



## Determinants of Capital Structure: A Study on Some Selected Corporate Firms in Bangladesh

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### Abstract

This paper scrutinizes Determinants of Capital Structure: A study on some selected corporate firms in Bangladesh. We have taken 10 out of 37 listed companies of DSE dividing into two sectors i.e. Pharmaceuticals and chemicals and Tannery sector, five years data from 2013 to 2017 has been collected from respective annual reports. Total number of observations was 50. There are different factors that affect a firm's capital structure decision. We use leverage (D/E ratio) as dependent variable and independent variables are profitability, tangibility, tax, size, growth, non-debt tax shield (NDTS) and financial costs. By using Descriptive Statistical Analysis, Correlation Analysis and Regression Analysis tools we find that Tangibility, size, NDTS, and financial costs are positively related with leverage and Profitability, tax, and growth are negatively related with leverage. In our analysis we see profitability, tangibility of asset, growth and non-debt tax shield have significant association. So when we take capital structure decision of the above firms we should consider profitability, tangibility of asset, growth and non-debt tax shield because other independent variables are insignificant in the context of Bangladesh economy.

**Keywords:** Capital structure; Leverage (Debt/equity ratio); Profitability; Non-debt tax shield (NDTS); Financial cost.

### 1. Introduction

Capital structure is referred to as the ratio of different kinds of securities raised by a firm as long-term financing specially debt and equity. Capital structure decisions are among the most important and crucial decisions for any business because of their effect on value and cost of the company. In this paper discussed the determinants of capital structure of Bangladeshi firms. The sample comprised 10 Bangladeshi companies. Size, growth, financial cost, tax, non-debt tax shields (NDTS), profitability and tangibility are used as independent variables, while leverage (Debt/Equity Ratio) is dependent variable. For analysis purpose descriptive statistics, correlation and regression analysis are used. The results imply that companies are small sized and capitalization so these companies prefer internal financing as compare to external finance.

We investigate the determinants of capital structure choice by analyzing the financing decisions of public firms in the industrialized countries. At an aggregate level, firm leverage is fairly similar across the G-7 countries. We found that factors identified by previous studies as correlated in the cross-section with firm leverage in the United States, are similarly correlated in other countries as well. However, a deeper examination of the U.S. and foreign evidence suggests that the theoretical underpinnings of the observed correlations are still largely unresolved. So we should study about this point of views in Bangladesh for best combination of leverage ratios.

### 2. Objectives of the Study

The objectives of the study are given bellow:

- i) To identify the determinants on Capital Structure.
- ii) To analyze the main determinants that influences the financing decision in the choice on capital structure.
- iii) To explain the relationship between leverage and the determinants of capital structure.
- iv) To suggest some determinants which are of considerable attention for capital structure decisions.

### 3. Review of Literature

According to Traditional view that there is a debt/equity ratio that minimizes the weighted average cost of capital and maximizes the total market value of the company. Although this view was generally accepted before the

publications of the MM (Modigliani and Miller) papers, no theoretical justification had been provided. In recent years, however theoretical support for the Traditional view has been provided.

**Modigliani and Miller (1958)** view with no tax suggested that in absence of tax, the total market value of a company is independent of its capital structure and as a consequence the weighted average cost of capital of a company is also independent of its capital structure.

**Modigliani and Miller (1958)** view with company income tax, MM introduced company tax into their analysis. Where there is company income tax. MM suggested that a company's optimal capital structure consisted entirely of debt. Because interest payments are tax deductible, the government in effect subsidizes the use of debt, the greater the amount of debt, the greater the subsidy.

**Van Horne (1998)** in the theory of capital structure analyzed the impact of the financing mix on the valuation of the firm. The theory also attempted to discover whether there existed an optimal capital structure for a firm. There are broadly two schools of thought. One school believes that the composition of the financing mix does not affect the cost of capital so that the capital structure has no relevance in the valuation of the firm. The proponents of the other school believe that the cost of capital is determined by the composition of the capital structure. The application of leverage results in a change in the cost of capital. They try to determine the optimal capital structure (**Haugen and Senbet, 1978**), at which level the overall cost of capital is minimal.

Another important theory of capital structure is the pecking order theory. This theory states that corporate managers choose capital according to the following preference: internal finance, debt, equity (**Myers, 1977**); (**Stewart and Majluf, 1984**). The theory assumes that managers do not seek any optimal level of leverage; rather debt is collected only when internal funds are not adequate to meet funding requirements. Equity is the last resort for the firms in an environment where information asymmetry exists between company insiders (managers) and outsiders (shareholders). Managers having superior knowledge about the actual value of the stock avoid issuing equity when they feel that the stock is undervalued in the market **Myers (1977)** and **Harris and Raviv (1991)**. Based on these theories different studies have developed a set of determinants for debt ratio of the firm and empirically tested those determinants. Some of the recent such studies are **Akhtar (2005)**, **Myers (1977)**, **Sogorb-Mira (2005)**, **Kim et al. (2006)**, **Eldomiaty (2007)**, **Fattouh et al. (2008)**, **Frank and Goyal (2003)** testing the pecking order theory of capital structure.

**Hossin and Islam (2019)**, examined the long-run equilibrium relationship between stock market development and economic growth of Bangladesh. The study demonstrated that a long run relationship exists between stock market development and economic growth in Bangladesh. The causality test results suggest a unidirectional causality running from stock market development to the economic growth.

According to Trade-off Theory, The major benefit of debt financing is that it provides a tax shelter that increases the available remaining to be distributed to shareholders of equity. Nevertheless, the main disadvantage related with debt financing is the risk of bankruptcy (**Andrade and Kaplan, 1998**; **Frank and Goyal, 2003**; **Haugen and Senbet, 1978**). Increased levels of leverage, while resulting in the availability of a larger tax shields also necessitate a higher cost line of financial distress. The company is trying to trade-off between the size of the tax shelter and financial distress costs. Higher probability of financial distress is in terms of start-ups and high growth businesses. The company is exposed to the risk of uncertain cash flow streams and low tangible asset base. Therefore, these types of companies should not place high confidence on the debt in their capital structure. On the other hand, firms with a stable revenue stream and sound asset base facing a lower risk of bankruptcy. This company can apply a moderately higher level of leverage in their capital structure.

**Hossin (2015)**, examined the relationship between inflation and economic growth in the context of Bangladesh and found a statistically significant long-run negative association between inflation and economic growth for the country as point out by a statistically significant long-run negative relationship running from Gross Domestic Product Deflator (GDPD) to GDP.

**Baumol and Malkiel (1967)**, have argued that capital structure will not be irrelevant if investors incur transaction costs when engaging in arbitrage activities. **Taub (1975)**, shows that if security markets are partially segmented, where traders are more risk averse than investors, then a sufficiently large increase in debt can lower the total value of the firm.

According to **Scott Jr (1976)**, the use of the traditional theory in such a manner can have negative implications on a firm value because it fails to consider the effects of increased the determinants of capital structure debt on a firm (**Martin and Scott, 1974**). **Hatfield et al. (1994)** who suggest that firms prefer an optimum level of debt and they increase or decrease that level to enhance their value in the market. The firms want that level of debt where they can beat other industry in battle of market value. There are many variables which can influence the firms leverage ratio and can have a positive or negative impact on the value of the firm. **Harris and Raviv (1991)** Identify variables that are considered to influence the firm's leverage ratio such as: profitability, size, tangibility, tax shields, growth opportunities, and NDTs.

**(Pathak, 2005)** studied the leverage decisions of Indian firms. His study explains the observed variation in capital structure using a regression model. He identified six major factors (tangibility, firm size, growth, profitability, liquidity) and one second tier factor (R&D) that are related to leverage decisions. He found that leverage increases with increase in Firm Size, Tangibility and Growth. In contrast, he found that leverage increases with the decrease in Business Risk, Profitability, and Liquidity (**Pathak, 2005**).

**Hossin (2020)**, analysed the relationship among interest rate reforms, financial development and economic growth of Bangladesh by using a financial deepening model and a simple trivariate causality model. The inference of

this study was that a deregulated deposit rate of interest will raise financial depth and eventually enhance the economic growth of Bangladesh.

Lima (2009), conducted a research in Bangladesh on pharmaceutical companies and the findings of the research are almost same and are aligned with research results in rest of the developed countries of the world. The size, value of assets, and financial cost do effect the financial decision of the companies in this sector (Lima, 2009). The larger companies have more access to funds and less chances of default that's why they enjoy more borrowings as compare to smaller firms.

Pandey (2001), examined the determinants of capital structure of Malaysian companies utilizing data from 1984 to 1999. He classified all the data into four sub- periods that correspond to different stages of Malaysian capital market. The results of his study found that profitability, size, growth, risk and tangibility variables have significant influence on all types of debt (Pandey, 2001).

Sayeed (2011), used panel data OLS and Tobit regression for panel data with cross section random effects to find out the determinants of capital structures of selected Bangladeshi listed companies. He used data from 46 companies listed in Dhaka Stock Exchange (DSE) for seven years (1999 – 2005). He showed total debt to market value of the company as the leverage ratio in one equation and long term debt to market value in another equation. The outcome found were agency cost (- effect on leverage), tax rate (+), debt tax shields such as depreciations (-), firm size (+), Collateral value of assets (+). Industry subsumes a number of smaller effects (Sayeed, 2011). Bankruptcy costs and profitability are irrelevant in determining leverage ratios.

## 4. Determinant of Capital Structure

Therefore, the relevant variables we used are Leverage (D/E ratio) as the dependent variable, and the growth opportunities, profitability, finance cost, size, asset tangibility, tax, NDTs as the independent variables.

### 4.1. Firm Specific Dependent Variable

#### 4.1.1. Measures of Leverage (Debt/Equity Ratio)

The study use total debt ratio as the dependent variables. No such studies in Bangladesh have examined the determinants of total debt ratio of the firms before. Thus, this study has improved the previous studies by attempting to determine the factors of total debt ratio of Pharmaceuticals and Chemicals and Tannery sector in Bangladesh.

Evaluation of optimal leverage varies among literatures. Because of the difficulty to manage market data, many researchers have chosen to use book data. Myers (1984), says that managers focus on book leverage because debt is better supported by assets than it is by the growth opportunities. Another reason to choose book leverage is that financial markets fluctuate a great deal and managers are said to believe that market leverage numbers are capricious as a guide to corporate financial policy Frank and Goyal (2007) and Myers (1984). Besides, for debt contracts, firms prefer to use book value. Hence, we measure debt in terms of book value rather than market values. For this study, we use the definition of leverage and present the data accordingly. Booth *et al.* (2001) and Frank and Goyal (2003) surveys suggest that capital structures of firms follow various theories such as agency theory, trade-off theory and pecking order theory. However, (Myers, 1977)

states that there is no universal theory of capital structure, so we cannot follow any theory strictly to determine capital structure. Some factors can be applied for some firms, or in some cases, inappropriate elsewhere.

### 4.2. Firm Specific Independent Variables

#### 4.2.1. Size

Firm size is another variable that has been widely used in capital structure studies. Larger firms can reduce bankruptcy risk by diversifying its businesses. At lower bankruptcy cost these firms can employ greater proportion of debts to achieve higher interest tax shield (Warner, 1977). Under this assumption we can predict a positive relationship between firm size and debt ratio. Natural logarithm of total assets has been widely used as the proxy of firm size.

$$\text{Size} = \ln (\text{Total Asset})$$

#### 4.2.2. Growth Rate

Empirically, there is much controversy about the relationship between growth rate and the level of leverage. Growth rate is calculated by using the formula  $\{(TA_t/TA_{t-1})\} - 1$  where TA means total asset of the firm.

#### 4.2.3. Financial Cost

The interest rate paid by financial institutions for the funds that they deploy in their business. The cost of funds is one of the most important input costs for a financial institution, since a lower cost will generate better returns when the funds are deployed in the form of short-term and long-term loans to borrowers. The spread between the cost of funds and the interest rate charged to borrowers represents one of the main sources of profit for most financial institutions.

#### 4.2.4. Profitability

The pecking order theory of capital structure asserts that firms which are more profitable would prefer to finance from internal sources than the external source. Thus more profitable firms will hold less debt level than low profitable firms. Thus

$$\text{Profitability} = \text{Net income} \div \text{Total Sales}$$

#### 4.2.5. Tangibility

Tangibility ratio (TR) is measured as a ratio of fixed assets divided by total assets. The numerator is the total gross amount of fixed assets. As a result we expect a positive relationship between tangibility of assets and leverage.

$$\text{Tangibility} = \text{Fixed assets} \div \text{Total assets}$$

#### 4.2.6. TAX

According to the static trade-off theory the benefit of debt is the tax deductibility of the corresponding interest payments. As a result firms will choose high debt ratio if it pays high tax rate to reduce the tax load.

$$\text{TAX} = \text{Tax paid} \div \text{EBIT}$$

$$\text{EBIT} = \text{Revenue} - \text{Operating expenses, or; EBIT} = \text{Net income} + \text{Interest} + \text{Taxes}$$

If proportion of tax paid is greater than proportion of interest then debt must be used for minimizing operating cost and maximizing profit by getting tax shield.

#### 4.2.7. Non-Debt Tax Shields (NDTS)

According to DeAngelo and Masulis (1980) non-debt tax shields can serve as an alternative to debt tax shield. Non debt tax shields are created by depreciation expenses which are tax deductible but do not require any cash outlay. As existence of high non- debt tax shields has already reduced tax burden, a firm will require less amount of debt to reduce its total tax liability. Thus the relationship should be negative between leverage and non-debt tax shield.

$$\text{NDTS} = \text{Total depreciation} \div \text{Total asset}$$

### 5. Methodology

#### 5.1. Data Sources

There is quantitative data in my study, The specific information, quantitative-Leverage (Debt/Equity), the growth opportunities, profitability, financing cost, size, asset tangibility, tax and NDTS; are collected from secondary data sources like website of Dhaka stock exchange (www.dsebd.org), Security and exchange commission (SEC) website (www.secdbd.org), Lanka Bangla Financial Portal and annual report of different companies in Bangladesh.

#### 5.2. Sample Selection Criteria

This research study is based on the data taken from the Central Bank of Bangladesh publication “Balance sheet analysis of companies listed on the Dhaka stock exchange in 2013-2017”. The research initially includes 10 out of 37 listed companies on DSE. Time period of the data is from 2013 to 2017. The sample of 10 DSE listed companies classified under two sectors –Pharmaceuticals & Chemicals and Tannery sector. The companies are then excluded from the sample which has required data missing. Samples are selected through disproportionate stratified random sampling technique.

Pharmaceuticals & Chemicals Sectors:	
Beximco Pharmaceuticals Ltd. (BXPHARMA)	The IBN SINA Pharmaceuticals Ltd. (IBNSINA)
Beximco Synthetics Ltd. (BXSYNTH)	Glaxo SmithKline PLG(GLAXOSMITH)
Square Pharmaceuticals Ltd. (SQRPHARMA)	Renata Ltd. (RENATA)
Libra Infusions Ltd. (LIBRAINFU)	ACI Ltd. (ACI)
Tannery Sector:	
Bata Shoe Ltd. (BATASHOE)	Legacy Footwear Ltd. (LEGACYFOOT)

#### 5.3. Hypotheses Generation

Total eight variables have been used in this study. The only dependent variable of the study is leverage and independent variables were hypothesized as follow:

$H_0: \beta_1 = 0 =$  There is no relationship between leverage ratios and Profitability.

$H_0: \beta_2 = 0 =$  There is no relationship between leverage ratios and tangibility.

$H_0: \beta_3 = 0 =$  There is no relationship between leverage ratios and size.

$H_0: \beta_4 = 0 =$  There is no relationship between leverage ratios and tax.

$H_0: \beta_5 = 0 =$  There is no relationship between leverage ratios and NDTS.

$H_0: \beta_6 = 0 =$  There is no relationship between leverage ratios and growth.

$H_0: \beta_7 = 0 =$  There is no relationship between leverage ratios and financial cost.

#### 5.4. Model Formulation

Following econometric model will be used for the purpose of Regression analysis:

$$\text{Leverag}(D/ERatio) = \alpha + \beta_1(PFT)_t + \beta_2(TG)_t + \beta_3(SZ)_t + \beta_4(T)_t + \beta_5(NDTS)_t + \beta_6(G)_t + \beta_7(FC)_t + \mu_t$$

Whereas;	
D/E = Measure of Leverage	T = Tax
PFT = Profitability	NDTS = Non-debt tax shield
TG = Tangibility of Assets	G = Growth
SZ = Size	F C = Financial Cost
$\mu_t$ = the Error Term	

## 5.5. Techniques of Data Analysis

The data analysis is done on the basis of quantitative data analysis technique. MS Excel and EViews are used for statistical data analysis. We have employed descriptive statistical analysis, Correlation Analysis, Regression Analysis.

### 5.5.1. Correlation

Primary objective Correlation analysis to measure the strength or degree of linear association between two variables. The correlation coefficient measures this strength of (linear) association.

Multiple Regression Analysis:

### 5.5.2. Multiple Regression Analysis

Here we apply multivariable regression where, Leverage (D/E ratio) is the dependent variable, and the growth opportunities, profitability, finance cost, size, asset tangibility, tax, NDTS are the independent variables.

**T-test** in a multiple regression, testing the *individual significance* of a partial regression coefficient (using the *t* test) and testing the *overall significance* of the regression (i.e.,  $H_0$ : all partial slope coefficients are zero or  $R^2 = 0$ ) are not the same thing.

**F-test** In particular, the finding that one or more partial regression coefficients are statistically insignificant on the basis of the individual *t* test does not mean that all partial regression coefficients are also (collectively) statistically insignificant. The latter hypothesis can be tested only by the F test. The F test is versatile in that it can test a variety of hypotheses, such as whether (1) an individual regression coefficient is statistically significant, (2) all partial slope coefficients are zero, (3) two or more coefficients are statistically equal, (4) the coefficients satisfy some linear restrictions, and (5) there is structural stability of the regression model.

**P-value** The actual probability of obtaining a value of the test statistics found in statistical table. P-value (i.e., probability value), is also known as the observed or exact level of significance or the exact probability of committing a Type I error. More technically, the p value is defined as the lowest significance level at which a null hypothesis can be rejected.

When Calculated <i>t</i> is greater than critical <i>t</i>	Fail To Accept Null Hypothesis
When Calculated F is greater than critical F	Fail To Accept Null Hypothesis
When Calculated <i>p</i> is greater than significant level	Fail To Reject Null Hypothesis

## 6. Empirical Results and Discussion

The relevant variables we used are: Leverage (D/E ratio) as the dependent variable, and the growth opportunities, profitability, finance cost, size, asset tangibility, tax, NDTS as the independent variables.

### 6.1. Descriptive Analysis

Table-1. Descriptive statistics of variables used in the Econometric Model

Variables	Mean	Median	Mode	Standard Deviation	Standard Error
Profitability	0.0864	0.0880	N/A	0.1254	0.0136
Tangibility	0.5352	0.5734	N/A	0.2071	0.0225
Size	15.0242	15.0201	N/A	1.2327	0.1337
Tax	0.2657	0.2621	0.00	0.1023	0.0111
NDTS	0.0051	0.0036	0.00	0.0041	0.0004
Growth	0.1481	0.1060	N/A	0.1736	0.0188
Financial Cost	17.6101	6.1463	N/A	35.5676	38.5785
D/E Ratio	0.7989	0.5873	N/A	0.7813	0.0847

Sources: Author's Own Estimations.

Variables which contains standard deviation less than 25% is not bad, amongst them the least is 0.4% of NDTS. When standard deviation is greater than 25% than the variability of those variables is high.

**Profitability:** There is a positive profitability trend in Bangladesh from 2013 to 2017. The mean profitability is 8.64% and standard deviation has only 12.54% that is lower variability of profitability in Bangladesh.

**Tangibility:** The fixed portion in total asset of Bangladeshi companies selected in the sample are high average 53.52%, having only standard deviation 20.71%, the high tangibility provide greater opportunities access to increase D/E ratio for the firm and high SD suggest that not all the firm are highly tangible in Bangladesh. The minimum tangibility is 8.95% and maximum tangibility is 94.1%, which shows high variability in tangibility across the observations in Bangladesh.

**Size:** Mean size of the firm in Bangladesh 15.02% on anti-log  $(15.02) = 3335055.05$  and SD 123% which suggest high variability in the observations.

**Tax:** The mean tax paid to EBIT is 26.57% and SD is 10.23% suggest tax has great impact on the net income. Since minimum tax is zero, that is there are some observations having negative net income and maximum tax is 54.07% suggest some have great profitability.

**NDTS:** Total depreciation to total asset is 0.51% and SD is 0.41%. There is very little variability across the company to have non-debt tax shield across the country.

**Growth:** Average growth rate of Bangladeshi companies are 14.81% which is greater than GDP growth rate in the country, SD is 17.36% implies high variability of the observation.

**Financial costs:** Mean finance cost is Tk.176101.44, but the range of variability is 2839892 which mean different companies attempt different amount of finance so that there is great variability in finance cost.

**Leverage (D/E ratio):** The average D/E ratio is 80% which is high and SD 78.13%, the maximum is 54.71% and minimum 15.08% suggest greater leverage variability in the company of Bangladesh.

## 6.2. Correlation Analysis

The correlation matrix of variables used in this study is presented in Table 2.

Table-2. Correlation analysis of variables used in the Econometric Model

	Profit ability	Tangibility	Size	Tax	NDTS	Growth	Finance Cost	D/E Ratio
Profitability	1							
Tangibility	0.0497	1						
Size	0.2459*	- 0.0163	1					
Tax	0.2587	- 0.1391*	- 0.0104**	1				
NDTS	0.2532**	- 0.1887	0.1573	0.2930*	1			
Growth	0.2142	- 0.1986	0.0826	0.0558**	0.0671	1		
Financial Cost	- 0.2133	0.3131	0.5039	- 0.3137	- 0.2595	- 0.0455	1	
D/E Ratio	- 0.2943	0.1941*	0.1878*	- 0.1957	- 0.1254	- 0.1149	0.4077	1

\*\*Correlation is significant at the 0.01 level. \*Correlation is significant at the 0.05 level.

Sources: Author's Own Estimations.

D/E Ratio has positive correlation with Tangibility ( $r = 0.1941$ ), Size ( $r = 0.1878$ ), and Finance Cost ( $r = 0.4077$ ). Where D/E Ratio has negative correlation with Profit ability ( $r = - 0.2943$ ), Tax ( $r = - 0.1957$ ), NDTS ( $r = - 0.1254$ ) and Growth ( $r = - 0.1149$ ).

The highest correlation between financial costs and size is 50.39% which is moderate, not highly correlated. If any correlation between two independent variables is more than 0.75 it is quoted as multicollinearity problem. Then regression result would not be meaningful.

Table-3. Summary Output of Regression analysis

Summary Output*						
R square		Adjusted R square			Standard Error	
0.2815		0.1244			0.3737	
ANOVA						
		DF		F	Significance F	
Regression		7		1.7913	0.1234	
Residual		32				
Total		39				
Coefficients						
Independent variables	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.3629	1.643	0.2209	0.8266	(2.983)	3.709
Profitability	(3.7157)	2.503	(1.4845)	0.0475	(8.814)	1.383
Tangibility	(0.8838)	0.525	(1.6843)	0.0219	(1.953)	0.185
Size	0.0477	0.112	0.4275	0.6719	(0.179)	0.275
Tax	0.1628	1.055	0.1543	0.8783	(1.986)	2.311
NDTS	72.0967	34.029	2.1187	0.0420	2.782	141.411
Growth	0.3338	0.343	0.9744	0.3372	(0.364)	1.032

Finance Cost	0.00005	0.0001	(0.1453)	0.8854	0.000	0.000
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\***Dependent Variable:** D/E Ratio

\***Predictors:** (Intercept), Profitability, Tangibility, Size, Tax, NDTs, Growth, Finance Cost.

**Sources:** Author's Own Estimations.

### 6.3. Regression Analysis

#### 6.3.1. Pharmaceuticals and Chemical Sector

Summary Output of Regression analysis on Pharmaceuticals and Chemical Sector is presented in Table 3.

Here,  $H_0 = \beta_1 \beta_7 = 0$  (There is no relation between dependent variable and independent variables).

Size, tax, NDTs, growth, financial costs are positively related with leverage (D/E ratio) and their p values are 67.19%, 87.83%, 4.20%, 33.72% and 88.54% respectively. Profitability and tangibility are negatively related with leverage (D/E ratio) and their p values are 4.75% and 2.19% respectively.

The average variability of leverage ratio of pharmaceuticals and chemical sector represented by the explanatory Variable is about 28.15%. and the overall significance F value is 12.34% which is insignificant at 10% level of significance.

**Table-4.** Result of Significance of Variables used in the Model

Variables	Coefficients	T stat	P-value	Result
PFT	(3.7157)	(1.4845)	0.0475	Significant
TG	(0.8838)	(1.6843)	0.0219	Significant
SZ	0.0477	0.4275	0.6719	Insignificant
TAX	0.1628	0.1543	0.8783	Insignificant
NDTS	72.0967	2.1187	0.0420	Significant
G	0.3338	0.9744	0.3372	Insignificant
F.C	0.00005	(0.1453)	0.8854	Insignificant

From the above Table 4 we see that;

**Profitability:** Here,  $H_0 = \beta_1 \neq 0$ . So reject null hypothesis because it is significant for p-value is 0.0475 at 5 % level of significance. There is negative relation between leverage ratios and profitability.

**Tangibility:** Here,  $H_0 = \beta_2 \neq 0$ . So reject null hypothesis because it is significant for p-value is 0.0219 at 5 % level of significance. There is negative relation between leverage ratios and tangibility.

**Size:** Here,  $H_0 = \beta_3 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.6719 at 5 % level of significance. There is no relation between leverage ratios and size.

**Tax:** Here,  $H_0 = \beta_4 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.8783 at 5 % level of significance. There is no relation between leverage ratios and tax.

**NDTS:** Here,  $H_0 = \beta_5 \neq 0$ . So reject null hypothesis because it is significant for p-value is 0.0420 at 5 % level of significance. There is positive relation between leverage ratios and NDTs.

**Growth:** Here,  $H_0 = \beta_6 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.3372 at 5 % level of significance. There is no relation between leverage ratios and growth.

**Financial Cost:** Here,  $H_0 = \beta_7 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.8854 at 5 % level of significance. There is no relation between leverage ratios and financial cost.

#### 6.3.2. Tannery Sector

Summary Output of Regression analysis on Tannery Sector is presented in Table 5.

**Table-5.** Summary Output of Regression analysis

Summary Output*						
R square		Adjusted R square			Standard Error	
0.9944		0.9750			0.0768	
ANOVA						
		DF		F	Significance F	
Regression		7		51.1329	0.0193	
Residual		2				
Total		9				
Coefficients*						
Independent variables	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-27.010	13.410	-2.014	0.182	-84.708	30.689
Profitability	27.945	15.224	1.836	0.208	-37.560	93.449
Tangibility	-3.891	1.573	-2.474	0.032	-10.657	2.876
Size	1.899	0.999	1.902	0.018	-2.397	6.195
Tax	-10.67	7.093	-1.505	0.271	-41.196	19.844
NDTS	97.344	149.267	0.652	0.581	-544.899	739.586
Growth	-0.870	0.602	-2.445	0.025	-3.458	1.719

Finance Cost	0.0001	0.000	-0.644	0.586	0.000	0.000
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\***Dependent Variable:** D/E Ratio

\***Predictors:** (Intercept), Profitability, Tangibility, Size, Tax, NDTs, Growth, Finance Cost.

**Sources:** Author's Own Estimations.

Here,  $H_0 = \beta_1 \beta_7 = 0$  (There is no relation between dependent variable and independent variables)

Profitability, size, NDTs, financial costs are positively related with leverage (D/E ratio) and their P value are 20.8%, 1.8%, 58.1%, and 58.6% respectively. Tangibility, tax and growth are negatively related with leverage (D/E ratio). And their p value are 3.2%, 27.1% 2.5% respectively.

The average variability of leverage ratio of Tannery sector represented by the explanatory Variable is about 99.44% and the overall significance of F value is 1.93% which is significant at 5% level of significance.

**Table-6.** Result of Significance of Variables used in the Model

Variables	Coefficients	t-stat	P-value	Result
PFT	27.945	1.836	.208	Insignificant
TG	(3.891)	(2.474)	.032	Significant
SZ	1.899	1.902	.018	Significant
TAX	(10.67)	(1.505)	.271	Insignificant
NDTS	97.344	0.652	.581	Insignificant
G	(0.870)	(2.445)	.025	Significant
F.C	0.0001	(0.644)	.586	Insignificant

From the above **Table 6** we find that;

**Profitability:** Here,  $H_0 = \beta_1 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.208 at 5 % level of significance. There is no relation between leverage ratios and profitability.

**Tangibility:** Here,  $H_0 = \beta_2 \neq 0$ . So reject null hypothesis because it is significant for p-value is 0.032 at 5 % level of significance. There is negative relation between leverage ratios and tangibility.

**Size:** Here,  $H_0 = \beta_3 \neq 0$ . So reject null hypothesis because it is significant for p-value is 0.018 at 5 % level of significance. There is positive relation between leverage ratios and size.

**Tax:** Here,  $H_0 = \beta_4 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.271 at 5 % level of significance. There is no relation between leverage ratios and tax.

**NDTS:** Here,  $H_0 = \beta_5 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.581 at 5 % level of significance. There is no relation between leverage ratios and NDTs.

**Growth:** Here,  $H_0 = \beta_6 \neq 0$ . So reject null hypothesis because it is significant for p-value is 0.025 at 5 % level of significance. There is negative relation between leverage ratios and growth.

**Financial Cost:** Here,  $H_0 = \beta_7 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.586 at 5 % level of significance. There is no relation between leverage ratios and financial cost.

### 6.3.3. Combined Sector of Listed Companies

Summary Output of Regression analysis on both Pharmaceuticals & Chemical and Tannery Sector combined is presented in **Table 7**. The total observations are 50.

**Table-7.** Summary Output of Regression analysis

Summary Output*						
R square	Adjusted R square		Standard Error			
0.4844	0.1651		0.7139			
ANOVA						
	DF			F	Significance F	
Regression	7			3.3726	0.0034	
Residual	42					
Total	49					
Coefficients*						
Independent variables	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-0.6791	1.3223	-0.5136	0.6090	-3.3121	1.9539
Profitability	-1.7170	0.7511	-2.2860	0.0250	-3.2125	-0.2214
Tangibility	0.4945	0.4301	1.1497	0.2538	-0.3620	1.3510
Size	0.0899	0.0874	1.0281	0.3071	-0.0842	0.2639
Tax	-0.2815	0.8374	-0.3362	0.7377	-1.9489	1.3859
NDTS	3.5748	21.2144	0.1685	0.8666	-38.6686	45.8182
Growth	-0.1365	0.4719	-0.2893	0.7731	-1.0763	0.8032
Finance Cost	0.00002	0.0000	1.5337	0.1292	0.0000	0.0000

\***Dependent Variable:** D/E Ratio

\***Predictors:** (Intercept), Profitability, Tangibility, Size, Tax, NDTs, Growth, Finance Cost.

**Sources:** Author's Own Estimations.



Here,  $H_0 = \beta_1 \beta_7 = 0$  (There is no relation between dependent variable and independent variables)

Tangibility, size, NDTs, and financial costs are positively related with leverage and their P values are 25.38%, 30.71%, 86.66%, and 12.92% respectively. Profitability, tax, and growth are negatively related with leverage and their P values are 2.5%, 73.77% and 77.31% respectively.

The average variability of leverage ratio of combined sector of listed companies represented by the explanatory Variable is about 48.44% and overall significance F value is 0.34% which is significant at 1% level of significance.

**Table-8.** Result of Significance of Variables used in the Model

Variables	Coefficients	T stat	P-value	Result
PFT	(1.7170)	(2.2860)	.0250	Significant
TG	0.4945	1.1497	.2538	Insignificant
SZ	0.0899	1.0281	.3071	Insignificant
TAX	(0.2815)	(0.3362)	.7377	Insignificant
NDTS	3.5748	0.1685	.8666	Insignificant
G	(0.1365)	(0.2893)	.7737	Insignificant
F.C	0.00002	1.5337	.1292	Insignificant

From the above [Table 8](#) we observe that;

**Profitability:** Here,  $H_0 = \beta_1 \neq 0$ . So reject null hypothesis because it is significant for p-value is 0.0250 at 5 % level of significance. There is negative relation between leverage ratios and profitability.

**Tangibility:** Here,  $H_0 = \beta_2 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.2538 at 5 % level of significance. There is no relation between leverage ratios and tangibility.

**Size:** Here,  $H_0 = \beta_3 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.3071 at 5 % level of significance. There is no relation between leverage ratios and size.

**Tax:** Here,  $H_0 = \beta_4 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.7377 at 5 % level of significance. There is no relation between leverage ratios and tax.

**NDTS:** Here,  $H_0 = \beta_5 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.8666 at 5 % level of significance. There is no relation between leverage ratios and NDTS.

**Growth:** Here,  $H_0 = \beta_6 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.7731 at 5 % level of significance. There is no relation between leverage ratios and growth.

**Financial Cost:** Here,  $H_0 = \beta_7 = 0$ . So fail to reject null hypothesis because it is insignificant for p-value is 0.1292 at 5 % level of significance. There is no relation between leverage ratios and financial cost.

## 7. Conclusion

In this study we used multiple variables to take convenient capital structure decision of 10 out of 37 listed firms in Bangladesh. From these above paper we use dependent variable as leverage (D/E ratio) and independent variables are profitability, tangibility, tax, size, growth, non-debt tax shield (NDTS) and financial costs. By using this independent variable we get leverage (D/E ratio) of firm. From this leverage (D/E ratio) we take a congenial capital structure decision of those firms. In this paper we see only profitability has significant rather than the other independent variables. So when we take capital structure decision of the above firms we should consider only profitability because other independent variables are insignificant in the context of Bangladesh economy.

## Recommendation

Capital structure determination is not a science so the firms analyze a number of factors to choose a best mix of debt and equity. Tangibility, size, NDTS, and financial costs are positively related with leverage and Profitability, tax, and growth are negatively related with leverage. Only profitability is not enough to take decision of capital structure of firms, other independent variables should be considered. But in the context of Bangladesh economy, only profitability is the measurement of the capital structure decisions which is significant. But on this situation decision only based on the profitability because other variables are insignificant due to Bangladesh economy is collapsed economy in the concurrent condition. There are different factors that affect a firm's capital structure decision. The results suggest that in Bangladesh most of the firms prefer internal funds over the external financing.

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