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Impact of dividend policy on share price volatility: A comparative study of the manufacturing companies listed in Dhaka Stock Exchange.

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IMPACT OF DIVIDEND POLICY ON SHARE PRICE VOLATILITY: A COMPARATIVE STUDY OF THE MANUFACTURING COMPANIES LISTED IN DHAKA STOCK EXCHANGE

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Abstract

The purpose of this study is to examine the relationship between dividend policy and share price volatility of the manufacturing companies listed on the (DSE) Dhaka Stock Exchange. For this purpose, we select a sample of 35 firms listed in DSE among all the manufacturing sectors for sixteen years (2004-2019). We examine the relationship between share price volatility with two direct measurements of dividend policy (dividend yield and dividend payout) by applying multiple regression for a period of sixteen years from 2004 to 2019. We expand the primary regression model by adding the control variables, including the firm's size, earning volatility, financial leverage, and growth. We show a comparative study of the regression models using pooled OLS, Fixed Effect Model, and Simultaneous Equation Model. The two-stage simultaneous equation method is estimated by including all the exogenous variables as instruments. Results of the models show a significant negative association between share price volatility and dividend policy (dividend yield and dividend payout). Moreover, a firm's size and growth have a significant positive association with share price volatility.

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Chapter 1: Introduction

Over the past half-century, numerous researchers have attempted to identify different factors influencing the payment of dividends by firms. Dividend policy is a significant financing decision that considers the payment to shareholders and affects their return on investment. A standard view is that dividend payments are an essential part of corporate strategy (Masum 2014). Dividend policy represents a crucial choice by firms regarding how best to use profits. Primarily how much if any of the firm's profits should flow directly to shareholders' returns and reinvest in the firm. This distribution that a company pays out from earnings to shareholders sends a clear message about the prospects and performance. That's why the managing board must determine the dividend amount, timing, and various other factors that may influence the dividend payments.

Dividend policy got attention with the work of (Lintner 1956), where he showed that several US firms tended to increase their dividend when they believe that there is a continuous growth in their net income. After that, several studies had been conducted and put the theoretical foundation of dividend policy research. Advocates of dividends believe that significant dividends are crucial for investors as dividends ensure a company's financial well-being. The reason is both cash and non-cash distribution may convey excellent or wrong signals to the investors. For example, when a company distributes a stock dividend, investors may perceive this as a signal of a shortage problem. So this decision is the most crucial decision that the managers may take, as this influences the primary aim of shareholders, maximizing their wealth by taking the dividends. Baskin (1989) mentioned dividend policy as a direct cause of typical stock price volatility. A company's ability to pay out regular dividends or cash distributions goes a long way towards communicating its fundamental strength and sustainability. As a result, a company that pays out a dividend attracts investors and creates demand for its stock. Though many big companies, such as

Microsoft, do not pay dividends, their stock price is growing, and this is because people are interested as they are growing. Most of the small companies pay dividends to increase their share price, and thus they grow. So this is very important to balance the pay ratio and retention ratio, especially for small and new companies (Khan et al. 2011). Another standard view is that the announcement of dividend payments is a significant factor regulating the stock price movement and giving a signal to the investors about the company. Indeed, dividend policy comprises whether to pay out the earnings or retain it for reinvestment in business (Vishwanath 2007). In addition, the impact of a firm's dividend policy on share price volatility is of interest not only to the management but also to the investors and economists.

While the relationship between dividend policy and the share price has been studied for more than 60 years, a common consensus has yet to be reached. Furthermore, while this association has been widely studied, most researchers have concentrated on the relationship within the developed economies. Very few papers address this issue within the context of Bangladesh.

In the present paper, we focus on the impact of variation in dividend policy on share price volatility, using a large sample of Bangladeshi Manufacturing companies listed on the Dhaka Stock Exchange (DSE). Dividend distribution strategies for manufacturing companies listed on Dhaka Stock Exchange differ significantly while operating under the same business atmosphere. In Bangladesh, how the manufacturing companies decide on payout creates a dilemma in dividend policies. The non-financial sector (manufacturing or other companies) does not have any unified dividend rules or regulations like the financial sector (banking industry). There may be so many factors influencing dividend policy, and there is no particular rule of thumb for companies to follow when deciding their payout rate.

In a developing country like Bangladesh, intensive research in this area is rare. So, there is a need to observe the factors that determine the companies' share price volatility listed on the DSE. This research gap inspires me to identify the factors considering in the time of dividend decisions. Several prior studies have exhibited that the decision on dividend policies is subject to various factors. The primary stakeholders of a company must understand those factors. It is also essential to consider the relationship between dividend payout and dividend yield ratios separately as these jointly create a company's dividend policy. Most of the studies ignore the effect of this relationship which may seem to generate multicollinearity problems.

Moreover, most researchers have ignored the endogeneity concern for dividend policy: dividend policy and share price volatility are jointly determined. Endogeneity refers to situations in which an explanatory variable correlates with the error term. It means something related to the Y variable related to the X variable, and we do not have that in our model. This study is intended to enhance the conception of these stimulators and show the impact of these stimulators on both dividend policy and share price volatility within the manufacturing firms operating in the corporate environment in Bangladesh. We extend this area of research by considering an empirical model where dividend yield, dividend payout, and share price volatility are each treated as endogenous.

Our study offers several contributions. Firstly, the sample is taken covering all of the manufacturing sectors listed in DSE, such as Food & Allied, Ceramics Sector, Cement, Pharmaceuticals & Chemicals, Engineering, Paper & Printing, Textile, and Tannery Industries. Secondly, we formulate a Simultaneous Equation Model consisting of the share price volatility equations and the dividend policy equation (dividend yield and dividend payout) to investigate the real impact of dividend policies on share price volatility. This approach has not been previously accepted. Thirdly, we also establish a model based on the existing literature and then show a

comparative analysis among those models, which has not been shown earlier. Finally, the period of this study is more extended, from 2004 to 2019 from the existing studies conducted in Bangladeshi Stock Market. The primary objective of this study is to identify the relationship between share price volatility with the two critical measures of dividend policy: dividend yield and dividend payout ratio. For this purpose, data has been collected from 35 manufacturing companies listed in DSE for 16 years (2004-2019). The paper is organized as follows: the next section represents different dividend policy theories, the determinants of the share price volatility, and their impact on the dividend policy. The subsequent two sections will unpack the study's objectives and the methodology and models used in this paper. Then the results are discussed in detail with a conclusion.

Chapter 2: Literature Review

Corporate dividend policy has been a much-researched topic for more than six decades. However, there is no specific conclusion on this issue so far. The investors and the managing board must decide on the optimal dividend policy because dividend policy can affect the stock prices. The existing research on dividend policy has been conducting from the perspective of developed countries. In a developing country like Bangladesh, research in this area is rare.

Dividend policy first got attention in 1956 with the work of (Lintner, 1956). Lintner showed that most US companies tended to increase dividends when they believe that there is a constant growth in their net income. Subsequently, in 1961 Miller and Modigliani presented the dividend irrelevance theory with the assumption of a perfect capital market. They stated that dividend policy is irrelevant to the shareholders. They said that dividends and capital gain are two main factors that can contribute to shareholders. So, when the firms choose to distribute their profits as dividends, the stock price will be reduced automatically by the amount of dividend per share on the ex-dividend date. So they argued that in a perfect market, dividend policy doesn't affect the shareholders' return (Miller and Modigliani 1961).

After that, several studies have been conducted relating to dividend policies and theories on dividend payment and reported that the statement by Modigliani and Miller could be true if the shareholders have systematic financial information about the companies. But usually, managers pass only positive news to the shareholders and retained negative information until they are forced to disclose that information by any regulations or financial constraints (Nazir et al. 2010). Some studies examined the effect of dividend policy on stock price volatility, and a majority of studies were conducted in developed markets (Baskin 1989, Profilet 2013, Hussainey, Mgbame and Chijoke-Mgbame 2011, Allen and Rachim 1996).

Baskin (1989) focuses on dividend policy as a determinant of return volatility. He analyzes dividend policy as the direct cause of common stock price volatility and an indirect indicator of other factors using 2344 US common stocks from 1967 to 1989. He used two variables, dividend yield, and payout ratio, with four control variables: firm's size, growth, earnings volatility, and debt. His findings show the correlation coefficient of share price volatility with dividend yield is greater than the correlation coefficient with any other variables (in terms of absolute value). This result interprets a strong inverse relationship between dividend yield and stock price volatility, suggesting that dividends can influence stock market risk.

Contrary to Baskin's result, Allen and Rachim (1996) found no evidence that dividend yield correlates with stock price volatility. They examined the relationship between dividend policy and stock price volatility by using a sample of 173 Australian listed companies from 1972 to 1985. They found significant positive correlations between stock price volatility and earnings volatility and leverage, plus a significant negative correlation with the payout ratio. Their results suggested that dividend policy doesn't have any apparent impact on the stock price volatility. Hussainey et al. (2011) examined the relation between dividend policy and share price changes in the UK stock market with two main dividend policy measurements and four other control variables: size, growth, earnings volatility, and debt. They collect data of publicly quoted companies in the UK for ten years from 1998-2007. His result shows a positive relation between dividend yield and stock price changes and a negative association between dividend payout ratio and stock price changes. In addition, the results show that debt level, size, firm's growth rate, and earnings also explain stock price changes.

Hashemijoo et al. (2012) examined the relationship between dividend policy and share price volatility, focusing on consumer product companies listed in the Malaysian stock market.

They focused on two main measures of dividend policy: dividend yield and dividend payout and six other control variables of firm size, earnings volatility, leverage, debt, and growth. Results show a significant negative relationship between share price volatility with the two primary measurements of dividend policy: dividend yield and dividend payout, and a significant negative relationship between share price volatility and firm size, indicating that dividend yield and firm's size have the most impact on share price volatility amongst the predictor variables (Hashemijoo, Mahdavi Ardekani and Younesi 2012). On the other hand, Zakaria et al. (2012) examined the impact of dividend policy on the share price volatility of 106 Malaysian listed construction and material companies from 2005 to 2010. They also focused on two main measures of dividend policy: dividend yield and dividend payout and six other control variables of debt, firm size, investment growth, and earnings volatility. The result of the least square regression shows a positive relationship between dividend payout ratio and share price volatility and an insignificant negative relationship between dividend yield and share price volatility of the firms (Zakaria, Muhammad and Zulkifli 2012). Hooi et al. (2015) also examined the relationship between dividend policy and share price volatility in the Malaysian market. They studied a sample of 319 companies from the Kuala Lumpur stock exchange and found that dividend yield and dividend payout is negatively related to stock price volatility (Hooi, Albaity and Ibrahimy 2015).

Nishat and Irfan (2004) examined the impact of dividend policy on stock price risk in Pakistan using a sample of 160 listed companies in the Karachi Stock Exchange from 1981 to 2000. The cross-sectional regression analysis results show that share price volatility is inversely related to both dividend yield and dividend payout ratio and positively related to the firm size and leverage (Nishat and Irfan 2004). Habib et al. (2012) also examined the relationship between dividend policy and share price volatility in the Pakistani stock market. The cross-sectional

regression analysis results show a positive relationship between dividend yield and share prices and a negative relationship between price volatility and payout ratio. Though the results of this study are not suitable as of the developed markets, it is crucial in the emerging market (Habib, Kiani and Khan 2012).

Nazir et al. (2010) examined the role of corporate dividend policy in determining the volatility in the Karachi Stock Exchange (KSE) in Pakistan using a sample of 73 firms from the KSE from 2003 to 2008. The fixed effect and random effect models show that dividend yield has a positive relationship with share price volatility. The dividend payout ratio negatively relates to stock price volatility (Nazir et al., 2010). Nazir et al. (2012) determined the effect of dividend policy on the volatility of stock prices of 75 financial sector firms listed in the Karachi Stock Exchange Pakistan for five years (2006-2010). The fixed effect regression analysis results show a significant negative relationship between dividend yield and dividend payout with share price volatility, suggesting that dividend policy is an essential tool in setting share prices in emerging economies (Nazir, Abdullah and Nawaz 2012). Suliman et al. (2013) also examined the stock price volatility of the listed non-financial firms on the Karachi Stock Exchange. Results show that stocks price volatility has a negative relationship with dividend yield and earnings per share and a positive relationship with size and growth in firms' assets. In addition, it identified that there is no relationship between price volatility and earning volatility of firms in Pakistan (Suliman et al., 2013).

Ramadan (2013) investigated 77 industrial Firms in Jordan listed at Amman Stock Exchange for 12 years (2000-2011). The result shows a significant negative effect of the dividend policy, dividend yield, and dividend payout on the share price volatility, indicating that increasing the dividend yield or payout in the industrial sector reduces share price volatility and ensures

stability. In addition to that, the study also suggests that the theory of duration effect and signaling are relevant in determining the share price volatility in the Jordanian equity market (Ramadan 2013). Lashgari and Ahmadi (2014) conducted a study on the Tehran Stock Exchange to identify the impact of dividend policy on share price volatility. They found share price volatility has a significant negative effect on dividend payout and a significant positive effect on asset growth rate (Lashgari and Ahmadi 2014). Al-Shawawreh (2014) also conducted a similar study with 53 companies listed in the Jordanian Stock market for 12 years (2001-2013) and found share price volatility has a significant negative relationship with dividend payout and a weak positive association with dividend yield. Also found a significant positive relationship between share price volatility and firm size. The paper concludes that share price volatility is mainly affected by the stock dividend and the dividend payout among all the predictor variables (Al-Shawawreh 2014).

Al-Hasan et al. (2013) examine the effect of dividend policy on the market share price in Bangladesh using five years of data for 28 manufacturing companies. The study has found that the impact of dividend payout is more on market price than retention, supporting Walter's and Gordon's model (Al-Hasan, Asaduzzaman, and Karim 2013). Ali and Chowdhury (2010) examine stock price reactions in the dividends of Listed Commercial banks in the Dhaka Stock Exchange. The result of the event study method found that the announcement of dividends doesn't convey any information because of insider trading and influencing factors from the capital market (Ali and Chowdhury 2010). Masum (2014) identified the relationship between dividend policy and stock market returns for 30 listed private commercial banks on the Dhaka Stock Exchange from 2007 to 2011. The overall result indicates that the Dividend Policy significantly positively affects Stock Prices (Masum 2014).

This brief survey of previous research shows that share price volatility, dividend yield, and dividend payout have relation to one another. There is a gap in using an empirical model to estimate these casual relationships among them. Here we observe, previous researchers have argued the determinants of share price volatility to include dividend yield, dividend payout, firm's size, financial leverage, earnings volatility, and growth. Most of the studies at hand ignore the correlation between dividend yield and dividend payout ratios, creating a multicollinearity problem: when two or more independent variables in a multiple regression model have high intercorrelations. Multicollinearity can lead to broader confidence intervals that produce less reliable probabilities in terms of the effect of independent variables in a model, undermining an independent variable's statistical significance. In general, multicollinearity can lead to broader confidence intervals that produce less reliable probabilities in terms of the effect of independent variables in a model. Most of the researchers also ignore the endogeneity concern of these variables. Considering this research gap, first, we aim to identify the impact of dividend policy on share price volatility using the models established by the existing literature. And then, we develop a simultaneous equation model for each endogenous and jointly determined variable to investigate the real impact of dividend policies on share price volatility.

For this purpose, secondary data has been collected from the DSE archive on Bangladeshi manufacturing companies listed in the DSE. By studying the dividend policies of 35 listed manufacturing companies in DSE for 16 years (2004-2019), we present a comparative study of the Pooled OLS, Fixed Effect Model, and Simultaneous Equation Model. The goal is to create a basis for future studies of the relationship between dividend policy and price volatility in the Bangladeshi manufacturing sector.

Chapter 3: Hypothesis of Study

The primary objective of this study is to examine the impact of dividend policy on share price volatility in the Dhaka Stock Exchange. Based on the above discussion, we propose the following null hypothesis:

H0: There is no significant impact of dividend policies on stock price, and the inter-industry variation does not affect stock prices.

We expect share price volatility is negatively affected by dividend yield and dividend payout. Several studies have explained a negative impact of dividend yield and dividend payout on the share price volatility based on duration effect, rate of return effect, arbitrage effect, and information effect (Baskin 1989). Baskin also proposed that the firm's size, earnings volatility, financial leverage, and growth affect both share price volatility and a firm's dividend policy. Based on that, our secondary objective is to estimate the relationship between share price volatility and the control variables. The firm's size may affect price volatility because the small firms usually have less variation in their activities. It is also possible that small firms have less information available to the investors about the stock market. Moreover, another reason for the impact of firm size on the share price volatility is that small firm's stock may be more liquid, so their share price can be more volatile than the larger firms. Baskin also proposed that firms with a more scattered body of shareholders are more likely to use dividends as a signaling device so that the size can also affect the dividend policy.

Chapter 4: Research Methodology

This study is based on secondary data collected from 35 manufacturing companies listed in Dhaka Stock Exchange for 16 years ranging from 2004 to 2019. The sample is taken covering all the manufacturing sectors listed in Dhaka Stock Exchange, such as Food & Allied, Ceramics Sector, Cement, Pharmaceuticals & Chemicals, Engineering, Paper & Printing, Textile, and Tannery Industries. The firms are selected based on the availability and ease of accessing the required data. Data are derived from the archive of DSE, the annual reports of companies listed on DSE, consisting of the balance sheet, income statements, financial ratios, and other relevant pieces of information for all publicly quoted companies. We dropped the firms operating less than ten years from our sample size, considering the data availability, comparability, and time frame.

The methodology section of the paper comprises two different models. In the first model, the framework and variables are derived following the study of Baskin (1989), Allen & Rachim (1996), Nazir et al. (2010), Hussainey et al. (2011), and Hashemijo et al. (2012). We analyze the association between share price volatility (PVOL) and dividend policy (DY and DP) by applying correlation analysis, a pooled OLS, and a fixed effect regression model. The primary regression model, which shows the association between share price volatility and dividend policy, has been expanded by the control variables recommended by Baskin (1989), Allen & Rachim (1996), Nazir et al. (2010), Hussainey et al. (2011) and Hashemijo et al. (2012). These control variables, including earning volatility (EV), financial leverage (LEV), firm's size (SIZE), and firm's growth (GROWTH), have an impact on both stock price volatility and dividend policy.

We have developed a simultaneous equation model in the second part of the methodology based on our literature review and arguments of the endogeneity of the firm's dividend policy and share price volatility. We conduct endogeneity tests to verify the endogeneity issue. Results show

that both of our primary independent variables (dividend yield and dividend payout) are endogenous. So here, three endogenous or jointly determined variables are share price volatility (PVOL), dividend yield (DY), and dividend payout (DP). The exogenous variables in the model include firm's size (SIZE), financial leverage (LEV), earning volatility (EV), return on the stock market (SMR) and firm's growth (GRTH), return on assets (ROA), the tangibility of the firms (TAN) and the liquidity of the firms (LQD). We use linear two-stage least squares methodology to estimate the parameters in the equations. The linear equation technique is discussed in (Wooldridge 2015). The two-stage linear simultaneous equation method is estimated by including all the exogenous variables as instruments (Wooldridge 2015). And then, the equations are estimated simultaneously.

VARIABLE MEASUREMENT

The variables used in this analysis are derived from the works of (Baskin 1989), (Allen & Rachim, 1996), (Nazir et al., 2010), (Hussainey et al., 2011), (Hashemijoo et al., 2012), (Al-Shawawreh, 2014) and (Abbas et al., 2016) relating stock price, dividend, earnings, growth, size, and debt. The variables are as follows:

Share price volatility (**PVOL**): Annual range of stock prices divided by the average of the high and low prices in the year, raised to the second power. Dividend yield (**DY**): The natural log of the sum of cash dividends paid to common shareholders divided by closing price plus one. Dividend Payout (**DP**): The natural log of the sum of cash dividend paid to common shareholders divided by earnings after interest and tax plus one. Earnings volatility (**EV**): Firstly, the ratio of operating income to total assets is calculated for each year and averaged for 16 years. Finally, the average of second power derivation from the overall average is computed, and a square root

transformation is used. Financial Leverage (**LEV**): The long-term debt ratio to the firm's total equity, where total equity is calculated by subtracting long-term debt from the total assets. Firm Size (**SIZE**): The natural log of the share outstanding multiplied by the closing price. Firm's Growth (**GRTH**): The ratio of the change in total assets at the end of the year to total assets at the beginning of the year.

MODEL SPECIFICATION

We analyze the relationship between stock price volatility and dividend policy of the manufacturing companies in Bangladesh using panel data analysis. Panel data is characterized by a combination of time-series and cross-sectional dimensions, which can reasonably reflect the widespread impact of time-to-time differences on the dividend policy and share price relationship. It is widely recognized that the form of the panel data model is advantageous for time-series and cross-sectional models for several reasons. For example, it can capture a more significant amount of economic and social information, control potential heteroscedasticity, and significantly avoid biased estimates caused by ignoring variables to enhance the explanatory power of the samples and increase the reliability of the results (Wooldridge 2015).

Pooled OLS and Fixed Effect Model

This study uses a panel data approach to estimate the relationship between share price volatility and dividend policy. The regression model relates share price volatility with the two main measures of dividend policies (dividend yield and dividend payout ratios) shown in equation (4.1). Then in equation (4.2), we have added other variables as the control variables: earnings volatility (EV), financial leverage (LEV), firm size (SIZE), and firm's growth (GRTH) to account

for certain factors that might also affect both dividend policy and price volatility. Next, in equation (4.3), we drop dividend payout from the equation considering its correlation with dividend yield. And, lastly, in equation (4.4), we drop dividend yield from the equation considering its correlation with dividend payout. The following models are then applied to estimate the relationship between the independent and the dependent variables:

$$PVOL_{jt} = \alpha_i + \beta_1 LDY_{it} + \beta_2 LDP_{it} + \varepsilon_{it} \quad \text{.....(4.1)}$$

$$PVOL_{jt} = \alpha_i + \beta_1 DY_{it} + \beta_2 DP_{it} + \beta_3 LSIZE_{it} + \beta_4 EV_{it} + \beta_5 LEV_{it} + \beta_6 GRTH_{it} + \varepsilon_{it} \quad \text{.....(4.2)}$$

$$PVOL_{jt} = \alpha_i + \beta_1 DY_{it} + \beta_2 LSIZE_{it} + \beta_3 EV_{it} + \beta_4 LEV_{it} + \beta_5 GRTH_{it} + \varepsilon_{it} \quad \text{.....(4.3)}$$

$$PVOL_{jt} = \alpha_i + \beta_1 DP_{it} + \beta_2 LSIZE_{it} + \beta_3 EV_{it} + \beta_4 LEV_{it} + \beta_5 GRTH_{it} + \varepsilon_{it} \quad \text{.....(4.4)}$$

Where $PVOL_{it}$ is Share price volatility for firm i for time t; LDY_{it} is Dividend Yield for firm i for time t; LDP_{it} is Dividend Payout for firm i for time t; EV_{it} is Return on Assets (earning volatility) for firm i for time t; $LEVT_{it}$ is Financial Leverage for firm i for time t; $LSIZE_{it}$ is Market Value for i for time t; $GRTH_{it}$ is Growth in Total Assets for firm i for time t, and ε_{jt} is the error term.

Simultaneous Equation Model

As mentioned earlier, dividend policy and share price volatility are jointly determined. Investors may prefer the current dividend instead of future capital gains even in the perfect capital market, considering the uncertainty of the future. There is a direct relationship between dividend policy and market value of share even if the required return and internal rate of return will be the same (Gordon 1962). In an imperfect market, a dividend policy may also affect the market share price of a firm. The announcement of dividends is considered a signal of the firm's future

profitability (Miller and Modigliani 1961). There have long been debates about the effects of dividend policy on the market value of the share, and the extant literature contains inconsistent conclusions (Amihud and Murgia 1997). Therefore, it is necessary to formulate an SEM consisting of the share price volatility equations and the dividend policy equation to investigate the real impact of dividend policies on share price volatility. Based on our literature review and arguments of the endogeneity of the firm's dividend policy and share price volatility, here we have developed a simultaneous equation model defined by equations (4.5), (4.6), (4.7), and (4.8).

$$PVOL1it = \beta i + \beta 1DPit + \beta 2LEVit + \beta 3SIZEit + \beta 4EVit + \beta 5SMRit + \varepsilon it \quad (4.5)$$

$$PVOL2it = \beta i + \beta 1DYit + \beta 2LEVit + \beta 3SIZEit + \beta 4EVit + \beta 5SMRit + \varepsilon it \quad (4.6)$$

$$DYit = \theta i + \theta 1PVOLit + \theta 2ROAit + \theta 3LEVit + \theta 4SIZEit + \theta 5TANit + \theta 6SMRit + \varphi it \quad (4.7)$$

$$DPit = \theta i + \theta 1PVOLit + \theta 2GRTHit + \theta 3LEVit + \theta 4SIZEit + \theta 5EVit + \theta 6ROAit + \varphi it \quad (4.8)$$

Where PVOLit is Share price volatility for firm i for time t; LDYit is Dividend Yield for firm i for time t; LDPit is Dividend Payout for firm i for time t; EVit is Return on Assets (earning volatility) for firm i for time t; LEVTit is Financial Leverage for firm i for time t; LSIZEit is Market Value for i for time t; GRTHit is Growth in Total Assets for firm i for time t; SMRit is Stock Market Return for firm i for time t; LQDit is Liquidity of the firm for firm i for time t; TANit is Tangibility of the firm for firm I for time t; ROAit = Return on Assets for firm I for time t, and φit = error.

Here the endogenous or jointly determined variables are share price volatility (PVOL), dividend payout (DP), and dividend yield (DL). And the exogenous variables in the model include firm's size (SIZE), financial leverage (LEV), earning volatility (EV), return on the stock market

(SMR), firm's growth (GRTH), firm's liquidity (LQD), firm's tangibility (TAN) and return on assets (ROA). In the PVOL1 equation (equation 3), the dividend yield is dropped from the equation considering its correlation with the dividend payout ratio. Similarly, in the PVOL2 equation (equation 4), dividend payout is dropped from the equation considering its correlation with dividend yield. Our endogeneity test results show both of our independent variables, dividend yield and dividend payout, are endogenous with a p-value of the resids less than 5%. Therefore, we develop two separate equations for dividend yield and dividend payout. In this model, we introduced some new exogenous variables such as SMR, LQD, TAN, and ROA; where the range of the stock price divided by the closing price is used as a measure of the stock market return (SMR), current ratio (total current assets divided by total current liabilities) is used as a measure of the firm's liquidity (LQD), the value of the fixed assets is used as a measure of the tangibility (TAN), and the earning-assets ratio is used as a measure of the profitability (ROA) of the firms. Variables are derived from the existing literature and theoretical framework of (Baskin 1989), (Allen and Rachim 1996), (Abbas, Hashmi and Chishti 2016), (Al-Shawawreh 2014), (Nazir et al. 2010), (Hussainey et al. 2011) and (Hashemijoo et al. 2012).

Chapter 5: Data Analysis and Results

DESCRIPTIVE STATISTICS

Table 5.1 shows the descriptive statistics of variables that affect the Price Volatility of the manufacturing companies listed in DSE from 2004 to 2019. Price Volatility, the model's dependent variable, ranges from 0.58 to 1.15 with a mean value of 0.92 and a standard deviation of 0.11. In following the results of Baskin (1989), Allen & Rachim (1996), and Hussainey et al. (2011), a normality test is conducted to test whether the stock price follows a normal distribution pattern since a large sample is used. Results show that the p-value of the normality test is less than 0.05, concluded price volatility is not normally distributed. Box-Cox transformation method is used to normalize the dependent variable.

Table 5.1: Descriptive Statistics

	PVOL	DY	DP	SIZE	LEV	EV	GRTH
Mean	0.921688	16.57356	0.436890	21.27327	0.128119	0.608901	-5.199847
Maximum	1.152230	22.12827	7.092912	27.84218	8.668774	73.90072	0.999415
Minimum	0.575550	13.71015	-0.616176	16.54988	-1.264989	1.706505	-1137.241
Std. Dev.	0.105236	1.436538	0.848909	1.784686	0.508419	4.248982	65.63756
Observations	557	557	557	557	557	557	557

Table 5.1 shows, firm size has the highest mean amongst variables with a value of 21.27327, and growth has the lowest mean amongst variables with a value of -5.227160. Growth also has the highest standard deviation amongst the variables with a value of 65.81335, and price volatility has the lowest standard deviation with a value of 0.105236. Moreover, growth also has the highest range (maximum-minimum) amongst variables with a value of 1138.241.

Table 5.2: Pearson Correlation Coefficient between variables

Variables	DY	DP	LEV	SIZE	EV	GRTH
VIF	1.64	1.20	1.14	1.15	1.20	1.24

Table 5.3: Pearson Correlation Coefficient between variables

Covariance Analysis: Ordinary
Date: 06/27/21 Time: 22:04
Sample: 2004 2019
Included observations: 557
Balanced sample (listwise missing value deletion)

Correlation Probability	PVOL	DY	DP	SIZE	EV	LEV	GRTH
PVOL	1.000000 -----						
DY	-0.108897 0.0101	1.000000 -----					
DP	-0.228508 0.0000	0.212261 0.0000	1.000000 -----				
SIZE	0.013217 0.7556	0.614715 0.0000	0.211996 0.0000	1.000000 -----			
EV	-0.057726 0.1737	-0.154879 0.0002	-0.046752 0.2707	-0.083644 0.0485	1.000000 -----		
LEV	0.037956 0.3713	-0.061274 0.1487	-0.281053 0.0000	-0.154820 0.0002	-0.121306 0.0041	1.000000 -----	
GRTH	0.151781 0.0003	-0.041383 0.3296	-0.208466 0.0000	-0.028443 0.5029	-0.334823 0.0000	0.156211 0.0002	1.000000 -----

Table 5.2 presents the result of VIF (Variance Inflation Factor) test. Here VIF test is carried out to test multicollinearity in the explanatory variables. A high degree of multicollinearity can result in regression coefficients being inaccurately estimated and difficulties in separating the influence of the individual variables on the dependent variables. Any variables with a variance inflation factor (VIF) value above ten or with a value below 0.10 of tolerance would have a correlation of >0.90 with other variables, indicating the existence of a multicollinearity problem. The VIF test shows that dividend yield (DY) has the largest VIF of 1.64 and financial leverage has the lowest VIF of 1.14, which indicates the absence of multicollinearity between the variables. So, there is no high correlation among the independent variables.

Table 5.3 presents the result of correlation analysis amongst the variables. Correlation analysis is used to find whether price volatility, dividend yield, dividend payout, earnings volatility, long-term debt, firm size, and firm growth rates are correlated. We see price volatility and dividend yield are negatively correlated with a value of -0.108897, and it is significant at a level of 1%. This finding is consistent with the results of Baskin (1989), Hussainey et al. (2011), Habib et al. 2012, and Hashemijoo et al. 2012 and contrary to the study of Allen & Rachim (1996) finding that shows positive correlation.

Price volatility and dividend payout are also negatively correlated with a value of -0.228508, and it is significant at a level of 1%. It is also consistent with the results of Baskin (1989), and Allen and Rachim (1996), Habib et al. (2012), and Hashemijoo et al. (2012).

Price volatility is positively correlated with firm size and financial leverage, and it is insignificant with a value of 0.013217 and 0.037956, respectively. We can also see the size is positively correlated with dividend yield and dividend payout. It is significant at 1%, implying that larger firms may have more dividend yield and payout ratios. On the other hand, financial leverage is negatively correlated with dividend payout and firm size, and it is significant at a level of 1%. This result implies that companies with high debt may have fewer dividend payments and retaining part of the earning to pay off debts.

Price volatility and earning volatility are negatively correlated, which is not significant. It is seen from the table that earning volatility has a significant negative correlation with financial leverage with a value of -0.154820, and it is significant at a level of 1%. It indicates that the higher the debt ratio, the more significant it could reduce the associated return on assets.

The correlation between price volatility and financial leverage is positive and insignificant with a value of 0.037956. Also, the correlation between dividend yield and leverage is negative (r = −0.016214) but insignificant. Moreover, financial leverage positively correlates with the dividend payout ratio, and this association is statistically significant. It implies that companies with high debt may have less dividend payment, retaining part of the earning to pay off the debts.

Price volatility and return on assets are negatively correlated with a value of -0.073425 but insignificant. We see from the table that returns on assets and financial leverage are negatively correlated with a value of -0.159793, and it is significant at a level of 1%. It implies that an increasing long-term debt ratio company may generate significantly less income utilizing its assets, using part of their income and assets to pay off the debts.

The table also indicates a significant positive correlation between price volatility and firm's growth with a value of 0.151788, and it is significant at a level of 1%. We can also see the firm's growth positively correlates with dividend payout, financial leverage, and return on assets with a value of -0.208472, 0.156204, and -0.376738, respectively, at a level of 1%.

We can also see from the table that dividend yield and dividend payout ratios are positively correlated with a value of 0.212261, and it is also significant at a level of 1%. Considering this relationship between dividend yield and dividend payout ratio, we repeat the regression in other steps. In the first step, we exclude dividend payout from the equation and run the regression with dividend yield and other control variables. In the second step, we exclude dividend yield from the equation and run the regression with dividend payout and the same control variables.

RESULTS OF THE POOLED OLS MODEL

Table 5.4 represents panel least square regression results based on equation (4.1), where we regress share price volatility on dividend yield and dividend payout. The results show that share price volatility and dividend payout have a significant negative association, exactly as hypothesized. On the other hand, the association between price volatility and the dividend yield is negative, but it is not significant.

Table: 5.4, Results of the Pooled OLS of primary regression model: Equation 4.1

Model	Coefficients	Std.Error	t-stat	Sig.
(Constant)	1.010122	0.051034	19.79310	0.0000
DY	-0.004633	0.003094	-1.497190	0.1349
DP	-0.026663**	0.005236	-5.091834	0.0000
R2= 0.056035; Adj. R2= 0.052628; F-stat.= 16.44318; F-prob.= 0.000000.				
Notes: (**) implies Significance level of 1%; (*) implies Significance level of 5%.				

Next, we expand the regression model by adding four control variables using equation (4.2). With these four control variables (size, earning volatility, leverage, and growth) to the regression model, we can see a significant association between price volatility and dividend payout remains. Also, the negative association between price volatility and dividend yield remains, and this time the association is significant. Table 5.5 also shows firm size and growth have a significant positive association with share price volatility. On the other hand, both leverage and earning volatility have an insignificant negative association with price volatility.

Table: 5.5, Results of the Pooled OLS with control variables: Equation 4.2

Model	Coefficients	Std.Error	t-stat	Sig.
(Constant)	0.941784	0.058269	16.16259	0.0000
DY	-0.011949**	0.003854	-3.100162	0.0020

DP	-0.027091**	0.005514	-4.913334	0.0000
SIZE	0.009033**	0.003092	2.921577	0.0036
EV	-0.001331	0.001101	-1.208869	0.2272
LEV	-0.006295	0.008971	-0.701680	0.4832
GRTH	0.000145*	7.15E-05	2.025540	0.0433
R2=0.085422; Adj. R2=0.075445; F-stat.= 8.561759; F-prob.= 0.000000.				
Notes: (**) implies Significance level of 1%; (*) implies Significance level of 5%.				

According to (Wooldridge 2015), pooled OLS is employed when a different sample for each year or period of panel data is selected. Here we observe the same samples through times where the effect of this time is strong, and with pooled OLS, we are neglecting the cross-section and time-series nature of data. With pooling, the major problem with this model is we deny the heterogeneity or individuality among these 35 companies. According to (Wooldridge 2015), fixed effects or random effects are more applicable when observing the same sample of countries, individuals, states, or companies overtimes. That is why, in the next step, we estimate the equation using both a Fixed Effect and a Random Effect model. And then, we execute a Hausman test to see which is the correct method. If the p-value is higher than 0.05, we reject the null hypothesis that the random effect is more appropriate. And if the p-value is lower than 0.05, we reject the null hypothesis and conclude that the Fixed Effect Model is more appropriate (Wooldridge 2015). Here Hausman Test results show the probability of Chi-Sq. Statistic is 0.0000, which concludes that Fixed Effect Model is more appropriate.

RESULTS OF THE FIXED EFFECT MODEL

Table 5.6 represents the results of the Fixed Effect Model based on equation (4.2). Here we see high coefficients and increased explanatory power (R2 risen from 9% to 20%). We see both dividend yield and dividend payout are negatively associated with share price volatility, and this association is significant at a significance level of 1%. It is exactly as hypothesized. It implies that dividend policy significantly influences the share price volatility of Bangladeshi manufacturing companies listed in DSE. In DSE, the share price volatility of the firms with higher dividend yield and dividend payout ratio is expected to be low. So, higher-income companies are expected to have low price volatility in Bangladesh.

Table 3 also shows firm size has a positive and significant relationship with share price volatility, with a significance level of 1%. It implies that a firm's size significantly influences share price in Bangladeshi manufacturing companies listed in DSE. From the perspective of Bangladesh, we can say the share price risks of larger manufacturing companies are higher than that of small manufacturing companies. And this is because the larger firms are more diversified, with more public information available to the markets. There may be information in the market regarding debt or other sensitive issues that the firm doesn't want to share with its investors. It is easier for small firms to hide this information from their investors and make it less risky.

Table 5.6 also shows earning volatility, and financial leverage have an insignificant negative association with price volatility. The firm's growth has a slight positive association with price volatility. It implies that the firm's debt-asset ratios, risk of stock market return, and firm's growth do not significantly impact the Bangladeshi Manufacturing Companies listed in DSE.

Table: 5.6, Results of the Fixed Effect Model: Equation 4.2

Model	Coefficients	Std.Error	t-stat	Sig.
(Constant)	0.864306	0.092234	9.370759	0.0000
DY	-0.030106**	0.006189	-4.864044	0.0000
DP	-0.020351**	0.005858	-3.474039	0.0006

SIZE	0.026724**	0.004231	6.316702	0.0000
EVOL	-0.001873	0.001315	-1.424126	0.1550
LEV	-0.011694	0.009778	-1.195942	0.2323
GRTH	0.000120	6.94E-05	1.730199	0.0842
R2=0.208423; Adj. R2=0.147060; F-stat.= 3.396573; F-prob.= 0.000000. Notes: (**) implies Significance level of 1%; (*) implies Significance level of 5%.				

In the next stage, dividend payout is dropped from the regression equation considering its correlation with dividend yield, and the result is presented in table 5.7. We see the significant negative association between price volatility and dividend yield, implying that dividend yield has a significant negative impact on the share price volatility of Bangladeshi manufacturing companies listed in DSE.

Table: 5.7, Results of the Fixed Effect Model: Equation 4.3

Model	Coefficients	Std.Error	t-stat	Sig.
(Constant)	0.895867	0.092270	9.709210	0.0000
DY	-0.033301	0.006155	-5.410505	0.0000
SIZE	0.027269	0.004246	6.421785	0.0000
EVOL	-0.001282	0.001314	-0.975102	0.3300
LEV	-0.004083	0.009606	-0.425038	0.6710
GRTH	0.000162	6.89E-05	2.358590	0.0187
R2=0.190493; Adj. R2=0.129780; F-stat.= 3.137588; F-prob.= 0.000000. Notes: (**) implies Significance level of 1%; (*) implies Significance level of 5%.				

In the last stage, we exclude dividend yield from the regression equation and show the result in table 5.8. We see the significant negative association between price volatility and dividend

payout, implying that dividend payout has a significant negative impact on the share price volatility of Bangladeshi manufacturing companies listed in DSE.

Table: 5.8, Result of the Fixed Effect Model: Equation 4.4

Model	Coefficients	Std.Error	t-stat	Sig.
(Constant)	0.606664	0.077145	7.863927	0.0000
DP	-0.024664	0.005916	-4.168850	0.0000
SIZE	0.015473	0.003619	4.275364	0.0000
EV	-0.002050	0.001343	-1.526621	0.1275
LEV	-0.011104	0.009989	-1.111581	0.2668
GRTH	0.000133	7.08E-05	1.878944	0.0608
R2=0.172128; Adj. R2=0.109678; F-stat.= 2.756226; F-prob.= 0.000000.				
Notes: (**) implies Significance level of 1%; (*) implies Significance level of 5%.				

So, we cannot accept the null hypothesis. That means there is a significant impact of dividend policies on the stock price and that inter-industry variation also has a substantial effect on stock prices.

RESULTS OF THE SIMULTANEOUS EQUATION MODEL

We use a two-stage least square methodology to estimate the parameters of the model defined by equations (4.5), (4.6), (4.7), and (4.8). The two-stage simultaneous equation method is estimated by including all the exogenous variables as instruments.

Table 5.9 represents the results of 2SLS regression based on equation (4.5), where share price volatility is regressed on dividend payout. The firm's leverage, size, earning volatility, and stock market return are added as control variables based upon arguments made in previous research. The results show that price volatility and dividend payout have a significant negative association, exactly as hypothesized. We can see firm's size also has a significant positive association with share price volatility; the larger the firms, the higher the share price risk. In the

PVOL1 equation, our last significant variable is the stock market return. It has a significant positive association with the firm's share price volatility, implying that higher stock market return is associated with higher share price risk.

Table: 5.9, Results of the Simultaneous Equation Model: Equation 4.5

Model	Coefficients	Std.Error	t-stat	Sig.
C	0.639968	0.080428	7.957007	0.0000
DP	-0.024988	0.008440	-2.960788	0.0033
LEV	-0.000416	0.000785	-0.530561	0.5960
SIZE	0.013000	0.003758	3.459228	0.0006
EV	-0.001598	0.001774	-0.900775	0.3683
SMR	0.005945	0.000561	10.59291	0.0000
R2= 0.387036; Adj. R2= 0.323457; F-stat.= 5.943968 ; F-prob.= 0.000000.				
Notes: (**) implies Significance level of 1%; (*) implies Significance level of 5%.				

In the subsequent step, share price volatility is regressed on dividend yield using 2SLS regression based on equation (4.6), and the results are presented in Table 5.10. The exogenous variables, firm's leverage, size, earning volatility, and stock market return, are added as control variables based upon arguments made in previous research. The results show that price volatility and dividend yield have a significant negative association, exactly as hypothesized. Also, both size and stock return are positively associated with share price volatility, and these results are significant at a level of 1%.

Table: 5.10, Results of the Simultaneous Equation Model: Equation 4.6

Model	Coefficients	Std.Error	t-stat	Sig.
C	0.942515	0.138043	6.827681	0.0000
DY	-0.031551	0.013360	-2.361604	0.0187

LEV	-0.001236	0.000673	-1.835260	0.0673
SIZE	0.022982	0.006211	3.699943	0.0002
EV	0.000274	0.001569	0.174771	0.8614
SMR	0.006120	0.000550	11.11811	0.0000
R2= 0.416297; Adj. R2= 0.356233; F-stat.= 5.809556; F-prob.= 0.000000. Notes: (**) implies Significance level of 1%; (*) implies Significance level of 5%.				

In this stage, we estimate the DY equation (equation 4.7), and the 2SLS regression results are presented in Table 5.11. In the DY equation, price volatility (PVOL) is negative and significant, with a significance level of 1%. It implies that firms with high dividend payout ratios have lower share price volatility, which supports the hypothesis. Moreover, these results and the results from the PVOL2 equation (equation 4) offer evidence that share price volatility and dividend yield are jointly determined. Among the five exogenous variables, the firm's size, tangibility, and stock market return are positively associated with the firm's share price volatility. The association is significant at a level of 1%.

Table: 5.11, Results of the Simultaneous Equation Model: Equation 4.7

Model	Coefficients	Std.Error	t-stat	Sig.
C	13.60979	1.399541	9.724470	0.0000
PVOL	-6.259208	1.830402	-3.419582	0.0007
ROA	-0.016669	0.011823	-1.409873	0.1594
LEV	0.009749	0.007134	1.366478	0.1726
SIZE	0.399563	0.038352	10.41845	0.0000
TAN	6.97E-11	1.00E-11	6.943093	0.0000
SMR	0.042949	0.011896	3.610329	0.0003
R2= 0.770390; Adj. R2= 0.746093; F-stat.= 40.66567; F-prob.= 0.000000.				

Notes: (**) implies Significance level of 1%; (*) implies Significance level of 5%.

As the last part of the SEM analysis, we estimate the DP equation (equation 4.8), and the 2SLS regression results are presented in Table 5.12. We see that the only endogenous variable price volatility (PVOL) is insignificant, indicating that share price volatility and dividend payout are not jointly determined. Among the exogenous variables, all the variables have a significant association with share price volatility. Return on assets has a strong negative association with dividend payout, implying that firms with higher earning-assets ratios may have lower payout ratios. One reason could be that as an investment requires allocation of resources from within the firm, little amount may be available for payout. Firm's leverage has a significant positive association with dividend payout. The results indicate that high leverage firms have a high dividend payout ratio. One reason could be debt is cheaper than acquiring capital. Highly geared firms are prone to more dividend payments as this increases as high gearing increases the firm's profitability, leading to a regular and stable dividend payout policy. We see a significant positive association between growth and payout. Most growing firms involve more acquisition and investment and thus increases profitability, which may help them maintain a consistent payout policy. Size is also positively correlated with dividend payout. This association is significant, implying that large firms can earn higher profits and use this profit to maintain a higher dividend payout ratio. The significant positive association between earnings volatility and dividend payout implies that more volatility in their earnings has a higher payout ratio.

Table: 5.12, Results of the Simultaneous Equation Model: Equation 4.8

Model	Coefficients	Std.Error	t-stat	Sig.
C	-1.788916	0.602517	-2.969072	0.0032
PVOL	0.065018	0.546097	0.119059	0.9053
GRTH	0.003650	0.000568	6.430903	0.0000
LEV	0.199982	0.009633	20.75933	0.0000

SIZE	0.054221	0.023451	2.312128	0.0213
EV	2.468671	0.143168	17.24313	0.0000
ROA	-2.202927	0.121699	-18.10137	0.0000
R2= 0.733536; Adj. R2= 0.705113; F-stat.= 25.89850; F-prob.= 0.000000.				
Notes: (**) implies Significance level of 1%; (*) implies Significance level of 5%.				

So, we cannot accept the null hypothesis. That means there is a significant impact of dividend policies on the stock price and that inter-industry variation also has a substantial effect on stock prices.

Chapter 6: Summary of Findings & Conclusions

Table 6.1, a comparative analysis of the Pooled OLS, FE model and SEM

Variable	OLS	OLS	FE	PVOL1	PVOL2	DY	DP.
Dependent Variable	PVOL	PVOL	PVOL	PVOL	PVOL	DY	DP.
Intercept	1.010122	0.941784** (0.0000)	0.864306** (0.0000)	0.639968** (0.0000)	0.942515** (0.0000)	13.60979** (0.0000)	-1.788916** (0.0032)
PVOL						-6.259208** (0.0007)	0.065018 (0.9053)
DY	-0.004633 (0.1349)	-0.011949** (0.0020)	-0.030106** (0.0000)		-0.031551** (0.0187)		
DP	-0.026663** (0.0000)	-0.027091** (0.0000)	-0.020351** (0.0006)	-0.024988** (0.0033)			
SIZE		0.009033** (0.0036)	0.026724** (0.0000)	0.013000** (0.0006)	0.022982** (0.0002)	0.399563** (0.0000)	0.054221* (0.0213)
EV		-0.001331 (0.2272)	-0.001873 (0.1550)	-0.001598 (0.3683)	0.000274 (0.8614)		2.468671** (0.0000)
LEV		-0.006295 (0.4832)	-0.011694 (0.2323)	-0.000416 (0.5960)	-0.001236 (0.0673)	0.009749 (0.1726)	0.199982** (0.0000)
GRTH		0.000145* (0.0433)	0.000120 (0.0842)				0.003650** (0.0000)
SMR				0.005945** (0.0000)	0.006120** (0.0000)	0.042949** (0.0003)	
TAN						6.97E-11** (0.0000)	
LQD							
ROA						-0.016669 (0.1594)	-2.202927** (0.0000)
R2	0.056035	0.085422	0.208423	0.387036	0.416297	0.770390	0.733536
Adj. R2	0.052628	0.075445	0.147060	0.323457	0.356233	0.746093	0.705113
F-stat	16.44318 (0.0000)	8.561759 (0.0000)	3.396573 (0.00000)	5.943968 (0.0000)	5.809556 (0.00000)	40.66567 (0.0000)	25.89850 (0.0000)

**Indicates statistical significance at the level of 0.01

*Indicates statistical significance at the level of 0.05

Table 10 presents the comparative discussion of the result we get from different stages of regression (Pooled OLS model, Fixed Effect Model, and Simultaneous Equation Model). The

primary regression model is expanded by adding control variables including firm's size, earning volatility, financial leverage, and firm's growth, and the results of the pooled OLS regression shows dividend policy has a significant negative impact on the firm's share price volatility on the Bangladeshi manufacturing companies listed in DSE. Among the control variables included in the model, firm size and growth are positively associated with the risk associated with share price among Bangladeshi manufacturing companies listed in DSE.

In line with the Hausman test result, fixed-effect analysis is conducted, and the results appear to perform better and explain a significantly higher portion of the systematic variations in the dependent variable than pooled OLS and Random Effect analysis. The strong significant negative association between share price volatility and the dividend yield is consistent with the results of Baskin (1989), where he reported that dividend yield has the strongest effect on share price volatility. The strong significant negative association between share price volatility and dividend payout is consistent with Baskin's (1989) and Allen & Rachim (1996) results. The significant positive association between share price volatility and firm's size is compatible with Alllen & Rachim (1996) results, but this contrasts with the findings of Baskin (1989), where he reported a significant negative association. As observed, the value of R2 improves considerably from 9% to 21%, which suggested that the FE model explains about 21% of the systematic variation in dependent variable with an adjusted value of 15%. The F-stat value 3.396573 and the p-value of 0.0000 indicated that we couldn't reject the hypothesis of a significant relationship between the dependent and independent variables at a level of 1%.

We extend our analysis part using four simultaneous model equations, considering the endogeneity and jointly determined characteristics of the dependent (PVOL) and independent (dividend yield and dividend payout) variables. Each endogenous variable has its equation. A two-stage least square methodology is used to estimate the parameters in the model, where we list all the exogenous variables as instruments. PVOL1 equation shows improvement in the R2 value to 49%, suggesting that this PVOL1 equation explains 39% of the systematic variation in the dependent variable. The results of the PVOL1 equation show that price volatility and dividend

payout have a significant negative association, and the PVOL2 equation shows that price volatility and dividend yield have a significant negative association. The result is consistent with Baskin's (1989) and Allen & Rachim (1996) results. In both PVOL equations, the exogenous variables, firm size, and stock market return significantly positively correlate with share price volatility. Though the other two exogenous variables, the firms' financial leverage, and earnings volatility, show some negative association with share price volatility, they are not statistically significant. Price volatility has a significant negative association with the dividend yield in the DY equation, though the relationship is not significant in the DP equation. It implies that share price volatility and the dividend yield are jointly determined among Bangladesh's manufacturing sector. The R2 value of the DP and DY equation of 73% and 77% suggests that the dividend equation is well estimated using the exogenous variables. Considering the data on hand, this would have been the best model to assess the relationship between share price volatility and dividend policy in the manufacturing sector of Bangladesh. The results would have been far better if we had had some instrumental variables of managerial ownership in the PVOL equation.

CONCLUSIONS

This study is conducted to determine the impact of dividend policy on the share price volatility of the Bangladeshi manufacturing companies listed on the Dhaka Stock Exchange. Here we present a comparative study of the pooled OLS, FE model, and Simultaneous Equation Model using 16 years of time series data from 35 DSE-listed manufacturing companies. The data's descriptive statistics show that the mean values of all the variables are low except dividend payout and firm size. Similarly, the standard deviation of growth is very high comparing other variables, implying a high fluctuation in total assets of the selected firms of the manufacturing industry of Bangladesh. In the first part of our analysis, the Hausman Test results show that the FE model is more appropriate. And in the second part of our analysis, we estimate the equation using use a two-stage least square methodology to estimate the parameters of the model defined by equations (4.5), (4.6), (4.7), and (4.8). The two-stage simultaneous equation method is estimated by including all the exogenous variables as instruments.

After careful observation of the results, we find that dividend yield and dividend payout, which is combinedly called the firm's dividend policy, have the most significant impact on the share price volatility of the manufacturing companies listed on the Dhaka Stock Exchange. Both models (FE and SEM) show dividend yield has the most substantial effect on share price volatility, which implies that in Bangladeshi firms with a higher dividend yield in the manufacturing sector are supposed to be less volatile than those with lower dividend yield. The significant association between share price volatility and dividend payout suggests that a higher payout ratio leads to lower volatility in the share price among the Bangladesh manufacturing industry. Among the control variables, size and growth have a significant positive relationship with share price volatility. We find that firm's size and growth, return from the stock market, dividend yield, and dividend payout are the explanatory variables of price volatility structure. Similarly, price volatility, firm's size, tangibility, and stock market return are the explanatory variables of dividend

yield. And return on assets, firm's financial leverage, earning volatility, growth, and size are the explanatory variables of dividend payout policy.

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Vita

Jakia Sultana was born on September 18, 1991, in Khulna, Bangladesh. She got her BBA (Bachelor of Business Administration) in fall 2014 and MBA (Master of Business Administration) in summer 2016 from the Business Administration Discipline of Khulna University, Bangladesh. After completing graduation, she joined as a Management Trainee Officer at City Bank LTD in Bangladesh. While pursuing studies back in her home country, she always dreamed to experience multidisciplinary educational environment and expose for higher studies and research within a diverse social contexts. In 2019, Jakia joined the Master of Science in Economics program in Economics and Finance Department at The University of Texas at El Paso (UTEP). While pursuing her degree, Jakia was appointed as a graduate teaching assistant for the Department of Economics and Finance. During the master's study, Jakia has worked closely with professors in preparing the class and exam materials, proctoring, and grading. Occasionally She was also assigned to conduct exam preparation classes. Currently, she is focusing on completing her master's degree by summer, 2021. Then she will take admission to TLC program to study issues of teaching, learning, and culture within diverse social contexts.

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