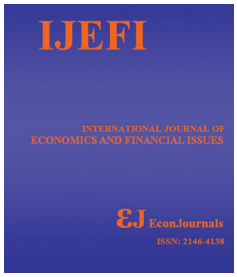

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Influence of Financial Leverage on Corporate Profitability: Does it Really Matter?

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ABSTRACT

Debt is an essential component of capital structure for firms. Companies use leverage to impact the returns that equity shareholders yearn for. In this study, the author attempts to establish a stochastic relationship between the use of leverage and the profitability of cement manufacturing firms worldwide primarily to assess whether leverage affects firm profitability. The study extends further to examine whether the level of debt affects the return on equity, return on assets and net profit margin in similar ways, as they are all proxies of profitability. The empirical analysis is performed on data from major cement companies listed on public exchanges worldwide. The data is collected from 2012 to 2018 with the sample size of the thirteen most prominent companies in the world in the cement manufacturing industry for 7 years consisting of ninety-one observations. Panel data regression analysis using the fixed effect model is applied to the data to investigate the relationship between the variables. Firstly, the study finds that financial leverage has a statistically significant inverse impact on profitability within the cement industry worldwide. Secondly, the study expands to determine that not all profit measures are influenced in the same way. The variables of profitability that really matter include the return on assets indicating the profit measured relative to the efficient use of resources and net profit margin that measures the returns from sales and by minimizing costs. The study does not find similar outcomes in relation to return on equity which contradicts theories that support debt as adding value to shareholders. The theory posits the stance of the benefit of tax-deductibility of debt, leveraged to increase profitability, and this study illuminates the incongruity of practical experiences to that of theory. The results of this study would assist corporate decision-makers in their capital structure decisions to critically examine the level of the worthiness of the benefit of tax deductibility of debt contributing to the firm's financial performance.

Keywords: Financial Leverage, Capital Structure, Profitability, Return on Equity, Return on Assets, Net Profit Margin, Debt
JEL Classifications: G32, G40, M40

1. INTRODUCTION

Time cannot dilute the importance of capital structure decisions for corporations. In this post-pandemic period where companies have been facing many challenges, the decision to use debt financing to manage cash flows has been critical. Many theories have evolved that try to explain the reasoning behind capital structure decisions. Modigliani and Miller's (1958) theory of capital structure irrelevance has been a milestone in this arena. However, the assumptions placed in this model are unrealistic and do not portray practicality. The Trade-off theory explains that firms measure the benefits of debt through its tax deductible feature and reduced agency costs related to managers and compare it to the dangers of bankruptcy costs and agency costs between shareholders and bondholders (Bradley et al., 1984; Graham and Leary, 2011). Balancing these benefits and costs enables firms to reach optimal leverage (Kraus and Litzenberger, 1973; Scott Jr., 1976; Castanias, 1983). The Pecking Order theory assumes capital structure decisions are primarily cost-based. Hence a firm uses internal financing first, followed by debt financing and finally equity which is believed to be the most expensive source of finance (Myers and Majluf, 1984; Serrasqueiro and Rogão, 2009).

Firms use debt to finance the business, generate shareholders' returns and impact profitability (Habib et al., 2016). Financial leverage is

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the term used to describe the level of debt employed in the company and is measured by the ratio of total debt to total assets or total debt to total equity. Firms use a combination of debt and equity financing to derive the lowest cost of capital with an aim to maximize returns and remain competitive in markets (Abor, 2005). The relationship between the use of leverage as a means of financing and its effect on the firm's profitability has been a focal area of study researchers for a long time. These studies have shown varying outcomes where leverage positively impacts profitability (Margaritis and Psillaki, 2010). Specifically, Abor (2005) found a positive relationship between short-term and long-term debt ratios and return on equity. Some studies have concluded that there was no significant impact of the level of leverage and a firm's performance (Soumadi and Hayajneh, 2012) and some others have, on the contrary, found a negative relation between leverage and a firm's profitability (Nguyen and Nguyen, 2015) where Zeitun et. al. (2007) studying companies in Jordan found that higher leverage in capital structure led to higher default risk and chances of bankruptcy. Furthermore, other studies reveal mixed results, where Weill (2008) found positive results in some countries like Spain and Italy and a negative relationship in firms in countries like Portugal and some other countries like Germany and France. This inconsistency in results can be attributed to many reasons, including but not limited to the types of variables used, the sample of countries used in the study, the nature of industries, firms used for analysis and the periods of consideration.

Housing and infrastructure are basic sectors for a thriving economy, irrespective of a developed or an emerging one (Rodrigues and Joekes, 2011; Pandey, 2017) and cement is the primary ingredient for supporting this sector. The cement industry's profitability and growth are vital for humankind's development and comfortable living. This study aims to add to the existing pool of knowledge to evaluate whether leverage really influences profitability, with a focus on the cement manufacturing industry of the world. The benefit of this study is that although it focuses on one sector, it gives the audience a global perspective, as companies included in the sample are from various countries. Furthermore, the study examines the differences in the influence of leverage on three accounting measures of profitability. A panel data regression is performed on data collected from major cement firms of the world from 2012 to 2018 to give a comprehensive insight to corporate managers concerning the relationship between the use of leverage and profitability.

2. LITERATURE REVIEW

2.1. Theories of Capital Structure

A firm's capital structure is typically a blend of debt and equity financing, which is pertinent in determining the firm's value where profitable use of such funding is the crux. Throughout the literature, we find the quest for whether an optimal capital structure can determine the value of a firm. Modigliani and Miller's (1958) theory of capital structure irrelevance, stating that financial leverage does not affect the firm's market value, is considered a pioneering work in the field (Pagano, 2005). Arguments against the assumptions of this theory are considered notional and not applicable to real-world practicalities. (Danso and Adomako, 2014) heightened the emergence of other theories in this field. Later Modigliani and Miller's (1963) introduced the beneficial effect of a tax shield of debt that reduces the cost of capital and increases the firm's value. Miller (1977) further expanded this to include three tax rates, the corporate tax rate, tax rate on dividend income and tax rate on interest income and concluded that the relative level of each tax rate contributes to determining the value of a firm. Myers and Majluf (1984) suggested the Static Trade-off theory that optimal capital structure exists where the benefits of debts are balanced by the bankruptcy and agency costs of debts where the firm's value is maximized (Chen and Chen, 2011). The Pecking Order Theory proposed by Myers and Majluf (1984) suggests no optimal capital structure and introduces the concept that information asymmetry and transaction costs of raising capital increase the cost of capital. Managers have more information about the company as compared to investors. They argue that firms follow a hierarchy of financing sources and prefer internal financing (least cost) when available. Debt is preferred over equity for external financing (highest cost) (Zeidan et al., 2018).

2.2. Literature Based on Outcomes

Studies related to the impact of leverage on profitability have revealed differing results. Some studies determined a positive relationship (Petersen and Rajan, 1994, Abor, 2005, Margaritis and Psillaki, 2010). Abor (2005) reveal a positive relationship between total debt to total asset ratio (leverage) and return on equity (profitability). Wippern (1966) used debt to equity ratio as a proxy for leverage and earnings per share as a proxy for profitability and revealed a positive impact of leverage on EPS, indicating the use of debt for increasing shareholders' wealth. Berger and Di Patti (2006) suggested similar outcomes for the banking industry. Dessi and Robertson (2003) identified a positive effect of leverage on expected performance measured by Tobin's Q for firms with low growth opportunities.

Some studies have found leverage negatively affects a firms' profitability. Moscu (2014) studied five profitability measures, namely, return on equity (ROE), return on assets (ROA), operating margin (OM), earnings per share (EPS) and market-to-book ratio (MBR). The study observed that ROA and MBR were negatively impacted by leverage, indicating profitable companies carry lower debt levels. Foong and Idris (2012) concluded the negative relationship limiting the scope to only insurance companies in Malaysia. Nguyen and Nguyen (2015) discovered no difference between the impact of short-term and long-term debt. Both were observed to have negatively affected the profitability of firms listed on the Vietnam stock exchange. Such a negative impact was indicated to be attributed to high fixed costs with comparatively lower returns.

Other studies reveal either a non-significant outcome or mixed outcomes. El-Sayed Ebaid (2009) examined the impact of debt on ROE, ROA and OPM that showed no significant impact on firm performance during the study period from 1997 to 2005. Aggarwal and Zhao (2007) emphasize that financial markets examine firm leverage only relative to the leverage in its industry, hence the irrelevance of its impact from market return perspective.

2.3. Literature Based on Geographies and Industries

Various studies have focused on specific countries or industries and/or business sectors. Weill (2008) examined a negative relationship between capital structure and performance for companies in

Germany, France, Belgium and Norway, whereas a positive relation in Spain and Italy. A previous study (Weill, 2007) revealed a negative relationship between capital structure and performance for companies in Portugal. Studies by Habib et al. (2016) focused on the non-financial companies in Pakistan, Abor (2005) examined firms in Ghana and Soumadi and Hayajneh (2012) focused on firms in the Amman Stock Exchange in Jordan. Moscu (2014) selected 53 companies listed on the Bucharest Stock Exchange for the study period from 2010 to 2012. Nguyen and Nguyen (2015) examined data collected from 147 companies listed on HCMC Stock Exchange in Vietnam from 2006 to 2014. Beltratti and Paladino (2015) used a GMM[1] based econometric model to analyze a sample of international banks during 2005-2011 and revealed a significant positive non-monotonic link between the capital ratio and residual income for the international banking industry. Fosberg and Ghosh (2006) identified a difference in the capital structures of firms listed on NYSE and AMEX and further revealed that NYSE firms had a higher leverage of 5% to 8% more than AMEX firms. Many studies have been conducted on developed economies of USA, UK, France and Italy (Bradley et al., 1984, Wald, 1999, Xu, 2012) and others in emerging markets (Abor, 2005; El-Sayed Ebaid, 2009; Kyerboah-Coleman, 2007; Lin and Chang, 2011; Foong and Idris, 2012; Dalci, 2018).

2.4. Other Studies with Mediating Factors

Given the inconclusive results from empirical studies directly related to the relationship between leverage and profitability, many studies have endeavored to explore other factor(s) influencing this relationship. Ruland and Zhou (2005) explored the joint function of leverage, diversification and valuation and concluded that the value of diversified firms increases with leverage, however that is not the case with specialized firms. Foong and Idris (2012) found that product diversification played a mediating role in affecting firm profitability and highly leveraged firms with high product diversity revealed a positive impact on profitability. Bae et al. (2019) examined the effect of corporate social responsibility (CSR) on firms and concluded that CSR reduces losses in the market share of highly leveraged firms. Weill (2008) emphasized the role of institutional factors like the legal system, and access to bank credit, among others, influence the leverage-profitability relationship that differs between countries.

Throughout literature, there was difficulty observing consistency in the outcomes of the empirical studies that have often shown contradictory results regarding the effect of leverage on firm profitability. This study empirically examines the influence on the firm's profitability through the use of debt financing or leverage, especially in the global cement manufacturing industry and examines this influence on three separate accounting profit measures.

3. RESEARCH OBJECTIVES AND HYPOTHESES

3.1. Research Objectives

This study aims to offer a perspective on the leverage-profitability relationship specific to the cement manufacturing industry. The main focus of the statistical tests will be to conclude how leverage is related to profitability and what it implies from a theoretical perspective. The main variable used as the proxy for financial leverage is total debt to equity (TDE). Profitability will be examined by Net Profit Margin (NPM), Return on Assets (ROA) and Return on Equity (ROE). The reason to use three different accounting profit measures is to assess if leverage influences all profitability measures in the same way or whether there are any differences in the way leverage impacts various accounting profit measures.

3.2. Hypotheses Development

The author examines the above-stated objectives through the hypotheses described below that will be tested empirically in the study. A positive relationship between leverage and profitability supports the theory of tax benefit of debt proposed by Modigliani and Miller's (1963) and the trade-off theory by Myers and Majluf (1984), whereas a negative relationship supports the Pecking Order theory by Myers and Majluf (1984). Three types of profit measures are used in this study to evaluate the impact of leverage on profitability, as different studies have used varying profit measures and found inconsistent results. Hence, the hypotheses determined for the study are as below.

H_0 (1) there is no relationship between total debt to equity and NPM
H_A (1) there is a relationship between total debt to equity and NPM
H_0 (2) there is no relationship between total debt to equity and ROA
H_A (2) there is a relationship between total debt to equity and ROA
H_0 (3) there is no relationship between total debt to equity and ROE
H_A (3) there is a relationship between total debt to equity and ROE

The size of the firm has been introduced as a control variable to improve the explanatory power of profitability. Previous studies have concluded varying outcomes. Some found no relationship between size and profitability (Abeyrathna and Priyadarshana, 2019), others with a positive relationship (Ilaboya and Ohiokha, 2016), and some other studies found that the majority of industries faced a negative relationship (Becker-Blease et al., 2010). Hence this study adds one more hypothesis to test the model with a control variable.

H_0 (4) there is no relationship between firm size and profitability
H_A (4) there is a relationship between firm size and profitability.

4. DATA AND RESEARCH METHODOLOGY

4.1. Research Framework

The study uses the framework described in Figure 1 to investigate the leverage-profitability relationship of cement manufacturing firms of the world and consider the firm's size as a control variable that also would be tested in the study.

4.2. Study Sample

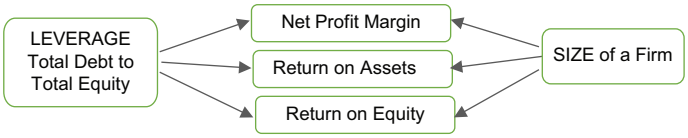
This study focuses on the sample from the major cement manufacturing companies of the world. Thirteen major cement manufacturing firms that are public companies are selected as the samples for the study, details in Table 1 below. The sample companies have been carefully chosen to exhibit a diverse presence of companies from around the world having a global presence

1 Generalized Method of Moments (GMM) is a statistical method that combines observed economic data with the information in population moment conditions to produce estimates of the unknown parameters of this economic model.

Table 1: Sample cement manufacturing companies

S. No.	Name of company	Year of establishment	Country headquarters	Listed on stock exchange	Details
1	Lafarge Holcim Ltd.	1833	Switzerland	SIX Swiss Exchange and Euronext Paris	Holds interests in more than 70 countries worldwide. They employ 71,000 people.
2	James Hardie Industries plc	1888	Ireland	Australian Stock Exchange and NYSE	A global building materials company and the largest global manufacturer of fiber cement products.
3	CEMEX S.A.B. de C.V	1906	Mexico	NYSE and the Mexican Stock Exchange ("MSE")	The 5th largest cement company (by the amount of cement produced annually) in the world.
4	Vulcan materials company	1909	Alabama, US	NYSE	An American company based in Birmingham, Alabama. It employs approximately 7,000 people at over 300 facilities.
5	Votorantim S.A.	1933	Brazil	B3 Stock exchange in Brazil and NYSE	Operates in 16 countries and is one of the few Brazilian companies with an investment grade rating by the three main rating agencies in the world.
6	Eagle materials Inc.	1963	Texas, US	NYSE	The company operates 7 cement plants, 1 slag grinding facility, 17 cement distribution terminals.
7	Ambuja cements limited	1983	India	BSE and NSE in India	The company entered into a strategic partnership with Holcim, the second-largest cement manufacturer in the world, in 2006.
8	Ultra tech cement Ltd.	1983	India	BSE and NSE in India	The largest manufacturer of grey cement, ready mix concrete (RMC) and white cement in India.
9	CRH PLC	1970	Ireland	London Stock Exchange and NYSE	The largest building materials company in North America, with operations in 46 US states and 7 Canadian provinces
10	China national building material Co. Ltd.	1984	China	Shanghai and Hong Kong Stock Exchange	The largest cement and gypsum board producer in China.
11	Martin Marietta materials, Inc	1993	North Carolina, US	NYSE	The company is a supplier of aggregates and heavy building materials, with operations spanning 26 states, Canada and the Caribbean.
12	Anhui Conch Cement Co., Ltd.	1997	China	Shanghai and Hong Kong Stock Exchange	The largest cement manufacturer or seller in the mainland China
13	Summit Materials, Inc	2014	Colorado, US	NYSE	It offers cement, asphalt, ready-mix concrete, other aggregates, and delivery, trucking, and paving services.

Figure 1: Framework of the study



from both developed and developing economies. Financial data has been collected for the periods 2012-2018 from their financial reports. The beginning period is taken considering not too far into the past and secondly, to avoid the time of the financial crisis of 2008 and a few years later to improve reliability, where profitability could have been affected in different ways in developed and emerging economies during the crisis period. A total of ninety-one observations have been used in the analysis.

4.3. Study Variables

For this study, the author uses secondary data collected from the financial statements of the sample companies for the period from 2012 to 2018. The variables used in the analysis include the following. The dependent variable for the study is profitability, which examines three types of profit measures: NPM, ROA and ROE. The literature has seen some previous studies use ROA, which reflects the efficiency in the use of resources allocated in the form of a firm's total assets, while others used ROE (Abor, 2005) to evaluate the returns available for equity shareholders. Others even used measures such as earnings per share (Ghosh, 2008) or Tobins Q (Aggarwal and Zhao, 2007 and Shah and Hussain, 2017) and Return on Sales (Javed et al., 2014). The author determined the use of the NPM and ROA as the measure of operational efficiency, which is the most commonly used (Ahmed Sheikh and Wang, 2013; Kachlami and Yazdanfar, 2016). This study also uses ROE to examine the efficiency of using share capital to provide a broader profitability analysis of this relationship. Total Debt to Equity (TDE) is the independent variable depicting leverage. There can be two types of profit and leverage measures, market and accounting measures, where some studies used market measures (Adrian and Shin, 2010). This study has used accounting measures as firms of the sample study are taken from various countries where

market values may not be efficient (Zhengwei, 2013). The model has added firm size as a control variable to examine its effects on profitability. The cement manufacturing industry is highly capital-intensive with investments in tangible assets and arguably more appropriate (Rezina et al., 2020; Chandrasekharan, 1993). Firm size is calculated as a logarithm of total assets (Chaklader and Chawla, 2016). Table 2 below gives a brief description of the variables.

4.4. Estimation Method

This study uses a quantitative method of analysis using a panel data regression model where observations are pooled on a cross-section of units over several periods of time, from 2012 to 2018 in this study. A correlation analysis is performed on all the study variables followed by a multiple regression using the ordinary least squares (OLS) regression method on panel data.

The relationship between leverage and profitability is evaluated using the following regression models:

$$NPM_{i,t} = t_i + t_1 Lev_{i,t} + v_2 Size_{i,t} + e_i, \quad (1)$$

$$ROA_{i,t} = t_i + t_1 Lev_{i,t} + v_2 Size_{i,t} + e_i, \quad (2)$$

$$ROE_{i,t} = t_i + t_1 Lev_{i,t} + v_2 Size_{i,t} + e_i, \quad (3)$$

Where:

- $NPM_{i,t}$ is net profit divided by net sales for firm i in time t;
- $ROA_{i,t}$ is EBIT divided by total assets for firm i in time t;
- $ROE_{i,t}$ is net profit divided by total shareholders' equity for firm i in time t;
- $Lev_{i,t}$ is total debt divided by total equity for firm i in time t;
- $Size_{i,t}$ is the log of total assets for firm i in time t;
- e_i is the error term

5. EMPIRICAL RESULTS AND INTERPRETATIONS

5.1. Data Analyses

A panel data method has been used in the analysis, given that the dataset is cross-sectional with firms during the time period used in the study (Hsiao, 2003). The variables have been analyzed using the using data visualization tools of the box plot to identify outliers and adjusted in the dataset. Before proceeding with the correlational and regression analyses, various prerequisite tests were conducted to check the suitability of the dataset. Multicollinearity tests for the two independent variables of leverage and size were performed to validate the application of these variables in the model. The dependent variables are used separately in the regression and collinearity among them is not a matter of concern. Table 3 below shows the Tolerance and the VIF data for the independent variables. The results show that the R^2 values are nowhere close to 1, hence no linear relationship between the variables is found. The tolerance ($1-R^2$) for the variables is not <10% and the variation inflation factor (VIF) is also not more than 10. Hence, there is no collinearity between the independent variables and it can be efficiently used in the regression model. The normality tests suggest normal distributions using the tests of Lilliefors and the Shapiro-Wilk test. The variables used in the study were tested for autocorrelation using the Durbin-Watson test, which confirms that all dataset is random and not merely white noise.

The data sample does not suffer from problems of heterogeneity and large outliers, as seen in the descriptive statistics below in Table 4. The mean and median observed of the sample suggest the industry's average for each variable. The ROA reveals a median of 3.9% and a mean of 4.475%. The ROE reveals a higher median of 7.07% compared to the mean of 6.86%. The mean and median of NPM are quite similar at 7.5% and 6.7% respectively. Figure 2 below shows the means for all the variables. The range and the standard deviation are highest for ROE at 40.78 and 7.99 respectively, indicating that the ROE is the most volatile measure of profitability in the sample. ROA is seen as the least volatile among the three profit measures. A fixed-effects panel model is performed to eliminate the possible influence of serially correlated errors.

5.2. Correlation Analysis

The Pearson correlation coefficient (Pearson *r*) is used to measure the strength and direction of the association between the explanatory variables of leverage and size and the dependent variables of profitability. This is the most suitable correlation measure as the study variables are continuous. The visual inspection of the scatter plots is advisable, as seen in Figure 3.

The scatter plots show a strong correlation between the three profit measures as they capture a similar idea of profitability in

Table 2: Description of the study variables

Type of variable	Definition	Formula	Scale
Dependent			
Profitability	ROA: Measure to assess the effectiveness in the use of resources allocated in the form of firm's total assets.	ROA=EBIT/Total Assets	Ratio
	ROE: Measure to assess the efficiency in the use of shareholders capital	ROE=Net Profit/Total Shareholders' Equity	Ratio
	NPM: Measure to assess the operational efficiency from sales.	NPM=Net Profit/Net Sales	Ratio
Independent			
Leverage	TDE: Measure of how much a firm is financed by debt, and its capital structure	TDE=Total Debt/Total Equity	Ratio
Control variable			
Size	Total Assets is the investment in the firm's assets.	Logarithm of Book Value of Total Assets	Log

ROA: Return on assets, ROE: Return on equity, TDE: Total debt to equity, NPM: Net profit margin

the study. Here it is observed that ROA and NPM have a robust correlation with the Pearson *r* of 0.878, indicating the profitability from operations and that through the efficient use of assets are interdependent in the sample cement manufacturing companies selected. Observing the explanatory variable, the correlation between leverage and ROA and NPM is negative, whereas with ROE is positive. The control variable of size does not seem to be well related to the profitability variables. Size is negatively related to profits. The strength of this relationship is very weak for ROE at the coefficient of −0.073 and for ROA and NPM it is below 0.30, hence inadequate for making any inferences. This is acceptable as it is used as a control variable in the study. Tables 5 and 6 show the Pearson *r* and the Coefficients of determination (Pearson r^2) below. The coefficient of determination 0.246 between leverage and ROA indicates a 24.6% variability in one is accounted for by the other. The r^2 0.156 between leverage and NPM reveals that a 15.6% variability in one is accounted for by the other and vice versa. $H_A(1)$ and $H_A(2)$, alternative hypotheses are supported as the correlation of leverage with NPM and ROA is strong and substantial for the study to proceed with the regression analysis. However, for $H_0(3)$, the null hypothesis is supported as the correlation is found to be very weak between leverage and ROE. The size of the firm seems to have no correlation with profitability in the study sample. To summarize the correlations, it is observed that the variables of interest for profitability influenced by leverage within the cement manufacturing industry are ROA and NPM.

Figure 2: Mean charts for the study variables

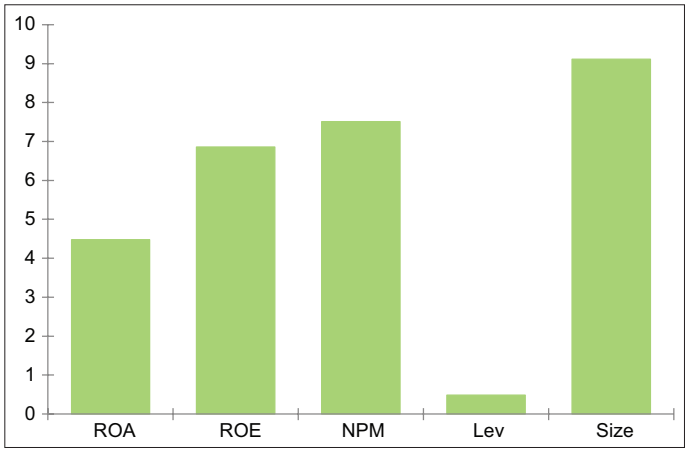


Table 3: Multicollinearity tests

Statistic	Lev	Size
R^2	0.125	0.125
Tolerance	0.875	0.875
VIF	1.142	1.142

5.3. Regression Results

A panel data regression is performed using the baseline regression model: $Profitability_{i,t} = \alpha_i + \beta_1 Lev_{i,t} + \beta_2 Size_{i,t} + e_i$, where the intercept is allowed to vary across the groups of firms in the panel data to control for firm-specific attributes that do not vary over time. Profitability is assessed separately through the three ratios of ROA, ROE and NPM. Multiple regression analysis using the OLS and fixed effect model is used at 95% confidence level in all instances. The regression statistics for ROA, ROE and NPM are shown in Tables 7-9.

5.4. Interpretations

This study used two main models of estimation, the OLS and the Fixed Effects models, as the Hausman test was performed that supported the fixed-effects estimation, the interpretations of the study focus on the results from the fixed-effects model estimations. The OLS models are therefore used as a robustness check. The four hypotheses will be discussed regarding the regression analysis results. The $H_0(1)$, stating that there is no relationship between total debt to equity and NPM, is rejected as the statistical model with R^2 of 0.18 suggests that 18% of the variability of NPM is explained by leverage and size, where leverage is statistically significant with a P = 0.002. The TDE ratio depicting leverage negatively impacts profitability as

Table 4: Descriptive statistics of the study variables

Statistic	ROA	ROE	NPM	Lev	Size
Nbr. of observations	91	91	91	91	91
Minimum	−8.272	−14.378	−11.259	−3.993	6.893
Maximum	20.517	26.407	26.093	4.968	11.242
Range	28.789	40.785	37.351	8.961	4.349
1st quartile	2.147	3.179	3.019	−0.569	7.926
Median	3.912	7.077	6.735	0.465	9.104
3rd quartile	7.062	11.658	13.027	0.673	10.345
Mean	4.475	6.861	7.507	0.485	9.111
Variance (n-1)	22.002	63.781	51.852	2.190	1.625
Standard deviation (n-1)	4.691	7.986	7.201	1.480	1.275
Variation coefficient (n-1)	1.048	1.164	0.959	3.048	0.140
Skewness (pearson)	0.320	−0.242	−0.007	0.612	0.011
Skewness (fisher)	0.326	−0.246	−0.007	0.622	0.011
Skewness (bowley)	0.282	0.081	0.258	−0.665	0.026
Kurtosis (pearson)	1.240	0.112	−0.108	1.913	−1.366
Kurtosis (fisher)	1.380	0.187	−0.045	2.092	−1.375
Standard error of the mean	0.492	0.837	0.755	0.155	0.134
Standard error of the variance	3.280	9.508	7.730	0.326	0.242
Standard error (Skewness [Fisher])	0.253	0.253	0.253	0.253	0.253
Standard error (Kurtosis [Fisher])	0.500	0.500	0.500	0.500	0.500

ROA: Return on assets, ROE: Return on equity, NPM: Net profit margin

Figure 3: Scatter plots for the study variables

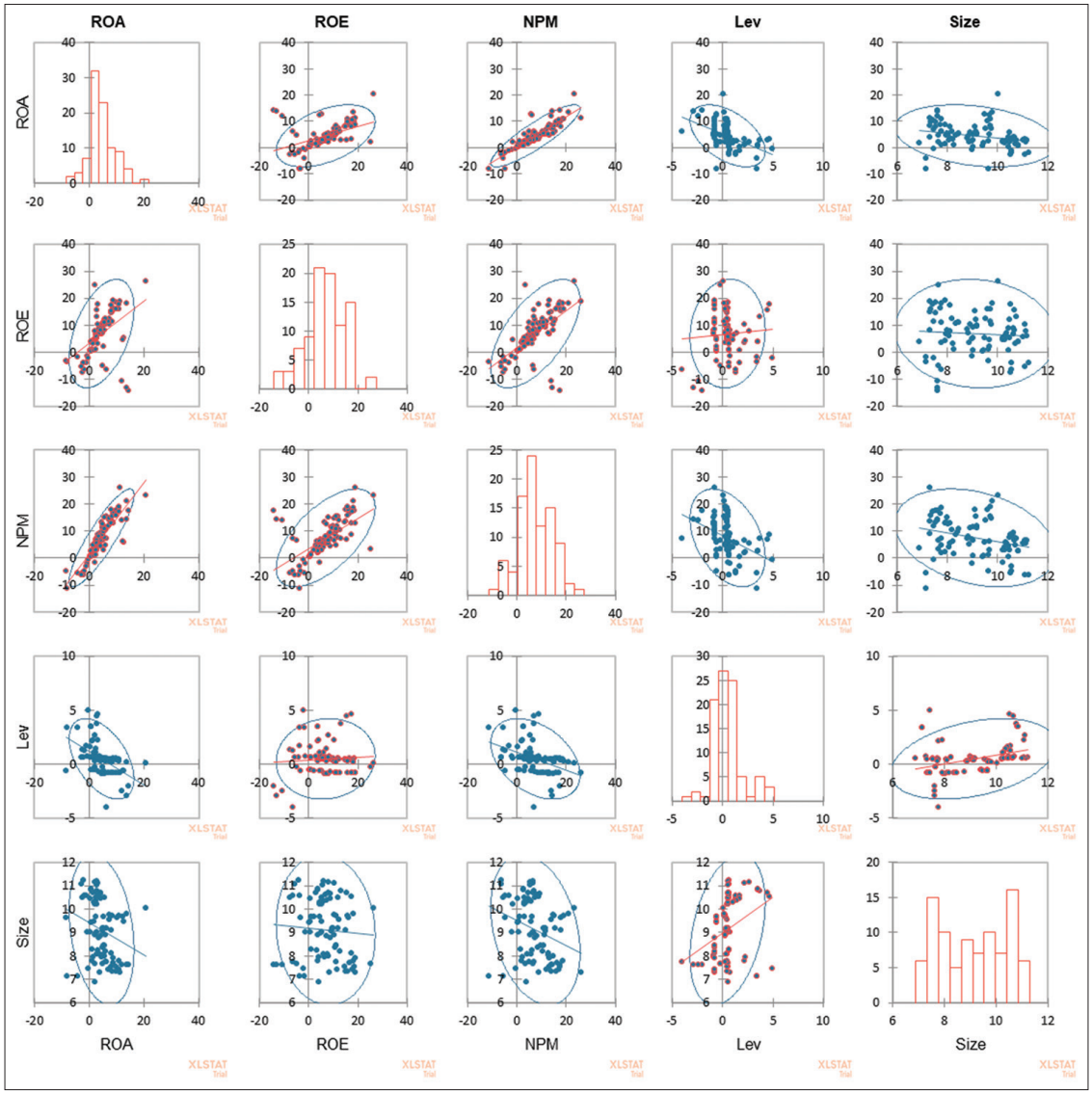


Table 5: Correlation analysis pearson *r*

Variables	ROA	ROE	NPM	Lev	Size
ROA	1	0.462	0.878	−0.496	−0.260
ROE	0.462	1	0.622	0.073	−0.073
NPM	0.878	0.622	1	−0.394	−0.298
Lev	−0.496	0.073	−0.394	1	0.353
Size	−0.260	−0.073	−0.298	0.353	1

ROA: Return on assets, ROE: Return on equity, NPM: Net profit margin

Table 6: Coefficients of determination (Pearson)

Variables	ROA	ROE	NPM	Lev	Size
ROA	**1**	0.213	0.771	0.246	0.068
ROE	0.213	**1**	0.386	0.005	0.005
NPM	0.771	0.386	**1**	0.156	0.089
Lev	0.246	0.005	0.156	1	0.125
Size	0.068	0.005	0.089	0.125	1

ROA: Return on assets, ROE: Return on equity, NPM: Net profit margin

measured by NPM with a coefficient of −1.515. The standardized coefficient suggests that a one standard deviation increase in leverage is associated with a 0.33% point decrease in firm profitability. $H_0(2)$ is also rejected as the relationship between total debt to equity and ROA is also found to be statistically significant and 25.4% (R^2) of the variability in ROA can be determined by leverage. The TDE ratio negatively impacts ROA with a coefficient of −1.339 and a statistically significant P-value. The standardized coefficient suggests that a one standard deviation increase in leverage is associated with a 0.46% point decrease in firm profitability. The case is not the same with ROE as a measure of profitability where the $H_0(3)$, the null hypothesis is accepted as the statistical model only shows a R^2 of 0.016 where <2% of the variability of ROE is explained by the independent variables, which is not sufficient to make and conclusive statements. The P-value suggests the coefficient is not statistically significant and does not contribute to the model. The size of the firm used as a control variable to check if it could affect the dependent variables does not play a role in this model in relation to any of the three profit measures. Hence, it can be concluded that it does not distort the effect on the dependent variables in the study. This does not support the findings of Margaritis and Psillaki, (2010), who found in their study that

Table 7: Regression of variable ROA

Goodness of fit statistics (ROA)	
Observations	91
Sum of weights	91
DF	88
R^2	0.254
Adjusted R^2	0.237

Model parameters (ROA) OLS							
Source	**Value**	**Standard error**	**t**	**Pr > |t|**	**Lower bound (95%)**	**Upper bound (95%)**	**P-values signification codes**
Intercept	8.452	3.277	2.580	0.012	1.940	14.963	*
Lev	−1.464	0.312	−4.693	<0.0001	−2.083	−0.844	***
Size	−0.358	0.362	−0.990	0.325	−1.078	0.361	

Signification codes: 0 < *** < 0.001 < ** < 0.01 < * < 0.05 <. < 0.1 < < 1

Fixed effect model coefficient (ROA)				
	Estimate	**Std. Error**	**t-value**	**Pr(>|t|)**
Lev	−1.339	0.616	−2.173	0.033
Size	0.797	1.562	0.510	0.612

ROA: Return on assets

Table 8: Regression of variable ROE

Goodness of fit statistics (ROE)	
Observations	91
Sum of weights	91
DF	88
R^2	0.016
Adjusted R^2	−0.006

Model parameters (ROE) OLS							
Source	**Value**	**Standard error**	**t**	**Pr > |t|**	**Lower bound (95%)**	**Upper bound (95%)**	**P-values signification codes**
Intercept	13.011	6.407	2.031	0.045	0.277	25.744	*
Lev	0.607	0.610	0.996	0.322	−0.605	1.819	°
Size	−0.707	0.708	−0.999	0.321	−2.114	0.700	°

Signification codes: 0 < *** < 0.001 < ** < 0.01 < * < 0.05 < . < 0.1 < ° < 1

Fixed effect model coefficient (ROE)				
	Estimate	**Std. Error**	**t-value**	**Pr(>|t|)**
Lev	2.715	1.063	2.554	0.013
Size	2.855	2.695	1.059	0.293

ROE: Return on equity

Table 9: Regression of variable NPM

Goodness of fit statistics (NPM)	
Observations	91
Sum of weights	91
DF	88
R^2	0.184
Adjusted R^2	0.166

Model parameters (NPM) OLS							
Source	**Value**	**Standard error**	**t**	**Pr > |t|**	**Lower bound (95%)**	**Upper bound (95%)**	**P-values signification codes**
Intercept	17.635	5.261	3.352	0.001	7.181	28.090	**
Lev	−1.607	0.501	−3.210	0.002	−2.603	−0.612	**
Size	−1.026	0.581	−1.765	0.081	−2.181	0.129	.

Signification codes: 0 < *** < 0.001 < ** < 0.01 < * < 0.05 <. < 0.1 < < 1

Fixed Effect Model Coefficient (NPM)			
	Estimate	**t-value**	**Pr(>|t|)**
Lev	−1.515	−1.834	0.071
Size	2.385	1.139	0.258

NPM: Net profit margin

as firm size increases, it reduces firm performance, which could be due to inefficiencies of large-size firms. However, this study focuses on cement manufacturing firms, and the same does not seem to be observed for this industry or sector.

6. CONCLUSION

This study was conducted with the aim of assessing the influence of leverage on a firm's profitability. The major finding of the empirical study suggests that leverage has a negative influence on firm performance. It supports the Pecking Order theory that suggests that profitable companies use less debt as they prioritize retained earnings when selecting the source of finance. The findings of this study do not support the theories posited by Modigliani and Miller (1963), Miller (1977) and Myers and Majluf (1984), who have emphasized the benefits of debt and its use in the capital structure that adds value, meaning increased profitability. The findings of this study majorly support previous studies that determined a negative influence of leverage on firm performance, such as Moscu (2014), Foong and Idris (2012), Nguyen and Nguyen (2015) and Antoniou et al. (2008). An important aspect of the study is understanding which profitability measure is influenced by debt in the capital structure. This study focuses on the accounting measures of listed companies as the sample companies were from different countries where the capital markets inefficiencies could distort results if market measures were used. The study revealed differences in the influences on ROE and ROA and NPM, where ROA and NPM are negatively influenced by leverage, ROE, on the other hand, although being a part of the profitability measures, was not influenced by leverage. It suggests to the management that shareholders cannot be influenced by raising the level of debt for higher return expectations for shareholders. This study suggests that higher the total debt in the capital structure would lead to lower profit margins measured for operational and resource utilization purposes. These results pertaining to the cement manufacturing industry may be extrapolated to other manufacturing industries with broadly similar attributes.

Previous studies that have concentrated on specific industries have also considered their focus on a single economy, and the benefit of this study is that it has included major companies from around the world, giving it a global perspective. The study's main limitation is that this applies to the specific industry as mentioned above and industries with differing attributes may not be affected similarly. Although sufficient care has been taken in selecting firms from large economies like US, China, and India, the sample size was limited, and future studies could incorporate larger sample sizes from varying industries and economies. Comparative studies between different industries could be undertaken to broaden the scope. Some theories support the use of debt in the capital structure, and here, it reveals the negative impact of leverage, unwrapping the risk side of the use of debt. Managers may include debt to appeal to shareholders by using low-cost debt to provide higher returns to shareholders, who would need to question whether this strategy could be sustainable in the long run.

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