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An Empirical Analysis of the Capital Structure of Selected Quoted Companies in Nigeria

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Abstract: This study examines an empirical analysis of the capital structure of selected quoted companies in Nigeria between 1990 and 2004. The analyses are performed using panel data pertaining to 50 non-financial firms. Static tests are conducted and panel data specifications are used. Considering the results for all the firms, leverage is negatively correlated with profitability. Tangibility is positively correlated with total debts and long-term debts, but negatively related to short-term debts. In addition, collateral appeared to influence all bank borrowing in Nigeria, whether short-term or long-term. Growth opportunity is positively related to both total debts and short-term debts. The size of the companies is positively correlated with total debts and short-term debts, suggesting that large firms can better support higher debt ratios than small firms. The empirical result shows that debt financing for listed companies in Nigeria corresponds mainly to a short-term debts nature, with a mean value of 60%. Nigeria firms should adopt appropriate steps to lengthen the maturity structure of corporate debt. In addition, government should endeavour to develop capital market to be able to absorb the increase in demand for funds.

Key words: Capital structure, leverage, panel data, Nigeria

INTRODUCTION

Following the seminar work of Modighiani and Miller (1958, 1963), a substantial amount of effort has been put forward in corporate finance theory to determine the factors that influence a firm's choice of capital structure. The important question facing companies in need of new finance is whether to raise debt or equity capital. The issue of finance has been identified as an immediate reason for business failing to start or to progress. It is imperative for firms in Nigeria to be able to finance their activities and grow over time if they are ever to play an increasing and predominant role in creating value-added, providing employment as well as income in terms of profits, dividends and wages to households, expanding the size of the directly productive sector in the economy, generating tax revenue for the government and facilitating poverty reduction through fiscal transfers and income from employment and firm ownership. It is important in this regard to understand how firms in Nigeria finance their operations by examining their capital structure decisions.

The corporate sector in the country is characterized by a large number of firms operating in a largely deregulated and increasingly competitive environment. Since 1987, financial liberalization has changed the operating environment of firms, by giving more flexibility to the Nigerian financial manager in choosing the capital structure of the firm. Therefore, the managers may exercise three main choices: use retained earnings, borrows through debt instruments, or issue new shares. Hence, the standard capital structure of a firm includes retained earnings, debt and equity; these three components of capital structure reflect fund ownership structure in the sense that the first and third components reflect ownership by shareholders while the second component represents ownership by debt holders. This is the pattern found in developing and developed countries (La-Porta *et al.*, 1999).

The problem of how firms choose and adjust their strategic mix of securities has called for a great deal of attention and debate among corporate financial literature. Over the years, the financial economists have examined the determinants of capital structure in developed countries. Existing empirical evidence is based mainly on data from developed countries. For example Bradley *et al.* (1984), Kim and Sorensen (1986), Friend and Lang (1988), Timan and Wessels (1988) and Chaplinsky and Niehaus (1990) focus on United States and Japanese manufacturing corporations; Rajan and Zingales (1995) examine firms from G 7 countries and Wald (1999) uses data from G 7 countries except Canada and Italy. Finding based on data from developing countries appeared only in the recent years for example Booth *et al.* (2001), Omet and Mashharawe (2002), Balla and Mateus (2003), Green *et al.* (2003), Chen (2004), Baner (2004) and Green and Tong (2004) etc. Thus, there is a conspicuous gap in the empirical research on capital structure of corporate firms in Nigeria.

It is widely recognized that the emergence of a dynamic private business sector is a critical ingredient in the process of economic growth and development. In this respect, a critical issue is to examine and understand how firms in developing countries finance their activities (Omet and Mashharawe, 2002). With the information gathered, it is discovered that little has been done on the study of the determinants of capital structure in Nigeria. The broad objective of this study is to investigate the main determinants of capital structure of non-financial quoted firms in Nigeria.

Review of Empirical Literature: The Determinants of Capital Structure

The empirical literature suggests a number of factors that may influence the financial structure of companies. As argued by Timan and Wessels (1988) and Harris and Reviv (1991), the choice of explanatory variables in the analysis of cross-sectional variation in capital structure is fraught with difficulty. As argued by Harris and Raviv (1991), the interpretation of results must be tempered by an awareness of the difficulties involved in measuring both leverage and the explanatory variables of interest. Rajan and Zingales (1995) in their study of capital structure in the G-7 economies find gearing in the UK to be positively related to tangibility (the proportion of fixed to total assets) and the size of the company, but negatively related to the level of profitability and the market-to-book ratio. The results of Rajan and Zingales (1995) are highly dependent upon the precise definition of gearing being examined.

Most of the empirical evidence on capital structure comes from studies of the determinants of corporate debt ratios e.g., Tima and Wessels (1988), Rajan and Zingales (1995), Graham (1996) and studies of issuing firms' debt vs. equity financing choice Marsh (1982), Jallilvand and Harris (1984), Bayless and Chaplisky (1990), Mackie-Mason (1990) and Jung *et al.* (1996). These studies have successfully identified firm characteristics such as size, R and D intensity, market-to-book ratio of assets, stock returns, asset tangibility, profitability and the marginal tax rate as important determinants of corporate financing choices. The effects associated with profitability ad market-to-book ratio have been found to be especially important.

Allen (1991) investigated the financial managers' perceptions of the broad determinants of listed Australian company capital structure decisions. His results were consistent with Donaldson's (1984) previously reported American funding, in that companies appear to follow a pecking order with respect to funding sources and also report policies of maintaining spare debt capacity. His study provides a practical explanation of why debt levels and company profitability might be inversely related. Filbeck *et al.* (1996) tested the Patel *et al.* (1991) hypothesis that firms have a tendency to keep their capital structure in line with the industry and found (unlike Patel *et al.*, 1991) virtually no support for herding behaviour of firms. They find only weak support for this hypothesis and conclude that firms act rationally with respect to financing decisions.

Bervan and Daubolt (2001) examined the difficulties of measuring gearing and test the sensitivity of Rajan and Zingales results to variations in gearing measures. Based on an analysis of the capital structure of 822 UK Companies, they found Rajan and Zingales (1995) results to be highly definitional-dependent. They argue that analysis of capital structure is incomplete without a detailed examination of all forms of corporate debt. The determinants of gearing appear to vary significantly, depending upon which component of debt is being analysed.

Graflund (2000) found empirical support that capital structure follow a dynamic equilibrium path. Hence, we cannot reject any of the theories suggesting on optimal capital structure. The findings justify the use of the cointegration framework on capital structure relationships and this ought to be applicable on other companies as well as industries. Fama and French (2002) agree that the negative effects of profitability on leverage is consistent with the pecking order model, but also find that there is an offsetting response of leverage to changes in earnings, implying that the profitability effects are in part due to transitory changes in leverage rather than changes in the target.

Bancel and Mittoo (2002) in their study survey managers of firms in seventeen European countries on their capital structure choice and its determinants. Financial flexibility, credit rating and tax advantage of debt are the most important factors influencing the debt policy while the earnings per share dilution is the most important concern in issuing equity. Evidence also supports that the level of interest rate and the share price are important considerations in selecting the timing of the debt and equity issues, respectively. Finally, hedging considerations are the primary factors influencing the selection of the maturity of debt or when raising capital abroad.

Horakimian *et al.* (2003) have successfully identified firm characteristics such as size, R and D intensity, market-to-book ratio of assets, stock returns, asset tangibility, profitability and the marginal tax rate as important determinants of corporate financing choices. It was reported that high market-to-book firms have low target debt ratios. On the other hand, consistent with market timing, high stock returns increase the probability of equity issuance, but have no effect on target leverage.

Singh and Hamid (1992) and Singh (1995) pioneer research into corporate capital structure in developing countries. Singh (1995) observes that developing countries firms finance themselves differently, mainly due to a different financial environment. He examines financing patterns of 100 top corporations in ten developing countries in the eighties. The basic conclusions are that, first, in developing countries there is an inverse pecking order as corporations rely heavily on external financing, especially stock issues and short-term finance. Second, top corporations in developing countries rely more heavily on equity issues than their counterparts in developed countries. While in the UK and the US, large issues of stock by large corporations are likely in the periods of high takeover activity; LDC's countries corporations use the proceeds to finance their regular investments, which is a major difference in motivation to issue shares.

Furthermore, Singh (1995) reveals that governments play substantial role in stock market formation and development, they pursue pro-equity financing policies and limit debt and equity financing of firms, especially abroad. In addition, according to him, existence of global international markets gives a special boost to stock market development in LDCs.

Omet and Mashharawe (2002) examine the nature and determinants of the company structure choice of Jordanian, Kuwaiti, Omani and Saudi non-financial listed companies. Based on the time period 1996-2001, the results indicate that Jordanian, Kuwaiti, Omani and Saudi companies have quite low leverage ratios. They argue further that the empirical results indicate that the financing decisions of Jordanian, Kuwaiti, Omani and Saudi companies can be explained by the determinants suggested by mainstream corporate finance models. Green *et al.* (2003) studied the financing activities of Indian quoted and unquoted companies using a unique new company accounts data set. Overall, their study provides a wealth of new information about corporate financial structures in the Indian economy.

According to Balla and Mateus (2003), in a country like Portugal that has suffered a strong development in the last fifteen years, the results are very similar to those obtained in Hungary. Total debt ratio is influenced by variables like asset tangibility, business risk, size and return on assets. Their finding that the more profitable the firm, the lower the debt ratio is consistent with the pecking-order hypothesis. Assets tangibility also affects financing decisions.

Baner (2004) examined the capital structure of listed companies in Visegrad countries (Czech Republic, Hungary, Poland and Slovak Republic) during the period from 2000 to 2001. The results are based on the database, which assembles financial reports of listed firms. In his study, six potential determinants of capital structure are analysed size, profitability, tangibility, growth opportunities, non-debt tax shields and volatility. According to his findings, leverage of listed firms in Visegrad countries is positively correlated with size. Leverage is negatively correlated with profitability. This finding is consistent with the pecking-order hypothesis rather than with static trade-off models. Also, leverage is negatively correlated with tangibility and non-debt tax shields. There is a negative relationship between leverage measured in market value and growth opportunities. Salawu (2006) examined the considerable factors in deciding on the appropriate amount of equity and debt in the Nigerian banking industry and the factors influencing banks' capital structure. His study revealed that ownership structure and management control, growth and opportunity, profitability, issuing cost and tax economics associated with debt are the major factors influencing bank's capital structure.

The empirical evidences discussed above came out of research investigations that mainly reproduced the literature relating to developed economies and few developing countries. Hence, the understanding of the determinants of capital structure can hardly be understated for a developing economy such as Nigeria, given the present state of international capital market.

Method of Analysis

Secondary data were used for this study. The data were sourced from the Annual Reports and Accounts of the sampled companies and annual publications of the Nigeria Stock Exchange. A sample of 50 non-financial quoted companies listed on the Nigerian Stock Exchange (NSE) randomly purposively selected for analysis. The study excludes the financial and securities sector companies, as their financial characteristics and use of leverage are substantially different from other companies.

Two different analytical techniques were employed in this study; they include the descriptive statistics and the inferential statistics (Panel data econometrics techniques). Descriptive statistics involving the use of mean, mode and median to evaluate some selected variables. Other measures of descriptive estimates like the range and standard deviation were also employed so as to see the degree of variability of these estimates. The Pooled Ordinary Least Squares (OLS) model, Fixed Effect Model and Random Effect Model were used in the analysis, which cover the data from 1990 to 2004.

Model Specification and Measurement of Variables

The model specification builds on an empirical framework using the determinants mentioned under the measurement of variables in order to discern the determinants of the capital structure of Nigerian listed firms in the sample.

The Static Model to analyze firms with panel data is as follows:

$$y_{it} = \beta \, X_{it} + \gamma_i + \lambda_t + U_{it} \tag{1}$$

with $I = 1, \ldots, N$ and $t = 1, \ldots, T$

Where:

y_{it} = The leverage of firm I in year t

X_{it} = KX1 vector of explanatory variables

β = K X 1 vector of constants

γ_i = Firm effect assumed constant for firm I over t. (individual effects i.e., firm-specific effect)

λ_t = Time effect assumed constant for given t over I. (time specific effects (e.g., interest rates, demand shocks), which are common to all firms and can change overtime

U_{it} = Error term (the time-varying disturbance term is serially uncorrelated with mean zero and variance.

The vector of explanatory variables incorporate the following variables (K = 1, 6)

$$\text{Leverage} = f\,(\text{prof, tang, grow, siz, ndts, div}) \qquad (2)$$

Where:

LEV1 = Total liabilities ratio = Total Debt/Total Assets = $\dfrac{TD}{TA}$

LEV2 = Long-term liabilities ratio = Long-term debt/Total Assets = $\dfrac{TLD}{TA}$

LEV3 = Short-term liabilities ratio = Short-term debt/Total assets = $\dfrac{STD}{TD}$

PROF = Profitability = $\dfrac{EAIT}{NA}$ = Earning after interest and tax/ Net assets.

TANG = Tangibility = Fixed Assets/Total Assets = $\dfrac{FA}{TA}$

GROW = Growth of the firm = $\dfrac{TA\ \text{in year(t)}}{TA\ \text{in year(t}-1)}$

SIZ = Size of the firm = The natural logarithm of total sales shall be used to test the effect of firm size on the leverage.

NDTS = Non-debt tax shield = $\dfrac{\text{Depreciation}}{\text{Total Assets}}$

DIV = Dividend = $\dfrac{\text{Dividend Paid}}{\text{Book Value of Equity}}$

RESULTS AND DISCUSSION

A quick review of Table 1 displays several issues. A critical examination of descriptive statistics for dependent and explanatory variables reveals the following observations. First, based on the first measure of leverage (total liabilities divided by total assets), the reported mean ratio is relatively high (0.658). In the first place, total liabilities on average amount to about 66% of total assets value. As far as the second measure of leverage (Long-term debt divided by total assets) is concerned, we could see that its means value is very low (0.082). In contrast, about ¾ of debt of US corporate is long term, while in Germany the ratio is 0.55 (Claessens *et al.*, 1998). Based on the mean values of long-term debt to total assets (i.e., 8.2%), it can be stated that Nigerian listed companies have extremely low values

Table 1: Descriptive statistics for dependent and explanatory variables (1990-2004)

Variables	Obs.	Mean	Median	Std. deviation	Minimum	Maximum
LEV 1	694	0.6583	0.6352	0.3734	0.0081	6.3003
LEV 2	694	0.0817	0.0354	0.3795	0.000	9.7689
LEV 3	694	0.6034	0.5606	0.4951	0.0081	9.4938
PROF	694	-0.4078	0.2073	13.0363	-266.0	28.1269
TANG	694	0.3121	0.2817	0.1927	0.0245	2.4280
GROW	694	1.3025	1.2076	0.5727	0.0818	11.9611
SIZ	694	14.3593	14.3903	1.8385	9.2228	18.3695
NDTS	694	0.0333	0.0285	0.0242	0.0000	0.2697
DIV	694	1.0282	0.3101	2.3310	0.0000	22.6609

of long-term debt in their respective capital structure. The analysis also suggests that large and small firms have particular difficulty accessing long-term debt finance with low and declining leverage ratios. No doubt this is partly the result of low prospective profitability of the firms.

Moreover, the standard deviation of the second measure of leverage (0.3797) is very close to the first measure of leverage (total liabilities divided by total assets). This observation predicts that companies in every stock market do not reflect large differences in their long-term debt holdings.

If we split total liabilities into long term and current liabilities, the figures 8.2 and 60%, respectively, show that debt financing for listed companies in the sample corresponds mainly to a short-term nature. This reveals a salient fact that Nigerian firms are either financed by equity capital or a mix of equity capital and short-term financing i.e., a mean of 60% as compared to a mean value of 8% posted by long-term liabilities. However, profitability has experienced a downward trend in growth with the average growth rate standing at a negative 41%. The disparity in profitability ranged from 28% maximum value for some firms to a loss of over 266% (minimum value) for others. This presents a great disparity between firms in profitability. This result reveals that companies under review will prefer less debts and more equity.

With respect to tangibility (fixed assets divided by total assets), it was discovered that fixed assets represent about 31.2% of total assets. This indicates that the bulk of companies assets quoted on the Nigerian Stock Exchange (68.8%) is held in form of current assets. This may be logical since the bulk of debt obligations of such companies come in the form of short-term debts. This may indicate a sound management principle of matching short-term debts with short-term assets.

The mean of Growth prospect is 130.3%. This indicates high rate of growth prospect for the sample of listed companies under study. The maximum value/percentage of growth ever experienced by the companies is 12% while the minimum value/percentage of growth ever experienced was 0.1%. The company size (SIZ) also experienced high growth of up to 18% and low growth of 9%. It is worthy of note to point out that this growth in size has not really translated to more profitable results. A look at the dividend (DIV) shows that dividend payment for the companies under study have grown at an average of 103% for the period under review.

Considering the standard deviation (SD) which measures the level of variation or degree of dispersion of the variables from their mean reveals that the most volatile (least stable) of the variables is profitability with an S.D of 1303% followed by dividend (DIV) 233% and company size (SIZ) 184%. The least volatile/most stable variable is non-debt tax shield (NDTS) 2%, followed by tangibility (TANG) 19%, LEV1 (37.3%), LEV2 (37.9%), LEV3 (49.5%) and growth (57.32%). The probability of all the variables is an indication that all of them are individually significant in the equation.

From Table 2, it could be seen that the correlation between total liabilities (LEV1) and other explanatory variables shows a positive correlation, which ranges between 8.38 and 27.69%. However, it is negatively correlated with the growth opportunities (GROW) and whose degree of association is -7.48%. Long-term liabilities (LEV2) is negatively correlated with profitability (-4.58%), growth (-3.87%), size of the company (-8.3%) and dividend (-1.97%). These results support the descriptive

statistics results, which show that the mean value of LEV2 is 8.2% compared to LEV3, which is 60.3%. On the other hand short-term debt (LEV3) is positively correlated with all explanatory variables except growth of the company (GROW). The degree of association ranges between 5.75 and 25.08%.

As shown above profitability has a positive correlation with LEV1 at 27.7% and with LEV3 at 16.76%. Tangibility (TANG) has positive correlation with LEV1, LEV2 and LEV3, whose degree of association are 22.68, 2.64 and 18.45%. There is a negative relationship between growth opportunities (GROW) and the three debt elements. The degree of association ranges between (-3.87%) and (-7.48%). Size of the company (SIZ) and dividend (DIV) are positively correlated with LEV1 and LEV3, while they are negatively correlated with LEV2. Non-debt tax shield (NDTS) also has positive correlation with the three debt elements.

Hence, from the above analysis, it can be deduced that the degree of associations are very weak, because the coefficients are very low. However, it is important to emphasize that the descriptive statistics and correlation analysis only indicate the associate link between variables. They do not necessary establish a causal relationship, even with high coefficients. Consequently, a more rigorous and advance econometrics technique is required to adequately capture definite causal nexus between the capital structure (leverage) and explanatory variables. These are addressed in the subsequent sections in this chapter.

Also, as it can be observed in Table 2, the correlation coefficients are not sufficiently large to cause collinearity problems in the regressions.

Determinants of Capital Structure: The Empirical Evidence

Table 3 to 5 present the results of the pooled OLS, fixed effects and random effects estimations for total debts (LEV1), long-term debts (LEV2) and short-term debts (LEV3). The analysis of the

Table 2: Correlation matrix among variables

	LEV 1	LEV 2	LEV 3	PROF	TANG	GROW	SIZ	NDTS	DIV
LEV 1	1.0000	0.0160	0.7178	0.2770	0.2268	-0.0748	0.1912	0.2744	0.0838
LEV 2	0.0160	1.0000	-0.0324	-0.0458	0.0264	-0.0387	-0.0830	0.0399	-0.0197
LEV 3	0.7178	-0.0324	1.0000	0.1676	0.1845	-0.0600	0.1608	0.2508	0.0575
PROF	0.2770	-0.0458	0.1676	1.0000	-0.0091	0.0552	0.0990	0.1274	0.1641
TANG	0.2268	0.0264	0.1845	-0.0091	1.0000	-0.1411	0.0466	0.4525	-0.0555
GROW	-0.0748	-0.0387	-0.0599	0.0552	-0.1411	1.0000	-0.0062	-0.2129	-0.0045
SIZ	0.1912	-0.0830	0.1608	0.0990	0.0466	-0.0062	1.0000	0.1540	0.4459
MDTS	0.2744	0.0398	0.2508	0.1274	0.4525	-0.2129	0.1540	1.0000	-0.0183
DIV	0.0833	-0.0197	0.0575	0.1641	-0.0555	-0.0045	0.4459	-0.0183	1.0000S

Table 3: Regression model estimates: total liabilities (LEV1)

Parameters	OLS	Fixed effect	Random effect
Constant	0.1086 (1.6848)	0.3051 (3.4576)	0.0303 (0.1997)
PROF	-0.0018 (-2.6812)*	-0.0016 (-2.1295)**	-0.0015 (-1.7123)
TANG	0.0182 (0.4311)	0.1206 (2.1709)*	0.5611 (6.6656)*
GROW	0.0243 (1.4021)	0.0086 (0.5572)	-0.0080 (-0.3932)
SIZ	0.0331 (7.8908)*	0.0208 (3.5724)*	0.0242 (2.3381)**
NDTS	0.5821 (1.5871)	0.1526 (0.4246)	3.3272 (5.5559)*
DIV	0.0079 (2.9886)*	3.89E-05 (0.0136)	9.41E-05 (0.0137)
Adjusted R^2	0.1626	0.5635	0.1784
F-statistic	23.39 (0.0000)	17.268 (0.0000)	26.082 (0.0000)
D-Watson stat	0.7158	1.18	1.024
Hausman test			26.436 (0.0002)
Number of observations	694	694	694

Note: Profitability (PROF) refers to earning after interest and tax/ net assets, tangibility (TANG) is defined as fixed assets/total assets, growth prospect (GROW) refers to the ratio of total assets in year t to total assets in year t-1. Size (SIZ) is the natural logarithm of sales. Non-debt tax shield (NDTS) is defined as the ratio of depreciation to total assets and dividends (DIV) refers to dividend paid /total equity. Numbers in parentheses appearing below the coefficients are t-values. *, ** and *** indicates coefficient is significant at the 1, 5 and 10% levels, respectively

individual leverage elements in Table 3-5 under pooled OLS reveal a series of equations that are significant at one percent level and five percent level. Although the adjusted R^2 measure differs significantly among them, from a low of 8.2% for long-term debts (LEV2) to a high of 16.26% for short-term debts. The results of the fixed effects in Tables 3-5 for all the debts elements suggest that the explanatory powers of the regressions are higher. The adjusted R^2 is satisfactory in all the cases. The adjusted R^2 is 0.5635 for the aggregate debts (LEV1), while it is 0.4813 and 0.6321 for the long-term and short-term model, respectively. The F-values are also significant in all the three models in Table 3-5.

Moreover, the outcome of the Hausman's specification test in the study rejects the hypothesis regarding the absence of correlation between the individual unobservable effects and the explanatory variables and therefore, the choice should be the fixed effects. The Hausman test indicates that the fixed effect model should be used.

In Table 3 and 5, the pooled OLS, fixed effects model and random effect model uncover a negative and significant correlation between profitability (PROF) and total debt (LEV1) and short-term debt (LEV3). Under pooled OLS, profitability is significant at 1% level for total debt and short-term debt respectively with negative coefficients (-0.0018 and -0.0017). These results suggest that profitable firms initially rely on less costly internally generated funds and subsequently look out for external

Table 4: Regression model estimates: long term liabilities (LEV2)

Parameters	OLS	Fixed effect	Random effect
Constant	0.2128 (9.0167)	0.1899 (7.3659)	0.3843 (2.8864)
PROF	0.0061 (0.4770)	-7.99E-05 (-0.3861)	0.0004 (0.4018)
TANG	0.0117 (0.7829)**	0.0354 (2.2228)**	0.0162 (0.1898)
GROW	-0.0048 (-0.8891)	-0.0079 (-1.9207)	-0.0190 (-0.7362)
SIZ	-0.0117 (-7.7703)*	-0.0085 (-4.7863)*	-0.0218 (-2.3786)**
NDTS	0.2880 (2.6081)**	0.2596 (2.3439)**	0.7696 (1.1112)
DIV	0.0033 (4.0781)*	0.004 (4.5920)*	0.0046 (0.6502)
Adjusted R^2	0.082	0.4813	0.0026
F – statistic	11.316(0.0000)	12.695 (0.0000)	1.3057 (0.2522)
D-Watson stat	0.672	0.952	1.096
Hausman test			4.8480 (0.5634)
Number of observations	694	694	694

Note: Profitability (PROF) refers to earning after interest and tax/ net assets, tangibility (TANG) is defined as fixed assets/total assets, growth prospect(GROW) refers to the ratio of total assets in year t to total assets in year t-1. Size (SIZ) is the natural logarithm of sales. Non-debt tax shield (NDTS) is defined as the ratio of depreciation to total assets and dividends (DIV) refers to dividend paid /total equity. Numbers in parentheses appearing below the coefficients are t-values. *, ** and *** indicates coefficient is significant at the 1, 5 and 10% levels, espectively

Table 5: Regression model estimates: short term liabilities (LEV 3)

Parameters	OLS	Fixed effect	Random effect
Constant	0.2169 (3.2902)	0.3493 (4.0742)	-0.1347 (-0.6509)
PROF	-0.0017 (-4.0226)*	-0.0012 (-2.7869)**	-0.0014 (-1.0412)
TANG	-0.0838 (-1.8415)	-0.0754 (-1.3547)	0.5371 (4.510)*
GROW	0.0397 (2.1700)**	0.0112 (0.7590)	0.0024 (0.0799)
SIZ	0.0199 (4.6724)*	0.0170 (3.0150)*	0.0304 (2.1379)**
NDTS	1.1909 (3.0316)*	0.5798 (1.6591)	3.8855 (4.4729)*
DIV	0.0109 (3.7328)**	-0.0011 (-0.4079)	-0.0019 (-0.1988)
Adjusted R^2	0.1156	0.6321	0.102
F-statistic	16.094 (0.0000)	22.644 (0.0000)	14.169 (0.0000)
D-Watson stat	0.715	1.279	1.65
Hausman test			18.9 (0.0043)
Number of observations	694	694	694

Note: Profitability (PROF) refers to earning after interest and tax/ net assets, tangibility (TANG) is defined as fixed assets/total assets, growth prospect (GROW) refers to the ratio of total assets in year t to total assets in year t-1. Size (SIZ) is the natural logarithm of sales. Non-debt tax shield (NDTS) is defined as the ratio of depreciation to total assets and dividends (DIV) refers to dividend paid /total equity. Numbers in parentheses appearing below the coefficients are t-values. *, ** and *** indicates coefficient is significant at the 1, 5 and 10% levels, respectively

finances if additional funds are needed. It is expected that more profitable firms will require less debt finance. Moreover, the negative relationship between leverage and profitability is consistent with the underdeveloped bonds market in all markets.

This result is consistent with the previous studies. For instance, Toy *et al.* (1974), Kester (1986), Timan and Wessels (1988), Harris and Raviv (1991), Bennett and Donnelly (1993), Rajan and Zingales (1995), Michaeles *et al.* (1999), Booth *et al.* (2001), Bervan and Danbolt (2001), Esperanc *et al.* (2003) and Hall *et al.* (2004) all find leverage to be negatively related to the level of profitability (supporting the semi-strong pecking-order theory).

Furthermore, the results show that tangibility (TANG) is positively correlated with both total debts and long-term debt/total assets ratio (LEV2), while it is negatively correlated with short-term debts (LEV3). However, the relationship between tangibility and long-term debt is significant at 5% under pooled OLS and fixed effect estimation, respectively with positive coefficient of +0.0117 and +0.0611. Moreover, the negative correlation between leverage (short-term debts) and tangibility is only significant at 1% under random effect estimation. This negative correlation between asset structure and short-term debt ratio means that short-term debts (current liabilities) are used to finance non-fixed assets, consisting basically current assets. This is the so-called maturity matching principle from Brealey and Myers (2000), which was reflected in hypothesis 2C that is clearly accepted. It seems that Nigerian banks place more emphasis on companies' tangibility when they provide them with long-term debt finance.

Hence, these results support the collateral explanation in the case of long-term debt (LEV2) and the maturity matching principle in the case of short-term debts (LEV3). The results also suggest that firms use tangible assets as collateral when negotiating borrowing, especially long-term borrowing. It is notable, however, that at the aggregate level, total debt (LEV1) was found to be negatively correlated with tangibility under pooled OLS, but not significant. This result confirms prior finding by Bervan and Daubolt (2001).

The pooled OLS and fixed effect results uncover a positive correlation between the growth prospect (GROW) and total debts ratio. These results indicate that firms with growth opportunities tend to hold more debt. This result agrees with the previous findings by Chittenden *et al.* (1996), Michaelas *et al.* (1999) and Bervan and Daubolt (2001). It is probably the case that companies with good investment (growth) opportunities are not really worried about their leverage (higher) ratios because they feel they can get the debt finance whenever they need it. This result implies that Nigerian companies with growth opportunities tend to have high leverage ratios.

Moreover, when the analysis controls for firm-specific time-invariant heterogeneity under fixed effect model. The panel data estimation under the three models gives a negative correlation between growth and long-term debts ratio (LEV2). The negative sign of growth at the aggregate long-term debt confirms that firms in Nigeria with growth opportunities contract less of long-term debt. Rajan and Zingales (1995) argue that due to the Myers and Majhif (1984) under-investment problem, firms expecting high future growth should use a greater amount of equity finance, thus suggesting a negative relationship between expected growth and leverage. Therefore, Nigerian companies contact more of short-term liabilities and less of long-term debt. This result supports the outcome of descriptive statistics in Table 1.

More importantly, the panel data estimations reveal a positive correlation between short-term liabilities (LEV3) and the growth prospect (GROW) with coefficient of +0.0397, +0.0112 and +0.0024, respectively. It was significant under pooled OLS at 5% level. This finding is consistent with the study of Bervan and Daubolt (2001). He finds a negative correlation between growth and long-term debt, but finds total debts to be positively related to the level of growth opportunities. On the other, he finds short-term debt to be positively related to growth opportunities. Overall, the level of growth opportunities appears to have little influence on the level of leverage.

In the panel data estimations, the evidence indicates that the size (SIZ) of firms has positive effect on their total debts ratio (LEV1) suggesting that large firms can better support higher debt ratios than small firms. It is noteworthy that for the pooled OLS, fixed and random effect estimations, the coefficients were significant at 1, 1 and 5% level, respectively. The pooled OLS identified a strongest statistics response (t-test) of 7.8908, followed by fixed effect of 3.5724. This result suggests that size determines firm capital structure for Nigerian companies. This result is consistent with the previous study by Berger *et al.* (1997). They find the positive relationship between leverage (LEV1) and company size to hold regardless of whether the regressions are estimated using OLS, fixed effects or random effects panel estimation.

In addition, the positive and significant correlation at both 1 and 5% level under the estimations between size and short-term debt (LEV3) suggests the fact that larger companies are more able to extract trade credit from suppliers and/or that suppliers are more willing to extend trade credit to larger companies. This may result from large firms being perceived to have lower risk of default.

The results also reveal a negative relationship between size and long-term debt ratio under pooled OLS, fixed effect and random effect estimations. The coefficients (-0.0117, -0.0085 and -0.0218) are significant at 1, 1 and 5%, respectively. The negative coefficients of the size variable (in relation to long-term debt) is in line with the prediction that small firms are more vulnerable to a liquidation risk when they are in financial distress, since banks are generally tougher against small firms. However, the negative coefficient of size under long-term debts ratio, might again be taken as evidence for the pecking order theory, which predicts that internal finance is preferred over external finance.

On the other hand, alternative tax shield, that is, Non-Debt Tax (NDTS) Seems to be positively related with debt ratios regardless of whether the regressions are estimated using pooled OLS, fixed effects or random effects panel estimation. The results show 1 and 5% level of significance in all the estimations for both long-term debt and short-term debt. However, this relationship is not in accordance with theoretical prediction and shows non-debt tax shields as not substitutes to debt related tax shield. Non-debt tax shield is a positive and significant determinant of capital structure for firms operating in countries that do not have a tax system. This is inconsistent with the tax hypothesis but may be due to NDTS proxying for collateral.

In these results, the dividend (DIV) variable is accompanied by a positive coefficient for both total debts and long-term debt ratios. Although only pooled OLS models were significant at 1% for total debt, while OLS and fixed effect results were significant at 1% level, respectively for long-term debt ratio. This seems to suggest that companies with low payout ratios are more likely to issue equity than debt.

The results for short-term debt ratio are positive and significant under pooled OLS result. This can be explained by the fact that dividend-paying firms need immediate cash, especially when their profits are limited. The best and fastest source for short-term cash is short-term bank loans. This is further supported by the fact that most of the Nigerian firms debt is in the form of short-term liabilities.

CONCLUSION AND RECOMMENDATIONS

This study examines an empirical analysis of the capital structure of selected quoted companies in Nigeria between 1990 and 2004. The analyses are performed using panel data. The results of this study further confirm some prior findings and extend the analysis using additional firm characteristics such as non-debt tax shields, dividend and a decomposition analysis of firm leverage. In particular the robust fixed effects model and pooled OLS model suggest the following relationship between capital structure (leverages) and explanatory variables.

One, the result shows that debt financing for quoted companies in the sample correspond mainly to a short-term nature. This reveals a salient fact that Nigerian firms are either financed by equity capital or a mix of equity capital and short-term financing i.e. a mean of 60% as compared to a mean of 8% posted by long-term liabilities. The major conclusion from this result is that listed firms rely heavily on equity and short-term bank financing. In addition, access to long-term debt is severely limited among all firms. Based on the data availability, six potential determinants of capital structure are analyzed in this study- profitability, tangibility, growth opportunity, size, non-debt tax shields and dividend. Considering the results for all the firms, leverage is negatively correlated with profitability, but leverage is positively correlated with profitability of the large firms. Tangibility is positively correlated with total debts and long-term debts, but negatively related to short-term debts. Growth opportunity is positively related to both total debts and short-term debts. However, the level of long-term debts components is negatively related to the level of growth opportunities. Overall, the level of growth opportunities appears to have little influence on the level of leverage i.e., capital structure.

The size of the companies is positively correlated with total debts and short-term debts, suggesting that large firms can better support higher debt ratios than small firms. The level of long-term debt is negatively related to company size. The non-debt tax shields and dividend are positively correlated with leverage. The overall result for all the firms is consistent with pecking order theory (semi-strong pecking order theory).

Thus, the results from this study have important implications for financial stability as higher ratios of short-term debt to total debt makes the corporate sector highly vulnerable to changes in economic conditions and may increase the economy wide impact of a financial crisis. Even though short-term financing is cheaper than long-term financing, they are riskier for a number of reasons; one, if a firm borrows on a long-term basis, its interest costs will be relatively stable over time, but if it uses short-term loans its interest expense will fluctuate widely, at times going quite high. Two, if a firm borrows heavily on a short-term basis; a temporary recession may render it unable to repay this debt. If the firm is in a weak financial position, lenders may not extend the loan, which could force the firm into bankruptcy.

The following recommendations are made. One, policymakers in Nigeria should take appropriate steps to lengthen the maturity structure of corporate debt. Two, government should pursue sectoral allocation of credit in favour of firms in Nigeria. This will enable firms to take advantage of the tax benefit from debt financing. In addition, government should endeavour to develop capital market to be able to absorb the increase in demand for funds.

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