

CAPITAL STRUCTURE AND FIRM PERFORMANCE: EVIDENCE FROM CEMENT SECTOR OF DHAKA STOCK EXCHANGE LIMITED

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Abstract

The paper aims to investigate the impact of capital structure on firm performance in Bangladesh. The study used panel data for the period of 15 years from 2001 to 2015 and 7 listed cement companies operating in the country. The study used short term debt to total assets and long term debt to total asset, as proxy for capital structure and, return on equity (ROE) and return on asset (ROA) as measure of performance of the companies. Random effect model has been used to estimate the relationship between the firm debt and firm performance. The study documents a significant positive association between the short-term debt to total assets ratio and firm performance measured in terms of ROA and ROE.

Keywords: Capital structure, Firm Performance, Return on Equity, Return on Asset

1. Introduction

The capital structure decision for any firm is very crucial because this is directly related to maximizing shareholder returns as well as to ensuring the firm's capacity to cope with its competitive environment. Identifying the optimal capital structure results in minimizing a firm's cost of finance thereby maximizing the firm's revenue. Since a firm's capital structure influences a firm's performance, it is reasonable to expect that the firm's capital structure would affect the firm's condition and its likelihood of default. Thus, the issue regarding the capital structure and firm performance are important for both academics and practitioners. Performance that enables an increase in market value is crucial and the most widely used instruments to measure firms performance are return on assets and return on equity [Demsetz and Lehn (1985), Mehran (1995)].

To what extent does capital structure decision affect performance and in which direction, is among the major concern of studies in cement companies' capital

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structure. Different studies have tried to examine the application of different capital structure theories in different industrial sector and other financial institutions and their results are diverse [Kipasha and Moshi (2014)].

At present, in Bangladesh, there are more than 125 companies incorporated as cement manufacturers and among these, 5 are multinationals. Many of these cement factories are small as 85 per cent of total market share is held by top ten manufacturers and many of them are out of the operation because of the fierce competition. The top four global cement producers operating in Bangladesh are: Lafarge, Holcim, Cemex and Heidelberg Cement. However, these companies' shares are gradually shrinking as local makers, such as Shah, Bashundhara, Seven Circle, Fresh, Premier, and Crown have significantly expanded their capacities. This paper investigates the impact of capital structure on seven listed cement companies in Bangladesh using panel data for the period of 15 years from 2001 to 2015.

A lot of studies were conducted on different industrial sectors in Bangladesh assessing the relationship between the capital structure and the firm performance [Amin and Hossain (2013), Lata (2014), Hasan et al., (2014)] but very few studies are done on cement sector capturing the extent to which the choice of financing affects the performance of the companies. This study attempts to investigate whether the choices of financing sources that make up the capital structure have any impact on the financial performance of listed cement companies operating in Bangladesh.

2. Literature Review

Initially Modigliani and Miller (1958) posited that capital structure of a firm does not have any impact on its value creation process. Subsequently Modigliani and Miller (1963) considered the corporate tax and explained the effects of benefits of the tax shield of debt; recognizing that leverage can reduce the payment obligations related to corporate tax. Researchers later have recognized the importance of financial leverage in affecting the overall cost of capital and value of the firm. Hence, many empirical researches were undertaken on the concept developed by MM proposition. Durand (1989) criticized the MM's theory and suggested several factors which were ignored in MM's model such as market imperfections, transaction cost and institutional reactions and preference for the present income over the future, affect the capital structure of firms. Other capital structure theories also rejected the MM theory which came up later, some of these theories include, static trade off theory, agency cost theory, pecking order theory and signaling theory. According to the static trade off theory, capital structure does exist and a firm's optimal debt-equity ratio is achieved at the point when the marginal present value of the tax on additional debt is equal to the increase in the present value of financial distress costs. So, this

theory argues that there is a positive relationship between the firm's leverage and performance.

Empirical studies that have tested the tradeoff theory have reported mixed findings; some studies have presented findings rejecting the arguments of the theory [Myers (2001), Zeitun and Tian (2007), Victor and Badu (2012) and Chechet and Olayiwola (2014)] while others have supported the theory [Jensen (1986), Harris and Raviv (1990), Stulz (1990)]. Agency cost theory supported by a number of researchers [Buferna et al (2005), Jensen & Meckling (1976)] proposes the use of debt financing as a way of monitoring managers of the firm to focus on overall objectives of the organization apart from their own interests. Thus, it is to be expected that increased leverage in the context of low agency costs may raise the level of efficiency and thereby contribute to upgrading firm performance.

The pecking order theory on the other hand, argues that there is a hierarchy in the firm's preference for financing its investments, and that compliance with the hierarchy represents the optimal financing strategy. According to the theory, firm should start using retained earnings followed by debts before going to equity shares. Thus, based on this argument, more profitable firms generate higher earnings that can serve for self-financing, enabling them to opt less for debt financing; conversely, less profitable firms do not enjoy the same opportunity, being compelled to take on debt to finance their ongoing activity. Consequently, the theory asserts a negative correlation between the debt level and firm performance. Ross (1977) laid down the foundations of signaling theory and its various extensions. According to Ross, investors interpret larger levels of leverage as a signal of the firm's current stable income, high future cash flows and managers' confidence about the performance of their own firm. Consequently, Ross (1977) argued that investors take larger levels of debt as a signal of higher quality and that profitability (as a proxy of quality performance) and leverage are thus positively related.

Empirical studies have analyzed the correlation between capital structure and firm performance in various countries taking into account the specific influencing factors. Some studies found empirical evidence in support of the positive correlation between capital structure and firm performance [Roden and Lewellen (1995)] while other studies found negative correlation [Kester (1986), Fama and French (2002)].

Soumadi and Hayajneh (2012) investigated the effect of capital structure on the performance of the public Jordanian firms listed in Amman stock market using multiple regression model on 76 firms from 2001 to 2006. The study found negative correlation between the capital structure and firm performance with no significant difference to the impact of the financial leverage between high financial leverage firms and low financial leverage firms on their performance.

Pouraghajan et al., (2012) evaluated the impact of capital structure on the financial performance of 400 companies listed in the Tehran Stock Exchange representing 12 industrial sectors from 2006 to 2010. They found that the financial performance measured by ROA and ROE had a significant negative relationship with debt ratio, while a significant positive relationship existed among asset turnover, firm size, asset tangibility ratio, and growth opportunities with financial performance measures. However, the relationship between ROA and ROE measures with the firm age was not significant.

In contrast, a lot of studies have shown positive relation between capital structure and firms performance. Margaritis and Psillaki (2010) observed a significant positive relation between leverage and firm's performance. They used a sample of both low and high growth French firms for the period 2003-2005 and found that leverage have positive effect on firms' efficiency over the entire sample. The study was consistent with Fosu (2013). This study investigated the association between capital structure and firm performance using GMM regression of panel data consisting of 257 South African firms over the period 1998 to 2009 and found a positive and significant relation between financial leverage and firm's performance.

With cross sectional time series fixed effect model, Chowdhury and Chowdhury (2010) examined the link between capital structure and firm value in Bangladesh. They found that maximizing the wealth of shareholders demands a perfect mixture of debt and equity, whereas cost of capital has a negative correlation in this choice and it should be as least as possible. Alom (2013) also witnessed significant negative relation between profitability and leverage in Bangladeshi firms.

Rouf (2015) studied the impact of capital structure on listed manufacturing companies in Dhaka Stock Exchange (DSE) for the period of 2008-2011 using multiple regression analysis and found that debt ratio, debt equity ratio were significantly negatively related with ROA and return on sales (ROS).

Consistent with the findings, Hasan et al., (2014) studied the influence of capital structure on firm's performance on a sample of 36 Bangladeshi firms listed in Dhaka Stock Exchange during the period 2007–2012 using pooled panel data regression method. The study found that EPS is significantly positively related to short-term debt while significantly negatively related to longterm debt. There is significant negative relation between ROA and capital structure. On the other hand, there is no statistically significant relation exists between capital structure and firm's performance as measured by ROE and Tobin's Q. Overall, they concluded that

capital structure had negative impact on firm's performance which is consistent with the proposition of Pecking Order Theory. Haque (1989) on the other hand found that capital structure significantly varies among industries and it had no significant impact on firm's profitability in Bangladesh.

In a recent study by Hossain (2016) on the effects of capital structure and managerial ownership on the profitability of the Bangladeshi companies based on panel data of 81 manufacturing companies listed under 10 industries in Dhaka Stock Exchange for 2002-2014, found that capital structure measures negatively affect ROA but positively affect ROE of the firms. Besides, short term debt influences profitability of the firms more severely compared to long term debt. The findings are consistent with Nasimi (2016) which studied 30 listed firms from FTSE-100 index of London Stock Exchange from 2005 to 2014.

Several studies are also conducted on the impact of capital structure on banks performance in both developed and developing countries. Capital structure in banking sector is so far unique as compared to other business firms because of its nature of operation. Saona (2010) examined the profitability-capital relationship for the US banks using over the period 1995-2007 using the GMM methodology to control for the endogeneity and the unobservable heterogeneity problems and documented a significant negative link between the capital ratio and the profitability for the banking industry. Amin and Hossain (2014) assessed the impact of capital structure on 24 listed commercial banks' performance in Bangladesh for the period of 6 years from 2008 to 2013 and documented a significant positive association and causality between the short-term debt to equity ratio and firm performance measured in term of return on equity (ROE) and net interest margin (NIM).

Few studies have been conducted on the emerging countries like Bangladesh on the relationship between the capital structure and the performance of cement companies. Most capital structure studies focused on the data set of developed countries showing the relationship between the capital structure and the manufacturing firms' performance as well as banks' performance. There are also several studies on determinants of capital structure that provide evidence from developing economies like Bangladesh representing various industries [Sayeed (2011) and Jahan (2014)]. Besides, Chowdhury (2004) studied the cross-sectional differences between firms in Japan and Bangladesh based on agency cost model of capital structure and found that corporate governance and monitoring by institutional shareholders have some role in mitigating agency problem. However, the area of analyzing the relationship of capital structure and the performance of companies operating in cement industry remains under researched in the context of Bangladesh. Therefore, study attempts to

reduce the research gap by analyzing the impact of capital structure on the performance of cement companies in Bangladesh.

3. Data and Methodology

This study was conducted taking all the listed 7 cement companies operating in Bangladesh from the period of 2001 to 2015. The secondary data were obtained from the annual reports of these firms. The study focused on examining the impact of capital structure on firms' performance. Two performance indicators have been used as dependent variables, these include return on equity (ROE) and return on asset (ROA). Capital structure of the company is measured using short term debt to total asset, long term debt to total asset. Such ratios have been used by different empirical studies as measures of capital structure [Kipsha and Moshi (2014), Victor and Badu, (2012), Berger, (2002) and Chechet and Olayiwola, (2014)]. Natural log of total assets (TA) is taken to control the size effects of the companies. To evaluate the impact of capital structure on firm performance, the following hypothesis is tested:

Ho: Capital structure has positive impact on firm performance

According to agency cost theory, leverage act as a driving force for managers to perform well in the organization. The use of debts requires managers to perform better so that the firm pays interests and other debts hence avoid loss of employment as a result of bankruptcy [Akintoye (2008), Pratomo and Ismail (2006)]. Likewise, the tradeoff theory suggests the positive impact of debt on firm financing as a result of tax advantages, though the use of more debt increases bankruptcy risk. To test the above hypothesis, the study uses panel data estimation which captures the effect of omitted variables in the model specification. The general pooled regression model is presented as:

Firm Performance = f Capital Structure

Following two regression models are estimated.

$$ROE_{it} = \lambda + \beta_1 x_{(SDTA)it} + \beta_2 x_{(LTDTA)it} + \beta_3 x_{(SG)it} + \beta_4 x_{(Age)it} + \beta_5 x_{(LnTA)it} + \mu_{it}$$

$$ROA_{it} = \lambda + \beta_1 x_{(SDTA)it} + \beta_2 x_{(LTDTA)it} + \beta_3 x_{(SG)it} + \beta_4 x_{(Age)it} + \beta_5 x_{(LnTA)it} + \mu_{it}$$

Where ROE_{it} is the return on equity of i^{th} company at time t , ROA_{it} is the return on asset of i^{th} company at time t . $LnTA_{it}$ is the natural log of the total asset of i^{th} company at time t . λ , β and μ are the intercept, regression coefficients and error terms of the regression model respectively.

Table 1
Variable Definitions

Variables	Definition
Return on equity (ROE)	Ratio of net income to average total equity
Return on asset (ROA)	Ratio of net income to average total assets
Short-term debts to total assets (SDTA)	Ratio of short-term debt to total assets
Long debt to total assets (LTDTA)	Ratio of long-term debt to total assets
Size effect (Ln TA)	Natural logarithm of total asset
Age	Total age of the company
Sales growth (SG)	Current year's sales minus previous year's sales divided by the previous year's sales

4. Empirical Findings

This analysis examined the effect of capital structure on the financial performance of cement companies using an unbalanced panel of 7 cement companies over 15 years. Table 2 exhibits the summary of descriptive statistics of the capital structure and profitability of cement companies along with the control variables.

Table 2
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.
ROE	86	0.2960	0.5955
ROA	86	0.0901	0.0830
SDTA	86	0.4193	0.1856
LTDTA	86	0.1307	0.1446
SG	86	0.3286	1.6766
Age	86	12.5465	4.8426
LnTA	86	8.0456	1.1312

The mean return on equity (ROE) is 29.60 percent which indicates that the equity holders of the cement companies have earned high rate of return on their equity capital for the observed period.

However, the standard deviation of ROE (59.55 percent) indicates considerable volatility in the performance of the cement companies. Return on asset (ROA) is also

considered as one of the performance indicators of the cement companies. The average ROA of the cement companies is 9 percent with a range of -11 percent to 28 percent. Capital structure of the companies is measured by two variables: short-term debt to total assets (SDTA) and long-term debt to total assets (LTDTA). It is observed that the cement companies of Bangladesh are not highly levered firms. On an average, 55 percent of the assets of the cement companies are finance by debt capital. However, the companies use more short-term debt which ranges from 3 percent to 83 percent of total assets with a mean of 42 percent. On the other hand, the cement companies employ around 13 percent long-term debt with a range of 0 percent to 61 per cent.

The financial performance of the cement companies is also affected by variables other than capital structure. Therefore, growth of sales (SG), age of the cement companies, and natural logarithm of total asset were used as control variables. The average growth of sales is 33 percent which indicates that cement industry is a growing sector in Bangladesh. The growth of sales of this industry ranges from -41 percent to 147 percent. By nature of the business, the revenue of the industry is closely related to the economy of the country. Therefore, the growth of sales indicates higher dispersion. The study considers all the listed cement companies in DSE. The operating age of the companies ranges from 11 years to 22 years with an average of 13 years. The size of the cement companies is expressed in term of natural logarithm of total asset (LnTA). The mean value of LnTA for the observed period is 8.05 with the standard deviation of 1.13.

Both fixed effect and random effect panel regression analysis were performed to test the impact of capital structure on the performance of cement companies measured in terms of ROE and ROA. Hausman test was used to identify the appropriate regression model between fixed effect and random effect. The test results indicate that random effect is applicable for both the models including ROE and ROA. Summary results of Hausman test are presented in Table 3.

Table 3
Hausman Test for Fixed and Random Effect Model

	Model 1 (ROE)	Model 2 (ROA)
Chi2 (5)	1.48	8.13
Prob>Chi2	0.9149	0.1491

As the results of standard regression may be noisy due to the existence of multicollinearity, heteroscedasticity, and autocorrelation, Collin diagnostic test was

performed to check the multicollinearity, Levene (1960) and Brown and Forsythe (1974) group wise test was used to check heteroscedasticity, and Wooldridge test was used to check the autocorrelation.

Partial correlation test was conducted to test the association between capital structure and performance of cement companies. The test results are presented in Table 4. The test results indicate a significant positive relationship between SDTA and ROE. The correlation between SDTA and ROA is also positive and significant, indicating short-term debt which is mainly composed of different types of payables including trade payables, short-term loans, and current portion of long-term debt had contributed positively to firm profitability.

Table 4
Partial Correlation Results

	ROE		ROA	
	Corr.	Sig.	Corr.	Sig.
SDTA	0.4232	0.0002	0.2311	0.0460
LTDTA	-0.2140	0.0652	-0.5941	0.0000
SG	-0.0216	0.8541	0.0127	0.9141
Age	0.0089	0.9398	-0.0164	0.8887
LnTA	0.0918	0.4334	0.4029	0.0003

The significant positive association between short-term debt and firm performance is consistent with the existing literature in the way that debt contributes positively to the equity owners' return. However, a statistically negative relation between long-term debt to total asset and ROE is found, contradicting the existing literature that long-term loans are relatively expensive source of financing with strong caveats. The correlation between LTDTA and ROA is also negative and significant. Age of the cement companies is found to be positively related with ROE. However, the age of the cement companies is negatively related with ROA. Nevertheless, none of the relationship is statistically significant.

The study found negative association between sales growth and ROE. This is inconsistent with the existing literature. However, the relationship between sales growth and ROA is positive. Nevertheless, the association of sales growth with ROE and ROA are not significant. A statistically significant positive correlation is found between LnTA and ROA. The association indicates that the firm performance is

positively related to the changes in total assets of the cement companies. However, the correlation between LnTA and ROE is not statistically significant.

Table 5 shows the regression results using random effect for ROE and ROA. The supports the results under partial correlation. The study found that there is a statistically significant positive relation between short-term debt and the profitability of the cement companies. This finding is consistent with the literature in the way that debt contributes positively to the return of the firms. However, when long-term debt to total asset is used as the proxy of debt financing, a negative impact of debt on ROA at 1 percent significance level is found.

Table 5
Random effect estimates on ROE and ROA

Independent Variables	ROE			ROA		
	Estimated Coefficient	Standard Error	z Statistic	Estimated Coefficient	Standard Error	z Statistic
Intercept	-0.7105	0.5490	-1.29	-0.1347*	0.0730	-1.85
SDTA	1.5861**	0.7097	2.24	0.0897**	0.0363	2.47
LTDTA	-0.8531	0.6259	-1.36	-0.3195***	0.0615	-5.20
SG	-0.0073	0.0088	-0.83	0.0005	0.0016	0.30
Age	0.0011	0.0074	0.15	-0.0002	0.0009	-0.27
LnTA	0.0533	0.0502	1.06	0.0283***	0.0080	3.53
R-squared		0.2489			0.4359	
Chi2		267.51***			364.21***	

*significant at the 0.10 level, **significant at the 0.05 level, ***significant at the 0.01 level

The negative relation between LTDTA and ROE was not found significant. This finding is consistent with the previous literature. The literature argue that long term debts increases the cost of borrowing and impose strong covenants. Moreover, long-term debts bring financial distress costs and additional regulatory supervision costs that might offset the benefit of long-term financing. In addition, the changes in asset is found to be positively related to the performance of the cement companies. LnTA and ROA have statistically significant positive association. These findings suggest that the performance of cement companies is sensitive to the capital structure of the firms as well as the performance indicators used in the model.

5. Conclusion

The objective of the study is to empirically investigate the impact of capital structure on the seven listed cement firms' performance in Bangladesh. The study used short-

term debt to total assets and long-term debt to total assets as proxy for capital structure, and return on equity and return on assets as indicator of firm performance of cement companies. The analysis exhibits a significant positive relationship between the short-term debt to total assets ratio and firm performance as measured in terms of ROE and ROA. The finding is consistent with many of the existing literature [Gill et al. (2011), Addae et al., (2013)]. This indicates that the short-term debt financing, mainly composed of trade payables and short-term bank loans, contribute positively to the profitability of the cement companies in Bangladesh. On the other hand, the test results indicate a negative association between long-term debt to total assets and firm performance.

However, the negative relationship between long-term debt and firm profitability was not found statistically significant. Nevertheless, the negative association between long-term debt and firm profitability is consistent with the existing empirical argument of capital structure in the way that long-term financing is relatively costly source of financing and impose tough covenants. In the end, the study identifies that the effect of capital structure on firm performance depends on the indicators and variables that are used to estimate capital structure and performance.

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Appendix
Estimates of Variance Inflation Factor

Variable	VIF	1/VIF
LnTA	1.48	0.673990
SDTA	1.39	0.718410
Age	1.23	0.814138
LTDTA	1.13	0.882184
SG	1.12	0.892009
Mean VIF	1.27	