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Factors Influencing Capital Structure on Firm's Value: A Study on DSE Listed Companies

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Abstract:
Using a panel of listed companies on the DSE, researcher investigates the association of capital structure on firm value and investigates the capital structure of firms in Bangladesh. This current study focuses that the results of the analysis on the relevance of capital structure on firm value indicated, there is no statistically significant relationship between firm value and the capital structure of firms. This analysis was conducted for the general sample of firms in the study, within industries and by firm size; however, the results were consistent throughout all the analysis. The analysis of the Bangladeshi firms' capital structure indicated that firms in Bangladesh tend to use more long-term debt than short-term debt. The leverage ratios also differed among industries with the Pharmaceuticals & Chemicals having the highest levels of leverage and the Textile industry having the lowest levels of leverage. The results of the capital structure and its determinants analysis indicated that Bangladeshi firms followed a pecking order theory. The results also indicated that profitability, size, asset tangibility and tax shield has a statistically significant relationship to gearing or the firm's capital structure.

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1.0 Introduction

There is a considerable number of theories and research on the effect of capital structure on firm value, size and profitability. The capital structure of the firm refers to the sources of funding used to finance a firm's investments. This refers to the choice between equity financing and debt financing. According to Modigliani and Miller (1958), the value of the firm, that is, its stock price, does not depend on the capital structure of the firm. This theory by Modigliani and Miller is based on a set of simplifying assumptions. These assumptions include no taxes, no transaction costs and no information asymmetry. The theory says that the total market value of all financial assets issued by a firm is determined by the risk and return of the firm's real assets, not by the mix of issued securities. The main idea behind Modigliani and Miller's theory is that a rational investor can create any capital structure on his/her own. Therefore, the firm should not focus much on its capital structure. "If the investor is highly indebted, the risk and return of the firm's stock (to the investor) will simply be the same as if the firm was highly levered" (Byström, 2007). This substitution called homemade leverage and the finding that a more leveraged firm doesn't only yield higher returns to the investor but also a higher risk, is the root of Modigliani and Miller's theory. There is a theory that states the value of the firm, in a world with corporate taxes, is positively related to its debt. This theory, which is known as the trade-off theory, states that profitable firms will tend to use more debt in order to capture the tax shield offered by debt financing of investments. According to this theory, in an all-equity firm, only shareholders and tax authorities have claims on the firm. The value of the firm is owned by the shareholders and the portion going to taxes is just a cost. The value of the levered firm has three claimants, explicitly: the shareholders, debt holders and tax recipients (Government). Consequently, the value of the levered firm is the sum of the value of the debt and the value of the equity. In these instances, value is maximized with the structure paying the least in the form of taxes (Hillier, et al., 2015). Other theories on capital structure include the pecking order theory and the market timing theory. According to the pecking order theory firms prefer internal finance and if external finance is required, firms issue the safest security first. Specifically, they start with debt, then possibly hybrid securities then equity as a last resort (Myers, 1984). This assumes that a firm's debt ratio will be reflective of its cumulative requirements for external finance. In contrast to the trade -off and pecking order theories of capital structure, Baker and Wurgler (2002) found that firms with low levels of leverage raised capital when their market valuations were high as measured by the market-to -book ratio whereas firms with high levels of leverage raised capital when their market valuations were low. This theory is known as the market timing capital structure theory. According to research by Kurshev and Strebulaev (2007), it has been recognized that large firms tend to have higher leverage ratios than smaller firms. International evidence suggests that in most, though not all countries, leverage is also cross-sectional positively related to size. Intuitively, firm size should be relevant or related to leverage for a number of reasons. At the outset, in the presence of fixed costs of raising external funds, large firms have cheaper access to outside financing. Also large firms are more likely to diversify their sources of financing. Secondly, size may also be a proxy for the probability of default because it is often assumed that it is more difficult for larger firms to fail or liquidate. Firm size may also be an alternative for the volatility of firm assets because small firms are more expected to be growing firms in industries that are rapidly expanding and inherently volatile. Another reason for the significance of firm size is the extent of the hold in the degree of information asymmetry between insiders and the capital markets which have a tendency to prefer larger firms by virtue of a greater scrutiny they face from the ever suspicious investors (Strebulaev and Kurshev, 2006). One of the most

encompassing studies that have been conducted on Bangladesh found that companies in the market tend to follow a modified pecking order. This study looked at Bangladeshi market (DSE). In this study, it is examined for capital structure dependence on variables such as asset tangibility, corporate tax, profitability, size and firm age. In terms of finding, some questions to be explained such as; Has Bangladesh sophisticated institutional and physical capital markets infrastructure? Is the legal environment encompassing clearly stated and enforced laws? Are the courts effective in forcing borrowers to honor business contracts?

1.1 Statement of the Problem

In Bangladesh all firms are still not fully automated (websites not up-to-date, or linked with internet) from where secondary data can be retrieved by the researchers. There is limited opportunity to access directly to collect financial statements or other data from the companies. Authenticity is another concerning matter for the researcher while conducting research work. Researcher finds many firms do not want to disclose their financial conditions like income, equity, financial position and other financial statements or strategies.

1.2 Significance of the Study

In Bangladesh firms are considered the dominant capital structure in their sector and general economy. The difficulty is that not knowing the average cost of external funds will lead firms to make inadequately informed capital budgeting decisions. For a firm to grow it has to embark on value adding projects; hence effective capital budgeting is indispensable. One of the ways for enhancing the effectiveness of the capital budgeting process is to estimate cash flows from the projects and the cost of capital. If a company does not have a good sense of what the dominant capital structure is in the market, it will not have a good sense of what the appropriate cost of external capital should be, whether debt or equity. This research may prove useful in filling the research gap that exists in the literature and increase our understanding of the capital decisions taken by firms in Bangladesh.

1.3 Scope of the Study

Limited research exists on the capital structure of firms in Bangladesh, as a result researcher knows little about how these firms make capital structure decisions. It is, therefore, necessary to deliberate on the capital structure of firms in Bangladesh. Firms in Bangladesh operate within a different environment as compared with firms in developed countries mainly due to the differences in institutional infrastructure. Capital markets in Bangladesh are characterized by inefficiency; they are small and thinly traded. On the contrary, capital markets in developed economies are characterized by well-functioning and efficient stock markets and well developed credit markets. It is therefore inappropriate to claim that the findings that come out of studies done on developed economies apply to developing economies i.e. the Bangladeshi markets precisely in Dhaka Stock Exchange (DSE). Even though there have been limited studies on capital structure, a few of these studies focused on developing capital markets. The literature on capital structure and firm value association is still very slender in the Bangladeshi perspective.

1.4 The Study Objectives

Apart from trying to shed sufficient light on the dominant capital structure in Bangladesh, this study attempts to answer the question of: what is the role of capital structure in firm valuation? In addition, the role of other market and economic variables like taxation will be assessed using a regression model and data drawn from financial markets. This study is

therefore intended to build upon the work that has been conducted so far and to contribute to the body of literature with the following questions as per guidelines: i) Is capital structure irrelevant as per MM I? ii) What is the capital structure (debt-to-equity) of firms per industry in Bangladesh? iii) How persistent is the equity-debt capital structure? iv) What factors determine the equity-debt structure divide? v) What is the debt structure in terms of funding between long term and short term debt? vi) How persistent is the long term-short term structure?

2.0 Data Collection and Methodology

The research analysis will be carried out on the firms listed on the DSE, excluding financial firms. Financial firms are excluded because their capital structure is different from that of non-financial firms, as their capital structure, sources and allocation of funds are dictated by regulations including mainly the capital adequacy ratio and reserve requirement. The distinction between the deposit type debt and the absolute debt of financial firms is distorted, which also makes the capital structure of these firms difficult to distinguish. The study will focus on listed firms because of the availability of data as listed firms have several data sources above and beyond their financial reports. The data that will be used for the analysis will be largely financial data, drawn mainly from the DSE database and the Industries own profiles. DSE is the preferred source of the required financial data relating to the firms because it is a relatively all-encompassing data base of information, however, McGregor, B. F. A. (2014) was also used as a source of data. The financial data compiled and used for the analysis will be in panel data form. Regression analysis will be used in answering the research questions. According to Dayton, C. M. (1992), Regression analysis is a statistical tool for the investigation of relationships between variables the investigator assembles data on the underlying variables of interest and employs regression to estimate the quantitative effects of the fundamental variables upon the variable that they influence. The data collected on the DSE listed firms will be analyzed using econometric techniques and a software tool pack called E-views. Relevant economic theories and empirical studies will be examined in order to build the most appropriate structure for assessing the hypothesized relationships.

3.0 Review of Literature

The Bangladesh paper attempts to test the influence of debt-equity structure on the value of shares given different sizes, industries and growth opportunities with the companies incorporated in Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE) of Bangladesh. For the strength of the analysis samples were drawn from the six most dominant sectors of industry from DSE i.e. services & real states, food & allied, engineering, pharmaceuticals & chemicals, textile and fuel & power to provide a comparative analysis. A strong positively correlated association is evident from the empirical findings when stratified by industry claimed by Chowdhury, A. et al. (2010). To see the relationship between capital structure and firm value in Bangladesh the research paper considered share price as proxy for value and different ratios for capital structure decision. The interesting finding of this paper suggests that maximizing the wealth of shareholders requires a perfect combination of debt and equity, whereas cost of capital has a negative correlation in this decision and it has to be as minimal as possible. This is also seen that by changing the capital structure composition a firm can increase its value in the market. Nonetheless, this could be a significant policy implication for finance managers, because they can utilize debt to form optimal capital structure to maximize the wealth of shareholders. Capital structure decisions have important implications for the value of the firm and its cost of capital according to

Hasan, M. B. et al. (2014). Inadequate capital structure decisions can lead to a large cost of capital thereby lowering the net present value (NPV) of the firm's investment projects making the investment projects unacceptable i.e. the underinvestment problem. Efficient capital structure decisions will lower the firm's cost of capital and increase the NPV of the firm's investment projects leading to more projects being suitable to accept thereby increasing the value of the firm. Capital structure is a very significant decision for firms to make so that they can maximize returns to their various stakeholders. Furthermore, the correct capital structure is important to the firm as it will aid in dealing with the competitive environment within which the firm operates. As per statement of Modigliani and Miller (1958) an 'optimal' capital structure exists when the risks of going bankrupt is offset by the tax savings of debt. When this optimal capital structure is realized, a firm would be able to maximize returns to its stakeholders that are higher than returns that would be attained from a firm whose capital consists of equity only i.e. an all equity firm. Despite the importance that capital structure can play in adding value to the firm, decade's worth of theoretical literature and empirical testing have not been able to give guidance to practitioners with regards to the choice between debt and equity in their capital structures explained by Frank, M. Z., & Goyal, V. K. (2009). It is rather baffling to try to logically understand capital structure literature because different capital structure theories are frequently utterly opposed in their predictions while sometimes they may be in agreement but have opposing views about why the outcome has been predicted. It is for this reason that Myers, S. C. (2001) stated that there is no universal theory of capital structure, only conditional ones. Factors that are of significance in one context may be of substantial insignificance in another. The notion of financial management can be defined as a managerial activity, which is highly concerned about controlling and planning of firm's financial resources, Pandey, I. M., & Bhat, R. (2007).

Furthermore, the functions of finance encompass a diverse area. These functions comprise choices on investments, choices on financing, choices on dividends, and choices on liquidity. This paper encompasses aspects with respects to the financing decision of a company i.e. deciding on how to obtain funds in order to fulfill the firm's needs of investments. The study of capital structure centers around the mix between debt, equity and the range of other hybrid instruments used to finance the investments of the firm. Capital structure is therefore concerned with the right hand side of the balance sheet mentioned by Bhaduri, S. N. (2002). All items on the right hand side of the balance sheet, excluding current liabilities, are sources of capital employed to finance the real assets required to conduct the business of the firm observed by Welch, I. (2004). Below is a simplified graphical depiction of the capital structure. If you want to evaluate the performance of the firm it is important to consider all interest bearing borrowings as loan capital regardless of whether they are short term or long term loans claimed by Fama, E., & French, K. (2011). Firms manage their capital structure by issuing new debt and equity and by settling old debt or repurchasing issued shares. It is frequently stated that the goal of financial management is to maximize the wealth of the shareholders or owners of the firm. According to Desai, M. A. et al. (2004) the goal of financial management is to maximize the current value per share of the existing shares. However, fixed assets working capital net assets capital equity loans retained profit equity capital overdraft long-term loans owners only have a residual claim to the assets of the firm and are only paid once every other stakeholder with a legitimate claim to the firm's assets has been paid. Since the lenders, employees and suppliers all have a superior claim on the firm's assets, it stands to reason that if the owners' wealth is maximized then all the other claimants will stand to gain. The market values of the firm's debt and equity, D and E, add up to total firm value V and

Modigliani and Miller's (1958) Proposition 1 says that V is a constant, regardless of the proportions of D and E, provided that the assets and growth opportunities on the left-hand side of the balance sheet are held constant explained by Myers, S. C. (1984).

4.0 Capital Structure Theories

There are a number of capital structure theories but for the purposes of this study researcher will review only the three most prevalent theories, the trade-off theory, the pecking order theory and the market timing theory. To start off the section we will look at the Modigliani and Miller (1958) theory of capital structure irrelevance.

4.1 Modigliani and Miller's Capital Structure Irrelevance

The departure point for virtually all discussions on capital structure theory is Modigliani and Miller's capital structure irrelevance theory first published in 1958. According to Modigliani, F., & Miller, M. H. (1958) financing doesn't matter in perfect capital markets. The value of the firm is maximized by the quality and productivity of the assets in which the firm has invested. Consider the market-value balance sheet below:

Assets-in-place and growth opportunities	**Debt**	**(D)**
	Equity	**(E)**
	Firm value	**(V)**

Figure 1: Market-Value Balance Sheet, Source: Myers, S. C. (2001) Page- 85

The market values of the firm's debt and equity, D and E, add up to total firm value V and Modigliani and Miller's (1958) Proposition 1 says that V is a constant, regardless of the proportions of D and E, provided that the assets and growth opportunities on the left-hand side of the balance sheet are held constant according to Myers, S. C. (2001). The Modigliani and Miller's (1958) Proposition 1 as captured in the equation below also states that:

$$V_L = V_U \quad \text{..... (i)}$$

Where: V_L= the value of the levered firm, V_U= the value of the unlevered firm. The expression above states that the value of the levered firm (V_L) is equal to the value of the unlevered firm (V_U) (Firer et al, 2008).

4.2 The Trade-Off Theory

Modigliani, F., & Miller, M. H. (1963) delivered a correction of their 1958 seminal paper and stated that the deduction of interest in computing taxable corporate profits will prevent the arbitrage process from making the value of all firms in a given class proportional to the expected returns generated by their physical assets. The correction restated the Proposition 1 equation to be expressed as:

$$V_L = V_U + T_C \times D \quad \text{..... (ii)}$$

Where: VL= the value of the levered firm, VU= the value of the unlevered firm, TC= the corporate tax rate, D = the amount of debt. The above expression states that the value of the levered firm (VL) is equal to the value of the unlevered firm (VU) plus the present value of the

interest tax shield. The principal value of debt is the fact that interest payments earned on the repayment of debt is deductible from corporate income tax. Debt, however, does have shortcomings that include an increased probability of bankruptcy if the firm failed to service its obligations, the agency costs earned by the lender to monitor the activities of the firm and the fact that managers have better prospects of the firm than the investors do, narrated by Gitman, L. J. (2003). The trade-off theory rationalizes reasonable debt ratios. It says that the firm will borrow up to the point where the marginal value of tax shields on additional debt is just offset by the increase in the present value of possible costs of financial distress according to Myers, S. C. (2001). Fama, E. F., & French, K. R. (2005) explained this optimal capital structure is attained when the marginal benefit of an extra unit of debt is offset by the marginal cost of an extra unit of debt.

4.3 Pecking Order Theory

In the pecking order theory there is no well-defined target of the debt-equity mix, because there are two kinds of equity, internal and external, one at the top of the pecking order and one at the bottom for each firm's observed debt ratio reflects its cumulative requirements for external finance as per the statement made by Myers, S. C. (1984). The pecking order arises if the costs of issuing risky securities such as transactions costs and the costs created by management's superior information about the value of the firm's risky securities overwhelm the costs and benefits proposed by the trade-off model by Fama, E. F. et al. (2005). According to the pecking order theory, firms will first finance new investments with retained earnings, then with safe debt, then risky debt and finally, but only under duress, with outside equity in order to lessen adverse selection costs also mentioned by Fama, E. F., & French, K. R. (2005). Below is a graphical illustration of the pecking order theory.

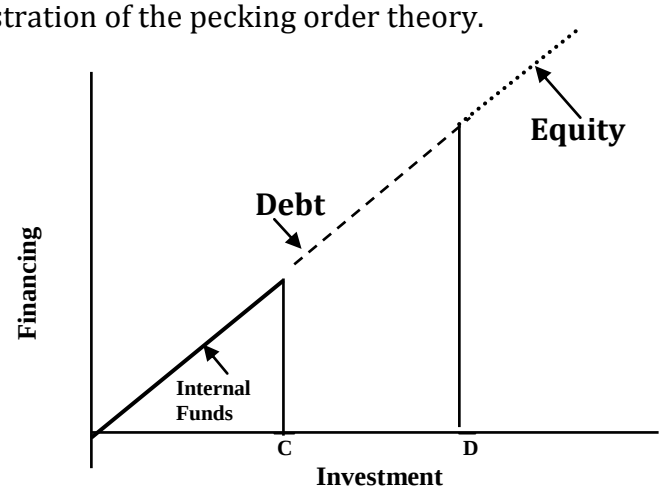

Figure 2: The Financing Hierarchy of the Pecking Order, Source: Leary, M. T., & Roberts, M. R. (2004), Page- 49

Although the pecking order theory is based on the adverse selection based on information asymmetry, it has been proven that information asymmetry does not need to exist for a financing hierarchy to arise. It has, however, been shown that other factors such as incentive conflicts could generate a pecking order behaviour mentioned by Leary, M. T. & Roberts, M. R. (2004). Titman, S. et al. (1988) also found that transaction costs may also be an important factor in the pecking order behaviour and this is substantiated by the fact that short-term debt ratios are negatively related to firm size. This variance in financing practice probably

reflects the high transaction costs that small firms face when they issue long-term debt or equity claimed by Titman, S., & Wessels, R. (1988).

4.4 The Market Timing Theory

Equity market timing refers to the practice of issuing shares at a high price (when their valuations are higher relative to book value and past market valuations) and repurchasing them at low prices (when their market valuations are lower). As a result observed capital structures are a function of the past market valuations of securities instead of a desire to attain an optimum capital structure or as a consequence of following a pecking order mentioned by Baker, M., & Wurgler, J. (2002). According to DeAngelo, H. et al. (2010), most firms with attractive market timing opportunities tend to fail to issue stock. One probable reason for this failure to issue stock is the investor rationality that would influence the managers to disguise their attempts to sell overvalued stocks. Rational investors would almost instantly recognize any attempts to sell off overvalued stocks and as a result would reduce the price they are willing to pay for the stock. As indicated by Baker, M. e al. (2002) one other explanation could be that managers are simply unable to time the market. This seems to resonate with the recent events where prominent financial institutions repurchased their shares at higher prices after the 2008 financial meltdown stated by DeAngelo, H. et al. (2010).

5.0 Hypotheses Development

i) Capital structure is irrelevant as per MM1: According to Ross, S. A. et al. (2008) capital structure decisions can have important implications for the value of the firm and its cost of capital. Inadequate capital structure decisions can lead to a large cost of capital thereby lowering the net present value (NPV) of the firm's investment projects, making the investment projects unacceptable, i.e. the underinvestment problem. To determine whether capital structure is irrelevant in the Bangladeshi context, the hypothesis will be stated as follows:

H0: $\mu > 0.05$ (debt-to-equity ratio is not correlated to EPS)
H1: $\mu \leq 0.05$ (debt-to-equity ratio is correlated to EPS)

ii) Does the debt-to-equity ratio differ among industries listed on the DSE? : According to the capital structure theory the industry within which a firm belongs is likely to have a substantial effect on the observed leverage levels of the individual firms and also that with time the firms will tend to converge towards the median industry debt levels. The said convergence towards the industry median debt level is considered as proof that an optimal capital structure does exist stated by Bowen, R. M. et al. (1982). To determine the difference between industry debt-to-equity ratio levels descriptive statistics will be employed, the hypothesis will be stated as follows:

H0: $\mu1 \neq \mu2 \neq \mu3 \ldots \mu n$ (industry median debt-to-equity ratios are heterogeneous)
H1: $\mu1 = \mu2 = \mu3 \ldots \mu n$ (industry median debt-to-equity ratios are homogeneous)

iii) There is a relationship between debt-to-equity ratio and profitability, size of firm, tax shield and asset tangibility: The findings of the above study showed that firm size, liquidity, profitability and sales growth affect the leverage ratios of industrials firms significantly. Among these factors, firm size and profitability are the most significantly influential factors

on capital structures of industrial firms, and these two factors are negatively correlated with leverage ratios. Growth factor was found to be statistically significant and positively correlated with leverage ratios. Liquidity factor is also statically significant but negatively correlated with leverage ratios. These findings are consistent with most of the capital structure literature and especially support Pecking Order Theory mentioned by Icke, B. T., & Ivgen, H. (2011). To determine factors affecting the debt-to-equity ratio levels, the hypothesis will be stated as follows:

H0: P (ROA, tax shield, market capitalization, asset tangibility) > 0.05
H1: P (ROA, tax shield, market capitalization, asset tangibility) ≤ 0.05

6.0 Data Analysis and Discussion

The results and findings are outlined in this section with inferences drawn from the hypotheses in the previous section of this paper as follows:

6.1 Descriptive statistics

Telecommunications and Jute industries were excluded when running the regression because they only had two and three firms listed in DSE, respectively, that did not meet the sample selection specifications. From Table 1 below, several measures of central tendency and dispersion were computed to show the underlying distribution of each variable. The key highlights of the table are as follows: i) EPS had an overall average of about 3.84% for all 82 companies and a median of 1.96%, ii) The debt-to-equity ratio had a mean of 50.17%, a median of 28.98% and a relatively high standard deviation of 71.03%. As can be seen the two variables, which forms the two main dependent variables adopted for this study, exhibit a distribution close to normality although they are extremely dispersed. The other variables whose descriptive statistics were computed are shown in table 1 below.

Table 1: All Industries Pooled - Descriptive Statistics

	AT	D2E	EPS	MCap	PE	ROA	TS
Mean	48.84	50.17	3.84	9.23	14.29	11.46	36.21
Median	39.55	28.98	1.96	3.25	11.51	9.40	45.08
Maximum	632.40	582.71	54.52	75.90	265.94	512.28	274.14
Minimum	0.00	0.00	-8.22	0.00	0.02	-45.60	-3,257.14
Std. Dev.	38.72	71.03	5.46	15.01	17.45	21.52	137.83

Note: **AT** stands for Asset Tangibility ratio, **D2E** stands for debt-to-equity ratio, **EPS** stands for Earning-Per-Share, **MCap** stands for Market Capitalization**, PE** stands for Price-Earnings ratio, **ROA** stands for Return-On-Asset, **TS** stands for Tax Shield ratio. Source of Output: E-views 10, Software Tool Pack.

Source of Output: E-views 10, Software Tool Pack.

6.2 Unit Root Test

A variable is said to have unit root when it is explosive. According to existing literature on unit root tests, a variable can only be included in a model when it does not have unit root or is stationary. Since most financial series have an underlying growth rate, their mean and/or variance are continually increasing which will lead to spurious regression results if they are included in regression models without eliminating such non-stationarity. Several methods of testing panel data unit root exist, but the Levin, A., et al. (2002) test was adopted for this study. The results of this test are given below. According to the results in Table 2 below, all

variables exhibited stationarity and unit root was non-existent and were all suitable to include in the regression analysis.

Summary Sample: 2009-2018
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel Balanced observations for each test

Table 2: Unit Root Test Panel Unit Root Test

Method	Statistic	Prob.**	Cross-sections	
Null: Unit root (assumes common unit root process)				
AT	-325.366	0.0000	82	576
Debt-to-Equity Ratio	-5.66143	0.0000	82	576
EPS	-4.34689	0.0000	82	576
PE	-12.4399	0.0000	82	576
TS	-215.158	0.0000	82	576
ROA	-17.2426	0.0000	82	576
Market Capitalization Ratio	-12.6915	0.0000	82	576

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Note: **EPS** stands for Earnings-Per-Share, **PE** stands for Price-Earnings ratio, **TS** stands for Tax Shield ratio, **AT** stands for Asset Tangibility ratio, **ROA** stands for Return-On-Assets. Source of Output: E-views 10, Software Tool Pack.

Source of Output: E-views 10, Software Tool Pack.

6.3 Research hypothesis one: capital structure is irrelevant as per MM1

The results for the pooled companies across industries show that none of the explanatory variables were significant at the 5% level of significance. However, asset tangibility showed significance at the 10% level. The debt-to-equity ratios of Bangladeshi firms sampled in this study were insignificant in this model, which means that they had no explanatory power on EPS (firm value). The overall fit of the model shown by the R squared stood at 0.6 or 60% which indicates that the model can explain 60% of the variance in the EPS (firm value). This is supported by a significant F-statistic at 5% level.

Dependent Variable: EPS
Method: Panel Least Squares Sample: 2009-2018
Periods included: 10
Cross-sections included: 82
Total panel (balanced) observations: 576

Table 3: Fem Regression of All Companies - Firm Value as Dependent Variable

Variable	Coefficient	Std. Error	t-Statistic	
C	4.451460	0.387097	11.49959	0.0000
D2E	-0.002138	0.002996	-0.713499	0.4758
TS	0.001515	0.001110	1.365001	0.1728
AT	-0.011029	0.006351	-	0.0830

			1.736578
Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.595398	Mean dependent var	3.860712
Adjusted R-squared	0.548820	S.D. dependent var	5.475059
S.E. of regression	3.677593	Akaike info criterion	5.541123
Sum squared resid	7871.369	Schwarz criterion	6.009483
Log likelihood	-1732.865	Hannan-Quinn criter.	5.722788
F-statistic	12.78285	Durbin-Watson stat	1.078609
Prob(F-statistic)	0.000000		

Note: **C** stands for the Common Intercept, **D2E** stands for Debt-To-Equity ratio, **TS** stands for Tax Shield ratio, **AT** stands for Asset Tangibility ratio, **S.E** stands for Standard Error, **S.D** is the Standard Deviation and **F-statistic** stands for Fischer Statistic.

Source of Output: E-views 10, Software Tool Pack.

6.4 Research Hypothesis Two: Does the Debt-To-Equity Ratio Differ Among Industries Listed on the DSE

Table 4: Debt-To-Equity Ratios by Industry

Ratio (%)	Services & Real states	Food & Allied	Engineering	Pharmaceuticals & Chemicals	Textile	Fuel & Power
2009/12/31	31	44	49	30	15	42
2010/12/31	29	34	38	32	15	26
2011/12/31	36	33	26	43	13	29
2012/12/30	30	41	29	53	32	34
2013/12/29	29	38	37	194	14	31
2014/12/31	53	48	41	210	19	25
2015/12/31	40	61	42	278	18	21
2016/12/31	35	43	34	238	10	15
2017/12/31	32	54	31	228	17	13
2018/12/30	32	44	38	214	38	10
Average ratio	**34.7**	**44**	**36.5**	**152**	**19**	**24.6**

Source of Output: E-views 10, Software Tool Pack.

The table above presents the different debt-to-equity structures per industry. According to the table above, the Pharmaceuticals & Chemicals industry had the highest levels of debt-to-equity followed by the Food & Allied sector. The Textile industry had the lowest levels of the debt-to-equity ratio over the observed period. According to the results presented in the table above, it can be concluded that the debt-to-equity ratios of the different industries sampled for this study are heterogeneous; therefore, it is accepted the null hypothesis.

6.5 Research hypothesis three: there is a relationship between debt-to-equity ratio and profitability, size, asset tangibility and tax shield

According to the regression results presented below, return on assets and asset tangibility were the only two variables in the model that were significant, meaning that they have explanatory power over the dependent variable debt-to-equity ratio (proxy for capital structure). The R squared was significant at the 5% significance level, with the model explaining 54% of the variation in the capital structure of firms sampled in this study.

Dependent Variable: D2E
Method: Panel Least Squares
Sample: 2009-2018
Periods included: 10
Cross-sections included: 82
Total panel (balanced) observations: 576

Table 4: Fem Regression of All Companies and Industries - Capital Structure as Dependent Variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	68.56153	6.892333	9.947508	0.0000
MCAP	-0.574213	0.492695	-1.165453	0.2443
ROA	-0.226823	0.101865	-2.226697	0.0264
TS	0.001885	0.015285	0.123351	0.9019
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.544307	Mean dependent var		50.18922
Adjusted R-squared	0.490972	S.D. dependent var		70.97957
S.E. of regression	50.64120	Akaike info criterion		10.78749
Sum squared resid	1489993.	Schwarz criterion		11.26274
Log likelihood	-3436.936	Hannan-Quinn criter.		10.97183
F-statistic	10.20559	Durbin-Watson stat		0.910026
Prob(F-statistic)	0.000000			

Note: **C** stands for the Common-intercept, **D2E** stands for Debt-To-Equity ratio, **MCap** stands for Market Capitalization, **ROA** stands for Return-On-Asset, **TS** stands for Tax Shield ratio, **AT**

stands for Asset Tangibility ratio, **S.E** stands for Standard Error, **S.D** is the Standard Deviation and **F-statistic** stands for Fischer Statistic.

Source of Output: E-views 10, Software Tool Pack.

7.0 Conclusion and Recommendation

As clearly stated above, the study sought to cover the questions, is capital structure irrelevant as per MM I, what is the capital structure (debt-to-equity) of firms per industry in Bangladesh, how persistent is the debt-to-equity capital structure, what factors determine the debt-to-equity structure divide, what is the debt structure in terms of funding between long term and short term debt and how persistent is the long term-short term structure. Several techniques were utilized to fulfill this end and each addressed a particular question. To establish whether capital structure is irrelevant, a panel data regression was done on all firms pooled across industries and an industry specific analysis was also done to establish the behaviors and relationships within the industries. To establish the robustness of our model and expand the analysis of MM I, we also conducted an analysis by firm size. The general pooled analysis found the model to be significant with the adjusted R squared of 55%. Although none of the variables were significant at the 5% level of significance, asset tangibility was significant at the 10% level of significance. The industry specific analysis found all models to be significant with adjusted R squared figures of 58% for Services & Real states, 48% for Food & Allied, 60% for Engineering, 81% for Pharmaceuticals & Chemicals, 46% for Textile and Fuel & Power 37%. The re-specified model on all firms was significant at the 5% level of significance with an R squared of 73%, however, debt-to-equity was still insignificant. The analysis by firm size also found all models to be significant at the 5% level of significance with R squared of 83%, 71% and 76% for large, medium and small firms respectively, however, the debt-to-equity ratio was insignificant in all models. This means that there is no statistically significant relationship between the firm value and capital structure of firms in Bangladesh. These findings are highly inconsistent with prominent literature such as Shivdasani, A., & Zenner, M. (2005), Fama, E. F., & French, K. R. (2005) all of whom concluded that there is a direct relationship between leverage and firm value. Ward, M., & Price, A. (2006) also indicated that an increased debt-to-equity ratio increases returns for the shareholders for profitable firms. Researcher inconsistent findings could be as a result of misspecification or other unfavorable effects inherent in the data used for the analysis or it could be that the MM I proposition holds in the Bangladeshi context. To establish the capital structure of firms within the different industries listed on the DSE descriptive statistics analysis were carried out were the mean of debt-to-equity ratios for all firms in each industry were computed. According to the computed means, the Health care industry had the highest debt-to-equity ratio meaning that firms in this industry used more debt than equity as their source of capital. The industry with the lowest debt-to-equity ratios was the Technology industry. The Pharmaceuticals & Chemicals industry had a larger market capitalization ratio of 33.3% as compared to the Textile industry ratio of 25%. These findings imply that larger firms tend to use more debt than smaller ones. Large firms are more visible and diversified than small ones and have access to easy and cheaper debt. This is inconsistent, however, with the findings of the regression analysis which indicated pecking order behavior of Bangladeshi firms. There may be other factors not included in this study that are driving the high debt-to-equity ratios of firms in the Health care industry. To determine the persistence of the capital structure within the different firms, the results above were plotted on a graph to visually illustrate the patterns of persistence. The patterns of the capitals structure within the different industries

varied over the observed period. For some industries the patterns had sharp increases and sharp declines while for some it showed a range bound pattern.

To establish factors that have an effect on the debt-to-equity divide, or simply capital structure of firms' researcher employed a panel data regression as in the previous case. All the models were significant at the 5% level of significance. The findings from the regression models indicated a negative significant relationship between profitability and the capital structure of a firm. This is supported by previous research by Gwatidzo, T., & Ojah, K. (2009) who found a negative significant relationship between profitability and capital structure. Umar, M. et al. (2012) also found that there was a negative and significant correlation between gearing and profitability for Manufacturing Small, Medium and Micro Enterprises (SMMEs) and large sized enterprises (LSEs). The results of the panel regressions indicated a pecking order behaviour which was also the findings of Gwatidzo, T., & Ojah, K. (2009) as well as Umar, M. et al. (2012). It could be argued that the results on MM I summarized above are mostly inconsistent with recent literature and economic theory from across the world. There is substantial literature that has shown that there is a relationship between firm value and the capital structure of a firm. This outcome, perhaps, concur with Myers, S. C. (2001) who stated that there is no universal theory of capital structure, only conditional ones. Factors that are of significance in one context may be insignificant in another. An interesting future research agenda would be to find possible explanations for these contrasting results, starting with verifying differences in test variables alternative and testing techniques deployed in these studies.

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