

## Effect of Firm Characteristics on Capital Structure of Listed Cement firms in Nigeria

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### Abstract

The study investigated the effect of firm characteristics on the capital structures of listed cement firms on the Nigerian stock exchange within the period of 2015-2020. The predictor variables are non-debt tax shield, business risk, profitability, and liquidity, while the explained variable was measured using leverage. The study used the census approach for the population, while random effect panel regression was used to estimate the connection linking firm characteristics and capital structure. A secondary source of data was used, which was extracted from the annual report of three (3) listed cement firms in Nigeria. Panel regression (fixed effect and random effect) and correlation were used in analyzing the data. Based on findings, the study concluded that specific identified firm characteristics such as non-debt tax shield, liquidity, profitability, and business risk influence the capital structure of selected listed cement firms in Nigeria. The study therefore recommends that the management of cement firms should ensure, taking into deliberation, non-debt tax shield and liquidity when making decisions pertaining to capital structure, to enable cement firms to have a more perfect capital structure.

**Keywords:** Profitability; Capital structure; Firm characteristics; Listed Cement firms-Nigeria

### 1. Introduction

The capital structure is an issue of concern in the cement industry in Nigeria due to the persistent raise in their debt levels which has an effect on the business's capital structure, the industry has been borrowing aggressively to fund their increasing market shares (Bala Augie, 2019). Bua cement issued the largest corporate bond in the history of the Nigerian capital market (Dipo, 2021). The capital structure of a business consists of mainly debt and equity. The major intent of all finance managers is to expand the overall worth of the business while reducing its cost of capital to the lowest level. In order to increase shareholders' riches the finance manager needs to seek the perfect capital structure. Businesses combine both debt and equity when financing their assets, especially when the owner's equity is not enough or sufficient, businesses raise more funds from outsiders, which brings about debt. It is very rare for any business to use equity as their only source of finance (Do et al., 2020). Decisions that are made on capital structure have an impact on the business' total worth or business value. A good conclusion will have a useful effect on the business value while a bad conclusion will have effect on the business's value negatively (Mbonu & Amahalu, 2021). The perfect combination of finances gives the business two merits which are increasing the worth of the business and reducing its cost of capital. A business has to issue out

various combinations of securities in other for the business to achieve a perfect capital structure (Okegbe et al., 2019). Although, in reality the possibility of achieving a perfect capital structure is almost unlikely due to variables that are conflicting with one another (Mbonu & Amahalu, 2021).

Capital structure theory commenced with the work done by Modigliani and Miller (MM) in the year 1958 and 1963 this is a generally accepted capital structure theory because it serves as the basis for other capital structure theories used by researchers. The MM theory states that the capital structure theory works under full market conditions with various assumptions of the full market, such as: no tax, a perfect competition exist, investors are rational, absence of bankruptcy costs and an efficient market(Okegbe et al., 2019). The propositions made by MM have made the world to have an interest in this field of research. The propositions made are still very crucial to ones understanding of the components of capital structure and it laid the foundation for the modern history of finance. Pontoh (2021) said that capital structure cannot be seen from one point of view because human beings plays an important role in the world of business, the way the firm behaves reflects how the people inside the organization behaves. Human behavior is very complicated hence business behavior is also complicated, especially when it comes to capital structure issues. Furthermore, Agbata and Uche (2019) in their discussion on how businesses' will raise their capital stated that capital structure issue has generated a lot of recent scholarly studies investigating why companies raise money from primary and secondary sources, or why they issue debt using different combinations of financial instruments such as common stock, debt, and hybrid securities. Majority of businesses are unable to identify the best mix of capital structure for increasing their profits.

According to Abdullahi and Suleiman (2020) the cement firms in Nigeria have been existing before independence, Nigeria has many cement businesses with an estimated market size of 361 billion Naira (US\$2.4billion) and production rate of over 13.4 million tons. The businesses have been contributing immensely to the economic growth of Nigeria. The country is developing with great prospects and potentials in the emerging markets of investment that calls the attention of investors around the globe. It has been forecasted that the production of cement locally will hit 53.8 Million tones per Annum by 2021, with the cement industry being dominated by three major players, Dangote cement Plc controls 60.6% of the market followed by Lafarage Africa Plc having 21.8% and Bua Group controls 17.6% of the market(Femi, 2021). However, despite the importance of the cement industry in Nigeria in terms of economic development and growth, it has been under investigated. Cement manufacturing businesses in Nigeria are battling with notable growing debt ratios. Dangote and Bua cements are among the firms with the largest debt proportion in their capital structure (Omokolade, 2021).

A number of researches have been conducted on capital structure of the cement firms' emphasizing on the major components of capital structure, but still there is still disagreements regarding the attributes that have significant effect in the determination of the perfect capital structure of a business. The firm characteristics that have impact on perfect capital structure of a

business in developed countries are not necessarily the same with the developing countries like Nigeria. Many of the theories and literatures that exist on capital structure are derived from the developed economies and large businesses whose assets, debt and equity are very complex. Although attempts has been made in the developing countries on the subject matter but the findings are not conclusive as to whether they are applicable in emerging countries or not (Michael, 2019). More so, the attributes that has effect on the perfect capital structure of a business and their influence on business's decisions still remain unsettled over the years, giving a gap for further research. Despite different approach and framework on capital structure, there is still no conclusive evidence in the literature of how a company's characteristics affect capital structure Nigeria. This worthy an exploration. The main aim of the study is determine the effect of firm characteristics on capital structure while the specific objective of the study is to determine the extent to which each of the independent variables affect the dependent variables. The study hypothesised that each of the independent variables does not have a significant effect on the dependent variable. .

## 2. Literature Review

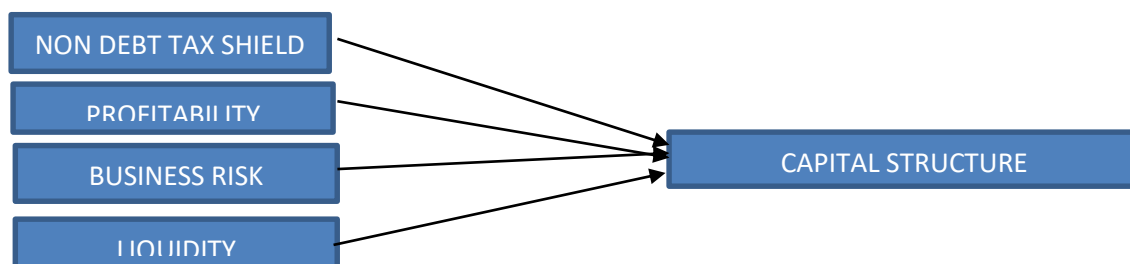
Bahir (2019) defined leverage as the ratio of debt to capital in a company's capital structure. For the purpose of this study leverage refers to the ratio of total liabilities of a company against the shareholders' equity. Studies have been conducted on firm characteristics and capital structure, Abdullahi and Suleiman (2020) conducted a study on firm characteristics and capital structure of cement firms in Nigeria. The targeted population included all cement firms listed on the Nigerian Stock Exchange. The data used was extracted from the yearly financial reports from 2010 to 2015. The regression result showed that profitability, asset tangibility and firm growth have insignificant influences on leverage. Firm size and liquidity has a significant negative influence on leverage which implies that has both firm size and liquidity increases the leverage decreases. The study did not make use of any theory to support the study. Okegbe *et al.* (2019) conducted a study on macroeconomic factors, firm characteristics and financial performance of selected quoted manufacturing firms in Nigeria and looked into how firm characteristics like firm size and asset tangibility affects capital structure. The research used of ex-post facto research design and focused on the use of secondary data to ascertain the effect. The study revealed that the effect of firm characteristics on debt to capital ratio was significant but has a negative impact, while the firm characteristics effect on debt to asset ratio was positively significant and firm characteristics was also non-significant but has a positive impact on debt to common equity ratio.

Furthermore, Elbekpashy and Elgiziry (2018) investigated the impact of firm characteristics on capital structure of quoted and unquoted SMEs. Three variables was used as a proxy for the leverage which are; total, long term, and short term leverage while the independent variables are profitability, liquidity asset structure, size, growth and ownership structure. The researchers used both quoted and unquoted SMES, which made it total population to be one hundred and twenty three (123), regression analysis was utilized to ascertain the relationship between the independent and dependent variables. The study shows all independent and control

variables primarily explain the determination of the capital structure of Egyptian SMEs. The study did not use any theory to support its findings. Abdur Rouf (2018) conducted a study on the corporate characteristics and leverage using evidence from Bangladesh. It examined the period of 2011-2015 with the leverage of one hundred and six (106) business in Bangladesh, multiple regression and ordinary least square was utilized for the analysis and estimation. It was discovered that age of the business, total asset, return on asset were negative but significant while the control variable debt to equity ratio was also significant but positive.

The findings of Do et al. (2020) showed that non-debt tax shield does not have any significant effect on leverage ratio. Although non tax shield has positive effect on short term debt ratio but has no significance influence in the real estate business. Bahir (2019) also found that non-debt tax shield has no significant influence on listed food and beverages firms in Nigeria. The findings of Buvanendra et al. (2017) showed that non-debt tax shield have significant positive influence on the total capital chosen by firms in Sri Lanka, while non-debt tax shields is a significant determinants in choosing the optimum capital structure in Indian firms. Liang et al. (2020); (Khan et al., 2020) found that non debt tax shield is statistically significant but has a negative relationship with leverage. Abdullahi and Suleiman (2020) discovered that profitability is insignificant but has a positive influence on capital structure and it is the most important variable in their study. Elbekpashy and Elgiziry (2018); Do et al. (2020); Liang et al. (2020) found that leverage has a negative relationship with the profitability of the business which is conflicting with the findings other researchers. Do et al. (2020) found that risk is negatively correlated with long-term debt ratio, while Khan et al. (2020) study showed that the business risk is not significant to the business's leverage. The findings of Abdullahi and Suleiman (2020); Mbonu and Amahalu (2021); Khan et al. (2020) showed that liquidity has a negative and significant impact on leverage while the findings of Abdur Rouf (2018) signified that liquidity is not significant, hence it has no impact on the capital structure. This research thus applies the tradeoff theory and pecking order theory to explore how firm characteristics affect the capital structure decision of companies, the theories suggested that firm characteristics should influence capital structure decision more effectively.

**Conceptual Framework Adopted for the Study**



**Fig 1 Conceptual Framework**

### 3. Methodology

Ex-post facto research design was employed to establish the effect of firm characteristics on capital structure. The targeted population of the study comprises of all the three (3) cement firms listed on the Nigerian stock exchange which are; Dangote Cement, Bua cement (formerly CCNN) and Lafarge Africa Plc. Secondary data was used, the data was gathered from the yearly reports of the cement companies in Nigeria. Panel regression (fixed effect and random effect) and correlation was used in analyzing the data. The technique was used because they are used to test the effect and relationship between variables.

**Table 3.1: Variable Measurements**

Variables	Type of variables	Measurements	Sources
Capital structure (Leverage)	Dependent Variable	Measured as long term debt plus short term debt divided by shareholders' equity	(Mbonu & Amahalu, 2021)
Non debt tax shield	Independent Variable	The ratio of depreciation to total assets (annual)	(Buvanendra et al., 2017)
Profitability	Independent Variable	Net Profit divided by Total Assets	(Elbekpashy & Elgiziry, 2018)
Business risk	Independent Variable	The standard deviation of return on asset of the firm in that year	(Do et al., 2020)
Liquidity	Independent Variable	Current assets divided by current liabilities	(Mbonu & Amahalu, 2021)

### Model Specification

The hypothesis of this study were examined using the ordinary least square regression:

$$LEV_{it} = \beta_0 + \beta_1 NDTS_{it} + \beta_2 PRFT_{it} + \beta_3 BR_{it} + \beta_4 LQ_{it} + E_{it}$$

Where;

LEV = Leverage

NDTS = Non Debt Tax Shield

PRFT = Profitability

BR = Business Risk

LQ = Liquidity

$\beta_0$  = Constant

$\beta_1$  to  $\beta_4$  = Coefficient of the independent variables

$E$  = Error term

$it$  = Panel data indicator

## 4. Results and Discussion

### Descriptive Analysis of Study Variables

Analysis in table 4.1 depicts the descriptive statistics of the dependent variable and all the independent variables in this study. This means that the average leverage ratio is about 55% and the standard deviation of approximately 34% which stipulates an average difference among the sample companies with a maximum of 133% and a minimum of 4.3%. The average non-debt tax shield (NDTS) is approximately 36.4% with a standard deviation of 21%. This suggests a low variation across the cement companies. The minimum and maximum ratio of NDTS for the period under consideration is -17% and 73%. The average of profitability (PRFT) across the listed cement companies in Nigeria for the period under study is 71%, while the normal deviation stands at 81%. This indicates a low variation in the level of profitability among the listed cement firms in Nigeria for the interval under consideration. The minimum and maximum profitability is -180% and 138% respectively. This implies that some listed cement firms have really low profitability. On the average, the mean of business risk (BR) is 92%, while the deviation is 19%. This suggests a high variation of the data from the mean. The minimum and maximum business risk is 72% and 117% respectively. This implies that some listed cement companies have lower business risk than others. Liquidity (LQ) shows an average -9.5% approximately, while the standard deviation of 41%. This implies a high variation among sample firms, the minimum and maximum are -147% and 33%.

**Table 4.1: Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
LEV	18	54.609	33.487	4.275	132.7
NDTS	18	0.364	0.215	-0.17	0.73
PRFT	18	0.708	0.809	-1.804	1.38
BR	18	0.924	0.191	0.723	1.17
LQ	18	-0.095	0.405	-1.47	0.33

*Source: Author's Computation using Stata Output, (2021)*

### Analysis of Relationship between Firm Characteristics Capital Structure

Looking at the result of correlation matrix presented in table 4.2, it can be observed that the leverage has a positive relationship with NDTS and PRFT. This means that the NDTS and PRFT move in the same direction with leverage. However, leverage has a negative relationship with BR and LQ. This means that when leverage is being used, the variable shifts in the opposite direction. Table 4.2 also depicts the association of the independent variables. According to Gujarati (2004), the correlation coefficient among two independent variables above 0.80 is considered too

much. From the table above, we can see that all correlation coefficients between the independent variables are all less than 0.80, indicating no multicollinearity. However, to further test collinearity, this task used the Variance Inflation Factor (VIF) test to estimate that part of the model in which the variance factor of each variable is approximated. VIF test results range from a minimum of 1.05 to a maximum of 1.88, all less than 10. To further substantiate this claim, the average VIF is 1.46. This also indicates a lack of multicollinearity between any of the independent variables of the study(Hair, et al., 2014).

**Table 4.2: Matrix of correlations**

Variables	LEV	NDTS	PRFT	BR	LQ
LEV	1.000				
NDTS	0.375	1.000			
PRFT	0.036	0.086	1.000		
BR	-0.119	-0.212	-0.541	1.000	
LQ	-0.582	-0.043	0.111	0.328	1.000

*Source: Author's Computation using Stata Output, (2021)*

### **Analysis of Firm Characteristics effect on Capital Structure**

The results of the cross-sectional time-series FGLS regression results presented in table 4.revealed that effect of firm characteristics on capital structure of selected Listed Cement firms in Nigeria. the R-squared is 0.527, suggesting that about 53% of the differences in capital structure are due to the dissimilarity of the independent variables, as explained in the model. This combined with non-debt tax shield, profitability, business risk and liquidity, accounts for 53% of the capital structure of the Nigerian listed cement company, statistically significant at 0.5% as indicated by the p-value of 0.000 which means that it is significant. The remaining 47% can be traced back to other factors that are not recorded in the model but were measured using the error term.

The regression result reveals that non-debt tax shield has a coefficient value of 61.502; a z-value of 2.37and probability value of 0.018which is significant. This shows that non-debt tax shield is statistically and positively significant at 5%. By implication, there is sufficient evidence to proof that a relationship exists between non-debt tax shield and capital structure. Hence, an increase in non-debt tax shield by 1 unit will lead to a corresponding increase in capital structure by 61.502% all things being equal. This is attributed to the fact that the measure of depreciation is an essential part of non-debt tax shields, when a company has more fixed assets that cause high depreciation the assets can be utilized as collateral, remedies for the company to acquire secured debt. This will increase debt capacity. This result is consistent with tradeoff theory and the findings of Buvanendra et al. (2017) but contradict the findings of Do et al. (2020); Bahir (2019). Based on

this, the null hypothesis which stated that non-debt tax shield has no significant impact on capital structure is therefore rejected.

Also, the regression result reveals that profitability is statistically significant and has no influence on capital structure with a coefficient value of 10.862, a z-value of 1.27 and probability value of 0.205 which is insignificant. This shows that profitability has no significant impact on capital structure of listed cement firms in Nigeria. The finding of the study is in line with (Abdullahi & Suleiman, 2020) but contradicts the findings (Liang et al., 2020); (Khan et al., 2020). Based on this, the null hypothesis which stated that profitability has no significant impact on capital structure is true. Moreover, the regression result reveals that business risk has a coefficient value of 59.494, a z-value of 1.52 and probability value of 0.127 which is insignificant. This shows that business risk has no significant impact on capital structure of listed cement firms in Nigeria. The finding of the study is in line with (Khan et al., 2020) however inconsistent with the result of (Do et al., 2020). Based on this the null hypothesis which stated that business risk has no significant impact on capital structure is true. Furthermore, the regression result reveals that liquidity has a coefficient value of -58.233, a z-value of -3.82 and probability value of 0.000 which is significant at 1%. This shows that liquidity is statistically and negatively significant at 1%. By implication, there is sufficient evidence to prove that a relationship exists between liquidity and capital structure. Hence, an increase in liquidity by 1 unit will lead to a corresponding decrease in capital structure by -58.233% all things being equal. This is attributed to the fact that using more debt in the capital structure increases the business's liabilities and leaves few current assets after settling its liabilities. The results of the study are consistent with the pecking order theory and the findings of Abdullahi and Suleiman (2020); Khan et al. (2020); Mbonu and Amahalu (2021) but contradict the findings of (Abdur Rouf, 2018). Based on this the null hypothesis which stated that liquidity has no significant impact on capital structure is rejected.

**Table 4.3: Cross-sectional Time-series FGLS Regression Results**

LEV	Coef.	St.Err.	z-value	p-value	VIF
NDTS	61.502	25.924	2.37	0.018	1.05
PRFT	10.862	8.570	1.27	0.205	1.63
BR	59.494	39.015	1.52	0.127	1.88
LQ	-58.233	15.231	-3.82	0.000	1.29
Constant	-35.993	43.806	-0.82	0.411	
Number of obs	18.00		Mean VIF		1.46
R-squared	0.527		Auto and Serial Correlation		0.001
Wald chi	20.05		Hetest		0.000
Prob> chi	0.001		Hausman		0.000
			Normality test		0.000



*Source: Author's Computation using Stata14 Output, (2021)*

## 5. Conclusion and Recommendation

Based on findings, the study concluded that specific identified firm characteristics such as non-debt tax shield, liquidity, profitability, and business risk influence the capital structure of selected listed cement firms in Nigeria. The study therefore recommends that the management of cement firms should ensure, taking into deliberation, non-debt tax shield and liquidity when making decisions pertaining to capital structure, to enable cement firms to have a more perfect capital structure.

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