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The impact of financial leverage and market size on stock returns on the Dhaka stock exchange: Evidence from selected stocks in the manufacturing sector

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Abstract: This paper examines the impact of financial leverage and market size of selected stocks on stock returns. Ordinary Least Square (OLS) regression models were used to examine the relationship between the dependent and independent variables. The leverage of the selected firms was estimated from the annual financial reports covering a period of five years from 2008 to 2012 of five corporations operating in the manufacturing sector. Furthermore, average monthly stock prices of the selected stocks between 2008-2012 for Fu-Wang Ceramic, Fine Foods Limited, Olympic Industries, Metro Spinning and Rahim Textiles. The study established a significantly negative relationship between leverage and stock return when the overall industrial data is used. However at the individual firm level the relationship was not stable. Four out of the five selected companies (i.e. Fu-Wang Ceramic, Fine Foods Limited, Olympic Industries and Metro Spinning) all had negative leverage coefficients. Rahim Textile however, had a positive leverage coefficient. The paper also found the relationship between size and stock returns to be significantly positive. However, the size effect within the manufacturing sector was limited.

Keywords: Leverage, Returns, Financial Risk, Investor

1. Introduction

Investors invest for anticipated future returns, but those returns can rarely be predicted precisely as there will always be risk associated with investments [1, 2]. Actual or realized returns will almost always deviate from expected returns anticipated in the beginning of the investment period. It is assumed that investors prefer investments with the highest expected return suitable to their risk aversion. Financial risk for a firm is commonly associated with the form of financing. The amount of debt a firm uses to finance its operation is directly proportional to the financial risk. The risk stems from the inability of the firm to meet its financial obligations. This has given rise to a school of thought in finance regarding the relationship between capital structure and return on equity. The expected return on equity should increase with the amount of debt in a firm's capital structure in a friction market. Theoretical finance regards leverage as one of the sources of risk and claims that the more leveraged a firm is, the higher the risk for equity holders [3]. As the risk-averse equity holders are exposed to more uncertain cash flows, they will demand a higher rate of return on their investment (equity).When a firm has high leverage, a further increase in its leverage ratio can increase the likelihood of default and its expected cost.

Leverage is the use of borrowed money to make an investment and earn returns on that investment [4]. Financial leverage is used in various circumstances as a means of altering the cash flow and financial position of a company. Capital structure decisions are critical as a shift in leverage could increase or decrease the financial strains on companies [5, 6]. Reference [7] and [8] argued that there exists an optimal leverage ratio that equates the marginal benefits of debt such as tax shields to the marginal costs of debt such as increase in expected bankruptcy costs. Reference [9] on the other hand argued that the value of a firm is independent of its capital structure. The immediate implication of this proposition was that the return on equity capital is an increasing function of leverage. This is because debt increases the riskiness of the stock and hence equity shareholders will demand a higher return on their stocks. Reference [10] suggests that since

capital structure is endogenous, it is possible that the optimal financial policy is one that advocates low leverage so as to mitigate agency problems while preserving financial flexibility.

The negative relationship between returns and leverage could also be due to the market's pricing of the firm's ability to raise funds if needed [11]. Reference [11] also argues that higher leverage increases the probability of a firm forgoing positive NPV (net present value) projects in the future because in some instances the pay-off from these investments to shareholder after fulfilling debt obligations is lower than the initial investment shareholders have to outlay. This under-investment reduces the growth option value of a firm. Thus, an increase in the leverage ratio can result in a lower stock price all other factors being equal. Researchers including [12] noted that firms with high leverage increase their likelihood of default and its expected cost. Despite its centrality within finance, empirical findings on this subject have been mixed and sometimes contradictory [13]. While some authors [14, 15, 16] show that returns increase with leverage others show that returns decrease with leverage [17, 18, 13, 10].

2. Literature Review

2.1. The Concept of Stock

In simple terms a stock refers to a share in the ownership of a company. Stock represents a claim on the company's assets and earnings [19, 20]. The percentage stake that an investor holds is reflected in the number of stocks the investor acquires from the company's stocks. Thus the more shares that one acquires, the greater his/her ownership rights in the company. When one holds a company's stock, it means that person is one of the many owners (shareholders) of the company and as such has a claim to everything the company owns. According to [21] an ordinary stock simply represents an ownership interest in a corporation. In this modern business age such certificates are rarely given to the shareholder because the brokerage firms keep these records electronically otherwise known as holding shares "in street name". This is done in an attempt to make the stock easily tradable. Unlike the past when had to physically take a share certificate to the brokerage in order to sell, now with just a click on the mouse or even a phone call stocks can be easily traded.

2.2. Investment Return

Return refers to the financial rewards gained as a result of making an investment. The nature of the return depends on the form of the investment [22]. For instance a company that invests in fixed assets and business operations expects returns in the form of profit, which may be measured on before interest, before tax or after tax basis and in the form of increased cash flows. An investor who buys ordinary shares expects returns in the form of dividend payment and capital gains [23]. An investor who buys corporate bonds expects regular returns in the form of interest payments.

2.3. Risk

Risk has been defined as the possibility that the actual return may be different from the expected return [24, 25, 1]. When the actual return receive is greater than what was expected, investors are happy. On the other hand, investors, companies, and financial managers are more likely to be worried with the possibility that the actual return is less than the expected return [26, 27]. Therefore, a risky investment is one where there is a significant possibility of its actual returns being lower or higher than its expected returns.

2.4. Risk and Return Relationship

Investors invest for anticipated future returns, but those returns can rarely be predicted precisely as there will always be risk associated with investments [27, 28]. Actual or realized returns will almost always deviate from expected returns anticipated in the beginning of the investment period. The risk-return tradeoff in financial markets implies that low levels of risk are associated with low returns and that high levels of risk imply high returns [29, 30]. Assuming that investors are risk averse, they will require a compensation for bearing risk. This risk compensation takes the form of a risk premium defined as the expected return less the risk-free rate. Financial risk for a firm is commonly associated with the form of financing. The amount of debt a firm uses to finance its operation is directly proportional to the financial risk.

2.5. Measures of Leverage

According to [31] the objective of a study has an essential influence on the measure of leverage. Total liabilities to total assets is the broadest definition of leverage, but this as [31] argues is not a good proxy for financial risk since many balance sheet items included in total liabilities are used for transaction purposes rather than financing. The next step after providing a definition of leverage is to decide on an appropriate measure. The use of either book or market value of leverage can yield different conclusions as presented by [32]. Reference [33] argued that the coefficients in the factor model may vary depending on whether book or market values are used. As we will use market values of equity for estimating returns, one might argue that market values of debt would be better for comparison. Although the use of market values of debt can have its advantages over book value [34, 35, 36], we consider what measures of debt are available.

2.6. Debt to Equity Ratio (DER)

According to [34] DER is a proxy for estimating the level of leverage of a company. A company with high DER may provide higher returns to its shareholders, in line with the risk that is faced by the company compared to other companies with lower DER.

$$\text{Debt to Equity} = \frac{\text{Total Debt}}{\text{Total Equity}}$$

DER shows a proportional relationship between debt and equity [35, 36, 37]. A lower DER means that total debt is relatively lower compared to total equity. The DER of a company are evaluated from a few perspectives, firstly the DER of comparable companies, secondly the business stage at which the company is in (new companies tend to have more debt), and thirdly the company policy that considers the optimum level of debt financing. According to [15] a natural proxy for the risk of common equity of a firm is that firm's (DER). An increase in the DER of a firm increases the risk of its common equity.

3. Empirical Methodology

3.1. Sources and Type of Data

This study used secondary data from the Dhaka Stock Exchange database. The leverage of the selected firms was estimated from the annual financial reports covering a period of five years from 2008 to 2012. Average monthly stock prices of the selected stocks between 2008-2012 for Fu-Wang Ceramic, Fine Foods Limited, Olympic Industries, Metro Spinning and Rahim Textile were used. The respective market capitalizations of the selected companies which are proxies for size were likewise sourced from the same database.

3.2. Empirical Model Specification

$$Rit=\alpha+\beta 1LEVERAGE+\beta 2SIZE+\varepsilon it \quad (1)$$

Where

Rit is the return for stock i in period t

α is the constant of the regression equation representing other factors that could have had an effect on the stock return

β1, and β2 are the co-efficient of the estimates

εit is the error term

3.2.1. Estimations of Model Parameters

The estimation of the stock returns for the selected stocks was estimated using (2)

$$Rt = \frac{(Pt - Pt-1)}{Pt-1} \quad (2)$$

Where,

rt is stock return for period t,

Pt is the market price of stock i in period t,

Pt-1is the market price of stock i in period t-1

The stock price data for the analyses were gathered from the GSE data base. Daily closing stock prices of the selected stocks were averaged to get the monthly stock prices used for the analyses. Stock market data covering the period of (2006-2010) were used for the analyses.

The leverage of the various selected stocks was estimated using (3)

Leverage (%) = (Long term debt + Short term debt & Current Portion of Long term debt/Total Capital + Short term debt & Current Portion of Long term debt) (3)

The data for the leverage estimations were extracted from the yearly published financial statements of the selected stocks. Financial statements also covering the period from 2008-2012 were used.

The Size of each selected stock as used in this research refers to the market capitalization of the stock. This is estimated by multiplying the number of common stocks issued by the firm by the closing stock market price of the stock.

4. Results Analysis and Discussion

4.1. Descriptive Statistics

As observed from Table 1 Size has the largest standard deviation of approximately 0.46086. This implies that selected companies differ to some extent in terms of their market capitalization. The mean leverage ratio in the manufacturing sector is 0.344 which signifies lower debt levels in the sector. The associated standard deviation of leverage (0.1789) is the lowest among the three variables. This signifies greater similarities in the level of debt as far as the selected companies are concerned.

Table 1. *Descriptive Statistics.*

	Stock Returns	Leverage	Size
Std. Deviation	0.24626	0.17874	0.46086
Mean	0.931231	0.34469	0.246265
Observation	5	5	5

Source: Analysis by the authors (2014)

4.2. Effect of Size and Leverage on Stock Returns

Table 2. *Results of OLS for manufacturing sector.*

	Leverage	Size
Coefficient	-0.394	0.009
Standard Error	0.139	0.001
T-Statistics	-2.835**	9.228**
R2	0.756	
DW	0.879	

** =5% significance level Source: Analysis by the authors (2014)

The paper applied Ordinary Least Squares to estimate coefficients of the regression model. The robustness of parameter coefficients are used to explain the relationship between stock returns and the selected independent variables. The results are presented in Table 2. The general model constructed for the manufacturing sector as a whole (with respect to the selected stocks) had an associated Durbin Watson (DW) statistic of less than 2. This clearly gives an indication that the data series used for the estimations are free from autocorrelation. Moreover, the Co-efficient of determination (R2) for the model is 0.756, which gives an indication of how the independent variables in the regression model explain the total variation in the dependent variable. For a time series data, an R2 of 0.5 and above is said to be good and acceptable for analysis.

The R2 value obtained for this study (0.756) indicates that the independent variables leverage and size explained 75.6%

of the total variations in stock returns. The remaining 24.4% of variation is explained by other factors not included in this model. The leverage coefficient is negative and statistically significant for the manufacturing sector. For every 1% fall in leverage, stock returns will increase by 0.394% in the manufacturing sector which comprises Fu-Wang Ceramic, Fine Foods Limited, Olympic Industries, Metro Spinning and Rahim Textile. The associated t-statistics is greater than two (i.e. 2.835). This may be due to the fact that firms that belong to the manufacturing sector may try to maintain low leverage levels due to the risk involved with high levels of leverage. Another possible explanation for this result may be due to the fact that financial institutions in Dhaka are unwilling to lend to manufacturing sector due to their perceived lack of competitiveness and hence their debt requirements would be relatively lower than other major sectors.

4.3. Relationship between Stock Returns and Leverage

Table 3. *Relationship between stock returns and leverage.*

STOCK	Coefficient	Standard Error	T-Statistics
Fu-Wang Ceramic	-12.54566	8.9865	-1.3258
Fine Foods Limited	-1.236554	0.323215	0.56484
Olympic Industries	-0.321564	0.985616	-0.64616
Metro Spinning	-3.5465	4.6546	-1.00024
Rahim Textile	0.0006151	1.21132	2.14546

Source: Analysis by the authors (2014)

The paper applied Ordinary Least Squares to estimate coefficients of the regression model. The robustness of parameter coefficients are used to explain the relationship between stock returns and the selected independent variables. The results are presented in Table 2. The general model constructed for the manufacturing sector as a whole (with respect to the selected stocks) had an associated Durbin Watson (DW) statistic of less than 2. This clearly gives an indication that the data series used for the estimations are free from autocorrelation. Moreover, the Co-efficient of determination (R2) for the model is 0.756, which gives an indication of how the independent variables in the regression model explain the total variation in the dependent variable. For a time series data, an R2 of 0.5 and above is said to be good and acceptable for analysis.

The R2 value obtained for this study (0.756) indicates that the independent variables; leverage and Size explained 75.6% of the total variations in stock returns. The remaining 24.4% of variation is explained by other factors not included in this model. The Leverage coefficient is negative and statistically significant for the manufacturing sector. For every 1% fall in leverage, stock returns will increase by 0.394% in the manufacturing sector which comprises Fu-Wang Ceramic, Fine Foods Limited, Olympic Industries, Metro Spinning and Rahim Textile. The associated t-statistics is greater than two (i.e. 2.835). This may be due to the fact that firms that belong to the manufacturing sector may try to maintain low leverage levels due to the risk involved with high levels of leverage. Another possible explanation for this result may be due to the fact that financial institutions in Dhaka are unwilling to lend to the manufacturing sector due to its perceived lack of competitiveness and corresponding lower debt requirements relative to other major sectors.

4.4. Relationship between Stock Returns and Capitalization

Table 4. *Relationship between stock returns and capitalization.*

STOCK	Coefficient	Standard Error	T-Statistics
Fu-Wang Ceramic	0.325	0.0025	7.25465
Fine Foods Limited	0.0564	0.354	5.2155
Olympic Industries	0.654	0.697	2.1255
Metro Spinning	0.9875	0.6487	1.25445
Rahim Textile	-0.464	.0654	-2.655

Source: Analysis by the authors (2014)

The results of the effect of size on stock returns for the selected stocks are presented in Table 4. In the case of Fu-Wang Ceramic Table 4 above shows that size has positive relationship with stock returns. The results as indicated above show that a 1% decrease in market capitalization will cause stock returns to decrease about 0.325%. Conversely, the result also reveals that, a 1% increase in market capitalization will also increase stock returns by 0.325% for Fu-Wang Ceramic stocks. The t-statistic for the estimated coefficient is 7.25465 implying that the result is statistically significant. The size effect on stock returns Fine Foods Limited is positive. The results as shown in Table 4 above indicate that there is a direct relationship between firm size and stock returns for Fine Foods Limited. It could be seen that a 1% increase in market capitalization (size) causes 0.0564% increase in stock returns. Statistically, the t-statistic for Fine Foods Limited is 5.2155% and it is greater than 2 implying that the result is statistically significant. The standard error for Fine Foods Limited with respect to size is 0.02 which indicates that the mean estimates are very reliable. Table 4 also displays the result of the OLS expressing the relationship between market capitalization (size) and stock returns for Olympic Industries.

The results indicate that there exists a positive relationship between stock returns and size for Olympic Industries. It can be seen from Table 4 that a 1% increase in size causes an increase of about 0.041% in stock returns. The t-statistic of the estimated coefficient is 2.1255 which is greater than 2 and implies that the result is statistically significant. The result for Rahim Textile is, however, different from the other companies under review. The study established a negative or an inverse relationship between size and stock returns in the case of Rahim Textile. Specifically, the estimated coefficient for size is -0.464 with a t-statistics of -2.655 as shown in Table 4. It is observed from Table 4 above that a 1% increase in the independent variable size will cause a 2.285% decrease in the dependent variable stock returns for Rahim Textile stocks. Thus the result for Rahim Textile expressing the relationship between stock returns and market capitalization is significant. Moreover, it can be seen that Metro Spinning size has a positive relationship with stock returns. Specifically, 1% increase in market capitalization results in a 0.060% increase in stock returns. The associated t-statistic is 1.25445 implying a statistically significant estimate. The overall result for the

manufacturing industry as seen in Table 2 indicates a positive relationship between Size and stock returns. OLS estimation shows that 1% increase in market capitalization (Size) cause an increase of approximately 0.001% in stock returns. The coefficient for Size is statistically significant since it is associated directly with stock returns.

5. Conclusion

This paper examined the relationship between expected stock returns, size, and leverage of selected firms in the manufacturing sector listed on the Dhaka Stock Exchange. Fu-Wang Ceramic, Fine Foods Limited, Olympic Industries, Metro Spinning and Rahim Textile are the manufacturing companies that were the focus of this study. The paper applied the techniques of Ordinary Least Square Regression Model to estimate the coefficients of the variables. Pearson Correlation was applied among the variables to test the validity of the results of OLS and establish differences of using these two methods of coefficient estimation.

The paper found that for both independent variables (i.e. leverage and firm size) a significant relation exists between the dependent variables and stock returns. The study found a significantly negative relation between leverage and stock return when overall industrial data is used. However at the individual firm level the relationship was not stable. Four out of the five selected companies (i.e. Fu-Wang Ceramic, Fine Foods Limited, Olympic Industries and Metro Spinning) had negative leverage coefficients, with the exception of Rahim Textile which showed a positive leverage coefficient. The paper also determined that the relation between size and stock returns is significantly positive.

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