Capital Structure and Financial Performance: A Sectorial Analysis

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Abstract: - The prevailing market circumstances and the peculiarities of the industry impact their funding needs and the availability of different forms of capital that could impact the ability of firms to have an optimal capital structure that will lead to the maximization of firm value. This study examines the relationship between capital structure and financial performance (FP), shedding new light on its effect across ten (10) sectors using Short-term debts, Long-term debts and Total equity as proxies for capital structure and two Return on Assets and Tobin's Q as proxies for financial performance. The study was based on the positivism philosophy and adopted the ex-post factor research methodology with data extracted from the audited financial firms of 129 listed non-financial firms in Nigeria from 2010 to 2021. The Generalized Least Square (GLS) method was adopted for the analysis of data. 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 across the various sectors. 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, Financial Performance, GLS, Sector

Received: February 22, 2023. Revised: June 16, 2023. Accepted: June 25, 2023. Published: July 7, 2023.

1 Introduction

Businesses require funds to carry out their operations and also exploit emerging investment opportunities. [1] is of the view that the liberalization of economic policies across the world has expanded investment opportunities, widened financing options and increased dependence on capital markets. According to [2], the sources of finance is a fundamental decisions to be made by businesses because of the risk and reward associated with such decisions. Furthermore, capital structure decisions are fundamental and crucial as it enables companies to determine the sources of finance and the best mix of capital that will minimize the overall cost of capital and maximize financial performance, [3], [4], [5], [6], [7]. Capital structure also impacts the ability of firms to deal with competition and the dynamic nature of the business environment. According to [8], capital structure decisions are taken each time a firm decides to either start operations, expand existing operations or have to invest in a new project. The funds that firms utilize in operations could be from debt in the form of long-term loans and short-term loans sourced from providers of capital or equity provided by the owners of the business.

Capital structure decisions revolve around choosing between debt and equity and the funding sources could be either internal or external. Finance managers must decide on the appropriate mix that would enhance the financial performance of firms, [8], notes that in countries where the financial sector is underdeveloped, firms have to rely heavily on banks to finance their operations. Thus, the prevailing market circumstances, interest rates, availability of different forms of capital, and costs associated with each form of capital could limit the ability of Finance Managers to choose the appropriate mix of debt and equity. The difference between these sources of capital raises a question on the effect each form could have on the financial performance of the firms across the industrial sectors that are listed on the stock exchange in Nigeria. This work aims to contribute to empirical literature in the field of Corporate Finance by exploring the effects.

This study is motivated by the fact that businesses even within the same industry use different forms of capital such as equity, long-term debts, or short-term debts. The difference between these sources of capital raises a question about the effect that each form could have on the financial

performance of the firms across the various sectors. This work aims to contribute to empirical literature in the field of Corporate Finance by exploring the effects of capital structure on financial performance; Specifically, the objectives are to assess the effect of short-term debt, long-term debt and total equity on Tobin's Q and firms return on assets of non-financial firms that are listed in Nigeria's Exchange Group by using a sectorial analysis. The rest of this paper is structured as follows: in section 2 we provide the literature review about the relationship between capital structure and financial performance; section 3 provides the specification concerning the applied methodology, section 4 explains the obtained results and section 5 summarises and concluding remarks are presented.

2 Literature Review

2.1 Theoretical and Conceptual Background

Several theories have been advanced to explain the relationship between capital structure and firm value, including the irrelevance theory of [9]–[15]. These theories play significant roles, in explaining the relationship between capital structure and firm value, but the trade-off theory that was first introduced by Kraus and Litzenberger in 1973 and modified by Myers, in 1984 and the pecking order theory of [16], [17] are found most appealing to the set of objectives of this study. 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 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 as a result of interest paid on debt that is tax deductible.

[16] 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. The trade-off theory is critical to this study because it provides for an optimal financing mix that maximises financial performance. Another theory that was adopted for the study is the pecking order theory which was popularised by [16], [17] and 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.

The relationship between capital structure and financial performance remains an open debate among academics, managers and practitioners. Capital Structure has been defined in several ways in the empirical literature and no consensus exists on any of the definitions. According to [15], [16], capital structure is the mix of debt and equity employed by a firm to finance its operations at any time. In the view of [18], it is the combination of the equity and debt capital that a firm uses for its financing. Similarly, [19] defines it as an amalgam of the sources through which a firm is financed. According to [9], [10], [11], Financial Performance is a measure of how effectively a firm uses its resources and assets to maximize its profitability. Financial performance can be described in various ways and can be measured in several ways: For this study, the return on assets (ROA) and Tobin's Q will be used as proxies for financial performance.

2.2 Empirical Review

The empirical evidence on the subject provides mixed and contradictory results and there is no agreement among scholars, some report a positive relationship, others report a negative relationship while others report mixed outcomes long tenured debts, or short-tenured debts.

[20] used a dynamic model to study the relationship between financial leverage on the firm value of selected firms quoted on the Nigerian Stock Exchange with secondary data which covered five years established that financial leverage has a positive effect on the firm value both in the long and short run. In Kenya, [21], [22] examined the effect of capital structure on the financial performance of non-financial firms that are listed at the Nairobi Securities with data that covered eight years also established that leverage had a significant positive relationship on the financial performance of the listed non-financial firms in the Nairobi Stock Exchange.

Another study that established a positive relationship was carried out by [23] that assessed the influence of Financial Leverage on Firm's Performance of listed non-financial firms in the Karachi Stock Exchange (KSE) 100 index. The data for the study covered ten years and the result of the

panel data analysis shows that capital structure has a positive impact on profitability.

A similar study was carried out in India by [24] on the influence of capital structure on financial performance with a sample of fifty manufacturing companies. Secondary data was collected from the financial statement of the selected companies. and the result of the multiple regression analysis established that there is a significant positive relationship between capital structure and profitability and the financial performance of the selected companies.

In Kenya, [25] studied the capital structure and financial performance using all the firms that are listed on the Nairobi Stock Exchange between 2002 and 2011 which also had a positive outcome.

[18] also studied the relationship between capital structure and the financial performance and Shareholders' wealth of firms in the textile industry in Pakistan. The study covered a period of six years from 2006 to 2011 using data from 155 companies and found that there is a significant positive relationship between capital structure and financial performance. This study could have been extended to cover a longer period. The findings of the study might differ if extended to other sectors.

Some scholars also reported negative relationships between capital structure. However, [26] carried out a study on the effect of financial leverage on firm value: evidence from selected firms quoted on the Nigerian Stock Exchange. Secondary data was obtained from the financial statements of eighteen companies from 2014 to 2018. The result of the panel data analysis shows that financial leverage has a significantly negative effect on firm value. Similarly, [27] assessed the relationship between capital structure and the profitability of non-financial companies that are listed on the Vietnam Stock Exchange. using data from 488 listed companies and data that covered the period from 2013 to 2018. The study also established that the capital structure of Vietnamese companies had a statistically negative effect on performance. he equity component of the capital structure.

Another study that found a negative relationship was carried out by [27] in their assessment of the impact of capital structure on the profitability of firms in four Asian economies, Taiwan, Korea, Singapore and Hong Kong using data from 2003 to 2016. The data used for the analysis was extracted from 5,112 firms and includes 46,301 observations over fourteen years. In Vietnam, [28] studied Capital Structure and Firm Performance. The study covered all listed non-financial firms and data was collected over the period from 2007 to 2012. The study established that all debt ratios have a significant negative ratio with firm performance. The result of this study brings to the fore certain peculiarities of developing countries with underdeveloped financial systems where the cost of debt is higher than the distress from borrowing. There is a need to replicate this study in Nigeria.

Similarly, [29] carried out an empirical Investigation of Capital Structure and Firm Value using accounting and stock market data of all the non-financial firms that are listed on the Ho Minh City Stock Exchange from 2007 to 2013. The sample contained 1214 firm years and the result indicates a negative relationship between leverage and shareholder value that shows that debt financing has a higher cost than benefit to firms in Vietnam. Another study carried out in Nigeria that showed positive outcomes of the relationship between capital and performance was undertaken by [30]. The researchers assessed the empirical evidence of the causal link between capital structure and performance. The sample size was seventy -five companies that are listed on the Nigerian Stock Exchange for the period 2010 to 2014. Their findings indicate a bi-directional relationship between the short-term debt-to-equity ratio and ROA as well as the proportion of equity to total assets to ROA.

In Turkey, [31] studied the Impact of Capital Structure on the Financial Performance of Firms that are listed on the Istanbul Stock Exchange, covering the period from 2005 to 2012 using secondary data from the annual financial statements of 136 companies and the results show that there is a significant negative relationship between capital structure and firm performance. Some scholars also reported mixed outcomes from their studies. [28] carried out a study to determine the effect of capital structure on a Firm's performance in Nigeria using data from 15 listed non-financial firms in Nigeria covering the period from 1999 – 2018. The results of the study show a significant negative relationship between long-term debt to total assets, total debt to total assets and the debt-to-equity ratio and ROE which supports the pecking order theory while there was a positive relationship between short-term debt and ROE as well as ROA which supports the agency theory. There was also a significant positive relationship between long-term debt to total assets, short-term debt to total assets, and the debt-to-equity ratio and a negative relationship between Tobin's Q and total debt.

In Kenya, [19] assessed the capital structure and financial performance of eight companies listed

under the manufacturing and allied sector in the Nairobi Stock Exchange using data covering the period from 2013 to 2018 and found that long-term debts had a positive effect on financial performance and most of the companies relied on and it was a major source of financing of the firms that were studied. Equity and retained earnings however had a negative effect on financial performance. Similarly, [32] carried out a study of the capital structure decisions and financial viability of seven firms quoted on the premium board segment of the Nigeria Stock Exchange from 2010 to 2018. The findings of the study show a mixed relationship between capital structure decisions and the financial viability of firms. the study.

In Pakistan, [33] studied the nexus between capital structure, firm-specific factors, macroeconomic factors and financial performance in the textile sector on the Pakistan stock exchange from 2008 to 2017 using data from 90 listed textile companies. The findings of the study show a mixed relationship between capital structure and financial performance. [34] assessed the effect of capital structure on the financial performance of all the listed pharmaceutical companies in Vietnam's stock market from 2015 to 2019. Using the ordinary least square regression model, the findings of the study show that financial leverage ratio, long-term asset ratio and debt-to-asset ratio had a positive relationship with performance while self-financing had a negative effect on performance.

In Germany, [35] studied the relationship between the financial performance of non-financial firms and their capital structure and reversely used data that covered a period of twenty-five years from 1993 to 2016. and the finding was that there is a significant positive relationship between capital structure and the financial performance of firms while the stock price is negatively affected by capital structure. A similar study was carried out by [36], [37] on the impact of capital structure on the profitability of ten publicly traded manufacturing firms in Bangladesh from 2013 to 2017 The findings are that debt ratio and equity ratio have a significant positive on ROA but debt to equity ratio has a significant negative impact on ROA. Equity ratio has a significant positive impact while debt to equity ratio has a negative impact on ROE. The debt and equity ratio has a significant negative impact on EPS. The sample size is considered small while the period is considered too short and could affect the credibility of its findings.

In Kenya, [38] reviewed the effect of Equity financing options on the financial performance of forty listed non-financial firms covering the period from 2009 to 2015 Data was analyzed by using panel regression econometric techniques. T The study established that the common stock ratio has a significant negative effect on ROA while retained earnings ratio and total equity ratio have a significant and positive effect on ROA. The ROE is not significantly affected by the equity variables. [39] studied Leverage and Firm Performance with a focus on the role of firm size using panel data of 101 listed firms in Nigeria between 2003 and 2007. The analysis of data was carried out by using the threshold regression model and the results show that leverage has a negative effect on the performance of small firms and vanishes as the size exceeds its estimated threshold level. Leverage has a positive relationship with Tobin's Q and the strength of the relationship depends on the size of the firm and is mostly higher for small-sized firms indicating that size also had a positive effect on Performance.

Another study with mixed outcomes was carried out by [39] in their assessment of the impact of capital structure on a firm's financial performance using data from 739 very large and large companies listed on the London Stock Exchange over the period from 2006 to 2015. The finding of the study is that there is a negative relationship between long-term debt and ROE and ROA. Insignificant result between short-term debt and ROE, and ROA. Positive results between short-term and long-term debt and Tobin's Q, while EPS had no relationship with leverage. The study also established that size and growth impact performance. The impact of leverage on ROE and ROA is stronger than other indicators.

Based on what has been thus far discussed, the under-listed null hypotheses have been formulated

H01: Short-term debts do not affect the return on assets of non-financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group); H02: 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); H03: 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); H04: 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); H05: Total equity does not affect the return on assets of non-financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group); H06: 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). ceteris paribus.

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 of 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 a 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 [2], [19], [35] with certain modifications. The panel regression model that will be used for this study will pool data from listed non-financial firms over twelve (12) years.

Model Specification: We regress corporate financial performance on the tailor-made CS measures on three pillars of performance lagged by one year, employing fixed effects regressions panel data as suggested by the Hausman test. A fixed effects model is typically used when the observed quantities, in terms of explanatory variables, are treated as non-random. The equations used are:

$$ROA_{i,t} = \beta_0 + \beta_1 STDR_{i,t-1} + \beta_2 LTDR_{i,t-1} + \beta_3 TER_{i,t-1} + \beta_4 SIZ_{i,t-1} + \epsilon_{i,t} \quad (1)$$

$$TQ_{i,t} = \beta_0 + \beta_1 STDR_{i,t-1} + \beta_2 LTDR_{i,t-1} + \beta_3 TER_{i,t-1} + \beta_4 SIZ_{i,t-1} + \epsilon_{i,t} \quad (2)$$

Accordingly, $\boldsymbol{y_{it}}$ in eqn. (i) include return on Assets, and Tobin's Q respectively of the observed firm units (i^{th}), covering ten (10) sectors throughout t = 1...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 dived by total assets; 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 is are the control variables.

Method of data analysis: The data were 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 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.

The data in Table 1 (Appendix section) 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 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 a profit others made losses. For Tobin's Q, the standard deviation was 1.221 which is close to the mean and thus it is 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 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 are 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. The industry had a mean of 6.23 and a standard deviation of 2.833.

Pre-model Diagnostic Test- Normality Test, Correlation and Unit Root Test

The pre-model diagnostic test was used to test for the probabilities of the presence of conditions and biases that may undermine the accuracy of outcomes. The tests were carried out to ensure that the data suits the basic assumptions of the panel model as follows:

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 2 (Appendix section) presents the correlation coefficient for the variables on the effect of the complete set of variables of Capital Structure and the financial performance of listed non-financial firms in Nigeria as considered in this study. Correlation values ranged from -1 to +1; where 0.75-0.99 signifies a "very strong" relationship between the intersecting variables, 0.5-0.74 implies a "strong" relationship within the intersecting variables and 0.35-0.49 implies a "weak" relationship among variables. As observed, there exists a significant negative relationship between STDR and TER; there is a positive relationship between ROA and Tobin's Q, ROA and STDR, and ROA and LTDR, but a negative weak relationship is observed between ROA and TER; also, a negative relationship is observed between LTDR and TER, LTDR and SIZ.

Table 3. 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 3 above, all the variable has 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 belief that another fundamental assumption for modelling 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 the Hausman test and thus minimizing the effect of any violation of the classical model assumptions.

The unit root test was carried out as a precondition for the analysis of panel data variables to ensure that the variables are stationary. 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 any unit root before fitting the panel regression for optimal results.

Table 4. 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

Table 4 shows the results of a Fisher-type unit-root test conducted on six different variables: ROA, TQ, STDR, LTDR, TER, and SIZ. The null

hypothesis (Ho) of the test is that all panels (or groups) of the data contain unit roots, which means that the data is non-stationary and has a trend or momentum that persists over time. The alternative hypothesis (Ha) is that at least one panel is stationary, meaning that the data is stationary and does not have a persistent trend over time.

The statistic column in the table shows the value of the test statistic for each variable, while the p-value column shows the corresponding probability of obtaining a test statistic as extreme as the one observed, assuming the null hypothesis is true. In this case, all p-values are less than 0.05, which suggests strong evidence against the null hypothesis and in favour of the alternative hypothesis. Therefore, the results of the unit-root test suggest that at least one panel of the data is stationary, meaning that there is no persistent trend over time for at least one of the variables. This information is important for time-series analysis and modelling, as non-stationary data can lead to unreliable and biased results.

Discussion of Findings

The results from sectorial static panel regression analysis of the effect of capital structure on the performance of listed non-financial firms in Nigeria presented in table 5 are discussed below:

Sectorial Analysis for the effect of Capital Structure on ROA: The results show that in the agriculture sector, all the capital structure variables (short-term debts, long-term debts and total equity) have a positive effect on return on assets. However, only the total equity had a significant positive effect on the performance of the listed non-financial firms while others were insignificant; In the conglomerate's sector, short-term debts and long-term debts have a negative and insignificant effect on the performance of the firms. Total equity has a positive but insignificant effect on the return on assets. This implies that the capital structure variables do not significantly affect the return on assets of firms in the conglomerate's sector; In the construction and real estate sector, all the proxies for the capital structure (short-term debts, long-term debts and total equity) have a positive effect on the return on assets, however, they have no significance since none of the variables parameter estimate have a p-value less than 0.05 level of significance; For the consumer goods sector, although all capital structure measure shows a positive effect on the return on asset, only the short-term debts and total equity have a significant and positive effect on the return on assets; For the healthcare sector, the short-term debts and long-term debts have negative and insignificant effect on return on assets, while total equity has a positive and significant effect on return on assets of the firms; The results also show that short-term debts, long-term debts and total equity of firms in the industrial goods sector had a positive and significant effect on their return on assets; Similarly, long-term debts and total equity had positive and significant effect on the return on assets of the firms in the ICT sector, while short-term debts had positive but insignificant effect on the return on assets; In the natural resources sectors, short-term debts, long-term debts and total equity had insignificant negative effect on the return on assets since the p-values were greater than 0.05 (5%) level of significance; Also, in the oil and gas sector, total equity had a positive and significant on return on assets, while the short-term debts and long-term debts returned a negative and insignificant effect on return on assets; Similarly, in the services sector, the total equity has a positive and significant effect on the return on assets. Short-term debts and long-term debts have a negative and insignificant effect on the return on assets.

Sectorial Analysis for the effect of Capital Structure on Tobin's Q: In the agricultural sector, short-term debts and long-term debts did not affect Tobin's Q, however, total equity has a positive and significant effect on the firm's performance in the sector; Also, in the conglomerate sector short-term debts, long-term debts and total equity have no significant effect on Tobin's Q since all the variables estimate returns coefficient p-values of greater than the 0.05(5%) level of significance; In the construction/real estate sector, short-term debts has a positive and significant effect on Tobin's Q, while the long-term debts and total equity had a positive but insignificant effect on the Tobin's Q. Also, in the consumer goods sector, short-term debts, long-term debts and total equity have a positive and insignificant effect on Tobin's Q; In the healthcare sector, the short-term debts and total equity have a significant and positive effect on the performance of the firms in the sector, while the long-term debt was seen to have no significant positive effect on the Tobin's Q. For the industrial goods sector short-term debts, long-term debts and total equity had a negative and significant impact on Tobin's Q in explaining their effect on the firms' performance within the sector. These findings suggest that there is a significant negative and generalizable effect of capital structure on the performance of the firms.

Only the capital structure variable (short-term debts and total equity) returns a positive and significant relationship to the firm's performance in

the ICT sector. While long-term debt is observed to have a negative and not significant effect on the firm's performance in the sector. As such, we can conclusively say that capital structure has a significant effect on the performance of the listed firms in the ICT sector; However, short-term debts, long-term debts and total equity had a positive and insignificant effect on Tobin's Q of firms in the natural resources sector, while short-term debts and long-term debts had a negative and insignificant effect on Tobin's Q of firms in the oil and gas sector but the total equity had a positive and significant effect on Tobin's Q; Similarly, in the services sector, total equity also had a positive and significant effect on the Tobin's Q, while; short-term debts had a negative and significant effect on Tobin's Q and long-term debts has a negative and insignificant effect on Tobin's Q.

5 Conclusion

The study established answers to the research questions and thus concluded as follows:

There is a significant relationship between capital structure and financial performance which is largely dependent on the industry and the proxies of the study variables that are considered. Overall, short-term debts have a significant positive effect on the return on assets of non-financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group). The result supports the findings of [30], [34],

Table 5. Sectorial Panel Regression Analysis of the Effect of Capital Structure on the Financial Performance of Listed Non-Financial Firms in Nigeria

Dependent Variable	Model selected	Coef. (p-value) of the independent variables (Capital Structure) and Control Firm Size					Number of obs	Number of groups	Wald chi2(4)	Prob.
		STDR	LTDR	TER	SIZ	_cons				
ROA	Fixed-effects	0.076(0.262)	0.097(0.31)	0.148(0.003)	-0.041(0.017)	0.575(0.045)	56	5	8.35	0.000
	Random-effects	-0.249(0.064)	-0.003(0.983)	0.176(0.164)	0.035(0.123)	-0.607(0.159)	58	6	82.94	0.000
	Random-effects	0.002(0.998)	0.091(0.269)	0.131(0.155)	0.013(0.459)	-0.284(0.353)	52	7	3.78	0.436
	Fixed-effects	1.149(0.000)	0.018(0.766)	0.956(0.000)	-0.046(0.348)	-0.025(0.976)	238	27	14.93	0.000
	Random-effects	-0.02(0.225)	-0.083(0.357)	0.085(0.000)	0.068(0.000)	-1.069(0)	83	9	73.46	0.000
	Random-effects	0.516(0.000)	0.495(0.001)	0.956(0.000)	-0.002(0.842)	-0.619(0)	152	22	162.8	0.000
	Random-effects	0.125(0.133)	0.254(0.030)	0.355(0.000)	0.008(0.474)	-0.38(0.081)	80	11	45.93	0.000
	Random-effects	-0.036(0.897)	-0.098(0.723)	0.185(0.522)	-0.038(0.007)	0.501(0.08)	43	4	77.77	0.000
	Random-effects	-0.024(0.791)	-0.24(0.401)	0.063(0.005)	0.01(0.353)	-0.136(0.515)	110	13	15.92	0.003
	Fixed-effects	-0.013(0.569)	-0.066(0.262)	0.147(0.000)	-0.003(0.895)	-0.012(0.975)	249	25	9.23	0.000
TQ	Random-effects	0.838(0.264)	-3.232(0)	1.138(0.021)	-0.299(0)	5.514(0)	56	5	49.7	0.000
	Random-effects	-0.682(0.572)	-1.389(0.308)	0.058(0.96)	-0.316(0.153)	6.646(0.115)	58	6	8.61	0.072
	Random-effects	2.421(0.000)	1.171(0.112)	1.253(0.088)	-0.02(0.776)	-0.654(0.611)	52	7	17.18	0.002
	Random-effects	0.151(0.618)	0.037(0.707)	0.196(0.488)	-0.224(0)	4.767(0)	238	27	16.03	0.003
	Random-effects	1.038(0.000)	0.127(0.753)	0.447(0.000)	-0.231(0.018)	3.746(0.014)	83	9	649.04	0.000
	Random-effects	-1.026(0.000)	-0.736(0.011)	-0.41(0.040)	-0.155(0)	3.991(0)	152	22	90.59	0.000
	Random-effects	1.288(0.001)	-0.328(0.563)	0.677(0.078)	0.022(0.729)	-0.447(0.705)	80	11	15.31	0.004
	Random-effects	1.893(0.326)	3.43(0.078)	3.203(0.113)	-0.532(0.000)	5.774(0.004)	43	4	57.59	0.000
	Random-effects	-2.213(0.011)	-0.298(0.634)	0.263(0.647)	-0.712(0.000)	15.37(0)	110	13	39.16	0.000
	Random-effects	-0.432(0.000)	-0.012(0.912)	0.396(0.000)	-0.292(0.000)	5.289(0)	249	25	191.83	0.000

Source: Researcher's compilation, 2022

[36], [37]. The findings show that the higher the leverage the higher the return on assets; Short-term debts have a significant negative effect on Tobin's Q of non-financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group). This finding agrees with the findings of the studies done by [9]–[12], [40], [30], [34], [36], [37]; Long-term debts had a significant negative effect on the return on assets of non-financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group). This result is consistent with the studies conducted by [15], [17], [25], [41], [42]; Long-term debts had an insignificant negative effect on Tobin's Q of non-financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group). The finding is similar to the studies of [3], [4], [5], [7], [8]; Total equity had an insignificant negative effect on the return on assets of non-financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group). The results contradict the findings of [6] that established a positive relationship between total equity and return

on assets; Total equity had a significant positive effect on Tobin's Q of non-financial firms that are listed on the Nigeria Stock Exchange (Nigerian Exchange Group). The result supports the findings of [39].

References:

[1] N. P. Singh and M. Bagga, "The effect of capital structure on profitability: An empirical panel data study," *Jindal J. Bus. Res.*, vol. 8, no. 1, pp. 65–77, 2019.

[2] A. Ullah, C. Pinglu, S. Ullah, M. Zaman, and S. H. Hashmi, "The nexus between capital structure, firm-specific factors, macroeconomic factors and financial performance in the textile sector of Pakistan," *Heliyon*, vol. 6, no. 8, p. e04741, 2020.

[3] A.-T. Le, A.-T. Doan, and T. Phan, "Institutional development and firm risk from a dynamic perspective: Does ownership structure matter?," *Econ. Anal. Policy*, vol. 72, pp. 342–357, 2021.

[4] M. Sadiq, S. Alajlani, M. S. Hussain, R. Ahmad, F. Bashir, and S. Chupradit, "Impact of credit, liquidity, and systematic risk on financial structure: comparative investigation from a sustainable production," *Environ. Sci. Pollut. Res.*, pp. 1–13, 2021.

[5] S. Wen, B. Lin, and Y. Zhou, "Does financial structure promote energy conservation and emission reduction? Evidence from China," *Int. Rev. Econ. Financ.*, vol. 76, pp. 755–766, 2021.

[6] L. Czerwonka and J. Jaworski, "Capital structure determinants of small and medium-sized enterprises: evidence from Central and Eastern Europe," *J. Small Bus. Enterp. Dev.*, 2021.

[7] B. T. Khoa and D. T. Thai, "Capital structure and trade-off theory: Evidence from Vietnam," *J. Asian Finance. Econ. Bus.*, vol. 8, no. 1, pp. 45–52, 2021.

[8] L. M. Etale, "Dangote Cement PLC Capital Structure and Financial Performance Link in Nigeria: Empirical Analysis," *Am. Int. J. Bus. Manag.*, vol. 3, no. 8, pp. 1–10, 2020.

[9] K. Demirgüneş, "Capital structure choice and firm value: New empirical evidence from asymmetric causality test," *Int. J. Financ. Res.*, vol. 8, no. 2, pp. 75–91, 2017.

[10] A. Pilvere-Javorska, I. Pilvere, and B. Rivža, "Company capital structure's theoretical framework: historical assessment and trends in the 21st century," *Res. Rural Dev.*, vol. 35, pp. 191–198, 2020.

[11] L. H. De Wet and S. J. Gossel, "South African capital structure decisions: A survey of listed companies," *J. African Bus.*, vol. 17, no. 2, pp. 167–187, 2016.

[12] R. Louziri, "The determinants of capital structure: The case of Moroccan firms," *Eur. J. Mark. Econ.*, vol. 1, no. 2, pp. 90–95, 2018.

[13] J. Chen, C. Jiang, and Y. Lin, "What determines firms' capital structure in China?," *Manag. Finance.*, vol. 40, no. 10, pp. 1024–1039, 2014.

[14] G. Mihalca and R. Antal, "An empirical investigation of the trade-off and pecking order hypotheses on the Romanian market," in *ASMDA. Proceedings of the International Conference Applied Stochastic Models and Data Analysis*, 2009, vol. 13, p. 109.

[15] G. Brenda, "Capital structure theories: A critical approach," *Stud. Univ. Babes Bolyai-Oeconomica*, vol. 56, no. 2, pp. 29–39, 2011.

[16] S. C. Myers, "Capital structure puzzle," National Bureau of economic research Cambridge, Mass., USA, 1984.

[17] P. Luigi and V. Sorin, "A review of the capital structure theories," *Ann. Fac. Econ.*, vol. 3, no. 1, pp. 315–320, 2009.

[18] M. Mujahid and K. Akhtar, "Impact of capital structure on firms financial performance and shareholders wealth: Textile sector of Pakistan," *Int. J. Learn. Dev.*, vol. 4, no. 2, pp. 27–33, 2014.

[19] L. M. Mutua and G. K. Atheru, "Capital Structure and Financial Performance of Companies listed under Manufacturing and Allied Sector at Nairobi Securities Exchange in Kenya," *J. Financ. Account.*, vol. 4, no. 1, 2020.

[20] U. A. Ibrahim and A. Isiaka, "Dynamic modelling of the relationship between financial leverage and firm value of selected firms quoted on the Nigerian Stock Exchange," *Int. J. Res. Bus. Soc. Sci.*, vol. 10, no. 3, pp. 259–275, 2021.

[21] L. K. Cheruiyot, "Effect of Ownership Structure on Corporate Restructuring Among Firms Listed at the Nairobi Securities Exchange." University of Nairobi, 2021.

[22] O. O. Olatunji, S. Akinlabi, N. Madushele, P. A. Adedeji, M. J. Ndolomingo, and T. Meshack, "Blended tropical almond residue for fuel production: Characteristics, energy benefits, and emission reduction potential,"

J. Clean. Prod., vol. 267, p. 122013, 2020.

[23] F. Ahmed, S. Talreja, and M. Kashif, "Effects of corporate governance and capital structure on firms' performance: Evidence from major sectors of Pakistan," *Indones. Cap. Mark. Rev.*, vol. 10, no. 2, p.3, 2018.

[24] C. P. Das and R. K. Swain, "INFLUENCE OF CAPITAL STRUCTURE ON FINANCIAL PERFORMANCE.," *Parikalpana KIIT J. Manag.*, vol. 14, no. 1, 2018.

[25] L. Maina and M. Ishmail, "Capital structure and financial performance in Kenya: Evidence from firms listed at the Nairobi Securities Exchange," *Int. J. Soc. Sci. Entrep.*, vol. 1, no. 11, pp. 209–223, 2014.

[26] U. A. Ibrahim and A. Isiaka, "Effect of financial leverage on firm value: Evidence from selected firms quoted on the Nigerian stock exchange," *Eur. J. Bus. Manag.*, vol. 12, no. 3, pp. 124–135, 2020.

[27] V. Nguyen, "Human capital, capital structure choice and firm profitability in developing countries: An empirical study in Vietnam," *Accounting*, vol. 6, no. 2, pp. 127–136, 2020.

[28] T. P. V. Le and T. B. N. Phan, "Capital structure and firm performance: Empirical evidence from a small transition country," *Res. Int. Bus. Finance.*, vol. 42, pp. 710–726, 2017.

[29] X. V. Vo and C. Ellis, "An empirical investigation of capital structure and firm value in Vietnam," *Financ. Res. Lett.*, vol. 22, pp. 90–94, 2017.

[30] A.-O. I. Iyoha, G. Ohiokha, D. Umoru, S. O. Akhor, and G. A. Igele, "Target Capital Structure For Managerial Decision Making: Dynamics And Determinants," 2022.

[31] S. Nassar, "The impact of capital structure on Financial Performance of the firms: Evidence from Borsa Istanbul," *J. Bus. Finance. Aff.*, vol. 5, no. 2, 2016.

[32] I. Peters, N. Michael, M. I. Gladys, and O. Josephine, "Capital structure decisions and financial viability of firms quoted on the premium board segment of the Nigeria Stock Exchange," *J. Asian Bus. Strateg.*, vol. 10, no. 2, pp. 192–203, 2020.

[33] J. Agyei, S. Sun, and E. Abrokwah, "Trade-off theory versus pecking order theory: Ghanaian evidence," *SAGE Open*, vol. 10, no. 3, p. 2158244020940987, 2020.

[34] P. K. Narayan, D. H. B. Phan, G. Liu, and M. Ibrahim, "Ethical investing and capital structure," *Emerg. Mark. Rev.*, vol. 47, p. 100774, 2021.

[35] H. Abdullah and T. Tursoy, "Capital structure and firm performance: evidence of Germany under IFRS adoption," *Rev. Manag. Sci.*, vol. 15, no. 2, pp. 379–398, 2021.

[36] M. A. Rahman, M. S. I. Sarker, and M. J. Uddin, "The impact of capital structure on the profitability of publicly traded manufacturing firms in Bangladesh," *Appl. Econ. Financ.*, vol. 6, no. 2, pp. 1–5, 2019.

[37] M. A. Naseem, J. Lin, R. ur Rehman, M. I. Ahmad, and R. Ali, "Does capital structure mediate the link between CEO characteristics and firm performance?" *Manag. Decis.*, vol. 58, no. 1, pp. 164–181, 2019.

[38] B. O. Achieng, W. Muturi, and J. Wanjare, "Effect of equity financing options on the financial performance of non-financial firms listed at the Nairobi Securities Exchange, Kenya," *Appl. Econ. Financ.*, vol. 5, no. 4, pp. 160–173, 2018.

[39] O. W. Ibhagui and F. O. Olokoyo, "Leverage and firm performance: New evidence on the role of firm size," *North Am. J. Econ. Finance.*, vol. 45, pp. 57–82, 2018.

[40] N. A. Admassu, "The impact of capital structure choice on firms' financial performance: Evidence from manufacturing PLCs in Tigrai Region, Ethiopia," *Res. J. Financ. Account.*, vol. 7, no. 15, pp. 31–38, 2016.

[41] B. Salami *et al.*, "Parent–child relationships among African immigrant families in Canada," *Fam. Relat.*, vol. 69, no. 4, pp. 743–755, 2020.

[42] P. Okeke-Ihejirika, S. Yohani, B. Salami, and N. Rzeszutek, "Canada's Sub-Saharan African migrants: A scoping review," *Int. J. Intercult. Relations*, vol. 79, pp. 191–210, 2020.

Appendix

Table 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	1.150569	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

Table 2. Correlation Matrix Table

	ROA	TQ	STDR	LTDR	TER	SIZ
ROA	1.0000					
TQ	0.1363	1.0000				
STDR	0.3330	0.0726	1.0000			
LTDR	0.0239	-0.0433	0.3832	1.0000		
TER	-0.2907	0.0427	-0.9126	-0.4578	1.0000	
SIZ	0.0031	-0.0933	-0.2440	-0.0270	0.2014	1.0000

Source: Author's compilation from STATA v15 output, 2022

Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)

The authors equally contributed in the present research, at all stages from the formulation of the problem to the final findings and solution.

Sources of Funding for Research Presented in a Scientific Article or Scientific Article Itself

No funding was received for conducting this study.

Conflict of Interest

The authors have no conflict of interest to declare that is relevant to the content of this article.