

## Optimisation of Capital Structure and Return on Assets of Listed Non-Financial Firms in Nigeria

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### **Abstract**

*This study examined the optimization of capital structure and return on assets of listed non-financial firms in Nigeria for the period 2009 - 2018. Data for this study were obtained from the annual reports of sampled firms and multiple regression of ordinary least square technique of pooled regression, fixed effects and random effects was used for the analysis. The results reveal that return on assets (ROA) is negatively related to both debt to capital employed (DCE) and equity to capital employed (ECE), while its relationship with debt to equity (DE) depends on which of the three models is a plausible description of the relationships being studied. The study concludes that the fixed effects model is the most plausible description of the relationship between capital structure variables and return on assets of the selected quoted firms in Nigeria. Therefore, the study recommends amongst others that chief executive officers and chief finance officers should design an appropriate capital structure architecture that would improve the wealth maximization of shareholders.*

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**Keywords:** *Capital Structure, Debt to capital Employed, Debt to Equity, Equity to capital employed, Return on assets,*

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### **INTRODUCTION**

The study of capital structure and financial performance of corporate entities have drawn extensive debate as a result of the relevance of capital as a major source of financing corporate businesses world-wide. According to Abu-Tapanjeh (2006), considerable amount of studies have been conducted on the correlation between capital structure and financial performance of corporations in developed and developing economies. These studies have provided arguments on the need to enhance the capital structure variables as a means of improving the financial performance of listed corporations (Ahmad et al., 2012; Shubita and Alsawallah, 2012; Appah, Okoroafor and Bariweni, 2013). Appah (2019) stated that capital structure decisions represent another important financial decision of a business organization apart from investment decisions. Ali et al (2011) noted that the decision regarding the use of debt and equity modes of financing is not an easy job, with the fact that a number of benefits and costs are associated with the management decisions regarding the optimal use of capital structure. It is important because it involves a huge amount of money and has long- term implications on firms. Appah, Okoroafor and Bariweni, (2013) noted that effective financial management and capital structure components are important to obtain better financial performance of corporate entities. A false decision about the capital structure may lead to financial distress and even to bankruptcy. Hardiyabto, Achسانی and Sembel (2014) assert that capital structure is a mix of debts and equities used by a company to finance its investment. Capital structure is determined through a combination of equity and debt financing. Appah, Okoroafar and Bariweni (2013) provided that corporations can use either debt or equity capital to finance their assets. The best

choice is a mix of debt and equity. One of the most perplexing issues facing financial managers is the relationship between capital structure, which is the mix of debt and equity financing and stock prices (Azhagaiah and Gavoury, 2011). Al-Qudah (2011) noted that the association between capital structure and firm value, how firms choose their capital structure and how much they should borrow based on various trades –off between the cost and benefit of debt versus equity.

There are several studies suggesting a negative nexus between capital structure and firm performance (Karadeniz, Kandır, Balcilar, and Onal, 2009; Chakraborty, 2010) while others reveal a positive association between financing choices and firm performance (Saeedi and Mahmoodi, 2011), moreover a number of studies find either poor or no significant relation between debt level and financial performance (Tang and Jang, 2007; Ebaid, 2009). Though many research studies have been undertaken in the field of capital structure and firm performance, very few studies have been undertaken to find the impact of capital structure on financial performance. Therefore, to fill this gap in the literature and shed light, this present study attempts to investigate the impact of capital structure and financial performance of listed entities in Nigerian Stock Exchange. Therefore, this study empirically investigates optimization of capital structure on the return of assets of listed corporations in Nigeria.

## LITERATURE REVIEW

The literature review of this current study is divided into three sub-sections, namely; theoretical framework, conceptual framework and empirical review.

### Theoretical Framework

The modern capital structure theory begins with the proposition of Modigliani Miller II, which stated the effect of debt on the firm value (Hardiyabto, Achsani and Sembel, 2014). According to their argument, corporations will benefit from the use of debt in the form of tax shield of the interest expense that can be deducted in calculating corporate taxes. Therefore, the theoretical framework of this study consists of three theories of capital structure. These theories are trade-off theory, pecking order theory and timing theory.

**Trade – off Theory:** This theory determines an optimal capital structure by adding various market imperfections, including taxes, costs of financial distress, and agency costs, but retains assumptions of market efficiency and symmetric information (Appah, 2019). Under the tradeoff theory, firms adjust capital structure towards a target that may change with firm characteristics, investor characteristics, and the tax environment. According to the static tradeoff theory, if firms seek external financing, they should issue equity when their leverage is above the desired target leverage, issue debt when their leverage is below the target, or issue debt and equity proportionately to stay close to the target (Appah, Okoroafor and Bariweni, 2013; Khan and Adom, 2015; Appah, 2019)

**Pecking Order Theory:** In the pecking order theory described by Myers (1984), there is no optimal capital structure. To be more precise, if there is an optimum, the costs of deviating from it are insignificant in comparison to the cost of raising external finance. The costs of raising external finance arise because managers have more information about the prospects of the firm than outside investors do, and because investors know this (Appah, Okoroafor and Bariweni, 2013). The pecking order theory proposes that firms follow the standard pecking order in their financing decisions (Appah, 2019). Firms prefer internally generated funds, and raise external funds only if internal funds are insufficient. If external funds are required, they prefer straight debt, then convertible debt, and finally external equity (Khan and Adom, 2015).

**Market Timing Theory:** In the market timing theory, managers may conclude that their stock is overvalued or undervalued *and* that outside investors will underreact to issue or repurchase announcements (Appah, 2019). This underreaction leaves some room to exploit the perceived mispricing and thereby benefit ongoing shareholders. The market timing (or windows of opportunity) theory, states that firms prefer external equity when the cost of equity is low, and prefer debt otherwise. According to the market timing theory, corporate executives sometimes perceive their risky securities as misvalued by the market (Appah, Okoroafor and Bariweni, 2013). Conditional on having financing needs, firms issue equity when they perceive the relative cost of equity as low, and issue debt when they perceive the relative cost of equity as high (Khan and Adom, 2015).

## **Conceptual Framework**

### **Capital Structure**

Capital structure is the combination of long-term debt, short-term debt, and equity capital (Appah, Okoroafor and Bariweni, 2013). It shows how a company finances its overall operations and growth by using different sources of funds (Uremadua nd Onyekachi). Capital structure of firms varies with its size, type and some other characteristics or determinants such as age of company, company size, asset structure, profitability, company growth, company risk and liquidity (Appah, 2019). The purpose of managing capital structure is to mix the financial sources in order to maximize the wealth of shareholders and minimize the company's cost of capital. Capital structure concerns the composition of the liability of a company, which is the relative to the several financial sources in the composition of the total obligation. Capital structure decision is very vital for any organization, every organization wants a mix of arrangements that eventually achieves or increases its performance and/or profitability and overall value (Uremadu and Onyekachi, 2019). The optimal capital structure of a firm is the capital structure with minimum cost implications which maximized the total value of the firm. It could be obtained using a combination of debt and equity financing that would give the firm a minimum cost of capital and enhanced market value. The amount of debt contained in a firm's optimal capital structure is referred to as its debt capacity (Appah, 2019; Onyekachi, 2019).

### **Financial Performance**

The definition of performance could vary, depending on the context of its use (Atrill et al., 2009). A wide variety of firm performance definitions have been introduced in the literature. Firm financial performance is generally defined as a measure of the extent to which a firm uses its assets to run the business activities to revenues. It examines the overall financial health of a business over a given period of time and can be used to contract the performance of identical firms in similar industries or between industries in general According to Atrill et al. (2009), the ratios that may be utilized to calculate the firm's profitability such as the return on assets (ROA), return on equity (ROE) and return on investments (ROI). These ratios express the success of a firm in generating profits or returns from the resources owned. Previous research by Fosu (2013) highlights return on assets (ROA) as a suitable measure for firm performance and the measure is widely used in capital structure literature (Derayat, 2012; Singh, 2013). ROA takes the total assets into account and thereby the high leveraged firms are not receiving a high profitability ratio as in the case of return on equity (ROE) (Fosu, 2013).

### **Empirical Review**

Yinusa, Ismail, Yulia and Olawale (2019) studied impact of capital structure on firm performance in Nigeria using the dynamic panel model on panel data of 115 listed non-financial firms in Nigeria. The study revealed a statistical significant relationship exists between capital

structure and firm performance particularly when debt financing is moderately employed. However, the paper found evidence of non-monotonic relationship between capital structure and firm performance when firms in Nigeria employed excessive debt financing which impinged on the performance of firms.

Hossain, Khan and Khalid (2019), studied the empirical analysis of capital structure and firms financial performance in a developing country. The investigation has been conducted through using panel data procedure for a sample of Dhaka stock market enlisted all IT firms during the year of 2013-2017. This research works have been performed through the three performance measures including return on equity, return on asset, and earnings per share as dependent variables, where capital structure is considered as debt ratio (DR), equity ratio (ER), long-term debt ratio (LTDR), short-term debt ratio (STDR) and used as independent variables. The studied revealed that capital structure has positively significant impact on return on asset (ROA).

Uremadu and Onyekachi (2019) examined the impact of capital structure on corporate performance in Nigeria using multiple regression of Ordinary Least Square (OLS) analytical technique for the analyses the data. The results from the study showed a negative and insignificant impact of capital structure on corporate performance of the consumer goods firm sector of Nigeria. That long-term debt ratio to total asset had a negative and insignificant impact on returns on assets, while total debt ratio to equity also had a negative and insignificant impact on returns on assets.

Nehu, Vintila and Gherghina (2018) examined the impact of capital structure on risk and firm performance of listed companies in Bucharest Stock Exchange for the period 2000 to 2016. Their study applied multivariate fixed-effects regressions, as well as dynamic panel-data estimations (two-step system generalized method of moments, GMM). The results showed that leverage is positively correlated with the size of the company and the share price volatility. On the other hand, the debt structure has a different impact on corporate performance, whether this calculated on accounting measures or seen as market share price evolution.

Dada and Ghazali (2016) studied capital structure and firm performance in Nigeria for the period 2010 to 2014 on 100 non-financial firms of listed on the Nigerian Stock Exchange (NSE). Their study found out that assets turnover and, tangible have a positive and significant relationship with Tobin's Q. Also, risk maintains negative and significant relations with Tobin's. Moreover, the age of a firm has negative and significant with ROA and Sales growth maintains positive and significant with ROA.

Rouf and Abdur (2015) examined capital structure and financial performance of listed non-financial firms in Dhaka Stock Exchange for the period of 2008 to 201. This study showed debt, debt to equity and proprietary of equity have significant negative impact on firm performance as return on asset, return on sales.

Onaolapo and Kajola (2010) examined the impact of capital structure on firm's financial performance using sample of thirty non- financial firms listed on the Nigerian Stock Exchange during the seven- year period, 2001- 2007. The result shows that a firm's capital structure surrogated by Debt Ratio; debt ratio has a significantly negative impact on the firm's financial measures (Return on Asset, ROA and Return on Equity, ROE). The study by these findings, indicate consistency with prior empirical studies and provide evidence in support of Agency cost theory.

Majumdar and Sen (2010) examined the role of different types of debt on the strategic behaviour and performance of firms in India. The finding indicates that only fixed deposit has

significant and positive relationship with performance. Other types of debt were not found to be significant. In a related study, San and Heng (2011) investigated the relationship between capital structure and performance of Malaysian firms in the construction sector before and during crisis that started since 2007. The results indicated that return on capital was found to be positively related to debt to equity market value for big firms. The same positive relationship was found between earnings per share and long term debt to capital. However, earnings per share were found to be negatively related with debt to capital. They also reported that operating margin and long term debt to common equity were positively related for medium companies and earnings per share and debt to capital has negative relationship in small companies.

Ebaid (2009) investigated the association between debt level and financial performance of 64 listed non-financial Egyptian firms. The study showed a negative significant relationship exists between short term debt, total debt and financial performance measured by Return on asset but the relationship between financial leverage and ROA was not found to be significant when long-term debt was used as measure of financial leverage. The study also reported that short-term debt, long-term debt and total debt were found not to have significant influence on financial performance when it was measured by ROE and Gross Margin. Generally, they assert that the results show that the capital structure choice has a weak-to-no impact on firm's performance in Egypt.

## MATERIALS AND METHODS

The data used in this research is secondary data from the annual financial statements of the sampled companies (Nestle, Unilever, Union Dicon, Honeywell, Guinness, Champion, and Vitaform) for the period 2009 to 2018. The annual financial statements are financial statements audited by public accounting firms; therefore the validity, accuracy, and consistency of the data used are reliable.

The empirical model of the study is specified as follows:

$$ROA_{it} = \beta_0 + \gamma_i + \beta_1 DE_{it} + \beta_2 DCE_{it} + \beta_3 ECE_{it} + e_{it}$$

Where ROA = return on assets, DE= debt to equity ratio, DCE = debt to capital employed ratio and ECE = equity to capital employed ratio. Further,  $\beta_0$  = intercept term,  $\beta_1$ ,  $\beta_2$  and  $\beta_3$  are betas that capture the effects of debt-equity ratio, debt-capital employed ratio and equity-capital employed ratio respectively. Also,  $\gamma_i$  is the model heterogeneity parameter, which captures the effects of unobserved firm-specific factors such as organization's culture and management style. The subscript,  $i$ , indicates the cross-sectional dimension of the panel data while the subscript,  $t$ , indicates the time series dimension.

There are three panel data methods; pooled regression, fixed effects and random effects, that can equally estimate the above model. The differences in these methods lie in the role of the heterogeneity parameter,  $\gamma_i$ . If  $\gamma_i$  is assumed to play no important role in our model (i.e.  $\gamma_i = 0$ ), then, the pooled regression method would provide the most plausible estimates of the relationship between capital structure variables and return and assets. On the other hand, if we assume that  $\gamma_i$  has direct influence on  $ROA_{it}$  ( $\gamma_i \neq 0$ ), and also correlates with  $DE$ ,  $DCE$  and  $ECE$ , then, the fixed effects method would provide the most plausible results. However, if  $\gamma_i$  is assumed not to correlate with  $DE$ ,  $DCE$  and  $ECE$ , then the random effects method would give the best results. All these imply that specification tests would be used to determine which method is best for our panel dataset. To this end, we would employ both Likelihood ratio and Hausman tests.

## DATA PRESENTATION AND ANALYSIS

### 4.1 Pooled Descriptive Statistics

Table 1 shows some summary statistics that describes the basic characteristics of the data. As we can see that the mean of return on assets (ROA) is -9.40%, indicating that the selected quoted firms, on average, recorded losses between 2009 and 2018. The standard deviation of 108.61 shows that ROA recorded very high variability over the same period. The skewness and Kurtosis coefficients of -5.20 and 40.24 show that the distribution of ROA across the firms is negatively skewed and leptokurtic. This implies that firms whose ROA is lower than the average are more than those whose ROA is higher than the average, and that some firms' ROA are much higher than others. Thus, there are outliers in the ROA series. On the other hand, debt to equity ratio (DE), debt to capital employed (DCE) and equity to capital employed (ECE) averaged 1.04, 0.32 and 0.83 respectively with relatively low variability. Further, while DE ( $S = -0.73$ ) and DCE ( $S = -5.39$ ) both have a negatively skewed distribution, ECE ( $S = 4.89$ ) has a positively skewed distribution. All distributions are leptokurtic ( $K > 3$ ), indicating the presence of outliers. Thus, to minimize the effects of these outliers, the empirical estimation would be based on the logarithm of the variables. Overall, none of the study variables has normal distribution as indicated by the Jarque-Bera statistics with almost zero p-value, which clearly rejects the normal distribution assumption in all cases.

**Table 1: Descriptive Statistics**

Variable	Mean	Std. Dev.	Skewness (S)	Kurtosis (K)	Jarque-Bera	p-value
ROA	-9.40	108.61	-5.20	40.24	4362.07	0.0000
DE	1.04	1.69	-0.73	3.99	9.23	0.0098
DCE	0.32	2.47	-5.39	38.68	4053.18	0.0000
ECE	0.83	0.43	4.89	34.53	3180.77	0.0000

### 4.2 Empirical Analysis

Table 2 shows the estimation results for the three panel data models. Panel A shows the estimated beta coefficients while Panel B shows the goodness of fit statistics.

**Table 2: Panel Data Results; brackets contain p-values**

Variable	Pooled Regression	Fixed Effects	Random Effects
<b>Panel A: Beta Estimates</b>			
Constant ( $\beta_0$ )	1.5897 (0.0000)	2.1177 (0.0000)	1.7315 (0.0000)
DE ( $\beta_1$ )	0.7836 (0.4385)	-0.4748 (0.6407)	0.4895 (0.5968)
DCE ( $\beta_2$ )	-0.8966 (0.3452)	-0.0368 (0.9667)	-0.6296 (0.4635)
ECE ( $\beta_3$ )	-0.3431 (0.7932)	-0.2842 (0.8268)	-0.2535 (0.8338)
<b>Panel B: Goodness of Fit Statistics</b>			
$R^2$	0.0986	0.3580	0.0432
$\bar{R}^2$	0.0411	0.2357	-0.0178
F-ratio	1.7150 (0.1767)	2.9281 (0.0108)	0.7080 (0.5520)

Durbin-Watson	1.1148	1.2843	1.1680
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From Panel A of Table 2, we can see that all the beta estimates are associated with a p-value that is higher than the conventional levels in all cases, hence, debt to equity ratio, debt to capital employed ratio and equity to capital employed ratio, none has a significant effect on return assets. However, for the direction of their relationships, we can see that while  $\beta_2$  and  $\beta_3$  both have a negative sign for all models, the sign of  $\beta_1$  is mixed. This indicates that ROA is negatively related to both DCE and ECE, while its relationship with DE depends on which of the three models is a plausible description of the relationships being studied.

From Panel B of Table 2, we can see that the  $\bar{R}^2$  is 0.0411, 0.2357 and -0.0178 for pooled regression, fixed effects and random effects models respectively. This implies that the proportion of the variance of ROA that is due to the joint influence of DE, DCE and ECE is relatively high for the fixed effects model but very low and even negative for pooled regression and random effects models. Further, while the F-ratio for both the pooled regression (p-value = 0.1767) and random effects (p-value = 0.5520) models is insignificant, that of the fixed effects model (p-value = 0.0108) is significant at 5% level. Also, the Durbin-Watson statistic for the fixed effects model (DW = 1.2843) is higher than that of the pooled regression (DW = 1.1148) and random effects models (DW = 1.1680). All these suggest that the fixed effects model provides much better estimates of the relationship between capital structure variables and return assets.

Table 3 shows the model selection tests for the plausible panel data model. First, the Likelihood ratio test compares the pooled regression model with the fixed effects model under the null hypothesis that the former is a better description of the study relationships. As Table 3 shows, the test statistic is associated with a p-value of 0.0040, indicating that the test is highly significant. Thus, the null hypothesis that the pooled regression model is a better description of the relationship being studied is strongly rejected. Second, the Hausman test compares the random effects model with the fixed effect model under the null hypothesis that the former is a better description of the study relationships. As Table 3 shows, the associated p-value of the test statistic is 0.0239, indicating that the test is significant at 5% level. Thus, the null hypothesis that the random effects model is better than the fixed effects model is rejected. These results, therefore, provide sufficient evidence that the fixed effects model is the most plausible description of the relationship between capital structure variables and return on assets of the selected quoted firms in Nigeria.

**Table 3: Model Specification Tests**

Test	Test statistic	p-value
Likelihood Ratio	17.3068	0.0040
Hausman	9.4500	0.0239

Table 4 shows the estimated fixed effects which represent the unobserved firm-specific factors that affect the return on assets directly and also correlates with the capital structure variables. As this Table shows, we can see that all the companies have positive fixed effects, except Union Dicon whose unobserved coefficient is negative. This implies that for most of the selected firms, the unobserved factors such as organization's culture, management style etc. have positive and highly significant effects on return on assets. However, the effect of these latent factors is highest for Nestle, followed by Guinness and then Unilever.

**Table 4: Estimated fixed effects.**

Heterogeneity	COMPANY	Effect
$\gamma_1$	Nestle	28.12864
$\gamma_2$	Unilever	17.30270
$\gamma_3$	Union Dicon	-98.88792
$\gamma_4$	Honeywell	11.81986
$\gamma_5$	Guinness	18.01400
$\gamma_6$	Champion	8.539325
$\gamma_7$	VitaFoam	15.08340

## CONCLUSION AND RECOMMENDATIONS

The present study examined optimization of capital structure on return on assets of listed firms on the Nigerian Stock Exchange. The results reveals that ROA is negatively related to both DCE and ECE, while its relationship with DE depends on which of the three models reveals a plausible description of the relationships is being studied. Also the study provide sufficient evidence that the fixed effects model is the most plausible description of the relationship between capital structure variables and return on assets of the selected quoted firms in Nigeria. Therefore, the study recommends that chief executive officers and chief finance officers should design an appropriate capital structure architecture that would improve the wealth maximization of shareholders; firms (both highly and lowly levered) should take into consideration the amount of debt incurred because it is a major determinant of firm's performance; firms should use more of equity financing than debt financing in their business operations, in as much as the value of a business can be improved using debt finance, it gets to a point that it becomes detrimental to the value of the to the growth and success of business activities; government should provide a more friendly environment so that businesses can thrive and thus increase performance level. This is because macroeconomic variables positively affect the performances of most firms in Nigeria.

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