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Evaluating the Nexus between Leverage and Profitability: With Specific focus on the Cement Industry

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Abstract: In this study, the authors attempt to empirically investigate the relationship between the use of leverage and the profitability of listed firms in the cement industry. The main objective is to examine whether the level of debt affects the return on equity, return on assets, and net profit margins as proxies of profitability. The sample used for the empirical analysis is the seven major cement companies listed on the New York Stock Exchange (NYSE) for the period of 2012 to 2018. Panel data regression analysis is applied to the data to investigate whether any relationship exists between the variables. The study finds that financial leverage has a statistically significant inverse impact on profitability within the cement industry. The leverage variable of importance is debt to total assets, whereas the dependent variable of importance is the return on assets among the others evaluated. These findings would provide further insight to the players in the cement manufacturing industries worldwide in their capital structure decisions. It is quite relevant in current times, where economies are reviving themselves from the aftereffects of the pandemic, where the real estate sector is a fundamental contributor to economic outcomes.

Keywords: Financial leverage, capital structure, profitability, return on equity, return on assets, net profit margin, debt.

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1. Introduction

1.3 Overview

Most of the time, businesses borrow cash from lenders to boost their sales volume, which results in better profits (Banerjee & Duflo, 2014). The amount of money borrowed from lending institutions demonstrates the firm's leverage. Financial leverage is often calculated as the percentage of total debts a firm is obligated to pay and total assets that a firm owns. The leverage ratio reveals how much money is borrowed and utilized to fund its capital structure. If a corporation borrows extra funds, it will also be required to pay more of the fixed costs accompanying those funds. This fixed interest cost is related to the borrowings by the company, which is called the interest amount. If the company borrows more cash from lenders, it must pay its lenders a larger portion in the form of interest, which reduces the company's net income and lowers its profits. When the economy is booming, higher leverage helps the company (Brigham, 1995), but during recessions, they negatively influence the firm's profit. During the economic downturn, it may lead the company to experience cash flow issues, and the company may not be able to make interest payments (Bodie et. al., 2008). This may occur because of a downturn in the economy which will result in lower sales volume, which prevents the company from being able to pay its lenders' interests.

There has been massive growth that the global financial market has experienced and technological advancements in the financial sector (National Academies of Sciences, Engineering, and Medicine, 1995), such as assets and financing products available with ease to companies. Leverage is regarded as one of the most crucial concerns for financial managers. This causes an increase in concern in both investment and financial choices to achieve positive growth in future earnings. Subsequently, managers face some of the most challenging decisions regarding leverage, as the rises in debt ratios could raise financial risks and drive-up capital costs. Therefore, businesses should enhance their usage of financial sources to boost their profit. The primary goal of this research is to investigate whether there is any relationship between financial leverage and the profitability of the cement industry in the United States of America (USA). According to many financial experts, leverage is the essential component among the various aspects that can impact the company's financial performance. On the other side, the necessity to upgrade the nation's infrastructure will increase the demand for cement. According to the American Society of Civil Engineering, the United States requires 2.6 trillion US dollars to repair deteriorating roads, broken bridges, and aged reservoirs by 2031 (Luhby, 2021). According to the group, forty-two percent of American structures are over fifty years old, and more than forty percent of public roads are in low or average condition.

1.4 Problem Statement

As leverage is the main element that can affect a firm's profitability, understanding the impact on how financial leverage affects a company's profits is relevant to the cement manufacturing industry in the USA. The manager's decision to make capital-intensive or debt-intensive firms creates the funding and capital structure strategies the management wishes to pursue. The firm's management usually uses a combination of debt and equity, and the question arises: how much of each is best for the company. Financial leverage is generally calculated as the percentage of total debts which the firm owes to total assets that the firm owns. According to the trade-off theory of capital structure (Brealey & Myers, 2003), businesses decide how much debt financing to utilize by considering the tax benefits of debt and bankruptcy costs. Therefore, it is essential to study how leverage affects the company's profitability, and for this purpose, the authors have selected cement manufacturing companies in the US.

1.5 Objectives of this Research

This study aims to understand the cause-and-effect relationship on how financial leverage affects the profitability of cement firms registered on the New York Stock Exchange. For achieving this purpose, the study utilizes the statistical regression model. The profit ratios are the dependent variables and the financial measurement that aid in assessing the company's financial success after a fiscal year. These ratios demonstrate a business's capacity to generate profits from its operating activities. On the other hand, the financial leverage ratios are independent variables, defined as a type of financial indicator that examines the amount of capital borrowed and evaluates a firm's capacity to pay its debts. The sample of cement manufacturing firms used in the study consists of Vulcan Materials, Eagle Materials, Cemex, Summit Materials, CRH PLC, James Hardie Industries, and Martin Marietta. Relevant financial information was gathered from secondary sources from 2012 to 2018. The main objective of this research is to examine how financial leverage impacts a company's profits and whether this relationship is positive or negative.

2. Literature Review

A review of the literature is a summary of previous research on this particular subject area. Numerous studies have previously been done on how leverage affects a company's profitability. Baker (1973) examined the impact of leverage or the usage of debt capital on the profitability of industries. In this research, a system with two formulas was formed and evaluated; the first formula explained the profitability of an industry in terms of the type of market structures factor and financial leverage, while the second equation included a few risk-factor variables to understand the leverage. He calculated the inverse as the ratio of the equity/total assets for the top businesses in a sector for ten years. He started by using the two-staged least square technique of estimate, which demonstrated the importance of leverage and has a proper inverse sign, indicating that small leverage levels are likely to boost industrial profit. He also employed simple least squares estimate, which supported the same outcomes.

Research in the past which Sheel has conducted (1994) and Miller (1977), suggests that leverage raises the cost of capital, which raises business profits and share prices. According to the trade-off concept of capital structure, businesses might prioritize debt to generate a significant return. While a firm will pay lesser taxes if it takes on debt, meanwhile financial risk will also rise. Financial leverage falls under the category of the financial strategy process, as it assists in raising the rate of return by creating a higher profit on the borrowed funds than the cost of utilizing those funds. The financial leverage is considered positive if a company's return on assets exceeds the rate of interest on its debts that has been paid before taxes. Debt is considered harmful if the company's return on assets is lower than its rate of interest before taxes.

Sheel (1994), in his research, substantiated the inverse relationship between the debt to total assets ratio and a company's previous profitability. Using cross-sectional regression methodology, he looked at the financial leverage of thirty-two companies across two business groups, the hospitality sector and the industrial sector. His research demonstrated that, except for the business size, all financial leveraging factors are relevant in understanding leverage variances in debt behavior. McConnell and Servaes (1995) investigated the association between financial leverage and a firm's value in large samples of companies in the US that are non-financial. The results revealed that the association between a company's value and leverage is inverse for fast-growing companies. Ezeoha (2008) investigated the nature and relevance of business size as a determinant of leverage in an undeveloped economy. The variables he utilized in his research were the company's size, leverage ratios, age of the businesses, profitability ratios, and tangible assets as controlled variables. He investigated seventy-one companies registered on the Nigerian Stock Exchange and examined them from 1990 to 2006 for seventeen years. The findings show a strong, negative correlation between the company's profitability and leverage, which suggests that profitable companies are more likely to depend on internal resources to fund their activities.

Khan (2012) researched the connection between capital structure decisions and the company's performances of manufacturing companies in Pakistan listed on the Karachi Stock Exchange. The outcomes demonstrated a substantial inverse correlation between leverage and company profitability using variables like return on assets, net profit margin, and Tobin's Q. The relationship between leverage and return on equity as a measure of the businesses' profitability was negative and insignificant. The asset size has an inconsequential relationship with the company's profitability measured by return on equity and gross profit margin, however, there was an inverse and significant association with Tobin's Q (market returns).

In conclusion, most of the above research examined the cause and effect of financial leverage and the company's profitability. The findings show that financial leverage had a significantly negative relationship with the company's profitability, represented by return on assets, gross profit margin, and other ratios. We intend to investigate further in this area by focusing on the cement manufacturing industry in the US. Recently, President Joe Biden signed more than one trillion-dollar infrastructure bill into regulation (Tankersley, 2021). The legislation will put hundred and ten billion into highways, bridges, and other major projects. The advancement of the nation's infrastructure, like roads, pipes, and commodity-intensive infrastructure projects which, demands an enormous amount of steel and cement, hence creating a boost in the economy.

3. Methodology

Using secondary sources, this research employs an analytical approach using the empirical tools of correlation analysis to determine the type and degree of relationship between the dependent and the

independent variables. A panel regression analysis to evaluate the leverage-profitability relationship and assess leverage's impact on profitability.

3.1 Sample Selection

A total of seven cement manufacturing companies in the US were chosen as a sample for the study. These cement manufacturing companies are listed in the United States in the NYSE, namely Vulcan materials, Cemex, Eagle Materials, James Hardie Industries, CRH Plc, Martin Marietta, and Summit Materials. The total number of observations acquired are forty-nine. The information utilized in this study contains seven years of annual data on the variables used for this research. Records for all the variables were collected during the time period from 2012 to 2018. This research's data were collected, analyzed, and reported using the appropriate analytical techniques like descriptive statistics, correlation analysis, and regression analysis.

3.2 Data Collection

The secondary data necessary for conducting the research was collected from the official websites of the cement manufacturing businesses and other websites such as Morningstar. The extraction of the data was performed using a variety of financial statements from seven different companies. The companies employed for studying the impact of leverage and profitability in the cement industry in the US were listed in the New York Stock Exchange, where the time period selected for analyzing the cause-effect relationship was from the years 2012 to 2018.

3.3 Variables Description

Profitability, in this research, is a dependent variable computed as the ratio of net profit after taxes to total assets. It is a specific measure of an organization's growth since it reveals how effectively a business utilizes its assets for profits. The profitability ratios used in this research are return on assets, return on equity and net profit margin. In this research, financial leverage is represented by two main ratios, total debt to total assets, where the total amount of debt comprises both short-term and long-term debts with maturities of one year or longer. This proportion shows how a business's total liabilities compared to its total assets. The other leverage ratios is the debt-to-equity ratio which measures the proportion of debt compared to equity in the capital structure. The interest coverage ratio is used as an additional leverage ratio.

Return on assets (ROA) measures how financially viable a firm's assets are at generating income. A rising ROA signifies the business succeeding in higher revenue with each dollar invested in assets spent.

Return on equity (ROE) is a ratio that informs investors how effectively a firm manages the funds that stockholders originally gave to it. In other terms, return on equity evaluates a company's financial performance in proportion to its shareholders' capital. The greater the ROE, the more effective leadership is at producing revenue and expansion from equity investment.

Net profit margin (NPM) is used to calculate the amount of net profits produced as a proportion of total revenue. NPM supports shareholders in determining whether such a firm's management generates adequate revenue from its sales as well as whether operational and administrative expenditures have been under control. The net profit margin is among the most crucial indications of a firm's entire financial stability.

The debt-to-equity ratio (D/E) is utilized to measure a firm's overall debts compared to shareholders' equity. It can be used to determine the amount to which it is reliant on a loan. D/E ratios differ from sector to sector and are mainly utilized to analyze relevant rivals or to track the company's working capital dependence over the period. A greater D/E ratio between many similar businesses indicates higher risks, whereas an especially low one could imply that a company is not using financial leverage to develop. So even though long-term loans want to carry more uncertainty than short-term debts, experienced investors alter the D/E ratio to consider only long-term borrowing.

Debt-to-total assets ratio (D/TA) is a leverage proportion that describes a firm's overall debt with its overall assets. Experts can use this unit of measurement to start comparing one firm's leverage to that of other businesses in a relatively similar industry. This data can indicate a firm's financial stability. Higher the proportion of debt, greater the degree of leverage, and thus the potential danger of investing in that firm.

The interest coverage ratio examines a firm's operating profit and interest on pending loans. Interest coverage is measured by dividing a firm's earnings before interests and taxes by its interest expenditure over a certain time-period.

Table 1 below details the calculations for the variables of the study.

Table 1: Variables of the Study

CONCEPTUAL FRAME	VARIABLE	FORMULA
Financial Leverage	Debt- Equity ratio	$\frac{\text{Total Debt}}{\text{Total Equity}} \times 100$
	Debt-to-Total *Assets* ratio	$\frac{\text{Total Debt}}{\text{Total Assets}} \times 100$
	Interest coverage ratio	$\frac{\text{EBIT}}{\text{Interest expense}} \times 100$
Profitability	Return on Assets	$\frac{\text{Net Income}}{\text{Total Assets}} \times 100$
	Return on Equity	$\frac{\text{Net Income}}{\text{Total Shareholders' Equity}} \times 100$
	Net Profit Margin	$\frac{\text{Net Income}}{\text{Sales}} \times 100$

3.4 Hypothesis

This specific study mainly is concerned with examining the following hypothesis:

Hypothesis 1: $H1_0$: A significantly negative relationship exists between debt-to-total assets and debt-to-equity as a measure of leverage on Net Profit Margin.

Hypothesis 2: $H2_{0:}$ A significantly negative relationship exists between debt-to-total assets and debt-to-equity as a measure of leverage on Return on Assets.

Hypothesis 3: $H3_{0:}$ A significantly negative relationship exists between debt-to-total assets and debt-to-equity as a measure of leverage on Return on Equity.

3.5 Statistical Research Technique

First, descriptive analysis was employed to define pertinent leverage features and give in-depth details on each crucial variable. Descriptive statistics usually provides a summary or describes the properties of a data collection. They consist of three basic categories: measurements of central tendency, measures of variability, and measures of frequency distribution.

The empirical method applied in the study includes correlation analysis to determine the direction and the strength of the correlation coefficients. Correlation methods were used in this study to evaluate the degree of association between the various variables. This technique establishes the importance of every independent variable to the model. Correlation analysis is mostly used to detect trends in datasets as well.

A set of statistical procedures is known as regression analysis and is utilized to assess the relationship between dependent variables and one or more independent variables. It examines the association between the independent and the dependent variables and determines the influence of independent factors on the financial performance of the companies. It is used to assess the effectiveness of the relationships between the variables. It shows how much of the variability is in our dependent variable, the ROA, and the independent variable is responsible for interpreting. The suggested hypothesis will be tested using panel regression technique analysis. This study employs the regression model since the dependent and independent variables are numerical, increasing its predictive potential over other methods. The authors have attempted to utilize the ordinary least squares methodology for examining the hypotheses. The financial data were analyzed for this purpose and the regression was carried out using the data analysis option in MS Excel. The calculation made use of the ordinary least squares method. Its estimations have the best qualities possible, such as linearity, unbiasedness, minimal variance, and mean square error estimates. Here is an attempt that is made to analyze the cause and effect of leverage on the profitability of the firms in the cement sector in the US.

The regression equations used in the study are as below:

$$ROA = a + b1(D/E) + b2(D/TA) + b3(ICR) + e \quad \text{(Eq 1)}$$

$$ROE = a + b1(D/E) + b2(D/TA) + b3(ICR) + e \quad \text{(Eq 2)}$$

$$NPM = a + b1(D/E) + b2(D/TA) + b3(ICR) + e \quad \text{(Eq 3)}$$

Where:

ROA - Return on Assets

ROE – Return on Equity

NPM – Net Profit Margin

D/E - Debt-to-Equity

D/TA - Debt-to-Total Assets

ICR - Interest Coverage Return

4. Data Analysis and Interpretation

An introductory study of the debt-to-equity ratios was conducted to understand the level of debt in the sample companies from 2012 to 2018. Table 2 below shows the debt-to-equity ratios. While comparing the cement firms in the study sample, James Hardie and Eagle Materials had a greater debt-to-equity ratio from 2012 to 2018. A higher debt/equity ratio suggests a business borrows more capital to finance its operational activities. A higher debt-to-equity ratio can be advantageous since it demonstrates that a business is employing its debt to boost the equity returns while also being able to fulfill its debt obligations quickly. On the other side, the company is carrying a higher financial risk.

Table 2: Debt to Equity Ratios

YEAR	VULCAN MATERIALS	CEMEX	EAGLE MATERIALS	JAMES HARDIE	MARTIN MARIETTA	CRH PLC	SUMMIT MATERIALS
2012	-0.64	-2.39	1.9	6.07	2.66	2.62	-4.09
2013	0.3	-2.17	4.69	2.06	3.76	-1.45	8.42
2014	2.51	-1.23	8.32	4.72	2.89	2.57	0.17
2015	2.7	0.23	11.01	14.04	3.99	2.56	1.34
20**16**	5	2.26	8.1	11.97	5.94	3.83	1.42
2017	6.69	2.7	9.6	13.64	8.73	6.03	3.71
2018	5.33	1.88	11.12	6.7	5.06	7.37	0.89

4.1 Descriptive Analysis

The variables employed in the study are for forty-two observations in all that were acquired for this research. Descriptive statistics for dependent and independent variables are shown in Table 3 below. The mean, median, min value, max value, and standard deviation of the observed data from 2012 through 2018 are displayed in the Table 3 below. The mean values of the profitability ratios are as follows: NPM is 5.51 percent, ROA is 3.48 percent, and ROE is 5.78 percent. Besides, the mean values of the D/E ratio, D/TA ratio, and interest coverage ratio are 0.93, 0.56 and 4.18 which have positive mean values.

Table 3: Descriptive Analysis of the Variables

	ROA	***ROE***	***NPM***	***D/E***	***D/TA***	***ICR***
Mean	3.484	5.783	5.512	0.933	0.564	4.186
Standard Error	0.562	1.468	1.074	0.108	0.020	0.650
Median	2.700	6.015	5.425	0.575	0.530	2.690
Standard Deviation	3.642	9.511	6.962	0.698	0.126	4.212
Sample Variance	13.266	90.450	48.472	0.487	0.016	17.743
Range	15.210	52.160	30.170	3.350	0.600	18.090
Minimum	-4.090	-31.870	-11.660	0.360	0.400	-0.870
Maximum	11.120	20.290	18.510	3.710	1.000	17.220
Sum	146.330	242.890	231.520	39.190	23.690	175.810
Count	42.000	42.000	42.000	42.000	42.000	42.000

The ROE and NPM have the highest standard deviations of 9.51 and 6.96, respectively. It suggests a significant variability level between these two profitability measures and shows that the observations are significantly spread from the mean. The D/TA ratio has the lowest mean and standard deviation values of 0.5640 and 0.1265, respectively, as shown in the table. The minimum ROE is -31.87%, while the maximum ROE is 20.29%.

4.2 Correlational Analysis

The relationships between the independent and dependent variables were tested using correlation analysis, and the results are presented below in Table 4. The statistical result of correlation analysis determines the strength of any potential relationships between two variables or datasets. It implies that correlation analyses are employed to analyze whether there are any important patterns or trends between the two variables. However, negative correlations suggest that when one variable drops, the other increases. Positive correlations imply that variables increase with respect to one another.

Table 4: Correlation Analysis

	NPM	*D/E*	*D/TA*	*ICR*
NPM	1.0000			
D/E	-0.5835	1.0000		
D/TA	**-0.7283**	**0.8490**	1.0000	
ICR	**0.7912**	-0.5130	-0.6183	1.0000
	ROA	*D/E*	*D/TA*	*ICR*
ROA	1.0000			
D/E	**-0.4229**	1.0000		
D/TA	**-0.6098**	0.8490	1.0000	

ICR	**0.7868**	-0.5130	-0.6183	1.0000
	ROE	*D/E*	*D/TA*	*ICR*
ROE	1.0000			
D/E	**-0.5430**	1.0000		
D/TA	**-0.6681**	0.8490	1.0000	
ICR	**0.6985**	-0.5130	-0.6183	1.0000

The correlation analysis table above indicates that NPM has a negative correlation with D/E and D/TA ratios and is positively related to the interest coverage ratio. And the more prominent of the debt ratios is again the D/TA ratio which is 0.7283 as compared to 0.5835 of the D/E ratios. The D/E ratio and D/TA ratio also have negative relationships with ROA. However, the interest coverage ratio has a positive relationship with ROA. It reveals that the ROA drops as the D/E ratio and the D/TA ratio rise. On the other hand, when the ROA rises, the interest coverage increases. The ROA is highly correlated with D/TA the most, with a strength of 0.6098 compared to D/E, which is only 0.4229. ROE also reveals a similar trend as the ROA. It shows that there is also a negative association between the D/E ratio and D/TA asset, with values of -0.5430 and -0.6681, respectively. Hence, we see that the highly correlated debt variable with that profitability is D/TA. One important result is that it also reveals that the D/TA ratio has a positive and robust relationship with the D/E ratio at 0.84. It indicates that an increase in the D/TA ratio relates to the D/E ratio and both leverage ratios show similar behaviors. It will enable us to infer the connection between the two leverage ratios.

4.3 Regression Analysis

This study uses the leverage ratios of D/E and D/TA as the independent variables, and profitability ratios such as ROA, ROE, and NPM are used as the dependent variable to carry out regression, to examine the impact of leverage on the profitability of the companies in the cement manufacturing sector in the USA, We will begin our analysis by evaluating the impact of leverage on each profitability ratio separately in different regression equations run multiple times.

Hypothesis 1: $H1_0$: A significantly negative relationship exists between debt-to-total assets and debt-to-equity as a measure of leverage on **Net Profit Margin**.

Table 5 below shows the multiple R for this model is 0.85, indicating that the relationship between the financial leverage and profitability is quite strong and a fit study model. The R square here is 0.72, which suggests that the data explains around seventy-two percent of the variability in the dependent variables, and the fitness level for this model is seventy-two percent. Here, the adjusted R square is 0.70, which leads us to conclude that financial leverage affects the firm's profitability by seventy percent. In the ANOVA table, the significance F is zero, which is lower than the five percent significance level. It indicates that the model is statistically significant and that these variables can be studied further. In this case, the p-value for debt-to-equity is 0.54, slightly above the five percent

significance level. The higher p-value means we cannot conclude that the independent variable affects the dependent variables. The D/E ratio has a regression coefficient of 1.01, indicating a 1.01 percent positive impact on NPM. When debt rises by one point, NPM falls by 1.01 points. The regression coefficient for D/TA is -26.11, meaning that D/TA has a negative effect on the NPM to the extent of -26.11. Hence H1 is accepted that there is a significantly negative relationship between leverage and NPM, and higher debts in the capital structure can negatively impact NPM.

Table 5- Regression Analysis for NPM

SUMMARY OUTPUT - NPM					
Regression Statistics					
Multiple R	0.85				
R Square	0.72				
Adjusted R Square	0.70				
Standard Error	3.82				
Observations	42.00				
ANOVA					
	df	***SS***	***MS***	***F***	***Significance F***
Regression	3	1434	478	33	0
Residual	38	554	15		
Total	41	1987			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	
Intercept	15.49	4.86	3.19	0.00	
D/E	1.01	1.62	0.62	0.54	
D/TA	**-26.11**	9.75	-2.68	0.01	
ICR	0.91	0.18	5.04	0.00	

Hypothesis 2: $H2_0$: A significantly negative relationship exists between debt-to-total assets and debt-to-equity as a measure of leverage on **Return on Assets**.

Table 6 displays the results of the regression analysis on ROA. The multiple R here is 0.82, which indicates that this model shows a significant association between the leverage and the firm's profitability in our study sample. An R-squared value of 0.67 may thus suggest that the model adequately accounts for 67 percent of the variation in the dependent variable. Therefore, this model has a sixty-seven percent fitness. According to the forty-two observations we have combined, the Adjusted R square is 0.64, implying that debt affects the company's profitability by sixty-four percent. From the ANOVA model, the significance F is 0, less than the five percent significance level, suggesting that the model is statistically significant. The P-value is the probability that the findings

have happened by chance, in which the lower p-value is considered significant, and the results are replicable. Regression coefficients are the estimations of the unknowable population attributes and describe the association between an independent variable in the regression analyses and the response. These coefficients are the values that multiply the independent variables in the regression. Based on Table 5, the D/E has a coefficient regression of 1.62, which indicates that it positively impacts the ROA to the level of 1.62. However, this is not statistically significant in our sample with a high p-value. The coefficient for D/TA is -13.46, meaning that D/TA impacts ROA negatively to the level of -13.46. When the debt goes up by 1, ROA goes down by 13.46 points. Considering the significance of D/TA on ROA, we can satisfactorily accept the H2. There is a significantly negative relationship between leverage and ROA, and higher debts in the capital structure can negatively impact ROA, integrating our correlation analysis of ROA and ROE having a high correlation and considering the results of ROE below in Table 7.

Table 6- Regression Analysis for ROA

SUMMARY OUTPUT - ROA					
Regression Statistics					
Multiple R			0.82		
R Square			0.67		
Adjusted R Square			0.64		
Standard Error			2.17		
Observations			42.00		
ANOVA					
	df	***SS***	***MS***	***F***	***SIGNIFICANCE F***
Regression	3.00	364.76	129.59	25.79	0.00
Residual	38.00	179.15	4.71		
Total	41.00	543.91			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	
Intercept	7.19	2.77	2.60	0.01	
D/E	1.62	0.92	1.77	0.086	
D/TA	**-13.46**	**5.55**	-2.43	0.02	
ICR	0.57	0.10	5.55	0.00	

Hypothesis 3: $H3_0$ A significantly negative relationship exists between debt-to-total assets and debt-to-equity as a measure of leverage on **Return on Equity**.

Interpreting the regression analysis for ROE, as shown in Table 7 below, it has a Multiple R is 0.76, indicating a reasonably strong model. According to the regression analysis for ROE, the R square here is 0.58, which shows that the data explains around fifty-six percent of the variability in our dependent variable. From the ANOVA table in Table 7 below, the significance F is also zero, which is less than five percent of the significance level, indicating that these variables are statistically significant. Further, the p-value for D/E is 0.74, higher than the five percent significance level. This suggests that we cannot conclude that the independent variable is impacted, which is the leverage affects the dependent variable, which is the ROE. However, D/TA has a p-value of 0.05, indicating statistical significance. The coefficient regression for D/TA is -33.10, indicating that D/TA impacts ROE negatively to the level of -33.10. When debt increases by 1, the ROE decreases by 13.46 points. Hence, we can satisfactorily accept the H3 that there is a significantly negative relationship between leverage and ROE.

Table 7- Regression Analysis for ROE

SUMMARY OUTPUT - ROE					
Regression Statistics					
Multiple R	0.76				
R Square	0.58				
Adjusted R Square	0.55				
Standard Error	6.41				
Observations	42				
ANOVA					
	df	***SS***	***MS***	***F***	***Significance F***
Regression	3	2149.0	716.3	17.5	0.00
Residual	38	1559.5	41.0		
Total	41	3708.5			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	
Intercept	19.25	8.16	2.36	0.02	
D/E	0.91	2.71	0.34	0.74	
D/TA	**-33.10**	16.36	-2.02	0.05	
ICR	1.04	0.30	3.44	0.00	

5. Conclusion

In the overall observation of empirical results, this study investigated the impact between debt and profitability of companies in the cement manufacturing industry. The findings reveal a negative association between financial leverage and profitability, indicating that when companies carry more debt, it negatively impacts their profits, whether they are NPM, ROE, or ROA. Secondly, the further in-depth analysis found that the measure of leverage most impactful in the model was D/TA Assets, which revealed a strong negative correlation compared to D/E. Hence, this model suggests that debt to assets is a better proxy for leverage than debt to equity. The higher the debt-to-total assets ratio, the lower the company's ROA, ROE, and NPM. The third important finding was that leverage impacts ROE the most. The least impact of leverage was on ROA. These findings reveal that higher debt levels in the capital structure affect ROE the most. These results indicate that the shareholders are highly impacted due to increased debt financing in the company's capital structure. This insight should help managers when they make their capital structure decisions. To keep shareholders invested, managers of cement manufacturing companies need to maintain lower leverage in their capital structure. They should be prudent when increasing debt financing as it would negatively impact the returns to shareholders and hence bring down the share prices, which can bring detrimental results considering the capital market behaviors.

REFERENCES

[1] Aloshaibat, Sulieman Daood. "Effect of Financial Leverage on the Financial Performance of Jordanian Public Shareholding Companies: Applied Study on the Financial Sector of Jordan for the Period of 2015-2019." International Journal of Economics and Financial Issues, vol. 11, no. 2, 2021, pp. 47–51., https://doi.org/10.32479/ijefi.11246.

[2] Baker, Samuel H. "Risk, leverage and profitability: an industry analysis. "The Review of economics and Statistics (1973): 503-507.

[3] Banerjee, Abhijit V. and Duflo, Esther. Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program, The Review of Economic Studies, Volume 81, Issue 2, April 2014, Pages 572–607, https://doi.org/10.1093/restud/rdt046

[4] Bodie, Zvi, Alex Kane and Alan J. Marcus, Investments, McGraw-Hill/Irwin (June 18, 2008).

[5] Brealey R.A., Myers S.C., (2003), "Principles of Corporate Finance", Seventh Edition, McGraw Hill.

[6] Brigham, Eugene F., Fundamentals of Financial Management (1995).

[7] Ebel Ezeoha, Abel. "Firm size and corporate financial-leverage choice in a developing economy: Evidence from Nigeria."The journal of risk finance 9, no. 4 (2008): 351-364.

[8] Hayes, Adam. "Interest Coverage Ratio: Formula, How It Works, and Example." Investopedia, Investopedia, 18 Dec. 2022. https://www.investopedia.com/terms/i/interestcoverageratio.asp.

[9] Kartikasari, D, Merianti, M. "The Effect of Leverage and Firm Size to Profitability of Public Manufacturing Companies in Indonesia". International Journal of Economics and Financial Issues (2016). https://dergipark.org.tr/en/pub/ijefi/issue/31978/352454?publisher=http-www-cag-edu-tr-ilhan-ozturk.

[10] Khan, Abdul Ghafoor. "The relationship of capital structure decisions with firm performance: A study of the engineering sector of Pakistan." International Journal of Accounting and financial reporting, no. 1 (2012): 245-262.

[11] Luhby, Tami. CNN. The cost to fix America's crumbling infrastructure? Nearly $2.6 trillion, engineers. Published 7:02 AM EDT, Tue March 30, 2021.

[12] McConnell, John J., and Henri Servaes. "Equity ownership and the two faces of debt." Journal of financial economics, no. 1 (1995): 131-157.

[13] National Academies of Sciences, Engineering, and Medicine. 1995. Following the Money: U.S. Finance in the World Economy. Washington, DC: The National Academies Press. https://doi.org/10.17226/2134.

[14] Paul Rajan, Arun Prakash. "A Study on Impact of Leverage on Profitability: Empirical Evidence from Select Pharmaceutical Companies in India." Research Gate, July 2016, https://www.researchgate.net/publication/347890544.

[15] Pratap, and Chandra Shekhar. "Financial Performance of Cement Companies in India – an Empirical Study." SCHOLARLY RESEARCH JOURNAL FOR INTERDISCIPLINARY STUDIES, vol. 9, no. 66, 2021, pp. 15494–15506. https://doi.org/10.21922/srjis.v9i66.6846.

[16] Rahman, Md. Musfiqur, et al. "The Impact of Financial Leverage on Firm's Profitability: An Empirical Evidence from Listed Cement Firms of Bangladesh." The Journal of Business Economics and Environmental Studies, vol. 10, no. 2, Korea Distribution Science Association, Apr. 2020, pp. 23–31, doi:10.13106/JBEES.2020.VOL10.NO2.23.

[17] Sheel, Atul. "Determinants of capital structure choice and empirics on leverage behavior: A comparative analysis of hotel and manufacturing firms." Hospitality Research Journal, no. 3 (1994): 1-16.

[18] Tankersley, Jim. The New York Times, 'Biden signs infrastructure bill, promoting benefits for Americans', Nov. 15, 2021. https://www.nytimes.com/2021/11/15/us/politics/biden-signs-infrastructure-bill.html