very interesting observation that can be made from Table 3 is that both models post very similar results. All the predictors, which they share in common behaved alike. They were all significant mostly at 1% level or less, and were all rightly signed as a priori expected. With the exception of the lending rates of interest (LRI) all other variables are positively related to the DQR. These variables will be taken in turns to enable us draw inference about the behaviour of the supply side financial intermediation of commercial banks in the face of their effects. Before this however, it is the submission of this paper that the contention, which sought to remove the TBR variable as a major argument in the DQR is not sustained by the evidence before us. It proved both significant and rightly signed. Thus, model (6) is preferred to (7). However, in view of their similar results both will be used in the ensuing analysis.

Table 3: Parameter Estimates Results of the Total Deposit-Output Models

<b>Variables</b>	<b>Model 6</b>	<b>Model 7</b>
Deposit rate of interest (DRI)	0.324 (3.56)**	0.320 (3.29)**
Treasury Bills Rate (TBR)	0.451 (2.2)*	- -
Foreign Exchange Rates (FER)	0.528 (5.07)**	0.470 (4.31)**
Socio-Political Trend Index (STI)	0.686 (6.63)**	0.71 (6.41)**
Lending Rates (Expected) (LRI)	-1.001 (-4.31)**	-0.53 (-5.31)**

Parameter estimates represent standardized beta coefficients. T-values are in parenthesis.

\* Represents significance at 5%. \*\* Represents significance at 1%.

### **Deposit Rates of Interest (DRI)**

The standardized beta coefficients of 0.324 and 0.320 and the t-values of 3.56\*\* and 3.29\*\* for models 6 and 7 respectively show that the DRI is positively and significantly related to DQR at 1% level. Thus, as the deposit rates of interest increases, commercial banks enjoy boosted deposit mobilization. This also suggests that commercial banks in order to boost their supply side intermediation activity should employ the pricing strategy since depositors are shown to be highly responsive to deposit rates of interest. This high responsiveness has been demonstrated in a number of occasions in the country, such as during the advent of aggressive and high-pricing finance and mortgage companies between 1990 and 1993. Most commercial and merchant banks joined the band-wagon of high-interest-paying institutions, though to their own peril. The great financial distress of 1995 through 1999 owes its origin largely to that practice. The lesson to be learnt is that caution should always be invoked when employing the high-deposit-rate-payment strategy to attract large deposits. High deposit-rate-of-interest strategy is a double-edge weapon that can sink a bank if proper care is not taken. For instance, when such costly funds are sourced without corresponding high-income-earning and safe investments, the outcome is always catastrophic for the bank. Generally, when commercial banks offer high rates of interest on deposits their behaviour can be described as aggressive funds mobilization behaviour. When, on the other hand, they offer lower rates, their

behaviour becomes consistent with conservative funds mobilization behaviour. The decision to behave aggressively or conservatively predicated on a number of factors. These include the existence of a relatively high-income earning asset or investment outlets to channel the funds; and the volume of additional funds needed to service treasury and other valued customers.

### **Treasury Bills Rate (TBR)**

As in Table 2 the estimated coefficient and t-value of the TBR variable in models 6 are 0.451 and 2.2\*, which is shown to be significant at 5% level or less. It is positively signed as expected. By interpretation high funds mobilizing activity of commercial banks associates with high money market rates; and vice versa. The point that appears to be demonstrated is that when the money market rates increase, commercial banks step up their funds mobilization efforts to take advantage of such increase. This owe to the fact that they are the most important institutional investors in the market. They are legally required to 'invest' a designated proportion of their funds in liquid and cash assets (which includes treasury securities). Thus, whenever they increase their holdings of treasury securities they are behaving as if they want to comply with the requirements of monetary regulation. This behaviour is referred to as prudential behaviour.

### **Foreign Exchange Rates (FER)**

The FER variable was a priori expected to be positively related to the DQR. The results (beta = 0.528 and 0.47; and t-values = 5.07\*\* and 4.31\*\* for models 6 and 7 respectively) confirm the expectations and also indicate high confidence level. Thus, higher exchange rates tend to give very significant boost to funds mobilization operations of commercial banks in Nigeria. What obtains is that banks would not mind going the extra mile in order to secure deposits, which in turn, is 'invested' in the foreign exchange market for super profits. Thus, the major motivation for commercial banks in their foreign exchange dealings is to maximize profit. This motivation has in fact reduced these banks to the status of mere traders in foreign currencies than intermediaries.

### **Socio-Political Trend Index (STI)**

This variable was equally significant and rightly signed in the two models. The beta coefficients were 0.686 and 0.71 while the t-values were 6.63\*\* and 6.41\*\* respectively for models 6 and 7. They are significant at 1% level or less. The implication of these results is that increased political stability and favorable social climate boosts high intermediation activity at the supply side. This result was consistent with the findings of Ezirim and Emenyonu (2002) in their study of the aggregate intermediation activity and environmental factors. Notice that the result also indicates that during regimes of harsh, unstable socio-political conditions, supply side intermediation activities are usually reduced, if not frustrated. The conditions that prevailed during the 1993-1999 period, when a total of

four 'presidents' ruled the country, presented no chance of vibrant intermediation activity. Depositors preferred to hold their money than to deposit with the bank. There were incidences of bank runs, panics, and eventual distress. Ordinarily, banks would thrive better in regimes of stable and favorable socio-political environments when they can aggressively mobilize funds for gainful operations. When conditions are not intermediation-friendly, they simply make every effort to survive. Thus, survival becomes a critical motivation for commercial banks in times of socio-political turmoil, impasse, and instability.

### **Lending Rates of Interest (LRI)**

Ordinarily, expectations of high lending rates of interest ought to cause the commercial banks to increase fund sourcing activity in order to earn higher income from loans. This would suggest a positive relationship between DQR and LRI. However, the results negate these expectations. The beta coefficients for models 6 and 7 are  $-1.001$  and  $-0.53$ , while their t-values are  $-4.31^{**}$  and  $-5.31^{**}$  respectively. Although significant at 1% level or less, the sign implication shows a negative relationship between the two variables. By interpretation, higher lending rate associates with lower intermediation activity at the supply side. It tends to suggest that when commercial banks increase their lending rates, their credit customers, who happen to be major depositors, in frustrations and discouragement react negatively. Perhaps their inability to secure loans at affordable rates go a long way to discouraging them from increasing their patronage of the banks. The psychology of the bank customer seems to be captured as follows: "Why should I continue to make huge deposits to the bank who would not grant me financial accommodation when needed and at reasonable prices?" The condition is worsened by the fact that a good number of commercial banks in the country shy away from lending, since they can reap higher profits by 'trading' in the foreign exchange market. This being the case, any small portion of funds that are allocated to loans and advances would not be enough to satisfy the demands of the customers. Ordinarily, this condition of low supply of funds as opposed to high demand for funds would cause price (LRI) to rise to the frustration of valued customers, who may need financial assistance.

### **Related Effects under Portfolio Considerations**

The relative effects of the explanatory variables in the light of portfolio considerations represented by models 11 and 12 are summarized in Table 4. From the Table, the model (equation 11) having time, savings, and foreign currency deposits ratio as independent variable behaved more closely to the total-deposit-output model represented by models 6 and 7 than the model having demand deposit ratio as regressand model 12). Accordingly, the DRI, STI, and LRI variables were significant at 1% levels in model 11. The TBR and FER variables were significant at 10% level. Again all the variables are rightly signed. By implications, all the variables are important arguments in explaining the time,

savings, and foreign currency deposit behavior of banks in Nigeria. This is true with the total deposit behavior as analyzed earlier. On the other hand, the demand deposit behaviors of the commercial banks are significantly influenced only by the own-deposit rate of interest, lending rates, and the socio-political index. The treasury bills rate and the foreign exchange rates do not exert so great influence as far as demand deposit generations of commercial banks are concerned. However all the variables are rightly signed as expected.

Table 4: Parameter Estimates of Portfolio Effects

<b>Variables</b>	<b>Models 11</b>	<b>Model 12</b>
Deposit Rate of Interest	0.332 (3.269)**	0.445 (4.532)**
Treasury Bills Rate	0.380 (1.814)+	0.224 (1.106)
Foreign Exchange Rate	0.173 (1.813)+	0.069 (0.753)
Socio-political Trend Index	0.828 (9.052)**	0.932 (10.537)**
Lending Rates (Expected)	-0.766 (-3.099)**	0.746 (-3.121)**

Parameter estimates are standardized beta coefficients. T-values are in parenthesis. \*\*Represents significance at 1%; \* Represents significances at 5%; + Represents significance at 10% respectively.

### **Concluding Remarks And Recommendation**

From the evidence of the estimated models, the total deposit-output ratio (DQR) is a positive function of DRI, TBR, FER, and STI; and a negative function of LRI. All the variables are significant at conventional levels. The same nature of relationship (sign implication) was established between the explanatory variables and the time, savings, foreign currency deposit ratio and the demand deposit ratio. Unlike the former where all the variables are significant, only three were revealed significant in the latter model. They are the deposit rate of interest, socio-political trend index and the lending rate of interest. In the light of the relevant analysis of the implications of these results, certain behavioral patterns are highlighted. In the deposit money market, the identified behavior is consistent with aggressive funds mobilization behaviour. In the face of the effects of treasury money market environment, commercial banks' behaviour is congruent with the prudential behaviour. In the foreign exchange market, the behaviour generally seems to be consistent with profit maximization. This

motivation perhaps accounts for their behaviour in the lending market when they allocate little or no funds for loans and advances. The bulk of their funds go to the foreign exchange market for windfall super-profits.

In the light of these results and identified behaviors, some policy recommendations are implicated. First, since deposit rates of interest associates strongly with supply side intermediation performance, commercial banks can cautiously adopt selective rates increase for its customers, where valued and high net worth customers are offered high rates that will attract them to place more of their funds with the bank. Competitive rates can be left for all other customers. This implies a conscious segmentation of the deposit money market. In the long-run, the bank may see itself concentrating on a lean portfolio of high-net-worth customers who will more than satisfy their deposit needs. This appears to be the incipient orientation of the earliest merchant bankers who came into the Nigerian banking scene in the early 1970s. This tradition has since been forsaken. This paper advocates its reinstatement for any bank who must distinguish itself among the comity of banks in the country.

Secondly, that high funds generation potentials associate strongly with high exchange rates and treasury bills rate implies that favourable price conditions in the foreign exchange and treasury money markets would be an attraction to embark upon aggressive marketing and sourcing of funds. The policy actions in these respects are two fold. First, the banks can jointly lead regular delegations through the Bankers' Committee to the Central Bank of Nigeria and the government to ensure that their interests in these and other markets are taken care of before any monetary policy is made or changed. By so doing, they would ensure that the market conditions remain favourable. Having guaranteed this, the other side of their action is to unrelentlessly embark upon aggressive marketing of customers for funds. To ensure success, a number of attractive services can be attached to deposits such as online cash management services of the bank. The banks in the country are currently wary of the risks associated with open internet access to their operations. As an incentive, however, the few valued high net worth customers can be allowed this access. Transactions through the telephones can equally be allowed for the customers' maximum convenience. Customers appreciate speed of delivery and accuracy of accounts management so well that they would stick with and happily reward any bank that will guarantee them.

In the interest of the macro economy, the policy of abandoning their traditional banking operation, lending, in preference to trading in the foreign exchange market should be reviewed and moderated. Being banks, they are expected to play key roles in funding economic growth and development. Thus, more and more funds should be allocated for preferred economic lending to relevant sectors of the economy. To help in causing this to happen as expected, the CBN may have to revisit the mandatory

credit guidelines again. Goal-driven guidelines with a commercial face can be beneficial to both the banks and the economy.

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Appendix: Commercial Banks Deposits and Environmental Indicators

Year	DRI	TBR	FER	STI	LRI	TSDR	DDR	TDQR
1970	4.00	4.00	.71	3.00	7.00	.62	.53	.57
1971	4.00	4.00	.71	3.00	7.00	.57	.43	.50
1972	4.00	4.00	.69	3.00	7.00	.66	.49	.57
1973	4.00	4.00	.66	3.00	7.00	.79	.58	.69
1974	2.00	4.00	.66	3.00	7.00	1.18	.87	1.02
1975	2.00	3.25	.62	3.00	6.00	1.97	1.58	1.78
1976	2.00	2.50	.63	4.00	6.00	2.23	2.46	2.34
1977	2.00	3.00	.63	5.00	6.00	2.35	3.10	2.73
1978	2.00	4.00	.65	5.00	7.00	2.92	3.03	2.97
1979	2.50	4.00	.65	5.00	7.00	4.06	3.58	3.82
1980	1.50	5.00	.56	5.00	7.00	5.37	5.04	5.21
1981	1.75	5.00	.55	5.00	7.00	8.23	6.93	7.58
1982	2.75	7.00	.64	5.00	10.25	9.75	7.38	8.57
1983	2.50	7.00	.67	5.00	10.00	12.17	8.82	10.50
1984	3.00	8.50	.75	5.00	12.50	14.91	10.07	12.49
1985	.25	8.50	.80	6.00	9.25	15.31	10.22	12.77
1986	1.00	8.50	.90	7.00	10.55	16.16	9.36	12.76
1987	3.50	11.75	3.32	8.00	17.50	21.33	11.31	16.32
1988	2.00	11.75	4.19	8.00	16.50	23.66	13.72	18.69
1989	10.40	17.50	5.35	8.00	26.80	20.33	12.20	16.27
1990	6.70	17.50	7.65	8.00	25.50	25.67	17.26	21.47
1991	5.72	15.00	9.00	8.00	20.01	32.09	24.15	28.12
1992	13.70	21.00	9.75	9.00	29.80	42.98	34.14	38.56
1993	19.43	26.90	19.66	9.00	36.09	60.52	49.92	55.22
1994	7.50	12.50	21.88	11.00	21.00	76.18	64.49	70.34
1995	7.83	12.50	21.88	12.00	20.18	96.12	76.77	86.45
1996	7.87	12.50	21.88	14.00	20.13	110.68	89.60	100.14
1997	7.53	12.50	21.88	14.00	17.86	127.45	115.29	121.37
1998	12.50	13.08	95.00	15.00	18.29	152.33	125.94	139.14
1999	13.40	18.50	99.00	17.00	21.00	236.09	174.06	205.08
2000	14.00	na	110.00	19.00	24.50	294.74	278.70	286.72
2001	15.00	na	116.00	21.00	25.00	397.04	356.36	376.70