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DETERMINANTS OF CAPITAL STRUCTURE OF LISTED DEPOSIT MONEY BANKS IN NIGERIA

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Abstract

Capital structure can be said to a pivot upon which all banking activity revolve, and if well determine will support the bank in it operation by providing a buffer to absorb unanticipated loses from it activity. The paper investigated the determinant of capital structure in Nigeria deposit money banks from 2004 to 2013. The population of the study comprises seventeen (17) DMBs listed on the Nigerian Stock Exchange (NSE) as at December, 2013. Out of which ten (10) banks constitute the sample size of the study. The study adopted both correlation and ex-post facto research design. The data for the study was purely from secondary source obtained from the annual reports of the sampled banks. Data was analyzed using several options of multiple panel data regression. But the most reliable of all is robust ordinary lease square regression as

suggested by 'Breusch and Pagan Lagrangian Multiplier Test for Random Effect' The results revealed that firm size, firm growth, age, tangibility, interest rate and return on investment have significant impact on leverage, the result approve the prediction of trade –off theory in case of firm size ,firm growth and interest rate, while tangibility and return on investment support pecking order theory, The study recommends that major players such as bank managers, financial analysts, policy makers And all stake holders in the banking sector should use the five variables of capital structure determinant as yardstick in determining their capital structure enable the banks operate at optimal level.

Keywords: Capital structure, Leverage, Deposit Money Banks

1. Introduction

The peculiarity of banking operation and its uniqueness suggest a variation in its determinant of capital structure in comparison to other financial and non-financial institutions. Evidently, banking sector constitutes the largest portion of financial institutions in Nigeria and by extension the engine room for economic growth. Legal capital regulation is the single most important factor in determining the capital structure of the banking sector.

The nature of banking sector necessitates that a bank should hold more than the legal capital required by the regulatory body, this is to serve as a safe guard against future uncertainty and absorb any unforeseeable circumstance. Financial and other institutions don't operate in a vacuum, or isolation from its immediate and larger environment as such both micro and macro elements can influence its determinant of capital structure. In Nigeria, banks seem not to have reached the optimal level of capital structure despite several capitalization and recapitalization requirements by the regulatory body. It is essential for both the providers of capital and the firm itself to find the right mix of debt and equity financing in order to optimize its operation. Many developing countries have experienced banking problems requiring major reforms to address weak banking supervision and inadequate capital. It has been shown that in addition to deposit insurance (implicit or explicit), official capital structure regulations play a crucial role in aligning the incentives of bank owners with depositors and other creditors (Berger, Herring & Szego, 1995).

However, it is not altogether clear whether the imposition of capital requirements actually reduces risk-taking incentives. Santos (1999), notes that actual capital requirements may induce borrowers to shift to capital markets and in the process

impair capital allocation, while Gorton and Winton (1995) show that raising capital requirements can increase the cost of capital. Thus, theory provides conflicting predictions on whether capital requirements curtail or promote bank performance. This study will make effort to examine as the determinants of capital structure in Nigeria with evidence drawn from the listed Nigerian Deposit Money Banks (DMBs) focusing on trade-off theory, pecking- order theory, and bankruptcy cost theory with six (6) variables namely: firm size, firm growth, firm age, tangibility, interest rate and return on investments of 10 quoted banks in Nigeria from 2004 to 2013.

Although, there abundant literature on determinants of capital structure in some sectors of the Nigerian economy but little was done in this sector (DMBs); only Aremu, Ekop and Mustapha (2013) to the best of my knowledge have carried out research in this area. Also empirical evidence doesn't yet firmly reject the view that banks hold the regulatory minimum plus. Moreover, there are divergent opinions in terms of theoretical view and empirical findings as to what determines a firm's capital structure. Like most other developing countries, the area of capital structure is relatively unexplored in Nigeria. This is because, most of the Nigerian based studies focus on micro variables (usually firms' specific characteristics) that influence capital structure. This study will be built on the prior researches by adding macro variable-interest rate as a determining factor, using a wider time frame from 2004-2013.

Owing to the problem and intent of this study, the overall objective of this study is to find out the determinants of capital structure of the listed DMBs in Nigeria, while the specific ones are to examine the effects of size, growth, age, tangibility, interest rate and return on investment on capital structure of listed DMBs in Nigeria.

Based on the stated objectives, the study has tested the following null hypotheses:
H₀₁: firm size has no significant impact on the leverage of listed DMBs in Nigeria
H₀₂: firm growth does not have significant effect on the leverage of listed DMBs in Nigeria
H₀₃: There is no significant influence of firm age on the leverage of listed DMBs in Nigeria.
H₀₄: tangibility has no significant impact on the leverage of listed DMBs in Nigeria
H₀₅: interest rate does not have significant effects on the leverage of listed DMBs in Nigeria
H₀₆: Return on investment has no significant impact on the leverage of listed DMBs in Nigeria

The finding of this research may be useful in broadening the horizon for major players, such as bank managers, financial analysts, policy makers And all stake holders in the banking sector in knowing the key determinant of capital structure . It is expected to effect change in minimum capital imposition on money deposit banks by regulatory authority (CBN). It is also expected serve as an additional literature and basis of validating theory.

2. Literature Review and Theoretical Framework

The Modigliani and Miller model started by debating that the market value of any firm is independent of its capital structure, based on the premise that capital structure does not affect a firm's cash flow (Kyereboah - Coleman, 2007). When interpreted, the arguments shows that the capital structure is not expected to vary from company to company. Barclay and Smith (2005), following on their preceding 1995 and 1999 papers, justify this "invariance" argument by trying conditions could be deliberately artificial and could be excluding information costs, personal or corporate taxes, contracting or transaction costs, and a fixed investment policy.

In 1963 Modigliani and Miller revised their initial stance that the financing decisions of firms do not affect their value, suggesting that firms with higher profits should use more debt, thus substituting debt for equity to take advantage of interest induced tax shields. Kyereboah-Coleman (2007) sources Myers (1984) as advancing the static trade-off theory. The theory explains how a firm decides on the debt-to-equity ratio on the assumption that some optimal capital structure exist, enabling the firm to operate efficiently and ensuring external claims on cash flow are reduced. Miller (1988) contend this is to imply that firms are encouraged to increase their debt levels. For this reason, Voulgaris et al. (2004) argue that a trade-off between tax gains and increased bankruptcy costs increases a firm's cost of capital. In highlighting limitations to optimal level of firm debt, voulgaris et al. consider the arguments of the stiglitz (1974) and (1998) paper; that bankruptcy costs which are associated with increasing levels of debt. Since the evolution of the trade-off theory, debate has raged with researchers adapting the assumptions to more realistic expectations and analysis (Kyereboah-Coleman,2007). One amongst some identified short comings, is that in reality high profitable companies tend to have less debt than less profitable companies as the former utilize the profits for financing

Jensen and Meckling (1976) predicted capital structure choice based on the existence of agency costs, i.e. costs due to conflicts of interest. According to them, these are essentially two sources of conflicts. Conflicts between shareholders and managers arise sine managers have an incentive to consume on

perquisites while putting less effort on maximizing profit for the firm. This is because managers bear the entire costs of pursuing profit maximization while they do not receive the entire gain. By increasing the level of debt, this agency cost of managerial discretion can be mitigated. However, increasing debt level may give rise to another type of agency cost, namely conflicts between shareholders and debt-holders. The conflicts arise due to share holders incentive to invest in sub optimal projects. If an investment earns a return well above the face value of debt, shareholders would receive most of the gain, but if the investment fails debt-holders will bear all the cost because the maximum amount that shareholders can lose is the amount of their investments (limited liability). Consequently, shareholders will have preference for investing in highly risky projects even though they are value-decreasing. This agency cost of debt financing is referred to as “asset substitution effect”. Accordingly, the optimal capital structure choice involves balancing the trade-off between the benefit of debt arising from mitigating the agency cost of managerial discretion against the agency cost of debt arising from “asset substitution effect”.

Myers (1984) and Myers and Majluf (1984) suggest that capital structure choice is driven by the magnitude of information asymmetry present between the firm insiders and the outside investors. The more severe the information asymmetry, the more risk the outside investors are facing and hence the more discount they demand on the price of issued securities. Consequently, firms will prefer financing through internal funds and if they do need to raise outside capital, they will firstly issue risk-free debt then followed by low – risk debt. Equity is only issued as a last resort. As stated in Myers (1984), the static trade-off theory proposes that the optimal debt ratio is set by balancing the trade-off between the benefit and cost of debt. The benefit is debt arises from the tax deductibility of interest payments on debt and the cost of debt comes in the form of higher probability of bankruptcy and the loss suffered in the event of bankruptcy.

The pecking order theory based on assertion that firms use debt only when retained earnings are insufficient and raise external equity capital only as a last resort. More recent models of capital structure choice include ‘windows of opportunity’ and ‘managerial optimism’ Heaton, (2002). Baker and Wurgler (2002) suggest that managers could minimize the cost of capital by timing the market (issuing equity when share prices increase) implying that market conditions influence the pecking order. However, hovakimian (2006) shows that the timing of equity issuance does not have any significant long-lasting impact on capital structure. In a quest for the factors that managers consider in deciding the financing mix of a firm, many studies have examined the role of several firm-specific factors. In a review article, Harris and Raviv (1991) resort the leverage is

positively related to non-debt tax shields, firm size, asset tangibility, and investment opportunities, while it is inversely related to bankruptcy risk, research and development expenditure, advertising expenditure, and firm's uniqueness.

Capital structure of banks is determined by various internal and external factors. The macro variables of the economy of a country like tax policy of a government, inflation rate, capital market condition, are the major external factors that affect the capital structure of a firm. The characteristics of an individual firm, which are termed here as micro factors (internal), also affect the capital structure of enterprises. This section presents how the micro-factors affect the capital structure of a firm with reference to the relevant capital structure theories stated earlier.

Bankruptcy costs are the costs incurred when the perceived probability that the firm will default on financing is greater than zero. The potential costs of bankruptcy may be both direct and indirect. Examples of direct bankruptcy costs are the legal and administrative costs in the bankruptcy process. Haugen and Senbet (1978) argue that bankruptcy costs must be trivial or nonexistent if one assumes that capital market prices are competitively determined by rational investors. Examples of indirect bankruptcy costs are the loss in profits incurred by the firms as a result of the unwillingness of stakeholders to do business with them. Customer dependency on a firm's goods and services and the high probability of bankruptcy affect the solvency of firms (Titman, 1984). If a business is perceived to be close to bankruptcy, customers may be less willing to buy its goods and services because of the risk that the firm may not be able to meet its warranty obligations. Also, employees might be less inclined to work for the business or suppliers less likely to extend trade credit.

These behaviors by the stakeholders effectively reduce the value of the firm. Therefore, firms that have high distress cost would have incentives to decrease outside financing so as to lower these costs. Warner (1977) maintains that such bankruptcy costs increase with debt, thus reducing the value of the firm. According to Modigliani and Miller (1963), it is optimal for a firm to be financed by debt in order to benefit from the tax deductibility of debt. The value of the firm can be increased by the use of debt since interest payments can be deducted from taxable corporate income. But increasing debt results in an increased probability of bankruptcy. Hence, the optimal capital structure represents a level of leverage that balances bankruptcy costs and benefits of debt finance. The greater the probability of bankruptcy a firm faces as the result of increases in the cost of debt, the less debt they use in the issuance of new capital (Pettit and Singer, 1985).

2.2 Firm Size and Leverage

The bankruptcy cost theory explains the positive relation between the capital structure and size of a firm. The large firms are more diversified (remmers at al 1974), have easy access to the capital market, receive higher credit ratings for debt issues, and pay lower interest rate on debt Capital (Pinches and Mingo 1973). Further, larger firms are less prone to bankruptcy (Titman and Wessels 1988) and this implies the less probability of bankruptcy and lower bankruptcy costs. The bankruptcy cost theory suggests the lower bankruptcy costs, the higher debt level. The empirical studies carried out during the 1970^s, as suggested by this theory, also show the positive relation between the size of firms and capital structure (Martin et al., 1988). But results of some empirical studies do not corroborate with this theoretical relation.

2.3 Firm Growth and Leverage

The agency cost theory and pecking order theory explain the contradictory relation between the growth rate and capital structure. Agency cost theory suggests that equity controlled firms have a tendency to invest sub-optimally to expropriate wealth from the enterprises' bondholders. The agency cost is likely to be higher for enterprises in growing industries which have more flexibility in their choice of future investment. Hence, growth rate is negatively related with long-term debt level (Jensen and Meckling, 1976). This theoretical result is backed up by the empirical studies carried out by Kim and Sorensen (1986), and Titman and Wessels, (1988) but Kester, (1986) study rejected this relation. Pecking order theory, contrary to the agency cost theory, shows the positive relation between the growth rate and debt level of enterprises. This is based on the reasoning that a higher growth rate implies a higher demand for funds, and, ceteris paribus, a greater reliance on external financing through the preferred source of debt (Sinha 1992). For, pecking order theory contends that management prefers internal to external financing and debt to equity if it issues securities (Myers 1984). Thus, the pecking order suggests the higher proportion of debt in capital structure of the growing enterprises than that of the stagnant ones. Chung (1993), Chaplinsky and Niehaus (1990) showed the evidence contrary to the pecking order and trade-off hypothesis pleads for the low level of debt capital of risky theory.

2.4 Firm Age and Leverage

As a firm continues longer in business, it establishes itself reputation and goodwill and therefore increases its capacity to take on more debt; hence age is positively related to debt. Before granting a loan, banks tend to evaluate the creditworthiness of entrepreneurs, this may include assessing its years of existence, when it comes to highly indebted companies, they are essentially gambling with their creditors money. If the investment is profitable, shareholders will collect a

significant share of the earnings, but if the project fails, then the creditors have to bear the consequences (Myers, 1977). To overcome problems associated with the evaluation of creditworthiness, Diamond (1984) suggests the use of firm reputation. He takes reputation to mean the good name a firm has built up over the years; the name is recognized by the market, which has observed the firm's ability to meet its obligations in a timely manner

2.5. Firm Profitability and leverage

The profitability of firms implies higher debt capacity and less risky to the debt holders. So, as per this theory, capital structure and profitability are positively associated. But pecking order theory suggests that this relation is negative. Since, as stated earlier, firm prefers internal order financing and follows the sticky dividend policy. If the internal funds are not enough to finance financial requirements of the firms, it prefers debt financing to equity financing (Myers 1994). Thus, the higher profitability of the enterprise implies the internal financing of investment and less reliance on debt financing, Aremu, Ekpo and Mustapha (2013). Most of the empirical studies support the pecking order theory. The studies Titman and Wessel (1988), Kester (1986), Friend and Lang (1988), Gonedes (1988) show that negative relationship exist between the level of debt in capital structure and profitability Indian and Nepalese studies also show the same evidence as foreign studies do (Baral, 1996). Only a few studies show the evidence in favor of static trade – off hypothesis contention.

2.6. Firm Tangibility and leverage

Due to the conflict of interest between debt providers and shareholders (Jensen and Mekling, 1976), lenders face risk of adverse selection and moral hazard. Consequently, lenders may demand security, and collateral value (proxied by the ratio of fixed total assets) may be a major determinant of the level of debt finance available to companies (Scott 1977), Stiglitz and Weiss (1981), Williamson (1988) and Harris and Raviv (1990).

The degree to which firms' assets are tangible and generic should result in the firm having a greater liquidation value. Capital intensive companies will relatively employ more debt (Myers, 1977), as pledging the assets as collateral (Myers, 1977; Harris and Raviv, 1991) or arranging so that a fix charge is directly placed to particular tangible assets of the firm. Bank financing will depend upon whether the lending can be secured by tangible assets (Storey, 1994; Berber & Udell 1998).

2.7 Interest rate and Leverage

Interest rate is the cost of borrowing for the firm, when a bank has the capacity to pay interest on the borrowed amount this may entice the bank to take advantage of lower interest to apply for more debt taking advantage of the lower rate, so also when the interest rate is high bank may tend to result to using more of equity financing and avoid new debt. The findings of Ooi (1990) concluded that the relationship between interest rate and leverage is negatively related, while Hung, C.Y., Albert, C.P.C., Eddie, H.C.M. (2002).find out that there is a positive relationship between leverage and interest rate.

3. Methodology and Model Specification

The study adopted correlational and ex-post facto research designs. This is because the study seeks to estimate the relationship between independent variables (determinants) and dependent variable (capital structure). Creswell (2014). The multiple linear regression equations. The study period covers 2004 to 2013, The choice in the period of the study is not accidental rather incidental as the year 2004 was the year of monumental recapitalization that saw the banks moving from 2 billion naira to 25 billion naira capital base , this increment in capital base stimulate activities in the capital market as banks jostle between primary and secondary market to increase capital . The data was sourced mainly from the Annual Reports and Statement of Accounts of 10 banks out of 17 listed deposit money banks in Nigeria presenting 58 % of the population. Random sampling technique was used to draw up the sampled banks so that all banks will have equal chance of representation.

3.3 Model Specification and Robustness Test

For the purpose of this study, the following model is specified:

$$LEV_{it} = \alpha + \beta_1 SIZE_{it} + \beta_2 GRWTH_{it} + \beta_3 AGE_{it} + \beta_4 TANG_{it} + \beta_5 INT_{it} + \beta_6 ROI_{it} + \epsilon_{it}$$

Where:

LEV= leverage measure as long term debt divide by total asset

SISZE= size of the firm (measured as log of turnover)

GROWTH= Growth measured as% increase in net total asset

AGE= number of years in which the firm was incorporated

TANG= tangibility of asset (measured as fixed asset divided by Net total assets)

INT= Interest rate (measured as average lending rate)

ROI= Return on investment (measured as profit after tax divide by capital employed)

ϵ = Error term

i= Bank

t= Time

3.4 Variable Measurement

| | |
|----------------------|---------------------------------------------------------|
| leverage | Measured as long term debt divide by total asset |
| Size | Measured as log of turnover |
| Growth | Measured as% increase in net total asset |
| Age | Number of years which the firm was incorporated |
| Tangibility | Measured as fixed asset divided by Net total asset |
| Interest rate | measured as average lending rate |
| Return on investment | measured as profit after tax divide by capital employed |

4.1 Results and Discussion of Findings

Table 4.1 presents descriptive statistics of the variables of the study. The mean, standard deviation, minimum, and maximum have been used to describe the data.

Table 4.1: Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---------------|-----|----------|----------|------------|----------------|
| Leverage | 110 | .30975 | .95261 | .8307799 | .08417767 |
| Firm size | 110 | 10.19884 | 21.89710 | 16.6836475 | 3.29385592 |
| Firm growth | 110 | -2.21986 | 2.17534 | -.0362770 | .59700955 |
| Age | 110 | .30103 | 2.49136 | 1.5290246 | .52995807 |
| Tangibility | 110 | .00878 | .64151 | .2618170 | .13068804 |
| Interest rate | 110 | 9.00000 | 19.99000 | 13.2777273 | 3.16695312 |
| ROI | 110 | -.04586 | .32998 | .0437901 | .06671938 |

Source: The Author, 2015

From the table above, leverage ranges from the minimum of 0.3936 to a maximum of 0.9526, while the mean is 0.8308. This shows that on average, the sampled firms have 83% as total debt in their capital structure during the period under review. The minimum value is an indication that some banks have as low as 39% of leverage, while some banks have up to 95% as total debt in their capital structure. The standard deviation of 0.0842 signifies that the data deviate from the mean value from both side by 8% implying that the data is not dispersed widely from the mean. This also proved that the sampled banks have more of leverage than equity financing in their capital structure. Furthermore, firm size (natural log of total assets) has a mean of 16.6837, while the minimum and maximum are 10.1988 and 21.8971 respectively. The standard deviation is 3.2939. This shows that the values are centered around the mean value i.e. there is not much dispersion away from the mean because, the standard deviation is less than the mean. Firm growth has a mean of -0.0363, while the range is from the minimum of -2.2199 up to a maximum of 2.1753. This shows that on average the banks

have annual firm growth of -4%. The deviation of 0.5970 is an indication that there is much dispersion around the average firm growth by 60%. Some banks achieved the maximum of 20% firms' growth, while some banks resulted in negative growth as low 20%. The banks' age has a minimum of 0.3010 and a maximum of 2. 4913. The mean age is 1.529 while the standard deviation is 0.52996 implying the age, measured in term of number of years since incorporation is not widely dispersed away from the mean age. Moreover, tangibility has a mean of 0.2618; the range is from the minimum of 0.0878 to a maximum of 0.6415. This shows that on average, the banks' tangible asset in relation to total asset is up to 26% during the period. However, the minimum of 0.0878 is an indication that some banks had only 9% as tangible assets; while on the other hand, some banks have up to 64% as tangible asset in proportion to total assets. The mean value for interest rate is N13.28k. The minimum interest rate during the period was fixed at N9.00k while the maximum was at N19.99k. The standard deviation of 3.17 was an indication that the interest rate was normally distributed during the period. This is because, it is far below the mean average. The ROI has a mean of 0.04379, indicating that the banks were able to generate returns on investment of 4% during the period. The maximum of 0.32998 is a clear indication that some banks were able to generate ROI to the tune of 33%; while the minimum of -0.04586 is showing that some banks lost ROI to the tune of 5%.

Table 4.2: Correlation Matrix

| | Leverage | Firm size | Firm growth | Age | Tangibility | Int. rate | Return on inv. |
|---------------|----------|-----------|-------------|---------|-------------|-----------|----------------|
| Leverage | 1.0000 | | | | | | |
| Firm size | 0.3076* | 1.0000 | | | | | |
| Firm growth | -0.1510 | 0.1254 | 1.0000 | | | | |
| Age | -0.0202 | 0.3163* | 0.1520 | 1.0000 | | | |
| Tangibility | 0.2534* | -0.0220 | -0.0201 | 0.2111* | 1.0000 | | |
| Interest rate | -0.2740* | 0.0951 | 0.0133 | 0.0141 | -0.0855 | 1.0000 | |
| Return on In | -0.4394* | -0.1892* | 0.0148 | 0.0013 | -0.1124 | -0.1755 | 1.0000 |

Source: Output STATA

* At 5% level of significance

The correlation matrix is used to determine the degree of association between independent variables and dependent variable. It is also used to identify whether there is relationship among the independent variables themselves, to be able to detect if multicollinearity problem may exists.

From table 4.2, the correlation coefficient between firm size and leverage is 0.308 significant at 1% level. This suggests that there exist a strong significant positive

association between firm size and leverage of listed DMBs in Nigeria. The relationship between Firm Growth, Age and leverage are found to be negative though, statistically insignificant. This can be confirmed from the correlation coefficient value -0.15 and -0.020 respectively. Furthermore, the association between tangibility and leverage is found to be positive and statistically significant. This can be observed from the correlation coefficient of 0.253 and the significant value of 0.008. Additionally, the correlation coefficient of Interest Rate is -0.274 (0.004), while that of Return on Investment (ROI) is -0.439 (0.00). This suggests a significant negative association between interest rate and leverage at 1% level; moreover, the statistical result further suggests a strong negative association between ROI and leverage of listed DMBs in Nigeria.

The relationships between independent variables themselves suggest to be minimal. In order to see whether the presence of multicollinearity will pose a problem to the statistical inferences, the study further conducted multicollinearity test, using Variance Inflation Factor (VIF) and tolerance value. The test reveals absence of multicollinearity, because VIF are consistently smaller than 10 while its reciprocal are consistently less than 1. The mean VIF for all the independent variables is 1.11. This suggests that the presence of multicollinearity is not enough to invalidate the statistical inference of the research finding.

4.3 Reliability and validity tests

To avoid making wrong inferences, some robustness tests were conducted and the summary of the statistical results can be depicted from table 4.3 below.

Table 4.4: Summary of Robustness Tests

| | Statistics | P-Values |
|--------------|------------|----------|
| Hausman-Chi2 | 8.51 | 0.2028 |
| LMTRE-Chi2 | 0.00 | 1.000 |
| Hetest-Chi2 | 37.97 | 0.000 |
| Mean VIF | 1.11 | |

Source: STATA Output

Note: LMTRE is ‘Breusch and Pagan Lagrangian Multiplier Test for Random Effect’

Data for the study is panel in nature and panel data may lead to error that are clustered and possibly correlated overtime. This is because each bank may have its own entity specific characteristic that can determine its capital structure (i.e. unobserved heterogeneity). And this may bias the outcome variable or even the explanatory variables. As such there is need to control for that. For that purpose,

fixed effect (FE) regression and random effect (RE) regression were ran. The Hausman Test suggest that RE regression is more appropriate for the data. This can be confirmed from the Chi2 value of 8.51 with a probability value of 0.2028. This suggests that entity specific attributes have no significant effect on the outcome variable.

Since the hausman test suggests the RE regression result, then there is need to further conduct another test to see whether there is a statistical variance among the unit in the panel. To test for that, ‘Breusch and Pagan Lagrangian Multiplier Test for Random Effect’ was adopted. Finally, the test result reveals that there is no statistical significant variance among the unit in the panel data all. This can be observed from the chi2 value of 0.00 and a P-value of 1.00. Thus, this suggests that OLS technique is more appropriate for the data of this study.

However, after running hetttest, the study observed the presence of heteroskedasticity in the panel data; as such the basic OLS would not be reliable. This can be confirmed from the hetttest result which revealed the chi2 value is 37.97 with a p-value of 0.000. In order to correct for this anomalies, Robust OLS was used; and hence, the inference will be made based on the results produced by the Robust OLS regression.

In addition to that, multicollinearity test was also conducted using VIF and its reciprocal (1/VIF) i.e. tolerance value. No multicollinearity threat was found; as the VIF are consistently smaller than 10 while the tolerance values are consistently smaller than 1. The mean VIF is 1.11. All this proved that multicollinearity will not pose a problem to our inference and suggest the appropriateness of the model in fitting the independent variables of the study.

Table 4.3: Summary of Robust OLS Regression

| | Coefficient | t-statistics | Probability value |
|----------------|-------------|--------------|-------------------|
| Constant | 0.8355 | 21.97 | 0.000 |
| Firm size | 0.0085 | 3.07 | 0.003 |
| Firm growth | -0.0220 | -2.84 | 0.005 |
| Age | -0.0222 | -2.34 | 0.019 |
| Tangibility | 0.1355 | 2.90 | 0.005 |
| Interest rate | -0.0095 | -2.88 | 0.005 |
| ROI | -0.5210 | -7.18 | 0.000 |
| R ² | 0.461 | | |
| F- statistics | 22.71 | | 0.000 |

Source: STATA Output

From table 4.3, the t-value for firm size (FS) is 3.07 and a beta coefficient is 0.008 with a p-value of 0.003. This implies that FS has a significant positive effect on leverage of listed DMBs in Nigeria at 1% level. The beta coefficient indicates that an increase of FS by 1% will cause leverage to increase by 0.008 (measured in term of natural log). The implication of this finding is that the higher the firm size the higher the leverage of listed DMBs in Nigeria. This provides evidence to reject the null hypothesis earlier formulated, which states that FS does not have significant impact on leverage of listed DBMs in Nigeria. The finding is in line with those of Marsh (1982) and Rajan and Zingales (1995)

The impact of firm growth on leverage is found to be negative and statistically significant at 5% level. This can be confirmed from the t-value of -2.84 and a p-value of 0.005. This implies that firm growth have significant impact on leverage of listed DMBs in Nigeria. The beta coefficient shows of -0.022 shows that leverage reduces by 2.2% with an increase in firm growth by 1%. Therefore, the finding also reject the null hypothesis which stated that FG has no significant effect on the leverage of listed DMBs in Nigeria. This finding supports the finding of long and Malizt(1985) and contradicts the finding of Titman and wessels(1988)

The beta coefficient and t-value of Age are -0.022 and -2. 34 respectively, with a p-value of 0.019. This shows that Age has a significant negative impact on leverage of listed DMBs in Nigeria, though at 10% significant level. The beta coefficient is explaining that as the year of incorporation increase by one year the proportion of debt in the total asset will reduced 2.2%. The implication of this finding is that the higher the age the lower is going to be the leverage ratio. This provides evidence to reject the null hypothesis stating that Age does not have significant impact on leverage of listed DMBs in Nigeria. The finding has gotten support empirically from the works of shehu hassan (2011,) this however contrary to our prior expectation which was based on the findings of daimond (1984)

Tangibility has a t-value of 2.90 and a beta coefficient of 0.135 with a p-value of 0.005. This implies that Tangibility has a strong significant positive effect on leverage of listed DMBs in Nigeria at 1% level. The beta coefficient indicates that an increase of Tangibility by 1% will cause leverage to increase by 13.5%. The implication of this finding is that the higher the tangibility the higher the leverage of listed DMBs in Nigeria. This provides evidence to reject the null hypothesis which states that Tangibility does not have significant impact on leverage of listed DBMs in Nigeria. The finding is in tandem with those of meckling (1976) and Myer (1977)

Furthermore, interest rate is found to have a significant negative impact on DMBs in Nigeria. This can be confirmed from the t-value of -2.88 and a probability value of 0.005. The implication of this finding is that DBMs in Nigeria avoid including debt in their capital structure when the interest rate is high. The coefficient of -0.009 is an indication that leverage reduces by 0.9% when interest rate increases by 1%. As such, this finding is line with that of the researcher and contrary to that of Ooi .J (1999).

The impact of ROI on leverage is found to be negative and statistically significant at 1% level. This shows that the impact is very strong; this can be confirmed from the t-value of -5.453 and a p-value of 0.000. This implies that ROI has a significant impact on leverage of listed DMBs in Nigeria. Therefore, the finding also reject the null hypothesis which states that ROI has no significant effect on the leverage of listed DMBs in Nigeria. This finding supports the finding of Rajan and zingales (1995)

The overall result shows that (R^2) has the value of 0.461. This indicates that the explanatory variables were able to explain the variation in the dependent variable (leverage) to the extent of 46%. The other 54% is explained by other factors not captured in the model. This could be both macro and micro variables that can also explained changes in leverage. The adjusted R^2 has a value 0.429 (43%). This implies that Firm size, firm growth, age, tangibility, interest rate, and return on investment play a significant role in explaining the leverage of listed DMBs in Nigeria. The regression result reveals fitness of the model with F-statistics of 22.71 and a p-value of 0.0000. Finally we come to conclude by saying that all the independent variables of the study determined the leverage of listed DMBs in Nigeria.

5.1 Conclusions and Recommendations

This study examines the determinants of capital structure of Banks in Nigeria. Previous researches mainly focus on micro element of to determinant of capital structure ignoring the macro element that affect the determinant of capital structure. The study discussed the determinant of capital structure the capital structure in Nigerian Banking industry covering the 10 banks in the country from 2004 to 2013

The study analyzed whether the determinants of capital structure as posited by various authors affect the capital decisions of these banks. The study therefore use database which has not been used for the examination of the capital structure before in Nigeria.

As a result of this research findings, it is found that the main determinant factors which contribute to the bank leverage level of the Banking industry in Nigeria between the years 2004 to 2013 are mainly bank size, growth, age, tangible assets, growth, return on investment and interest rate.

The study recommends that major players such as bank managers, financial analysts and policy maker will have better understanding about the factors which may influence the capital structure of the Nigerian banking sector and enhance competitiveness in the banking sector. And all stake holders in the banking sector should use the five variables of capital structure determinant as yardstick in determining their capital structure enable the banks operate at optimal level.

```
. xtset id year
      panel variable: id (strongly balanced)
      time variable: year, 2004 to 2013
      delta: 1 unit
```

```
. xtreg lev firmsize firmgrowth age tangibility interestrates roi, fe
```

```
Fixed-effects (within) regression      Number of obs   =    110
Group variable: id                    Number of groups =    11

R-sq:  within = 0.4083                obs per group:  min =    10
      between = 0.5602                avg             =   10.0
      overall  = 0.4310                max             =    10

corr(u_i, Xb) = -0.1462                F(6,93)        =   10.69
                                          Prob > F        =   0.0000
```

| lev | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] | |
|---------------|-----------|-----------------------------------|-------|-------|----------------------|-----------|
| firmsize | .0120461 | .0037012 | 3.25 | 0.002 | .0046962 | .019396 |
| firmgrowth | -.020581 | .0144787 | -1.42 | 0.159 | -.0493328 | .0081707 |
| age | -.0289043 | .031836 | -0.91 | 0.366 | -.0921242 | .0343157 |
| tangibility | .0686045 | .0604247 | 1.14 | 0.259 | -.051387 | .188596 |
| interestrates | -.0095757 | .0021097 | -4.54 | 0.000 | -.0137651 | -.0053863 |
| roi | -.4656921 | .09907 | -4.70 | 0.000 | -.6624255 | -.2689588 |
| _cons | .8028295 | .087213 | 9.21 | 0.000 | .6296417 | .9760172 |
| sigma_u | .02530291 | | | | | |
| sigma_e | .0636545 | | | | | |
| rho | .1364491 | (fraction of variance due to u_i) | | | | |

```
F test that all u_i=0:      F(10, 93) =    0.98      Prob > F = 0.4690
```

```
. est store fe
```

```
. xtreg lev firmsize firmgrowth age tangibility interestrates roi, re
```

```
Random-effects GLS regression      Number of obs   =    110
Group variable: id                    Number of groups =    11

R-sq:  within = 0.3922                obs per group:  min =    10
      between = 0.8027                avg             =   10.0
      overall  = 0.4609                max             =    10

corr(u_i, X) = 0 (assumed)           Wald chi2(6)    =   88.05
                                          Prob > chi2     =   0.0000
```

| lev | Coef. | Std. Err. | z | P> z | [95% Conf. Interval] | |
|---------------|-----------|-----------|-------|-------|----------------------|-----------|
| firmsize | .008484 | .0020132 | 4.21 | 0.000 | .0045381 | .0124299 |
| firmgrowth | -.0220271 | .010371 | -2.12 | 0.034 | -.0423539 | -.0017003 |
| age | -.0222932 | .0126043 | -1.77 | 0.077 | -.0469973 | .0024109 |
| tangibility | .1354826 | .0486765 | 2.78 | 0.005 | .0400785 | .2308868 |
| interestrates | -.0094623 | .0019686 | -4.81 | 0.000 | -.0133207 | -.0056038 |
| roi | -.5210121 | .0955458 | -5.45 | 0.000 | -.7082785 | -.3337457 |
| _cons | .8355048 | .0449545 | 18.59 | 0.000 | .7473956 | .9236139 |
| sigma_u | 0 | | | | | |
| sigma_e | .0636545 | | | | | |

```
. xtset id year
      panel variable: id (strongly balanced)
      time variable: year, 2004 to 2013
      delta: 1 unit
```

```
. xtreg lev firmsize firmgrowth age tangibility interstrate roi, fe
```

```
Fixed-effects (within) regression      Number of obs   =   110
Group variable: id                    Number of groups =    11

R-sq:  within = 0.4083                obs per group: min =    10
      between = 0.5602                avg =           10.0
      overall = 0.4310                max =           10

corr(u_i, Xb) = -0.1462                F(6, 93)       =   10.69
                                          Prob > F        =   0.0000
```

| lev | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] | |
|-------------|-----------|-----------------------------------|-------|-------|----------------------|--|
| firmsize | .0120461 | .0037012 | 3.25 | 0.002 | .0046962 .019396 | |
| firmgrowth | -.020581 | .0144787 | -1.42 | 0.159 | -.0493328 .0081707 | |
| age | -.0289043 | .031836 | -0.91 | 0.366 | -.0921242 .0343157 | |
| tangibility | .0686045 | .0604247 | 1.14 | 0.259 | -.051387 .188596 | |
| interstrate | -.0095757 | .0021097 | -4.54 | 0.000 | -.0137651 -.0053863 | |
| roi | -.4656921 | .09907 | -4.70 | 0.000 | -.6624255 -.2689588 | |
| _cons | .8028295 | .087213 | 9.21 | 0.000 | .6296417 .9760172 | |
| sigma_u | .02530291 | | | | | |
| sigma_e | .0636545 | | | | | |
| rho | .1364491 | (fraction of variance due to u_i) | | | | |

```
F test that all u_i=0:      F(10, 93) =    0.98      Prob > F = 0.4690
```

```
. est store fe
```

```
. xtreg lev firmsize firmgrowth age tangibility interstrate roi, re
```

```
Random-effects GLS regression      Number of obs   =   110
Group variable: id                    Number of groups =    11

R-sq:  within = 0.3922                obs per group: min =    10
      between = 0.8027                avg =           10.0
      overall = 0.4609                max =           10

corr(u_i, X) = 0 (assumed)           Wald chi2(6)    =   88.05
                                          Prob > chi2     =   0.0000
```

| lev | Coef. | Std. Err. | z | P> z | [95% Conf. Interval] | |
|-------------|-----------|-----------------------------------|-------|-------|----------------------|--|
| firmsize | .008484 | .0020132 | 4.21 | 0.000 | .0045381 .0124299 | |
| firmgrowth | -.0220271 | .010371 | -2.12 | 0.034 | -.0423539 -.0017003 | |
| age | -.0222932 | .0126043 | -1.77 | 0.077 | -.0469973 .0024109 | |
| tangibility | .1354826 | .0486765 | 2.78 | 0.005 | .0400785 .2308868 | |
| interstrate | -.0094623 | .0019686 | -4.81 | 0.000 | -.0133207 -.0056038 | |
| roi | -.5210121 | .0955458 | -5.45 | 0.000 | -.7082785 -.3337457 | |
| _cons | .8355048 | .0449545 | 18.59 | 0.000 | .7473956 .9236139 | |
| sigma_u | 0 | | | | | |
| sigma_e | .0636545 | | | | | |
| rho | 0 | (fraction of variance due to u_i) | | | | |

```
. est store re
```

. nausman re re

| | Coefficients | | (b-B) Difference | sqrt(diag(V_b-V_B)) S.E. |
|---------------|--------------|-----------|---------------------|-----------------------------|
| | (b) fe | (B) re | | |
| firmsize | .0120461 | .008484 | .0035621 | .0031058 |
| firmgrowth | -.020581 | -.0220271 | .0014461 | .0101032 |
| age | -.0289043 | -.0222932 | -.0066111 | .0292346 |
| tangibility | .0686045 | .1354826 | -.0668781 | .0358015 |
| interestrates | -.0095757 | -.0094623 | -.0001134 | .0007584 |
| roi | -.4656921 | -.5210121 | .05532 | .0261889 |

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\chi^2(6) = (b-B)'[(V_b-V_B)^{-1}](b-B)$$

$$= 8.51$$

$$\text{Prob} > \chi^2 = 0.2028$$

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

$$\text{lev}[id,t] = x_b + u[id] + e[id,t]$$

Estimated results:

| | Var | sd = sqrt(Var) |
|-----|----------|----------------|
| lev | .0070859 | .0841777 |
| e | .0040519 | .0636545 |
| u | 0 | 0 |

Test: Var(u) = 0

$$\text{chibar}^2(01) = 0.00$$

$$\text{Prob} > \text{chibar}^2 = 1.0000$$

. reg lev firmsize firmgrowth age tangibility interestrates roi

| Source | SS | df | MS | Number of obs = | 110 |
|----------|------------|-----|------------|-----------------|--------|
| Model | .355956231 | 6 | .059326038 | F(6, 103) = | 14.67 |
| Residual | .416404668 | 103 | .004042764 | Prob > F = | 0.0000 |
| | | | | R-squared = | 0.4609 |
| | | | | Adj R-squared = | 0.4295 |
| Total | .772360899 | 109 | .00708588 | Root MSE = | .06358 |

| lev | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] |
|---------------|-----------|-----------|-------|-------|----------------------|
| firmsize | .008484 | .0020132 | 4.21 | 0.000 | .0044912 .0124768 |
| firmgrowth | -.0220271 | .010371 | -2.12 | 0.036 | -.0425955 -.0014587 |
| age | -.0222932 | .0126043 | -1.77 | 0.080 | -.047291 .0027045 |
| tangibility | .1354826 | .0486765 | 2.78 | 0.006 | .0389443 .2320209 |
| interestrates | -.0094623 | .0019686 | -4.81 | 0.000 | -.0133666 -.0055579 |
| roi | -.5210121 | .0955458 | -5.45 | 0.000 | -.7105047 -.3315195 |
| _cons | .8355048 | .0449545 | 18.59 | 0.000 | .7463482 .9246614 |

. nettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

H0: Constant variance
Variables: fitted values of lev

chi2(1) = 37.97
Prob > chi2 = 0.0000

. reg lev fimsiz fimgrowth age tangibility interstrate roi, robust

Linear regression

Number of obs = 110
F(6, 103) = 22.71
Prob > F = 0.0000
R-squared = 0.4609
Root MSE = .06358

| lev | Coef. | Robust Std. Err. | t | P> t | [95% Conf. Interval] | |
|-------------|-----------|------------------|-------|-------|----------------------|-----------|
| fimsiz | .008484 | .0027645 | 3.07 | 0.003 | .0030013 | .0139667 |
| fimgrowth | -.0220271 | .0077578 | -2.84 | 0.005 | -.0374128 | -.0066414 |
| age | -.0222932 | .0093585 | -2.38 | 0.019 | -.0408535 | -.0037329 |
| tangibility | .1354826 | .0467413 | 2.90 | 0.005 | .0427824 | .2281829 |
| interstrate | -.0094623 | .0032897 | -2.88 | 0.005 | -.0159867 | -.0029378 |
| roi | -.5210121 | .0725223 | -7.18 | 0.000 | -.6648429 | -.3771813 |
| _cons | .8355048 | .0380217 | 21.97 | 0.000 | .7600978 | .9109118 |

. vif

| Variable | VIF | 1/VIF |
|-------------|------|----------|
| age | 1.20 | 0.831243 |
| fimsiz | 1.19 | 0.843435 |
| roi | 1.10 | 0.912692 |
| tangibility | 1.09 | 0.916520 |
| interstrate | 1.05 | 0.954187 |
| fimgrowth | 1.03 | 0.967495 |
| Mean VIF | 1.11 | |

. su lev firmsize firmgrowth age tangibility interestrate roi

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|--------------|-----|----------|-----------|-----------|----------|
| lev | 110 | .8307799 | .0841777 | .3097538 | .9526122 |
| firmsize | 110 | 16.68365 | 3.293856 | 10.19884 | 21.8971 |
| firmgrowth | 110 | -.036277 | .5970096 | -2.219865 | 2.17534 |
| age | 110 | 1.529025 | .5299581 | .30103 | 2.491362 |
| tangibility | 110 | .261817 | .130688 | .0087844 | .6415061 |
| interestrate | 110 | 13.27773 | 3.166953 | 9 | 19.99 |
| roi | 110 | .0437901 | .0667194 | -.0458569 | .329978 |

. corr lev firmsize firmgrowth age tangibility interestrate roi
(obs=110)

| | lev | firmsize | firmgr-h | age | tangib-y | intere-e | roi |
|--------------|---------|----------|----------|--------|----------|----------|--------|
| lev | 1.0000 | | | | | | |
| firmsize | 0.3076 | 1.0000 | | | | | |
| firmgrowth | -0.1510 | 0.1254 | 1.0000 | | | | |
| age | -0.0202 | 0.3163 | 0.1520 | 1.0000 | | | |
| tangibility | 0.2534 | -0.0220 | -0.0201 | 0.2111 | 1.0000 | | |
| interestrate | -0.2740 | 0.0951 | 0.0133 | 0.0141 | -0.0855 | 1.0000 | |
| roi | -0.4394 | -0.1892 | 0.0148 | 0.0013 | -0.1124 | -0.1755 | 1.0000 |