IMPACT OF CAPITAL STRUCTURE ON PROFITABILITY AND CORPORATE VALUE OF CERAMIC INDUSTRY: A STUDY ON SOME SELECTED LISTED COMPANIES IN DHAKA STOCK EXCHANGE

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Abstract

The purpose of this study is to investigate the effect of capital structure on profitability and corporate value of listed ceramic companies of Bangladesh. One of the endogenous variables in this study is profitability measured by return on asset, return on equity, return on sales, earnings per share, and net profit margin and another explained variable is corporate value indicated by Tobin's Q and market to book value of equity. The exogenous variable is capital structure proxied by short term and long -term debt to asset ratio, total debt ratio and debt to equity ratio. This research is a quantitative study that uses panel data regression model with the help of R software to aid the analysis. This work involves five ceramic companies enlisted in Dhaka Stock Exchange over the period of seven years from 2012 to 2018. Three econometric techniques – pooled ordinary least square, fixed effect and random effect models were applied. However, the appropriate method for each profitability and corporate value measure was sorted out through different tests. Finally, panel corrected standard error technique was applied to test the hypotheses. Multicollinearity problem restricted the use of short -term debt to asset and total debt ratio as capital structure estimators. Firm size and liquidity were used as control variables to avoid omitted variable bias. The research outcome demonstrates a positive relationship of debt- equity ratio with profitability and corporate value. On the other hand, long-term debt to asset ratio upholds a negative correspondence with the explained variables. Capital structure was found to create no significant impact on net profit margin. This study lays a groundwork to explore the impact of capital structure on profitability and firm value of solely the listed ceramic companies of Bangladesh. To the author's knowledge, no such study has been conducted so far on the ceramic industry of Bangladesh. However, such study is highly essential to support financial managers, lenders and investors to take prudent decisions.

Keywords : *Capital Structure, Ceramic Companies, Corporate Values, Correlation Matrix, Exogenous Variable, Fixed Effect Model, Multicollinearity, Pooled Ordinary Least Square, Profitability, Random Effect Model.*

1. INTRODUCTION

The study of a firm's profitability portrays its sustainability and financial strength. High profitability implicates that management is able to utilize company's resources

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effectively and efficiently, which, in turn, is beneficial for the overall industry as well as the country's economy as a whole. Management's efficacy in raising fund and decision-making upgrades firm's corporate value as well. An industry comprising of companies with high financial performance and corporate value thus, can gain shareholders' confidence and trust, which enables the industry to attract more and more new investors.

Many factors can affect the profitability and corporate value of an industry. These factors might be of two types: microeconomic and macroeconomic. Among the microeconomic factors, capital structure choice of the firm is one of the most significant components that plays a great role in determining firm's financial performance and improving its value to all stakeholders. Again, the capital structure of any firm depends on many internal and external environmental factors. An effective capital allocation strategy i.e. debt- equity proportion can help a company to be highly profitable and thus, can maximize its value.

One of the rapidly flourishing manufacturing sectors of Bangladesh is the ceramic industry. This industry is gaining momentum by shifting its status from being an import dependent sector to an export-oriented sector, diversifying the export basket and hence, contributing greatly to Bangladesh economy. To ensure a steady export earnings and a sound balance of payment position diversification of export items is very important for this country. Because of the remarkable progress of this sector in the global export market, ceramic industry of Bangladesh is receiving significant attention of investors, entrepreneurs, and government. Consequently, there lies the necessity to conduct researches on this exponentially growing sector of Bangladesh.

The objectives of this research work are:

- To select the capital structure components that create impact on both the firm profitability and corporate value of listed ceramic companies of Bangladesh.
- To identify the appropriate panel data regression method to observe the effect of the selected capital structure variables on profitability and corporate value of the listed ceramic companies.
- To explore the strength and direction of the effect of the selected capital structure variables on profitability and corporate value of the listed Bangladeshi ceramic companies.

As a whole, this paper aims to examine the effect of capital structure on ceramic industry's profitability and corporate value and thus provide direction to finance managers for raising capital funds. The next section gives a brief overview of the ceramic industry in Bangladesh. The literature review section of this work summarizes the findings of the related studies carried out in other countries and Bangladesh. The methodology section discusses the data sources, dependent, independent and control variables, conceptual framework, research hypotheses development, and model specification. In the analysis and finding section, the results of the descriptive statistics,

correlation matrix, and different tests e.g. test of multicollinearity, heteroscedasticity, serial correlation, unit roots, endogeneity have been discussed. In addition, linear regression model has been illustrated through correlated panel corrected standard errors (PCSEs) model. Furthermore, this section identifies the statistically significant variables affecting different profitability and corporate value measuring parameters of ceramic industry of Bangladesh.

2. CERAMIC INDUSTRY OVERVIEW

The ceramic sector is one of the most potential industries in Bangladesh which started operation in late 1950. The first ceramic plant, owned by Tajma Ceramic Industries, was established in Bogra in 1958. It was a plant for manufacturing porcelain tableware. However, extreme rivalry faced from foreign competitors hindered the establishment of any big ceramic manufacturing company in the country until 1980. However, the sector saw an immense flow of investment during the 1990 after the advent of technological advancement. Since then, the local ceramic market is propelling over the years. According to Bangladesh Ceramic Manufacturers and Exporters Association (BCMEA), at present, there are 54 ceramic companies in production and more than 29 are in the pipeline for production.

With a market size of roughly BDT 29,000 crore, the ceramic industry of Bangladesh occupies many major sub-sectors. Each of the sub-sectors produces different products – mainly various types of tableware, tiles, sanitaryware, insulators, heavy clay, refractories and many more. Ceramic is also utilized for advanced applications for example biomedical, dental, photonic, magnetic, optical, and high-performance industry uses as well as for preparing semiconductor chips, machine tools, and so on. In addition, great hardness, resistance to thermal and chemical stress and such unique properties enable ceramic to hold the potential to revolutionize many industries like: electrical and electronic, military, defense, pharmaceuticals, semiconductors and automotive sectors (Mahmood, Rahman, & Zaman, 2013). The robust development potential of the real estate sector and rising living standard have triggered a spiraling growth in the use of ceramic products and thus, the demand for ceramics is growing on an average by 20% each year. This extensive rise in demand has resulted in a whopping 200% growth in production in the last decade (Source: RAK Annual Report 2018). In 2017-18 fiscal year, Bangladesh ceramic sector earned a record-breaking revenue through the local sales of tableware, tiles as well as sanitaryware. Tableware and tiles held the highest domestic market shares (92.87% and 76.18% respectively) in 2017-18 within the interval of the last five fiscal years from 2012-13 to 2017-18.

Meeting-up around 90% of the local demand for tableware, 70% for tiles and 80% for sanitaryware, Bangladesh ceramic industry is expanding significantly to the international market with time. This rapid expansion is backed by some inherent advantages like high quality products capable of fulfilling the demand of local and global customers, cheap labor, and innovative production. Bangladesh ceramic sector now holds 0.14% of the global export market and contribution of this sector to

GDP is roughly US$ 42 million each year. This promising industry achieved a record 31.44% growth in export of tableware in 2017-18 fiscal year and earned total US$ 45.98 by exporting ceramic products to more than 50 countries around the world including Italy, the US, Germany, the Netherlands, Poland, Greece, Turkey, India, Canada, Sweden, Norway, Spain, the UAE, and Russia (NBR, EPB, BCMEA). Md. Shirajul Islam Mollah, president of BCMEA anticipates that by 2024, the ceramic industry will be the third largest export sector after the garment and leather industry.

Despite the tremendous growth in ceramic sector, Bangladesh still imports 25-35% tiles to meet the local demand. Two principal reasons for this deficit are: inadequate supply of natural gas and shortage of local raw materials. As such product quality and consistent supply to the market suffer. However, Bangladesh government has focused on resolving the issues by active replacement with liquefied natural gas (LNG) and duty-free raw material import facility. Thus, there is a scope to meet the gap in local demand which is leading the local ceramic producers to expand their business further (Source: RAK Annual Report 2018). Not only that, many new entrepreneurs both from home and abroad are showing their interest to enter into this sector.

Most of the Bangladeshi ceramic products enjoy duty free and quota free access to almost all the developed countries and some of the most demanding and quality -conscious markets of European Union (EU), America, Australia, and Asia (Source: RAK Annual Report 2017). This access to the global market is further aided by the fact that the policy regime of Bangladesh for foreign direct investment (FDI) is by far the best in South Asia. Furthermore, export of Bangladeshi ceramic products to abroad enjoys 10% cash incentive and the benefit of good reputation around the world which make this sector extremely lucrative to local and foreign investors.

The industry insiders expect to bring about some revolutionary changes e.g. incorporation of nanotechnology and software-based automation in the production process along with dynamic transition from the production of traditional ceramic items to advanced categories like bio ceramic, microchips, mechanical ceramics and the like. These changes will certainly increase the acceptability of the ceramic products of Bangladesh to the global market and contribute immensely to the local economy.

3. LITERATURE REVIEW

Modern theory of capital structure emerged following the irrelevance theory of Modigliani and Miller (1958) who stated that firm value of both a leveraged and unleveraged firm are equal. However, the theory soon faced much debates since the assumptions hinged to this theory such as no taxes, bankruptcy and agency costs were practically never existing in the real world. To answer such challenge, Modigliani and Miller (1963) argued that considering the tax saving from debt, capital structure choice becomes relevant (Matemilola, Bany-Ariffin, & McGowan, 2013). On the other hand, Miller (1977) claimed that in the presence of personal taxes, the tax savings from corporate taxes are counterbalanced by giving personal

taxes. As a result, balanced capital structure remains irrelevant. However, Modigliani and Miller (MM) theory fails to explain if bankruptcy, agency and transaction costs are considered.

Even though, a realistic picture of capital structure choice is not obtained by MM theory, it provides a theoretical background for further research on the question of how such a study is relevant and what are the factors to be considered while financial managers need to choose the debt-equity structure. That is how MM proposition-I (Ross, Westerfield, & Jaff, 2013) gave rise to the evolution of the agency theory (Harris & Raviv, 1991; Jensen & Meckling, 1976; S. Myers, 2001), the pecking order theory (S. Myers, 2001; Stewart Myers & Majluf, 1984), and the trade-off theory (Kim, 1978; Kraus & Litzenberger, 1973; Miller, 1977; Modigliani & Miller, 1963) in academic research. Some other theories leading to establish the tools for raising capital are signaling theory (Barclay & Smith, 1999; Graham et al., 2001; Harris & Raviv, 1991; Ross, 1977) and market timing theory (Baker & Wurgler, 2002).

With a view to observing whether the impact of capital structure determinants on financial performance of Malaysian and Indonesian firms are the same or different, Ramli, Latan, and Solovida (2019) used partial least square- structural equation modeling (PLS-SEM) method. The authors also investigated the mediating effect of firm leverage on the firm performance. The study was conducted on the data collected for the period of 1990-2010. Among the different firm-specific factors, asset structure, growth opportunity, firm size, liquidity, business risk, and non-debt tax shield were chosen. The selected macroeconomic determinants that were used by Ramli et al. (2019) were stock and bond market development, economic growth, interest rate, and inflation rate. The study revealed that firm financial performance indicated by return on equity (ROE), return on asset (ROA), return on investment capital (ROIC) is directly affected by some capital structure determinants. Furthermore, the results indicated that only the Malaysian firms' sample has a positive significant correlation between firm leverage and financial performance and relies on external financing rather on internal financing. Another remarkable finding of the research was that the mediating effect of firm leverage measured by total debt ratio (TDR), total debt to capital for book and market value (TDTC-BV & TDTC-MV), long term debt to capital for book and market value (LTDTC-BV & LTDTC-MV), short term debt to capital for book and market value (STDTC-BV & STDTC-MV) on performance is applicable only in Malaysia however, not in Indonesia. Results from multi-group analysis (MGA) evidenced that specific determinant coefficients of both capital structure and firm performance notably vary from Malaysia to Indonesia.

The moderation effect of credit risk on the relationship of capital structure (long-term debt to total asset-LTDTA) and firm performance (pretax profit to total assets) in small and medium sized enterprises (SMEs) of some of the European countries such as Austria, Belgium, Finland, France, Germany, Italy, Portugal, Spain, Sweden, and the UK was examined by Li, Niskanen, and Niskanen (2019). The study used net turnover ratio, age, size, patent, trademark, membership to the same business

group as well as market based financial system, industry classification and country classification as control variables to firm leverage. The ordinary least square (OLS) regression, logistic regression and instrumental variable (IV) 2SLS method analysis done on cross-sectional data of the selected countries for 2012 fiscal year yielded that the relationship between capital structure and performance is determined by an SME's credit risk status. The most remarkable finding was that leverage is negatively related to performance for low credit risk SMEs. On the other hand, for high credit risk SMEs, the relationship does not hold.

The mutual relationship of capital structure and profitability and its impact on corporate values was examined by Mangesti Rahayu, Suhadak, and Saifi (2019) using general structural component analysis (GSCA) performed on the data of 33 manufacturing companies enlisted in Indonesian stock exchange for the period of 2008-2015. The outcome of the research suggested that corporate profitability indicated by return on investment (ROI), return on equity (ROE) and net profit margin (NPM) has a significant negative influence on capital structure (STDTA, LTDTA, DER) which in turn means that high profit-making firms tend to use lesser amount of debt compared to those making low profit. Similar relationship is also found between capital structure and profitability. Analysis results also showed that both profitability and capital structure are determinants of corporate values of listed manufacturing companies of Indonesia.

The way capital structure creates impact on profitability of Chinese firms was explored in (Dalci, 2018). As such, annual financial data of 1503 listed manufacturing firms over the period of 2008-2016 were investigated. To control for potential endogeneity, initially, a simultaneous equation method was employed. After that panel data regression like OLS, fixed effects, first difference, random effects and 2-step Generalized Methods of Moments (GMM) were performed. The study demonstrated that the influence of capital structure on profitability follows an inverted U shape, where, the positive effect might be caused by tax shield benefit and negative effect might be the result of bankruptcy cost, financial distress, acute agency problems and information asymmetry present in the firms.

The effect of capital structure on financial performance of the cement industry of Bangladesh is observed by Khatoon and Hossain (2017). Among the 7 cement listed companies, panel data of 5 over the period of 1999 to 2011 were utilized for this purpose. Performance indicators that were used in this study were ROE, ROA, EPS, and Net profit margin. Five capital structure ratios namely SDTA, LDTA, TDTA, LTDCE, TDTQ along with size, growth of the company, tangibility of assets, cash flows and liquidity were the exogenous variables. Panel data regression Fixed Effect Model analysis yielded that performance variables are positively influenced by short term debt and cash flows. Except for ROE, other financial performance variables are negatively affected by long term debt, tangibility, and liquidity.

A similar study is performed by Siddik, Kabiraj, and Joghee (2017) on the banking sector of Bangladesh. Along with bank specific factors e.g. liquidity and size, Siddik

et al. (2017) also took account of macroeconomic factors like GDP growth rate and inflation. Panel data of 22 banks which had audited financial statements from the period of 2005-2014, were used to observe the effect of capital structure variables STDTA, LTDTA, and TDTA on the performance in terms of ROA, ROE and EPS. The study suggested that an inverse relationship exists between debt dependence and bank performance using pooled ordinary least square regression. Only TDTA has a positive significant influence on EPS.

Hossain (2016) explored the influence of capital structure together with managerial ownership on profitability of 81 manufacturing companies selected from 10 different industries and listed in Dhaka Stock Exchange. The sample companies belong to cement, ceramic, engineering, food and allied, fuel and power, information technology, jute, pharmaceuticals and chemicals, tannery, and textile industries of Bangladesh. The time period investigated was for 2002-2014 and Panel Corrected Standard Error (PCSE) regression model was used for analysis. The research identified that capital structure creates negative impact on ROA, however, positive effect on ROE. Another important finding was that impact of short-term debt is stronger on profitability than that of long-term debt. Managerial ownership has positive effect on profitability and thus, follows the Agency cost theory.

Islam (2016) examined the determinants of capital structure for 63 listed manufacturing companies of Bangladesh. This paper also made the use of panel data of the selected firms chosen from the pharmaceuticals and chemicals, textile, engineering, and other sectors during the period of 2008-2012. The data analysis technique deployed was Feasible Generalized Least Square (FGLS) regression and it was found that Pecking Order Theory (POT) more clearly explains capital structure compared to other theories, especially Trade-off theory i.e. unless the firm managers can reap more benefit than equity fund, usually, they are not interested to go for debt financing. The reason was found to be the existing risk sensitivity of the debt market and variation in the corporate tax rate. The postulation was reinforced by the significance of the relationship of firm size, growth opportunities, liquidity, age, profitability, and age to capital structure together with the existence of agency problem and signaling theory. However, Bangladeshi companies do not exactly follow the hierarchy of Pecking order theory. Unlike developed countries, firms were found to prefer short term debt to long term debt as a potential source of fund.

The impact of capital structure on the firm performance of the seven publicly traded cement companies of Bangladesh was investigated by Amin and Jamil (2015). Short term debt to total asset (STDTA) along with long term debt to total asset (LTDTA) were used to represent capital structure while, ROE and ROA were indicators of firm profitability. By analyzing the panel data of the sector for 15 years (2001-2015) using random effect model, the study revealed that STDTA consisting of accounts payables and short-term bank loan has a significant positive relationship with both ROE and ROA in Bangladesh. However, LTDTA was found to be negatively associated though not statistically significant, with firm performance.

Effect of firm specific determinants such as profitability, asset tangibility, size and growth rate of capital structure of textile industry of Bangladesh were explored in (Jahan, 2014). In addition, this paper attempted to examine the alignment of the sector's financing decision with any capital structure theory. For this purpose, financial statement data from 2008 to 2012 of nine listed textile companies selected under random sampling method were investigated. Total debt to total asset ratio served as a proxy to capital structure, ROA as profitability, fixed asset to total asset as tangibility, natural logarithm as size and compound growth rate of gross asset as growth rate. Employment of fixed effect model on the panel data led to the result that choice of the debt level of textile sector of Bangladesh is significantly positively impacted by profitability and tangibility whereas the effect of the other two indicators namely size and growth rate are not significant.

Latif and Kabir (2015) examined the profitability and consistency of the ceramic sector of Bangladesh though a cross-sectional analysis based on financial as well as statistical measures. Financial performance of the five publicly listed ceramic companies was indicated by gross profit margin, operating profit margin, NPM, ROA and ROE which were acquired from the financial statements of the respective firms for the period of 2006-2012. A cross-sectional comparison on liquidity, efficiency and leverage was also performed. However, the ANOVA result of liquidity and efficiency were not found to be significant. Comparison among the five companies revealed that RAK ceramics was comparatively in a better position than the rest four. The other ceramic companies were recommended to efficiently manage asset, sales and liquidity.

From the above discussion it is evident that very few researches have been carried out to explore the impact of capital structure decisions on the profitability and corporate value of any particular Bangladeshi manufacturing industry. Some researchers attempted to carry out studies to observe the relationship between leverage ratios and firm performance of cement, textile and banking industry of Bangladesh whereas, other researchers observed the same effect on several industries considered together. To the authors' knowledge, there is no such work that focused solely on finding out and analyzing the impact of capital structure on profitability of the ceramic industry of Bangladesh. Furthermore, any research on what influence leverage decision plays on the corporate value of that industry is virtually non-existent. Since, the industries influence capital structure decisions within an industry and those decisions vary across industries (Degryse, Peter, & Kappert, 2012), here lies the necessity to conduct the research on a specific sector. The ceramic industry of Bangladesh is one of the growing and promising sectors. Therefore, this work attempts to explore the relationship of capital structure with firm profitability and corporate value of the ceramic industry of Bangladesh.

4. METHODOLOGY AND VARIABLE DESCRIPTION

From the existing literature, this work studied the empirical models and applied those in Bangladeshi ceramic industry. A deductive approach was followed in constructing

the model. Collinear relationship among the variable was hypothesized and the study followed a quantitative approach. In order to fulfill the objective of this report, multiple regression analysis has been performed on panel data. Three different econometric techniques namely – pooled ordinary least square (OLS) model, fixed effects model, and random effects model were applied and different tests like tests for multicollinearity, unit root/ stationarity, co-integrity, heteroscedasticity, serial correlation, and endogeneity were performed. Finally, panel corrected standard errors were used instead of standard errors to automatically adjust any inherent econometric problem of heteroscedasticity and serial correlation. The results of multiple regression were then explained to analyze the effect of capital structure choice on profitability and corporate value of Bangladeshi ceramic industry.

4.1 Data Sources

The data for this study were collected from secondary sources e.g. published annual reports from Dhaka Stock Exchange (DSE) and the DSE website. At present, there are five ceramic companies listed in DSE. All the companies' seven years data (2012-2018) were used for this research work.

4.2 Explained Variables

The two latent explained variables for this study are profitability and corporate value. Any single performance measure for profitability falls short in properly reflecting an industry's overall profit generation ability since various indicators depict different forms of relationship. For this reason, in this study, five financial ratios e.g. return on asset (ROA), return on equity (ROE), return on sales (ROS), net profit margin (NPM), and earnings per share (EPS) instead of only one are used as the estimated variables of profitability. Likewise, two financial ratios namely Tobin's Q (TQ), and market to book value of equity (MBE) are utilized as the estimated variables for corporate value.

4.2.1 Profitability

Capital structure is said to play a determinant role in firm profitability (Hasan, Ahsan, Rahaman, & Alam, 2014). Different researchers use different performance measures for profitability. For instance, Return on Asset (Amin & Jamil, 2015; Binh Dai, 2017; Hasan et al., 2014; Khatoon & Hossain, 2017; Liljeblom, Maury, & Hörhammer, 2019; Mallik, Saha, & Khan, 2018; Rouf, 2015; Siddik, Kabiraj, & Joghee, 2017; Usman, 2019; Vieira, Neves, & Dias, 2019; Yapa Abeywardhana & Magoro, 2017), Return on Equity (Amin & Jamil, 2015; Binh Dai, 2017; Hasan et al., 2014; Khatoon & Hossain, 2017; Liljeblom et al., 2019; Rahayu et al., 2019; Saputra, Achsani, & Anggraeni, 2015; Siddik et al., 2017), Return on sales (Liljeblom et al., 2019; Rouf, 2015), Earnings per share (Hasan et al., 2014; Khatoon & Hossain, 2017; Siddik et al., 2017), Net profit margin (Khatoon & Hossain, 2017; Rahayu et al., 2019) and so on. A brief description of the variables used as proxy to profitability in the current study is given below.

(a) Return on asset (ROA)

Return on asset (ROA) is an overall measure of profitability (Weygandt, Kimmel, & Kieso, 2016) which is measured as net income after tax divided by total assets. In other words, ROA is net operating income divided by total assets. This performance indicator of a firm determines how profitable the form's total asset is i.e. how much profit total assets can generate for debt holder and equity holders. The formula is as follows:

$$\text{ROA} = \frac{\text{Net Income after Tax}}{\text{Total Assets}}$$

(b) Return on equity (ROE)

ROE or return on equity is another measure of profitability which measures profitability from common stockholders perspective (Weygandt et al., 2016). This ratio represents the amount of net income the company can earn for each money value invested by the owners. ROE can be obtained by dividing net income by total stockholders' equity i.e.-

$$\text{ROE} = \frac{\text{Net Income}}{\text{Total Equity}}$$

(c) Return on Sales (ROS)

Return on sales (ROS) indicates how much operating profit total sales revenue of the company can generate. The formula is-

$$\text{ROS} = \frac{\text{Earning before Interest and Tax (EBIT)}}{\text{Total Sales}}$$

(d) Net profit margin (NPM)

Net profit margin or NPM specifies the net income or profit total sales can generate for shareholders. A high profit margin depicts that the firm can efficiently manage its expenses to result in a sufficient amount of profit. The formula to calculate NPM is as follows-

$$\text{NPM} = \frac{\text{Net Income}}{\text{Total Sales}}$$

(e) Earnings per share (EPS)

Earnings per share (EPS) serves as a useful perspective for determining profitability. It is a measure of net income earned on each share of common stock (Weygandt et al., 2016). EPS is calculated by dividing the net income less preferred dividends by the number of weighted average common shares outstanding during the year.

$$\text{EPS} = \frac{\text{Net Income-Preferred Dividends}}{\text{Weighted Average Common Shares Outstanding}}$$

4.2.2 Corporate Value

Shareholders use corporate value as one of the indicators to gauge the success rate of a company. A high corporate value enables a firm to gain trust and reliability from market based on the expectation of the firm's future prospect. Therefore, each company's aim is to increase its corporate value and that can be done by investing in various profitable projects. As such the firm needs to go through external investment (collecting debts and/or issuance of new shares) and internal investment (retained earnings). Consequently, capital structure decision of a firm must have a great influence on the increase or decrease of its corporate value (Mahdaleta, Muda, & Nasir, 2016; Yusra et al., 2019). In the current study, Tobin's Q (TQ) and Market to book value of equity (MBE) these two indicators are used as an estimate of corporate value. Rahayu et al. (2019), Suhadak, Rahayu, and Handayni (2019), and Kodongo, Mokoaleli-Mokoteli, and Maina (2015) have used Tobin's Q as a measure of corporate value. Market to book value of equity (MBE) is used as a proxy to corporate value in (Hermuningsih, 2013; Suhadak, Rahayu, & Handayani, 2019; Suhadak, Kurniaty, Handayani, & Rahayu, 2019).

(a) Tobin's Q (TQ)

Tobin's Q is a measure that combines market performance with book value (Kodongo et al., 2015). The Tobin's Q variable used in this research is the modified version of q proposed by Chung and Pruitt (1994).

$$\text{Approximate q} = \frac{\text{MVE+PS+Debt}}{\text{TA}}$$

Where, MVE is the company's stock price multiplied by the number of common stock shares outstanding; PS is the liquidating value of a company's outstanding preferred stock; Debt is the value of the company's short-term liabilities net of its short-term assets, plus the book value of the company's long-term debt. Finally, TA is the book value of a company's total asset (Sá, Neves, & Góis, 2017; Vieira et al., 2019). The numerator includes the market value of the total capital (debt as well as equity) and the denominator uses total assets rather than equity. As a whole TQ mirrors expected future development (Fosu, 2013).

(b) Market to Book Value of Equity (MBE)

Market to book value of equity (MBE) is an enterprise value multiple that relate the total market value of a company's stock to a measure of a fundamental value for the entire company. The fundamental quantity in this case is the book value of equity or owner's equity based on accounting values.

$$\text{MBE} = \frac{\text{Market Price of Stock x Number of Share Outstanding}}{\text{Book Value of Owner's Equity}}$$

4.3 Explanatory and Control Variables

This study aims to investigate the effect of capital structure on profitability and corporate value of listed ceramic companies of Bangladesh. A very crucial decision

for a company is how to finance investments (e.g. factories, equipment, machineries, and tools) or the decision of capital structure which encompasses the debt and equity mix of a company. Based on literature, the independent variables chosen are listed in Table 1.

Since the performance of firms depends on other things than just their capital structure, control for the effects of those variables must be included in the model to avoid omitted variable bias. That is why, two determinants of capital structure namely size and liquidity of the firms are incorporated as important control variables to explain more of the variation in profitability and corporate value. The control variables are described in Table 1 as well.

Table 1: Variable Definitions

Variables	Formula	Source
Explanatory Variables Short term debt to asset ratio (SDTA)	Current liability/Total asset	(Abeywardhana, 2015; Usman, 2019)
Long term debt to asset ratio (LDTA)	Noncurrent liability/Total asset	(Amin & Jamil, 2015; Khatoon & Hossain, 2017)
Total debt ratio (TDR)	Total liability/Total asset	(Khatoon & Hossain, 2017; Siddik et al., 2017)
Debt to equity ratio (DER)	Total liability/Total Equity	(Kodongo et al., 2015; Rahayu et al., 2019)
Control Variables Size (SIZE)	Natural logarithm of total asset	(Binh Dai, 2017; Kodongo et al., 2015)
Liquidity (LIQ)	Current asset/Current liability	(Le & Phan, 2017; Rouf, 2015; Vătavu, 2015)

4.4 Conceptual Framework

The objectives of the research lead to the research model shown in Figure 1.

4.5 Hypotheses Development

The following research hypotheses are formulated based on empirical study.

H_{01}. Capital structure has no relation with ROA of ceramic companies of Bangladesh.

H_{02}. Capital structure has no relation with ROE of ceramic companies of Bangladesh.

H_{03}. Capital structure has no impact on ROS of ceramic companies of Bangladesh.

H_{04}. Capital structure has no impact on NPM of ceramic companies of Bangladesh.

H_{05}. Capital structure has no relation with EPS of ceramic companies of Bangladesh.

H_{06}. Capital structure has no relation with TQ of ceramic companies of Bangladesh.

H_{07}. Capital structure has no impact on MBE of ceramic companies of Bangladesh.

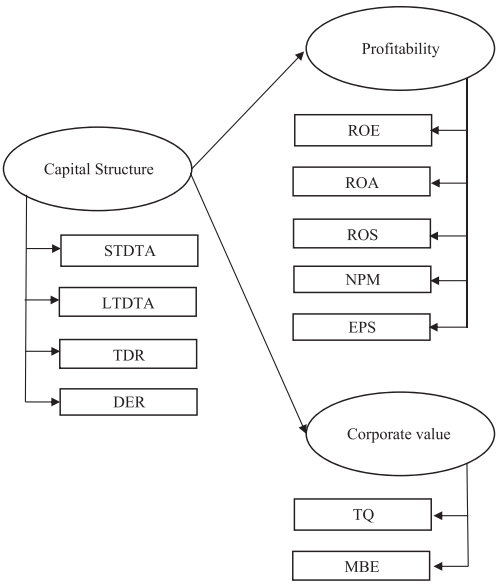

Figure 1: Conceptual framework

4.6 Model Specification

A multiple regression model is used to test the hypotheses in this study. The regression model is as follows:

$$Y_{i,t} = \beta_0 + \beta_1 STDTA_{i,t} + \beta_2 LTDTA_{i,t} + \beta_3 TDR_{i,t} + \beta_4 DER_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 LIQ_{i,t} + \in_{i,t}$$

Where, $Y_{i,t}$ is either profitability variable (ROA, ROE, ROS, NPM, or EPS) or variable for corporate value (Tobin's Q or Market value of equity to book value of equity) for company i at time t. Size (SIZE) and liquidity (LIQ) are the control variables to avoid omitted variable bias. ϵi,t is the error component of company i at time t. $\beta_{1,2,\ldots 6}$ are the parameters to be estimated, i = ceramic company = 1, 2, …., 5; and t = index of the time periods = 1, 2, …., 7.

5. ANALYSIS AND FINDINGS

5.1 Descriptive Statistics

Table 2 represents a general overview of the characteristics of the data i.e. the minimum and maximum values along with mean and standard deviation of the dependent, independent, and control variables used for the analysis.

The mean of short-term debt to asset ratio (STDTA) is 0.31, while long term debt ratio (LTDTA) shows an average of only 0.05. Thus, it is evident that the ceramic companies prefer short-term liabilities to long term debts. However, the standard deviation of STDTA is roughly 11.74% while, that of LTDTA is only 3.72%. Total debt ratio (TDR) is on an average 0.48 implying that the firms need nearly 50% of overall assets to cover up total debt. Average of another explanatory variable

debt to equity ratio (DER) is 0.62 which indicates that the firms' capital structure is composed more of debt than equity. Deviations from the mean value in case of DER and TDR are very close to each other.

The summary statistics of the two control variables used in the analysis namely size and liquidity show that mean values are 21.58 and 1.34 correspondingly. Natural logarithm of total asset is used as a proxy of size (SIZE) and the ratio of current asset to current liability represents liquidity (LIQ). The mean value of liquidity of publicly listed ceramic companies of Bangladesh infers that on an average the companies have only 1.34 times of current assets compared to their short-term liabilities which specifies a weak liquidity position.

Table 2: Descriptive Statistics

Variable	Observation	Min	Max	Mean	Std. Deviation
Independent Variables					
STDTA	35	0.1419	0.5127	0.309963	0.1173536
LTDTA	35	0.0000	0.1385	0.050373	0.0372090
TDR	35	0.1851	1.2659	0.482553	0.3466460
DER	35	0.2272	1.2659	0.615306	0.3128769
Control Variables					
SIZE	35	19.0952	23.2236	21.579436	1.3836773
LIQ	35	0.5630	3.2166	1.342048	0.6189771
Dependent Variables Profitability					
ROA	35	-0.001717	0.097253	0.04537508	0.025132474
ROE	35	-0.029001	0.157684	0.04974987	0.051304925
ROS	35	-0.017056	0.253780	0.13242457	0.074913134
NPM	35	-0.043306	0.163921	0.05769957	0.060737314
EPS	35	-0.39	3.25	0.9480	0.92726
Corporate Value					
TQ	35	0.1919	5.2859	1.114550	0.9606710
MBE	35	0.0440	11.7357	1.988674	2.1161548

As observed from Table 2, the profitability indicators ROA, ROE, ROS, NPM and EPS imply that some firms incurred loss while some other firms could generate profit. In other words, Bangladeshi ceramic companies face difficulties in managing their asset, equity and sales to generate sufficient net profit margin. This is because all five profitability indicators range from negative to positive values during the period under consideration, for instance, -0.17% to 9.73%, -2.9% to 15.77%, -1.71% to 25.38%, -4.33% to 16.39% and -0.39 to 3.25 respectively. Hence, the highest dispersion and mean values exist in EPS of the listed ceramic companies. Earnings per share (EPS)

varies from - 0.39 to 3.25 with a mean value of 0.948 which means that the companies on an average can make only net profit of BDT 0.948 per share of common stock. The average EPS in turn, is an indication of poor accounting performance of the ceramic companies for the period under consideration.

Average Tobin's Q (TQ) of the companies under consideration is 1.11, though over the period of the 7 years the value of TQ varies from 0.19 to 5.29. Another proxy to corporate value used in this work- Market to book value of equity (MBE) has a mean of 1.99 with a big spread from 0.04 to 11.74.

5.2 Correlation Matrix Analysis

The correlation between the variables are represented in Table 3. High correlations can be observed between short term debt to asset ratio (STDTA) and total debt ratio (TDR), STDTA and debt equity ratio (DER), TDR and DER. Consequently, multicollinearity problem might exist. The correlations indicate that LTDTA and TDR have negative impacts on ROA and NPM. Other than those variables, LTDTA has negative correlation with other two profitability variables ROE and EPS. It has positive relation only with performance indicator ROS. However, TDR has negative assistance with ROS and positive assistance with the rest of the three profitability parameters. STDTA and DER have negative correspondence with ROS and NPM and positive with the other three proxies to profitability. All explanatory variables except LTDTA have positive effect on the corporate value estimators namely TQ and MBE. However, the correlation of LTDTA with the corporate values is not found to be significant.

Table 3: Pearson's Correlation Matrix

	STDTA	LTDTA	TDR	DER	SIZE	LIQ	ROA	ROE	ROS	NPM	EPS	TQ	MBE
STDTA	1												
LTDTA	-0.327	1											
TDR	0.901**	-0.168	1										
DER	0.953**	-0.066	0.951**	1									
SIZE	-0.509**	0.310	-0.773**	-0.554**	1								
LIQ	-0.338*	-0.285	-0.402*	-0.419	0.152	1							
ROA	0.115	-0.193	-0.050	0.059	-0.150	-.558**	1						
ROE	0.387*	-0.331	0.170	0.296	0.043	0.504**	0.891**	1					
ROS	-0.337*	0.089	-0.548**	-0.394*	0.614**	0.532**	0.686**	0.475**	1				
NPM	-0.041	-0.209	-0.242	-0.129	0.267	0.763**	0.812**	0.817**	0.761**	1			
EPS	0.341*	-0.352*	0.076	0.222	0.191	0.409*	0.802**	0.902**	0.508**	0.757**	1		
TQ	0.504**	-0.177	0.500**	0.519**	-0.298	0.086	0.426*	0.524**	0.032	0.283	0.553**	1	
MBE	0.586**	-0.204	0.573**	0.598**	-0.342*	0.064	0.400*	0.533**	-0.25	0.253	0.520**	0.982**	1

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Table 4: VIF Values of all Independent Variables

Variables	VIF
STDTA	145.8388
LTDTA	16.5057
TDR	150.7806
DER	291.5795
SIZE	18.9290
LIQ	2.0039
Mean	104.2729

Table 5: VIF Values of the Selected Variables

Selected Variables	VIF
LTDTA	1.2644
DER	1.7278
SIZE	1.6175
LIQ	1.3767
Mean	1.4966

The average VIF in the second case is 1.4966 which is below the threshold value. Therefore, it can be concluded that the model is now free from multicollinearity. Thus, the problem of strong correlation of STDTA with TDR and DER and that of TDR with DER is now resolved.

5.3 Test for Multicollinearity

To investigate whether the independent variables are highly correlated to each other, variable inflation factor (VIF) test was conducted. VIF estimates how much the variance of an estimated regression coefficient increases if the predicting variables are correlated. High correlation is indicated by VIF values between 5 and 10 which may lead to problematic regression result. Regression coefficients will be poorly estimated due to multicollinearity if VIF is greater than 10. The VIF scores in Table 4 show that variable inflation factors are much higher than 10 which means multicollinearity exists among some of the variables. The most likely variables which can be expressed as a linear combination to other are STDTA, LTDTA and TDR. Hence, any one or two of these variables must be removed to solve for the multicollinearity problem. VIF comes down below 10 only when both STDTA and TDR are removed. VIF values of the selected explanatory variables are presented in Table 5.

5.4 Test for Unit Roots/Stationarity

To avoid invalid statistical inference, the augmented Dickey-Fuller (ADF) test was applied to check for the presence of unit root or non-stationarity in all the time series data used in this analysis. The test results are depicted in Table 6.

Table 6: Unit Root Test Results

LTDTA	DER
data: Panel.set$LTDTA Dickey-Fuller = -2.6959, Lag order = 2, p-value = 0.3029	data: Panel.set$DER Dickey-Fuller = -1.6875, Lag order = 2, p-value = 0.6944
SIZE	LIQ
data: Panel.set$SIZE Dickey-Fuller = -1.1557, Lag order = 2, p-value = 0.9003	data: Panel.set$LIQ Dickey-Fuller = -3.4377, Lag order = 2, p-value = 0.06827
ROA	ROE
data: Panel.set$ROA Dickey-Fuller = -2.7116, Lag order = 2, p-value = 0.2968	data: Panel.set$ROE Dickey-Fuller = -2.1464, Lag order = 2, p-value = 0.5162
ROS	NPM
data: Panel.set$ROS Dickey-Fuller = -3.0118, Lag order = 2, p-value = 0.1802	data: Panel.set$NPM Dickey-Fuller = -2.9041, Lag order = 2, p-value = 0.222
EPS	TQ
data: Panel.set$EPS Dickey-Fuller = -2.0196, Lag order = 2, p-value = 0.5655	data: Panel.set$TQ Dickey-Fuller = -0.46942, Lag order = 2, p-value = 0.9776
MBE	
data: Panel.set$MVEtoBVE Dickey-Fuller = 0.13074, Lag order = 2, p-value = 0.99	
Alternative Hypothesis: Stationary	

It is evident from Table 6 that unit root is present in all the time series data leading to non-stationarity. However, if two time series are cointegrated i.e. economically linked or follow the same trend and constantly hold the relationship, the error term from regressing one on the other is covariance stationary and yields reliable t-tests. Thus, multiple regression can be used to model the relationship among multiple time series data if they are cointegrated (Engle & Granger, 1987). The Engle Granger cointegration test is applied to test for the cointegration of the error term in the linear regression of the dependent and independent variables. It is found from the test results as shown in Table 7 that t-statistic is less than critical t-value at 5% significance level such that the null hypothesis of no co-integration is rejected. Thus, the explained and explanatory variables are cointegrated indicating that a long-term financial relationship exists among them so that they do not diverge from one another without bound in the long run. Hence, the regression coefficients and standard errors will be consistent to be used for hypothesis test i.e. multiple regression can be used to model their relationship.

Table 7: Test Statistic and 5% Critical t-value from Engle Granger Co-integration Test

	ROA	ROE	ROS	NPM	EPS	TQ	MBE
Test-statistic	-4.4994	-4.9502	-4.4994	-5.8913	-4.4667	-3.7223	-3.7422
Critical t-value at 5% Significance Level	-1.95	-1.95	-1.95	-1.95	-1.95	-1.95	-1.95

5.5 Test for Heteroscedasticity

To check whether the error variances are constant or not, Breusch-Pagan test was conducted for homo/heteroscedasticity. The test results presented in the first row of Table 8 reveal that TQ and MBE face the problem of heteroscedasticity.

Table 8: Results of Breusch-Pagan & Breusch-Godfrey Wooldridge Test

	ROA	ROE	ROS	NPM	EPS	TQ	MBE
Breusch-Pagan test for heteroscedasticity	BP = 2.0229, df = 4, p-value = 0.7315	BP = 9.485, df = 4, p-value = 0.05004	BP = 9.4778, df = 4, p-value = 0.05021	BP = 7.4501, df = 4, p-value = 0.1139	BP = 0.7107, df = 4, p-value = 0.95	BP = 23.501, df = 4, p-value = 0.0001005	BP = 45.885, df = 4, p-value = 2.603e-09
Alternative Hypothesis : Data are Homoscedastic							
Breusch-Godfrey Wooldridge test for serial correlation	chisq = 5.9589, df = 7, p-value = 0.5446	chisq = 5.4077, df = 7, p-value = 0.6103	chisq = 15.066, df = 7, p-value = 0.03516	chisq = 12.317, df = 7, p-value = 0.0906	chisq = 5.3588, df = 7, p-value = 0.6163	chisq = 6.7909, df = 7, p-value = 0.451	chisq = 9.3755, df = 7, p-value = 0.2268
Alternative hypothesis: Serial correlation in idiosyncratic errors							

It is evident from Table 8 that for TQ and MBE the null hypotheses for no homoscedasticity cannot be rejected. Hence, heteroscedasticity exists in these two cases.

5.6 Test for Serial Correlation

In order to check whether the residual terms are correlated with one another in other words, whether serial correlation is present in the panel data, Breusch-Godfrey Wooldridge test was run. The results are described in the second row of Table 8 and according to the outcomes of the test all variables except ROS are free from serial correlation.

5.7 Tests for Choosing the Right Model

With a view to investigating whether or not there is any individual company specific impact along with capital structure on the profitability and corporate value of the selected ceramic companies of Bangladesh, an F-test was performed between the within effect and ordinary least square (OLS) regression model. It is evident from the first row of Table 9 that OLS regression is better in all of the cases except for

NPM. Since the null hypothesis is rejected (0.01189<0.05), fixed effect model is suitable for NPM only. Now, to decide between fixed or random effects Hausman test was run on NPM (Second row of Table 9). Test result indicates fixed effect to be significant i.e. individual specific errors are correlated to the regressors as the null for using random effect model is rejected. Again, the results of F test and Breusch Pagan Lagrange multiplier test for time fixed effect reveal that no time fixed effect is present in the data of NPM (third and fourth rows of Table 9). Finally, Breusch Pagan Lagrange multiplier test for the rest of the variables directs to use OLS model instead of random effect model according to the test results shown in the last row of Table 9 where the null hypotheses for OLS are not rejected.

5.8 Test of Endogeneity

The main objective of this work is to find out the impact of capital structure on profitability. However, some other empirical studies suggest that there might exist potential endogeneity problem between profitability, corporate value and capital structure i.e. capital structure might depend on profitability (Binh Dai, 2017) and corporate value as well (Chandra et al., 2019). Theoretically, endogeneity exists when the error term of the dependent variable is correlated to one or more independent variables. In this case, there are possibilities that simultaneity could be present i.e. profitability causes a certain debt level of the companies and debt level causes profitability. Hence, it is required to run an endogeneity test to check the actual scenario.

In order to test for endogeneity an instrumental variable regression or two stage least square (2SLS) regression was run for each dependent variable where, the average industry leverage (ILEV) was used as an instrumental variable. After the 2SLS regression was performed, a diagnostic test reveals that ILEV is a strong instrumental variable. However, Wu-Hausman test suggests that there is no potential endogeneity problem in the dataset. Hence, OLS regression results turn out to be sufficient to describe the relationship between the explained (profitability and corporate value) and explanatory variables (capital structure).

Table 9: Test to Choose between OLS vs. Fixed, Random vs. Fixed, Time Fixed Effect & OLS vs. Random Effect Model

	ROA	ROE	ROS	NPM	EPS	TQ	MBE
Fixed vs. OLS (F-test)	F = 1.0778, df1 = 4, df2 = 26, p-value = 0.3877	F = 1.2988, df1 = 4, df2 = 26, p-value = 0.2964	F = 2.3203, df1 = 4, df2 = 26, p-value = 0.08356	F = 3.9836, df1 = 4, df2 = 26, p-value = 0.01189	F = 1.0635, df1 = 4, df2 = 26, p-value = 0.3944	F = 1.4423, df1 = 4, df2 = 26, p-value = 0.2483	F = 1.2898, df1 = 4, df2 = 26, p-value = 0.2997
Alternative hypothesis: Significant effects							
Random vs. Fixed (Hausman test)				chisq = 17.162, df = 3, p-value = 0.0006546			

	ROA	ROE	ROS	NPM	EPS	TQ	MBE
Alternative Hypothesis: One model is Inconsistent							
F-test for time fixed effect				F = 1.1542, df1 = 6, df2 = 20, p-value = 0.3687			
Alternative Hypothesis: Time Fixed Effect Present							
Breusch-Pagan Lagrange Multiplier Test for time fixed effect				chisq = 0.16873, df = 1, p-value = 0.6812			
Alternative Hypothesis: Significant Effect							
Random vs. OLS (Breusch-Pagan Lagrange Multiplier Test)	chisq = 1.8532, df = 1, p-value = 0.1734	chisq = 1.7535, df = 1, p-value = 0.1854	chisq = 1.6604, df = 1, p-value = 0.1975	N/A	chisq = 2.1258, df = 1, p-value = 0.1448	chisq = 2.4509, df = 1, p-value = 0.1175	chisq = 2.256, df = 1, p-value = 0.1331
Alternative hypothesis: Significant effects							

5.9 Result of Linear Regression and Panel Corrected Standard Error (PCSE)

With a view to observing the effect of capital structure on profitability and corporate value of ceramic companies of Bangladesh, ordinary least square (OLS) regression was found to be applicable for dependent variables- ROA, ROE, ROS, EPS, TQ and MBE. On the other hand, fixed effect model was found to be effective for NPM in the selected dataset. According to some previous discussion, some of the variables suffer from the problem of heteroskedasticity and serial correlation. Hence, panel corrected standard error model was utilized which corrects the standard errors of the linear regression model's estimated coefficients to account for the heteroskedasticity and serial correlation.

5.9.1 The Influence of Capital Structure on Profitability

(a) Return on Asset (ROA)

The results of OLS regression along with panel corrected standard error to test the effect of capital structure on ROA are presented in Table 10. It is evident that between the two capital structure variables only DER has a significant (1% level of significance) positive impact on ROA. However, the significance level enhances (0.1%) using PCSE when the panel corrected error decreases further. Thus, the null hypothesis H01 that there is no significant relationship between capital structure and

ROA is rejected. The result indicates that the higher the debt to equity ratio of the listed ceramic companies, the higher the profitability in terms of ROA. Such relation between ROA and DER is not consistent with Abeywardhana (2015); Rahayu et al. (2019), Hasan et al. (2014), and Rouf (2015). However, Barbete and Balasundaram (2010) found that DER is strongly and positively associated to profitability ratios for instance gross profit ratio, operating profit ratio and net profit ratio. Umar, Tanveer, Aslam, and Sajid (2012), Younus, Ishfaq, Usman, and Azeem (2014) also observed positive relationship between capital structure and ROA. The two control variables SIZE and LIQ are obtained to have positive significant impact on ROA. Such results are consistent with Ahmed Sheikh and Wang (2013), Pouraghajan, Malekian, Emamgholipour, Lotfollahpour, and Bagheri (2012). The R^2 value directs that 50.16% variation in ROA can be explained by the model. Furthermore, the F-statistic reports that the overall regression model is highly significant at 0.001 level.

Table 10: Coefficients, Standard & Corrected Errors-Profitability

Independent & control variables	ROA				ROE			
	OLS		PCSE		OLS		PCSE	
	Coefficient	Standard error	Coefficient	Corrected error	Coefficient	Standard error	Coefficient	Corrected error
Intercept	-0.165092*	0.068755	-0.165092*	0.070219	-0.474129***	0.107789	-0.474129***	0.125372
LTDTA	-0.044995	0.097891	-0.044995	0.079489	-0.292671.	0.153468	-0.292671*	0.119210
DER	0.045066**	0.013609	0.045066***	0.009075	0.138390***	0.021335	0.138390***	0.017602
SIZE	0.006763*	0.002977	0.006763*	0.003191	0.017272***	0.004668	0.017272**	0.005610
LIQ	0.029103***	0.006140	0.029103***	0.006826	0.060162***	0.009626	0.060162***	0.009160
R-squared Adj. R-squared F-statistic	0.5016 0.4352 7.549***				0.7061 0.6669 18.02***			
Independent & control variables	ROS				EPS			
	OLS		PCSE		OLS		PCSE	
	Coefficient	Standard error	Coefficient	Corrected error	Coefficient	Standard error	Coefficient	Corrected error
Intercept	-0.693491***	0.185250	-0.693491***	0.164362	-10.56829***	2.14723	-10.56829***	2.132091
LTDTA	0.125303	0.263755	0.125303	0.259627	-8.67237**	3.05718	-8.67237***	2.830406
DER	0.039991	0.036667	0.039991*	0.030053	2.33178***	0.42501	2.33178***	0.442118
SIZE	0.032875***	0.008022	0.032875***	0.007235	0.43713***	0.09298	0.43713***	0.086144
LIQ	0.063759***	0.016544	0.063759***	0.016859	0.80871***	0.19176	0.80871***	0.186158
R-squared Adj. R-squared F-statistic	0.5928 0.5385 10.92***				0.6429 0.5953 13.5***			
'***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1								

(b) Return on Sales (ROS)

The findings from Table 10 regarding the relationship between ROS and capital structure depict that capital structure has no influence on ROS. However, the corrected standard error reduces to an extent to create a positive influence of DER on ROS at 5% significance level and as such the null hypothesis H03 that there is no significant relationship between capital structure and ROS is rejected. Such result is not consistent with Rouf (2015). Both control variables strongly affect ROS with positive association. The R squared value implies that the model can explain 59.28% variation of ROS. Overall regression model selected for capital structure variables and ROS is highly significant as indicated by the F-statistic.

(c) Return on Equity (ROE)

From the result obtained of the regression, as described in Table 10, LTDTA and DER create significant negative and positive impact on ROE respectively. Though the coefficient of DER is significant at 99.9% level of confidence, LTDTA is significant only at 90%. However, the confidence interval of LTDTA increases in PCSE model to 95%. Therefore, the null hypothesis H02 that there is no significant relationship between capital structure and ROE is rejected. Positive association of capital structure on ROE is also observed by Hossain (2016), Nasimi (2016), Salteh, Ghanavati, Khanqah, & Khosroshahi (2012). The study conducted by Amin and Jamil (2015) and Arbabiyan and Safari (2009) reported postive relation of ROE with STDTA but negative with LTDTA. Nevertheless, Hasan et al. (2014) found no effect of capital structure on ROE. The finding also reveals that control variables size and liquidity have strong positive effect on ROE. 70.61% of variability of ROE can be explained by the model, overall explanatory power of which is quite high.

(d) Earnings Per Share (EPS)

Pooled OLS model is suitable for explaining the effect of capital structure on EPS when used as a proxy to profitability. LTDTA, DER along with the control variables all are found to significantly influence EPS. All the variables have strong positive effect except for LTDTA as represented in Table 10. As a consequence, the null hypothesis H05 that there is no significant relationship between capital structure and EPS is rejected. Positive relation between capital structure and EPS is consistent with the findings of Umar et al. (2012). Hasan et al. (2014) and Salim and Yadav (2012) found significantly negative relation of long-term debt on EPS. According to Table 10, 64.29% of the variation in EPS can be described by the model with a very good significance (F-statistic=13.5 with a p-value=2.083e-06).

Table 11: Coefficients, Standard & Corrected Errors in Fixed Effect Dummy Variable Model for NPM

Independent, control variables & dummy variables	NPM			
	OLS		PCSE	
	Coefficient	Standard error	Coefficient	Corrected error
LTDTA	-0.042844	0.369124	-0.042844	0.283615
DER	-0.003055	0.122959	-0.003055	0.085258
SIZE	0.141454*	0.068793	0.141454*	0.068569
LIQ	0.014915	0.024523	0.014915	0.027924
Factor (Company) Fu Wang	-2.913535.	1.420107	-2.913535.	1.436050
Factor (Company) Monno	-3.090875*	1.470106	-3.090875*	1.482162
Factor (Company) RAK	-3.153461*	1.523263	-3.153461.	1.549159
Factor (Company) Shinepukur	-3.197835*	1.518747	-3.197835*	1.534147
Factor (Company) Standard	-2.698190*	1.230739	-2.698190*	1.268339
R-squared Adj. R-squared F-statistic	0.9135 0.8836 30.51***			
'***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				

(e) Net Profit Margin (NPM)

An individual company specific impact exists only in case of NPM among all other profitability variables used in this study. Thus, fixed effect within estimator model was applied to observe the bearing of capital structure on NPM. Nonetheless, the overall explanatory power of the model was not found to be significant (F-statistic=2.04008 with p-value=0.1181). That is why fixed effect dummy variable model was employed to check for the company specific effect and it was detected from Table 11 that capital structure components LTDTA and DER have no impact on NPM. As a result, the null hypothesis H04 that there is no significant relationship between capital structure and NPM cannot be rejected. This outcome is not consistent with Umar et al. (2012) who found positive effect of capital structure on NPM. All companies create a negative influence of which factors originated from Monno, RAK, Shinepukur and Standard ceramic companies are significant at 95% level. The overall explanatory power of the model is extremely good (F-statistic= 30.51 with a p-value=1.336e-11) which can explain 91.35% of the variation of NPM.

In sum, the results suggest that profitability of Bangladeshi ceramic companies is positively influenced by financial leverage. Such results are consistent with Fosu (2013), Margaritis and Psillaki (2010) and Ramli et al. (2019). It was found in this study that capital structure positively affects all the chosen proxies to profitability namely ROA, ROE, ROS and EPS except for NPM. This implies that the agency benefits of debt are much more realizable than that of equity in case of Bangladeshi ceramic companies. In the other words, a positive relationship between capital structure and profitability of the listed ceramic companies of Bangladesh indicates that the debt

levels of the firms are in an appropriate level which enables the managers to manage the operations efficiently. Furthermore, all the selected profitability measures are positively influenced by firm size which means that larger size enables firms to earn huge profits. Similar findings are obtained by Pratheepan (2014); Yazdanfar (2013) as well. Profitability variables also have positive association with liquidity while, NPM has no influence of liquidity level. Such result indicates that a firm with higher liquid assets is capable to face any short or long- term financial obstacles with current available liquid assets and thus, it is likely to perform better and be profitable. Similar kind of studies are conducted by Nunes & Serrasqueiro, Z.M. Sequeira (2009) and Zaid, Ibrahim, and Zulqernain (2014). In case of NPM firm specific effects are likely to play more remarkable role than capital structure.

5.9.2 The Influence of Capital Structure on Corporate Value

(a) Tobin's Q (TQ)

DER creates a significant positive impact on Tobin's Q as shown in Table 12. Thus, unlike Hasan et al. (2014) who found no relation of capital structure on TQ and Salim and Yadav (2012) who found negative significant relation of LTDTA on TQ, the present study suggests that TQ is independent of LTDTA and the higher the DER, the higher the corporate value in terms of Tobin's Q. Similar result was also obtained by Salteh et al. (2012). Liquidity also has a positive effect on TQ. However, firm size has no impact on it. Thus, asset growth does not influence corporate value of Bangladeshi ceramic companies as does liquidity. Hence, the null hypothesis H06 is rejected. Nonetheless, there might be some other factors affecting the corporate value because only 38.27% of the variation in TQ can be explained by this model with overall significance at 5% level.

(b) Market to Book Value of Equity (MBE)

The impact of capital structure on MBE is almost similar to that obtained for TQ with a rejection of the null H07. Ahmed Sheikh and Wang (2013) observed capital structure is positively related to MBE under fixed effect and random model while negatively related under pooled OLS. DER and liquidity affect corporate value as measured by market to book value of equity with positive association (Table 12). 41.22% of the MBE variation can be explained by the given model with overall significance at 0.1% level.

Table 12: Coefficients, Standard & Corrected Errors-Corporate Value

Independent & control variables	TQ				MBE			
	OLS		PCSE		OLS		PCSE	
	Coefficient	Standard error	Coefficient	Corrected error	Coefficient	Standard error	Coefficient	Corrected error
Intercept	-1.51646	2.92497	-1.51646	2.869533	-4.43355	5.90575	-4.43355	5.674812
LTDTA	-1.11754	4.16452	-1.11754	3.693386	-3.72574	8.40849	-3.72574	7.127650

DER	2.11459***	0.57895	2.11459***	0.214549	5.23441***	1.16894	5.23441***	0.510206
SIZE	0.02996	0.12666	0.02996	0.111662	0.08016	0.25574	0.08016	0.234017
LIQ	0.55122*	0.26122	0.55122*	0.267894	1.23642*	0.52743	1.23642**	0.436498
R-squared Adj. R-squared F-statistic	0.3827 0.3004 4.649*				0.4814 0.4122 6.961***			
0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1								

To recap, corporate value of Bangladeshi ceramic companies is found to be positively affected by capital structure. Such results are consistent with Chowdhury and Chowdhury (2010) and Hermuningsih (2013). Thus, maximizing firm value requires a perfect combination of debt and equity. A high leverage ratio signals the investors that the firm is going to make higher prospects and thus, its market value increases with respect to the firm's book value. Consequently, the bigger the proportion of liabilities in the firm's fund structure, the higher the firm value. As far as the control variables are concerned, size has positive influence on corporate value, but the relationship is highly insignificant in all the cases. Liquidity creates significant positive impact on corporate value which means that highly liquid firms are capable to operate more effectively and hence, increase shareholder's wealth as well as firm value as opposed to less liquid firms.

6. CONCLUSION

This study examines whether capital structure affects the profitability and corporate value of the listed ceramic companies of Bangladesh for the period of 2012-2018. Three different panel regression methods namely – pooled ordinary least square (OLS) model, fixed effects model, and random effects model were applied and different tests were conducted to select the best model in each case to investigate the relation between capital structure and firm value. The analysis reveals that leverage ratio has significant positive influence on profitability measures ROA, ROE, ROS and EPS whereas insignificant though negative effect on NPM. Long term debt to asset ratio negatively influences most of the profitability indicators except ROS. However, the effect is significant only in case of ROE and EPS. The overall findings regarding capital structure and profitability thus demonstrate that till now the debt-equity proportion of the ceramic companies of Bangladesh is in a favorable position leading to effective and efficient management by the firm managers. However, a bigger proportion of long-term debt to asset might risk the current balanced position of the companies. Hence, financial managers should be cautious regarding borrowings and prudently follow the trade-off theory. Individual firm-specific measures other than the decision on the composition of debt and equity financing are observed to create more profound impact on net profit margin.

Corporate value of the selected ceramic companies of Bangladesh has significantly positive association with leverage decision and insignificant negative relation with

long-term debt to asset proportion which in turn means that an optimum debt level signals the market about upcoming progress a ceramic company is going to make. Thus, overall market value of the company rises following the signaling theory. Noteworthily, the present proportion of liability and equity of the publicly listed ceramic companies of Bangladesh is in a phase to continue to enhance the corporate value.

Finally, this study has explored some important policy implications for financial managers, debtors, and investors. For instance, financial managers should strictly consider the impact of capital structure decision on profitability and corporate value while setting and adjusting the debt level. Lenders should carefully impose debt covenants taking their impact on firm profitability and value into account. Last of all, investors should review the company's liability position, performance and value before making investment decision.

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