

## **Impact of Financial Leverage on Firm Performance: A Panel Data Study**

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*The main motives of this research are to measure the impact of financial leverage (total debt, long-term debt and short-term debt) on firm performance and to assess whether firm size affects the leverage – performance relationship and how this relationship is varied from industry to industry. This study is conducted using a panel data on 24 non-financial companies of CSE50 index, listed in Chittagong Stock Exchange over the duration of 2005 to 2014. The authors have used proxy of Return on Asset, Return on Sales and Net profit margin to measure firm performance and Debt to Asset, Long-term debt to Asset and Short-term debt to Asset to measure financial leverage. Some other control variables (e.g. Size, age, tangibility, GDP growth rate, dummy variable etc.) which are expected to have major influence on firm's performance have also been considered by the authors. Fixed effect method is used to conduct various estimations of this study. Empirical results of this paper reveal that financial leverage has significant (at 10% significance level) negative impact on firm's performance, this result is consistent in case of both short-term and long-term leverage and in case of manufacturing firms, this impact is significant but it is insignificant for service oriented firms.*

**JEL Classifications:** C33, G3, G32

**Keywords:** firm performance, financial leverage, and agency cost, debt maturity structure, manufacturing industry, service industry.

### **1. Introduction**

Different combinations of debt financing decisions are core component for a firm's financial wellbeing. In many cases, the degree of leverage used in firm capital structure is responsible for maximizing shareholder's wealth. At the same time, it is also responsible for bankruptcy of a firm. According to Eriotis et al. (2007), to reach in optimal capital structure, firm may use various mixes of financial leverage. The concept of financial leverage is generally considered as utilization of debt to finance assets. High leverage ratio indicates creditors contribute more fund to finance assets compared to the equity holders. Ross et al. (2008) defined financial leverage as the degree to which a firm relies on debt. The higher the debt used in capital structure, the grater the reliance on debt. Many studies show that the relationship between firm's financial leverage and financial performance is significant. According to the agency cost theory, positive relationship between financial leverage and performance can be expected.

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But this study also prevails that this positive result between financial leverage and performance does not always exist for those firms which have large amount of debt because the large amount of debt may arise potential number of limitations which leads the firm to perform negatively (Evgeny 2015). According to the agency cost theory of Myers (1977), the negative relationship between financial leverage and firm performance assures that higher-growth firms employ lower optimal leverage ratio. But firm performance is not always affected by leverage only, firm's size; its operating age can also influence its performance. Even economic conditions of a country can contribute to the firm performance.

The Economic growth of Bangladesh basically depends on agriculture, manufacturing and service industry that contribute huge portion to the GDP of Bangladesh. It is important to carry out the study from the perspective of Bangladeshi nonfinancial sectors which includes both manufacturing and service industries because these two industries are considered as growth-engines of Bangladesh and there is no such study conducted before related to our concerned areas from the context of Bangladesh which has considered both the industries together.

Since Bangladesh's economy is in growing stage, many new sectors and new businesses are established as well as dependency on leverage to finance business is also increased. Therefore, this scenario gives us an opportunity to conduct our research to get more insight regarding the relationship between financial leverage and firm performance of Bangladeshi firms and our findings may assist the managers of a firm to take effective decision to determine level of leverage for their firms.

There are some previous studies conducted to see the impact of financial leverage on firm performance considering only a particular sector such as Hunjra et al. (2014) studied on fuel and energy, Franklin & Muthusamy (2011) concentrated on pharmaceuticals and Baloch et al. (2015) researched on cement sector. So, the results of these studies are not generalized. In this study, authors have employed all non-financial companies under CSE50 index regardless of any particular sector to get a broader view. However, to get industry specific view, authors of this paper have divided samples in service and manufacturing industry and used dummy variables for both type of industries to see the impact of leverage on firm performance separately which was not addressed by the earlier research conducted in our country.

Additionally, the authors have also explored the impact of leverage on firm performance from the context of long-term debt and short-term debt, manufacturing and service industry and small and large firms separately. This study is the complete evidence on the topic of financial leverage and firm performance which differentiate the result from each and every context mentioned above. There are some other studies (Rajkumar 2014; Hunjra et al. 2014) conducted before in our country and in different parts of the world on this topic but these studies did not identify the impact of leverage on firm performance from all of these contexts separately in a single paper. Thus, this study contributes greatly to the body of the knowledge of Bangladeshi non-financial sectors.

In a similar type of research, Evgeny (2015) adopted ROA, ROE and operating margin(ROS) as proxies of firm's performance whereas the authors of this research have adopted both Operating margin and Net profit margin along with ROA to measure firm performance and to differentiate

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leverage-performance relationship before considering interest and tax and after considering interest and tax and we also adopted long-term debt, short-term debt and total debt ratio as measures of leverage whereas in his study, only total debt and long-term debt ratio were employed.

Some previous studies show that impact of leverage is different in case of different measure of firm performance. Such as Rehman (2013) claimed that leverage has positive relationship with both return on asset (ROA) and sales- growth but negative relationship with EPS, net profit margin and ROE. But leverage has significant negative impact on all of these three measures of firm performance (ROA, ROS, NPM) has been found by the authors of the study when total model has been used. However, the authors have also found that long-term debt exert more negative impact on firm performance than short-term debt when a separate model is used.

The authors of the research have also explored that size of the firm has great influence on leverage-performance relationship. Vithessonthi and Tongurai (2015) claimed that the effect of leverage on performance is positive in case of small firms and negative for large firms whereas in this research, the authors have found that the impact of leverage on performance is negative and significant for small size firms and insignificant for large size firms.

Moreover, a large number of researches (Evgeny 2015 ; Rajkumar 2014; Hunjra et al. 2014) were done previously on this topic simply considering correlation or OLS (Ordinary Least Square test) method to see the robustness of the result whereas the authors of this study have investigated the result by using Pearson correlation, fixed effect and random effect model.

This paper is structured in the following manner. First of all, section 1 contains introduction. Section 2 presents literature review where several scholarly articles related to the topic were studied. Section 3 focuses on methodology including measurement of different variables and empirical models. In section 4, empirical results have been presented and eventually, we have drawn a brief conclusion and provide some important implications in section 5.

## 2. Literature Review

According to Myers (1977) debt plays a significant role in decision making of firms. He described that the decision of a firm, which has risky debt outstanding and which acts in its stockholders' interest, will not be as same as the decision of those firms which can issue risk-free debt or which do not issue debt at all. Moreover, he proposed that firms financed with risky debt will pass up valuable investment opportunities. Through these investments, firms can get positive outcomes which can contribute to firm performance and market value. On the other hand, in the earlier theory of capital structure, Modigliani and Miller (1963) argued that capital structure plays an important role to determine the value of a firm. The relevance of this theory was based on the debate that the use of debt provides an opportunity of tax shield. Based on this argument, firms can use capital structure with full debt.

There are many studies have been conducted by many scholars to find out the relationship between financial leverage and financial performance of a firm. More or less, all the studies showed dualistic relationship between leverage and performance. For instance, Akthar et al.

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(2012) found a positive relationship between financial leverage and financial performance. The results of their study confirmed that firms with higher profitability may improve their financial performance by having high levels of financial leverage. This result is consistent with the studies conducted by Berger and Udell (2006), Margaritis and Psillaki (2010). On the other hand, a recent study carried out by Evgeny (2015) on Russian joint-stock companies showed that the impact of financial leverage on firms' performance is negative. In addition, he proposed that the leverage-performance relationship is varied between developed and developing countries whereas how this relationship is varied between large and small firms, service and manufacturing industry within a particular economy regardless of its economic condition have been explored by the authors in this study which was not addressed by previous study. Rajkumar's (2014) revealed that financial leverage has a statistically significant negative association with performance and recommended that managers of listed non-financial companies should reduce the reliance on long-term debt as a source of finance. Majumdar and Chhibber (1999), Eriotis et al. (2014), Zeitun and Tian (2007) and Mwangi et al. (2014) also showed that debt has negative effect on profitability. Rehman (2013) claimed that debt-equity ratio (financial leverage) has positive relationship with both return on asset (ROA) and sales-growth but negative relationship with EPS, net profit margin and ROE. So, this result reflects (Rehman 2013) that impact of leverage is different for different measures of firm performance. In our research we also want to differentiate the impact of long-term and short-term debt on performance separately which was not identified by the researcher. On the other hand Kebewar (2012) found there is no effect of debt on firm's performance.

Many other empirical studies were conducted employing different measures that influence capital structure as well as financial performance of firms. Gill and Mathur (2011) found that financial leverage is positively related with firm size in the study conducted for Canadian Firms. Same result was also stated by Akingunola and Oyetayo (2014). Fernandez et al. (2013) proposed that the more the firm-size increases, the more the use of leverage increases in case of Omani listed companies. Vithessonthi and Tongurai (2015) claimed that the effect of leverage on performance is positive in case of small firms and is negative for large firms. However, it is also expected that firm age, tangibility can also influence the result. Ezeoha (2008) claimed that firm-age is positively and significantly related to financial leverage. Similarly, positive relationship between asset tangibility and financial leverage was confirmed by Srivastava (2014).

Moreover, many studies also revealed that the relationship between leverage and performance vary from industry to industry. For instance, a study carried out by Hunjra et al. (2014) for the cement sector of Pakistan found that leverage has a positive impact on ROA but negative impact on ROE. Moreover, according to Franklin and Muthusamy (2011), asset structure and retained earnings are positively related to the financial leverage for Indian Pharmaceutical Sector. But Baloch et al. (2015) claimed that retained earnings have no significant impact on financial leverage in their study conducted on auto sector of Pakistan. And Enekwe et al. (2014) found that both debt ratio (DR) and debt-equity ratio (DER) are negatively related with return on asset (ROA) but interest coverage ratio (ICR) is positively related with return on asset (ROA) in case of Nigerian pharmaceutical industry.

After reviewing above studies, the authors of this paper have concluded that there is no conformity on the relationship between financial leverage and firm performance. Moreover, the

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authors have found that leverage, alone, cannot affect the firm's performance, it may get influenced by some other factors such as firm-size, operating age, tangibility, economic growth etc. And the impact of these factors on leverage-performance relation is varied from country to country as well as from industry to industry. These are the reasons why the further research is required to be conducted from the context of Bangladesh. This research contributes to the empirical theories of capital structure.

### 2.1 Hypotheses

**H1o:** There is no significant impact of financial leverage on performance for non-financial companies.

**H1a:** There is a negative significant impact of financial leverage on performance for non-financial companies.

**H2o:** Level of significance of long-term and short-term debt on firm performance does not vary.

**H2a:** Level of significance of long-term and short-term debt on firm performance is varied.

**H3o:** Impact of leverage on firm performance does not vary for large and small firms.

**H3a:** Impact of leverage on firm performance varies for large and small firms.

**H4o:** Impact of leverage on firm performance does not vary between manufacturing and service industry.

**H4a:** Impact of leverage on firm performance varies between manufacturing and service industry.

### 3. Methods and Data

To show the impact of financial leverage on firm performance, the authors have chosen 24 nonfinancial firms listed in Chittagong Stock Exchange (CSE) during the period of 2005 to 2014. The sample of 24 companies has been selected from CSE50 index. In this index, in total, 50 financial and nonfinancial companies are included which reflect the true scenario of financial market of Bangladesh. The authors have only considered nonfinancial companies from this index for our research because the meaning of leverage is different for financial and non-financial firms. The high leverage indicates distress for non-financial firms whereas it is normal for financial firms.

In this research, secondary panel data has been obtained from the annual reports and financial statements of listed non-financial companies. According to Hunjral et al. (2014), panel data have the ability to identify and estimate effects that may not be considered in pure time series or in pure cross section data. They also claimed that individual heterogeneity can be avoided by panel data study. This sort of data can provide higher degree of volatility, freedom, and lower degree of colinearity. After considering missing data, the authors have retained only those firms that

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have data for at least 4 years. Maximum 10 years data of some firms were available. Total 195 firm-year observations have been collected.

In this study, the dependent variable is firm performance. Firm performance can be measured by several ways. Some scholars suggested that using total factor productivity (TFP) can be more appropriate measures of firm performance when accounting ratios might not be used (Evgeny 2015). Some additional measures of firm performance are not considered due to the shortfall of available information regarding firm's operating and financial activities. In this paper, we have employed three commonly used variables considered by many researchers such as return on asset (ROA), net profit margin (NPM), return on sales (ROS). First reason to employ these three variables is that through these variables, the authors can evaluate the impact of leverage on firms' income. And another reason is that as these variables were used in related research conducted in different countries, it will be convenient to compare the results of this study with others'. Moreover, it was explained by Hagel et al. (2010) that ROA explicitly takes into account a firm's assets which are used to support business functions explicitly. It focuses on whether the company is capable to generate sufficient return on these assets. It was also claimed that, asset-heavy companies require higher level of net income to provide support to the business in compare to asset-light companies that can generate very good return on asset with low margin. ROA as a key performance metric efficiently draws the management attention on asset required to run the firm. Hansen and Wernerfelt (1989), Alzharani et al. (2011), Hunjra et al. (2014) and many scholars used ROA in their studies to measure firm performance. To show the firm performance before deduction of interest and taxes, authors of this study have employed return on sales ratio (ROS) and to show the firm performance after deduction of interest and taxes, the authors have employed net profit margin ratio (NPM). ROS and NPM have been calculated as EBIT divided by total sales and net income divided by total sales respectively. Titman and Wessels (1988) used EBIT as firm profitability measure. To measure firms' operational efficiency, return on sales (ROS) has been employed as firm performance measure. ROS reflects how efficiently a firm generates profit from its sales.

On the other hand, for leverage calculation, total debt to total asset ratio has been used by the authors. The ratio has been calculated as total debt (included both long term and short term debt) divided by total asset. Margariti and Psillaki (2010) used debt to total asset as firm-leverage in their study. Eriotis et al. (2007) used debt to asset ratio to show the impact of maturity structure of leverage, they also assessed the impact of the long term debt ratio and short term debt ratio on firm performance. In this research, the authors have also employed both long term and short term debt to investigate the individual impact of these two types of debts on firm's performance. In a similar study, Evgeny (2015) suggested that differentiation of both long term and short term debt is crucial for a firm. The reason is that they considered long term debt as a tool that leads the manager to be more disciplined because fixed payments are required for firm's long-term obligation. On contrary, to finance firm's current operation, short term debt is used. According to Eriotis et al. (2007), the rationale behind the use of short term debt to calculate firm's leverage is that short-term debt can cover short-term obligation of a firm more efficiently. According to Mwangi et al. (2014), capital structure can be measured by short-term debt to asset ratio, long-term debt to asset ratio, and total debt to total asset. In a study of "Corporate efficiency", Quader and Dietrich (2014) calculated leverage as ratio of long-term debt to total asset. In their research, they also employed size, leverage, tangibility and profit margin as independent variables.

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In this research, the authors have investigated the impact of firm size. The size of a firm can be determined by its total asset. To show the impact of size, the proxy of log total assets has been employed. Here, Total asset is transformed into logarithm of firm's total asset. Margaritis and Psillaki (2010) measured the logarithm of the firm sales as firm size. A Firm larger in size gets more advantages than a smaller firm. Because financial institutions are willing to provide loan more easily to the larger firms as these firms can diversify risk. On the other hand, larger firms require bigger amount for financing its business, so they might get loan relatively at a lower interest rate. Eriotis et al. (2007) defined size as a potential explicatory indicator that shows the different level of leverage among firms. He stated that risk and bankruptcy cost are also highly associated with firm size and larger firms can be more diversified so that they encounter less risk and thus, less probability of default. Here, the authors have also used square value of log total asset. Square value of log total asset has been employed to examine whether increase of total asset has any effects on firm and to investigate whether any nonlinear relationship exists between log total asset and square value of log total asset.

To ascertain more rigorous result of financial leverage on financial performance, authors have also included some additional measures as independent variables. We have considered tangibility because it is assumed that a firm with high tangible assets is more privileged to get debt. This is broadly explained that tangible asset can be pledged as collateral to lender that ultimately helps a firm to raise good amount of debt (Giambona & Schwienbacher 2007). Titman and Wessels (1988) claimed that firms which have assets and use those assets as collateral may desire to issue more debt. Tangibility is calculated as ratio of total tangible assets to total assets (Quader & Dietrich 2014). In addition, the authors have also used age which has been measured as a form of logarithm. Age has been measured from the date of incorporation of each firm. Square value of  $\text{LogAge}$  has also been calculated. To make the result more relevant, GDP growth rate has also been considered. To identify the impact of economic boom or recession, we have employed GDP growth rate. The Growth rate of GDP has been obtained from Bangladesh bank's website. Dummies of service and manufacturing firms (MD) are also used as independent variables to see how the results vary for both industries separately.

### 3.1 The Model

For this study, the authors have relied on panel data. Panel data study is very effective empirical tool where both cross-sectional and time series data are present. In empirical study, panel data provide high degree of freedom or flexibility to the author to establish relationship between two variables by general model (Eriotis et al. 2007). At initial stage, authors have adopted Pearson linear correlation to investigate how firm leverage is correlated with firm performance.

To get more in depth of causality between leverage and performance, the authors have adopted simple linear regression as well. The result of correlation isn't sufficient proof of causation because one variable may influence the other variable or vice versa, or a third factor may involve creating this association (Zou et al. 2003). Thus, to estimate the strength and direction of the relationship between two random variables and to deal with the effect for panel data, two other approaches can be used. One is random effect model and the other one is fixed effect model (Eriotis et al. 2007). At first, the authors have tested fixed effect and then random effect. Both

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types of effects are widely used to investigate the causality between dependent and independent variable. Fixed Effect model shows the relationship between predictor and outcome variables within an entity. And in random effect model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model (Torres-Reyna 2007). But there is no justification that the effects should be treated as uncorrelated with the other regressors. To decide between these two models (Fixed effects model and Random effects model), a Hausman test can be run to know whether the individual effects are uncorrelated with the regressors or not (Eriotis et al. 2007). Thus, to differentiate between the results of fixed effect model and random effect model in panel data, the authors have adopted Hausman test. In our study, Hausman test have showed significant ( $\text{Prob} > \chi^2 = 0.0005$ ) which recommends that fixed effect is better for our model, so that fixed effect model has been adopted.

The main model (equation: 1) of our research that the authors have used to investigate the causality between financial leverage and firm performance is:

$$\text{PERFit} = \beta_0 + \beta_1 \text{Leverage}_{it} + \beta_2 \text{LogSize}_{it} + \beta_3 \text{LogSize}^2_{it} + \beta_4 \text{LogAge}_{it} \\ + \beta_5 \text{LogAge}^2_{it} + \beta_6 \text{Tangibility}_{it} + \beta_7 \text{GDPR}_{it} + \beta_8 \text{MD} + \eta_i + \epsilon_{it}$$

In this model, multiple measures of firm performance, leverage and different control variables and dummy variables have been regressed. It is already discussed that impact of one variable on another variable can be influenced by some other variables. So that, in this equation, some other control variables such as firm size, age, tangibility and GDP growth rate have been considered to examine whether these variables have influence on firm performance or not. Here,  $\text{PERFit}$  is used as a proxy of performance of firm  $i$  at time  $t$ . Here, ROA, ROS (operating margin) and NPM (Net profit margin) are three different measures of firm performance. Independent variable, debt to asset ratio (D/A), is proxied by  $\text{Leverage}_{it}$  of firm  $i$  at time  $t$ . However, in case of Size and Age, we have transformed them into logarithm form where Size is measured by firm's total asset as firm's total asset represents total value of a firm. The authors have also added tangibility of the firm that represents the position of firm's fixed asset in compare to total asset value of a firm. The control variable MD is dummy of service and manufacturing firms.

Above model has also been used to evaluate the impact of leverage on performance for service and manufacturing industry and for small and large firms where MD=1 for manufacturing and 0 otherwise and SD= 1 for small firm and 0 otherwise.

Moreover, in this research, The authors have also carried out a test to know how debt maturity structure both long-term and short-term debt influence the firm performance. The authors have measured the degree to which firm performance can be affected by each type of debt separately. To test this, The authors have adopted a new equation (equation: 2) :

$$\text{PERFit} = \beta_0 + \beta_1 \text{LTDR}_{it} + \beta_2 \text{STDR}_{it} + \beta_3 \text{LogSize}_{it} + \beta_4 \text{LogSize}^2_{it} + \beta_5 \text{LogAge}_{it} \\ + \beta_6 \text{LogAge}^2_{it} + \beta_7 \text{Tangibility}_{it} + \beta_8 \text{GDPR}_{it} + \beta_9 \text{MD} + \eta_i + \epsilon_{it}$$



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In this equation, long term debt ratio of firm  $i$  at time  $t$  is proxied by  $LTDR_{it}$  and short-term debt ratio of firm  $i$  at time  $t$  is represented by  $STDR_{it}$ . According to previous empirical study, maturity structure of debt is potential factor that can affect firm performance in different manners.

### 4. Empirical Result

In this section, the authors have described the empirical result of the study. To evaluate the impact of all control variables on firm performance, the total model has been used. This model estimates the result for whole sample used in this research. In this research, panel data have been analyzed. To diagnose panel data, The authors have used two types of effect. One is random effect and another one is fixed effect (explained in previous section). To choose between these two effects, Hausman test has been used. According to the Hausman test result, fixed effect is better for the model.

Descriptive statistics (Table-1) indicates the descriptive parameters for each variable separately (Pouraghajan et al. 2012). Authors have shown the descriptive statistics results in Table-1. The results show that over the period under study, all the selected variables have positive mean values. The mean value of ROA is 7.54251, the mean value of ROS is 26.27825 and the mean value of NPM is 20.66632. The positive returns of these three variables indicate that the companies were on average profitable. But the negative minimum observed values indicate that some companies were operating at loss. The mean values of debt-to-asset (DA), long term debt (LTDR) and short term debt (STDR) ratios are 52.949, 12.82307 and 40.18355 respectively.

These results indicate that on average approximately 53% of financial resources needed by the selected non-financial companies are supplied from debt where out of

**Table 1: Descriptive statistics for selected variables**

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	193	7.54	5.18	-6.60	25.02
ROS	192	26.28	20.88	-24.93	89.17
NPM	194	20.67	27.21	-35.64	141.3
D/A	195	52.95	22.74	8.87	94.98
LTDR	189	12.82	14.07	0	54.93
STDR	195	40.18	24.49	5.37	94.92
Size	195	16.31	1.13	13.42	18.69
Size <sup>2</sup>	195	267.2	36.52	180.0	349.3
Age	195	3.05	.69	1.10	4.02
Age <sup>2</sup>	195	9.79	4.01	1.21	16.20
Tan	194	37.35	27.02	.61	112.9
GDPR	195	6.16	.34	5.57	6.63

this 53% debt, approximately 13% is represented by long term debt and 40% is represented by short term debt. The mean of firm size (measured by Logarithm of Total Asset) is 16.3081 though its minimum and maximum values are 13.41631 and 18.68821 respectively. The mean of age

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(measured by Logarithm of Age) is approximately 3 years which indicates that on average the sample companies are relatively young. On the other hand, the mean of tangibility is 37.35148 and its minimum and maximum values are .6138913 and 112.8876 respectively which indicate that this ratio is highly varied among the sample companies. And finally, the mean value of GDP growth rate is 6.157487 and the standard deviation is .3397108 which indicates that the observations in the data set are close to the mean that means over the period between 2005 and 2014, the GDP growth rates were remained almost same in Bangladesh.

Table-2 provides correlation matrix for the pooled sample of 195 observations. The authors have observed that return on asset (ROA) is negatively and significantly correlated with debt-to-asset (DA), long-term-debt to asset (LTDR) and short-term-debt to asset (STDR) ratios. Many other researchers such as Enekwe et al. (2014), Pouraghajani et al. (2012), Meero (2015), Mohammadzadeh et al. (2013), and Batra and Munjal (2015) found the same relationship between ROA and debt-to-asset in their studies. The relationship of LTDR and STDR with ROA in the study is also consistent with the studies conducted by Mohammadzadeh et al. (2013). Though ROA is negatively related with debt-to-asset, the other two performance indicator variables return on sales (ROS) and net profit margin (NPM) are positively related with debt-to-asset ratio according to the correlation analysis. But these positive relationships are found insignificant. However, the results show that both ROS and NPM are inversely related with LTDR but positively related with STDR. These relationships are significant as well. Likewise leverage ratios, other variables such as size (Log Total Asset), age (Log Age), tangibility and GDP growth rate (GDPR) are showing different relationships with the selected three performance indicator variables-ROA, ROS and NPM. Results have showed that as size of the firm increases, the ROA ratio decreases because of their inverse relationships.

**Table 2: Correlation analysis for selected variables**

Variables	ROA	ROS	NPM	DA	LTDR	STDR	Size	Age	Tan	GD PR
ROA	1.00									
ROS	0.15*** (0.035)	1.00								
NPM	0.15*** (0.038)	0.72*** (0.00)	1.00							
D/A	-0.4*** (0.00)	0.066 (0.363)	0.089 (0.213)	1.00						
LTDR	-0.12** (0.099)	- 0.23*** (0.002)	-0.32*** (0.00)	0.13** (0.067)	1.0000					
STDR	-0.3*** (0.00)	0.18*** (0.014)	0.26*** (0.000)	0.83*** (0.00)	-0.42*** (0.00)	1.00				
Size	-0.08 (0.255)	0.127** (0.079)	0.059 (0.413)	0.20*** (0.004)	0.075 (0.30)	0.126** (0.079)	1.00			
Age	0.03 (0.626)	0.103 (0.152)	0.21*** (0.003)	-0.019 (0.787)	-0.56*** (0.00)	0.27*** (0.00)	0.18*** (0.014)	1.00		
Tan	0.014 (0.847)	-0.14** (0.054)	-0.33*** (0.00)	-0.25*** (0.000)	0.59*** (0.00)	-0.55*** (0.00)	0.018 (0.804)	-0.67*** (0.00)	1.00	
GDPR	-0.15*** (0.035)	-0.004 (0.956)	-0.052 (0.463)	0.009 (0.893)	-0.006 (0.936)	0.027 (0.710)	0.000 (0.997)	0.065 (0.368)	-0.01 (0.84)	1.00

In parentheses: \* p < 0.10; \*\* p < 0.05; \*\*\* p < 0.01

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On the other hand, both ROS and NPM are showing positive relationships with size. But only the relationship between ROS and Size is showing significant at 0.1 levels. Moreover, the results reveal if firms become older, their performances get better in terms of these three performance indicator variables. But the results also reveal that only the relationship between NPM and Age is significant. On the other hand, the relationships of tangibility with ROS and NPM are negative and significant and its relation with ROA is positive but insignificant. However, the relationships of GDP growth rate with all the three performance indicator variables are similar-negative. But again, this relationship is only significant between ROA and GDPR. This relationship, between ROA and GDP growth rate, is also consistent with the studies conducted by Cekrezi (2013) and Boadi and Li. (2015).

In table 3, total model has been presented. The authors have already mentioned that the main purpose of this research is to identify the impact of financial leverage on financial performance of the firm. Authors have found that there is a significant (at 10% level) negative impact of leverage on firm performance. Thus, null hypothesis (H10) is rejected and H1a is accepted as debt to total assets is showing negative coefficient with ROA, ROS and NPM. The p-value of these three measures of firm performance is 0.061, 0.018 and 0.063 respectively. This significant negative result indicates that higher leverage is responsible for lowering firm performance.

**Table 3: Regression results for the whole sample (Fixed effect)**

Variables	ROA		ROS		NPM	
	Coef.	P> t	Coef.	P> t	Coef.	P> t
D/A	-.0639 (.0338)	0.061	-.2149 (.0896)	0.018	-.2792 (.1488)	0.063
Size	35.09 (7.989)	0.000	49.88 (21.02)	0.019	3.656 (35.15)	0.917
Size^2	-1.095 (.2472)	0.000	-1.671 (.6500)	0.011	-.3578 (1.088)	0.743
Age	7.033 (12.83)	0.584	43.13 (33.88)	0.205	68.30 (56.44)	0.228
Age^2	-3.222 (3.793)	0.397	-11.34 (10.06)	0.262	-25.34 (16.68)	0.131
Tan	-.0990 (.0393)	0.013	-.0865 (.1046)	0.410	.0122 (.1728)	0.944
GDPR	1.374 (2.882)	0.634	-1.377 (7.593)	0.856	-6.236 (12.69)	0.624
No. of obs.	192		191		193	
No. of group	24		24		24	
R-squared	within = 0.320 between = 0.002 overall = 0.008		within = 0.220 between = 0.0201 overall = 0.032		within = 0.167 between = 0.030 overall = 0.046	

Standard errors in parentheses

This result is consistent with several theoretical backgrounds. Same results were found by many scholars in their previous studies that were conducted in different countries. Such as Titman and Wessels (1988) found that debt has negative relationship with growth opportunity where growth opportunities are linked with firm value, Rajan and Zingales(1995) found that the profitability is negatively related with leverage in all countries except Germany among G7 countries.

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McConnell and Servaes (1995) explained that negative effect of leverage on firm performance is faced by high-performing firms. On the other hand, this relationship does not exist in case of low-performing firms. Nawaz et al. (2015) explained in their research that a firm with larger amount of debt has to pay higher amount of interest to the lenders which diminish the net income of the firm and thus, it affects the firm performance. Myers (1977); Stulz (1990) claimed that the higher the leverage, the bigger the agency costs arise from the conflict among shareholders, debt holders and manager and this leads to underinvestment in projects. According to Modigliani and Miller (1963) firms get tax advantage due to interest paid on debt, thus leverage helps the firm to perform positively, on the other hand the cost of financial crisis and agency problem put the firm in troublesome condition. So that the marginal tax shield advantage are simply equivalent to the marginal cost arise by the agency conflict (Jensen & Meckling 1976). They also argued that due to increase of debt in capital structure beyond a certain level, the marginal agency cost of debt starts dominating marginal agency cost of debt outside equity. When firms employ debt in their capital structure, monitoring cost increases as bond holders' demand for proper monitoring of their funds and that ultimately reduces the total value of firms (Titman and Wessels 1988). Here, manager and shareholders have to take whole wealth burden of the agency cost. Thus, the agency conflict can be one of the major reasons for negative relationship between firm leverage and performance. Generally, firms may perform poorly if the returns generated by leverage exceed the cost (interest rate) incurred by leverage.

**Table 4: Regression results for long term and short term leverage**

Variables	ROA		ROS		NPM	
	Coef.	P> t	Coef.	P> t	Coef.	P> t
LTDR	-.1480 (.0514)	0.005	-.3920 (.1393)	0.006	-.3367 (.2394)	0.162
STDR	-.0300 (.0356)	0.401	-.2282 (.0971)	0.020	-.2284 (.1656)	0.170
Size	41.90 (7.816)	0.000	55.70 (21.19)	0.009	7.738 (36.39)	0.832
Size^2	-1.294 (.2412)	0.000	-1.830 (.6538)	0.006	-.4827 (1.123)	0.668
Age	-1.310 (12.56)	0.917	34.23 (34.03)	0.316	75.44 (58.44)	0.199
Age^2	-.9616 (3.757)	0.798	-9.280 (10.17)	0.363	-28.54 (17.47)	0.104
Tan	-.0912 (.0394)	0.022	-.0730 (.1066)	0.494	-.0236 (.1836)	0.898
GDPR	.9701 (2.936)	0.617	-1.335 (7.954)	0.867	-8.574 (13.68)	0.532
No. of obs.	186		186		187	
No. of group	24		24		24	
R-squared	within = 0.385 between = 0.043 overall = 0.010		within = 0.258 between = 0.019 overall = 0.019		within = 0.176 between = 0.027 overall = 0.040	

Standard errors in parentheses

Bangladesh is a developing country; here market as well as different industries is still in a stage of growth. So, it can be another cause for this inverse relationship between leverage and firm performance. Opportunity of growth in the market that is still on the way of developing is

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considered as one of the causes of this inverse relationship between leverage and firm performance according to Evgeny (2015). Table-3 also exhibits the result of other control variables such as LogTotal Asset and LogTotal Asset<sup>2</sup>. The impact of total asset on ROA and ROS are significant. These results are showing nonlinear relationship with performance. Initially with the increase of firm's total asset, firm performance is increasing. But after a certain point, the increase of firm's total asset decreases the firm's performance.

In this section (table- 4), the authors have explained the impact of both long-term and short-term leverage on firm performance separately. To see the causality between the debt maturity pattern and firm performance, total debt has been divided into long term debt and short term debt.

In case of long term leverage, statistics are showing significant negative impact on ROA and ROS, but the same relation is not found for NPM. On the other hand, the result of short term leverage is significant and negatively affects only the ROS. The influence of both type of leverage has different impact on firm performance. Table-4 represents that  $\beta_1$ (coefficient of long-term debt) and  $\beta_2$ (coefficient of short-term debt) are less than zero (here,  $\beta_1$  and  $\beta_2$  from equation-1). But the p-values of ROA, ROS and NPM differ in terms of long-term and short-term debt. Thus, the null hypothesis ( $H_2o$ ) is rejected and  $H_2b$  is accepted. Based on the results (showed in table 4), it can be assumed that firms those held long term debt for financing its asset has adverse impact on their firms' performance due to the decrease of both ROA and ROS rather than firms those employ short-term debt. The degree of long-term debt used by firm negatively associated with firm's future growth (Titman and Wessels 1988) and firm's issuance of short-term debt instead of long term debt lessen the agency conflict (Myers 1977). Usually a firm that uses too much long term leverage to finance its asset requires several years to pay off this large amount of money and often find it difficult to carry out the interest payment for long period that may sluggish the smooth growth of firm and this act keeps the firm away from utilizing its total earnings in any beneficial project. This ultimately hampers firm's desired performance.

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**Table 5: Regression results for small firm (Fixed effect)**

Variables	ROA		ROS		NPM	
	Coef.	P> t	Coef.	P> t	Coef.	P> t
D/A	-.0602 (.0471)	0.206	-.2426 (.1249)	0.056	-.3601 (.1824)	0.052
Size	64.21 (12.04)	0.000	79.00 (31.33)	0.014	67.22 (46.55)	0.153
Size^2	-1.978 (.3704)	0.000	-2.584 (.9639)	0.009	-2.544 (1.432)	0.080
Age	-.0139 (15.14)	0.999	27.96 (39.66)	0.483	97.49 (58.53)	0.100
Age^2	-2.501 (4.739)	0.599	-9.953 (12.53)	0.429	-38.35 (18.33)	0.040
Tan	-.1268 (.0488)	0.011	-.1254 (.1293)	0.335	.1328 (.1888)	0.484
GDPR	6.469 (11.62)	0.579	22.81 (30.69)	0.460	111.04 (44.94)	0.016
No. of obs.	107		105		107	
No. of group	13		13		13	
R-squared	within = 0.479 between = 0.006 overall = 0.057		within = 0.316 between = 0.011 overall = 0.007		within = 0.356 between = 0.091 overall = 0.080	

Standard errors in parentheses

Table 5 and 6 show the impact of both large and small size firms on leverage- performance relation. Most of the time, firm size is considered as an effective component that is highly associated with firm performance. Financial performance of many firms is influenced by firm size (See Panagiotis, and Konstantinos 2008).

Here, firm size is considered as an independent variable and it is significantly related with firm performance. Some scholars found that firm size are positively related with firm performance and some found opposite relationship between firm size and performance. At the same time, impact of leverage on firm performance also is varied based on firm size. In this study firm size calculation is proxied by the logarithm form of total asset, Titman and Wessels (1988) also used logarithm of total asset as firm size measure. To differentiate firm based on size of total asset, at first we have taken the mean of log Total Asset. The value of mean of LogTotal Asset is 16.3081 (Table-1). Then we have considered LogTotal Asset greater than 16.3081 (large firm = LogTotal Asset > 16.3081) as a large firm and LogTotal Asset smaller than 16.3081 (Small firm = LogTA < 16.3081) as a small firm.

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**Table 6: Regression results for large firm (Fixed effect)**

Variables	ROA		ROS		NPM	
	Coef.	P> t	Coef.	P> t	Coef.	P> t
D/A	-.0847 (.0451)	0.065	-.1645 (.1405)	0.246	-.1108 (.2210)	0.618
Size	4.166 (27.23)	0.879	18.64 (84.74)	0.827	446.5 (133.3)	0.001
Size^2	-.1543 (.7879)	0.845	-.6903 (2.453)	0.779	-12.57 (3.858)	0.002
Age	32.31 (40.18)	0.425	146.8 (125.1)	0.245	-121.1 (196.8)	0.541
Age^2	-7.012 (10.73)	0.516	-33.94 (33.38)	0.313	36.69 (52.49)	0.487
Tan	-.0083 (.0747)	0.912	.0602 (.2313)	0.796	-.2702 (.3639)	0.461
GDPR			-7.990 (13.82)	0.565	-20.16 (21.74)	0.357
No. of obs.	85		86		86	
No. of group	11		11		11	
R-squared	within = 0.324 between = 0.074 overall = 0.011		within = 0.192 between = 0.012 overall = 0.061		within = 0.343 between = 0.006 overall = 0.042	

Standard errors in parentheses

In table 5, the authors have presented the statistical result of small size firms. In case of small firms, the relationship between leverage and firm performance is negative. The result exhibits that debt to total asset has significant negative impact on ROS and NPM. On contrary, negative impact of leverage is insignificant on ROA. This outcome of small size firms indicates that these firms are less capable to diversify their asset in profitable manner that may affect operating profit margin and net profit margin. On the other hand, in case of large size firms (table- 6), total debt is also negatively associated with firm performance. The leverage of large size firm has significant negative impact only on ROA but this impact of leverage is not found for operating margin and net profit margin. So, it can be drawn from the statistical result is that for large size firms' leverage have less negative influence on firm performance. According to the result, shown in table-5 and 6, the null hypothesis, H<sub>3o</sub> is rejected because the p-values of all three dependent variables (ROA, ROS and NPM) differ in case of small and large firms. So that H<sub>3a</sub> is accepted.

According to pecking order theory, large firms are fully grown and occupied good position in debt market that reduces their agency cost and thus firm performance is less adversely affected. There is an argument that even though large firms are more likely to use debt but they are more diversified and have less default risk (Margaritis & Psillaki 2010; Titman & Wessels 1988). They also mentioned that issuance of debt and securities incurred cost which is linked with firm size and cost of issuing debt is higher for small firm. So, it is clear that performance of small firm is diminished greatly by the use of leverage relatively to the performance of large firm.

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**Table 7: Regression results for manufacturing industry (Fixed effect)**

Variables	ROA		ROS		NPM	
	Coef.	P> t	Coef.	P> t	Coef.	P> t
D/A	-.1367 (.0535)	0.013	-.2588 (.1358)	0.061	-.6374 (.1843)	0.001
Size	55.66 (19.74)	0.006	13.67 (50.11)	0.786	-178.8053 (68.01)	0.011
Size^2	-1.813 (.6711)	0.009	-.3975 (1.703)	0.816	6.241 (2.31)	0.009
Age	65.54 (47.59)	0.173	166.32 (120.8)	0.173	-95.92 (163.92)	0.560
Age^2	-14.68 (12.83)	0.257	-38.83 (32.57)	0.237	36.66 (44.20)	0.410
Tan	.1198 (.0829)	0.153	.2000 (.2103)	0.345	.8485 (.2855)	0.004
GDPR	3.758 (5.161)	0.469	-2.128 (13.10)	0.871	-20.59 (17.78)	0.251
No. of obs.	92		92		92	
No. of group	11		11		11	
R-squared	within = 0.401 between = 0.009 overall = 0.0001		within = 0.232 between = 0.163 overall = 0.093		within = 0.404 between = 0.080 overall = 0.066	

Standard errors in parentheses

Finally, at the end of the empirical result section, the authors have compared how the impact of financial leverage on firm performance varies from industry to industry. Many scholars also considered that leverage-performance relation is influenced by the industry characteristics. (See Frank & Goyal, 2004). As the authors have already discussed above that we have selected 24 nonfinancial companies out of 50 companies (CSE50 index). Among 24 companies, The authors have divided them in two categories where 11 firms are under manufacturing industry (including pharmaceuticals, steel, cement, food, oil, ceramic, textile etc) and rest are under service industry (Hotel, airlines, telecommunication, electricity and gas supplier). To measure their result separately, the authors have used dummy variable as MD. In table-7, leverage-performance relationship has been investigated for manufacturing industry. On the other hand, table-8 reveals the evidence for service industry. Results prevail that impact of leverage on performance is negative for both the industries where it is significant for manufacturing industry and insignificant for service industry. That is why we have rejected the null hypothesis (H4o) and accepted H4a.

According to Titman and Wessels (1988) firms which manufacture products require expensive machineries, special servicing for machineries, liquidation of scrapped parts etc. These activities lead the firm to perform negatively.



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**Table 8: Regression results for Service industry (Fixed effect)**

Variables	ROA		ROS		NPM	
	Coef.	P> t	Coef.	P> t	Coef.	P> t
D/A	-.0001 (.0441)	0.997	-.1768 (.1330)	0.188	-.1073 (.2545)	0.674
Size	47.73 (10.27)	0.000	63.67 (30.30)	0.039	66.54 (59.13)	0.264
Size^2	-1.447 (.3182)	0.000	-2.052 (.9385)	0.032	-2.228 (1.831)	0.228
Age	7.625 (6.568)	0.250	31.18 (19.35)	0.112	36.61 (37.85)	0.337
Age^2	-5.8745 (2.228)	0.010	-7.943 (6.609)	0.233	-23.25 (12.82)	0.074
Tan	-.2362 (.0459)	0.000	-.1876 (.1390)	0.182	-.2381 (.2644)	0.371
GDPR	2.172 (3.301)	0.513	3.597 (9.721)	0.712	-7.414 (19.03)	0.698
No. of obs.	100		99		101	
No. of group	13		13		13	
R-squared	within = 0.498 between = 0.000 overall = 0.013		within = 0.387 between = 0.017 overall = 0.000		within = 0.163 between = 0.002 overall = 0.014	

Standard errors in parentheses

According to Myers (1977), in the Industry where competition is high, firms have to put too much effort to survive. Effort should not be limited to plant and equipments maintenance. Firm has to give relentless effort to attract customer through promotion, incorporation of innovative technology, sales, high efficiency, selecting right pool of manpower and provide training. There is a large monetary value associated to perform all the activities. It can be noted that many of the cost raised from the above activities those are mentioned by Myers (1977) are higher for manufacturing industry. So, the cost incurred by all of the above activities may decline firm performance of manufacturing firms rather than service oriented firms as these firms are not involved in those activities.

## 5. Conclusion

In this research, the authors have investigated how a firm performance is affected by the use of outside borrowing. The authors have estimated the causality between leverage and performance from the context of debt maturity structure, small and large firms and from the context of service and manufacturing industry to test robustness of the results and to see how these factors responding in different cases. Findings of this research reveal that financial leverage has significant negative impact on performance of non-financial companies of Bangladesh. In case of long-term debt, this impact is more significant than short-term debt and a small firm is more adversely affected by the leverage than a large firm. However, this negative impact of debt is significant for manufacturing firms and insignificant for service oriented firms. These results are compatible with the previous studies (Titman & Wessels 1988; Rajan & Zingales 1995;

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McConnell & Servaes 1995). Agency cost theory of Jensen and Meckling (1976) and pecking order theory of Myers & Majluf (1984) also supported this study's research findings.

### 5.1 Implication and Scope of Study

This research study has wider implications as firm owner, manager, government and other regulatory bodies will be benefited by our research findings in several ways. First of all, this study reveals that increase of leverage deteriorates firm performance. Therefore, it suggests to the policy makers of an organization that they should reduce their dependency on financial leverage to accelerate financial performance of the firm. To ensure shareholders' wealth maximization of an organization, this study can play a key role as shareholders' wealth maximization is highly related to a healthy financial condition of an organization. Secondly, findings of the study might direct the managers of a corporation to concentrate more on short-term debt as a better source of financing than long-term debt because the authors have found that firms which hold large amount of long-term debt are more adversely affected than those which hold short-term debt. Thirdly, it is recommended by the authors that government of our country should adopt necessary policies (monetary policy) to minimize high borrowing cost of our country and support firms to improve their financial condition. Finally, the authors have suggested that the findings of this research can be implemented as an essential tool for corporate governance issues as these issues have become more significant for the agency costs. This study can be much more lucrative to those investors who have invested in levered firms because it will assist them to identify over and under leveraged firms and therefore, they may find more avenue to find out probable investment targets.

This study can be the center of interest for future research in the area of corporate finance among developed, developing and under developed countries. At the same time researcher of different countries may conduct their research by including large pool of firm from different industries to get more elaborate idea.

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