

Capital Structure Choice of Bangladeshi Firms: An Empirical Investigation

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Abstract

This study endeavors to investigate the impact of firm specific factors on capital structure decision for a sample of 44-firm listed on Dhaka Stock Exchange (DSE) during the period of 2004-2011. To achieve the objectives, this study tests a null hypothesis that none of the firm's specific factors such as, liquidity, market to book, collateral, dividend payment, profitability, size and industry classification has significant impact on leverage using estimate of fixed effect model under Ordinary Least Square (OLS) regression. Checking multicollinearity and estimating regression analysis through Pearson correlation model respectively this study found that profitability, collateral and liquidity have significant and negative impact on leverage. Positive and significant impact of market to book value ratio on leverage has been found in this study. On the other hand, dividend payment and size were not found as significant explanatory variables of leverage. Results also expose that total debts to total assets ratios are significantly different across Bangladeshi industries.

Keywords: Capital Structure, Leverage, Firm's Specific Factors, Dhaka Stock Exchange, Bangladesh

1. Introduction

Many corporate finance models rely on rigorous assumptions such as rationality in decision making. However, behavioral finance uses models in which decisions are influenced by psychological and/or cognitive biases. This is an area of research that has developed from the work of Kahneman and Tversky (1979) and prospect theory. It provides insight into the influence of psychology on the behavior of managers and investors and the subsequent effects on markets of their financial decision making (Nofsinger, 2005).

Identifying the determinants of capital structure can help managers make more informed decisions. Academically, it is of interest to understand what determines capital structure given the considerable research since Modigliani and Miller (1958). However, there is no one universal theory of capital structure and it is only recently that manager confidence has been considered an important variable in capital structure choice.

One of the many objectives of financial managers is to maximize the wealth of the firm, more specifically

Shareholder's wealth maximization. To maximize firm's value as well as minimize the cost of fund, a manager should set up an optimal capital structure. The fundamental components in capital structure are debt and equity. A firm should attempt to determine the optimal capital structure that causes the maximization of firm's value. Positive relationship between leverage and value of the firm has been identified in some studies (Champion, 1999; Ghosh et al, 2000; Chowdhury S.& Chowdhury A., 2010). Capital structure policy is also important in a sense that level of risk and return of a firm is mostly affected by it. Using more debt in capital structure to finance firm's assets results in increase the variability of firm's cash flows stream more specifically and escorts to generate higher risk accordingly. But no strict theory has been developed yet to determine the exact optimal capital structure. So it concerns managers in identifying some factors influencing capital structure decision by which they can benefit to make an optimal mix of debt and equity to maximize firm's value. Moreover these factors vary across countries and firm's characteristics i.e. liquidity, market to book, collateral, dividend payment, profitability size assets etc. Since Modigliani and Miller (1958), who are the pioneer in this field, executed an instructional research in identifying the determinants of capital structure. Thereafter, many researchers have been conducted in the developed country such as Rajan and Zingales (1995) (the G-7 countries), Akhtar (2005) (Australia), and Akhtar and Oliver (2009) (Japan).

As a developing country Bangladesh has become an emerging market with a lot of potential of investment that gets an attention for investors and managers to rethink about the influencing factors of using debt and their extent of influence over firms. Although there have been small numbers of research in Bangladesh focusing on the primary determinants of capital structure such as Chowdhury MU. (2004), Lima M. (2009), and Sayeed M.A. (2011), there is still disagreement regarding which factors have significant impact in determining a firm's capital structure. Nevertheless, an important factors affecting capital structure determination of a firm in developed country may not be equally important to a firm in developing country like Bangladesh. Furthermore, all possible factors affecting capital

structure decision have not been considered in a research at a time and that is why some factors are still important to further use in measuring their impact on capital structure determination and there is a need to bridge between current study and capital structure theory.

This study extends the existing literature by analyzing the factors affecting capital structure decision on 44 listed companies in the Dhaka Stock Exchange by using the panel data models over the periods 2004-2011. This study is different from others because it considers some firm's specific factors that have not been used yet in Bangladesh. This study attempts to analyze the impact of firm specific factors on capital structure decision in a systemic manner and provides practical and applicable guideline for anyone who wants to have insight of the topic. Therefore, this study provides further evidence of the capital structure theories pertaining to a developing country.

The rest of this paper proceeds as follows. Section 2 summarizes the literature on the capital structure. Section 3 describes the determinants of capital structure. Section 4 and 5 describes objective and hypothesis of this study. Methodology of this study shown is section 6. The analysis and results are presented in section 7. Finally, section 8 concludes the paper.

2. Theoretical Discussion

Since the work of Modigliani and Miller (1958) on the irrelevance of capital structure to firm value, theoretical and empirical analyses have been developed to discuss the determinants of corporate financing decisions in practice. This research has generally followed traditional finance theory and comprises the trade-off theory, the pecking-order theory and more recently the market timing theory. However, there is no universal theory of capital structure and no reason to expect one (Frank and Goyal, 2004).

The trade-off theory argues that a firm's optimal capital structure results from a tradeoff between tax advantages of debt and bankruptcy costs of debts (Miller, 1977). According to the pecking-order theory, formalized by Myers and Majluf (1984) and Myers (1984), there is a hierarchy in manager financing choices. External financing transaction costs, especially those associated with adverse selection, result in managers having a preference for internal financing, and then new debt and finally new equity financing. Regarding the market timing theory, managers will issue equity when the firm's market value relative to book value is high and they will issue debt when the debt market conditions are perceived relatively more favorable (see Myers, 1984; Graham and Harvey, 2001; Hovakimian, Opler and Titman, 2001).

Intensive empirical research has been conducted to test the predictions of these theories (Rajan and Zingales, 1995; Shyam-Sunder and Myers, 1999; Fama and French, 2002; Frank and Goyal, 2003, 2004). The theories are supported in the empirical research to varying degrees. A nascent literature recognizes that the bias of confidence is a significant determinant of managers investment and financing decisions. Psychological studies document that confidence causes people to underestimate risks, to be more certain about predictions and to exaggerate their ability to control events (see Gilovich, Griffin and Kahneman (2002) for an overview of this area).

Heaton (2002) argues that confident managers overestimate the futures cash flows and so the Net Present Value (NPV) of new investment projects. Hackbarth (2004) develops a theoretical model to study the implications of managerial confidence for financing decisions. The model shows that optimistic and overconfident managers tend to choose higher debt levels and to issue new debt more often compared to otherwise identical less confident managers. Recently, Malmendier, Tate and Yan (2005) test these predictions. They find that managerial confidence leads to a preference for internal financing over external finance and conditional on accessing the capital market, debt over equity. The main argument for the manager bias toward debt financing is that confident managers underestimate the probability of financial distress, and therefore take on higher levels of debt than optimal. This may lead to higher probability of bankruptcy and higher costs of capital. Hence, in support of this confidence bias we expect a positive relation between manager confidence and leverage.

3. Capital Structure Determinants

3.1 *The independent variables*

The independent variables used in equation (1) are Liquidity, market to book ratio (*MB*), dividend payment (*DIVDUM*), collateral (*COLLTRL*), profit (*PRF*) and the firm size (*SIZE*). We explain in this sub-section why they are considered determinants of capital structure and how they are measured.

3.2 *Liquidity*

As predicted by the pecking order theory, firms with high liquidity will borrow less. The fact that a firm with more current assets is expected to generate more internal inflows, which can be used to finance its operating and investments activities. Thus a negative relationship between liquidity and leverage is expected. Friend and Lang (1988) Deesomsak, et al. (2004), Sbeiti (2010), and Icke and Ivgen (2011), found liquidity is negatively and significantly related to leverage. On the other hand, trade-off theory suggests a positive relationship between leverage and liquidity because higher liquidity ratio reflects the greater ability of a firm to meet short-term obligation on time. Ozkan (2001) suggests that liquidity has ambiguous effect on the capital structure decisions. In the line with study of Ozkan (2001) the proportion of current assets to current liabilities is chosen as a proxy for liquidity.

3.3 *Market-to-book (MB)*

The market-to-book ratio has been used by previous research to measure growth opportunities (Adam and Goyal (2002) present a summary of this literature). When market equity prices are high relative to book prices, the market is signaling higher expected growth. Previous empirical studies in the capital structure literature document a negative relation between the market-to-book ratio and leverage ratio. This negative sign is predicted by most capital structure theories. Indeed, firms with high market-to-book ratio have higher costs of financial distress (Rajan and Zingales, 1995) and consequently are expected to have lower debt. This interpretation is consistent with the trade-off theory. Under the pecking-order theory, profitable firms have much retained earnings and therefore a smaller need for external finance and thus debt. According to the market timing hypothesis, if the market-to-book ratio

is high, then issuing equity seems more attractive than issuing debt. Given these arguments, we expect a negative relation between leverage and the market-to-book ratio. The market-to-book ratio (*MB*) is defined as the market value of assets divided by book value of assets. The market value of assets equals the book value of assets minus the book value of common stock plus market value of equity.

3.4 Dividend dummy (*DIVDUM*)

Predictions about how paying dividend affects leverage are unclear (for more details see Fama and Bangladeshi, 2002). The pecking order model permits interpretation in two contradictory ways. In one way, dividend paying firms may have high earnings relative to investment opportunities and consequently they can maintain less leverage- a negative relation between dividend paying firms and leverage. This prediction is confirmed by Fama and Bangladeshi (2002). In the other way, as interpreted by Shyam-Sunder and Myers (1999) and reported by Frank and Goyal (2004), the decision to pay dividend increases firms financing needs, all else equal. If firms are constrained to retain debt financing, the implication of paying dividend is to increase leverage- a positive relation between dividend paying firms and leverage. Under the trade-off theory, predictions of the relation between leverage and payout decisions can be driven from considering either bankruptcy costs or agency costs of free cash flow. Indeed, firms paying dividend have normally more cash flows in comparison to investment opportunities and so they do not have to increase leverage and deadweight costs of debt. In the agency models of Jensen and Meckling (1976) and Easterbrook (1984), the managers do not necessarily act in the interest of shareholders and can waste the free cash flow. Dividends and debt, by forcing managers to pay out free cash flow, can control the free cash flow problem. Since they are presented as substitutes for controlling the agency problem, we can predict that relation between dividends and leverage will be negative. The empirical study of Frank and Goyal (2004) has shown that dividend paying firms have lower leverage. The dividend variable (*DIVDUM*) is measured by a dividend paying dichotomous variable which takes a value of unity if the firm paid dividends in the corresponding year and zero otherwise.

3.5 Collateral assets (*COLLTRL*)

The asymmetric information theory explains that moral hazard and adverse selection problems can appear when banks or creditors have limited information on investment project returns. Collateral may be considered as a signal of the solvency capacity of the firm and it can diminish the moral hazard problem. Therefore, tangible assets are likely to have an impact on the borrowing decisions of firms. Empirical studies (for example Rajan and Zingales, 1995 and Frank and Goyal, 2004) show that the relation between collateral and leverage is significant and positive. Our proxy for the collateral value of the firm (*COLLTRL*) is the sum of inventory plus property, plant and equipment divided by total assets. We predict a positive relation between the level of collateral and leverage.

3.6 Firm profitability (*PRF*)

From a pecking-order perspective, for firms with large expected investments, it is likely that financing would be from internal sources and low risk debt (Myers, 1984). Indeed, to manage the risk of foregoing future investments because of a lack of financing resources, profitable

firms will choose to have less current leverage. Frank and Goyal (2004) has shown that in the US, more profitable firms have less debt, supporting the pecking order theory. We measure firm profitability (*PRF*) as the operating income before depreciation to total assets. We expect a negative relation between leverage and profitability, supporting the pecking order theory of capital structure.

3.7 Firm size (*SIZE*)

The effect of firm size on leverage is ambiguous. Rajan and Zingales (1995) find that financial leverage increases with size. They justify this finding by the fact that size is an inverse proxy for the probability of bankruptcy. Bigger firms can diversify more easily and so the probability of being in financial difficulty is lower. Under the trade-off theory, such companies can increase the percentage of debt. In this case, a positive relationship between size and leverage is to be expected. On the other hand, size may proxy for the information available to outsiders. Under the pecking order theory, less information asymmetry implies preference for equity relative to debt, thus applying a negative correlation between size and leverage. Given those arguments, it is difficult to expect a clear sign of the relation between firm size and leverage. Our proxy for firm size (*SIZE*) is the natural logarithm of total assets.

4. Objectives of Study

This study will attempt to accomplish the following objectives:

- i. To identify the firm specific factors affecting capital structure decisions of listed firms in Dhaka Stock Exchange.
- ii. To analyze how the factors affecting capital structure decision are related to leverage.

5. Hypotheses of the Study

Taking into account the literature on capital structure debate, the null hypotheses we proposed about the possible determinants of the capital structure decisions of listed firms are as follows:

- H1: There is no significant impact of liquidity on leverage.
- H2: There is no significant impact of market to book on leverage.
- H3: There is no significant impact of collateral on leverage.
- H4: There is no significant impact of dividend on leverage.
- H5: There is no significant impact of profitability on leverage.
- H6: There is no significant impact of size on leverage.

6. Methodology of the Study

6.1 Sample Size

The sample consists of all Bangladeshi firms listed on the Dhaka Stock Exchange (DSE) during the year of 2004-2011. Financial companies are excluded because they are subjected

to legal regulations from central bank regarding capital structure. There are 521 firms listed on Dhaka Stock Exchange including 191 non financial firms in 2013. All the accounting and financial statement data are sourced from balance sheet and income statement of specific companies. Stock return and market price of stock data are sourced from secondary market (i.e. DSE). Table 1 illustrates frequency distribution of industry categorization.

Table 1. Frequency Distribution of Industry Classification

Industry	Frequency
Ceramic	3
Cement	3
Pharmaceuticals	10
Textile	9
Fuel & Power	4
Food & Allied	8
Information Technology	2
Telecommunication	1
Engineering	4
Total	44

6.2 Data Collection Procedures

This study is based on secondary data. The data used in this analysis can be divided into two groups: the firm specific factors influencing capital structure decision (independent variables) and the capital structure's variable (dependent variables). It takes ten potential firm specific factors that may have significant impact on capital structure decision namely liquidity, market to book, dividend paid, collateral, profitability and size, and industry classification. In this analysis, the capital structure is the dependant variable and it is measured by the leverage. These data have been collected from the book value based yearly financial data given in the financial statements (Balance Sheet & Profit and Loss A/C) of selected companies over 2004 to 2011 which has been gathered from Dhaka Stock Exchange Library

6.3 Empirical Model

This study combines cross-sectional with time series to make it a panel data. As noted by Schulman et al (1996), panel data allow economists and other social scientists to analyze, in depth, complex economic and related issues which could not be treated with equal rigidity using time-series or cross-sectional data alone. Like cross-sectional data, panel data describes each of a number of individuals. Like time-series data, it describes changes through time. According to Baltagi (1995), by combining time series of cross-section observations, panel data give "more informative data, more variability, less collinearity among variables, and more efficiency." Descriptive and quantitative analysis is used for this research. Descriptive analysis presents mean, median, standard deviation, maximum and minimum value for each variable used in the study. In quantitative analysis, Pearson's correlation and pooled regression analysis is used. In regression analysis fixed effects model is used to investigate the relationship and also to prove the hypotheses. The cross section company data and time

series data are pooled together in a single column letting the intercept may differ across each cross-sectional unit (here the eight industries) and each industry's intercept does not vary over time. In addition to, it is assumed that the slope coefficients of the regressors do not vary across industry or over time. The estimation method used is Seemingly Unrelated Regression in Eviews with a common intercept. This method estimates a feasible GLS specification correcting for both cross-section heteroskedasticity and contemporaneous correlation. To ascertain the significance of these determinants for leverage we use a pooled cross sectional time-series model as follows:

$$LEVERAGE_{it} = \alpha_0 + \alpha_1 LIQ_{i,t-1} + \alpha_2 MB_{i,t-1} + \alpha_3 DIVDUM_{i,t-1} + \alpha_4 COLLTRL_{i,t-1} + \alpha_5 PRF_{i,t-1} + \alpha_6 SIZE_{i,t-1} + \varepsilon_{it} \quad (1)$$

All the independent variables are lagged one year. This allows the information regarding the determinants of capital structure to be available to managers in the year prior to the observed level of leverage. *LEVERAGE* is the total amounts of debt to market value of assets of firm *i* at a time *t*, defined as:

$$LEVERAGE_{it} = \frac{Long\ term\ debt_{it} + Short\ term\ debt_{it}}{Market\ value\ of\ assets_{it}} \quad (2)$$

Market value of assets is obtained as the sum of the market value of equity, long term debt, short term debt, preferred-liquidation value, deferred taxes and investment tax credit. Rajan and Zingales (1995) and Frank and Goyal (2004) discuss various definitions of leverage and argue that the most appropriate measure is the total debt to market value of assets

7. Analysis and Discussion of Results

This section contains the descriptive statistics, correlation coefficient and the results of regression analysis of 44 sample firms in seven types of industries listed on DSE during the five year period from 2004 to 2011. The interpretation of the empirical findings is also presented in this section. Finally, important conclusions about the results of the study have been drawn

7.1 Descriptive Statistics

Table 2 presents summary statistics of the relevant variables. The average leverage of firms (*LEVERAGE*) in the sample is approximately 61.56%. This value represents an average in both time series and cross section.

The average dividend payment is 66.75% across the sample. The minimum of 1% and maximum of 100% indicates most of the sampled firms paid dividend during this period 2004-2011. The average liquidity of Bangladeshi firms is 2.15, it indicates current assets are 2.15 times higher than current liabilities and which is quite good in terms of liquidity. The average market-to-book ratio (*MB*) is 26.75 times. This implies that Bangladeshi firms are overvalued value firms over the sample period, trading at premium to their book value. The average proportion of collateral assets to total assets (*COLLTRL*) is 45.08%. It indicates most

of the firm's assets are backed by collateral to min the default risk. The average profitability of Bangladeshi firms (*PRF*) in the sample over the period is 6.77% per annum and max profitability is 37.56% to loss 18.95%. The mean value of size measured in log of sales is 20.44% while the standard deviation is 3.17. The maximum and minimum value of size is 25.36 and 0.022 respectively

Table 2. Explanatory Variables – Summary Statistics

This table provides summary information for the dependent and independent variables used in the analyses. It provides the variable's definition, the source of data for the variable and the key summary statistics.

Variable	Variable description (Source)	N	Mean	Median	Std. Dev.	Min	Max
Leverage: LEV	The sum of current liabilities plus long term debt divided by the market value of assets.	44	61.56	.69	47.45	.17	362.41
Dividend paid: DIVDUM	1, if a firm pays more than or equal to 10% dividend and 0 otherwise.	44	0.66	.492	.484	.001	1.00
Liquidity: LIQ	Current assets divided by current liabilities	44	2.154	1.564	13.33	.046	275.10
Market-to-book ratio: <i>MB</i>	The market-to-book ratio is defined as the market value of assets divided by book value of assets. The market value of assets equals the book value of assets minus the book value of equity plus market value of equity.	44	26.75	19.85	13.78	1.15	115.25
Collateral: <i>COLLTRL</i>	The sum of inventory plus property, plant and equipment divided by total assets.	44	45.08	32.65	23.67	.075	94.23
Firm profitability: <i>PRF</i>	The operating income before depreciation divided by total assets	44	6.77	7.32	8.65	-18.95	37.56
Firm size: <i>SIZE</i>	Natural logarithm of total sales	44	20.44	18.87	3.17	.022	25.36

7.2 Collinearity

To study the existence of multicollinearity among regressors pearson correlation coefficients is used. In general, independent variables having collinearity at 0.7 or greater would not include in regression analysis due to multicollinearity. As shown in table 3 the highest correlation coefficient is 0.516 between profitability and dividend payment. Thus all of the independent variables are free from serious problems of multicollinearity and more competent for regression analysis.

Table 3. Pearson Correlation Coefficients

Variables	<i>LIQ</i>	<i>MB</i>	<i>DIVDUM</i>	<i>COLLTRL</i>	<i>PRF</i>	<i>SIZE</i>
<i>LIQ</i>	1.00	.316	.015	.478	.324	.132
<i>MB</i>	.316	1.00	.439	-.123	.398	.217
<i>DIVDUM</i>	.015	.439	1.00	.088	.516	.234
<i>COLLTRL</i>	.478	-.123	.112	1.00	.391	.112
<i>PRF</i>	.324	.398	.516	.391	1.00	.453
<i>SIZE</i>	.132	.217	.234	.112	.453	1.00

*Summary of Pearson Correlation Coefficients between Variables.

7.3 Regression Model

Results of Regression Analysis

Table 4 shows the results of pooled regression analysis, in which fixed effect model is applied. In our regression model for leverage has an R-squared (coefficient of determination) of 0.556. It informs that the fraction of variation in the dependent variable that is explained by variation in the independent variables more precisely it shows how well the sample regression line fits the data (goodness of fit). Thus, 55.6% of the variation in leverage (Total Debt/Total Assets) is accounted for by variation in the independent variables. The value of adjusted R-squared is 0.513. F-statistic, 11.331, shows that overall model is satisfied at the 1% level and the value of Durbin- Watson, 1.37, signals that the model is fit for regression without estimating any significant autocorrelation. The existence of autocorrelation does not bias the estimated coefficient, but it makes the estimates of the standard errors smaller than the true standard errors. As, these findings are observed from table 4, the first hypothesis of this study is liquidity and beta coefficient is -5.887, rejecting the null hypothesis, it suggests that liquidity has strong negative impact on leverage for DSE listed firms. Beta coefficient of market to book value ratio is 0.623 and rejects the second hypothesis at 10% significant level. The negative coefficient value of collateral rejects the third hypothesis at 1% significant level. Dividend payment the fourth hypothesis of this study is accepted with beta coefficient of -8.65 that mean dividend payment has no significant impact on leverage of Bangladeshi firms listed on DSE. The coefficient value of profitability is -1.83, which is significant at 1% level. So, fifth null hypothesis has no significant impact on leverage, is rejected. The last or sixth hypothesis of this study is firm size, which beta coefficient is 0.275 and its not significant even at 10% level, thus this hypothesis is accepted.

Table 4. Regression Model results

Variables	Beta Coefficients	Standard Error	t-value	Sig.
Constant	87.572	23.674	2.568	.025
LIQ	-5.877	1.053	-4.345*	.000
MB	.623	.317	1.785***	.012
DIVDUM	-8.65	7.138	-1.592	.089
COLLTRL	-.368	.156	-2.785*	.014
PRF	-1.83	.34	-4.271*	.23
SIZE	.275	1.712	.579	.650

TD/TA= Total Debt/ Total Assets

*Significant at 1% level

** Significant at 5% level

*** Significant at 10% level

Model Summary

R-Squared	.675
Adjusted R-Squared	.641
Durbin-Watson	1.37
F-statistic	27.76
Sig.	.000

8. Summary

This study attempts to investigate how firm specific factors are impacting the capital structure decision of a sample of 44 Bangladeshi firms listed in DSE utilizing OLS regression method. Data were collected from the financial statements of each firm during the eight-year period from 2004 to 2011. Under OLS regression, fixed effect model was run and the findings of the study show that profitability, collateral and liquidity have significant and negative impact on leverage. Positive and significant impact of market to book value ratio on leverage has been found in this study. On the other hand, dividend payment and size were not found as significant explanatory variables of leverage. Results also reveal that leverage ratios are significantly different across Bangladeshi industries. Overall all the results are almost consistent with previous study and capital structure.

However, the limitations of this study can open the door of opportunity for further research work in this area. This study only uses total debt to total assets as a dependent variable, the other definition of leverage can be used in future study to identify which definition of leverage is powerfully explained by given control variables. In conclusion, overall results can be improved by including new explanatory variables and observations and management preference to debt and equity.

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