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# Corporate characteristics and leverage: evidence from Bangladesh

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## Abstract

**Purpose** – This paper aims to determine the influence of various corporate characteristics such as total assets (TA), total sales (TSE), return on assets (ROA), return on sales (ROS), liquidity and age on leverage of the listed non-financial companies in the Dhaka Stock Exchange (DSE).

**Design/methodology/approach** – A non-probability sampling technique has been used in this study, and the leverage of 106 companies listed in the DSE has been examined for the time period 2011-2015. Multiple regression models are used to estimate the influence of corporate characteristics on leverage and leverage is measured by the debt ratio, that is, total liabilities divided by total assets (TA).

**Findings** – The results obtained from the regression models show that TA, ROA and age are negatively and significantly related to the leverage of companies.

**Research limitations/implications** – Considering only non-financial companies as the sample is a limitation. Hence, the results may not extend across all listed companies in Bangladesh. The study explores only six corporate characteristics variables; other factors influencing the leverage of the firm such as the number of foreign shareholders, ownership structure and auditors' opinion could be explored in further studies.

**Originality/value** – The finding of this study contributes to the regulators and enforcement agencies such as Institute of Cost and Management Accountants of Bangladesh (ICMAB), Institute of Chartered Accountants of Bangladesh (ICAB), the Securities and Exchange Commission (SEC) and the DSE. It will enable the regulatory agencies to aim at greater compliance with the local and international standards and also enforce penalties for non-compliance.

**Keywords** Profitability, Liquidity, Age, Debt ratio, DSE, Size of the firm

**Paper type** Research paper

## 1. Introduction

Financial managers of the firm are trying to enhance the value of their business unit, funding, timely investment in profitable projects and optimal allocation of existing resources. In fact, in this competitive world, the company's manager should make the best decision by examining and evaluating different investment projects. Suppose, the



management first evaluates different existing projects and then chooses the best one. Now it should supply financial resources required for the investment using one of the various funding methods. Each single decision made by the management can affect the firm's capital structure. On the other hand, investors while making investment decisions consider different factors.

Capital structure has been one of the most broadly argued subjects in corporate finance. Since the study of [Modigliani and Miller \(1958\)](#), the question has been raised that how the mixture of debt and equity in capital structure affect the firm value. Also, the factors that can have an impact on the firm's capital structure are debatable in finance literature.

Prior studies indicate a correlation between corporate characteristics and leverage. [Jong et al. \(2008\)](#); [Serrasqueiro and Rogao \(2009\)](#); [Viviani \(2008\)](#); [Deesomsak et al. \(2004\)](#); [Eriotis et al. \(2007\)](#); [Jong et al. \(2008\)](#); [Serrasqueiro and Rogao \(2009\)](#); and [Sharif et al. \(2012\)](#) investigated that size of the firm and leverage are positively correlated.

To date, several studies have been conducted on determinants of capital structure, in an attempt to investigate the significant correlations between capital structure and the possible firm-specific characteristics having an impact on them. The seminal paper of [Modigliani and Miller \(1958\)](#) was the first study and researchers continue identifying the determinants of capital structure. In this paper, the researchers analyze capital structure and its determinants for 106 listed companies on Dhaka Stock Exchange (DSE) over the time period 2011-2015. This paper aims to investigate whether there is a significant correlation between the corporate characteristics and capital structure such as size, profitability, liquidity and age.

## 2. Research objectives

The research objectives of this study are as follows:

- to identify the corporate characteristics that affects the leverage of listed companies in Bangladesh; and
- to determine the relationship between the corporate characteristics and the leverage of listed companies in Bangladesh.

## 3. Literature review and hypotheses development

### 3.1 Size

Most of these studies found that the size of firm does affect the leverage of companies. [Bauer \(2004\)](#), [Deesomsak et al. \(2004\)](#); [Eriotis et al. \(2007\)](#); [Jong et al. \(2008\)](#); [Serrasqueiro and Rogao \(2009\)](#) and [Sharif et al. \(2012\)](#) investigated that the size of the firm and leverage are positively correlated. [Tong and Green \(2005\)](#) had established inverse relation between size and leverage. On the other hand, a positive association was found between size and leverage of the firms ([Zou and Xiao, 2006](#)). Large firms are less exposed to risk as they are more diversified and there are fewer chances for them to go bankrupt. The variable of size is also positively associated with leverage ratio and is statistically significant. Previous research result shows its persistence with the trade-off theory ([Ahmed et al., 2010](#); [Sharif et al., 2012](#)). According to the trade-off theory, large firms should borrow more debt for an optimal capital structure. Furthermore, large firms have a low agency cost such as low monitoring cost because of trouble-free access to capital markets. Pecking order theory advocates negative relationship between the said variables because large firms have no issue of information asymmetry and they can issue common stock equity easily. In this study, total

sales (TSE) and total assets (TA) will be used as the measures of company size. The following specific hypotheses have been tested regarding the size of the firm:

- H1. There is a positive relationship with statistical significance between the total assets and leverage of the companies.
- H2. There is a positive relationship with statistical significance between the total sales and leverage of the companies.

### 3.2 Profitability

The pecking order theory states that firms should use an order while deciding for raising funds; the order must be as follows: utilize the retained earnings first, select for the debt and if both these sources are unavailable or the prevailing conditions and circumstances are against these sources, then the firm may opt issuing new stock to generate capital. The pecking order theory shows that profitability has a negative relationship with leverage. Similarly, in the studies by [Rouf \(2015\)](#); [Pratheepkanth \(2011\)](#); [San and Heng \(2011\)](#); [Saeedi and Mahmoodi \(2011\)](#) and [Zeitun and Tian, \(2007\)](#), a negative relationship between the capital structure and firm performance was established. Conversely, the trade-off theory states that leverage and profitability of a firm are positively related ([Bauer, 2004](#); [Chen, 2004](#); [Huang and Song, 2006](#); [Jong et al., 2008](#); [Serrasqueiro and Rogao, 2009](#); [Viviani, 2008](#); [Zou and Xiao, 2006](#)). In this study, profitability is measured by return on assets (ROA) and return on sales (ROS), that is, net income divided by TA and net income divided by TSE. The following specific hypotheses have been tested regarding profitability of the firm:

- H3. There is a negative relationship with statistical significance between the return on assets (ROA) and leverage of the companies.
- H4. There is a negative relationship with statistical significance between the return on sales (ROS) and leverage of the companies.

### 3.3 Liquidity

Liquidity is the firm's ability to gather its short-term obligations as they become payable. The more the firm has liquidity, the supplementary it is to pay off interest on debt. [Ahmed et al. \(2010\)](#) and [Fama and French \(2002\)](#) found a positive relationship between liquidity and leverage. It states that a firm with high liquidity should option debt as a major contributor to the capital structure as the firm can easily pay off the debt. Conversely, [Sharif et al. \(2012\)](#) and [Tong and Green \(2005\)](#) concluded a negative correlation between liquidity and leverage. A number of researchers recommended that highly liquid firms should use internally generated funds ([Deesomsak et al., 2004](#); [Mazur, 2007](#); [Viviani, 2008](#)). In this study, liquidity is measured by current assets divided by current liabilities. The following specific hypothesis has been tested regarding liquidity of the firm:

- H5. There is a negative relationship with statistical significance between the liquidity and leverage of the companies.

### 3.4 Age

Many studies have taken age of the firm as an explanatory variable that may determine capital structure decisions. Bigger firms that have been operational for many years in fairly stable markets do not need debt financing. Alternatively, recently established smaller firms

require more debt for their financing needs. Sharif *et al.* (2012) states that successful larger firms that have created goodwill in the market can generate the needed short-term debt financing easily as creditors know that they have the ability to pay their obligations on the due dates. Thus, an inverse relationship between the age of the firm and leverage prevails, i.e. a direct relationship between age and long-term debt and an inverse relationship between age and short-term debt (Hall *et al.*, 2004). In this study, age is measured by the difference between the observation year and the establishment year. The following specific hypothesis has been tested regarding age of the firm:

- H6. There is a negative relationship with statistical significance between the age and leverage of the companies.

### 3.5 Controllable variable

A review of the literature on voluntary disclosure led to the decision to include five controllable variables in multiple regression models for testing the main hypotheses. These are debt-to-equity ratio (DER), current debt ratio (CDR), proprietary of equity ratio (PER) and current assets proprietors' funds ratio (CAPFR).

## 4. Methodology

### 4.1 Sample design

The data used in this study were obtained from the audited financial statements of the firms listed in DSE in the period 2011-2015. The sample firms were selected using a non-probability sampling technique. Firms with the required information were initially selected based on their sectorial classification. In total, 106 non-financial firms were finally used as sample. The data in the current study about corporate characteristics and leverage consist of independent and dependent variables. The corporate characteristics are TA, TSE, ROA, ROS, liquidity and age. The method of analysis is multiple regression and the method of estimation ordinary least squares (OLS).

### 4.2 Model specification

The economic model used in the study is given as:

$$Y = \beta_0 + \beta \text{Fit} + \text{eit} \quad (1)$$

where Y is the dependent variable.  $\beta_0$  is the constant,  $\beta$  is the coefficient of the explanatory variable (corporate characteristics), Fit is the explanatory variable and eit is the error term (assumed to have zero mean and independent across time period) (Table I).

It is important to state that this study uses debt ratios to measure the leverage of the firm. By adopting the economic model as in equation (1) specifically in this study, equation (2) is obtained as follows:

$$\begin{aligned} \text{LEV} = & \beta_0 + \beta_1 \text{TA} + \beta_2 \text{TS} + \beta_3 \text{ROA} + \beta_4 \text{ROS} + \beta_5 \text{LIQ} + \beta_6 \text{AGE} + \beta_7 \text{DER} \\ & + \beta_8 \text{CDR} + \beta_9 \text{PER} + \beta_{10} \text{CAFR} + \text{eit} \end{aligned} \quad (2)$$

### 4.3 Analysis of data

Statistical tools such as average, standard deviation, co-efficient of variance, correlation, regressions, *t*-tests and *F* tests have been used to obtain the objectives of this study. Statistical

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Package for Social Science (SPSS) 22.0 for Windows has been used for the analysis and interpretation of the data and different tables have been used for data presentation.

## 5. Result and discussion

### 5.1 Descriptive statistics

**Table II** reports the descriptive statistics of sample of non-financial companies in terms of the dependent and independent variables for the period 2011-2015. The results from the leverage show that the level of average leverages in the sample companies is 56.56 per cent; the highest leverage achieved by a firm is 169.91 per cent, and the lowest leverage is 14.39 per cent with a standard deviation of 24.54 per cent. The average firm size is (Taka Bangladeshi) Tk.14851.54lakh and Tk.8814.94lakh, respectively, in terms of TA and total sales (TS). The average profitability of the firm is (Taka Bangladeshi) 3.84 and 5.07, per cent, respectively in terms of ROA and ROS. The mean of the liquidity is 127.90 per cent with the standard deviation being 155.65 per cent. The average age of firm is 28 years with a minimum and maximum age of 6 and 50 years, respectively.

### 5.2 Pearson correlation analysis

**Table III** provides the Pearson product-moment correlation coefficients of the continuous explanatory variables as well as the dependent variables included in the survey. The results of Pearson product-moment correlation showed that the TA, ROA, age of the firm and

**Table I.**  
Dependent and independent variables and their description as used in the study

Variables	Description/measurement
Leverage (LEV)	Debt ratio (total liabilities divided by total assets) $\times$ 100
Total assets (TA)	Total assets of the firm
Total sales (TS)	Total sales of the firm
Return on assets (ROA)	(Net profit after tax divided by total assets) $\times$ 100
Return on sales (ROS)	(Net profit after tax divided by total sales) $\times$ 100
Liquidity (LIQ)	Current assets divided by current liabilities
Age (AGE)	Difference between observation year and establishment year
Debt-to-equity ratio (DER)	Ratio of total debt/outsider funds to total assets
Current debt ratio (CDR)	Ratio of total current liabilities to shareholder equity
Proprietary of equity ratio (PER)	Ratio of shareholder funds to total assets
Current assets proprietors' funds ratio (CAPFR)	Ratio of total current assets to shareholder equity

**Table II.**  
Descriptive statistics

Variable	Mean	Median	SD	Minimum	Maximum
LEV	56.56	54.29	24.54	14.39	169.91
TA	5311319.34	14851.54	10584934.71	1596	59748912
TS	35320.61	8814.94	116309.74	45.02	753573.15
ROA	6.65	3.84	7.40	0.10	40.39
ROS	11.49	5.07	19.37	0.09	107.25
LIQ	161.62	127.90	155.65	22.24	1323.91
AGE	27.12	28	9.68	6	50
DER	222.76	119.91	286.90	16.80	1588.32
CDR	189.26	107.33	276.01	6.60	1588.32
PER	48.89	46.58	41.08	4.10	347.61
CAPFR	118.59	108.74	63.97	27.58	444.99

**Table III.**  
Pearson correlation  
analysis results  
( $N = 106$ )

Pearson correlation analysis	LEV	TA	TS	ROA	ROS	LQR	Age	DER	CDR	PER	CAFR
LEV	1										
TA	-0.405**	1									
TS	-0.084	0.549**	1								
ROA	-0.420**	0.306**	0.240*	1							
ROS	0.068	0.120	-0.022	0.180	1						
LIQ	-0.261*	0.021	-0.010	-0.101	-0.046	1					
AGE	-0.382**	0.128	0.164	0.161	0.012	-0.065	1				
DER	0.573**	0.318**	-0.065	-0.098	0.245*	-0.147	0.232*	1			
CDR	0.165	0.329**	-0.059	-0.056	0.273*	-0.190	0.269*	0.168	1		
PER	-0.137	-0.132	-0.039	-0.043	-0.147	0.017	-0.145	-0.450**	-0.371**	1	
CAFR	-0.519**	-0.008	-0.003	0.022	0.044	0.417**	-0.143	-0.215	-0.153	0.210	1

**Notes:** \*Correlation is significant at the 0.05 level (two-tailed); \*\*Correlation is significant at the 0.01 level (two-tailed)

CAPFR are negatively associated with the leverage of the firm ( $p < 0.01$ , two-tailed), but DER of the firm is negatively associated with the leverage of the firm ( $p < 0.01$ , two-tailed). TSE, ROA, DER and current debt ratio (CDR) of the firm are positively related to TA ( $p < 0.01$ , two-tailed).

### 5.3 Multiple regression analysis

Table IV shows the results of the multiple regression analysis. Regression has been used in most previous studies (Akhtaruddin and Rouf, 2012; Rouf and Harun, 2011; Rouf, 2011a, 2011b; Rouf *et al.*, 2014). The table shows the association between leverage of the firm and experimental variables. The coefficient of coordination  $R^2$ ,  $F$  ratio, beta coefficients and  $t$ -statistics for the regression model and summarized results of the dependent variable on the explanatory variables are shown in Table IV. The result indicates an  $R^2$  value of 0.555 and an  $F$  value of 10.872, which is significant at 0.000 level. Both these values suggest that a significant percentage of the variation in leverage of the firm can be explained by the variations in the whole set of independent variables.

Variables	Standard error	Coefficients	Beta $t$ values	Significance
TA	0.010	-0.247	-2.043	0.045**
TS	0.000	0.121	1.054	0.296
ROA	0.033	-0.146	-0.460	0.007***
ROS	0.132	0.070	0.673	0.503
LIQ	0.016	-0.037	-0.373	0.710
AGE	0.236	-0.058	-0.624	0.035**
DER	0.034	1.148	2.851	0.006***
CDR	0.035	-0.540	-1.368	0.176
PER	0.060	0.134	1.331	0.188
CAFR	0.039	-0.377	-3.718	0.000***

**Table IV.**  
Multiple regression  
results ( $N = 106$ )

**Notes:** \* $p < 0.1$ , two-tailed; \*\* $p < 0.05$ , two-tailed; \*\*\* $p < 0.01$ , two-tailed;  $R^2 = 0.555$ ; adjusted  $R^2 = 0.485$ ;  $F$  value = 10.872;  $F$  significance = 0.000



If the independent variable TA is increased by one unit, the dependent variable decreases by  $-0.247$  with standard error (SE) =  $0.010$ , beta  $t$ -values =  $-2.043$  and significance at the  $0.045$  level. The result suggests that TA is negatively associated with the leverage of the firm. This result is similar to that of [Tong and Green \(2005\)](#).

The significant corporate characteristic variable is ROA. The regression coefficient for the variable is  $-0.146$ , which is negative and statistically significant at the  $0.007$  level ( $p < 0.01$ , two-tailed). This supports  $H_3$  that the leverage of the firm is negatively related with ROA. This result is similar to that provided by [Pratheepkanth \(2011\)](#); [San and Heng \(2011\)](#) and [Saeedi and Mahmoodi \(2011\)](#).

The next significant corporate characteristic variable is age of the firm. The coefficient for age of the firm is  $-0.058$ . It is statistically significant at the  $0.035$  level ( $p < 0.05$ , two-tailed), suggesting that the leverage is negative the older the firm.

With regard to controllable variables, this study suggests that a firm's DER is positively and significant related with the leverage of the firm at the  $0.006$  level ( $p < 0.01$ , two-tailed) and CAPFR is negatively and significant related with the leverage of the firm at the  $0.000$  level ( $p < 0.01$ , two-tailed).

## 6. Conclusions

This study is an extension of previous research, where a set of corporate characteristic variables is considered to examine their association with the leverage of the firm. The objective of this study was to examine corporate characteristics and their influence on leverage. These characteristics include total assets (TA), total sales (TSE), return on assets (ROA), return on sales (ROS), liquidity, age, debt equity ratio (DER), current debt ratio (CDR), proprietary of equity ratio (PER) and current assets proprietors' funds ratio (CAPFR) of the firm. The findings of this study have contributions for the regulators and enforcement agencies such as Institute of Cost and Management Accountants of Bangladesh (ICMAB), Institute of Chartered Accountants of Bangladesh (ICAB), the Securities and Exchange Commission (SEC) and the Dhaka Stock Exchange (DSE). It will enable the regulatory agencies to aim at greater compliance with the local and international standards and will also enable them to enforce penalties for non-compliance. The limitation of the study is that only non-financial companies have been used as a sample. Hence, the results may not extend across all listed companies in Bangladesh. The study explores only six corporate characteristic variables; other factors influencing the leverage of the firm such as number of foreign shareholders, ownership structure and auditors' opinion could be explored in further studies.

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