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## Bank Capital Structure, Liquidity and Profitability Evidence from the Nigerian Banking System

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### Abstract

This study presents empirical evidence of the effect of bank capital structure and liquidity on profitability using Nigerian data for the period 1980-2006 studied. The data were analyzed using descriptive statistics and the auto-regressive distributed lag (ADL) model. Specifically, the study applied data on an OLS methodology that incorporated unit root tests for stationarity and co-integration. We find a positive influence of cash reserve ratio, liquidity ratio and corporate income tax; and a negative influence of bank credits to the domestic economy, savings deposit rate, gross national savings (proxy for deposits with the central bank), balances with the central bank, inflation rate and foreign private investments, on banking system profits. We equally observe that liquidity ratio leads banks' profits in Nigeria, closely followed by balances with the central bank and then, gross national savings and foreign private investments, followed suit in that order. We therefore recommend a drastic reduction in balances with central bank, liquidity ratio and cash reserve ratio profiles by the monetary authorities to enable banks create adequate credits and release more money into circulation for effective financial intermediation to occur; ensure effective and efficient management of bank liquidity by banks to moderate levels so as to optimize profitability, and curb perennial unethical banking practices such as directly engaging in trading, importation and exportation of goods, and other speculative deals, instead of lending to the domestic economy.

**Keywords:** Bank Capital Structure, Liquidity, Profitability, Nigerian Banking System, Bank Credits, Savings Ratio, Liquidity Ratio

### Introduction

Capital structure refers to the various financing options of the asset by a firm. A business concern can go for different levels of the mixture of equity, debt and other financial facilities with equity having the emphasis on maximizing the firm's value. Capital structure affects the liquidity and profitability of a firm (Rahemen, Zulfiqar and Mustafa, 2007). Bank for International Settlements (BIS) in July 1988 specified two forms or categories capital can be divided into, for banks constituting their capital structure as *Tier 1* (or core) capital comprises shareholders' equity, non-cumulative

participating preference shares and disclosed reserves (that is, it comprised equity or common stock capital, preference share capital and retained earning capital), *Tier 2* (or supplementary) capital comprises revaluation reserves, general provisions, hidden reserves, subordinated term debt and certain hybrid debt/equity instruments (i.e. this type is made up of general and all kinds of reserves and debt capital or debentures). It is required that banks should have capital equal in value to at least 8% of total risk-weighted assets. Within this ratio, at least a half of the capital must be for the core variety" (Goache, 1990). This recommended composition assures an enhanced liquidity profile for the particular bank, in question.

Nonetheless, not all business firms use a standardized capital structure hence they differ in their financial decisions in various terms. It is a difficult decision for the firms to determine the capital structure in which risk and cost are minimum and that can give high profits and as such can raise the value of shareholders and/or maximize profit (Raheman, Zulfiqar and Mustafa, 2007). This difference of choices about the financing decisions gives rise to various capital structure theories.

These theories try to justify and explain the differences of the capital structure across regions and overtimes. Empirical studies dealing with capital structure are not recent (Taggart, 1977; Marsh, 1982; Jalivard and Harris, 1984; Titman and Wessels, 1988 and Okafor and Harmon, 2005). The latter authors made a significant contribution in formulating and testing the determinants of capital structure as identified by theory. There exist other studies that have addressed the nature of capital structure decisions, Marsh (1982), Harris and Raviv (1991), Rajan and Zingales (1995), Chirinko and Singha (2000); Frank and Goyal (2003); Uremadu and Efobi (2008) and Raheman, Zulfiqar and Mustafa (2007). Two outstanding theories present a clear direction and firm behavior about debt and capital structure. These are trade-off theory and pecking order theory.

According to trade-off theory propounded by Miller (1977), if firms are more profitable they prefer debt financing as compared to equity for the sake of profit. This posture is driven by three forces (Raheman, Zulfiqar and Mustafa, 2007); (1) More debt in a firm's capital structure allows for more tax benefits as their tax liabilities come lower and even in some cases it is waved off. Some firms having more profits go for more debts rather than equity. (2) If a firm has a low profit than there exists greater chances of bankruptcy. So if the firm takes more debt there is more chances that it is bankrupt and as a result of this, investors cannot have trust on it. On the other hand, if a firm has more profits than there exists less chances of bankruptcy so that investors trust rises and the firm tends to earn more profits. (3) The agency cost which has to be borne by investors (shareholders) is a cost in form of interest rate because creditors always check the position of the company and monitor the management. So, if a firm has a good image that it can get loan at a lower cost because creditors are not worried about bankruptcy and their agency cost is very low, it can acquire more debt.

However, the banking firm sees debt financing from different angle in that it cannot do without acquisition of debts. The bank cannot operate without greater and continuous mobilization of different categories of deposits (savings deposits, time deposits, demand deposits) into its pool of funds from which it allocates funds to lending (loans and advances) and to other liquidity and profitability yielding assets existing in its portfolio of assets (Uremadu, 1998, 2000). The banking firm must live on borrowed funds (short-term and long-term debts) to be in business. How it does manage these debts becomes the central issue for bank management to pilot and the impact this will have on bank profitability (and or liquidity) becomes the central issue of research in this study.

According to Pecking Order Theory, developed by Myers and Majluf (1984) and Myers (1984), firms having high profits, tend to attain low debt profile because when firms are more profitable their first priority is to generate financing through retained earnings because they can maximize the value of the existing shareholders. If retained earnings are not sufficient, the firms can then go for debt and if further financing is required they issue new equity. The retained earning is preferred because it almost has no cost, but if the external resources are used for financing like issuance of new shares it may take very high cost. The Pecking Order Theory is as a result of information asymmetries existing between insiders of the firm and outsiders (Raheman, Zulfiqar and Mustafa, 2007). The model leads managers to adopt their financing policy to minimize these associated costs. It means that they will prefer internal financing to external financing and very risky debt to equity.

An important issue to note at this juncture is that despite the large tax advantage enjoyed by debt, why do firms still have low leverage ratios? This issue aggravated the early research on agency theory (Jenson and Meckling, 1976 and Myers, 1997); work on information asymmetries (Myers and Majluf, 1984; Miller, 1977; Myers, 1984; Leland, 1998 and Graham, 2000). The conclusion is that bankruptcy costs alone is small to offset the value of the shields, and they also conclude that agency costs must be included into the cost-benefit analysis to explain capital structures of corporate entities.

In both theories, investment opportunities tend to make firms to use less debt than equity. However, banks cannot do without higher debt acquisition in their capital mix by way of deposit mobilization. As the capital structure has many dimensions such as leverage, size, growth, etc, it is very difficult to state which portion is the best choice to adopt in order to maximize a firm's value to its shareholders as well as maximize its corporate profitability. There is no final decision that profits have positive relations with debt or retained earnings. It is still a mutable point! However, uniqueness of the firm's product also influences its capital structure posture. In addition, the industrial classifications also impact on the capital structure as the variety of intensity of the basic factors may also influence the structure. In the case of the banking firm which largely depends on debt or external sources of funds and their equity or capital funds to finance lending and other investments, there is need to ascertain which effect this kind of capital structure would have on bank profits (Uremadu, 2000). Furthermore, the duration of financial requirements also induces firms to go for either debts or equity. The banking firm being a service industry has no other option but to mobilize both short-term and long-term funds to run both its lending and investment activities. This, of course, will be with an eye on attaining a compromise point between getting adequate liquidity and getting adequate profitability for the particular banking firm in question (Uremadu, 2000).

Therefore the central issue before a financial manager is to determine the appropriate mix between equity and debt for his firm. The mix of debt and equity is known as the firm's capital structure. A financial manager must strive to achieve an optimum mix or the optimal capital structure for his or her firm; that is, the capital structure which would maximize the market value of the firm's shares and assure adequate liquidity. The use of debt affects the return (profitability) and risk to shareholder; it may increase the return to equity funds but (it) always increases its risk. Thus, a proper balance has to be struck between the need for return and the danger of risk. When the shareholders' return is maximized and risk is minimized, the market value per share (eps) will be considered optimum (Okafor and Harmon, 2005).

This study is an attempt to establish the relationship between corporate capital structure and the profitability-cum-liquidity of the banking system in Nigeria, and to ascertain to what direction the

impact has been on the total banking system profits within the period under study. Although there exists a number of studies on the determinants of capital structure of corporate enterprises but as far as the impact of capital structure on banking profits is concerned there exists a few globally and in Nigeria, in particular, none exists to our knowledge, hence necessitating this study. At the end of research, we should be able to determine direction of impact.

### Literature Review and Theoretical Framework

The literature review will cover theoretical and conceptual framework on which the study leans, and a brief assessment of what other authorities have documented on the subject of research. Below we discuss the theoretical underpinning for the work in hand.

### Theoretical Framework

The capital structure of a firm refers to the relativities among the components of the financing mix. It could be analyzed either from the broad perspective of only the elements in the financing mix or from the narrower perspective of only the elements of long-term financing. In relationship to the latter, the capital structure would be defined as the ratio of long-term debts of a firm to its equity financing. Traditional financial economists have argued that the financial structure of a firm has an impact on its profit performance (Okafor and Harmon, 2005).

The impact of financing decisions on the cost of capital in its entirety should be determined on the basis of minimizing the overall cost of capital and maximizing the value of the firm. Taking into consideration the tax shield advantage of debt, it should have a positive impact on the value of a firm and should also help to reduce the overall cost of capital to the firm. On the other hand, it should be realized that a firm cannot *ad infinitum* reduce its overall cost of capital by employing more and more debts (Modigliani and Miller, 1958 and Uremadu, 2004). A point has to be reached beyond which the use of debt capital becomes expensive hence unprofitable because of the increased risk of excessive debt to creditors and shareholders. Increases in the degree of leverage (the degree of dependence on long-term debts as capital source) invariably increases the risk to creditors which induces them to demand for higher interest rates as a compensation for higher risks they have assumed. Indeed, at a point when creditors feel that their position has become extremely risky, they are reluctant to grant more loans to a firm. Moreover, excessive use of debt makes the shareholders' position both risky and shaky in the business. This has the gross effect of increasing the overall cost of equity to the firm. In essence, up to a point, the overall cost of capital decreases with the level of debt financing but beyond that point the cost of capital would start increasing. Beyond that point, it would thus be unwise to employ more debts into the firm. Conceptually, therefore, there would be a combination of debt and equity (a capital structure) which minimizes the firm's overall cost of capital and maximizes the market value per share. Hence if the business earns more on capital employed than it has to pay for the use of funds, the difference helps to increase the return on equity. This theoretical concept seems to favour capital structure of the banking firm.

The literature is replete with empirical findings of various authors on the main issue of research as earlier said. The controversy has always been whether or not there are benefits that can be gleaned from adopting any particular capital structure. For example, the capital structure of a typical banking firm is very debt (deposit) expansive. This controversy still looms large. However, it is obvious that there exist some obvious advantages in the use of debt finance. This study explores the extent of these advantages.

### Empirical Studies

Many financial economists have studied capital structure from different viewpoints and in different global environments. The following ones are very interesting and useful for our study.

Christopher, Schafer and Talavera (2006) in their study find that there exists strong effect of short-term and long-term debts on profitability. According to them, the organization which prefers financing through long-term debts has low profitability and on the alternative, if a firm uses short-term financing, it earns more profits. In this particular study in which their data covered 1988 to 2000 period, they were able to prove a hypothesis that firms using short-term debt financing are relatively more profitable than the firms using long-term debts. This view tends to favour commercial banks' sources and uses of funds. Demand deposit liabilities are short-term sources of funds to banks and through various short-term channels banks lend short-term funds to rake in huge profits (Lockett, 1984).

Pandey (2004) explains the relationship between capital structure and market structure; and capital structure and profitability. The results suggest that capital structure and market structure have cubic relationship that at lower and high range of Tobin Q ratio firms are using high debt; and at medium range, they use less debt. This is due to agency costs and bankruptcy costs because when firms take more debts there are chances of bankruptcy because the firms might not be able to repay the debts in future. Regarding relationship between profitability and capital structure they conclude that there is a saucer-shape relationship between capital structure and profitability because of the interplay of agency costs, costs of external financing and the interest rate and tax shield.

Andrea and Mateus (2003) while conducting a study on capital structure choices adapt Booth *et al* (2001) which is evident of the fact that the capital structure decisions of firms in developing countries are influenced by the same variables as in developed countries. They tested the same variables for Portugal and Hungary where firms have a combination of debt and equity in their capital mix. They discover that although these factors are the same but differ, to some extent, because the ratios are affected by country specific factors such as inflation, status of capital market and growth rates of the country. They further verify the Pecking Order Theory, asymmetric information, and agency cost theories and conclude that the more profitable companies have lower debt ratios, which conform to the Pecking Order Theory.

Drobtz and Fox (2005) discuss determinants of capital structure and two hot issues: Trade-off theory and Pecking Order Theory. In trade-off, there exist three main factors, agency costs, tax shields and bankruptcy costs. Due to these three factors more profitable firms use more debt than equity. In Pecking Order Theory, more profitable firms use less debt than equity because firstly, they use retained earnings, then use debt, and at third option, they use equity financing. They are of the view that if investment opportunities abound then after using retained earnings the firms should use debts to exhaust these opportunities, otherwise there would be no need to take debts.

Eriotis, Frangouli and Neokosmides (2002) investigate the relationship between debt to equity ratio and firm's profitability. They also consider the level of firm's investment and degree of market power and discover that those firms that prefer to finance their investment activities using equity capital are more profitable than firms who finance by using borrowed capital.

Hadlock and James (2002) while assessing the financial slack provided by the banking system to the companies, report that the decision of financing of corporate assets through debt or equity is mainly influenced by the market evaluation of the shares thus confirming the pecking order hypothesis. After analyzing the financing decision of 500 non-financial companies, the authors

conclude that the firms chose bank financing because market interprets loans and advances as a positive step because firms prefer that financing choice which results into high returns.

Mesquita and Lara (2003) examine the relationship between capital structure and profitability of some Brazilian firms. They are of the view that there is a difficult decision as to whether company should use debt or equity and this decision becomes more difficult when a company is operating in an unstable environment and that this problem occurs largely in Brazil. They also examine effect of short and long-term financing on return on equity (ROE). They conclude that in the short-run there exists inverse relationship between debt and profitability. Although they fail to indicate how significant is this relationship in either direction of impact.

Booth, Aivazian, Demirguc-Kunt and Maksimovic (2001) assess the portability of capital structure theories across developing countries with different structures of economic and financial institutions. After analyzing firms in 10 countries they reveal that the same variables are pertinent in making decision about capital structure across the countries studied irrespective of the fact that the countries have different structures of institutions and development stages. However, there exist country peculiarities at work which create differences in the outcomes of the decisions regarding capital structures of firms studied. They conclude that however, some structures are portable across different countries but most of the things are to be done at local levels which are quite different due to the structure and country factors such as growth rate, inflation, and others.

Raheman, Zulfiqar and Mustafa (2007) investigate effect of capital structure on the profitability of firms listed on Islamabad Stock Exchange using Pearson's correlation coefficient and regression analysis on 94 non-financial firms for period 1999-2004 on a pooled OLS model. They find that capital structure has a significant effect on the profitability of these firms. Specifically, they discover that long-term debts have negative relationship with profitability while equity is positively correlated with profit. They therefore subscribe to a balanced financing mix to avoid unforeseen future losses.

In Nigeria, Uremadu and Efobi (2008), examine impact of capital structure on corporate profitability in Nigeria using 10 manufacturing companies for 5 years (2002-2006) using Pearson's correlation coefficient and OLS regression model on a pooled time series data. They find that ratio of long-term debt to equity capital (gearing) has a positive and significant impact on return on capital employed (ROCE). They recommend that company management should properly manage composition of their capital structure more especially as it relates to long-term debts and equities including corporate reserves.

All the above reviewed empirical studies provide us with a solid background for the study as well as give us idea regarding capital structure and profitability at the global level. These works have also given us the results and conclusions of those researches that have already been conducted on a similar field of study for different countries and environments and from different perspectives. Drawing from those studies conducted in different countries of the world, we shall now develop our own methodology for research.

### **Methodology of Research**

The methodology deals with model specification, data requirements and sources of data. Two analytical tools will be used in the study namely: descriptive statistics and multiple regression analytical models. Multiple analytical models will be used to estimate the relationship between level of bank profits (proxied by operating maximum lending rate) and the identified financial and macroeconomic variables of influence such as savings deposit rate, bank credits to the domestic

economy, gross national savings, cash reserve ratio, balances with central bank, liquidity ratio, inflation rate, foreign private investment and corporate income tax. While the descriptive statistics will be used mainly to conduct economy analysis in relation to macroeconomic variables of interest. Empirical implementation of the model will make use of a time series data covering 1980-2006 to determine the effect of capital structure on bank profits in Nigeria. The study will apply the data on an ordinary least squares (OLS) method which will incorporate other error-correction approaches like unit root tests using the augmented Dickey-Fuller (ADF) and the vector error-correction estimates where necessary, to conduct our investigations and analysis.

### Model Specification

We shall adopt and modify the models of Raheman, Zulfiqar and Mustafa (2007), and Uremadu and Efobi (2008), in determining the impact of capital structure and liquidity on the banking system profitability in Nigeria. The relevance of both models is that they fit perfectly well into the present study. The major difference of our own model from theirs is that it is applied to financial services sector while theirs were applied to manufacturing sector. It should be noted that banks depend virtually on debt (demand deposit liabilities) for its sources of total capital employed to fund its lending and other liabilities unlike the other corporate firms in the manufacturing sectors of the economy. Hence the need for the modification in our model. The multivariate specification of this probabilistic model will assume the form of:

$$BSP_{it} = \beta_0 + \sum_{i=1}^n \beta_i X_{it} + e \quad (1)$$

Where:  $BSP_{it}$  = dependent variable representing the measure of banking system profitability proxied by the maximum lending rates for the period 1980-2006;  $\beta_0$  is the regression constant;  $\beta_i = b_1, b_2, \dots, b_9$  is the change coefficient for  $X_{it}$  variables and  $X_{it} = X_1, X_2, \dots, X_9$ , are the different independent variables for profitability or otherwise of the banking system while  $t$  is the time period (i.e.  $t = 1, 2, 3, \dots, 27$  years). The above general least square equation (1) will now be restated with specified variables thus;

$$BSP = f(TBCRED, SDR, CRR, GNS, TBWCBN, LR, INFR, CFPI, CIT) \quad (2)$$

(+)        (-)    (-)    (+)        (-)    (-)    (-)    (-)    (-)

The final equation to be estimated from equation (2) is:

$$BSP = b_0 + b_1 TBCRED - b_2 SDR - b_3 CRR + b_4 GNS - b_5 TBWCBN - b_6 LR - b_7 INFR - b_8 CFPI - b_9 CIT + e \quad (3)$$

Where:

BSP = banking system profits proxied by maximum lending rate (%);

TBCRED = Total banking system credits to the domestic economy as % of GDP at current market price;

SDR = Savings deposit rate (%);

CRR = Cash reserve ratio (%);

GNS = Gross national savings as % of GDP at current market price;



TBWCBN = Total balances with the Central Bank of Nigeria as % of GDP at current market price;

LR = Liquidity ratio (%);

INFR = Domestic inflation rate (%);

CFPI = Cumulative foreign private investment as % of GDP at current market price;

CIT = Corporate income tax as % of GDP at current market price;

e = random error term.

### Data Requirement, Sources and Limitations

Secondary data will be utilized to estimate the above model. The data were extracted from different sources which included *Central Bank of Nigeria Statistical Bulletin Vol. 17* (Dec. 2006), and *Annual Reports and Statement of Accounts* (various), Financial Statistics Computed from Deposit Money Banks Returns and Commercial Banks' Selected Performance Indicators, by the Central Bank of Nigeria Research Department (2006) as cited in the above already indicated *CBN Statistical Bulletin Vol.17*; as well as the *Nigerian Annual Abstract of Statistics* (2006), published by the National Bureau of Statistics (NBS), Abuja.

### Estimation Method

The above model will be estimated for the nine macroeconomic explanatory variables for 27 years (1980-2006) with maximum lending rate (mirror of bank profitability) as the dependent variable. Two additional reduced model equations to model equation 3 were sequentially estimated. That is, variables that were found to be less significant were dropped from the subsequent estimation using OLS estimation technique in each case (see Uremadu, 2006). Besides, most macroeconomic time-series data display non-stationarity and can be classified as integrated or near integrated (see Olusoji, 2003). Regressing with these variables leads to danger of non distributed parameter estimates which make influence much more difficult. The first difference transformation I (1) eliminates this linear trend, which makes the series stationary. Therefore while estimating models we will also test for the unit root characteristics of the variables and establish to which extent the variables are co-integrated. This will be done using the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) (see Engel and Granger, 1987). This application will remove non-stationarity of some of these variables contained in the model to enable better results to be achieved.

These two reduced form model equations were transformed from equation 3 and are stated below as;

$$BSP=b_0 + b_1TCRED - b_2 SDR - b_3CRR + b_4GNS - b_5TBWCBN - b_6LR -b_7CFPI - b_8CIT + e \quad (4)$$

(Here, the macro-economic instability factor proxied by domestic inflation rate has been eliminated from equation to form model equation 4). In reduced form model equation 5, both domestic inflation rate (INFR) and corporate income tax (CIT) were dropped as insignificant variables to get the new model;

$$BSP=b_0 +b_1TCRED-b_2SDR - b_3CRR + b_4GNS - b_5TBWCBN - b_6LR - b_7CFPI + e \quad (5)$$

These three model equations (3), (4), (5) will now be estimated to observe impact of the stated variables on banking system profits in Nigeria within the period studied.

**Model Estimation, Results and Discussion**

These will be outlaid and discussed below.

**Presentation and Analysis of Results of Stationarity Tests**

Tests for the stability of all the variables used in the model are presented in Table 1 below.

Table 1. Unit Toot Test Results for Stationarity

| Variable        | DF  | ADF (test critical values) | t-Statistic | P-Values* | Order of integration |
|-----------------|-----|----------------------------|-------------|-----------|----------------------|
| Δ BSP (-1,1)    | 1%  | -3.752946**                | -4.353309   | 0.0026    | I(1)                 |
|                 | 5%  | -2.998064***               |             |           |                      |
| Δ TBCRED (-1,2) | 1%  | -3.808546**                | -5.093425   | 0.0006    | I(1,2)               |
|                 | 5%  | -3.020686***               | -2.943003   | 0.0552    | I(0)                 |
|                 | 10% | -2.635542****              |             |           |                      |
| Δ SDR (-1,2)    | 1%  | -3.752946**                | -4.892791   | 0.0007    | I(2)                 |
|                 | 5%  | -2.998064***               |             |           |                      |
| Δ CRR (-1,1)    | 1%  | -3.75294.6**               | -64.88988   | 0.0000    | I(1)                 |
|                 | 5%  | -2.998064***               |             |           |                      |
| Δ GNS (-1,2)    | 1%  | -3.752946**                | -9.264301   | 0.0000    | I (2)                |
|                 | 5%  | -2.998064***               |             |           |                      |
| Δ TBWCBN (-1,2) | 1%  | -3.752946**                | -4.341083   | 0.0026    | I (2)                |
|                 | 5%  | -2.998064***               |             |           |                      |
| Δ LR (-1,2)     | 1%  | -3.752946**                | -5.193765   | 0.0004    | I (2)                |
|                 | 5%  | -2.998064***               |             |           |                      |
| Δ INFR (-1,2)   | 10% | -2.638752****              | -2.726706   | 0.0849    | I (2)                |
| Δ CFPI (-1,1)   | 5%  | -2.991878***               | -3.659288   | 0.0119    | I (1)                |
|                 | 10% | -2.635542****              |             |           |                      |
| Δ CIT (-1,2)    | 1%  | -3.752946**                | -5.516404   | 0.0002    | I (2)                |
|                 | 5%  | -2.998064***               |             |           |                      |

Source: Authors' Calculations

**Key:** \* MacKinnon (1996) one sided p-values; \*\* Significant at 1% level; \*\*\* Significant at 5% level; \*\*\*\*Significant at 10% level.

For the ADF statistics (the 95% critical values are shown after each t-statistic at the next column), the null of non-stationarity is accepted if the reported statistic is greater than (One Tail Test) the critical values. Results show that when expressed in levels, nine of the variables (BSP, SDR, CRR, GNS, TBWCBN, LR, INFR, CFPI, CIT) are non-stationary except one, TBCRED which is stationary at 10% degree of freedom. Differencing once however, induced stationarity in four (BSP, CRR, CFPI, TBCRED) at 1%, 5%, 10% degrees of freedom while (SDR, TBWCBN, GNS, LR, INFR, CIT) were differenced twice before they became stable at 1%, 5%, 10% degrees of freedom.

To ascertain if there exists a co-integrating relationship between the explanatory variables, the model equation 3 was estimated with the variables at their levels. The residuals were found to be

stable indicating the existence of a co-integrating relationship. Using the MacKinnon (1996) critical values for co-integration test, we reject the null hypothesis of no co-integration and conclude that the variables are co-integrated at 5% level of significance. This motivated development of an OLS regression model with an inbuilt random error term (e). In particular, we used the E-Views Computer Package for the purpose of our programming which yielded results for the regression coefficients and associated statistics.

### Analysis of Results

After normalizing the structural equation on change in banking system profits (BSP) in vector auto-regression (VAR) of the current and lagged first and second differenced of the variables as the case may be, and then starting with an over-parameterized model based on the general-to-specific methodology, regression was conducted. Table 2 below is the empirical results for the OLS modeling of the determinants of the banking system profitability (proxy for return on equity) in Nigeria.

Table 2. Modeling BSP Function by OLS

| Variables                 | Coefficient | Std error | t-Statistic  | Prob.  |
|---------------------------|-------------|-----------|--------------|--------|
| b <sub>0</sub> (Constant) | 12.30570    | 9.580861  | 1.284405     | 0.2185 |
| TBCRED                    | -0.058399   | 0.103317  | -0.565244    | 0.5803 |
| SDR                       | -0.374198   | 0.647932  | -0.577527    | 0.5722 |
| CRR                       | 0.001699    | 0.002198  | 0.772871     | 0.4516 |
| GNS                       | -0.307857   | 0.288574  | -1.066824    | 0.3029 |
| TBWCBN                    | -0.061457   | 0.036317  | -1.692215*** | 0.1113 |
| LR                        | 0.102072    | 0.046937  | 2.174646**   | 0.0461 |
| INFR                      | -0.01783862 | 0.193862  | -0.092268    | 0.9277 |
| CFPI                      | -0.070215   | 0.07920   | 0.885541     | 0.3898 |
| CIT                       | 0.045690    | 0.446527  | 0.102322     | 0.9199 |

R<sup>2</sup> = 68.30%, R<sup>2</sup> Adj. = 49.28%, = 1.30, F-stat = 3.591346\*, Prob (F-stat) = 0.014174

Source: Author's Calculation

Key: \* Significant at 1% level; \*\* Significant at 5% level; \*\*\*Significant at 10% level.

Looking at the results shows that liquidity ratio (LR) had the greatest significant and positive impact on banking system profitability and therefore leads bank profits in Nigeria, followed by total balances with the central bank (at 5% and approximately 10% levels of significant), respectively. Results also reveal that four of the variables (SDR, TBWCBN, INFR, CFPI) maintained negative and right direction of sign while five (TBCRED, CRR, GNS, LR, CIT) had wrong signs. In general, the descriptive statistics for this model (R<sup>2</sup>, F-Stat and DW-stat) are within acceptable bounds. Further, results of the diagnostic tests indicate absence of error of auto-correlation and conditional heteroscedasticity as value of DW test is tending to 2, hence errors are normally distributed.

Specifically, the negative and insignificant influence of total bank credits (TBCRED) shows that banks have not been extending enough credits (loans and advances) to the domestic economy to raise returns on capital employed or profitability (BSP). Lending is a major source of bank profits (Lockett, 1984) and since TBCRED could not have a positive impact on bank profits mirrored by

operating maximum lending rate, then credit must have been restrained, and bank performance in this regard has become suboptimal (Uremadu, 2000). Furthermore, comparing liquidity ratio (LR) results with bank credit (TBCRED) results reveal that excess liquidity has been converted into lending and investments in real terms to rise profitability hence liquidity ratio has exhibited a positive impact on bank profits instead. It does appear excess liquidity is absent in the Nigerian banking system going by these results.

Again, comparing results of savings deposit rate (SDR) and bank credit (TBCRED) with both attaining negative signs seriously portend that neither adequate savings has been mobilized for lending nor enough credits been extended to the real sector to influence growth of the economy.

Both cash reserve ratio (CRR) and liquidity ratio (LR) are expected to always have an inverse relationship with bank profits. That both maintained positive outlook with profitability as observed from our results tends to suggest that excess liquidity never really existed in the Nigerian banking system within the period covered. It further shows that Nigerian banks have been optimizing their liquidity (excess cash) via investments to raise their profitability. Otherwise it will suggest that serious distortions exist in the Nigerian banking environment. CRR is internal to the banks. If it decreases, there exists no excess reserves (liquidity) in the banking system and bank profits will tend to decrease.

Results also indicate that gross national savings (GNS) had a negative and poor significant impact on bank profits against *a priori* expectations. It's attaining a negative sign shows that banks have not been mobilizing adequate domestic savings that would be used to meet investment needs of the Nigerian state so as to create wealth to engender growth in the economy.

Total balances with Central Bank of Nigeria (TBWCBN), ranked second in influencing bank profits in Nigeria. It had the right (negative) sign according to economic thinking in impacting on profitability of banks. As balances with central bank rises it negates (reduces) ability of banks to lend or create credit (money) out of which they make profits. Since liquidity ratio is presently high (above 40%) for most of the period covered, a reduction in bank balances with the central bank may be the right monetary policy goal to enable banks create credit and release more money into circulation to shore up liquidity in the financial system.

Results from Table 2, demonstrate that liquidity ratio (LR), though with the most significant impact on bank profits, negated our *apriori* expectations as it exhibited a positive sign instead of an inverse relationship with bank profits. Liquidity ratio has been above 40 percent in 21 out of 27 years considered, and as it still had a positive effect on bank profits shows that if LR is further lowered (reduced) to say, between 30-39% or 20-29%, banking system profits will rise further in Nigeria. The banks should be encouraged by the apex bank to optimize their liquidity to raise their profitability profile.

Results of INFR with a negative and insignificant impact meets *apriori* expectation that macroeconomic instability (mirrored by inflationary pressures) always drags down corporate profitability. It has never been different for banking industry in Nigeria in this regard.

Similarly, results of CFPI with a negative and insignificant effect on bank profits are in accordance with our economic thinking. This is because foreign private investments (FPI) or FDIs in Nigeria reduce the quantum of bank credits to domestic economy via payment of interest and principal and other capital flight channels thereby lowering level of profitability that would have been generated (made) or attained by Nigerian banks on lending and other investments. Banks make huge profits by charging interest rates on lending (see Uremadu, 2008 and Lockett, 1988).

Finally, the coefficient of the level of corporate income tax (CIT) on bank profitability is wrongly signed. CIT exhibits a positive and insignificant relationship with bank profits in Nigeria instead. The implication of these results is that bank profits are moderately taxed in Nigeria as the present corporate income tax has a positive effect on corporate profitability with special consideration on banks.

### Downward Simulation by Variable Elimination of Model Equation

As stated earlier, we re-estimated the model equation 3 sequentially two times by eliminating (reducing) the number of variables from 9 to 8 to get equation 4; eliminated a variable from equation 4 (i.e. from 8 to 7) to obtain equation 5. INFR was removed from equation 3 to obtain equation 4 and CIT was removed from equation 4 to obtain equation 5, respectively. The two new model equations were subsequently estimated using OLS method to arrive at improved results of our regression analysis obtained in each case, are now relayed in Tables 3 and 4 and discussed below.

Table 3. Modeling BSP Function by OLS for Reduced Form Eq.4

| Variables                 | Coefficient | Std error | t-Statistic | Prob.  |
|---------------------------|-------------|-----------|-------------|--------|
| b <sub>0</sub> (Constant) | 12.52178    | 8.997792  | 1.391650    | 0.1831 |
| TBCRED                    | -0.059697   | 0.099133  | -0.602187   | 0.5555 |
| SDR                       | -0.401484   | 0.558359  | -0.719043   | 0.4825 |
| CRR                       | 0.001738    | 0.002090  | 0.831554    | 0.4179 |
| GNS                       | -0.310650   | 0.277948  | -1.117653   | 0.2802 |
| TBWCBN                    | -0.062544   | 0.033272  | -1.879771** | 0.0785 |
| LR                        | 0.099649    | 0.037679  | 2.644672*   | 0.0177 |
| CFPI                      | -0.073081   | 0.070655  | -1.034343   | 0.3164 |
| CIT                       | 0.021934    | 0.353338  | 0.062075    | 0.9513 |

R<sup>2</sup> 68.83%, R<sup>2</sup> Adj. = 52.24%; DW Stat = 1.32 F-stat = 4.306036\*, Prob. (F-statistic) = 0.006291

**Source:** Author's Calculation

**Key:** \*Significant at 1% level; \*\*Significant at 5% level.

Results obtained by regressing model Eq.4 are displayed on Table 3 above. As observed from Table 3, all the descriptive statistics (R<sup>2</sup>, R<sup>2</sup> Adj, DW-stat, F-stat, Prob (F-stat) have all demonstrated significant improvements in their results. There have also been remarkable improvements in the level of significance attained by TBWCBN and LR as the two most important precision variables influencing bank profits in Nigeria, arranged in their increasing order of importance. LR is significant at 1% level while TBWCBN is significant at 5% level.

Finally, Table 4 below presents results of regressing reduced form model equation 5 with the intercept reasonably fit the data with R<sup>2</sup> of 68.28% and R<sup>2</sup> Adj. (55.21%) and levels of significance of both LR and TBWCBN in impacting on banking system profits, have now changed to an improved 1% and 5% degrees of freedom, respectively. The values of the overall descriptive statistics (R<sup>2</sup>, R<sup>2</sup> Adj., F-stat and DW-stat) are significantly improved and are within acceptable bounds.

Table 4. Modeling BSP Function by OLS for Reduced Form equation 5

| Variables                 | Coefficient | Std error | t-Statistic | Prob.  |
|---------------------------|-------------|-----------|-------------|--------|
| b <sub>0</sub> (constant) | 12.81562    | 7.424427  | 1.726143    | 0.1024 |
| TBCRED                    | -0.060326   | 0.095680  | -0.630498   | 0.5368 |
| SDR                       | -0.407213   | 0.534303  | -0.762139   | 0.4564 |
| CRR                       | 0.001749    | 0.002021  | 0.865397    | 0.3989 |
| GNS                       | -0.321513   | 0.209516  | -1.534553   | 0.1433 |
| TBWCBN                    | -0.062428   | 0.032232  | -1.936848** | 0.0696 |
| LR                        | 0.098972    | 0.034994  | 2.828263*   | 0.0116 |
| CFPI                      | -0.0768026  | 0.068026  | -1.082305   | 0.2942 |

$R^2 = 68.28\%$ ;  $R^2 \text{ Adj} = 55.21\%$ ; DW-stat = 1.33 F-stat = 5.226915\*; Prob (F-stat) = 0.002533

Source: Author's Calculation

Key: \* Significant at 1% level; \*\*Significant at 5% level.

In sum, the three model equations proved to display consistent results showing that liquidity ratio (LR) still leads banking system profitability in Nigeria. It is then closely followed by total balances with the central bank of Nigeria (TBWCBN).

### Findings and Recommendations

In this section, we shall summarize major findings of the paper and simultaneously make recommendations on each of the findings immediately it is stated.

(1) Study established banks have not been extending adequate credits to the domestic economy to ensure growth in the real sector thereby necessitating total bank credits (TBCRED) exhibiting a negative relationship with banks' profitability (BSP). Since lending is a major source of bank returns on capital employed, we therefore recommend that Nigerian banks be encouraged to become more optimal in their credit extension to the domestic economy in future.

(2) It was also discovered that it seems as if excess liquidity is absent in the Nigerian banking system as liquidity ratio (LR) follows the same positive direction with total banks' credits (TBCRED). However, over the years there had been hue and cry for existence of excess liquidity in the Nigerian financial system. So if liquidity exists and results are showing otherwise, then, the monetary authorities have to critically ascertain what is responsible for this "false" excess liquidity existing perennially in the financial system. In the present scenario, we recommend that bank regulators check to find out if excess liquidity reported by banks matches with the true situation on ground. Secondly, they have to ensure that banks optimize their excess liquidity to balance profitability with adequate liquidity for efficiency in their operations. Thirdly, the monetary authorities should ensure that distortions in the Nigerian banking system are minimized so as to remove abnormal positive impact of liquidity on bank profits.

(3) Findings from the results again revealed that Nigerian banks have not been optimizing liquidity or cash reserves via lending and investments to raise profits as both cash reserve ratio (CRR) and liquidity ratio (LR) toed the same positive direction with bank profits. These findings seem to be in agreement with Uremadu (1998, 2000) which report similar results for the performance of Nigerian

banks. It implies that if the Central Bank data reports excess liquidity in the banking system and bank profits are raising, it then means serious distortions are prevalent in the system which has to be checked forthwith. It may also mean that profits made by banks were not achieved through pure traditional banking business of lending and investments in financial assets. Probably the banks were making their profits via unethical banking practices like directly engaging in trading (buying and selling real asset goods), importation and exportation of goods, funding bank subsidiary companies and other speculative deals that were not properly recorded in the banks' books for public and monetary authorities' scrutiny. We therefore recommend that banks should be discouraged from engaging in these unethical practices in a bid to better the lot of the domestic economy and attain growth in real terms.

(4) Study revealed banks have failed to mobilize enough savings that can be used for loanable funds to raise capital formation and or gross domestic investment (GDI). Adequate accumulation of domestic savings will enable banks to lend to genuine investors who will invest to create wealth to lead growth in the economy. GNS (savings ratio) had a negative association with banks' profits (BSP) against our *apriori* expectations. Banks should be made to utilize all possible avenues that will enable them mobilize adequate savings which will be extended as credits to investors in the domestic economy.

(5) Balances with Central Bank of Nigeria (TBWCBN) are negative and significant in affecting banking system profitability (BSP). It is the second most important factor in impacting bank profits in Nigeria. Since liquidity ratio is currently high (above 40%) for most of the period covered, we recommend that a reduction in TBWCBN should be the right monetary policy objective to embark now in order to allow banks create adequate credits and release more money into circulation. This action will shore up liquidity in the financial system more especially now that global financial (liquidity) meltdown is ravaging the entire world economies, Nigeria inclusive.

(6) It has been discovered from the study that liquidity ratio (LR) is the most important factor affecting bank profits in Nigeria. That it, however, exhibited a positive association with banking system profits (BSP) against our economic thinking shows that all is not well with the Nigerian banking system. Plausible reason should be as a result of prevalent serious distortions in the financial system. More so, when liquidity ratio rating has been above 40% in 21 out of 27 years covered in this study (CBN, 2006). If there exists excess liquidity and banks are taking in huge profits, then something is definitely wrong with the environment. We therefore, recommend that this abnormality should be corrected by the monetary authorities forthwith. The banks should be made to optimize their excess liquidity to raise profitability while discouraging all known unethical practices that they engage in which distort efficient liquidity management by both the banks and the regulatory authorities. We seriously recommend effective and efficient management of bank liquidity by both the banks and the monetary authorities to moderate levels which will most likely optimize bank profits in the years to come.<sup>1</sup>

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<sup>1</sup> This author has done much work on the Nigerian economy particularly in the areas of financial system liquidity management, domestic money markets, savings mobilization, capital formation, FDI and growth, bank credits to the domestic economy; domestic inflation rate, real interest rate, spread and their effects on savings ratio, etc. Through these studies he has gained tremendous knowledge (insight) on how best to prod core precision variables to put Nigeria on the path of growth and economic development. He only hopes that one day the Government of Nigeria and the World Bank

(7) Finally, we discovered from the results of our analysis that corporate income tax (CIT) exhibits a positive association with bank profits against our economic expectations. It then implies that bank profits have not been appropriately taxed over the years by the Nigerian tax authorities. That the proportion of corporate income tax that Nigerian banks pay has not been commensurate with the huge profits they rake in yearly for the period studied. We therefore strongly consider singling out banks to carefully work out an upward review of the right corporate income tax (CIT) Nigerian banks should be made to pay on their profits henceforth.

### Conclusions

In conclusion, it should come to the knowledge of the policy makers and the individual banks operating in the Nigerian financial environment that the profitability and liquidity of the banks, and by extension, the banking and financial system depend on four core precision variables: liquidity ratio, balances with the central bank, savings ratio and cumulative foreign private investment, in which the first two, are major and the last two, are minor. That the health of the banking system as to liquidity or profitability seriously depends on how these factors are effectively and efficiently managed; and that also for the economic growth and development of the domestic economy, will largely depend on how these precision variables are handled, in similar fashion, it must be well noted.

The present work is a follow up to Uremadu (2009) "Determinants of Financial System Liquidity" which is already on the internet published by *Banking and Finance Letters* Vol. 1, No.1 (Turkey). Further researches are still beckoning for more attention on other additional core determinants of banking system profitability and liquidity in the Nigerian financial system. Sooner than later, we may contemplate doing another extension to the present work. Expected contributions, no doubt, will help to lead growth of the domestic economy.

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authorities will take notice of these works and invite him to lend a helping hand in the management of the Nigerian monetary and financial system for he is, indeed, an economic and financial seer given to the nations of the world in the times.



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