

# Leverage Structure Dynamics and Firm Value: Evidence From Bangladesh

Mohammad Nazim Uddin, International Islamic University, Chittagong, Bangladesh

Mohammed Shamim Uddin Khan, University of Chittagong, Bangladesh

Mosharrof Hosen, UCSI University, Malaysia\*



<https://orcid.org/0000-0002-9301-4318>

Md. Shahnur Azad Chowdhury, International Islamic University, Chittagong, Bangladesh

## ABSTRACT

The paper aims to examine the impact of leverage structure dynamics on firm value in Bangladesh. To this end, the panel techniques (GMM and PCSE) were used to control for serial correlation, heteroskedasticity, and cross-sectional difficulties in the panel data set. The paper found that leverage structure influences firm value. The result also supports the trade-off theory, which asserts that tax savings on interest expenses result in a lower total cost of capital and ultimately upturn firm value. Lastly, the paper highlights the significance of endogenous variables such as liquidity, profitability, tangibility, and tax rate on firm value in Bangladesh.

## KEYWORDS

Firm Value, GMM and PCSE, Leverage Ratio

## 1. INTRODUCTION

Globalisation and privatisation have grown concomitantly in the corporate business arena, with firms struggling to find a competent corporate leadership for their long-term success in today's global economic climate (Xie, Lin & Li, 2022; Zhao et al., 2022). To thrive in this competitive and global economy, a firm must design an optimal leverage structure that generates a positive change in firm value. The leverage structure affects the cost of financing, thereby impacting the stock's market price (Landi et al., 2022). The comprehensive relationship between leverage structure and firm value has been recognized, but the relationship may vary in signs and traits depending on the development of financial system and corporate governance practices in a country (Uddin et al., 2019). The financial manager of a firm is responsible for designing a suitable leverage structure that yields the optimal benefits of tax structure for its firm (Habib, 2019). Generally, leverage structure is to be designed based on business risk and profitability of firms, such that a balance is struck between the possibility of bankruptcy and gaining the tax benefits (Alber & Youssef, 2020). The management, on the other

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\*Corresponding Author

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hand, must assess the relative benefits of financial instruments and capital market behavior in order to choose the best leverage structure for value creation.

The ultimate purpose of the financial manager is to maximize the firm value, which management attempts to achieve via the implementation of certain administrative and financial policies. The use of effective finance and investment policies contributes to the firm value. Such policies are frequently chosen based on the views of shareholders, directors and management. Managers often select a leveraging structure that enables achievement of their firms aim (Uddin, 2021). This leverage structure provides a framework of the weighted average costs of the fund and firm value. If the leverage structure is not correctly formulated, the firm may collapse sooner or later. Many capital structure theories describe the various comprehensive links between leverage and corporate value. Modigliani and Miller Theorem (1958, 1963) proposed that a firm value is unaffected by leverage structure, while the trade off-theory proposed otherwise (Sibindi, 2016). The cost of deviation is determined to be insignificant according to the pecking order theory, since there is no optimal capital structure. Several ideas have led to various hypotheses being developed about the relationship between leverage structure and firm value. In Bangladesh, no comprehensive empirical research on the link between leverage structure and firm value exists, and hence the significance of this study.

We have chosen Bangladeshi manufacturing sectors for our investigation for several reasons: First, previous research has focused on the developed economies, and their outcomes may not be applicable to emerging economies, such as Bangladesh. Second, due to prolonged military rule, Bangladesh has dealt with various forms of monetary exploitations in its money and capital markets over the past decade (Rahman & Rana, 2018; Uddin, 2019). This has significantly impacted the Bangladeshi manufacturing firms' financial decisions. Third, the manufacturing industry is regarded as the mainstay of production in Bangladesh, albeit its current fragility owing to a lack of solid corporate qualities. Poor accounting standards and audits, lack of accountability, lack of transparency, management inefficiency, and political turbulence are the main factors influencing firm's long-term value maximization (Uddin, 2021; Stilitz & Weiss, 1981; Pontines, 2008).

Unlike the previous studies, the study made remarkable contributions in the following ways: (i) The study attempts to identify the best technique for manufacturing firms to develop an optimal leverage structure to increase their value or the market price of their stock. Besides, any firm can benefit from the use of optimal debt. (ii) This study adds to the development of a conceptual framework by including firm characteristics and value as empirical data from a typical country, resulting in a clearer understanding of their influences on the firm. (iii) This study addresses the shortcomings in a previous study that had concentrated on a specific sector or division of manufacturing industries and had employed an insufficient sample and data. The result of such study may not be generalized to all manufacturing companies, despite the adoption of common debt policy or structure in all manufacturing companies (Haque et al., 2011). (iv) Unlike prior research, the study's conclusions were refined using consequential panel tests, which are more relevant for policy implications. Specifically, the tests allow us to control problems of heteroskedasticity, serial correlation and cross-sectional concerns. To the best of our knowledge, this is the first study primarily undertaken to investigate the leverage dynamics of manufacturing companies on firm value.

The remainder of the study is organized as follows: Section 2 presents a brief review of related literature and develops the hypothesis; Section 3 discusses the conceptual framework; Section 4 extends the methodology, data and variables measurement; and Section 5 presents the results and discussion. The final section draws the conclusion, policy implications and suggestions for further research.

## 2. REVIEW OF LITERATURE

Capital structure is utilized as a proxy for debt-equity ratio and has been experimentally examined in many research globally. According to Farooq et al. (2016), leverage structure has a strong favorable impact on the value of 19 KSE-listed companies in Pakistan from 2008 to 2012. Ater (2017) and Antwi

et al. (2012) examined evidence on the link between capital structure and firm value, and concluded that capital structure has a considerable impact on firm value. Nenu et al. (2018), investigated the factors that favorably influence firm value in Ghana, and found equity capital as a component of capital structure and long-term debt to be major determinants of a firm's value. The results indicated that a statistically significant relationship exists between the capital structure and value of non-financial firms listed on the Nairobi Securities Exchange. Based on the study's recommendation, firms should always compare the marginal benefits and costs of using long-term debt before concluding on its use in financing their operations. Long-term debt, just like equity capital, was found to positively impact a firm's value (Alber & Youssef, 2020). The positive impact of leverage on the firm value was also confirmed by Weill (2008) on Spanish and Italian firms. Meanwhile, Mwangi et al. (2014) examined the relationship between a firm's leverage and its financial performance, and found a negative correlation between the two (Singh, 2016). In another study performed by Kodongo et al. (2015) in Kenya, an inverse relationship was observed between leverage and firm value. Abor and Biekpe (2007) also reported a momentous and inverse relationship between leverage ratio and firm value of listed companies in Kenya. Rayan (2008) established a negative association between debt ratio and firm value of firms listed on the Johannesburg Stock Exchange. So far, the findings of these investigations have inconsistent or contradictory, thus necessitating further inquiry.

Under some realistic assumptions, Modigliani and Miller (1958, 1963) proposed that firm value is unrelated to capital structure or leverage ratio, whereas Myers (1977, 1984) suggested that firm value would be at its maximum level depending on the use of optimal-level debt by balancing between the benefits and costs of debt. As a result of the tax benefit, using leverage increases the firm's worth. In today's economy, it is inconceivable for a society not to tax its citizens. *Profitability*: According to the trade-off principle, a firm's profitability is maximized when it uses more leverage to gain a greater tax advantage. Based on the pecking order theory, firms should prioritize internal finance before turning to external sources. According to the hypothesis, the firm that generates more profit with less leverage generates more profit (Hosen, 2021; Myers & Majluf, 1984). As a result, profitability and business value have an inverse connection. *Growth Opportunity*: According to the pecking order theory, expanding companies often use retained earnings to fulfill expansion opportunities. Growth boosts earnings, which in turn enhance the value of a firm. As a result, debt and firm value have a negative connection. Rajan and Zingales (1995) also discovered an inverse relationship between borrowing and growth rate. Hence, growth potential is predicted to have a negative impact on the firm value. *Firm Size*: The size of a firm can have a variety of effects on its value. According to Cheng et al. (2010), large firms have lower firm value. Rajan and Zingales (1995) highlighted that there is a high likelihood of symmetric information about big firms being shared between management and investors, which increases investor confidence and hence encourages firms to issue common stock. As a result, an inverse relationship exists between the size of a firm and its value. According to Titman and Wessels (1988), big-scale firms have a high level of confidence in the likelihood of bankruptcy costs and are more diversified in generating services with low risks; therefore, they favor the use of more leverage, which has a favorable impact on the company value. *Liquidity*: According to Ibrahim (2007), there is an inverse relationship between liquidity and company value. The findings support the theoretical paradigm that less liquid firms are more likely to spend more in order to increase profitability, hence exaggerating firm value (Islam, 2016). Based on the pecking order theory, firms with higher liquidity need less debt-based external funding, since they rely on internal capital. The empirical evidence of pecking order theory confirms the theory's assumption (Ahmed et al., 2010; Najjar & Petrov, 2011). *Asset Tangibility*: According to Harris and Raviv (1991), firms with large fixed assets are allowed to borrow more debt because fixed assets may be utilized as a long-term debt mortgage. In other words, fixed properties might be pledged by firms as security to reduce the possible agency cost associated with loan utilization. Hence, there is a positive association between tangibility and firm value. Matlitz (1985) and Allen (1995) discovered empirical evidence of a positive relationship between leverage utilization and asset tangibility. *Tax shield*: Trade-off theory

recommended that a firm should use more debt for corporate tax saving to magnify the firm value. Auerbach (1985) examined the impact of tax structure on corporate financing decisions. The study established that variations in the corporate tax rate for any firm have an effect on financing decisions. Graham (1996) determined that, in general, taxes influence the corporate leverage structure, but the extent of the effect is not significant. Ashton (1991) identified that any tax benefit from the usage of external borrowing is likely to be negligible. Therefore, it can be said that there is an insignificant connection between debt usage and taxed firms.

### 3. CONCEPTUAL FRAMEWORK

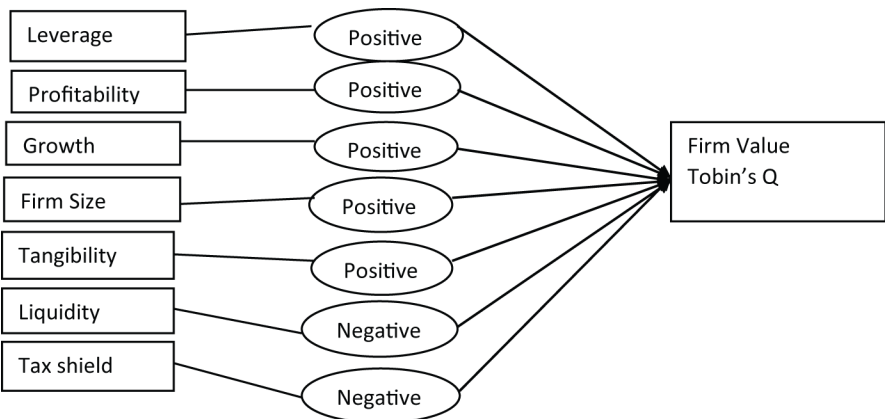
The framework was developed to investigate the influence of certain variables on the value of a company. This study attempts to uncover the effects of leverage structure and other variables on firm value or market price of common stock. It is hypothesized that changes in the debt ratio due to liquidity, business size, growth, profitability, and tax shelter may alter the weighted average cost of capital. When capital components deviate or fluctuate, the cost of capital rises, affecting the firm's value. The empirical evidence on the link between leverage structure and firm value has been inconsistent. At the micro-level, several research have described how the link between capital structure and firm value works (Rajan and Zingales, 1995). According to Frank and Goyal (2009), leverage rises with company size, tangibility, and median industry leverage, but falls with profitability and market-to-book ratios. Multiple regression analysis was utilized in the study to illustrate the empirical framework, subsequent to evaluation using Panel Corrected Standard Error (PCSE). The theoretical model is based on the hypotheses in Figure 1.

### 4. METHODOLOGY, DATA, AND VARIABLE MEASUREMENTS

#### 4.1 Methodology

The association between leverage structure dynamics and firm value was investigated using panel data estimators. To find the most appropriate approach, panel estimators such as panel ordinary least square, fixed effects and random effects were used successively. The fixed effects technique is suited for panel regressions, according to Hausman (1978). The study next tested the panel data for endogeneity, unobservable heterogeneity and simultaneity problems, and found them to be existent in the panel data. However, Arellano and Bover (1995); Blundell and Bond (1998) permitted the use

Figure 1. The Conceptual Research Model



of GMM on the panel data sets to efficiently address such challenges. This approach also allows us to control the endogeneity problem (Trujillo-Ponce, 2013). The data used in this study also suffers from the problems of serial correlation, heteroskedasticity and cross-section effects. Consequently, we adopted the PCSE to tackle such problems, as suggested by Beck and Katz (1995), and analyze the link between leverage structure constituents and firm value.

## 4.2 Sources of Data Collection and Variables Definition

The analysis relied on 945 observations from 63 listed manufacturing businesses on the DSE from 2003 to 2017, with each company having an average of 15 years of observation. Financial disclosures such as financial statements, notes to financial statements and cash flow statements of listed firms in Bangladesh were used to compile the data. The information gathered is available to the public on the Dhaka stock exchange's data cell and company websites. The samples were chosen based on the availability of data and active involvement in the financial markets throughout the study period. The time frame of 15 years (2003 to 2017) has been selected due to availing the largest information consistent with financial and non-financial data for the assessment of stated variables. Prior to this period, the data were inconsistent or missing. The financial sector such as banks, insurance firms, and leasing organizations was left out of the research, since their assets, activities, and regulatory requirements differ greatly from those of the industrial sector (Diamond & Rajan, 2000a; Hosen, Imran & Chowdhury, 2021). Also, this analysis excludes manufacturing enterprises that were no longer in operation before 2003 and had only limited data.

The debt ratio, debt to equity ratio, profitability, growth, company size, liquidity, tangibility and tax shield were identified as explanatory factors that influence firm value. Tobin's Q (market value to book value) was used as a proxy for company value (Rayan, 2008; Adeyemi et al., 2011). For the purpose of calculating market value, the ending market price was used (Maryam & Abdulkarim, 2015; Alfi & Safarzadeh, 2016). The ending market prices were gathered from 63 DSE-listed businesses between 2003 and 2017. The leverage structure dynamics (debt ratio or total debt-equity ratio) were measured by dividing total debt by total assets or total debt by total equity (Li et al., 2009; Harvey et al., 2004; Uddin et al., 2022). Profitability was calculated by dividing net profit by the equity of shareholders. Growth is defined as a rise in current-year total assets over last-year total assets, implying a positive relationship between firm value and growth. Gill et al. (2009) calculated firm size using the natural logarithm of total assets. Larger firms have a wider range of products and services, and have a lower risk of defaulting than small firm. Liquidity is the difference between a firm's current assets and current obligations, and it has a negative relationship with the firm's worth, thereby increasing lenders' trust. Asset tangibility is a significant factor determining the firm's worth, and is derived by dividing fixed assets by total assets (Harris & Raviv, 1991). The tax shield (amount of tax paid divided by net income) is projected to have a positive relationship with business value. Graham (1996) opined that financial decisions are generally made based on corporation tax structure, and that the magnitude of their influence is negligible. Financial ratios from annual reports of sample firms available at DSE from 2003 to 2017 were used to calculate the parameter values.

## 4.3 Model Specification

This section aims to investigate whether there is a link between leverage structure dynamics and firm value in Bangladeshi firms by using suitable econometric approaches to quantitatively analyze financial data. The market-to-book value of equity ratio was used as a proxy for firm value, which is the dependent variable, while the total debt ratio, also known as total debt by equity ratio, was utilized as a proxy for leverage structure, which is the independent variable. The model also takes into account control factors such as PROF, GROTH, SIZE, LIQ TANG and Tax shield. The relationship between leverage structure dynamics and firm value was established using the following econometric model:

Table 1. Measurement of the variables

	Variables	Description	Measurements	Predicted Sign
Dependent Variable	MBV	Market value to book value	Market value/book value(Tobin'sQ)	
Independent Variables	DR	Debt ratio	Total debt/total assets	+
	D/E	Total debt-equity ratio	Total debt/total equity	+
	PROF	Profitability Ratio (PR)	Net income/ equity	+
	GROWTH	Growth	Change in TA/net asset	-
	LIQ	Liquidity Ratio (LR)	Current assets/current liabilities	-
	TANG	Asset Tangibility	Fixed assets/total assets	+
	FS	Firm Size (FS)	Ln(total assets)	+
	TS	Tax shield (TS)	Tax/net income	-
	A	Constant terms		
	e	Error term		

Source: Data have been compiled by the researcher using Ratios

$$MBV = B_0 + B_1DR + B_2D/E + B_3PROF + B_4GROWTH + B_5SIZE + B_6LIQ + B_7TANG + B_8TS + e$$

## 5. EMPIRICAL RESULTS AND DISCUSSION

The findings of the multiple regression model on the link between leverage structure dynamics and firm value in Bangladesh are described in this section. This section aims to uncover answers to research questions, assess whether pre-determined hypotheses are valid and compare the outcomes to earlier findings.

### 5.1 Descriptive Statistics

The findings of descriptive statistics for each variable are noted in Table 2. Descriptive statistics are a common feature of data sets used to comprehend normative causes and actions on the study's final outcomes.

The table summarizes the sample size, minimum, maximum, mean value, standard deviation, skewness and kurtosis of supplied data from 2003 to 2017. For the 945 observations, the minimum and maximum firm values are 0.0219 and 62.192, respectively, which exhibit a wide range. The minimal firm value of 0.0219 implies a firm with an eroding shareholder value, while the highest value of 62.199 indicates a firm with an impressive shareholder value. The standard deviation of firm value was 5.914, which indicates that firm value fluctuated a lot over the study period. The lowest and highest debt values were 0.0181 and 0.994, respectively, indicating that businesses were adopting aberrant debt ratios. The firm that borrows 1.81 percent of its capital structure, leaving the tax advantage and is against the optimum capital structure and trade-off theory, but with a low financial risk of 0.223. The average debt of the sample companies was 53.99 percent, which is the usual amount based on the tax benefits and financial risk. The debt-equity ratio's minimum and maximum values were 0.229 and 185.020, respectively, representing the highest and lowest bankruptcy risks. The debt-equity ratio

**Table 2. Results of Descriptive Statistics**

Variables	Sample	Min.	Max.	Mean	SD	Skewness	Kurtosis
FV	945	0.0219	62.192	3.413	5.914	5.250	38.414
DR	945	0.0181	0.994	0.539	0.223	-0.107	2.322
DE	945	0.229	185.020	2.992	9.308	13.406	232.070
FS	945	9.633	24.284	20.070	2.160	-1.456	6.212
AT	945	0.004	0.947	0.432	0.224	-0.030	2.179
GR	945	-0.999	5.673	0.148	0.397	7.389	80.541
LR	945	0.324	77.137	1.967	3.923	14.926	272.786
PR	945	-4.792	1.657	0.129	0.238	-8.959	204.535
TR	945	-1.686	0.865	0.215	0.164	-1.359	22.593

Source: Data have been compiled by the researcher using Annual Reports (2003-2017)

has an average value of 2.992(SD= 0.229), indicating a high degree of debt and financial risk. The highest, lowest, and mean values of firm size were 9.633, 24.284 and 20.0709, respectively, with a standard deviation of 2.160, indicating a wide range of company sizes. The minimum and maximum tangibility values were 0.004 and 0.947, respectively, which are not expected.

The average tangibility score of 0.432 indicates that enterprises are keeping a suitable amount of fixed assets in relation to total assets, while the standard deviation of 0.224 indicates the average risk in fixed assets. The minimum and maximum values of growth rates were -0.999985 and 5.67, respectively, with an average growth value of 0.148 (SD = 0.397). This reflects a substantial average growth rate, albeit wide variation. The minimum and maximum liquidity ratios of 0.324785 and 77.137 times of current assets to current liabilities, respectively, represent the enterprises' lowest and highest liquidity levels. The mean value of 1.96 times is close to the conventional current ratio guidelines, but the standard deviation of 3.923 indicates the presence of excessive volatility in liquidity. The minimum and maximum values of profitability were - 4.792 and 1.657 percent, respectively, indicating a wide range in the firms' profitability. The average firms' profit was 0.129, which is satisfactory, although the standard deviation of 0.238 indicates a slightly higher average risk. The minimum, maximum and mean value (SD) of tax shield were -1.686, 0.865 and 0.215 (0.164), respectively, signifying that the firms are paying the highest amount of tax.

The asymmetric pattern of data is described by skewness. Ideally, asymmetric data has a skewness of roughly zero, indicating the normal distribution of the data. The current analysis indicates the permissible value of skewness for all variables. Skewness has three values: zero, negative and positive. The study's greatest and lowest skewness values were 14.926 and -8.959. Kurtosis shows how the final and tails of a variable's distribution diverge from a normal distribution. A normal distribution has a kurtosis value that is close to zero. A negative and positive kurtosis score represents the relative tails and a strong peak, respectively, in the research.

## 5.2 Correlation Matrix

The Pearson Correlation Matrix was used in this study to see if either of the two variables in the model have any correlation. Before running the regression model, most researchers display the Pearson correlation matrix (Broni, Hosen & Mohammed, 2020; Huynh & Su, 2010; Padachi, 2006). The test of multicollinearity yielded the following results.

Table 3 shows the results of the Pearson correlation matrix test, which represents the link between any two variables in the specified model. At a 1% significance level, factors including debt ratio, debt-equity ratio and tax rate showed a substantial positive link with business value. The findings

**Table 3. Pearson Correlation Matrix of variables**

	FV	DR	DE	FS	AT	GR	LR	PR	TR
FV	1								
DR	0.095**	1							
DE	0.240**	0.401**	1						
FS	-0.275**	-0.023	-0.037	1					
AT	-0.130**	-0.392**	-0.155**	0.147**	1				
GR	-0.018	0.081*	0.052	0.089**	0.054	1			
LR	-0.149**	-0.118**	0.033	-0.060	-.089**	-0.011	1		
PR	0.295**	0.142**	0.095**	-0.058	-.222**	0.013	0.258**	1	
TR	0.115**	0.083*	0.046	-0.073*	-.157**	-0.009	-0.042	0.114**	1

Source: Data have been compiled by the researcher using Annual Reports (2003-2017)

\*\* Significant level at 1 percent

\*Significant level at 5 percent

also suggest that the debt-to-equity ratio, tax shield and debt-to-equity ratio are all significant and positively connected with firm value. At the 1% significant level, five major independent factors such as size, tangibility, growth liquidity and profitability demonstrated a significant negative link with firm value. Firm value decreases when size, tangibility, growth, liquidity, and profitability increase. Also, the data demonstrated a negative and significant association between debt-equity and the remainder of the debt, tangibility, profitability and tax shield at the 1% significance level. The study found a strong positive association between debt-equity and a set of growth, liquidity, and company size.

### 5.3 Operational Results of Generalized Method of Moments (GMM)

To assess panel data, the GMM provides a convenient alternative to the fixed or random-effects models. The superfluous variables were controlled by this panel estimator, which delivers efficient results. Table 4 shows the GMM test results.

The systematic findings obtained from the GMM testing are shown in Table-4. The overall debt ratio and the debt-equity ratio are the two primary leverage structure ratios, with the total debt ratio being unimportant as opposed to the total debt to equity ratio, which exhibits a positive and substantial effect on the firm value. The leverage structure, often known as the overall debt-to-equity ratio, is the true driver of a firm value. This study outcome corroborates the findings of past research (Thauti, 2011; Mohouli, 2013; Chowdhury & Chowdhury, 2010).

The debt-equity ratio and firm value have a positive and significant relationship, according to the study. The firm value of Bangladeshi firms rises by 0.139 percentage for every unit increase in debt-equity ratio. The findings are in line with Sinha's (2017) research, which focused on the growth of Indian economy. The findings are also consistent with the trade-off hypothesis, which proposes that increasing leverage will result in tax savings and lower agency costs until a divergence occurs, during which an increase in leverage will result in even higher significant agency costs of external debt, making the possibility of bankruptcy or liquidation imminent. The incremental costs offset the advantage of tax shield through debt financing, which counteracts the positive effect of debt financing on firm value. As a result, financial managers must identify the best debt structure to strike a balance between the interest tax benefit and the increased cost of leverage. The debt-equity ratio is also positively associated with firm value, which is consistent with market-time theory. According to the theory, a firm should issue common stock or equity when the market price is high, since the cost of common stock will be cheaper. This would increase the firm's worth at the expense of new



**Table 4. Results of Panel Generalized Method of Moments**

Variable	Fixed Effect Model			
	Co-efficient	Std. Error	t-statistic	p-value
Constant	15.452	1.767	8.740	0.000
DR	-0.826	0.929	-0.889	0.374
D/E	0.137	0.020	6.724	0.000
FS	-0.668	0.081	-8.218	0.000
AT	-0.073	0.867	-0.0841	0.933
GR	-0.188	0.438	-0.430	0.667
LR	0.096	0.046	2.057	0.039
PR	5.973	0.774	7.714	0.000
TR	2.327	1.072	2.170	0.030
R-square.		0.204		
Adjusted R-squared.		0.197		
S.E. of regression		5.297		
J-statistic		1.325		
Prob(J-statistic)		0.000		
Durbin-Watson stat		0.599		

Source: Data have been compiled by the researcher using Annual Reports (2003-2017)

owners, with the advantages going to present shareholders. As a result, the link between leverage structure and company value is widely established.

The findings showed that firm size has a negative and significant impact on the firm value. The findings could be rational due to the fact that larger firms are more diversified and boast stronger internal source of financing, which make them less dependent on borrowing. This indication substantiates the pecking order theory, which focuses on sequential financing from internal sources to external borrowings. The results are similar to that of Draniceanu and Ciobanu (2013), but also contrast the findings of numerous other studies (Barton et al., 1989; Mackie-Mason, 1990; Al-Sakran, 2001; Hovakimian et al., 2004; Joshua, 2008). As a result, the hypothesized association between firm size and firm value is accepted. The study revealed that asset tangibility is not a critical component of leverage structure, as it was negatively related to firm value. Specifically, if tangibility increases by 1 unit, the firm value will reduce by 5.164504 times. The finding is consistent with that of Booth (2001), which revealed a negative relationship between tangibility and Thai firms' value. Hence, the relationship between the asset tangibility and firm value is rejected.

The study found an inverse and insignificant link between growth rate and firm value. It was observed that a unit increase in company's growth rate decreases the firm's value by 0.201 times. When a firm expands in terms of sales or assets, it reduces its leverage and manages its growth requirements through internal finance, which is supported by the pecking-order theory. The findings are consistent with that of Rajan and Zingales (1995), who observed that growth opportunities and leverage have an adverse relationship. As a result, the hypothesis of a link between growth rate and firm value is not accepted.

With regards to the influence of liquidity on firm value, it was stated that liquidity is a critical factor to consider when determining the firm's worth. A firm with significant liquidity can boost its value by increasing creditors' trust in its ability to satisfy existing commitments and reducing the

risk of bankruptcy. Creditors and suppliers prefer companies with significant liquid assets, which increases the market value's acceptability. According to the pecking order theory, high-liquid firms would utilize less external borrowing, which is the opposite of the result of Ibrahim (2017). As a result, the hypothesized association between liquidity and firm value is accepted.

In terms of profitability, the findings showed that profitability and firm value have a positive and significant relationship. Profitable firms would produce more money, which would, as predicted, improve their value. This corresponds to the common understanding of finance that potential investors often anticipate. As a result, the proposed link between profitability and firm value is recognized.

It has been discovered that tax has a compelling effect on corporate value. A firm with a high tax rate takes on additional debt in order to take advantage of the tax benefit on interest expenditure, which increases the firm's value. According to the trade-off theory, a firm will grow its leverage to the point where the tax savings on financial charges for that level of leverage are offset by an increase in the present value of bankruptcy expenses (Myers, 2001). As a result, the hypothesis on the association between tax rate and firm value is accepted. Finally, since five predictors out of eight independent variables were determined to have an influence on the firm value, it can be said that an effective association exists between leverage structure and firm value.

#### 5.4 Operational Results of Panel Correlated Standard Error

PCSE deals with issues such as serial correlation, heteroskedasticity, and cross-sectional problems, all of which may alter the outcome of the study. The method is capable of diagnosing the aforementioned issues and improving the efficiency and effectiveness of the findings for use and policing. The results of PCSE testing are presented in Table 5.

Table 5 shows the association between leverage structure and firm value. To evaluate the relevance of the factors on firm value, they were employed as independent variables, such as debt ratio, debt-equity ratio, firm size, growth rate, liquidity, profitability, tangibility and tax rate. The PCSE estimator's results are explained using hypotheses about the firm value that have been developed.

According to the findings, debt ratio and firm value have a positive but weak association, as one unit rise in the debt ratio increases the firm value by 0.211 units. The connection is consistent with

**Table 5. Results of Panel Corrected Standard Errors (PCSE)**

Variable	Panel Correlated Standard Error			
	Co-efficient	Std. Error	z-statistic	p-value
Constant	9.005	3.277	2.75	0.006
DR	0.211	1.326	0.16	0.873
D/E	0.123	0.014	8.42	0.0000
FS	-0.285	0.154	-1.84	0.066
GR	-0.151	0.175	-0.86	0.387
LR	0.110	0.044	2.46	0.014
PR	3.043	0.788	3.86	0.000
AT	-2.192	1.239	-2.75	0.077
TR	1.394	0.678	2.06	0.040
R-square.	0.2006			
Wald Chi-square	146.42			
p-value	0.0000			

Source: Data have been compiled by the Researcher using Annual Reports (2003-2017)

the trade-off theory, which predicts that borrowing debt for a tax deduction on interest expenses will boost firm value at some time. Hence, the study hypothesis that overall leverage has a significant and positive association with firm value is rejected.

The analysis indicated that the debt-to-equity ratio is the most important indicator influencing the firm value positively, as a unit rise in debt-to-equity ratio leads to 0.123 unit rise in the company value. The finding may be supported by the trade-off theory, which states that firm value should be maximized by employing the optimal level of debt because the tax benefit lowers overall financing costs. Once the debt is issued, the market value has no bearing on the tax advantages. The finding is the polar opposite of Modigliani and Miller's (1958) capital structure theory, which argued that capital structure is irrelevant to firm value under a perfect capital market in which the mix of financing has no effect on firm value. When information asymmetry is not a factor, a perfect capital market allocates no corporation tax or transaction costs, and a firm's value is produced by its capacity, regardless of whether capital is sourced internally or externally.

However, Modigliani and Miller's (1963) model is changed if there is a corporate tax, and borrowed capital is risk-free, since interest on debt might lower corporate tax and so operate as tax shields. As leverage rises, the total cost of capital will fall. In this situation, firms must finance their activities through debt. The more debt a firm has in its capital structure, the more tax advantages it may pursue, and therefore the more value the company will gain. Chowdhury (2010) discovered that the leverage ratio and firm value had the same significant relationship. Previous studies on the relationship between leverage and firm value revealed that as debt levels rise, so does the firm value (Ward & Price, 2006; Sharma, 2006; Firer et al., 2004). The findings are consistent with those of Mas'ud (2008) and Kesuma (2010), who concluded that leverage had a significant impact on firm value. Similarly, Gupta et al. (2011) found that the stock market in India had a substantial and adverse influence on firm value when leverage was applied. According to Ogbulu and Emeni (2012), there is a significant link between leverage structure and market-to-book value. As a result, the hypothesis that the debt-equity ratio and firm value have a positive significant association is established.

Firm size is a key determinant of firm value. Specifically, it has a negative relationship with the firm value. The findings suggest that bigger organizations are more likely to employ less borrowing in their financial structures, whereas small enterprises are more likely to take on more debt. This conclusion is backed by a lot of evidence (Akhtar et al., 2011; Booth et al., 2001), which highlighted that an inverse association exists between business size and firm value. Also, the findings are consistent with Rajan and Zingales' (1995) theory that there is less asymmetrical information regarding larger enterprises. This decreases the risk of undervaluation when issuing fresh shares and encourages large companies to adopt equity financing. As a result, the positive association between firm size and firm value hypothesis is rejected.

The growth rate is not one of the most essential criteria in determining the firm value, as a negative association exists between the two variables. According to the findings, a weak interaction exists between firm value and expansion opportunities, consistent with the prior research of Chowdhury and Chowdhury (2010), who found that growth opportunity had little impact on firm value. Meanwhile, using the book-to-market value ratio as a measure of firm value, Uddin (2009) discovered a positive association between growth and firm value. The findings are also consistent with those of Rajan and Zingales (1995), which demonstrated an adverse association between growth possibilities and the use of debt. As a result, the relationship between growth opportunity and firm value is not accepted.

The liquidity ratio has been shown to be a key element in determining the firm value. Liquidity and firm value have a favorable association, suggesting that having more liquid assets increases the firm value. The upshot of this finding might be that companies can easily use their liquid assets to satisfy present commitments, thereby increasing stakeholders' trust in the firms. As a result, the hypothesis of an inverse link between liquidity and company value theory is accepted.

Profitability and firm value have been demonstrated to have a strong and substantial link. This means that if a firm's profitability rises, so does its value. This conclusion is based on the fact that

profitable firms are more appealing to investors, which raises the demand for their shares and ultimately results in an increase in the market price of their stocks. Bradley, Jarrell, and Kim (1984) employed a model based on contemporary capital structure balance theory. They discovered a substantial link between non-tax shields and a company's debt level. As a result, the hypothesis of the positive relationship between profitability and firm value is accepted.

Based on our findings, asset tangibility is not a significant determinant of firm value, implying that if a firm has a substantial investment in fixed assets, it will generate less profit and in turn experience a lower firm value. Across several research, empirical data on the effect of tangibility on leverage structure produced varied outcomes. Wiwattanakantang (1999) discovered an inverse relationship between tangibility and Thai business capital structure. Similarly, Booth (2001) revealed an inverse relationship between leverage structure and Thai firms' value. According to Prasad et al. (2003); Suto (2003), there is a positive significant association between tangibility and leverage for Malaysian enterprises. Enterprises with a high fixed asset base are anticipated to borrow more money at a lower interest rate than firms with less fixed assets, and vice versa. The study's findings regarding tangibility and firm value are incongruent, and therefore, the hypothesis on the relationship between tangibility and firm value is rejected.

In terms of tax rate, it is one of the most important positive determinants of firm value. The outcome backs the predictions of trade-off theory, which states that high-tax-bracket enterprises should utilize more debt, since interest on debt is a tax shelter that increases firm value. As a result, the positive significant association between corporation tax rate and firm value hypothesis is accepted.

The R-square value of the model is 20.06 percent, suggesting that the model can explain 20.06 percent of the variation in firm value by the studied explanatory variables. The p-value and F-statistic confirm the appropriateness of the model at 1 percent significant level.

## 6. CONCLUSION

Using data from 2003 to 2017, this study looked at the influence of leverage structure dynamics on firm value in Bangladesh. The analysis discovered that the debt-equity ratio has a substantial positive association with firm value, in line with the conclusions of Barton et al. (1989) and Shim & Siegeltheoretical (2000). This research clearly demonstrates that leverage structure has a significant impact on firm value in Bangladesh. The discovery also contradicts a number of earlier research findings (Rajan & Zingales, 1995; Eltayeb, 2011; Smith & Watts, 1992; Barclay, Smith, & Watts, 1995). This study backs the core notion of trade-off theory, which states that by employing the optimal level of debt, firm value may be maximized due to interest expenditure tax savings. Consistent with the claim of Modigliani and Miller (1958) that leverage structure and firm value are linked, this study found that liquidity, profitability and tax shelter are all important positive determinants of firm value. Meanwhile, tangibility and company size was found to have a significant negative effect on firm value. This suggests that firms with more fixed assets and total assets tend to require less outside the capital. The data appears to support the pecking order theory's premise. The study also found that total debt ratio and growth rate are unimportant, with total debt ratio being positively associated with firm value and growth rate being negatively related.

Policy implications drawn from the findings are as follows: i) The empirical data evidenced that a rise in leverage level boosts firm value, congruent with the trade-off theory. As a result, in order to maximize the firm value for sustainable development, managers must employ the most effective leverage ratio in their capital structure. (ii) Some explanatory factors, such as liquidity, business size and growth were discovered to contrast the assertion of earlier studies. Firms must implement financial policies and establish corporate governance for sustainable financial development by utilizing debt policy. Due to a lack of corporate governance and underuse of financial policies, the use of debt is riskier and limited in the stock market. (iii) Some businesses run by families, institutions and political leaders, most of whom are not professionally mature, focus on the ownership structure, resulting in

inappropriate financial decisions. The enterprises, on the other hand, must be founded by dispersed shareholders, which necessitates regulation adjustments by the Bangladesh Securities and Exchange Commission in order to modify the ownership structure. (iv) Since corporation tax is a major concern for company policymakers, financial managers must operationalize the trade-off theory. Future studies may consider the influence of other factors such as corporate governance and government policy on firm value in Bangladesh.

## **CONFLICT OF INTEREST STATEMENT**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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