

The Influence of Capital Structure on Firms' Profitability

Usakutiya Jeff Okundamiya¹, *Oghogho Michael Okundamiya²

¹Department of Banking and Finance, College of Administrative and Business Studies,
Adamawa State Polytechnic, Numa, Nigeria

²Department of Business Administration,
National Open University of Nigeria, Benin Study Centre, Benin City, Nigeria

*Corresponding Author: Oghogho Michael Okundamiya

Abstract: This research paper studied the influence of capital structure on firms' profitability in Nigeria. A sample of five (5) non-monetary companies quoted on the Nigerian Stock Exchange between 2001 and 2010 are considered. Statistical and econometric tools are employed in the analysis of the data obtained based on three profitability measures selected in this research namely, returns on asset, returns on equity and returns on capital employed. Correlation analysis is used to summarise the initial characterisation of the data, ordinary least squares (OLS) estimations are employed in the estimation models while the F-statistic is used to determine the overall significance of the profitability models developed. Results indicated that firms' capital structure have a pervasive influence on its profitability.

Keywords : capital structure, firm's profitability, returns on asset, returns on equity, returns on capital employed

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I Introduction

The problem of establishing a relationship between capital structure and the worth of a firm is one of the key issues in both the theory and practice of accounting and financial management. There have been different and conflicting theories on the correlation between the capital structure and worth of a firm. This topic has been controversial in the study of finance, and different schools of thoughts have emerged with their theoretical findings [1]-[5].

The study of the capital structure of firms cannot be decided without consideration of certain factors that influence the business activities of the firms. As reported by Muradoglu and Sivaprasad [6], an extensive research, which examines the "determinants of change in capital structure" as well as "the stability of capital structure choices and reversions over time," following Miller [7] and Myers [8], has been done. Flannery and Rangan [9], for example, showed that firms in actual fact observes objective capital structures, which give details of variations in firms' capital structures more accurately compared to either the pecking-order theory hypothesised by Myers [10] or the market-timing theory put forward by Baker and Wurgler [11]. In 2006, Ahn *et al.* [12] examined the relationship between leverage (capital structure) and investment patterns. The study found that firms with more focused investments have lower leverage compared to firms with diversified assets. Some of the important factors in determining the relationship between leverage and investment patterns include assets, taxes, debt and non-debt tax shields, financial slack, loan covenants, growth opportunities, financial flexibility, control, marketability and timing, and so forth.

In Nigeria, the capital market development, banking sector reforms and the array of investment opportunities among listed firms have encouraged, facilitated and made frequent loan acquisition and the issue of financial securities as sources of finance to companies. These developments attracted the attention of both Nigerian and foreign investors into the new windows of investment, cumulating into oversubscription of issues and refunds to investors. Considering the risky nature of these securities on the part of firms there is the need, to weigh the influence of capital structure on firms' performance when deciding on their choice of financing. Filling this knowledge gap of the importance of the capital structure, in evaluating the firm's performance will in no doubt assist firms in their choice of investment and capital structure decision respectively.

The overall aim of this paper is to investigate the influence of capital structure on firms' profitability in Nigeria. The specific objectives are to determine the relationships between capital structure and the following: returns on assets, returns on equity and returns on capital employed. Based on the aforementioned objectives, the hypotheses to be tested are that there is a significant relationship between capital structure and the following: returns on assets (ROA), returns on equity (ROE) and returns on capital employed (ROCE).

This research would be of significance to firms and managers of firms in formulating profitable financing policy, in choosing the exact mixture of debt and equity to finance business operation in order to get the most out of the firm's value, while enhancing the nation's economic development. The paper can provide useful insight to the interpretation of capital structure of firms, to potential debt holders and trade creditors, where they are stakeholders. Potential equity holders can also benefit from this research, as they can be informed on the implications of different levels of leverage, on expected returns. Moreover, the research could serve as a reference point for future researchers who intend to carry out further study on the topic.

II Research Methods

This section describes the methods adopted to achieve the set objectives of this paper, which consists of the source of data, research design and sampling, method of data analysis, the model specification and the test of significance.

2.1 Source of Data: Based on the fact that knowledge possibilities are expansive and that every study has its own boundaries, a sample of five (5) non-financial organisations quoted on the Nigeria stock exchange (NSE) was considered. These firms are Guinness Nigeria PLC (Brewery), Julius Berger Nigeria PLC (Construction), Unilever Nigeria PLC (Conglomerates), UTC PLC (Food) and OANDO Nigeria PLC (Petroleum/Marketing). These sectors are selected based on their capital-intensive nature, which favours borrowing. Secondary data are collected from these non-monetary firms for duration of ten years (2001 to 2010).

2.2 Research/Sampling Design: This entails the collection of data on variables that are sampled and the analysis of such data in order to make certain inference about a population. This research employed the ex-post facto design. In addition, the judgmental sampling design is adopted in this research paper. This method allows the researcher to personally decide on the sample unit from the research population on the basis of one's knowledge of the population, its elements and the objectives of the research.

2.3 Method of Data Analysis: Data are analysed based on the correlation between capital structure and the profitability of the firms as reviewed in literatures. The regression analysis tool is used to analyse data. The regression analysis tool carries out linear regression analysis by means of the least square technique to fit a line through a set observation. This tool is utilised to evaluate the quality of relationship between two or more variables. Three dependent variables (indices) are used to capture the firms' profitability namely, ROA, ROE and ROCE.

Estimation technique is employed to evaluate the postulates of the working hypotheses of the study. Two common techniques are used in the empirical analysis to present a robust evaluation in this paper. Firstly, statistical examination of data is carried out to initially characterise the data used in the paper. Secondly, the regression results are estimated, summarised and analysed using the Eviews 3.1 Econometric software.

2.4 Model Specification: In line with the objectives and hypothesis of this study, the following models are to be tested. In addition to capital structure, two additional variables of earnings per share and share price, which accounts for variations in monetary cost of capital in time series, are used as explanatory variable. Furthermore, the stock market activities are included in the model to measure the availability of cash flow to the firm from the capital market.

Model 1

$$ROA = a + \alpha_1 LEV_1 + \alpha_2 EPS_1 + \alpha_3 SP_1 + \alpha_4 ROA_{t-1} + e_i \quad (1)$$

Where ROA is the return on asset, a is the intercept (constant term), α_i is the regression coefficient of leverage, LEV is the debt to equity ratio (proxy for capital structure), EPS is the earnings per share and e is the stochastic error term. The autoregressive terms (lagged dependent variables) are included in the model in order to avoid autocorrelation in the model. From model 1, the hypothesis 1 shall be analysed, i.e.,

$$H_0: \alpha_1 \neq 0 \quad (2)$$

Model 2

$$ROE = b + \beta_1 LEV_i + \beta_2 EPS_i + \beta_3 SP_i + \beta_4 ROE_{t-1} + e_i \quad (3)$$

Where b is the intercept (constant term), β_i is the regression coefficient of leverage, ROE is the return on equity; and all the other variables are as earlier defined. From model 2 (Equation 3), the hypothesis 2 shall be analysed, i.e.,

$$H_0: \beta_1 \neq 0 \quad (4)$$

Model 3

$$ROCE = c + \gamma_1 LEV_i + \gamma_2 EPS_i + \gamma_3 SP_i + \gamma_4 ROCE_{t-1} + e_i \quad (5)$$

Where c is the intercept (constant term), ROCE is the return on capital employed and all the other variables are as earlier defined. From model 3, the hypothesis 3 shall be analysed, i.e.,

$$H_0: \gamma_1 \neq 0 \quad (6)$$

2.5 Test of Significance: For every multiple regression model, there should be test of significance of variables. F-Statistics, which measures how strongly a particular independent variable explains variation in the dependent variable, was adopted in this study. To test the significance, the risk level was set at 5% level of significance.

III Results and Discussion

The pair wise correlation matrix for each of the variable is reported in Table 1. The purpose of the analysis was to observe the level of correlation between the dependent variables on each of the independent variables and to consider the level of relationship among each independent variable.

Table 1: Pair-wise Correlations Matrix

	ROCE	ROE	ROA	EPS	LEV	SP
ROCE	1					
ROE	0.109178	1				
ROA	0.171352	-0.34407	1			
EPS	0.252996	-0.17042	0.075778	1		
LEV	0.57444	0.473122	-0.22795	0.1374	1	
SP	0.005048	-0.17077	-0.12995	0.92472	-0.01525	1

The clear pattern of relationships between the dependent and independent variables is that a positive correlation exists between ROCE and ROE, with respect to all the independent variables. Indeed improved capital application moves positively with other firm improvement or performance factors. On the other hand, ROE has a negative correlation with respect to other independent variables, except leverage. Leverage is also seen to have a negative relationship with ROA, but a positive relationship with ROE. The negative relationship is quite strong at about - 22.8%. This suggests that a rising ROE tends to lead to a reduction in firm's leverage.

The highest correlation coefficient is between earnings per share and share price. This is not surprising since higher share prices tend to lead to higher earnings per share. There is also a positive relationship, which indicates that increased share portends upsurge of leverage ratio in the company or vice versa. The leverage versus ROCE coefficient is also relatively high, indicating that larger leverage tends to imply more efficiency in capital application. There is indeed a sort of competition between the stock market and money market in Nigeria, among investors. Based on the correlation analysis, the risk of multi-linearity in the model is averted since relatively low correlation coefficient exists among the explanatory variables.

In order to observe the pattern of behaviour of the firm's performance arising from covariance in firm capital structure, the OLS estimation and the outcome of the coefficients are reported.

The results of Model 1, which explains the behaviour of ROA is presented in Table 2. Model 1 has impressive diagnostic outcomes. The R-squared value of 0.711 indicates that over 71 % of the systematic variations in ROA are explained by variations in the explanatory variables at any given time. The F-value of 8.62 indicates good overall performance. This value easily passes the significance test at the 5% confidence level. This implies that a noteworthy linear relationship actually exists between ROA and all the independent variables combined. From this, it can be deduced that the hypothesis of a significant relationship between ROA and all the independent variables combined cannot be rejected.

Table 2: Capital Structure and Firm ROA

Variable	Coefficient	T-Ratio
Constant (b)	33.04	4.969
EPS	6.813	4.162
LEV	- 0.209	-2.962
SP	- 0.518	-4.296
ROA (-1)	- 0.465	3.205
R² = 0.711	F = 8.62	DW = 2.03

From Table 2, the individual test of significance of the explanatory variables indicates that all the coefficients are significant at the 5% confidence level. This suggests that these factors effectively predict the behaviour of ROA for the firms sampled in this study. Moreover, both the coefficients of LEV and SP are negatively signed, implying that they both have negative effects on ROA. Particularly, rising leverage seems to reduce a firm's ROA in the long run. This is the only performance variable that has a negative relationship with leverage. Consequently, the relative efficiency of assets usage by firms is negatively affected by their debt

structure. On the other hand, share prices have negative effect on the ROA, suggesting that the internal performance of the firm does not easily reflect the market performance.

In Table 3, the result of model 2, i.e., (3), which explains the behaviour of the ROE is presented. This model has less than impressive diagnostic features. The R-squared value of 0.40 indicates that about 40% of the symmetric variations in ROE are explained by variations in the explanatory variables. In order to determine the overall performance of the model the F-statistic was observed. The F-value of 2.34 just manages to pass the 10% significance test. This indicates that a significant linear relationship actually exists between ROE and all the independent variables combined. When these variables change together, they produce a significant effect on the firms return on assets.

Table 3: Capital Structure and Firm ROE

Variable	Coefficient	T-Ratio
Constant (a)	-657.50	0.439
EPS	-120.30	3.380
LEV	15.27	-0.1996
SP	5.70	-0.337
ROE(-1)	-0.37	3.311
R² = 0.40	F = 2.34	DW = 2.20

A close examination on the individual coefficient test indicates the particular impact of each explanatory variable on ROE. Only the coefficient of leverage is significant at 5% confidence level, all the other variables failed the significance test at 5% confidence level. This shows that capital structure (leverage) has a considerable influence on a firm's return on equity. Effective performance of a firm in the market is actually predicted by the level of its capital structure. An increase in the leverage of a firm tends to boost its ROE. Perhaps, this is due to the fact that rising debt structure in the firm tends to cause shareholders to force managers to be more responsible in management. The DW statistic value of 2.20 suggests the absence of autocorrelation in the model. Thus, the coefficients in the model are reliable for structural analysis and policy directions.

Table 4 presents the result of the analyses of Model 3, which indicates the behaviour of the ROCE. The R-squared value of 0.596 indicates that it has a slightly high explanatory ability at any given time. The F-value of 5.17 is quite higher than the 1% critical value of 2.45. This indicates good overall performance despite average R-squared value. Consequently, the hypothesis that a significant relationship exists between ROCE and all the independent variables combined cannot be rejected. In addition, changes in capital structure and the other variables help to predict the behaviour of ROCE in firms.

Table 4: Capital Structure and Firm ROCE

Variable	Coefficient	T-Ratio
c	16.398	4.969
EPS	7.994	4.162
LEV	0.331	-2.962
SP	- 0.553	-4.296
ROCE(-1)	- 0.167	3.205
R² = 0.596	F = 5.17	DW = 2.31

A close examination on the individual coefficient of the explanatory variables is performed considering their signs and their level of significance. LEV and EPS have positive coefficients, SP has a negative coefficient, and the lagged ROCE has an insignificant negative coefficient. This indicates that the share price negatively affects the firms ROCE. The lagged ROCE coefficient suggests that the long term movement of the ROCE is not ensured.

At 5% level of significance, EPS, SP and lagged ROCE coefficients are significant, while that of LEV passes the 10% test. This suggests that capital structure has significant positive influence on the ROCE of the firm. Rising debt composition of the firm's capital structure tends to force managers to use capital more efficiently in order to generate adequate resources to retire the debt. The DW statistic value of 2.31 suggests the absence of autocorrelation in the model. Consequently, the coefficients in Model 3 are reliable for structural analysis and policy directions.

IV Conclusion

This research paper investigates the empirical correlation between the capital structure and profitability of a firm. Three profitability measures were selected in the research namely, returns on asset, returns of equity and returns on capital employed. It is argued that the pattern of firm financing has a strong effect on its behaviour in terms of shareholders value and the intrinsic performance of the firm. Moreover, the capital structure of a firm is measured by the ratio of equity to debt as well its tax obligations, size and stock market

support. In addition, other market performance factors are included in the analysis because it provides an alternative source of financing to firms in terms of commercial papers and other money market instruments.

Five non-financial companies are selected from the Nigerian Stock Exchange to carry out the empirical analysis. These firms are Guinness Nigeria PLC (Brewery), Unilever Nigeria PLC (Conglomerates), Julius Berger Nigeria PLC (Construction), UTC PLC (Food), and OANDO Nigeria PLC (Petroleum). Both statistical and econometric tools are employed in the analysis using data obtained from the Nigerian stock exchange for the period 2001 to 2009. Correlation analysis was used to summarise the initial characterisation of the data in this study while Ordinary Least squares estimations were employed in the estimation of the models. Results from the empirical analysis showed that a rather unclear relationship exists between capital structure and performance of a firm. Specifically, the following findings are presented:

- (a) that the capital structure of a firm has a significant negative influence on its return on asset; hence, as the capital structure moves in favour of debt, the return on asset tends to deteriorate in the firms;
- (b) that leverage of a firm, which is a measure of the firm's capital structure, has a significant positive influence on its return on equity; thus, a higher debt equity ratio tends to dampen the efficiency in manager's handling of shareholders' funds;
- (c) that the capital structure of a firm has a significant positive effect on its return on capital employed, this suggests that the efficiency of capital use of firms is improved by higher leverage in the firms.

V Recommendations

The following recommendations, which are useful to both the market regulators and investors in the market, are made based on the findings in this paper.

- (a) Optimising the wealth of shareholders requires a perfect mix of equity and debt. When self-interested managers opt to undertake negative present value task, shareholders should insist on the issuance of debt. On the other hand, such companies may forgo positive present value development. Consequently, the optimum debt structure should be established by balancing the optimum agency cost of debt and that of managerial discretion.
- (b) In maximising shareholders' wealth, a very important avenue for generating debt for the company should be the capital market. Firm's participation in the market would not only expand the market but would provide the necessary information to shareholders in watching the firm.
- (c) The high positive significance of the leverage coefficient shows that varying the capital structure composition a firm could increase its overall performance. This is an important policy recommendation for business managers, since they can utilise debt to establish the optimum capital structure to maximise shareholders' wealth.
- (d) Lastly, larger firms should also consider looking inwards within the firm for their financial needs since it has been shown that larger firms tend to perform better in terms of asset

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