

# **DO DETERMINANTS INFLUENCE THE CAPITAL STRUCTURE DECISION IN BANGLADESH? A PANEL DATA ANALYSIS**

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## **ABSTRACT**

More than two decades, capital structure decision marked as variation from optimal decisions as determinants are not properly considered due to the collapse of corporate governance. This study examines the impact of determinants on capital structure decisions in Bangladesh using Fixed-Effect Model (FEM) and Panel Corrected Standard Error (PCSE). The study revealed that debt structure is considerably influenced by liquidity, firm size, asset structure, non-debt tax shield, and operational age of companies. The study also indicates that the companies, which are not financially, sound, but used more debt because the owners of such companies are politically empowered in stock market. The firms that hold less fixed assets (as a percentage of total assets, particularly the family-run and politically affiliated firms used more debt regardless of their tax bracket, profitability and growth—showed a greater capacity for increased debt. This study primarily focused on financial framework to make capital structure decision based on related determinants.

**Keywords:** Firm size, liquidity, asset tangibility, capital structure decision.

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## **1. INTRODUCTION**

Companies play fundamental role in the growth and development of economy in Bangladesh. In this era of modern economy, the field of business has been competitively overwhelmed by globalization and privatization. Hence, to survive in this competitive and global environment, financial managers need to make reasonable financial decisions that will lead to long-term sustainability of the firms. While determination of the optimal capital structure is one of the strategic financial decisions to be considered by company managers, it remains an inconclusive and debated issue in the corporate finance (Shibru, 2012). Modigliani and Miller (1958)

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contributed significantly to the topic, which results in the formulation of alternative capital structure theories, such as the trade-off model, market timing, pecking order, and agency cost theory. Such theories indicated that alternative capital structure in business world is influenced by firm size, profitability, liquidity, tax rate and business risks. As an instance, pecking order theory focused on the successive orders of firms' capital from internal to external sources. However, the estimation of these theories is yet to be embraced by firms of different environments (Rajan & Zingales, 1995). Morri and Beretta (2008) argued that common determinants of optimal capital structure decisions are still obscure. According to the empirical results of Amidu (2007), banks are unclear about the factors that lead to better capital structure decision and the means of determining the capital structure. Firms find it hard to consider capital structure theories in their financial decisions, as these firms are generally operated by politicians or some families who exercise their political influence on the bank and stock market regulations to raise capital. Besides, such firms fall under highly tax bracket and are prone to transaction costs, bankruptcy costs, and information asymmetry and imperfect markets for which Modigliani and Miller hypothesis is inapplicable. The way of collecting such capital resembles pecking order or trade-off theory in some aspects. The study is the first to explore the reasons for firms' aversion towards the application of capital theories in managing future financial and default risks. Such valiant financial decision is unfavorable for corporate governance and is a threat for damaging the financial system in Bangladesh.

Despite there are great crisis in corporate governance for past few decades in Bangladesh, the country's economy has been advancing. However, such economic advancement may not be sustained in the long run, unless certain determinants are considered in financial decisions. The basic reasons of excluding suitable determinants in capital structure decision and financial policies are: (i) Firms are mostly controlled by politicians and families who are affiliated with governments and are also inexperienced in managerial operations (Rahman & Rana, 2018). (ii) In managerial structure of such firms, professional managers are limited into power in making capital structure decision in accordance with the financial policies and market conditions (Habib, 2019). (iii) Few individuals and families who are supported by government dominate and manipulate stock market and banks, resulting in the loss investors' confidence. In such situation, these firms hardly struggle to manage their capital optimally (Rahman & Rana, 2018; Rashid & Johara, 2018; Habib, 2019). However, to get back the investors' confidence, firms should accurately build a capital structure decision considering the existing argument and systematic factors. Therefore, the Bangladeshi firms need to revise their current structure decisions to adapt the financial policies and also examine certain determinants influence the debt level in the capital structure (Sayeed, 2011). Some specific factors such as the firm's characteristics, regulatory requirements and capital market conditions of the economy are expected to affect the capital structure decisions. Therefore, this paper aims to examine the impact of determinants on capital structure decisions in Bangladesh.

A number of manufacturing firms were included in this study for many reasons: First, capital structure is more balanced in manufacturing sectors than the financial sectors, since the equity ratio is a negligible amount in financial sectors and its regulatory system is uniquely distinct from the manufacturing units. Besides, as explained in the capital structure theories, the shape of capital structure in manufacturing companies are considered suitable for the analysis of financial policies. Also, utilization of the manufacturing firms offers a new insight into capital structure decision. Second, the basic needs of people such as foods, medicines, leather, cottons, cloths,

construction materials, etc., are produced by the manufacturing industries and are considered as an integral part of economic growth and development. As an indispensable sector of production and major contributor to livelihood, the manufacturing sector needs to be shielded from harmful financial decisions and the resulting economic collapse. Third, the manufacturing sector contributes significantly to job creation in Bangladesh, where the number of unemployed is huge. Bangladesh hosts a large population, despite its small land mass coupled with ill-governance. Hence, if the manufacturing sector is protected by adapting fair financial policies in firms for optimal capital structure decision, the issue of unemployment will improve in the country. Fourth, the recent COVID-19 pandemic contracted the financial liberalization of firms to raise necessary capital, thereby declining the financial strength of general people due to their contraction in income level. In such circumstance, only those firms that ensure proper management of their capital by producing quality products and services can survive in the competitive environment and generate more cash flows for investor or stockholders. Fifth, a large number of investors in stock markets are also associated with manufacturing firms, whose collapse and financial loss may trigger stock market volatility. Notably, the collapse of stock market is also influenced by the lack of corporate governance, political interference and violation of rules of law (Uddin et al., 2021). Therefore, the study investigates the impact of determinants on capital structure decision in Bangladesh; this will allow firms to establish pertinent capital structure decisions in the light of financial policies aimed at meeting the challenges of stock market after the COVID-19.

Hence, unlike the previous studies, the paper contributes to the existing knowledge on capital structure in the following ways: (i) previous studies had considered small samples. In other words, they relied on data of few companies from a single industry or related industries, which is unfit for policy-making model. Therefore, this study fills the gap by employing larger sample for establishment of sustainable financial policies. (ii) There is a growing concern that companies are run by few families and politicians who are not trained professionally. Such ownership structures seriously damage the corporate governance system and ultimately affect the capital structure decision, while, in developed countries; ownership structure concentrates on dispersed shareholders and is operated by professional managers (Uddin, 2021). Hence, the study will explore the main challenges to the development of actual corporate financial policies that addresses ownership and corporate governance issues. (iii) We used suitable panel techniques, which enable the control of serial correlation, heteroskedasticity and cross-sectional problems in the model estimation. The analysis of panel data generates practical results for policy implications. (iv) The nature of ownership of Bangladeshi firms differs from those of developed countries to some extents; as an instance, firms in Bangladesh are considered for approval based on their political affiliation rather than their professionalism. Hence, the basis of financial decisions may not agree with the research findings from developed countries (Uddin, 2021). Furthermore, to the best of our knowledge, reasons why firms failed to consider all factors for capital structure decision in Bangladesh were not investigated in the previous studies. Therefore, this study explores new directions to adapt financial policies and theories to capital structure decisions of firms in developing countries like Bangladesh where political orientation is favored over professional ethics.

The residual parts of this study are organized as follows: the section-2 explains the related literature and conceptual framework; section-3 reveals material and methods included sample,

data collection, model specification and description of method. Section-4 analyzes the results and discussion in details, and concluding remarks and policy implications are shown in section-5.

## **2. LITERATURE REVIEW**

In this section, we discussed previous studies on the factors of capital structure decisions include that profitability has mixed relationship with capital structure. Several studies indicated a positive and significant relationship between profitability and capital structure decision (Alber & Youssef, 2020; Buferna et al., 2005; Fama & French, 2002; Jahan, 2014). An inverse relationship between profitability and capital structure is found (Amidu, 2007; Singh, 2016; Zeitun & Tian, 2008). Nevertheless, a number of literature also revealed that no significant relationship exists between profitability and capital structure decision (Najjar & Petrov, 2011; Salawu & Agboola, 2008; Hossain & Yakub, 2014; Hossain & Hossain, 2015). In case of growth, there were different relationship between growth and leverage structure. Pecking order theory predicted a positive relationship between growth and leverage, as high-growth firm often requires higher debt ratio in their capital structure (Hossain & Hossain, 2015). Amidu (2007) and Zeitun and Tian (2008) also proved that a positive and significant relationship exists between growth and leverage. However, Hossain and Ali (2012), Huang (2006) revealed an inverse association between growth and leverage ratio. Several studies also indicated that growth is not significant association with capital structure decision. Chen (2003) reported a positive correlation between the use of debt and tangibility. Tangibility is significant determinant of the capital structure decision, since the fixed asset can act as a collateral for long-term financing and gives confidence to the creditors (Caglayan & Sak, 2010, Khrawish & Khraiweh, 2010; Najjar & Petrov, 2011; Nyead et al., 2017). Nevertheless, some studies indicated an insignificant correlation exists between growth rate and debt financing (Hoque et al., 2014; Shubiri, 2010; Salawu & Agboola, 2008; Buferna et al., 2005).

Apart from the growth rate and debt financing, firm size also positively influence the capital structure decision, as larger firms are more diversified and require higher debt financing (Deesomsak et al., 2004; Huang, 2006; Amidu, 2007; Caglayan & Sak, 2010; Singh, 2016; Ozkan, 2001; Sayeed, 2011). Whereas, Rajan and Zingales (1995) confirmed an inverse correlation between firm size and capital structure or debt ratio, as large-scale firms require greater access into equity market which is more sensitive to information asymmetry and ensure lower debt. Likewise, the pecking order theory predicted a negative association between firm size and capital structure decision (Mutairi & Nasar, 2015), and found an insignificant relationship between firm size and capital structure decision (Alom, 2013; Hossain & Yakub, 2014; Imtiaz et al., 2016; Jahan, 2014; Hossain & Ali, 2012). Deesomsak et al. (2004), Ahmed et al. (2010), Zeitun and Tian (2008), Singh (2016) and Islam (2016) empirically demonstrated an important relationship between liquidity, and capital structure decision, and find an adverse association between liquidity and capital structure decision. The pecking order theory also suggested that companies, which hold more liquidity often, rely on internal funds, which is also supported by Ahmed et al. (2010) and Najjar and Petrov (2011). However, no relationship exists between liquidity and capital structure (Mutairi & Naser, 2015; Hossain & Yakub, 2014; Imtiaz et al., 2016). Hoque et al. (2014) indicated that corporate tax is one of the significant determinants for capital structure decision, since high tax bracket firms often use more debt for tax advantage. Similarly, trade-off theory suggests that the firms should utilize the debt ratio to a point where

there is a balance between the tax benefits and bankruptcy cost (Sibindi, 2016; Nejad & Wasiuzzaman, 2015). Non-debt tax shields provide an alternative to the tax advantage of debt capital. The trade-off theory also trends similar conclusion, suggesting that non-debt tax shield might be an alternative to the debt level of the firms (Siddiqui, 2012; Jahan, 2014; Huang, 2006; Salawu & Agboola, 2008).

However, a few studies marked no significant link between non-debt tax shield and the debt level of the firms (Singh, 2016; Nejad & Wasiuzzaman, 2015; Hossain & Hossain, 2015). The trade-off theory argued that firms with higher operating profits often use more debt to safeguard their profits from corporate tax. However, pecking order theory advocated that when a firm generates more operating profits, which allow them to retain more profits, they would prefer internal financing to external financing of debt. Therefore, the relationship between debt service coverage and the intensity of leverage is insignificant, in line with observations of Islam (2016) and Hossain and Hossain (2015). The age of companies is considered as one of the influential factors for capital structure decision, as firms that have grown their products and services over the time are able to enhance their operational capital (Zeitun & Tian, 2008). Nevertheless, other study revealed that no relationship exist between the operational age and capital structure decision (Nejad & Wasiuzzaman, 2015).

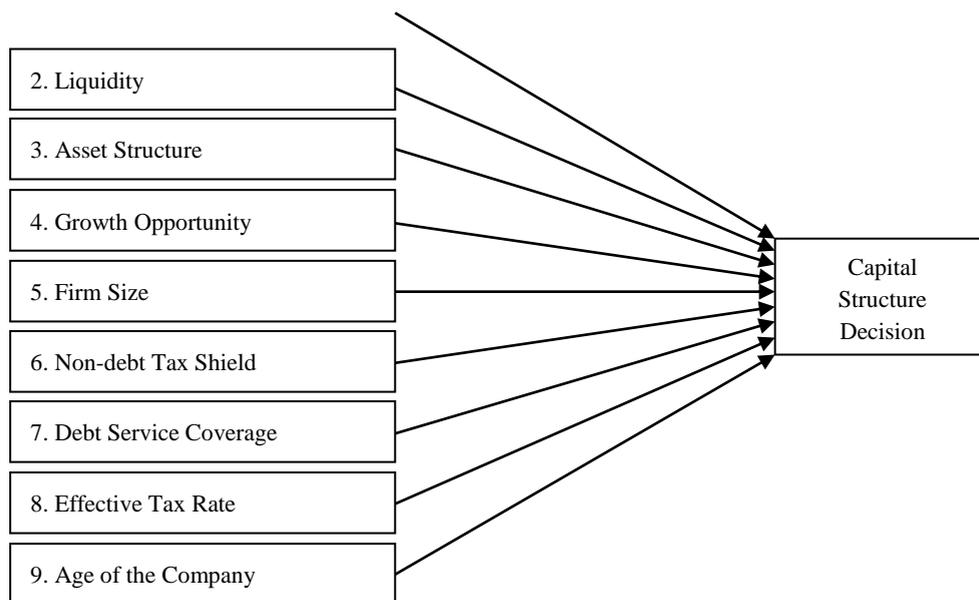
The review of literature in the context of developed and developing countries revealed heterogeneous impact of determinants on the capital structure decision. Majority of the studies were conducted in developed economies, which may not reflect the situation in developing economies like Bangladesh. Factors affecting capital structure decision in Bangladesh are unlike those in developed and developing economies and include political intervention, family ownership, regulatory agencies and unskilled workforce. Therefore, this study represents a new and different approach to the topic under discussion, aimed at improving on the existing works.

### **2.1. Conceptual Framework and Hypotheses Development**

The theoretical framework demonstrates the composite relationship between determinants and capital structure of listed companies in Bangladesh. The study attempts to draw insights on capital structure based on the following hypothetical framework.

**Figure 1:** Hypothetical Framework Between Determinants and Capital Structure

1. Profitability
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The above framework establishes a network between the dependent and independent variables. A profitable firm generally utilizes extended debt to mitigate the tax structure. When a firm holds more liquid, it tends to have less debt in its capital structure by holding less fixed assets. Usually, a firm that holds more fixed assets tends to have increased debt. Similarly, highly productive firms tend to expand their debt structure. The larger firms are more diversified in their products or services, which facilitate their augmented debt. When non-debt tax shield becomes high in a firm, it tends to decrease its debt structure, resulting in its access to tax advantage. Higher debt service coverage leads to increased debt at lowered interest expenses. If corporate tax is considered so high, firms could incur more liability for getting tax benefits. Therefore, the framework showed the nature of the relationship between independent variables and capital structure.

### 3. MATERIALS AND METHODS

#### 3.1. *Sample Design and Data Collection*

The study included a total of 9,450 observations from a sample of 63 listed companies on DSE for the period 2005-2019. The study excluded the service sector, banks, leasing companies, insurance companies, finance companies, mutual fund, real estate services, and travel and leisure, as their regulatory rules differ from those of the manufacturing sector, such as the minimum capital requirements. Hosen et al. (2021) and Diamond and Rajan (2000) highlighted that “bank assets and functions are not the same as those of industrial firms.” Similarly, our analysis excluded firms that stopped trading on DSE at some point during the study period and therefore had missing data. We had chosen both public limited and government companies to obtain their complete database. The government companies refer to the state-owned companies in which the

government and its subsidized companies hold more than 50 per cent of their shares; whereas, the public limited companies are those run by general shareholders, families and institutions. We also removed some manufacturing companies that fail to disclose financial statements timely on DSE during the studied period. The selection criteria of samples considered include the active capital market participation, regular dividend payments, AGM and available financial disclosures from 2005 to 2019. The purposive sample technique was utilized in this study to address the research problem and objective. The sub-sectors of manufacturing companies were considered in the data collection:

**Table 1.** Sector-Wise Sample Distribution

No	Nature of Industry	Samples	Population	% of the Population
01	Jute & Textile Sector	11	52	21
02	Food and Allied Sector	8	18	44
03	Engineering Sector	9	36	25
04	Tannery, Footwear and Fuel & Energy Sector	6	24	25
05	Pharmaceutical & Chemical Sector	12	28	43
06	Cement & Ceramic Sector	7	12	58
07	IT and Telecommunication	5	10	50
08	Miscellaneous	5	14	36
Total		n = 63	N= 194	33

*Source:* Dhaka Stock Exchange (DSE), Bangladesh.

### 3.2. Data Collection

The research was developed based on the previous studies conducted in developed countries, which failed to consider the pertinent determinants of corporate culture and economy. We understood that capital structure decision is a critical problem in developing countries due to powerful influence of politician on leverage decision. The study assembled necessary financial statements and information from data cell of DSE from 2005 to 2019. The values of variables used were extracted from the income statements, balance sheets, cash flow statements and notes of financial statements of sample firms. Each variable was computed using financial ratios and subsequently run by the software to process the results. Besides, we utilized articles, journals and different manuals for the theoretical development of the study.

### 3.3. Model Specification

This study employed multiple regression model to test the relationship between capital structure and a set of determinants. We assumed a linear relationship between dependent and independent variable and a normal distribution for the residual error term. Based on our assumption, the following multiple regression model was developed:

$$DR = B_0 + B_1PR + B_2LR + B_3AT + B_4FS + B_5GR + B_6NDTS + B_7DSC + B_8TR + B_9OY + e$$

**Table 2:** The Description of Variables

Variables	Description	Calculation procedures	Expected Sign
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Dependent Variables	DR	Leverage Ratio	Total debt/total assets	.....
Independent Variables	PR	Profitability Ratio (PR)	Net income/ equity	Positive
	LR	Liquidity Ratio (LR)	Current asset/current liabilities	Negative
	AT	Asset Tangibility (TR)	Fixed asset/total assets	Positive
	FS	Firm Size (FS)	Ln(total assets)	Positive
	GR	Growth Rate (GR)	Change in TA/net asset	Positive
	NDTS	Non-Debt Tax Shield (NDTS)	Annual Dep./total assets	Negative
	DSC	Debt Service Capacity (DSC)	EBIT/financial expenses	No relationship
	TR	Effective Tax Rate (TR)	Tax paid/EBT	Positive
	OY	Operating Year	Number of years	Positive
	a	Constant term of the model		

### 3.4. Measurement of Variables

We included debt ratio used as capital structure of sample firms is a dependent variable of the model. Debt is calculated as the sum of current liabilities and long-term debt (Hossain & Hossain, 2015; Guner, 2016). Profitability reflects the financial reward offered by the companies to the shareholders, which indicates their economic efficiency. Profitability can be captured using varying measures, like return on assets, return on equity, return on capital employed and earnings per share of a company. This study considered the return on equity (ROE), which measures the net profitability in terms of shareholder value. The finance theory indicates that highly profitable firms tend to take increased debt to access tax benefits. Also, it was observed that highly efficient and productive firms require higher debt to reduce the agency problem (Fama & French, 2002; López-Gracia & Sogorb-Mira, 2008). Liquidity is captured by easy access to investment, which influences the capital structure decision of firms. According to the pecking order theory, liquidity and capital structure are adversely connected, which is measured current assets divided by current liabilities (Deesomsak et al., 2004; Sbeiti, 2010).

Asset tangibility denotes fixed assets over total assets, which is acted as collateral to take debt, and is considered an opportunity for long-term financing (Bradley et al., 1984). Firm size was calculated as the natural logarithm of total assets or sales of the firm (Titman & Wessel, 1988). On the other hand, small firms are less diversified in their products and services and tend to borrow less debt, which make them more susceptible to bankruptcy during financial distress. Growth rate represents an increase in sales or assets in the current year compared to the previous year. Agency cost theory contradicts the pecking order theory and revealed a negative relationship between growth and debt (Kim & Sorensen, 1986; Stulz, 1990). The non-debt tax shield was determined total depreciation divided by total assets. Firms with higher non-tax shield are likely to lessen their debt, as the depreciation expenses are tax-deductible (Siddiqui, 2012; Jahan, 2014). Debt service capacity was calculated as the operating income divided by total interest charges and indicates the firms' ability to meet the interest expenses of the annual operating income. Corporate tax is one of the most influential factors of capital structure decisions, which reduces the net income of shareholders. Firms in high tax bracket tend to use extended debt to save the tax liability. Age of companies is defined as the number of operating

years of firms. When a firm grows over time, it will increase its debt capital. Therefore, the level of debt or capital structure depends on the age of companies.

### **3.5. Method**

We utilized the panel estimators in this study, as they address the issues of adjusted serial correlation, heteroskedasticity and cross-sectional dependence. Panel data was compiled using a combination of cross-sectional and time-series data to provide an in-depth insight to researchers and economists, which could have been impossible with time series or cross-sectional data alone (Schulman et al., 1996; Uddin et al., 2019). Based on the test of Hausman (1978), the Fixed-Effect Model (FEM) was considered to be an appropriate estimator of panel regression analysis. Subsequently, we conducted several diagnostic tests to ascertain the presence of serial correlation, heteroskedasticity, and cross-sectional dependence in the data set. To eliminate these problems, Beck and Katz (1995) suggested the use of modified full GLS-Parks estimator called Panel-Corrected Standard Errors (PCSE). Beck and Katz (1995) first indicated that panel techniques of Feasible Generalized Least Squares (FGLS) or PCSE are used in a statistical analysis, whereby the data is characterized by: (i) group-wise heteroscedasticity, (ii) first-order serial correlation and (iii) coexistent cross-sectional dependence. However, depending on the sample size and time duration, a researcher may apply either FGLS or PCSE. PCSE is considered to be more efficient than FGLS when sample size (N) exceeds the time duration (T) (Jiang, 2009), which is the case in our study. Consequently, PCSE estimator was employed for data analysis using the STATA software. The following highlights the diagnostic tests undertaken prior to the actual data analysis:

#### **3.5.1. Hausman Test**

The Hausman test (1978) was used to specify the use of either fixed effects or random effects model (REM). The results of Hausman test are: Chi-square statistic= 30.433091 and p-value=0.0004, which is less than 5%, and therefore suggest the superiority of FEM over REM for the current data set.

#### **3.5.2. Serial Correlation Test**

Serial correlation test is a vital to verify the effectiveness of a method. The results of Breusch-Godfrey serial correlation test are: F-statistic=660.4151 and p-value= 0.000, which is considered significant at 1% level, and thus indicates the inexistence of a serial correlation problem.

#### **3.5.3. Heteroskedasticity Test**

Heteroscedasticity assesses whether the variance of error terms differ across the observations. On the other hand, a data is said to be homoscedastic when the error variance is constant across the observation. The results of heteroskedasticity test include: F-statistic= 69.68285 and p-value=0.000, which suggest the presence of heteroskedasticity in the data.

#### **3.5.4. Cross-Sectional Dependency Test**

Cross-sectional dependence was measured by the absolute values of the cross-sectional correlations, average over all possible pairs of cross-sectional units. The results of cross-sectional dependency test indicate the existence of cross-sectional problems in the residuals at 1% significance level.

## 4. RESULTS AND DISCUSSION

### 4.1. Descriptive Statistics

The descriptive statistics are imperative in data analysis to identify all normative relationships in the hypothesis testing, correlation and regression analysis. Unless these techniques are entirely grasped, data can be easily misinterpreted and consequently distorted.

**Table 3:** Descriptive Statistics

Variables	Sample	Min.	Max.	Mean	SD
DR	945	0.018123	0.994624	0.541669	0.222753
PR	945	-4.792920	1.657490	0.129848	0.238279
LR	945	0.324785	77.13766	1.9673463	3.92309340
AT	945	0.004370	0.947802	0.4328283	0.22470060
FS	945	9.633514	24.28406	20.070975	2.16025726
GR	945	-0.99985	5.673166	0.148258	0.397709
NDTS	945	0.00224	0.442778	0.0332692	0.03709011
DSC	945	-2751.934	3498.792	53.409633	291.999962
TR	945	-1.359329	0.865071	0.215280	0.37917308
OY	945	1.000000	54.00000	25.079365	10.1789625

Table 3 depicts the descriptive statistics of dependent and independent variables and covers the minimum, maximum, mean value and standard deviation of the data set. First, it was observed that on average, companies include 54.16 percent of debt in their capital structure, with the minimum and maximum amount being 1.81 and 99.46 percent, respectively, indicating the non-compliance of companies to the capital structure policy. Second, proportion of the companies' profit ranged between 4.79 and 16.5 percent with an average of 12.98 percent. Third, the companies were found to hold the current assets which are 1.96 times of current liabilities, with the range of liquidity being at variance with the current asset policy. Fourth, companies include an average 43.28 percent of fixed assets in their total assets. The ratio of the highest and lowest fixed assets makes a great difference, suggesting that companies can use their fixed assets as strong collateral for long-term debt. Fifth, the firms' size was observed to range between 9.63 and 20.07 times, with an average of 20.07 times. Sixth, the companies experienced an average growth rate of 14.82 percent of total assets. Seventh, the companies were found to keep 3.32 percent depreciation of total assets. Eighth, concerning the debt service coverage, the companies kept 53.40 percent interest expenses of the EBIT. Ninth, companies paid an average 21.52 percent tax of net income to the government. Last, on average, the operating age of companies is 25 years.

### 4.2. Correlation Analysis

Pearson Correlation Analysis (PCA) used to understand the association between firm capital structure and the set of determinants, and the results are presented below:

Table 4: Correlation Matrix

	DR	PR	LR	AT	FS	GR	NDTS	DSC	TR	OY
DR	1									
PR	0.143**	1								
LR	-0.120**	0.258**	1							
AT	-0.400**	-0.222*	-0.089**	1						
FS	-0.024	-0.058	-0.06	0.147**	1					
GR	-0.082*	0.013	0.11	0.054	0.089**	1				
NDTS	-0.090**	-0.071*	0.047	0.21**	-0.094**	-0.079**	1			
DSC	-0.182**	0.028	0.189**	-0.087	-0.035	0.021	-0.003	1		
TR	0.075	0.114**	-0.0142	-0.157**	-0.073*	-0.009	-0.155**	0.019	1	
OY	0.095**	0.160**	-0.039	-0.212**	-0.010	-0.002	-0.227**	0.048	0.117**	1

Notes: \*\*Significant at 1 percent level; \* Significant at 5 percent level

Table 4 depicts the relationship between each of the determinants and total debt ratio. It was observed that profitability and operating year exhibit a positive and significant relationship with

the total debt ratio, with coefficient values of 0.143\*\* and 0.095\*\*, respectively. Although the corporate tax rate (0.075) showed a positive relationship with debt ratio, it is not statistically significant in the companies. This indicate that an increase in the aforementioned variables will result in an increase in the total debt ratio. On the contrary, variables such as liquidity, tangibility, size, growth, tax shield, and debt service coverage demonstrated a negative and significant relationship with total debt ratio, given their coefficient values of -0.120, -0.400, -0.024, -0.082, -0.090 and -0.182, respectively, suggesting that an increase in these variables will reduce the total debt ratio.

#### 4.3. Test of Fixed Effect Model

Hausman (1978) test was conducted to determine the suitability of FEM for the panel data analysis, and the results are organized below:

**Table 5:** Estimated Results of Fixed Effect Model

Variable	Fixed Effect Model			
	Co-efficient	Std. Error	t-statistic	p-value
Constant	1.208718	0.118842	10.17081	0.0000
PR	0.013257	0.016730	0.792423	0.4283
LR	-0.003786***	0.001015	-3.731228	0.0002
FS	-0.021333***	0.006779	-3.146703	0.0017
GR	-0.008195	0.008912	-0.9195511	0.3581
AT	-0.354238***	0.030262	-11.70581	0.0000
NDTS	0.270918	0.134716	2.011025	0.0446
DSC	1.890500	1.151050	1.250560	0.2114
TR	0.035035	0.024432	1.433962	0.1519
OY	-0.003835***	0.001067	-3.594008	0.0003
R-square.		0.813184		
Adjusted R-squared.		0.797991		
S.E. of regression		0.100117		
F-statistic		53.52196		
Prob(F-statistic)		0.000000		
Durbin-watson stat		0.685960		

Table 5 reveals that profitability is positively related to total debt ratio, although it is statistically insignificant. This indicates that highly profitable firms often include more debt in their capital structure. The finance theory asserts that profitable firms generally use more debt to reduce their tax burden. Hence, our research hypothesis positive relationship between profitability and capital structure is rejected (Fama & French, 2002; López-Gracia & Sogorb-Mira, 2008).

There is an adverse connection between liquidity and total debt ratio. Less liquid firms utilizing increased debt are at increased risk of bankruptcy according to the finance theory. This is possible, as directors of corporate firms have political affiliation and influence the financial market. Therefore, we accept the hypothesis that a negative relationship exists between liquidity and total debt ratio, in line with the previous studies (Deesomsak et al., 2004; Sbeiti, 2010; Icke & Ivgen, 2011).

The study also shows that firm size is negatively correlated with the leverage of a firm. Although larger firms are usually more diversified, enjoy more stable cash flow and are capable of utilizing

more debt. In case of Bangladesh, new or small firms owned by family and political leaders, as indicated in the above results, tend to access more debt in financial markets by leveraging on the support of the government. Large and diversified firms prefer to use less debt in their capital structure compared to small firms. Hence, the research hypothesis of positive relationship between firm size and debt ratio is rejected, which is in contrast with the results of Deesomsak et al. (2004) and Sbeiti (2010). Also, Icke and Ivgen (2011) indicated that liquidity is negatively and significantly related to the leverage, contradicting the positive relationship proposed by the trade-off theory. The growth rate showed a negative and insignificant impact on the total debt, indicating that firms with higher growth tend to have decreased debt level, which contradicts the findings of earlier studies (Stulz, 1990). Hence, our research hypothesis of a positive relationship between growth and leverage is rejected.

Asset tangibility demonstrated an inverse and significant correlation with the total debt ratio, which is at variance with the finance theory. Firms with less fixed assets tend to include as much debt in their capital structure due to the influence of their owners who are family and political leaders and are affiliated with the government. In contrast, firms with larger fixed assets in their total assets require less debt in their capital structure. Besides, Chen (2003) indicated that a positive relationship exists between tangibility and leverage. However, this relationship is not supported in our study. The non-debt tax shield showed a positive and significant association with the total debt ratio, indicating that the companies that include more depreciation in their total assets utilize more debt in their capital structure. Hence, the hypothesis that an adverse relationship exists between non-debt tax shield and leverage is rejected.

Similarly, we observed that debt service coverage exhibits a positive and insignificant relationship with total debt ratio, demonstrating that firms with high debt service ratio will use more debt in their capital structure (Islam, 2016; Hossain & Hossain, 2015). Therefore, we reject the hypothesis that debt service coverage and leverage have a positive and insignificant relationship. Concerning the tax rate, it was observed to have a positive and insignificant association with debt ratio. This signifies that firms that pay higher tax require increased debt in their capital structure, which is in contrast with the agency theory, which is supported by Nejad and Wasiuzzaman (2015). Thus, we reject the hypothesis of presence of a positive and significant relationship between corporate tax and leverage.

Furthermore, operating year showed a negative and significant correlation with debt ratio. An older firm uses less debt, as they are able to generate enough internal capital or retained earnings, as indicated by pecking order theory. Therefore, the research hypothesis that age of companies is positively related to leverage is rejected. The R-square value is 81.31 percent, indicating that all predictors explain 81.31 percent of the total debt ratio in Bangladesh. The Chi-square value is 53.51 at 1 percent level of significance, implying that the set predictor variables might have a significant influence on the total debt ratio. Hence the model is well fitted.

#### **4.4. Panel Corrected Standard Error (PCSE)**

PCSE estimator has become a very popular method for the empirical analysis of panel data, garnering approximately 2000 citations on Web of Science (Mantobaye et al., 2017). In order to test our hypotheses, the PCSE was conducted, and the following results are generated:

**Table 6:** Estimated Results of Panel Corrected Standard Error (PCSE)

Variable	Panel Corrected Standard Error (PCSE)			
	Co-efficient	Std. Error	z-statistic	p-value
Constant	0.8587504	0.0686396	0.12.51	0.000
PR	0.0134421	0.0140661	0.96	0.339
LR	-0.003853***	0.0011565	-3.33	0.001
AT	-0.3184713***	0.0311755	-10.22	0.000
FS	-0.0085385***	0.003074	-2.78	0.005
GR	-0.0104976	0.0075379	-1.39	0.164
NDTS	0.366902***	0.0975769	3.76	0.000
DSC	-0.0000261	0.0000185	-1.41	0.159
TR	0.0186443	0.0195494	0.95	0.340
OY	-0.0013218	0.0008503	-1.55	0.120
R-squared		0.6778		
Wald Chi-square		177.70		
P-value		0.0000		

Table 6. The result revealed that a positive and insignificant relationship exists between debt ratio and profitability. The highly profitable firms require more external debt financing than the less profitable firms, which is in agreement with the pecking order theory. In contrast, profitable firms might have better access to the debt market compared to their less profitable counterparts. According to the trade-off theory, profitable firms should use debt to an optimum level, when tax advantage equals bankruptcy costs. Hence, our observation on the relationship between profitability and debt ratio is consistent with agency and trade-off theories. The highly profitable firms require increased debt level in their capital structure to mitigate the agency problem and maximize the cash flows for shareholders (Fama & French, 2002; López-Gracia & Sogorb-Mira, 2008). Hence, we reject the research hypothesis that profitability is positively associated with leverage ratio.

Liquidity was observed to have a negative and significant relationship with debt ratio, implying that less liquid firms, which are prone to bankruptcy, require less debt. However, the reverse is the case in Bangladesh, as less liquid firms were observed to take more debt owing to the influence of firms' owners who are political and family leaders and enjoy extensive economic support of the government. The result of this study is agreement with past studies (Deesomsak et al., 2004; Mazur, 2007) and the pecking order theory. In contrast, trade-off theory predicts that large liquid firms have strong financial worth to face any short or long-term obligations. Hence, the hypothesis that a negative relationship exist between liquidity and leverage is accepted.

Asset tangibility showed a negative and significant impact on the total debt ratio, suggesting that firms with extended fixed assets have a tendency to use less debt in their capital structure. On the other hand, firms with lesser fixed assets are able to utilize extended debt by controlling the money and capital market through the firms' owners under the shelter of government. Although this observation is by the earlier studies (Daskalakis & Psillaki, 2008; Sheikh & Wang, 2011), it

contradicts the finance theory as well as the banking policy. Hence, the hypothesis of significant relationship between tangibility and leverage ratio is accepted.

Firm size was found to have a negative and significant relationship with total debt ratio, suggesting that extended firms are more likely to borrow less. Most scholars also revealed that large firms are more diversified in terms of their products and services and tend to include more debt in their capital structure to get the tax advantage. It was observed that small or new firms obtain more debt due to their political affiliation which grant them influence in the money and capital market. Therefore, we accept the research hypothesis that firm size and leverage ratio are positively correlated.

Concerning the growth rate, the study revealed that a negative but insignificant relationship exists between growth and leverage ratio of Bangladeshi firms. The result showed the tendency of firms with higher growth towards the use of fewer amount of debt in their capital structure. Hossain and Ali (2012) reported that a negative correlation exists between growth opportunity and capital structure, which aligns with the trade-off theory and is also supported by the empirical findings of Huang (2006). This insignificant association between growth and leverage has been reported in the empirical findings of Titman and Wessels (1988), Ahmed et al., (2010) and Najjar and Petrov (2011). Therefore, the proposition that there is a positive association between growth rate and capital structure is rejected.

Non-debt tax shield showed a positive and significant relationship with the total debt ratio, indicating that firms with a higher amount of depreciation in their total assets tend to request for more debt in the capital market. This finding is supported by the trade-off theory but at variance with the past empirical findings (Siddiqui, 2012; Jahan, 2014). Hence, we reject the hypothesis that a negative relationship exists between non-debt tax shield and leverage ratio. As for debt service coverage, it was found to have a negative but insignificant relationship with total debt ratio in Bangladeshi firms. The higher Earnings Before Tax (EBT) of a firm indicates its use of less debt in its capital structure. The EBT generates the internal funds for companies and in turn increases their financial capacity of, which agrees with the pecking order theory. Past scholars highlighted that leverage is not obtained via debt service coverage. Therefore, the supposition that debt service coverage ratio is correlated with leverage ratio is accepted. Regarding the corporate tax, it was found to exhibit a positive and insignificant relationship with leverage ratio. According to the trade-off theory, corporate tax should exert a positive impact on debt level, as tax benefits on interest expense are allowed by the tax authority for use of debt level. However, no significant correlation was found between effective tax rate (TAX) and debt ratio. Hence, we reject the hypothesis that corporate tax is positively and significantly related with leverage ratio.

A negative but insignificant link was observed between the age of firms and total debt ratio, suggesting that older firms tend to take fewer debts over time, as these firms are unable to adopt the innovative and advanced technology to achieve information symmetries with lenders, resulting in their obsolescence in the market. The finding disagrees with studies of Petersen and Rajan (1994) who found that older SMEs require higher debt ratios to improve their service quality. Therefore, we reject the hypothesis that the age of firms and the leverage ratio is positively associated. With the R-square value being 67.78 percent, it can be said that the

explanatory variables influence 67.78 percent of the total debt ratio. The chi-square value is 177.70 at 1 per cent level of significance, indicating that the null hypothesis is rejected.

## **5. CONCLUSION AND POLICY IMPLICATION**

In Bangladesh, financial markets have been dominated by family and politically connected individuals who, with the support of the government, command economic power. The paper examines the impact of determinants on the capital structure decisions of firms in Bangladesh using suitable panel techniques. The analysis indicated that profitability had no impact on capital structure decision, as the weak or less profitable firms tend to manage more debt owing to the influence of their owners on debt market via political or familial intervention. The study shows that liquidity and asset tangibility are adversely correlated with capital structure decisions as the owners of firms are politically involved, who can influence the loan approval authority in money and capital market. Second, despite the possession of large fixed assets, firms tend to have limited access to the debt market; whereas, firms with less fixed assets enjoy a greater access to debt due to their familial and political affiliation. This result is supported by earlier evidences (Uddin, 2021; Ahmed et al., 2010). The results also indicated that large firms tend to have a fewer debt owing to their dependence on retained earnings. Such firms focused on internal source of financing, in line with the pecking order theory (Chen, 2003; Deesomsak et al., 2004). Additionally, the analysis indicated that firms with huge depreciation for the use as fixed assets to save the tax have greater propensity to use more debt. The result disagrees with the pecking order theory that firms with higher depreciation often rely on internal funds (Siddiqui, 2012; Jahan, 2014). Based on the finance theories and empirical evidence, the most influential factors are profitability, growth rate and corporate tax, while operating age failed to produce any observable influence on the capital structure decision, thus contrasting the trade-off, agency, market timing and pecking order theories. This observation may be attributed to the influence of directors of the firms, as they are politically connected with the government (Uddin et al., 2021).

The following are the policy implications that can be derived from our results: First, the manufacturing firms should change their ownership structure and emulate dispersed ownership structure, similar to the developed countries. The variation in ownership structure such as including professional directors and shareholders might bring about changes in corporate governance and leverage structure decisions. Second, the removal of family and politically connected firms should be implemented by capable regulatory bodies to ensure compliance to corporate governance in manufacturing firms. Third, the capital structure decisions should be made based on the determinants to eliminate the default risk and ensure compliance with capital structure policies for the optimal decision. Therefore, our results are quite relevant and consistent across the model. Further studies are needed to cover the following limitations: (i) Investigation of the impact of politicians on board meeting for leverage structure decisions. (ii) How does family ownership in corporate firm influence the professional code of ethics in Bangladesh?

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