Impact of Capital Structure on Market Based Firm Performance: Evidence from Bangladesh

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Abstract: *This study tries to investigate how capital structure influences market-based firm performance, utilizing a dataset comprising 117 manufacturing firms listed on the Dhaka Stock Exchange between 2018 and 2022. The study evaluates three market-based performance metrics-P/E ratio, market-to-book value ratio, and Jensen alpha as dependent variables. Independent variables include measures of capital structure like the debt-to-book value of equity and debt-to-market value of equity. Additionally, control variables such as the proportion of independent directors, current ratio, total assets, and market capitalization are incorporated. All the data were collected from the Dhaka stock exchange databases and the annual reports of the sample companies. The analysis included descriptive, correlation, and ordinary least square regression statistics. The descriptive statistics provided an overview of the dataset, while the correlation analysis revealed the relationships between the variables. The regression analysis further explored the influence of debt on various market-based performance indicators. The empirical results indicate that capital structure significantly affects market-based performance, particularly the Market to Book Value ratio and Jensen Alpha. These findings highlight that the choices a company makes in financing its operations-whether through debt, equity, or a combination of both-impact how the market assesses the company's value and its risk adjusted returns.*

Keywords: Capital Structure, Dhaka Stock Exchange, Firm's Performance, Jensen Alpha, Manufacturing Companies

1. Introduction

Capital structure stands as a pivotal decision within corporate finance, denoting the method by which a company funds its assets through a blend of liabilities and equity (Gul & Cho, 2019). The foremost aim of any firm is to optimize the wealth of its shareholders. To achieve this objective, a company can pursue strategies such as minimizing the cost of capital or opting for sources of funding that offer lower costs and greater advantages. The main sources of financing are equity and debt, and both have its advantages and disadvantages. To be leveraged, the firm should have financing from both sources; however, the balance between equity and debt is the issue which the researchers in the financial management and corporate governance try to explore. (Andi, et al., 2023; Shrabanti, 2022; Ylber, et al., 2023)

The significance of the capital structure decision is underlined by the researchers through the theoretical research of its influence on the performance and solvency of the firm (Modigliani and Miller, 1963). Most of the studies in this field belong to developed economies like Europe, America, Australia, etc. Numerous studies, conducted primarily in Western countries (Babalola, et al., 2022; Abeywardhana, 2015; Taiwo, et al., 2015), have explored the relationship between corporate capital structure and the financial performance of firms. However, there exists a lack of empirical evidence concerning the impact of capital structure on firm performance within developing nations. Therefore, extensive empirical research is crucial to delve into the correlation between capital structure and firm performance. Understanding the relationship between performance variables and capital structure can illuminate avenues for financial planning, aiming to foster performance growth while mitigating risks. This study tried to explore this tendency and prove the association between leverage other control factors, and market-based performance indicators so that it provides the evidence to find the character of dependence and make further conclusions on the capital structure significance in the financial decision-making among manufacturing firms in Bangladesh.

2. Literature Review

Numerous researchers all over the world took the topic of capital structure for their study and tried to understand its impact on the performance of the companies. They took different variables as dependent specially Debt-to-equity and its variations as the main independent. The empirical review shows that the

market performance tends to be decreased by the higher debt borrowings. It was proved by Gokcehan and Waseen (2014) and Fosu (2013). Similar result also found by the other researchers researches (Aliakbar, Seyed, and Pejman , 2013; Gill, Biger, & Mathur, 2011; Margaritis and Psillaki , 2010; Goyal, et al., 2013).

Conversely, Collins (2019) observed a statistically significant adverse impact of capital structure on firm performance in Nigerian companies, while Hieu, et al. (2020) identified a similar negative effect for companies in Vietnam. Likewise, Babalola, et al. (2022), Omondi & Muturi (2013), Nguyen (2015), and Chakraborty (2010) have all highlighted a negative correlation between capital structure and firm performance. Tariq, et al. (2014) and Hoque et al. (2014) discovered a relationship between capital structure and firm performance, but the direction of this relationship appears to be mixed.

Some of the research papers (Ebaid, 2009; Khalaf, 2017; Phillips & Sipahioglu, 2004) have reported no impact or insignificant influence of capital structure on firm performance. The study of Hasan et al. (2014) on 36 Bangladeshi firms has observed significant negative relation among ROA and capital structure while no evidence of statistical significant relation among capital structure and ROE and Tobin's Q. At the same time, Chadha and Sharma (2015) examined that the capital Structure has no effect on performance measures such as ROA and Tobin's Q, while the leverage is negatively correlated with ROE.

The outcomes of prior research on capital structure across developed and developing markets exhibit variability in terms of the models utilized, variables assessed, results obtained, and conclusions drawn. Such disparities cannot be generalized as wisdom applicable to Bangladesh. Hence, there is a need to address these variations to gain insight into the impact of capital structure on the market-based performance of manufacturing companies in Bangladesh.

3. Materials and Methods

The study has been an empirical one, and the inferences of the study are applicable only in Bangladesh. This study was based only on secondary data which has covered manufacturing companies listed on DSE for 2018 to 2022. On the basis of availability of data the total sample consisted of 117 DSE publicly listed manufacturing companies. The data mostly derived from annual report of sample companies and DSE database.

Table 1: Operational Variables

Variables	Lebel	Definition
Debt-to-Book value of Equity Ratio	DE	The capital structure of the firm calculated by dividing the book value of debt to the book value of shareholders' equity. Determines the leverage of the firm.
Debt-to-Market Value of Equity Ratio	DME	The capital structure of the firm calculated by dividing the book value of debt to the market value of shareholders' equity (Market Capitalization). Determines the leverage of the firm.
Price to Earnings Ratio	P/E	The share price of the firm divided to the Earnings per Share by shareholders.
Market Value to Book Value Ratio	MvBv	Market Capitalization divided by the book value of shareholders' equity.
Jensen's Alpha	JA	The measure of over- or underperformance of the firm compared to the expected return calculated by subtracting Cost of Capital (CAPM) from the actual return.
The share of Independent directors	InDir	The number of independent directors divided to the number of total directors.
Current Ratio	CR	A measure of liquidity calculated by the division of Current assets to Current Liabilities.
Total Assets	LnTA	Natural logarithm of total assets.
Market Capitalization	LnMCap	Natural logarithm of market capitalization.

Researchers Scholars extensively examined various published works both domestically and internationally concerning the present study. The literature review facilitated the identification of diverse variables associated with capital structure and market-based firm performance. Subsequently, the study acquired the necessary secondary data from multiple sources, including but not limited to the Bangladesh Bureau of

Statistics (BBS), publications from the Dhaka Stock Exchange (DSE), reports from the Bangladesh Bank, annual reports of sampled companies, and the DSE database.

The study employed Ordinary Least Square (OLS) regression models to investigate the influence of capital structure on the market-based performance of manufacturing companies in Bangladesh. Within the analysis, three distinct functional relationship models were assessed using a multivariate OLS regression technique, outlined as follows:

Model 1 : $P/E_{it} = \alpha_{it} + \beta_1(DE)_{it} + \beta_2(DME)_{it} + \beta_3(InDir)_{it} + \beta_4(CR)_{it} + \beta_5(MR)_{it} + \beta_6(LnTA)_{it}$
$$+ \beta_7(LnMcap_{it} + \varepsilon_i$$

Model 2: $MvBv_{it} = \alpha_{it} + \beta_1(DE)_{it} + \beta_2(DME)_{it} + \beta_3(InDir)_{it} + \beta_4(CR)_{it} + \beta_5(MR)_{it} + \beta_6(LnTA)_{it}$
$$+ \beta_7(LnMcap_{it} + \varepsilon_i$$

Model 3: $JA_{it} = \alpha_{it} + \beta_1(DE)_{it} + \beta_2(DME)_{it} + \beta_3(InDir)_{it} + \beta_4(CR)_{it} + \beta_5(MR)_{it} + \beta_6(LnTA)_{it}$
$$+ \beta_7(LnMcap_{it} + \varepsilon_i$$

This research is based on the following hypothesis that clearly defines the research criterion.

H_a: The capital structure influences the market-based firm performance.

4. Results and Discussion

This section of the study is structured around three key analyses: descriptive statistics, correlation analysis, and regression analysis. Table 2 provides the descriptive statistics for all variables involved in the analysis. It presents mean values and their standard deviations. Looking at Table 2, it is apparent that within the sample of manufacturing firms, the mean Debt-to-Equity ratio (DE) is calculated at 2.13. This figure suggests that, on average, these firms tend to have a debt level of 2.13 units for every 1 unit of shareholder's equity. This finding implies that the sampled manufacturing firms typically finance approximately two-thirds of their capital through debt and one-third through shareholder equity, indicating a borrowing level that is twice the amount of owned funding. At the same time, the Debt-to-Market Value of Equity (DME) ratio's mean is 1.30, which confirms the tendency of Bangladeshi manufacturing companies to prioritize debt in the capital structure, as well as shows that the market value of equity tends to be higher than the book value of equity. Overall, it can be said that Bangladeshi Manufacturing companies tend to rely heavily on debt and on average prefer more debt as the source of financing. Price-to-Earnings ratio represents that on average investors are willing to invest about 37 Taka for the sample companies to get 1 Taka of return. Nevertheless, due to the high standard deviation of 74.82, the P/E ratio is dispersed significantly for all companies from the mean, consequently, it is impossible to claim the unified number for the Bangladesh Capital Market. Negative Jensen's Alpha, highlights that sample companies are not able to overcome the expectations of their investors. MvBv ratio greater than 1 (4.626) proves that the sample companies are valued slightly higher on the market than their book value.

Table 2: Descriptive Statistics Results

Variable	Mean	Std. Deviation	Variance
DE	2.13	4.457	19.868
DME	1.30	3.905	15.253
PE	36.80	74.82	5599.9
MvBv	4.626	7.547	56.981
JA	-0.092	0.556	0.310
IndDir	0.264	0.084	0.007
CR	2.60	3.96	15.72
RM	0.036	0.129	0.017
LnTA	29.06	1.75	3.074
LnMCap	29.89	1.76	3.127

Source: Author's calculation

The variance in total assets and market capitalization proves that in the sample there are companies of different sizes and the results can be applicable to all companies in the market. Looking at the other control variables the conclusion can be made that in Finland companies tend to have approximately 26 % of which are independent directors (Standard Deviation = 0.084). The Current Ratio mean of 2.60 shows that firms are liquid and have 2.60 Taka of current assets per each Taka of their liabilities, however high dispersion (standard deviation = 3.96) highlights the versatility of companies considering this indicator.

Table 3: Correlation Test between IVs and *DV*

Variables	DE	DME	PE	MvBv	JA	IndDir	CR	RM	LnTA	LnMCap
DE	1									
DME	0.369**	1								
PE	-.052	-.075	1							
MvBv	.26**	-.14**	.23**	1						
JA	.046	.058	.12**	.034	1					
IndDir	.078	.025	-.018	.08*	-.006	1				
CR	.12**	.017	.008	.065	-.06	-.016	1			
RM	.027	-.012	-.040	-.031	.28**	.000	.008	1		
LnTA	-.12**	.23**	-.11**	-.29**	-.044	-.18**	-.03	.023	1	
LnMCap	-.19**	-.16**	.067	.21**	.023	-.18**	.043	.014	.68**	1

Note: (**) indicates 5% significance level. Source: Author's calculation

Table 3 illustrates the pair wise correlations among all variables utilized in this study. The table encompasses a range of variables: independent variables such as Debt-to-Book Value of Equity (DE) and Debt-to-Market Value of Equity (DME); dependent variables associated with market-based performance; and control variables, including the proportion of independent directors, Current Ratio, market return, total assets, and market capitalization. The correlations were assessed at a significance level of 5%.

The results of the correlation analysis indicate that the Debt-to-Book Value of Equity ratio exhibits significant positive correlations with the Debt-to-Market Value of Equity, market value to book value ratio (MvBv), and current ratio. Conversely, this ratio demonstrates a significant negative correlation with total assets and market capitalization. A negative relationship implies that higher DE ratios are associated with lower values in terms of total assets and market capitalization.

The significant positive correlation between Debt-to-Market Value of Equity and total assets suggests a potential impact of a high Debt-to-Market Value of Equity ratio on a firm's innovation and size. This finding aligns with theoretical assertions indicating that companies likely channel this debt towards physical assets to enhance performance. Additionally, Debt-to-Market Value of Equity exhibits a significant negative correlation with Market-to-Book value and the logarithm of market capitalization. These outcomes underscore that excessive debt relative to market capitalization tends to lead to diminished market performance.

Regarding the dependent variables, the market performance indicators, P/E ratio, exhibit a positive correlation solely with market value to book value ratio and Jensen's Alpha. This can be elucidated by their shared classification as measures of market performance. MvBv is significantly positively correlated with the share of independent directors and the log of market cap, while there is also a negative correlation with the log of assets. Besides, Jensen's Alpha is significantly positively correlated with market return (RM).

Prior to conducting the regression analysis, several assumptions were evaluated, including linearity, normality, homoscedasticity, and independence of errors. The results revealed no issues with linearity, normality, homoscedasticity, or independence of error terms. In other words, it was established that all the necessary statistical assumptions for multivariate statistical techniques were met. The fulfilment of these assumptions ensures the validity and reliability of the obtained results. Tables 4, 5, and 6 represent the dependence of market-based performance on the Debt-to-Equity ratio and Debt-to-MV of Equity ratio, as well as on the other control variables, including Market-Value to Book value, Jensen's Alpha, Price to earnings ratio, Current Ratio, log of market capitalization, log of total assets, proportion of independent directors, and market return. The significance levels are represented by the denotations of *, **, or *** at 1%, 5%, and 10% respectively.

In three models the Durbin-Watson statistic value around 2 indicates that the residuals of the regression models do not exhibit significant first-order autocorrelation. This supports the assumption of independence of errors, suggesting that the models adequately capture the linear relationship between variables without systematic patterns in the residuals.

As per Table 4, the price-earnings (P/E) ratio demonstrates a lack of significant association with both the Debt-to-Book Value of Equity and Debt-to-Market Value of Equity. This suggests that fluctuations or alterations in the levels of debt concerning book value or market value do not notably influence or correlate with the company's price-earnings ratio. Essentially, an "insignificant relationship" indicates that shifts in debt levels relative to book value or market value do not strongly align with changes in the P/E ratio. Investors seem to base their valuation and growth expectations on other factors beyond the company's debt structure, which may hold more significance in influencing the P/E ratio.

Table 4: Regression Result- P/E Ratio as Dependent Variable

Model: $P/E_{it} = \alpha_{it} + \beta_1(DE)_{it} + \beta_2(DME)_{it} + \beta_3(InDir)_{it} + \beta_4(CR)_{it} + \beta_5(MR)_{it} + \beta_6(LnTA)_{it} + \beta_7(LnMcap_{it} + \varepsilon_i$

Variable	Coeff.	Std. Error	t	Sig.
C	88.157	46.529	1.895	.059
DE	-1.014	.757	-1.340	.181
DME	1.507	.976	1.544	.123
IndDir	-22.257	37.156	-.599	.549
CR	-.161	.773	-.208	.835
RM	-19.338	23.312	-.830	.407
LnTA	-14.637	2.777	-5.271	.000*
LnMCap	12.693	2.668	4.758	.000*
R^2	.056			
Adj. R^2	.045			
F	4.912*			
P (F-statistic)	0.000			
Durbin-Watson stat	1.847			

Source: Author's calculation

The inverse relationship observed between the P/E ratio and the logarithm of total assets, along with the positive correlation noted with the logarithm of market capitalization, indicates that diverse size metrics affect how the market assesses companies based on their earnings. This suggests that the market's appraisal of companies in relation to their earnings is shaped by different dimensions of company size and investor sentiments.

According to Table 5 Market-to-Book Value ratio is highly positively dependent on the Debt to Book Value of Equity and the Debt to Market Value of Equity. The significance level of this dependence is around 99%. The conclusion can be made that a higher DE ratio is associated with a higher market-to-book ratio, indicating that investors may perceive the company's risk and growth potential more favorably despite higher debt levels. Similarly, when the ratio of debt to market value of equity increases, it signifies a higher proportion of debt concerning the company's market value. Again, a higher DE ratio is linked with a higher market-to-book ratio, suggesting that investors are optimistic about the company's potential to generate returns that outweigh the perceived risks associated with higher debt levels. In essence, the statement implies that as these debt-related ratios increase, investors appear to place a higher value on the company's potential for growth and earnings, despite the increased debt load to both book and market values of equity. However, it's important to note that while a positive correlation may exist, it doesn't indicate causation, and various other factors could also influence the market-to-book ratio.

Table 5 aslo shows The negative correlation with total assets implies that as companies' total assets increase, their market value relative to book value (MvBv ratio) tends to decrease. This might suggest that larger asset bases might not be as positively perceived by the market when valuing companies in relation to their book value.. On the other hand, the positive relationship between the logarithm of market capitalization and the MvBv ratio indicate that investors are willing to pay a premium relative to the book value for companies with larger market values, possibly due to expected future growth or profitability.

Table 5: Regression Result – Market Value to Book Value Ratio as Dependent Variable

Model: $MvBv_{it} = \alpha_{it} + \beta_1(DE)_{it} + \beta_2(DME)_{it} + \beta_3(InDir)_{it} + \beta_4(CR)_{it} + \beta_5(MR)_{it} + \beta_6(LnTA)_{it} + \beta_7(LnMcap_{it} + \varepsilon_i$

Variable	Coeff.	Std. Error	t	Sig.
C	2.263	3.303	.685	.494
DE	.482	.054	8.978	.000*
DME	.247	.069	3.567	.000*
IndDir	5.017	2.638	1.902	.058***
CR	-.065	.055	-1.176	.240
RM	-1.678	1.655	-1.014	.311
LnTA	-3.968	.197	-20.126	.000*
LnMCap	3.976	.189	20.988	.000*
R^2	0.532			
Adj. R^2	0.527			
F	93.838*			
P (F-statistic)	0.000			
Durbin-Watson stat	1.778			

Source: Author's calculation

Jensen's Alpha, which serves as another marker for market performance, exhibits a significant positive correlation with the Debt-to-Market Value of Equity ratio. This suggests that increased leverage, indicated by a higher DME ratio, might be linked to enhanced investment performance or the generation of alpha. It implies that companies carrying higher debt concerning their market value of equity might yield returns surpassing expectations considering their risk level. As per Table 6, the high positive dependency of Jensen's Alpha on the market return indicates a trend where investments or portfolios tend to yield greater excess returns during periods of overall market growth. This might indicate an outperformance of investments during bullish market phases or the effectiveness of a strategy in capitalizing on gains during positive market conditions.

Table 6 Regression Result – Jensan Alpha as Dependent Variable

Model: $JA_{it} = \alpha_{it} + \beta_1(DE)_{it} + \beta_2(DME)_{it} + \beta_3(InDir)_{it} + \beta_4(CR)_{it} + \beta_5(MR)_{it} + \beta_6(LnTA)_{it} + \beta_7(LnMcap_{it} + \varepsilon_i$

Variable	Coeff.	Std. Error	t	Sig.
C	.102	.336	.302	.762
DE	.001	.005	.129	.897
DME	.021	.007	3.002	.003*
IndDir	-.117	.268	-.438	.661
CR	-.012	.006	-2.067	.039
RM	1.247	.168	7.418	.000*
LnTA	-.072	.020	-3.617	.000*
LnMCap	.063	.019	3.290	.001*
R^2	0.112			
Adj. R^2	0.101			
F	10.424*			
P (F-statistic)	0.000			
Durbin-Watson stat	2.001			

Source: Author's calculation

Table 6 also shows the negative correlation between Jensen's Alpha and the logarithm of total assets, alongside the positive correlation with the logarithm of market capitalization, implies that different size metrics affect investment performance differently. This suggests that the impact of size on performance (as measured by Jensen's Alpha) is nuanced and may vary depending on the specific aspect of size being considered (total assets vs. market capitalization).

R Square for the Market Value-to-Book value Ratio is 0.532, what is moderate and proves that the regression model explains a significant portion of the variability in this ratio based on the chosen independent variables. However, there's still a notable portion of unexplained variability, suggesting the presence of other influential factors impacting the Market Value-to-Book Value Ratio. R square for the P/E ratio is 0.056, and for Jenson Alpha is 0.112 what is quite low, and it is obvious that there are more factors affecting these

ratios, which were not considered in this research. Nevertheless, based on the significance of the F-statistic across all three models implies that the dependence between the capital structure and market performance is proved and the capital structure affects the market-based performance.

5. Conclusion

The objective of this paper is to assess how capital structure influences the market-based performance of manufacturing firms in Bangladesh, employing three performance indicators (P/E ratio, Market to Book Value ratio, and Jensen Alpha). This study utilizes a dataset comprising 117 companies over a 5-year period from 2018 to 2022. Through correlation matrix and multiple regression analysis, the study scrutinizes the data. The findings demonstrate that capital structure metrics (Debt to Book Value of Equity and Debt-to-Market Value of Equity ratio) exhibit a positive and significant impact on the Market to Book Value ratio and Jensen Alpha within Bangladesh's manufacturing sector. Overall, these results suggest that within the manufacturing domain in Bangladesh, companies leveraging higher debt levels concerning their book value of equity and market value of equity might witness heightened market valuations and improved risk-adjusted returns. However, the interpretation should be considered in conjunction with the broader economic environment and the specific conditions prevailing in the manufacturing sector of Bangladesh.

Future Research Directions

Nowadays the Bangladesh capital market is becoming efficient and people are becoming aware of the importance of information-based investment and financing the discrepancies being corrected gradually. The point is that capital structure theories can be tested in the future as markets move towards efficiency. Finally, as some of the listed firms' data were unavailable, the same theories can be tested with even large sample-size firms in the future.

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