

# Capital Structure and Firm Performance: Empirical Evidence from Nigeria Listed Non - Financial Firms

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*Abstract:* - The high lending rates, high level of inflation, volatility of exchange rate and insecurity makes the business environment in Nigeria very challenging and impacts on the ability of firms to raise equity or access debt to finance their operations. Debt could be either short tenured or long tenured depending on the maturity structure. The associated cost of each form of capital differs, therefore the mix of debt and equity that a firm uses to finance its operations will impact on the financial performance. Establishing an appropriate mix of debt and equity that will optimize financial performance is thus a critical issue for firms and it is for this reason that the study seeks to assess the effect of capital structure on the financial performance of listed non-financial firms in Nigeria. The study was based on positivism philosophy and adopted the ex-post factor research with historical data obtained from financial statements of all non-financial companies listed on the Nigerian Stock Exchange over a period of twelve years from 2010 to 2021. Panel data analysis was employed for the study by using the pooled regression model, the fixed effects model and the random effects model. Using the Hausman's Chi square test statistic, the fixed effects model was selected as the appropriate model for the study. The empirical evidence from the results shows that at 5% level of significance short term debt which had significant, positive effect on return on assets and Tobin's Q, while long term debt had a significant negative effect on the return on assets. Total equity also had significant positive effect on the Tobin's Q. However, the effect of long-term debt on Tobin's Q and total equity on return on assets was negative and insignificant. The results suggest that the effect of the short-term debts on financial performance supports the trade-off theory of capital structure which states that debt has a positive effect on performance while the effect of long-term debt on return on assets supports the pecking order theory of capital structure which states that profitable firms rely initially on internally generated funds before looking for external financing. The study concludes that the listed non-financial firms are financed by a mix of short-term debt, long term debts and equity which have mixed effects on their financial performance. The study therefore recommends that firms in Nigeria should have appropriate policies to guide their capital structure decision that will ensure that they have the appropriate mix of debt and equity that will optimize their performance.

*Key-Words:* - Capital Structure, Firm Size, Long Term Debt Ratio, Return on Assets, Short Term Debt Ratio and Tobin's Q

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## 1 Introduction

Funding is central and vital for any business since its availability facilitates successful operations and the ability to exploit investment opportunities. [1]are of the view that the liberalization of economic policies across the world has expanded investment opportunities, widened financing options and increased the dependence on the capital markets. [2]state that businesses require capital to start operations and subsequently expand their operations. The funds that firms utilize in operations could be from debt sourced from providers of capital or equity invested by the shareholders of a company. Capital

structure decisions revolve around choosing between debt and equity.

According to [3]the mix of debt and equity that a firm utilises to finance its operations is a critical issue because of their cost components and effect on earnings before interest and taxes that ultimately affects the intrinsic value of the firm. Capital structure decisions are fundamental and crucial as it impacts on financial performance of firms ([4], Mutua and [5]& [6]

According to [7]corporate finance decisions are important and remains vital and paramount to the operations of companies. Some firms could be all

equity, a mix of equity and debt or even all debt as the case may be, but [6]state that the most realistic mix is that which combines a certain percentage of debt and equity in the capital structure to take advantage (if any) of the benefits of leverage.

However, most studies focus on the debt variables while adequate attention has not been given to the equity variables. This study is an effort to contribute to the empirical literature on the subject and provide a basis for testing the applicability of the western developed theories in Nigeria.

## 2 Problem Formulation

The high lending rates, high level of inflation, volatility of exchange rate and insecurity in Nigeria makes the business environment very challenging. Businesses operating in this environment require capital to finance their operations and [3] reports that the mix of debt and equity that a firm utilises to finance its operations is a critical issue because of their cost components and its effect on the financial performance of firms. Several theories have been advanced to explain the relationship between capital structure and firm value including the [8]irrelevance theory, the trade-off theory by [9], the Agency Theory of [10], the Pecking order theory [11]and the Market Timing Theory by [12]. The existing theories emerged from studies in the developed economies.

Empirical evidence on the subject provides mixed and contradictory results: Scholars such as [13] [14]established a positive relationship between capital structure and performance while [15][4], and [16]established a negative relationship. [17] state that here is no agreement by scholars regarding the appropriate mix of debt and equity to optimize performance even in the developed nations. Most of the studies were either sector specific or considered a few companies across all the sectors, few of the studies (if any) was a census of all the listed non-financial firms in the Nigeria Stock Exchange (Nigerian Exchange Group). The findings of existing studies contribute to the capital structure literature but do not add up to a conclusive and complete explanation for corporate financing decisions especially in a developing country like Nigeria.

The selected period of the study, 2010 to 2021, starts with the period of recovery of the capital market from the effects of the 2008/2009 global financial crisis, the 2016 recession in the country and the 2019/2020 Covid 19 pandemic and the gradual recovery of the economy in 2021 which has not been considered in the existing studies. The capital that

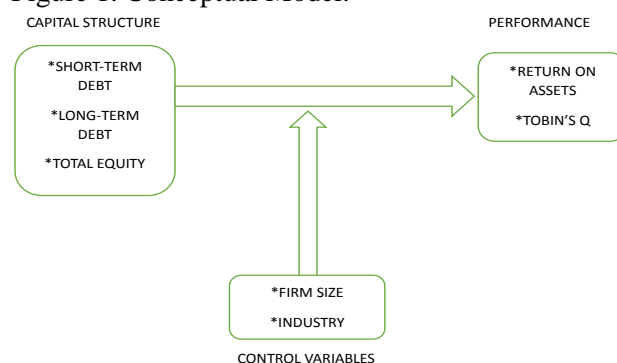
businesses use either in the form of debt or equity to finance their operations and debts could either be long tenured or short tenured. Therefore, an understanding of the effect of short-term debts, long term debts and equity on the financial performance of listed non-financial firms in Nigeria would be relevant to finance managers, investors, lenders, creditors, researchers as well as policy makers.

Also, the peculiarity of the Nigerian business environment creates a need for further research on the subject to assess the effect of capital structure of listed non-financial firms in Nigeria on their financial performance to generate more knowledge within the context of the study.

### 2.1 Objectives of the Study

The empirical literature reviewed shows that there is no consensus in literature on the effect of capital structure on financial performance of firms. Therefore, the general objective of the study is to assess the effects of capital structure on the financial performance of listed non-financial firms in Nigeria. The other specific objectives are to assess the effect of short-term debt, long-term debt and total equity on firms' performance proxied by the return on assets and Tobin's Q of listed non- financial firms in Nigeria. This is thus represented in the conceptual model in fig 1 below:

Figure 1. Conceptual Model.



Source: Researcher (2022)

#### 2.1.1 Theoretical Framework

The theoretical framework serves as a guide for research to build a structure based on formal theories and act as the lens that would be used to explore the study from different perspectives. This study would be underpinned by the trade-off theory that was first introduced by [9] and modified by Myers, in 1984 and the pecking order theory of [18]which would be used to explore the assess the relationship between capital structure and firm performance.

The trade-off theory provides for an optimal capital structure that firms should maintain to maximise

performance. The theory places a limit which would be used to assess the relationship between capital structure and firm performance. The trade-off theory that states that firms will trade off the costs and benefits of debt to maximise the value of the firm. It assesses the effect of bankruptcy cost which is the risk associated with debt, and the benefit of debt is the tax shield associated with the decrease in income because of interest paid on debt that is tax deductible. [18] suggests that a firm operating under the assumptions of trade-off theory sets a target capital structure that is determined by balancing the dead weight cost of bankruptcy with the tax deductions on interest earnings. Although the theory has been criticised for suggesting that there is an optimal capital structure that maximises the value of the firm that is difficult to establish in practice, the trade-off theory is critical to this study because it provides for an optimal financing mix that maximises financial performance.

Another theory that would be adopted for the study is the pecking order theory which was developed by [19] and popularised by [19] and [18] states that firm financing follows a hierarchy: retained earnings first, followed by debt and equity. The theory further states that more profitable firms have more internal financing available. This implies that there is a negative relationship between debt and profitability. It is grounded in information asymmetry between internal and external stakeholders since managers know more about the earning potentials of a business than external investors.

### 2.1.2 Empirical Review

Several scholars have reviewed the relationship between capital structure and the performance of firms. Some of these studies found a positive influence of Capital Structure on Financial Performance. These studies include Ibrahim and [6], [20] [21][22][23][24][25][26] [27] While studies of [28][29], Le and Phan (2017[4], [30], [16][31], [32], [33][22][34], [7], [35] and [36] indicated Negative influence of Capital Structure on Financial Performance. However, some other studies by [4][37], [3][38][39], [40], [41][42] [43][44] and [45] reported mixed outcomes of the effect of capital structure on performance. Most of the studies reviewed on the effect of capital structure on performance with different outcomes, it was gathered that only few studies if any in this area that are focused on the effect of capital structure on the performance of all non - financial firms that are listed on the Nigerian Stock Exchange over the period covered by the study. Also, only a few studies that have considered the effect of the size of firms and

industry on the capital structure and performance of firms. This thus a gap this study is focused on bridging.

## 3 Methodology

*Population:* The population of the study comprised all non- financial firms that are listed in 10 industry sectors including Agriculture, Conglomerates, Construction/Real Estate, Consumer Goods, healthcare, ICT, Industrial goods, Natural Resources, Oil and Gas and Services on the Nigerian Stock Exchange. (Nigerian Exchange Group). The study covered 129 non-financial firms that are listed on the Nigerian Stock Exchange (Nigerian Exchange Group) between 2010 and 2021.

*Sample:* The study used census as it will cover all the listed non-financial firms on the Nigeria Stock Exchange (Nigerian Exchange Group).

*Model Specification:* Following the hypotheses that were earlier formulated to assess the effect of capital structure on financial performance the regression models are designed in the light of studies carried out by [4][46][13][23] and [4] with certain modifications. The panel regression model that will be used for this study will pool data from listed non-financial firms over a period of twelve (12) years.

*As a result, we mathematical model to accommodate the study objectives is thus:*

$$Y_{ij} = \alpha_0 + \beta X_{ij} + \beta C_{ij} + \varepsilon_t \quad \dots (i)$$

Where:

$Y_{ij}$  = Financial Performance (ROA, Tobin's Q)

$\beta X_{ij}$  = Proxies of the independent variables, such that

$\beta X_{ij} = (STDR_{ij} + LTDR_{ij} + TER_{ij})$

$\beta C_{ij}$  = Control variables (IND + SIZ)

$\alpha_0$  = Constant of firm  $i$  for period  $j$

$i$  = 1, 2, 3 ... , 129

$j$  = 2010, 2011, 2012, ... , 2021

$$ROA = \alpha_0 + \beta STDR_{ij} + \beta LTDR_{ij} + \beta TER_{ij} + \beta IND_{ij} + \beta SIZ_{ij} + \varepsilon_t \quad \dots (ii)$$

$$Tobin's Q = \alpha_0 + \beta STDR_{ij} + \beta LTDR_{ij} + \beta TER_{ij} + \beta IND_{ij} + \beta SIZ_{ij} + \varepsilon_t \quad \dots (iii)$$

Accordingly,  $y_{it}$  in eqn. (i) include return on Assets, and Tobin's Q respectively of the observed firm units (ith), covering ten (10) sectors over a period of  $t = 1 \dots 10$  expressed above.

Where:

Return on assets (ROA) is measured as Earnings after interest and taxes divided by the book value of total assets; Tobin's Q is measured as the market value of equity plus total debt divided by total asset; Short term debt ratio (STDR) is measured as the ratio

of short-term debt to total assets; Long term debt ratio (LDTR) is the measure of long-term debt to total assets; Total Equity ratio (TER) is the measure of total equity divided by total assets; Industry (IND) and Firm size (SIZ) which is the natural log of total sales are the control variables; Industry (IND) and Firm size (SIZ) which is the natural log of total assets are the control variables.

*Method of data analysis:* The data was analyzed with the use of panel multiple regression analysis to assess the effect of capital structure on the financial performance of the firms because the study will combine both time series and cross-sectional data. Panel data analysis is a statistical method that is used to analyze multi-dimensional data that covers a period of time on cross sectional units that would enable the study of the research variables and establish the relationship between the independent and the dependent variables.

### 4 Data Analysis and Interpretation

*Descriptive Statistics:* The descriptive statistics of the selected variables of capital structure and financial performance are presented in this section. These statistics are used to describe the main features of the data set, which include measures of central tendency (mean); measures of variability (standard deviation); the minimum and maximum values of variables, providing the summary of samples and observations which forms the basis for the description of the data set. This is a precondition for fitting the panel regression model.

**Table 4.1: Summary of Descriptive Statistics**

Variable		Mean	Std. Dev.	Min	Max	Observations
ROA	overall	.0332738	.4047148	-4.256455	6.302756	N = 1121
	between	.4059104	-4.256455	1.190569		n = 129
	within	.3508127	-2.386116	5.319565		T-bar = 8.68992
TQ	overall	.9983918	1.221824	-.0180832	12.50878	N = 1121
	between	1.002656	.0103072	7.224782		n = 129
	within	.8487063	-2.86942	9.211086		T-bar = 8.68992
STDR	overall	.5540765	1.589097	0	34.24274	N = 1121
	between	1.293576	0	14.04865		n = 129
	within	.7744259	-5.445446	20.74817		T-bar = 8.68992
LTDR	overall	.215368	.4567991	0	11.55886	N = 1121
	between	.3207435	0	2.359295		n = 129
	within	.3582128	-.9155825	10.62591		T-bar = 8.68992
TER	overall	.2955969	1.786602	-35.69421	7.427399	N = 1121
	between	1.530163	-15.31926	2.475851		n = 129
	within	.7896538	-20.07935	6.906365		T-bar = 8.68992
SIZ	overall	16.19834	2.024145	10.95583	22.06286	N = 1121
	between	2.018883	11.35776	21.62097		n = 129
	within	.6022294	11.61185	21.11178		T-bar = 8.68992
IND	overall	6.230701	2.833763	1	10	N = 1127
	between	2.710159	1	10		n = 129
	within	0	6.230701	6.230701		T-bar = 8.73643

Source: Author’s computation, 2022

The data in Table 4.1 shows the descriptive statistics of the variables. The financial performance of firms proxied with return on assets (ROA) has a mean of 0.03327 which suggests that the average return on assets of the firms at 3.3%, while the mean of the

Tobin’s Q, the market based dependent variable was 0.9983 which is approximately 1%, showing that the average financial performance of Nigerian firms is low. Also, the maximum and minimum Tobin’s Q stood at 12.508 and -0.018 and for ROA, it is 6.302 (approximately 6%) and -4.256 (approximately -4%) This is an indication that whereas some of the listed firms made profit others made losses. For Tobin’s Q, the standard deviation was 1.221 which is close to the mean and thus its said to be well dispersed. Similarly, for ROA, the standard deviation was at the value of 0.404 which is an indication that the variables are fairly dispersed/spread without outliers. The results also reflect that there is a significant disparity between the accounting-based performance indicator and the market-based performance indicators.

The mean for short term debts is 0.554 as against the mean of 0.215 for long term debts indicating that on the average the firms had more short-term debts than long term debts. The maximum short-term debt is 34.24 while the maximum long-term debt is 11.56. For the total equity, the mean is 0.296 while the maximum equity is 7.426 against the minimum which is a negative of 35.69. The standard deviation is N294 billion shows the disparity between the minimum and maximum equity held by the firms. This implies that the average and standard deviation of the variables for capital structure also shows a fair spread and devoid of outliers and thus meeting one of the panel regression fundamental assumptions. Firm size has a mean of 16.198 and a standard deviation of 2.024. Industry had a mean of 6.23 and a standard deviation of 2.833.

*Normality Test:* The result of the Doornik-Hansen multivariate normality test for all the variables returned a p-value less than 0.05 (5%) level of significance. The result implies that the variables are not normally distributed. As such, the variable natural logarithm transformation or difference is used to correct for the non-normality seen in the series before modelling.

**Table 4.2 Variance Inflation Factor for Multicollinearity Test**

Variable	VIF	1/VIF
TER	6.52	0.153313
STDR	6.16	0.162231
LTDR	1.28	0.780254
SIZ	1.07	0.934178
Mean VIF	3.76	

Source: Researcher’s computation, Stata v 15 2022

From the test of multicollinearity shown in table 4.2 above, all the variable have a VIF value that does not exceed the minimum condition (<10) for no collinearity stated by the Variance Inflation Factor (VIF). As such, we can apply Panel Data Regression (generalized least square GLS) model with the believe that another fundamental assumption for modeling is met and hence the estimates will be reliable and robust. Furthermore, fitting the GLS model (fixed and random effect model) will further suggest the most robust model for testing the hypotheses of the study with the help of Hausman test and thus minimizing the effect of any violation of the classical model assumptions.

Unit Root Test: The unit root test is a test for stationarity in a panel data. Stationarity is present in the time series component of the panel data if a shift in time does not cause a change in the shape of the distribution and on the other hand, there is no stationarity if a shift in time causes a change in shape of the distribution. Unit root is a cause for non-stationarity. The test result and interpretation are contained in Unit-Root Table.

**Table 4.3 Unit-Root Test**

Fisher-type unit-root test			
Based on augmented Dickey-Fuller tests			
Ho: All panels contain unit roots			
Ha: At least one panel is stationary			
Variable	Test	Statistic	p-value
ROA	Inverse chi-squared(224) P	987.8968	0.000
TQ	Inverse chi-squared(224) P	838.6399	0.000
STDR	Inverse chi-squared(224) P	593.7299	0.000
LTDR	Inverse chi-squared(224) P	822.617	0.000
TER	Inverse chi-squared(224) P	827.6273	0.000
SIZ	Inverse chi-squared(224) P	692.6118	0.000

Source: Stata v 15 Output 2022

As a precondition for the analysis of panel data variables, the need to ensure that the variables are stationary requires unit root tests of each of the variables in the model. The outcome of our unit root tests using the Fisher-type unit-root test for panel data shows that all variables are stationary as seen in the unit root test table above. Since all the variables have no effect of unit root (stationary), the variables may not be required to undergo any form of transformation to correct the effect of the any unit root before fitting the panel regression for optimal result.

**Table 4.4 Model Parameter Estimate**

Financial Performance	Model	Estimate	Capital Structure (Independent variables)			Control	Constant	F/Wald test	p-value	R <sup>2</sup>	Adj-R <sup>2</sup>	Hausman Test	
			STDR	LTDR	TER							SIZ	_cons
ROA	Pooled Effect	Coef.	0.105	-0.113	0.002	0.020	-0.322	42.65	0.000	0.1326	0.1295	39.21	0.000
		P> t	0.000	0.000	0.903	0.001	0.001						
	Random Effect	Coef.	0.136	-0.097	0.022	0.013	-0.252	106.81	0.000	0.1296	na		
		P> z	0.000	0.001	0.255	0.240	0.168						
	Fixed Effect	<b>Coef.</b>	<b>0.132</b>	<b>-0.064</b>	<b>-0.010</b>	<b>-0.035</b>	<b>0.547</b>	<b>28.23</b>	<b>0.000</b>	<b>0.1026</b>	<b>na</b>		
		<b>P&gt; t </b>	<b>0.000</b>	<b>0.031</b>	<b>0.639</b>	<b>0.049</b>	<b>0.062</b>						
TQ	Pooled Effect	Coef.	0.495	0.009	0.441	-0.040	1.237	24.34	0.000	0.0802	0.0769	71.2	0.000
		P> z	0.000	0.913	0.000	0.027	0.000						
	Random Effect	Coef.	0.445	0.046	0.500	-0.266	4.900	215.95	0.000	0.2095	Na		
		P> z	0.000	0.491	0.000	0.000	0.000						
	Fixed Effect	<b>Coef.</b>	<b>0.421</b>	<b>-0.014</b>	<b>0.505</b>	<b>-0.446</b>	<b>7.843</b>	<b>69.9</b>	<b>0.000</b>	<b>0.2206</b>	<b>Na</b>		
		<b>P&gt; t </b>	<b>0.000</b>	<b>0.838</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>						
NB:			➤ Number of observation (1,121) & Number of groups/panel (129) ➤ Selected Model Estimate in <b>Bold</b> and <i>Italics</i>										

Source: Researcher's compilation, 2022

*Test of Hypotheses and Discussion of Results*

The assessment of the plausibility of the hypotheses was carried out on the available data, using the panel model regression. The fixed effect model was adopted as the most appropriate for the study based on the results of the Hausman Test to assess to effect of short-term debt, long term debt and total equity on return on Assets and Tobin's Q of the listed non-

financial firms in Nigeria. The level of significance adopted in the regression analysis is 5%.

Ho1: Short-term debts have no effect on the return on assets (ROA) of non- financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group).

The empirical evidence from the regression results of the fixed effects model shows that the variable

“Short-term” has a panel regression coefficient of 0.132 against firms’ return on assets. Furthermore, the Short-term has a p-value of 0.000 which is less than 0.05 (5%) level of significance. Therefore, short term debts have a significant positive effect on the return on assets of the non-financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group) at 95% level of confidence. As a result, there is no reason not to reject the null hypothesis as stated above. Therefore, the relationship between the Short-term debt and the return on assets is true and generalisable. The result supports the findings of [4][42]and [43]), it is however at variance with the findings of [47], [4] and [34]. The findings show that the higher the leverage the higher the return on assets.

Ho2: Short-term debts have no effect on the Tobin’s Q of non- financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group).

Short-term debts have a panel regression coefficient of 0.421 against firm’s Tobin’s Q. This implies that the short-term debts have a positive impact on the firms’ Tobin’s Q as a measure of financial performance; Furthermore, the Short-term debts has a p-value of 0.000 which is less than 0.05 (5%) level of significance which implies that the coefficient is statistically significant. Hence, the null hypothesis is rejected. This finding agrees with the findings of the studies done by [48], [49]), [42]and [50]

Ho3: Long-term debts have no effect on the return on assets of non- financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group). Based on the results of the fixed effects model, the variable Long-term debts have a panel regression coefficient of -0.0643397 for return on assets, which implies that the Long-term debts have a negative effect on the firms’ return on assets as measure of performance. The p-value of 0.031 is less than 5% level of significance adopted for the study under return on assets, therefore, the relationship is statistically significant for return on assets. Hence, the null hypothesis is rejected. Thus, we conclude that long-term debts have a negative and significant effect on the firms’ return on assets.

This result is consistent with the studies conducted by [29][4] [51]and [7], but in disagreement to the results of the findings of [4][52] and [42]

Ho4: Long- term debts have no effect on the Tobin’s Q of non- financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group).

Also, the variable Long-term debts has a panel regression coefficient of -0.0136932 for Tobin’s Q, which implies that the Long-term debts has a negative effect on the firms’ Tobin’s Q as measure of performance. The p-value of 0.838 of is greater than

5% level of significance adopted for the study, therefore, the relationship is termed not statistically significant. Hence, the null hypothesis is upheld and there is no reason to reject the null hypothesis. The finding is similar to the studies of [53][54][12]

Ho5: Total equity has no effect on the return on assets of non- financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group).

Also, from the estimator, the fifth variable with null hypothesis states as “Total equity has no effect on the return on assets of listed non-financial firms in Nigeria. The variable total equity, has a panel regression coefficient of -0.010121 which implies that the Total equity has a negative effect on the firms’ return on assets as a measure of financial performance, implying that the higher total equity, the lower the profitability. It is further observed that the p-value of 0.639. is greater than the 5% level of significance. Hence, the null hypothesis is not rejected; meaning that the Total equity has a negative relationship but not a significant effect on the firms’ return on assets. The results contradict the findings of Achieng et al. (2018) that established a positive relationship between total equity and return on assets.

Ho6: Total Equity has no effect on the Tobin’s Q of non- financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group).

Also, from the panel estimator, the sixth variable with null hypothesis states as “Total Equity has no effect on the Tobin’s Q of listed non-financial firms that are listed in Nigeria. The variable Total Equity has a panel regression coefficient 0.505 which implies that the Total Equity has a positive effect on the firms’ Tobin’s Q, as a measure of financial performance, which is also observed to be significant since the p-value 0.000 is less than the 5% level of significance. Hence, the null hypothesis is rejected which implies that the Total Equity has positive and significant effect on the firms’ Tobin’s Q. The result supports the findings of [23].

## 5 Conclusion

From the review of literatures, we noted that following the pioneering works of Modigliani and Miller in 1958, the effect of capital structure on the financial performance of firms continues to attract a great deal of interest because of its importance. In a country like Nigeria with high level of inflation, limited financing options, the study introduces new evidence by reviewing the effect of equity and the different maturity structure of debts on financial performance of listed non- financial firms in the country.

The results show that not all the explanatory variables conform to the apriori specification. It suggests that

the effect of the short-term debt on return on assets and Tobin's Q supports the tradeoff theory of capital structure which states that debt has a positive effect on performance while the effect of long-term debt on the dependent variables support the pecking order theory that states that profitable firms rely initially on internally generated funds before looking for external financing.

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