The Effect of Capital Structure on the Profitability of Cement Industry in Nigeria

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ABSTRACT: The study utilized the panel regression method of analysis to measure The Effect of Capital Structure on The Profitability of the Cement Industry in Nigeria**.**   of 3 Cement companies in Nigeria by collecting data on the capital structure (Equity and Debt ratio) as well as on a controlled variable, between 2007 and 2019, a period of thirteen years. The Hausman test was used to determine the appropriate Model between the Fixed and Random Models, the two main methods appropriate for analysing panel data. The test affirmed the appropriateness of the Fixed Effect Model. The finding shows that capital structure has a positive and statistically significant impact on the industry's profitability. Because; each of the components of capital structure (D.R. and EQTY) is positive and significant since the respective p-values are less than the average critical value of 5% (0.05). This study recommends that managers of manufacturing companies (cement) increase the reliance on debt financing as a source of finance because they have much influence on profit generation on both returns on Equity (ROE) and return on asset (ROA), as indicated by regression results.

KEYWORDS: Capital Structure, Profitability, Financing Decision, Strategic Management, Panel Data.

INTRODUCTION

The Nigerian economy is one of the biggest growing economies in the sub-Saharan region, and many industries are contributing to the Gross Domestic Product (GDP) of the economy Nigeria. The manufacturing sector is one of the significant contributors to the country's GDP, and this sector is also the leading sector in providing employment opportunities to the country's labour force. A nation will develop only when the country has a good infrastructure facility. The Cement Industry helps develop infrastructural facilities, assists the economy in many ways, provides comprehensive employment and employment opportunities either directly or indirectly, and helps create other industries by bringing Foreign Direct Investment (FDI) through export. Furthermore, the Cement industry is one of the largest industries in Nigeria. Hence it is necessary to examine the effect of capital structure on the Profitability of Cement industries in Nigeria.

Financial managers try to discover a nexus of capital structure with the appropriate combination or proportion. However, capital structure is a combination of Debt and Equity used to finance corporate activities and growth. Capital structure is a pure financing decision of a firm. Therefore financial managers must take caution on deciding the mix of debts and Equity of a firm's capital structure (Mwambuli, 2015). The optimal capital structure exists only when Debt and Equity combine to reduce the cost of capital and enhance the firm's profitability. Equity in a company's capital structure consists of common stock and retained earnings, which are components in the shareholders' equity account on a statement of financial position (Okwoli & Kpelai, 2008). In any business enterprise, financing decisions cannot be excessive. The factors contributing to business failure can be viewed using approaches and financial decisions that drive growth and achieve organisational goals and objectives (Salazar, Soto, and Mosqueda, 2012). According to Mwangi, Makau, and Kosimbei (2014), Wealth maximisation is the aim of all financing decisions, and the immediate way of measuring the quality of any financing decision is to examine the impact of such decision on the firm's profitability.

From the financial-economic point of view, capital is an essential parameter since it is linked with a firm's ability to meet the various desires of shareholders (Jensen, 1986). Firms sought funds through several means. Since the decisive research of Modigliani and Miller (1958), Capital structure and its influence on the firm financial performance and overall value has remained an issue of great attention amongst economic scholars, arguing that under a perfect market setting, the capital

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structure doesn't influence in valuing the firm.. Proposing that real asset is the yardstick through which the value of a firm is a measure, not the mode they are financed. Minimising capital costs can enhance or maximise the value of a firm. Identifying optimal capital structure is one of the primary goals of strategic management. The existence of optimal capital structure is when the Debt and Equity can be combined to reduce the cost of capital and enhance or maximise the financial performance. Suppose the firm fails to minimise capital cost, and its manager fails to manage its capital cost properly. In that case, it is reasonable to expect that the firm's capital structure would affect its growth and profitability, further escorting to financial distress. Finally, firms can go bankrupt (Khalifa-Tailab, 2014).

Available Nigerian literature like Adesina, Nwidobie, and Adesina (2015); Nwachukwu and Akpeghughu (2016) focuses on banking and non-financial sectors of the economy none of the studies looked at the impact of capital structure on the financial performance of listed cement companies in Nigeria and lack of a consensus on the effect of capital structure on financial performance are motivational factors for this study. A better understanding of the issues at hand requires a look at the relationship between capital structure and its effect on the profitability of cement companies.

The study's objective is to determine the effect of Debt and Equity on the profitability of listed cement companies in Nigeria. To achieve this fit, the study hypothesised that Debt has no significant impact on financial performance and Equity has no significant effect on financial performance.

The relationship between capital structure and profitability cannot be ignored because the improvement in profitability is necessary for the long-term survivability and sustainability of the companies. Consequently, it is essential to test the relationship between capital structure and the profitability of the cement industry to make sound capital structure decisions. A study of this nature will undoubtedly serve as an indispensable planning tool for financial managers.

This Paper is planned into five sections, with this section being the introduction. Section two deals with reviewing relevant and related literature. Section three is dedicated to the methodology of the study. Section four presents and discusses the result. Section five concludes the study by emphasising the findings and then the recommendations.

LITERATURE REVIEW

Previous studies conducted in different countries are related to this research topic. To show the research gap and justify the importance of this study, the following section presents a review of the empirical evidence that has examined the capital structure and financial performance.

Capital structure is the mix of Equity and Debt that a company uses to finance its operations. Financing of all firms is done by Equity, debt or hybrid security. A firm's capital structure relies upon the size of the composition of Debt or Equity that firms then use to be operational. The arrangement of debt financing and equity financing is required for a firm to finance its assets. According to Ndiwa (2014), a firm's capital structure refers to the mix of its financial liabilities. The firm's capital structure is significant since it is related to the ability of the firm to meet the needs of its stakeholders through dividend payments, Debt, and other financial obligation servicing, paying salaries on schedule and the likes. The capital structure can also be defined as a mix of a company's long-term Debt, specific short-term Debt, common Equity and preferred Equity. The capital structure shows how a firm finances its overall operations and growth by using different sources of funds. Debt mostly comes in bond issues or long-term notes payable, while Equity is classified as common stock, preferred stock or retained earnings.

Pouraghajan and Malekian (2012) studied the capital structure and firm performance evaluation measures: Evidence from the Tehran Stock Exchange. The study sought to determine the impact of capital structure on firm performance in Iran. The study is similar to this, except it used a different industry. Findings showed a significant negative relationship between debt ratio and financial performance of companies listed on the Tehran Stock Exchange. Also, there is an essential positive relationship between asset turnover, firm size, asset tangibility ratio and growth opportunities with financial performance measures.

Kipesha& Moshi (2014) explore the Capital structure and firm performance: evidence from commercial banks in Tanzania. The study sought to assess the impact of capital structure on bank performance in Tanzania. Their findings indicated a presence of a significant negative relationship between total Debt to equity and long-term debt to Equity with bank cost efficiency and return on Equity, which implies the existence of a negative trade-off between firm leverage and firm performance.

Goyal (2013) Impact of Capital Structure on Performance of Listed Public Sector Banks in India. The study sought to examine the impact of capital structure on the Performance of Listed Public Sector Banks in India. The findings showed that the study

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validated a solid positive dependence of short-term Debt to the capital with all profitability measures of ROA, ROE and EPS. In contrast, long term debt to capital and total Debt to capital had a negative relationship with return on assets (ROA), Return On Equity (ROE) and Earning Per Share (EPS).

Soumadi and Hayajneh's (2015) Capital Structure and Corporate Performance empirical study on publicly Jordanian shareholding firms listed in the Amman stock market. The study sought to evaluate the effect of capital structure on the performance of the Jordanian public firms listed in the Amman stock market. . Findings showed that capital structure is associated negatively and statistically with firm performance in the study sample generally. Also, the study found out that there are no differences in the impact of the financial leverage between high financial leverage firms and low financial leverage firms on their performance. The study also showed that the effect of financial leverage based on growth is no difference between the financial leverage of high growth firms and low growth firms on performance, which was negatively and statistically discovered in the firms.

Kariuki and Kamau (2004) conducted Determinants of Corporate Capital Structure among Private Manufacturing Firms in Kenya: a Survey of Food and Beverage manufacturing firms. The study sought to investigate factors influencing corporate capital structure in private firms in Kenya as negatively and statistically discovered in the firms. Findings of the study showed that growth opportunities positively impact capital structure; firm size negatively influences the capital structure, there is an insignificant negative relationship between firm Profitability and the capital structure, and there is a minor positive interaction between asset tangibility and the capital structure of private firms in Kenya.

Gill, Nahum and Neil (2011) The Effect of Capital structure on Profitability: Evidence from the United States. The study sought to examine the effect of capital structure on the Profitability of American service and manufacturing firms. Findings showed a positive relationship between Debt to total assets and profitability and between total Debt to total assets and profitability in the service industry. Also, the results of their study show a positive relationship between Debt to total assets and profitability in the short-run, long-term Debt to total assets and profitability, and between total Debt to total assets and profitability in the manufacturing industry.

Hermawana and Mulyawan (2014) investigated whether companies' profitability contributes to corporate social responsibility in Indonesia. The study is similar to my work, but it is based on corporate responsibility. Their result suggests that not all profitability ratios correlate significantly to CSR disclosure. Kompas100 and industry-specific tend to have a relationship with several lines in the CSR report.

Chechet and Olayowola (2014) Capital Structure and Profitability of Nigerian Quoted Firms: The Agency cost theory perspective. The study sought to examine Nigerian Quoted Firms' Capital Structure and Profitability. The findings showed a significant positive correlation of 5 % between Profitability and Equity and a negative correlation of 1% between profitability and debt ratio. Therefore, the study concluded that a higher proportion of Debt in capital structure hurts the firm's" profitability and equity financing positively affects the profitability of a firm's profits though not significantly.

Abeywardhana (2015) examined capital structure and Profitability: An empirical analysis of SMEs in the U K. The study sought to determine the relationship between capital structure and profitability of non-financial SMEs in the U K. Findings showed a significant relationship between capital structure and profitability which is negatively related. Also, it shows that the capital structure of the firm has a considerable influence on the Profitability of SMEs in the U. K. In the same vein, Khan, Naz, Khan, Khan, and Ahmad (2013) empirical investigated the impact of capital structure and financial performance on stock Returns "A Case of Pakistan Textile Industry" for the period of 2003-2009. The findings revealed that Debt to equity ratio, return on equity ratio, cash flow ratio, earning per share and time interest earned ratio positively affect the stock return. If financial decision plays a significant role in determining the level of a firm financial performance as Salazar, Soto and Mosquedo, (2012); Mwangi, Makau: Kosimberi (2014); Nikoo (2015), Zafar, Zeesham and Ahmed (2016) and. Siddik, Kabraj and Jinoghee (2017) assert then the capital structure is part of the strategic business decision. The literature survey shows that although there are many studies about the impact of capital structure on firm financial performance, the results do not display any cohesiveness regarding the association between capital structure and financial performance. Therefore, this Paper's goal is to focus on the insights of financial decisions, a crucial aspect of strategic Business, to gain greater insight into the impact of capital structure on the firm's economic performance.

The review of the literature discussed in this section reveals the existence of many gaps in knowledge in this regard, particularly in the context of Nigeria. Although there are many studies, such as Pouraghajan, Malekian, Emamgholipour, Lotfollahpour, and Bagheri (2012), found a positive relationship between capital structure and financial performance. In the same vein, Mwaura

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(2013) study revealed a strong relationship between capital structure and financial performance. Nwachukwu and Akpeghughu (2016) investigated the relations between capital structure and firm performance within the banking industries in Nigeria using a sample of 15 quoted banks on the Nigerian stock exchange. The capital structure measure includes (long-term Debt and equity capital) as independent variables. The results indicate that firm performance measured by return on investment has a positive and significant relationship with equity capital. Moreover, there exist a negative and significant relationship between debt capital and return on investment.

In contrast to these views, other researchers' empirical results revealed that a firm's capital structure has a significantly negative impact on the firm's financial performance; for example, Tharmila and Arulvel (2013) attempted to determine the empirical relationship between capital structure and financial performance of the listed companies traded in Colombo stock exchange for the period of 2007-2011. They found a negative relationship between the capital structure and financial performance. Arowoshegbe and Emeni (2014) evaluated the relationship between shareholders' wealth and the debt-equity mix of quoted companies in Nigeria. Two measures of shareholders' wealth: Return on Equity (ROE) and Earnings per Share (EPS), were taken as the dependent variables, respectively. The principal explanatory variable for each Model was Debt Ratio (D.R.). The study results confirm our apriori expectation that a significant negative relationship exists between shareholders' wealth and the debt-equity mix of quoted companies in Nigeria. The study of Shubita and Alsawalhah (2012) analysed the effect of capital structure on the profitability of the industrial companies listed on the Amman Stock Exchange for six years (2004-2009). The findings revealed a significantly negative relationship between Debt and Profitability. In addition, Pouraghajan, Malekian, Emamgholipour, Lotfollahpour, and Bagheri (2012) examined the impact of capital structure on the financial performance of companies listed in the Tehran Stock Exchange from the period 2006-to 2010. The findings showed a significant negative relationship between debt ratio and the financial performance of companies and a meaningful positive relationship between asset turnover, firm size, asset tangibility ratio, and growth opportunities with economic performance measures. The study of Salim and Yadav (2012) conducted an empirical study o relationship between capital structure and firm performance in Malaysia from 1995-to 2011. The findings revealed that firm performance, measured by return on asset, Equity and earnings per share, negatively correlates with short-term Debt, long-term Debt, and total Debt as the independent variable. In the study of Umar, In the same vein, Khan, Khan, Khan, and Ahmad (2013) empirically investigated the impact of capital structure and financial performance on stock Returns in "A Case of Pakistan Textile Industry" for the period of 2003-2009. The findings revealed that Debt to equity ratio, return on equity ratio, cash flow ratio, earning per share and time interest earned ratio positively affect the stock return. Singh (2013) argues that an increase in debt funds in Capital Structure minimises the net Profit of the Manufacturing firms listed on the Bombay Stock Exchange in India.

The review of the literature discussed in this section reveals the existence of many gaps in knowledge in this regard, particularly in the context of Nigeria. Although there are many studies such as Chinaemerem & Anthony (2012); Chandrasekharan (2012); Idode, Adeleke, Ogunlowore & Ashogbon (2014); Adesina, J B., Nwidobie, B. M., and Adesina, O. O. (2015); Nwachukwu and Akpeghughu (2016), conducted in Nigeria but none of the studies used earnings before interest and taxes (EBIT) to Equity as a proxy for measure financial performance. However, most of the studies in Nigeria focus on the banking and non-financial sectors of the economy. None of the studies looked at the impact of capital structure on the financial performance of listed insurance firms in Nigeria. Some authors like Raheman, Zulfiqar and Mustafa (2007); Salehi and Biglar (2009); Pouraghajan, Malekian, Emamgholipour, Lotfollahpour, and Bagheri (2012); Mwaura (2013); Nirajini and Priya (2013); Singh (2013); Mujahid and Akhtar (2014); Idode, Adeleke, Ogunlowore, Ashogbon (2014); AbuTawahina (2015) are of the view that a positive relationship exists between capital structure and the firm performance while some like Atta-Doku (2009); Chinaemerem, and Anthony (2012); Pouraghajan, Malekian, Emamgholipour, Lotfollahpour, and Bagheri (2012); Salim and Yadav (2012); Umar, Tanveer, Aslam, and Sajid (2012); Mwaura (2013); Tharmila and Arulvel (2013); Younus, Ishfaq, Usman, and Azeem (2014); Rajha and Alslehat (2014); Khan, Naz, Khan, Khan, and Ahmad (2013); Mwangi and Birundu (2015) believes that there is a negative relationship. The need to carry out a study that focuses on the insurance sector in Nigeria is fuelled by the absence of literature on this area, but very few works have been done. Therefore, this study attempts to address this gap in information on Nigeria's cement industry. Then, this study intends to measure the effect of capital structure on profitability.

THEORETICAL FRAMEWORK

Suppose there have been areas where Finance Discipline has engaged the most excellent attention and caused the highest argument. In that case, it is the theory of Capital Structure and leverage and how they affect organisational performance. The Capital Structure and its effect on profitability can be traced back to David Durand (1959), who propounded the approaches to

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Capital Structure, namely Net Income Approach and Operating Income Approach. Capital Structure has been an essential focal point in the literature since MM started featuring their research about it in 1958. Capital structure is a great topic because it has academic and organisational levels in financing and investing activities.

Therefore, there are many approaches to capital theory, which discuss it in many different ways. It is referred to as how a firm mixes Debt and Equity to finance itself. Alternatively, in other words, it concerns combinations of funds in the form of Debt and Equity. Therefore, there is still a challenging debate: Does an optimal Capital Structure exist, and how does capital structure affect the profitability of the cement industry?

The firm's financing decision is investigated in this study to show the effects of capital structure on profitability performance. Few Approaches, such as the net income, and net operating income, traditional approaches have sought to explain capital structure by introducing frictions omitted in the original Modigliani and Miller framework. Besides, all the works so far produced are yet to present a sound basis for establishing an empirical validity of the different theoretical models, despite the critical contributions to the general perception of the various intricacies of corporate capital structure (Denis, 2012).

Though the literature systematically describes the various attempts to model corporate debt/equity policy but is yet to determine what optimal mix of securities a firm should issue. Myers (1984), commenting on the disagreement surrounding the corporate capital structure theory, calls it a puzzle. Kamath (1997) sees it as a problem (inexplicable), and Stiglitz (1988) views it as a puzzle. Hence, Myers (2001) concludes that there is no universal theory of the debt-equity choice and no reason to expect one.

There are conflicting views on the effect of capital structure and the firm's profitability. The traditionalists believe that capital structure affects firms' value. In contrast, Modigliani and Miller (M-M) (1958) argue that capital structure decisions are irrelevant under the assumptions of perfect capital markets and no taxes. However, their position was later reversed when they considered corporate taxes (Pandey, 2010).

The need to review these approaches is quite understandable. First, the thesis seeks to establish the effect of a firm's capital structure and its profitability performance. Therefore, the theory which suggests that a firm's capital structure affects its profitability performance will assist the researcher in identifying the nature of their consequence and the extent to which they influence one another. Secondly, such a theory would also provide support on which the researcher's results could be anchored. However, where such a result runs contrary to the current view, the peculiarity of the study environment could be examined to identify and explain the reasons for such contradictions.

In this section, therefore, we attempt to classify the approaches to explaining the capital structure and the value of the firm into two: those approaches that support the relevance of capital structure and those that do not (capital structure irrelevance). Approaches that state that capital structure matters, according to Pandey (2004), include:
1. The Traditional View
2. The Net Income Approach

While the theory which supports capital structure irrelevance includes:
3. The Net Operating Income Approach,

Furthermore, this thesis discusses the theory of capital structure, which presume the existence of optimal financing policy following (Sanders, 1998). Other approaches but not addressed in this work, state that an optimal debt-equity mix exists (e.g. Trade-off theory), those which support optimal financing hierarchy (e.g. the Pecking Order theory), and lastly but by no means the least, the Agency cost theory which emphasises the need to use more debt financing as a control mechanism to align management interest with that of shareholders (Jensen &Meckling, 1976).

This study adopts the net income approach of capital structure to underpin this research work since the theory is linked with a positive association between companies' profitability and capital structure. Because the net income approach postulates that the more Debt a firm employs, the higher the value of the firm and the lower the cost of capital. With this assertion, companies will prefer debt sources of finance to equity sources. The order of the preference is the least sensitive (and least risky) to the most sensitive (and most difficult) that arise because of asymmetric information between corporate insiders and less well-informed market participants. By this token, profitable firms with access to Debt can rely on them instead of depending on equity sources.

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The objective of the study
The study is undertaken to investigate the effect of capital structure on the profitability of the cement industry in Nigeria. The corporate financial performance is represented by dependent variables, ROA (Return on Assets) and ROE (Return on Equity), and the dependent variables are Total sales of the firm, Total Debt to Total Assets (TDTA), Debt- Equity Ratio (DER), and Growth opportunities. Which are related to the capital structure of the companies belonging to the Nigerian cement companies were chosen for the study.

Methodology and Model Specification
The ex-post facto research design method was adopted for this study. This is because the study seeks to investigate the effect of capital structure on the profitability of the cement industry in Nigeria. The data for this study were extracted from secondary sources collected from the audited annual reports and accounts of all the listed cement in Nigeria. The study population consists of all the eighteen (3) listed cement Firms in Nigeria, and the researcher used all the listed firms as a sample size. Panel regression was used for the analysis, and STATA was used to run the regression.

Model Specification:
A linear model is built to examine the influence of capital structure on listed cement firms' financial performance in Nigeria. The Model captures the contribution of capital structure to the profitability of listed cement companies in Nigeria. The regression equation model is as below:

$$\text{PROFITABILITY}_{it} = \alpha + \beta\text{CAPSTR}_{it} + \mu_{it} \qquad (1)$$

Where:
PROFITABILITY= profitability measured as the ratio of profit after tax to Total Assets (Shehu and Musa, 2014).
EQTY= Equity measured as Shareholders' fund/Total asset (Umoren, Oyerinde, and Olokoyo, 2007).
D.R. = Debt measured as Shareholders' fund/Total asset (Buigut, Soi, Koskei, & Kibet, (2013)
The profitability of cement firms (Profitability $_{it}$) is regressed on the explanatory variable capital structure, which is a vector of debt ratio (D.R.) and Equity (EQTY), which is the control variable. The general form of the Model is thus specified into a single Model as presented below:

$$\text{PROFITABILITY}_{I,t} = \beta_0 + \beta_1 \text{DR}_{i,t} + \beta_2 \text{EQTY}_{i,t} + {}_t + \varepsilon_{i,t} \dots (2)$$

Where:
DR= Debt Ratio. This is the total Liabilities to Total Assets (Abdur Rouf, 2015). Cuong and Canh (2012) have used a natural log of total assets to measure the firm size
equity$_{,t}$ = Equity of Cement firms i in period t.
$\varepsilon_{i,t}$ = component unobserved error term.
β_0 = constant term
β_1, β_2, and **β_3** = are sloped to be estimated.
i = cement companies' identifier (Lafarge, CCNN, . . . BENUE cement) – (3 cement companies)
t = time variable (2007, 2011, ……2018) – (Twelve Years)

Panel Data Regression Analysis
Panel data involves the pooling of observations on a cross-section of units several times and provides a not detectable result in pure cross-sections or time series. According to Hsiao (2009), such data increases the explanatory power of the Model. Since the data collected in this work is both cross-sectional and time series, the panel data model becomes more appropriate. The panel data model is described below:

$$Yit = \beta_1 + \beta_2 Xit + uit \dots\dots\dots\dots 3.1$$

Where:
Y= dependent variable
X= all the independent variables
β1= the constant term
β2= slope/coefficient of the independent variable
ε= error term
i = (1, 2, 3) – number of cement firms

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t = (1, 2, 3..., 12) – number of years

i x t = (3*12)

The Panel regression model comprises fixed and random effect models, which take the one-way error component method. The choice of using any of them depends on the significance of the Hausman test (Torres-Reyar, 2009). In this Paper, a Hausman test was used to determine the most consistent method between the fixed effect model and the random effect model.

Fixed Effect Model (FEM)

FEM appears when there is an individual effect, and explanatory variables correlate with X_{it} or have a pattern that nature is not random. This assumption makes an error component of the individual, and time effects can be part of the interception, namely:

For the one-way error component:

$$y_{it} = \alpha_i + \Lambda_i + \beta X_{it} + u_{it} \dots 3.2$$

For two-way error component:

$$y_{it} = \alpha_i + \Lambda_i + \mu_t + \beta X_{it} + u_{it} \dots 3.3$$

Where:

y_{it} = dependent variable

α_i = constant term

Λ_i = firms error term

μ_t = time error

X_{it} = independent variable

β = slope of the independent variable

u_{it} = component error term

Random Effect Model (REM)

REM appears when there are individual effects and no correlation among regressors. This assumption makes an error component of the individual and time effects included in the error, in which:

For the one-way error component:

$$y_{it} = \alpha_i + \beta X_{it} + u_{it} + \Lambda_i \dots (3.4)$$

For two-way error component:

$$y_{it} = \alpha_i + \beta X_{it} + u_{it} + \Lambda_i + \mu_t \dots (3.5)$$

y_{it} = dependent variable

α_i = constant term

Λ_i = firms error term

μ_t = time error

X_{it} = independent variable

β = slope of the independent variable

Hausman Test

In choosing which is better between the fixed or random effect, the Hausman test was used in this study. The hypothesis is stated as follows:

H_0: $E(\Lambda_i X_{it}) = 0$ or REM is the correct model

H_1: $E(\Lambda_i X_{it}) = 0$ or FEM is the correct model

The formulation of Hausman statistic is:

$$H = (\beta REM - \beta FEM)' (MFEM - MREM)^{-1}(\beta REM - \beta FEM) \sim \chi^2 (k) \dots (3.6)$$

In which:

M is the covariance matrix for β parameter

K is degrees of freedom

H_0 from the Hausman test is the estimation using REM as against the H_1, using FEM.

Model 1

Implicitly the Model becomes

$$ROA_{it} = \beta_0 + \beta_1 TDTA_{it} + \beta_2 SG_{it} + \beta_3 FMSZ_{it} + \mu_{it} \qquad \dots\dots\dots\dots\dots \quad (1)$$

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Model 2

$ROE_{it} = \alpha_0 + \alpha_1 DER_{it} + \alpha_2 SG_{it} + \alpha_3 FMSZ_{it} + \mu_{it}$ .... (2)

Using multiple regression analysis, the model was modified as follows

And

$$\beta_0 = \frac{\sum_{i=1}^{n} yi - \beta 1 \sum_{i=1}^{n} xi}{n}; \beta_1 = \frac{n \sum_{i=1}^{n}(XiYi) = n \sum_{i=1}^{n} xi \; \sum_{i=1}^{n} Yi}{n \sum_{i=1}^{n} X_{1-}^2 (\sum_{i=1}^{n} Xi)^2}$$

The independent variable was D/E, D/A, firm Size and sales growth, whereas the dependent variables were ROE and ROA, ε was the error term, β_0 was the constant term, and $\beta1, \beta2$, and $\beta3$ were the partial regression coefficients of the independent variables

Where,

ROA_{it} = Return on assets of firm i at period t (Proxy for firm Profitability, a dependent variable)

ROE_{it} = Return on Equity of firm i at period t (a proxy for firm Profitability, a dependent variable)

$TDTA_{it}$ = Total Debt to total assets of firm i at period t (a proxy for capital structure, an independent variable)

DER_{it} = Debt–equity ratio of firm i at period t (proxy for capital structure, an independent variable)

SG_{it} = Sales growth of firm i at period t (control variable, an independent variable)

$FMSZ_{it}$ = Firm size of firm i at period t (control variable, an independent variable)

i = Selected Company

t = Time Series

$\mathcal{E}it$ = Error Term

$\beta_0 \alpha_0$ = Constants

$\beta_1, \beta_2, \beta_3, \alpha_1, \alpha_2, \alpha_3$ = Coefficient of determination

Decision Rule

If the p-value is less than the significance level of 0.05, the null hypothesis is rejected while the alternate hypothesis is accepted. If the p-value is more significant than the significance level of 0.05, the null hypothesis is accepted, and the alternate hypothesis is rejected.

Reject H_o if P < 0.05

Accept H_o if P > 0.05

Data Analysis and Results

Table 1: Im, Pesaran and Shin (IPS) Unit root Test

Variable	Level	P-value	First difference	P-value	Order of integration
ROA	-2.269	0.0116	-3.110	0.0009	I(0)
ROE	-1.867	0.0309	-2.965	0.0015	I(0)
DER	-1.765	0.0388	-2.242	0.0125	I(0)
TDTA	-5.170	0.0000	-2.069	0.0193	I(0)
SG	-2.169	0.0150	-2.181	0.0146	I(0)
FMSZ	-3.541	0.0002	-3.752	0.0001	I(0)

Source: E Views 10 analysis of data

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Table 1: Shows the results of the unit root test. The unit root test was conducted to determine the validity and reliability of the data used for this study. The result shows that data for each of the variables are stationary. This implies that the data used for this study are reliable and valid for further analysis and interpretation. See Appendix C for further details.

Table 2: Correlation Matrix

	ROE	ROA	TDTA	DER	SG	FMSZ
ROE	1					
ROA	0.866023	1				
TDTA	0.248442	0.520017	1			
DER	0.152208	0.277503	0.872928	1		
SG	0.054312	-0.04708	-0.17756	0.08997	1	
FMSZ	0.096752	-0.17132	-0.51104	0.33211	0.159769	1

Source: E Views 10 analysis of data

The correlation result for dependent and independent variables in table 7 shows that all the variables have a positive relationship to return on Asset (ROA) and Equity (ROE). Except for sales growth (S.G.) and firm size (FMSZ) control variables. The result revealed that debt-equity and total Debt correlated to return on Asset (ROA) and Return on Equity (ROE) by 27.7%, 15.2%, 52.0%, and 24.8%, respectively. At the same time, sales growth (S.G.) and firm size (FMSZ) correlated to return on Asset (ROA) and Return on Equity (ROE) by -4.7%, 5.4%, -17.1 and 9.7%, respectively.

Table 3: Hausman Test

```
-------+----------------------------------------------------
---- Coefficients ----
|    (b)       (B)        (b-B)     sqrt(diag(V_b-V_B))
|   random    fixed     Difference       S.E.
-------+----------------------------------------------------------
tdta |  .179228   .2034617   -.0242337          .
sg   |  .013417  -.0403091    .0537261       .0347192
fmsz       |  .0194776   .0086074    .0108702          .
------------------------------------------------------------------
b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test:  Ho:  difference in coefficients not systematic
chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
=      4.55
Prob>chi2   =    0.2081
(V_b-V_B is not positive definite)
```

Source: STATA windows 14

Table 3 shows the result of the Hausman specification test. The Hausman test indicated that the chi-square value of 4.55, with a p-value of 0.2081 at 5% significance level.

Model One for Hypothesis one

$ROA_{it} = 0.00694 + 0.1792\,TDTA_{it} + 0.01341\,SG_{it} + 0.01947\,FMSZ_{it}$

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Table 4: Result of Pooled Regression, Fixed Effect and Random Effect

	Expected sign	Panel A Pooled Coefficient	P-value	Panel B Fixed Coefficient	P-value	Panel C Random Coefficient	P-value
TDTA$_{it}$	+	0.1729	0.002	0.2034	0.001	0.1729	0.001
SG$_{it}$	+	0.0134	0.805	-0.0403	0.338	0.0134	0.804
FMSZ$_{it}$	+	0.0194	0.482	0.0086	0.867	0.0194	0.477
CONSTANT		0.0069	0.964	0.0608	0.827	0.0069	0.963
R^2		0.3851		0.2622		0.2839	
N		36		36		36	
F*		4.23	0.0126	11.41	0.000	12.68	0.0054
Corr(Ui, X)		-	-	-0.2561	-	0	-

Dependent Variable: ROA$_{it}$
Source: STATA Window 14 analysis of data

The robustness tests were conducted for the data, it has a correct functional form, and the Model's residuals are serially uncorrelated, customarily distributed, and homoskedastic. Therefore, the outcomes reported are serially uncorrelated, customarily distributed and homoskedastic. Hence, the results reported are valid for reliable interpretation.

The pooled regression from Panel A shows that Total Debt (TDTA) has a positive effect on Return on Assets (ROA) with a coefficient value of 0.1729. In Panel B, Total Debt (TDTA) positively impacts Return on Asset (ROA) with a coefficient value of 0.2034. Panel A and B are not used in this study because the Hausman test indicated that the random effect model is the best estimator. However, in Panel C, Total Debt (TDTA) has a positive effect on Return on Asset (ROA) with a coefficient value of 0.1729. This means that Total Debt (TDTA) has led to an increase in the Return on Asset (ROA).

Table 4 shows that the control variables, sales growth (S.G.) and firm size (FMSZ), are positive. This indicated that Sales Growth (S.G.) and Firm Size (FMSZ) have positively affected the level of ROA of cement firms in Nigeria. The coefficient of determination $r^2 = 0.2839$ shows that a 28.39% change in **ROA$_{it}$** is a result of the changes in Total Debt (TDTA), Sales Growth (S.G.) and Firm Size (FMSZ)

The F- test with a value of 12.68 and a p-value of 0.0054 shows a strong linear dependency between independent and dependent variables. The estimated result is homoscedastic because the Breusch-Pagan / Cook-Weisberg test indicated the presence of heteroscedasticity but was corrected with the estimation of robustness test.

The regression result of the study shows that capital structure has a significant positive effect on the Profitability of listed cement Firms in Nigeria. This result is in line with other findings like Rahman, Zulfiqar and Mustafa (2007); Salehi and Biglar (2009); Pouraghajan, Malekian, Emamgholipour, Lotfollahpour, and Bagheri (2012); Mwaura (2013); (2013); Mujahid and Akhtar (2014); Idode, Adeleke, Ogunlowore, Ashogbon (2014); AbuTawahina (2015). empirical studies revealed that capital structure has a positive effect on profitability

In contrast to these views, other researchers' empirical results revealed that a firm's capital structure has a significantly positive impact on the firm's financial performance. Pouraghajan, Malekian, Emamgholipour, Lotfollahpour, and Bagheri (2012); Salim and Yadav (2012); Umar, Tanveer, Aslam, and Sajid (2012); Mwaura (2013); Tharmila and Arulvel (2013); Younus, Ishfaq, Usman, and Azeem (2014); Rajha and Alslehat (2014); Khan, Naz, Khan, Khan, and Ahmad (2013); Mwangi and Birundu (2015).

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CONCLUSION AND RECOMMENDATION

The cement Industry is unarguably essential to the growth of all sectors of an economy. Because of this, the desire for the overall development of a country's economy necessitates that the industry remains healthy and sound. Thus, one primary concern that could undermine the sector's strategic importance is the capital structure problem; in this regard, capital structure is crucial for the estimation of listed cement companies in Nigeria's manufacturing sector. The study examines the capital structure and profitability of listed cement Firms in Nigeria. The study, however, finds that capital structure has a positive significant relationship and effect on the profitability of listed cement companies in Nigeria. From the regression result of the study, the significant positive relationship between capital structure and profitability may be due to high-volume Debt and market conditions. And This study recommends that managers of manufacturing companies (cement) increase the reliance on debt financing as a source of finance because they have much influence on profit generation on both return on Equity (ROE) and return on asset (ROA), as indicated by regression results

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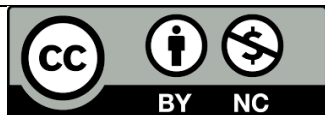
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