



The Impact of Capital Structure on Stock Return of Selected Firms in the Pharmaceutical and Chemical Sector in Bangladesh

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Abstract

The purpose of this study is to investigate whether there is any statistically significant relationship between capital structure and stock return for the selected firms of pharmaceutical and chemical sector which are listed in Dhaka Stock Exchange of Bangladesh. To examine the relationship this study selects twenty one firms of pharmaceutical and chemical sector. The data collected for the time period from 2010 to 2018. This study considers Hausman specification test to select the appropriate model in order to analyze the balanced panel data. According to the results of Hausman specification test the fixed effect model becomes appropriate in order to determine the relationship between capital structure and stock return. This study considers debt to equity ratio as independent variable and stock return as dependent variable. The control variables are the return on equity, earnings per share, firm size, times interest earned and price-to-earnings ratio. The result of this study suggests that debt to equity ratio has statistically significant negative relationship with stock return. Furthermore, from the control variables return on equity, earnings per share and firm size has statistically significant positive relationship with stock return. But times interest earned and price-to-earnings ratio has no statistically significant relationship with stock return.

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1. Introduction

There are three sources of funds available to firms which are debt, equity and internal equity (retained earnings). The right side of the statement of financial position reflects the combination of these sources of funds in order to raise the desired level of funds for firms. Therefore, capital structure is the blend of these sources of funds (debt, equity and internal equity) which are utilized by the financial managers of a firm to raise funds. The optimal mix of these sources of funds enhances the performance of the firm, which in turn, ensures the wealth maximization for the shareholders of the firm. Optimal mix of capital structure refers that mix of debt, equity and internal equity which minimizes the weighted average cost of capital. Franco Modigliani and Miller (1958) stated that the return of shareholders of a firm is affected by the optimal mix of capital structure. A firm may favor higher level of debt financing in a country where interest expense of debt is tax deductible. Therefore the firm will enjoy greater tax savings. But higher level of debt also increases the risk of bankruptcy. According to Brigham and Ehrhardt (2001) firms which rely heavily on debt financing is affected by higher level of bankruptcy risk. Therefore, this higher level of risk makes the shareholders to require higher rate of return in order to compensate them against this higher level of risk. Lasher (2016) stated that the capital structure of unlevered firm is formed only by equity. Unlevered firms do not enjoy tax savings of interest expense which reduces its profitability. Therefore, where financial managers' prime goal is to maximize the shareholders wealth, increasing the equity in the capital surely put them into dilemma. The dilemma even gets more clustered when the financial managers have to choose optimal debt to equity ratio to form firm's optimal capital structure. Therefore, when the financial managers are determining the optimal debt

to equity ratio, they eventually make trade-off between the perceived risk and return. Ross (1977) found that there is statistically significant positive relationship between leverage and bankruptcy risk. Leland and Pyle (1977) found that equity and firm's value has statistically significant positive relationship. Furthermore, the optimal combination of debt and equity reduces agency conflicts between the managers and shareholders as well as managers and debt holders. Since agency conflicts is one of the obstacles of shareholders' wealth maximization objective attainment so that the optimal mix of debt and equity certainly optimize return for shareholders. In order to determine the impact of capital structure on stock return, many studies have been conducted in the other countries. But, in the context of Bangladesh where capital market is weak form market which is the source of equity financing and banking sectors with increasing rate of defaulter which is a major source of short term and long term debt financing, the relationship between debt to equity with the stock return may differ than those of developed countries with highly regulated financial sectors. Therefore, this study will attempt to determine whether capital structure has any statistically significant impact on the stock return in the selected firms of pharmaceutical and chemical sector which are listed in the Dhaka Stock Exchange of Bangladesh.

1.1. Statements of the Problem

This study will attempt to determine the relationship between capital structure and stock return in the selected firms of the pharmaceutical and chemical sector of Bangladesh by examining whether capital structure has statistically significant impact on stock return or not. To investigate the relationship this study will find the answer of the following questions, which are:

1. What is the relationship between debt to equity ratio and stock return?
2. What is the relationship between return on equity and stock return?
3. What is the relationship between earnings per share and stock return?
4. What is the relationship between firm size and stock return?
5. What is the relationship between times interest earned and stock return?
6. What is the relationship between price-to-earnings ratio and stock return?

1.2. Objectives of the Study

This study will attempt to attain the following specific objectives in order to determine whether capital structure can significantly explain stock return or not in the selected firms of the pharmaceutical and chemical sector of Bangladesh by examining:

1. The relationship between debt to equity ratio and stock return.
2. The relationship between return on equity and stock return.
3. The relationship between earnings per share and stock return.
4. The relationship between firm size and stock return.
5. The relationship between times interest earned and stock return.
6. The relationship between price-to-earnings ratio and stock return.

2. Theoretical Framework

2.1. Modigliani and Miller Theory

Baker and Martin (2007) stated that the Modigliani and Miller theorem developed in 1958 by Franco Modigliani & Metron H. Miller which is considered as the first theorem regarding the capital structure. Later on, based on this theorem many other theories were being developed and numerous empirical studies had been conducted. Khatoun and Hossain (2017) pointed out that the first proposition of Modigliani and Miller theorem is not practical because it implies that any decisions regarding the capital structure or financing decisions do not enhance or reduce the value of the firm, providing that, there is the presence of five assumptions which are- 1) There is no existence of transaction costs and taxes in the capital market and the cost of borrowings is identical for general investors and firms. 2) There is no presence of cost of bankruptcy. 3) There is no presence of asymmetric information in the market so that same information regarding earnings and risk is available to every investor. 4) Market price is not affected by the influence of market participants. 5) The capital structure of firm is perpetual and it is known to all market participants. Modigliani and Miller (1963) continued their study on this theorem to develop second proposition which implies the firm value will be increased by increasing the amount of debt in the capital structure of the firm. Because borrowings produce tax savings by which firm's value will be intensified. As result financing decisions have influence on the firm value. Therefore, close attention should be given to the optimal mix of debt and equity to form optimal capital structure. Thus weighted average cost of capital would be minimized, in turn; shareholders' wealth would be maximized.

2.2. Agency Theory

Jensen and Meckling (1976) conducted a study on optimal capital structure based on the theory of Principal-Agent. This theory implies agents usually perform those actions which will be best for their own interest, instead the interest of the principals. To minimize this problem principal can monitor or take control

or take other necessary actions to make agents to act for the best interest of principal. But this will incur cost refereed as agency costs. This principal-agent theory can be implemented for firms' managers and shareholders. [Jensen and Meckling \(1976\)](#) argued that to minimize the agency cost of a firm, the amount of borrowings in capital should be increased up to an optimal level. Because increased amount of borrowings gives the creditors more power over the managers. This would reduce the possibility and the power of the managers to take conceited actions. Therefore, increasing the amount of debt up to optimal level will enhance the performance of the firm.

2.3. Pecking Order Theory

[Graham and Harvey \(2001\)](#) argued that pecking order theory implies issuance of equity is the last resort of financing. Because when a firm is selecting between debt and equity to finance a project, investor would believe the project will be financed by equity only when firm's equity is overvalued. Therefore, investors will penalize the value of equity not by buying the shares of firm as long as any advantage available to the firm is eliminated. Thus stock price will be declined. [Myers \(2001\)](#) pointed out that for financing, firm should follow pecking order where internal equity comes first. In case of insufficiency of retained earnings or internal equity, when external financing becomes inevitable, then issuance of debt will be favored over issuance of equity. Therefore issuance of equity is the last resort of financing. Because, when information of issuing equity is conveyed to the market it signals that equity is overvalued. Thereby, price of stock will be decreased by the reaction of the investors.

2.4. Trade-off Theory

According to [Myers \(2001\)](#) the decision regarding capital structure of firm is made based on the trade-off between financial distress's cost and tax shield from interest expenses. It also implies firms which have higher amount of asset and higher level of income should have greater amount of debt in proportion to equity. But the marginal utility of taking more debt would be diminished when debt to asset ratio increases; causes sub-optimal capital structure. Therefore, firm should operate with optimal amount of debt, since increased interest expenses would trigger greater tax savings which will allow equity holders to enjoy greater benefit. However, pecking order theory opposes trade-off theory because pecking order theory strongly support retained earnings or internal equity as the first resort of financing whereas trade-off theory consistently advocate the firm should maintain optimal level of debt in capital structure.

2.5. Signalling Theory

The signalling effect is based on the concept that when stock price sensitive information is conveyed to the market, then how investors react upon receiving the information has impact on stock price. Based on the reaction of investors, stock price increases or decreases. [Barclay and Smith \(2005\)](#) postulate that the impact of signalling theory is implied in the decisions of financing which sends signals to market about the confidence of the managers of the firms towards its future prospect and financial stability to the investors. [Akorsu \(2014\)](#) conducted a study for determining the statistically significant effect of signalling theory based on the capital structure decision in Ghana where the author considered 26 listed firms of Ghana stock exchange as the study sample. The results pointed out that signalling theory is significantly applied in Ghana since capital structure decision of firm has significant influence over its performance.

3. Review of Past Empirical Studies

With an intention to determine the impact of capital structure on stock return, [Khan et al. \(2013\)](#) conducted a study on the textile industry of Pakistan. In this study the authors considered sixty nine listed textile companies out of one hundred eighty-nine listed companies. The time period for the collected data was from 2003 to 2009 so that seven years for each firm. To analyze the data they applied ordinary least square regression model. In this study the independent variables were debt to equity ratio, return on equity, earnings per share, times interest earned and cash flow ratio and the dependent variable was stock return. The results of the study showed that debt to equity ratio, earnings per share, return on equity has statistically significant positive effect on stock return. Times interest earned and cash flow ratio have positive impact on stock return which was not statistically significant. Therefore, the outcomes of the study confirmed the expectation of the authors since debt to equity ratio as a proxy of capital structure has statistically significant positive relationship with stock return.

[Arviana and Lapoliwa \(2013\)](#) examined to determine the impact of capital structure on stock return in the Indonesian stock exchange. The sample selected for this study was twenty-five firms. The data was collected for the time period from 2009 to 2011. The independent variables of this study were debt to equity, return on asset, earnings per share and price to earnings ratio. Debt to equity ratio was being used as a proxy of capital structure. Return on asset and earnings per share were being implemented as proxy of profitability. Price to earnings ratio was being considered as a measure of market ratio. The dependent variable was the stock return. To analyze the data the author employed ordinary least square regression model. The results of this study indicated that debt to equity ratio has statistically significant negative relationship with stock return.

Earnings per share have statistically significant positive relationship with stock return. Price to earnings ratio and return on asset has positive but statistically insignificant impact on stock return.

Acheampong, Agalega, and Shibu (2014) investigated the impact of capital structure and firm size on the stock return of manufacturing sectors of Ghana stock exchange for the time interval from 2006 to 2010. This study analyzes the data by applying ordinary least square (OLS) regression model. Debt to equity ratio was being considered as a proxy of capital structure as well as financial leverage and market capitalization was being selected as proxy of firm size. The findings of this study suggested that debt to equity ratio has negative relationship with stock return but the relationship is statistically insignificant. In contrast, firm size has statistically significant positive relationship with stock return.

Tahmoospour, Randjbaran, and Abbar (2015) carried on a study to determine whether there is any statistically significant association between capital structure and stock return in the Asia Pacific region or not. To conduct this study they collected twelve years of data for one thousand eighty-two companies from eight countries of Asia Pacific region. The time interval chosen for this study was from 1990 to 2002. The eight countries include Australia, China, Hong Kong, Japan, Malaysia, Singapore, South Korea and Taiwan. This study reveals that industry and market in which the firm is conducting its business heavily affect the impact of capital structure decision on the stock return. The findings of this study showed that there is statistically significant negative association between debt to equity and stock return in Australia, China and South Korea.

Ghi (2015) investigated to explore whether there is any existence of statistically significant relationship between capital structure and stock return. The study was conducted on Home Min Stock Exchange of Vietnam. The sample size was one hundred seventy-five companies. The data collected for a time interval from 2010 to 2013 so that four years data was collected for each company. The independent variables considered in this study were debt to equity ratio, return on equity, earnings per share, times interest earned and cash flow ratio. The dependent variable was stock return. To analyze the data the author employed ordinary least square regression model. The findings of the study indicated that debt to equity ratio as a proxy of capital structure has statistically meaningful negative impact on stock return. Earnings per share and return on equity have statistically significant positive impact on stock return. However, times interest earned and cash flow ratio has positive impact on stock return which is not statistically significant.

Nalurita (2015) attempted to determine the effect of capital structure on the stock return in the property, construction and real estate sector of Indonesia. To conduct the study thirty eight firms was considered as sample which was listed in Indonesian stock exchange. The data was collected for the time period from 2010 to 2014 for each firm. This paper considers Hausman specification test and on the basis of the test results it selects random effect model to analyze the data. The author considered debt to equity ratio as the explanatory variable to determine the impact of capital structure on stock return. The control variables were return on equity and price to earnings ratio. The outcome of this study shows that debt to equity ratio as a proxy of capital structure and return on equity has statistically significant positive impact on stock return. In contrast, price to earnings ratio has positive effect on stock return but it has no statistical meaningfulness.

Mustafa and Al Salamat (2016) carried on a study to find the relationship between capital structure and stock return. The study was conducted on all the listed companies of Amman Stock Exchange of Jordan. The time period for the collected data for sample was from 2007 to 2014. But the data was unbalanced panel data. So to analyze the unbalanced panel data they performed Hausman specification test and select random effect model to explain the relationship between capital structure and stock return. The final outcomes of this study show that capital structure (debt to equity ratio) has statistically significant negative relationship with stock return. As control variable earnings per share has negative and firm size has positive relationship with stock return. But their relationship with stock return was statistically insignificant.

Atidhira and Yustina (2017) attempted to examine the relationship between stock return and capital structure, profitability and size effect. The sample considered for this study was fifty listed companies. To analyze data they applied ordinary least squared regression model. The findings of this study pointed out that debt to equity ratio and earnings per share has statistically significant positive impact on stock return. In contrast, profitability ratios and firm size has statistically insignificant negative impact on stock return.

Mustafae, Saeed, and Zafar (2017) performed an empirical study with an intention to determine the effect of capital structure and firm size on the stock return on the non-financial sector of Pakistan. In this study the non-financial firms which were listed in Karachi stock exchange was considered as sample. For the sample the data was collected for the time period from 2004 to 2015. To analyze the data ordinary least squared regression model (OLS) was employed in this study. Debt to equity ratio was being considered as a proxy of capital structure as well as financial leverage and market capitalization was being selected as proxy of firm size. The final outcomes of the study demonstrated that debt to equity ratio has statistically insignificant negative relationship with stock return. But firm size has statistically significant positive relationship with stock return.

With a purpose to explore the relationship between capital structure and stock return, Ali (2017) carried on a study by considering the data of ten companies for ten years from oil and gas sector of Pakistan. The time interval for the collected data was from 2005 to 2014. To analyze the data the author implemented ordinary least squared regression model. Upon the completion of the study the author confirmed that debt to equity ratio has statistically significant positive impact on stock return.

Nurlaela, Mursito, Kustiyah, Istiqomah, and Hartono (2019) conducted a study in the property and real estate sector of Indonesia to determine the impact of capital structure and profitability on the stock return. The sample size of this study was twenty nine listed companies of Indonesian stock exchange. The data for each firm was collected for the time period from 2012 to 2016. The independent variables of this study were debt to equity ratio as a proxy of capital structure and return on asset and return on equity as a proxy of profitability. The authors applied ordinary least squared regression model (OLS) to analyze the data. The results of this study demonstrated that return on equity has statistically significant positive relationship with stock return. Debt to equity ratio and return on asset has statistically insignificant relationship with stock return.

Utami and Darmawan (2019) carried on a study on the manufacturing companies of Sharia Indonesian stock exchange in order to explore the statistically significant impact of debt to equity, return on asset, return on equity and earnings per share on stock return. To perform the study the fifty three companies were considered as sample. The data was collected for the time period from 2012 to 2016. The number of observation was two hundred fifty-three.

To analyze the balanced panel data the authors conduct Hausman specification test and based on test results they select fixed effect model. The final outcome showed that debt to equity, return on asset and return on equity has statistically insignificant positive relationship with stock return. In contrast, earnings per share have statistically significant positive relationship with stock return.

After considering all the arguments, counter arguments, findings and discussion of the past empirical studies regarding the impact of capital structure on the stock return, it is of utmost essential to determine the impact of capital structure on stock return in Bangladesh. As result, this study considers pharmaceutical and chemical sector to find the relationship between capital structure and stock return by applying the best effort to illustrate the outcomes of this study in the light of the existing literature.

4. Methodology

4.1. Sources of Data

This thesis paper considers only secondary data. For the selected independent variable, control variables and dependent variable secondary data is collected to conduct the analysis. The secondary data is obtained from selected firm's annual report, Dhaka Stock Exchange website and LankaBangla website.

4.2. Statistical Population and Sample

At present under pharmaceutical and chemical sector in Bangladesh there are thirty two companies which are listed in Dhaka Stock Exchange (DSE). Therefore the population of this study is thirty two listed companies of pharmaceutical and chemical sector.

Among these companies, this paper considers twenty one companies as sample because only these selected firms were established before 2010 so that these firms would be able to provide data for the period from 2010 to 2018. Therefore, the time period for collected data of this sample would be latest eight years for a time period from 2010 to 2018. The data is strongly balanced panel data. Since the considered periods for this study is latest eight years and cross-section included is twenty one which is the number of firms so that the number of observations for each of the variable is one hundred sixty eight.

4.3. Hypotheses

Debt to equity ratio:

H_0 : Debt to equity ratio does not have statistically significant relationship with stock return ($\beta_1=0$).

H_a : Debt to equity ratio has statistically significant relationship with stock return ($\beta_1\neq 0$).

Return on equity:

H_0 : Return on equity does not have statistically significant relationship with stock return ($\beta_2=0$).

H_a : Return on equity has statistically significant relationship with stock return ($\beta_2\neq 0$).

Earnings per share:

H_0 : Earnings per share does not have statistically significant relationship with stock return ($\beta_3=0$).

H_a : Earnings per share has statistically significant relationship with stock return ($\beta_3\neq 0$).

Firm size:

H_0 : Firm size does not have statistically significant relationship with stock return ($\beta_4=0$).

H_a : Firm size has statistically significant relationship with stock return ($\beta_4\neq 0$).

Times interest earned:

H_0 : Times interest earned does not have statistically significant relationship with stock return ($\beta_5=0$).

H_a : Times interest earned has statistically significant relationship with stock return ($\beta_5\neq 0$).

Price-to-earnings ratio:

H_0 : Price-to-earnings ratio does not have statistically significant relationship with stock return ($\beta_6=0$).

H_a : Price-to-earnings ratio has statistically significant relationship with stock return ($\beta_6\neq 0$).

4.4. Definition of the Variables

Table-1. Definition of the variables.

| Variables | Definition | Sources |
|-----------------------|--|--|
| Debt to equity | Total debt/ total shareholders' equity | Atidhira and Yustina (2017) and Utami and Darmawan (2019). |
| Return on equity | Net profit after tax// total shareholders' equity | Nurlaela et al. (2019) and Utami and Darmawan (2019). |
| Earnings Per share | (Net profit - preferred dividend)/ weighted average number of common share | Emamgholipour, Pouraghajan, Tabari, Haghparast, and Shirsavar (2013); Mustafa and Al Salamat (2016) and Utami and Darmawan (2019). |
| Firm size | Ln (market capitalization) | Acheampong et al. (2014) and Mustafae et al. (2017). |
| Times interest earned | Earnings before interest tax/ interest expenses | Khan et al. (2013) and Ghi (2015). |
| Price-to-earnings | Stock price/ earnings per share | Emamgholipour et al. (2013) and Nalurita (2015). |
| Stock return | (Current period stock price-previous period stock price)/ current period stock price | Khan et al. (2013); Acheampong et al. (2014) and Din (2017). |

Source: Definition provided in the past empirical studies.

Table 2 shows the definition which were provide in the past empirical studies based on which this paper also conduct the necessary calculation for the selected variables.

5. Findings and Analysis

5.1. Descriptive Statistics

Table-2. Descriptive statistics of the variables.

| Variables | N | Minimum | Maximum | Mean | Standard deviation |
|-----------------------|-----|---------|---------|-----------|--------------------|
| Stock return | 168 | -0.6189 | 0.5547 | 0.056941 | 0.2318075 |
| Return on equity | 168 | -0.1266 | 0.405 | 0.128054 | 0.1070803 |
| Earnings per shares | 168 | -1.8 | 7.52 | 2.929643 | 1.9332873 |
| Debt to equity | 168 | 0.0642 | 2.8364 | 0.81452 | 0.6978794 |
| Firm size | 168 | 17.9257 | 26.1071 | 22.058875 | 1.696344 |
| Price to earnings | 168 | -28.258 | 59.7264 | 16.659874 | 17.32807 |
| Times interest earned | 168 | -8.6077 | 6.351 | 2.601139 | 2.0264632 |

Source: Author's computation by using SPSS.

Based on the Table 2 stock return has an average of 0.056941 which represent low return for shareholders. The range of stock return is form -0.6189 to 0.5547. It means by making investment in these stock the minimum return that shareholders would receive is -0.6189 which represent loss. In contrast, the maximum return that shareholders would receive is 0.5547 which represent positive return. The volatility of return stock return is 0.2318075.

The mean for return equity is 0.128054. The range of return on equity is form -0.1266 to 0.405. It indicates some firms are making loss, therefore, minimum return on equity is -0.1266 which is negative. In contrast, the maximum value for return on equity is 0.405. It reflects some firms are incurring net profit; therefore, maximum return on equity is positive. The volatility of return on equity is 0.1070803.

Earnings per share has an average of 2.929643 where the minimum value is -1.8 and maximum value is 7.52. It indicates some firms are making loss due to their inefficiency of managing their operations. In contrast, some firms are making net profit after tax indicating their efficiency of managing their operations. The volatility of the earnings per share is 1.9332873.

The mean for debt to equity ratio is 0.81452. The range of debt to equity ratio is from 0.0642 which indicates some firms do not depend heavily on debt financing, to 2.8364 which indicates some firms depend heavily on debt financing since the debt of these firms are more than twice of their equity. The volatility of debt to equity ratio is 0.6978794.

Firm size has an average of 22.058875. The maximum value of firm size is 26.1071 and the minimum value is 17.9257. The standard deviation of firm size is 1.696344. The dispersion in the range of firm size is occurred due to the fact that some firms may continuously performing better which increases stock price.

Some other firms are underperforming so that the stock price decline. Therefore, the dispersion in the range of firm size based on market capitalization exists.

The price-to-earnings ratio has a mean value of 16.659874. It has a range from -28.258 to 59.7264. The minimum value -28.258 is negative since earning per share is negative for some firms due to their underperformance. The standard deviation is 17.32807. Times interest earned has an average of 2.601139. The minimum value is -8.6077 and maximum value is 6.351. The standard deviation of times interest earned is 2.0264632.

5.2 Multicollinearity Test

5.2.1. Pearson Product-Moment Correlation Coefficient

Wooldridge (2013) argued that if the correlation coefficient between two variables is more than 0.70, then evidently multicollinearity exists between those two variables.

Table-3. Pearson correlation coefficient.

| Variables | Debt to equity | Return on equity | Earnings per shares | Firm size | Times interest earned | Price to earnings |
|-----------------------|----------------|------------------|---------------------|-----------|-----------------------|-------------------|
| Debt to equity | 1 | | | | | |
| Return on equity | 0.059943 | 1 | | | | |
| Earnings per shares | -0.058324 | 0.46891 | 1 | | | |
| Firm size | -0.230925 | 0.524844 | 0.383746 | 1 | | |
| Times interest earned | -0.099543 | 0.570829 | 0.384767 | 0.552287 | 1 | |
| Price to earnings | 0.115838 | 0.374319 | 0.377616 | 0.229069 | 0.436805 | 1 |
| Stock return | -0.214328 | 0.078066 | 0.109405 | 0.144369 | 0.051541 | 0.029109 |

Source: Author's computation by using eviews.

Based on the Table 3, it is clearly observed that the highest value of correlation coefficient is 0.570829 which exists between times interest earned and return on equity. But this value is less than 0.70. Therefore, according to the guideline, since no correlation coefficient is more than 0.70 so that the variables are not affected by multicollinearity problem.

5.2.2. Variance Inflation Factors

The variance inflation factors estimates how much multicollinearity can intensify the variance of the coefficient of the estimated regression model. According to Hair and Tripp (1995); Lin (2006) and Wooldridge (2013) the cut-off point for the variance inflation factor is 10. It means if the variance inflation factor for any variable is 10 or more than then that variables should not be included in the regression model.

Table-4. Variance inflation factors.

| Variables | VIF | 1/VIF |
|-----------------------|------|----------|
| Times interest earned | 1.89 | 0.529052 |
| Return on equity | 1.88 | 0.531844 |
| Firm size | 1.75 | 0.572165 |
| Earnings per shares | 1.42 | 0.704612 |
| Price to earnings | 1.38 | 0.724694 |
| Debt to equity | 1.14 | 0.873643 |
| Mean VIF | 1.58 | |

Source: Author's computation by using stata.

Based on the Table 4, it can be observed that the highest value of variance inflation factor is 1.89. This value is far less than the cut-off value 10. It indicates the variables are not affected by multicollinearity problem. Therefore according to the guideline, it can be concluded no variables should be excluded from the regression model due to multicollinearity problem.

5.3. Test of Normality

5.3.1. Jarque-Bera Test

Table-5. Jarque-Bera test.

| | | | |
|------------------|-------|--------|--------|
| Jarque-Bera test | 1.709 | Chi(2) | 0.4255 |
|------------------|-------|--------|--------|

Source: Author's computation by using stata.

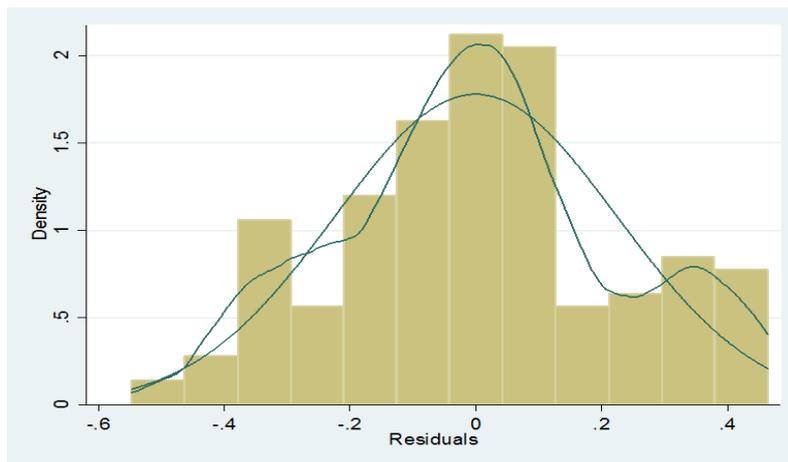


Figure-1. Histogram of residuals.

Source: Determined by author by using stata.

Based on Table 5 the Jarque-Bera test shows the results of 0.4255 which is far greater than 0.05 the significance level. As result null hypothesis cannot be rejected. Therefore it can be concluded that data is normally distributed. Moreover, based on the Figure 1 the histogram also helps to understand that the pattern of the distribution of the data is very close to normal.

5.3.2. Kolmogorov-Smirnov Test

Kolmogorov-Smirnov test can be conducted for unstandardized, standardized, studentized, deleted and deleted studentized residuals. In order to ensure about the normal distribution of data, this study will perform Kolmogorov-Smirnov test as the second test of normality. The Kolmogorov-Smirnov test will be conducted for unstandardized residuals because this approach of Kolmogorov-Smirnov test was implemented in the similar study by Cathelia and Sampurno (2010) and Atidhira and Yustina (2017) in their study.

Table-6. Kolmogorov-Smirnov test.

| Type of residual | Statistic | df | Sig. |
|-------------------------|-----------|-----|-------|
| Unstandardized residual | 0.066 | 168 | 0.073 |

Source: Author's computation by using SPSS.

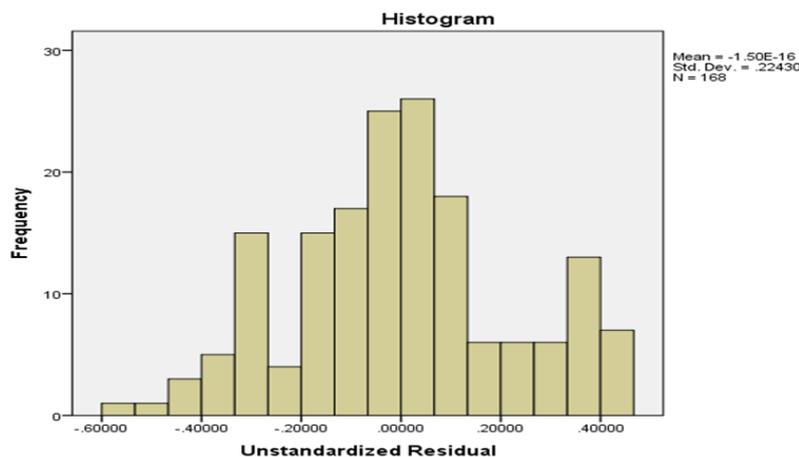


Figure-2. Histogram of residuals.

Source: Determined by author by using SPSS.

Based on Table 6 the Kolmogorov-Smirnov test shows the significant value of 0.073 which is greater than 0.05. As result null hypothesis cannot be rejected. Therefore it can be concluded that data is normally distributed. Furthermore, based on the Figure 2 the histogram also helps to understand that the pattern of the distribution of the collected data is very close to normal.

5.4. Test of Heteroskedasticity

5.4.1. Breusch-Pagan Test

Wooldridge (2013) stated that when the null hypothesis is rejected it indicates the data has heteroskedasticity.

Table-7. Breusch-Pagan test.

| | |
|---|----------|
| Breusch-Pagan / Cook-Weisberg test for Heteroskedasticity | |
| Ho: Constant variance | |
| Variables: fitted values of Stock return | |
| chi2(1) | = 0.30 |
| Prob > chi2 | = 0.5811 |

Source: Author's computation by using stata.

Based on Table 7 it is clearly observed that, the result of the Breusch-Pagan test shows that probability value is 0.5811. This probability value 0.5811 is far greater than the level of significance which is 0.05 or 5%. Since the probability value is higher than significance level, so that null hypothesis cannot be rejected rather the null hypothesis should be accepted. Therefore, based on the outcome of Breusch-Pagan test it can be concluded that data has homoskedasticity. This homoskedasticity of data is always desirable in order to develop a good regression model to make further analysis more relatable. However, it would not be very wise to make any further proceed of the analysis based on results of only one test. Therefore, another test of heteroskedasticity would be conducted which is Halbert White test.

5.4.2. Halbert White Test

Table-8. Halbert White test.

| | |
|-------------|--------|
| chi2(27) | 39.81 |
| Prob > chi2 | 0.0533 |

Source: Author's computation by using stata.

Based on Table 8 it is clearly observed that, the result of the Halbert White test shows that probability value is 0.0533. This probability value 0.0533 is higher than the level of significance which is 0.05 or 5%. Since the probability value is higher than significance level, so that null hypothesis cannot be rejected rather the null hypothesis should be accepted. Therefore, based on the outcome of Halbert White test it can be concluded that data has homoskedasticity. This homoskedasticity of data is always desirable in order to develop a good regression model to make further analysis more useful.

Since both Breusch-Pagan test and Halbert White test shows that the data has homoskedasticity. Therefore, it can be concluded that the observations of the study is not suffered by heteroskedasticity.

5.5. Hausman Specification Test

Table-9. Hausman specification test.

| | |
|---|----------|
| b = consistent under Ho and Ha | |
| B = inconsistent under Ha, efficient under Ho | |
| Test: Ho: difference in coefficients not systematic | |
| chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B) | |
| = | 50.64 |
| Prob>chi2 | = 0.0000 |

Source: Author's computation by using stata.

In Table 9 for the result of Hausman specification it is clearly observed that probability value is 0.0000 which is less than 0.05 which is the level of significance. As result, null hypothesis can be rejected or should not be accepted. Therefore, it can be concluded that fixed effect model is appropriate for this study in order to conduct further analysis of the balanced panel data.

5.5.1. Random Effect GLS Regression Model

Table-10. Random effect GLS regression model.

| | |
|------------------------------|----------|
| Number of observations | 168 |
| Number of groups | 8 |
| Observations per group (Min) | 8 |
| Average | 8 |
| Maximum | 8 |
| F(6, 141) | 2.940515 |
| Prob > F | 0.009480 |
| R-squared | 0.098762 |
| Adjusted R-squared | 0.065175 |

| Stock return | Coefficient | Standard error | z | P>z |
|-----------------------|-------------|----------------|-------|-------|
| Debt to equity | -0.0830078 | 0.0297559 | -2.79 | 0.005 |
| Return on equity | 0.3490288 | 0.2833556 | 1.23 | 0.218 |
| Earnings per shares | 0.0147938 | 0.0128603 | 1.15 | 0.25 |
| Firm size | 0.0148552 | 0.018692 | 0.79 | 0.427 |
| Times interest earned | -0.0032653 | 0.0130078 | -0.25 | 0.802 |
| Price to earnings | -0.0009313 | 0.0012531 | -0.74 | 0.457 |
| _cons | -0.2666077 | 0.3977506 | -0.67 | 0.503 |

Source: Author's computation by using stata.

In Table 10 the results of the random effect model is provided. Since this model is not appropriate so that no explanation would be provided for this model.

5.5.2. Fixed Effect Regression Model

Table-11. Fixed effect regression model.

| | |
|------------------------------|--------|
| Number of observations | 168 |
| Number of groups | 8 |
| Observations per group (Min) | 8 |
| Average | 8 |
| Maximum | 8 |
| F(6, 141) | 6.31 |
| Prob > F | 0.0000 |
| R-squared | 0.4006 |
| Adjusted R-squared | 0.2901 |

| Stock return | Coefficient | Standard error | t | P>t |
|-----------------------|-------------|----------------|-------|---------|
| Debt to equity | -0.0798613 | 0.0328871 | -2.43 | 0.016* |
| Return on equity | 0.9590673 | 0.3834136 | 2.5 | 0.014* |
| Earnings per shares | 0.0328554 | 0.015305 | 2.15 | 0.034** |
| Firm size | 0.0794293 | 0.0311196 | 2.55 | 0.012* |
| Times interest earned | -0.0017178 | 0.0013585 | -1.26 | 0.208 |
| Price to earnings | 0.0079934 | 0.0144716 | 0.55 | 0.582 |
| _cons | -1.840655 | 0.6807678 | -2.7 | 0.008 |

Note: *Significance level at 5%.

**Significance level at 10%.

Source: Author's computation by using stata.

Based on Table 11 the number of observations for each variable is 168. Since the maximum, minimum and average number of observations for each variable is 8 so that this study is considering balanced panel data. The R-squared (coefficient of determination) of the fixed effect model is 40.06% which means 40.06% variations in the stock return (dependent variable) can be explained by independent and control variables. The probability value of the F-statistics is 0.0000 which represents the model is statistically significant and reliable.

5.5.2.1. Debt to Equity Ratio

The coefficient of debt to equity ratio is -0.0798613 which indicates if unit increases in debt to equity, the stock return will be decreased by -0.0798613 unit, other thing remaining constant. The probability value is 0.016 which is less than significance level. As result the null hypothesis can be rejected and it can be concluded that debt to equity ratio has statistically significant negative relationship with stock return. This statistically significant negative relationship occurs because when firms rely heavily on debt for financing, it also increases the probability of bankruptcy. Substantial amount of debt also makes the overall capital structure sub-optimal. Moreover, higher level of debt also requires higher amount of interest payment by the firms to the lenders. Therefore, profitability decreases. Increasing level of bankruptcy risk and higher amount of interest payment makes the firms less attractive to investors for making investment in their stock. Therefore, stock price decreases. Ultimately stock return decrease due to the negative effect of debt. This finding is consistent with Tahmorespour et al. (2015); Ghi (2015); Mustafa and Al Salamat (2016) and Ali (2017). But this findings is inconsistent with (Khan et al., 2013); Nalurita (2015) and Atidhira and Yustina (2017).

5.5.2.2. Return on Equity

The coefficient of return on equity is 0.9590673 which indicates if unit increases in return on equity, the stock return will be increased by 0.9590673 unit, other thing remaining constant. The p-value is 0.014 which is less than significance level. As result the null hypothesis can be rejected and it can be concluded that return

on equity has statistically significant positive relationship with stock return. This statistically significant positive relationship occurs because when return on equity increases it indicates firm is making more net earnings after tax against per taka (monetary unit) of equity. Moreover, increase in return on equity also indicates firms' management is efficiently controlling the operations so that revenue has been increased or cost has been reduced or both. Therefore, higher return on equity attracts the investors to make investment in the stock of the firm. Therefore, stock price increases. Thus, stock return increases. This finding is consistent with Khan et al. (2013); Ghi (2015) and Nalurita (2015). But this finding is inconsistent with Utami and Darmawan (2019).

5.5.2.3. Earnings per Share

The coefficient of earnings per share is 0.0328554 which indicates if unit increases in earnings per share, the stock return will be increased by 0.0328554 unit, other thing remaining constant. The p-value is 0.034 which is less than significance level. As result the null hypothesis can be rejected and it can be concluded that earnings per share has statistically significant positive relationship with stock return. This findings support signalling theory. According to the signalling theory when earnings per share increase it signals to the market that the firm has been performed well and it will continue to do so. The higher the value of earnings per share the more attractive investors will become to make investment in that stock. Because earnings per share represent how much taka (monetary unit) investors will receive from one share. Therefore higher value of earnings per share increases the demand for the stock so that stock return intensified. This finding is consistent with Khan et al. (2013); Ghi (2015); Atidhira and Yustina (2017) and Utami and Darmawan (2019). But it is inconsistent with Mustafa and Al Salamat (2016).

5.5.2.4. Firm Size

The coefficient of firm size is 0.0794293 which indicates if unit increases in firm size, the stock return will be increased by 0.0794293 unit, other thing remaining constant. The p-value is 0.012 which is less than significance level. As result the null hypothesis can be rejected and it can be concluded that firm size has statistically significant positive relationship with stock return. Generally, firm with higher market capitalization or larger firm tends to hold greater reserve of liquid asset such as cash in order to maintain the higher quality of their business operations. Generally investors are risk averse and they are attracted to large firms in making their investment in those stock compared to small size firm since large firm are more secure. As result, higher market capitalization increases the demand for stock in the market. Therefore, stock price increases. Thus stock return also increases. This finding is consistent with Acheampong et al. (2014); Mustafae et al. (2017) and Din (2017). In contrast, this finding is inconsistent with Mustafa and Al Salamat (2016).

5.5.2.5. Times Interest Earned

The coefficient of times interest earned is -0.0017178. The p-value is 0.208 which is more than significance level. As result the null hypothesis cannot be rejected and it can be concluded that times interest earned has negative relationship with stock return which is statistically insignificant. The higher or lower times interest earned will not contribute to lower or higher stock return. This finding is consistent with Ghi (2015) but it is inconsistent with Khan et al. (2013).

5.5.2.6. Price-to-Earnings

The coefficient of price-to-earnings ratio is 0.0079934. The p-value is 0.582 which is more than significance level. As result the null hypothesis cannot be rejected and it can be concluded that price-to-earnings ratio has positive relationship with stock return which is not statistically significant. The higher or lower price-to-earnings ratio will not contribute to higher or lower return of stock. Therefore, investors should not implement price-to-earnings ratio as reference in formulating their investment strategy. This finding is consistent with Arviana and Lapoliwa (2013) and Nurlaela et al. (2019).

6. Conclusion and Recommendations

6.1. Conclusion and Summary

This study is conducted with an intention to determine whether capital structure has statistically significant impact on stock return or not in the selected pharmaceutical and chemical firms which are listed Dhaka Stock Exchange in Bangladesh. The data collected for the sample is for the time period from 2010 to 2018. Therefore, this study considered balanced panel data. In order to analyze the balanced panel data Hausman specification test is conducted to identify the appropriate model to implement. The result of this test shows that fixed effect model is appropriate to analyze the data by rejecting the null hypothesis. The fixed effect model is statistically significant since probability value of F statistics (0.0000) is less than significance level (0.05). The R-squared value shows that the independent and control variables have the ability to explain the stock return at a rate of 40.06%. The outcomes of the fixed effect model showed that debt to equity ratio has statistically significant negative relationship with stock return. Return on equity, earnings per share, firm

size has statistically significant positive relationship with stock return. But times interest earned and price-to-earnings ratio does not have any statistically significant impact on stock return.

6.2. Recommendations

Based on the results of the study several recommendations can be made both for firms and investors which are as follows:

1. Firms should not take more debt since debt to equity ratio has statistically significant negative effect on stock return. Firms should strictly maintain less than optimal amount of debt in their capital structure by following strict short term and long term debt policy. Those firms which are relying heavily on debt financing should focus on their internal financing.

2. Firms should focus on increasing their net profit after tax since return on equity and earnings per share both have statistically significant positive impact on stock return. Firms should increase their efficiency in managing operations to increase their revenue and to decrease their cost or both, to increase net profit after tax. Therefore, due to increase in net profit after tax both ROE and EPS increase which sends positive signal to the investors about the firms' performance. Then investors will appreciate the firms' stock price. Thus, stock return increases.

3. Investors have to be more careful in term of interpreting the performance of the firms. This is because firms' earnings per share have significant positive effect on stock return whereas price-to-earnings ratio has no statistically significant effect on stock return. But investors need to understand that earnings can be manipulated easily whereas price-to-earnings ratio is the reflection of market judgment of firms' performance. As results, investors should focus on price-to-earnings ratio rather than earning per share while evaluation firms' performance.

6.3. Suggestions for Future Study

Suggestions for the futures studies are”

1. Generally, an increase in debt to equity ratio increases stock return. This paper shows debt to equity ratio has statistically significant negative association with stock return. This may happen because excessive amount of debt might make overall capital structure sub-optimal. Another reason can be investors may perceive taking debt as bad sign for these firms based on industry and economic condition. Therefore, study should be conducted to determine optimal capital structure based on industry specific by considering economics circumstances.

2. Number of independent variables has to be increased. Authors of the future study may consider fundamental macro economic factors such as GDP growth rate, interest rate, inflation rate to be included in the study.

3. Expand the number of sectors. Authors of the future studies may consider other sectors such engendering sector, textile sector or cement sector to conduct their study. Therefore it will intensify the ability of cross-industry applicability of the findings. Moreover, in this way the number of observations will also be increased. Therefore, the results of the future studies will be more reliable and can be generalized on greater field such as for Dhaka Stock Exchange.

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