Impact of Leverage on Profitability of Textile Industry of Bangladesh: A Study on Listed Companies in Dhaka Stock Exchange

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Abstract

This study is an endeavor to focus on the relationship between leverage and profitability of textile sector operating in Bangladesh. The aim of this study is to focus on the impact of leverage on profitability of textile companies operating in Bangladesh. Elucidating the role of leverage is one of the primary objectives of this research. The degree of operating leverage (DOL), degree of financial leverage, and degree of total leverage (DTL) have been computed and compared with return on investment (ROI). 10 textile companies as sample which is listed on the Dhaka Stock Exchange from the period 2007 to 2015 has been used for analysis. For data analysis, regression model is used. This study finds the use of leverage has statistically significant impact on firm’s profitability based on the level of riskiness inherent to each firm. To dig deeper the impact of leverage, some significant ratios have been calculated, which helped us to come to a conclusion that there is a significant relationship with DOL and ROI (P = 0.010). However, this study will help financial manager with the better understanding about the use of leverage.

Keywords: Leverage; Degree of Operating Leverage; Business Risk; Degree of Financial Leverage; Financial Risk; Return on Investment; Textile Industries

1. Introduction

Analysis of firm’s profitability is of extreme importance to all stakeholders of a firm, especially to its common equity investors. When the assets are used effectively to increase profit, profitability can be affected by operating decisions. The effectiveness of the companies’ management in making the profit from the assets used basically indicates the efficiency of a firm. The analysis of financial leverage on profit profiles of firms engages a considerable portion of financial literature (Dean, 1968; Sheel, 1994). The importance of profitability as an index for assessing business efficiency and controversy surrounding the relationship between financial leverage and profitability is the reasons behind this. This paper intends to analyze the profit profile of textile firms in Bangladesh and to scrutinize the affect of financial leverage on profitability. Leverage is one of the tools used by firms to gear up their capital with a view to increasing profit. One of the common ways through which a company increases its profit is with the help of financial leverage. To increase the anticipated level return on the company’s equity financial leverage uses debt instruments. This study will help to reveal that there is a significant relationship between leverage and profitability, and leverage basically helps to gear up the profitability of a firm and a textile firm is no exception.

1.1. Objectives of the study

The main objective of this study is to analyze the relationship between leverage and return on investment (ROI) of textile companies operating in Bangladesh. Specific objectives are:
i. To analyze the relationship between degree of operating leverage (DOL) and ROI.
ii. To analyze the relationship between degree of financial leverage (DFL) and ROI.
iii. To analyze the relationship between degree of total leverage (DTL) and ROI.

2. Literature Review

An extensive theoretical and empirical body of knowledge scrutinizes the issue of importance of leverage on profitability. The literature review focuses on verification related to the issue of relation between leverage and profitability as the objective of this study is to determine whether leverage is significantly related to firm’s profitability or not.

There are so many pragmatic works on the relationship between leverage and profitability. However, the findings of these studies are not the same. Some studies found inverse relationships between leverage and profitability while others found a positive relationship. There is also evidence of no relation between these two. Robb and Robinson (2009) and Ruland and Zhou (2005) consider that there is a constructive relationship between leverage and profitability. Jensen (1986), leveraging up a firm boosts up profitability, which results in a positive relation between leverage and profitability. Moreover, this finding agrees with the study of Modigliani and Miller (1963).

Chandrakumarangalam and Govindasamy (2010) found out that shareholders wealth is maximized when firms are able to employ more debt indicating leverage is positively related to profitability. Return on equity is increased or decreased by the use of high levels of debt in the capital structure. In contrast to the above view, some studies have found inverse relationships between leverage and profitability (Negash, 2001). A study found that debt has a negative impact on the firms’ profitability, Negash (2001). He said that the financial benefits generated from leverage are significant over an infinite period of time and which is supported by the Modigliani and Miller (1963) theory.

Highly profitable firms have lower levels of leverage than less profitable firms do. Titman and Wessels (1988) as they first use their earnings before debt. Sheel (1994), Sunder and Myers (1999), and Wald (1999) have substantiated that stock prices reveal how firms perform. In a heteroskedastic to bit regression model, Wald (1999) found that profitability has a negative effect on debt to asset ratios. Sheel (1994) found an inverse relationship between debt to asset ratio and non-debt tax shield and between firm’s leverage behavior and its past profitability.

Debt does not consider tax benefits, Fama and French (1998). Negative relationships between leverage and profitability exist when degree of leverage tends to generate agency problems among shareholders and creditors. Few studies reported no or zero relationship between profitability and leverage. Long and Malitz (1986) found out that there is no relationship between capital structure and profitability. Due to inherited different characteristics of short-term and long-term debt, total debt as a whole has no association with firm profitability, Amjed (2007).

Berkivitch and Israel (1996), think a firm’s value, and debt’s level is positively related when shareholders have total control over the firm’s business and it is inversely related when debt holders have the power to persuade the course of the business. Hence, there is a relationship between profitability and leverage.

3. Research Methodology

This study made use of exploratory study based on secondary data obtained from companies listed in Dhaka Stock Exchange (DSE). Data of all the variables belonged to period starting from 2007 to year 2015 were taken in this study.

3.1. Model estimation and specification

Three dependent variables made up of profitability ratios, one independent variable is considered for this study (Table 1).

This study used regression analysis model for identifying the impact of leverage on profitability. The general form of the estimated model is as follows:
\[ \hat{Y} = \alpha + \beta_1 \text{DOL} + \beta_2 \text{DFL} + \beta_3 \text{DTL} + \epsilon_{i,t} \]

Where,

\( \hat{Y} = \) Return on investment (ROI) for firm \( i \) in time \( t \);

\( \text{DOL} = \) Degree of operating leverage (DOL) for firm \( i \) in time \( t \);

\( \text{DFL} = \) Degree of financial leverage (DFL) for firm \( i \) in time \( t \);

\( \text{DTL} = \) Degree of total leverage (DTL) for firm \( i \) in time \( t \);

\( \epsilon_{i,t} = \) Random error term (factors that might have effect on the dependent variable, but for the purpose of the study, researcher was not considered this factor).

### 3.2. Variables description

**ROI:** Return on assets is an indicator of a profitability a company which provides information how well company is using its total assets to generate profits. The estimated formula is:

\[
\text{Return on investment (ROI)} = \frac{\text{Net profit after-tax}}{\text{Total asset}}
\]

In this study, profitability is used as dependent variable measured by net profit after tax to total assets. It is a comprehensive indicator of a firm’s performance because it shown in percentage. Positive ROI indicates managerial efficiency, and negative ROI indicates managerial inefficiency.

**DOL:** The DOL is a leverage ratio that summarizes the effect a particular amount of operating leverage has on a company’s earnings before interest and taxes (EBIT) over a period of time. Operating leverage involves using a large proportion of fixed costs in the operations of the company. The formula is as follows:

\[
\text{Degree of operating leverage (DOL)} = \frac{\text{EBIT} + \text{operating fixed cost}}{\text{EBIT}}
\]

Positive DOL: When fixed cost has a greater portion in the total cost structure of the firm/company, a small percentage increases in sales increases a greater percentage in net operating income. This concept is known as positive operating leverage.

Negative DOL: A negative operating leverage is a situation where fixed cost has a greater portion in the total cost structure of the company and there is a decrease in sales. Such a situation has a negative effect on the revenue of the firm resulting in a greater percentage decrease in net operating income.

**DFL:** DFL is the relationship between percentage change in earning per share and percentage change in EBIT. In our study, DFL is independent in each year because it varies with the use of fixed financial cost the firms cost structure. Hence, the following formula can be derived as follows:

\[
\text{Degree of financial leverage (DFL)} = \frac{\text{EBIT}}{\text{EBIT} - \text{Financial fixed cost}}
\]

Positive DFL: A positive financial leverage means that the assets acquired with the funds provided by creditors and preferred stockholders generate a rate of return that is higher than the rate of interest.
or dividend payable to the providers of funds. Therefore, use of financial leverage may increase the profitability common stockholders.

Negative DFL: A negative financial leverage occurs when the assets acquired with the debts and preferred stock generate a rate of return that is less than the rate of interest or dividend payable to the providers of debts or preferred stock. Negative financial leverage is the reduction of profitability of common stockholders.

3.3. Degree of combined leverage or DTL

A leverage ratio that summarizes the combined effect of the DOL and the DFL has on earnings per share (EPS), given a particular change in sales. This ratio can be used to help determine the most optimal level of financial and operating leverage to use in any firm. The formula is as follows:

\[
\text{Degree of total leverage (DTL)} = \frac{\% \text{ change in EPS}}{\% \text{ change in sales}} = \text{DOL} \times \text{DFL}
\]

4. Empirical Results Analysis

This section of the research presents the empirical analysis of secondary data extracted from the annual reports of listed textile companies as published in the DSE from 2007 to 2015. The analysis was based on the regression with ROI as dependent variables and DOL, DFL, and DTL served as independent variables.

4.1. Descriptive statistics

Table 2 provides a summary of the descriptive statistics of the dependent and independent variables based on the financial statements of the selected companies.

From Table 2, the profitability of the firms’ measured by ROI an average return of 3.65%. The ratio of DOL, DFL, and DTL estimated in averages of 1.63, 3.60, and 5.88, respectively. From the above, analysis is found that, if DOL is increase or decrease by 1.63 points, the EBIT will increase or decrease by 16.30%. The statistical result also signifies this evidence at the 5% level of significance label the value of F-statistics is 0.027.

4.2. The correlation matrix

To examine the strength and relationships among the dependent and independent variables, a correlation matrix of the variables for the sample firms is discussed in Table 3.

DOL is an important measure of a firm’s business risk. Operating leverage generally refers to the firm’s incurrence of fixed operating costs. As a general rule, high fixed costs create more unstable DOLs.

Table 3 shows that ROI is only significant (0.010) with DOL and statistically insignificant relationship with DFL (0.081) and DTL (0.084). This analytical result implies that high a high DOL may increase ROI significantly, but there is no possibility of increasing ROI by increasing the financial leverage.

Table 2: Descriptive statistics of the dependent and independent variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observation</th>
<th>Mean±SD</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROI</td>
<td>90</td>
<td>3.6545±3.6190</td>
<td>0.4351</td>
<td>6.9636</td>
</tr>
<tr>
<td>DOL</td>
<td>90</td>
<td>1.6262±0.8839</td>
<td>−8.6143</td>
<td>1.4064</td>
</tr>
<tr>
<td>DFL</td>
<td>90</td>
<td>3.5948±1.5860</td>
<td>−1.6147</td>
<td>2.4794</td>
</tr>
<tr>
<td>DTL</td>
<td>90</td>
<td>5.8800±2.8079</td>
<td>−4.4910</td>
<td>1.2977</td>
</tr>
</tbody>
</table>

ROI: Return on investment, DOL: Degree of operating leverage, DFL: Degree of financial leverage, DTL: Degree of total leverage, SD: Standard deviation
4.3. Regression analysis

4.3.1. Model summary

To analyze the relationship between leverage and profitability, regression analysis was made. ROI measures the profitability which is regressed against DOL, DFL, and DTL. Regression results are presented in Table 4. It should be noted that the values of all the variables are at 5% significant level.

The model summary table explains the amount of variability in the dependent variable explained by the independent variable. The value of $R^2$ is merely 0.101 that means approximately 10.10% of the variability of dependent variable (ROI) is explained by the independent variables and remaining of the variance is unexplained. Adjusted $R^2$ is 69% indicating that 69% variability in dependent variable can be explained by independent variables.

The value of Durbin-Watson always lies between 0 and 4. If the Durbin-Watson statistic is substantially <2, there is evidence of positive serial correlation. As a rough rule of thumb, if Durbin-Watson is <1, there may be cause for alarm. In our study, the value of Durbin-Watson test is 1.183 which indicates that there is no serious statistical problem. Since the textile industry is very fast-growing industry in Bangladesh. Most of the companies are inclined to use the high degree of leverage. Since the mean value of DOL is 1.6262 and DFL is 3.5948.

ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>117.333</td>
<td>3</td>
<td>39.111</td>
<td>3.208</td>
<td>0.027</td>
</tr>
<tr>
<td>Residual</td>
<td>1048.345</td>
<td>86</td>
<td>12.190</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1165.678</td>
<td>89</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Predictors: (Constant), DTL, DOL, DFL. *Dependent variable: ROI. ROI: Return on investment, DOL: Degree of operating leverage, DFL: Degree of financial leverage, DTL: Degree of total leverage, level of significance 5%.

Table 3: Correlation matrix of the variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>ROI</th>
<th>DOL</th>
<th>DFL</th>
<th>DTL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROI</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOL</td>
<td>−0.246 (0.010)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DFL</td>
<td>−0.148 (0.081)</td>
<td>0.002 (0.491)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>DTL</td>
<td>−0.147 (0.084)</td>
<td>0.040 (0.356)</td>
<td>0.966 (0.000)</td>
<td>1</td>
</tr>
</tbody>
</table>

Correlation is significant at the 5% (one-tailed); significant value in bracket, ROI: Return on investment, DOL: Degree of operating leverage, DFL: Degree of financial leverage, DTL: Degree of total leverage.

Table 4: Coefficients

<table>
<thead>
<tr>
<th>R</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>Standard error of the estimate</th>
<th>Model summary</th>
<th>Change statistics</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.317</td>
<td>0.101</td>
<td>0.69</td>
<td>3.491427</td>
<td>0.101</td>
<td>3.208</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>86</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.027</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.183</td>
</tr>
</tbody>
</table>
F-test

The F-test is used to determine whether a significant overall relationship exists between dependent variable named Ŷ (ROI) and the set of all independent variables which are DTL, DOL, and DFL; F-test is the test for overall significance.

In this ANOVA model, the hypothesis for the F-test involves the parameters of the multiple regression models:

- $H_0 = \text{Null Hypothesis } = \beta_1 = \beta_2 = \beta_3 = 0$
- $H_1 = \text{Alternative hypothesis } = \beta_1, \beta_2, \beta_3$ is not equal to zero.

Rejection and acceptance criterion: If $H_0$ is rejected, that is when calculated F value is greater than table value, then we have enough evidence to deduce that two of the parameters are not equal to zero and that the overall relationship between Ŷ (ROI) and other independent variables DTL, DOL, and DFL is significant. However, if $H_0$ is accepted, that is when calculated F value is less than table value, then we do not have the sufficient evidence to deduce that a significant relationship exists between dependent and independent variables.

- With a level of significance $\alpha = 0.05$, the tabulated value shows that 3° of freedom in the numerator and 86° of freedom in the denominator, $F_{0.05} = 2.71$. As calculated F value is 3.208 which is higher than the table value (2.71), we reject $H_0$ and infer that an overall significant relationship exists among ROI, DTL, DOL, and DFL.

Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized coefficients</th>
<th>Standardized coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Standard error</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>5.955</td>
</tr>
<tr>
<td></td>
<td>DOL</td>
<td>-1.275</td>
</tr>
<tr>
<td></td>
<td>DFL</td>
<td>-0.438</td>
</tr>
<tr>
<td></td>
<td>DTL</td>
<td>0.229</td>
</tr>
</tbody>
</table>

- In this multiple regression equation, we have established the relationship among ROI, DTL, DOL, and DFL.
- Dependent variable Ŷ = ROI.
- Independent variable, DOL = DOL.
- Independent variable, DFL = Degree of financial leverage.
- Independent variable, DTL = Degree of total leverage.
- So, Ŷ = 5.955-1.275 DOL - 0.0438 DFL + 0.229 DTL
- Here, $\beta_1$ is the slope of DOL, $\beta_2$ is the slope of DFL, and $\beta_3$ is the slope of DTL. If DFL, DOL, and DTL are zero, then $a = \bar{Y}$.
- Here, $\bar{Y} = 5.955$ which is Ŷ intercept. It shows that ROI is positive indicating without the independent variables there will be no ROI of the textile industry of Bangladesh.
- Now, the value of $\beta_1$ or the slope of DOL is −1.275. It means if the DOL increases by 1% then the ROI of textile industry decreases by 1.275% assuming all other variables are constant.
- Next, the value of $\beta_2$ or the slope of DFL is −0.0438. It means if DFL increases by 1% ROI decreases by 0.0438% and vice versa assuming all other things are remaining same.
- Moreover, finally, the value of $\beta_3$ or the slope of DTL is 0.229. It means if DTL increases by 1% ROI also increases by 0.229% and vice versa assuming all other things are remaining same.

5. Findings of the Study

The core objective of the study was to analyze the relationship between leverage and profitability (ROI). Periods taken for the study were from 2007 to 2015. After conducting analysis, some issues are
found, which are, there is significant relationship between leverage and profitability, DOL, DFL, DTL, and ROI are significantly related, there is a negative relationship between DOL and ROI. An inverse relation exists between DFL and ROI, (industry specific variables may help explain these unexpected findings) and a positive relation exists between DTL and ROI. ROI is the most inclusive measure of profitability of a firm. It considers the operating decisions made as well as the financing decisions. In most of the years, operating costs and financial costs were high which resulted into a lower net profit after tax, which is why DOL and DFL are inversely related with ROI. However, due to industry-related issues, percentage change in EPS moved positively with ROI resulting positive relation with DTL.

The study recommends further improvement between the relationship between DOL and DFL. If they have positive impact on profitability, then this sector will flourish more.

References


Dean, J. (1968), Managerial Economics. New Delhi: Prentice-Hall of India.


