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Thesis title: The relationship between dividend policy and stock price volatility in mainland China

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Abstract: The study investigates the relationship between dividend policy and stock price volatility in six main industries in the mainland China. In total, the sample ranging from 2009 to 2016 and 409 listed firms of Shanghai Stock Exchange are included. Derived from the empirical results, a significant positive relationship is found between dividend policy and stock price volatility. Listed firm's size is significantly positively correlated with stock price volatility and leverage is found to have a significant positive relationship with stock price volatility. Furthermore, no significant relationship showed between stock price volatility and growth, negative relationship showed between growth and stock price volatility. Last but not the least, earning volatility is positively correlated with stock price volatility, no significant relationship is revealed.

1. Introduction

Numerous studies have investigated the link between the dividend policy and stock price volatility during the past few decades. In short, dividend means distribute earning of the firms to their shareholders based on how much the investors invested and means how much return the shareholders will be received from their investment of that stocks. Several reasons are put forward to explain why the firms pay the dividend to the shareholders. To start with, the primary aim of shareholders to invest in the firms' stocks is to obtain further dividend and increase their income. Thus, the shareholders' wealth increased when firms paid the dividends through stock dividend as well as cash dividends. In addition, the firms that distributed dividend could be regarded as a positive signal and further increase the confidence of investors who bought the firms' stocks (Al-Malkawi, 2007). The dividend is very important among investors since dividend is considered as a source of income as well as a way to assess the firms they invested. Thus, the dividend yield and payout ratio are regarded as the key factors that investors would consider when they are making an investment decision. Dividend policy is one of the major financial decisions of a firm, a suitable dividend policy could increase the firm's value and affect the stock prices. Besides, stock prices are vital for both the investors and the firms, it is crucial to understand the price volatility when analyzing the value of stocks. The paper (Chawla, 2008) illustrated that when forming a divided policy, many factors were taken into consideration, for instance, companies past dividends, current and future earnings and cash flows, etc. According to some practical articles (Baskin, 1989; Zhou & Ruland, 2006; Hussainey, 2011), a significant relationship existed between dividend policy and stock prices. If more information about the dividend payout ratio and dividend yield that the investors have, they would make more accurate financial decisions which further increase the value of their investment. In addition, other factors, for instance, size, long-term debt, are used as the control variables, have the impact on both the dividend policy and stock price variation. Contradictory, another evidence reports that dividend policy should have little or no influence on stock price, which is related to the dividend irrelevance theory argued by Miller & Modigliani (1961).

1.1. Dividend policy in mainland China

There are three kinds of dividend policies that listed firms could choose in mainland China. The first dividend policy is stock dividends, second dividend policy refers to the transference of the additional paid-in capital to contributed capital. The third form is cash dividends, cash dividends have the more direct influence on the listed firms in long-run operation. Nevertheless, according to the paper (Chen, D. H., Liu, H. H., & Huang, C. T., 2009), the ratio of both cash-dividends-paying firms and stock-dividends-paying firms were experienced declining trends during the period from 1990 to 1999.

1.2. Institutional background

During the 1990s, mainland China opened its own stock exchanges. To be specific, there are two stock exchanges in China, the first one is Shanghai Stock Exchange launched in 1990 and the other one is Shenzhen Stock Exchange launched in 1991, and they have the same listing requirements. The Chinese stock market experienced a huge growth during the last decades. For instance, in 2009, there were 1718 listed companies on the Chinese stock exchanges. In addition, the number of companies listed on the Chinese stock exchanges reached 3052 in 2016, which described a dramatic increase of the aggregate market capitalization on the Chinese stock market. Regarding the aggregate market capitalization, it showed a huge increase ranging from US$1.3 billion in 1991 to more than US$500 billion on December 2017. Nowadays, the Chinese stock market becomes the second largest stock market in the Asia-Pacific region.

1.3. Research questions

Over the years, relationship between the dividend policy and stock price volatility has still been one of hot debated financial topics and still necessary to induct a research. Although there are plenty of articles examined the relationship between the dividend policy and stock price volatility in developed economies, not many articles pay attention to the developing countries. As China has become one of the largest economies in the world and huge growth are experienced in mainland China, several reasons are illustrated why main-land China set as research target, first of all, few research papers examine socialistic stock market, most of the researches are focused on the developed economic market, for instance, U.S. stock market. Thus, in order to have more complete study of the association between dividend policy and stock price volatility, various economic bodies with different characteristics are needed. Secondly, there are few studies conduct

research on developing economies, therefore, it is necessary to investigate how the dividend policy affect the stock price volatility in mainland China. Besides, several reasons are illustrated why this study focuses on six main industries in mainland China. To start with, there are 401 listed firms of electronic &electrical equipment industries in mainland China and has the largest amount of the listed firms in mainland China. Additionally, industrial engineering contributes 25.7% of all listed firms in six main industries in mainland China, there are 397 listed firms in industrial engineering industry in mainland China. The construction &material industries account for 14.5% of all listed firms in six main industries in mainland China, the automobile & parts and the technology hardware& equipment industries contributes similar percentage of 12.5% and 12.1% respectively. Last, general retailing has the least amount of listed firms of the six main industries in mainland China. Therefore, since six main industries are the most important industries supporting China's economy, the aim of this paper is to examine the relationship between the dividend policy and stock price volatility of six main industries in mainland China.

The remainders of this paper are shown as follows. In this paper, Section 2 presents the related literature reviews which focuses on the relationship between dividend policy and the stock price volatility and shows a thorough theoretical background. Afterwards, theoretical prediction is included. Section 3 indicates data selection and the sample periods used in this paper and variable measurement is included. Section 4 describes the methodology used to test the relationship between dividend policy and stock price variance. Section 5 shows the empirical results. Conclusion and discussion are showed in Section 6. Limitation and suggestion are included in Section 7.

2. Literature Review

The association between the dividend policy and share price is considered as one of the hot debate topics in financial studies. Dividend policy is how much of its firms' earnings will pay to the shareholders and how much to be kept in the company as retained earnings, both the investors and the managers of firms are concerned about the dividend policy and the movement of the stock prices. However, although the relationship between stock prices volatility and dividend policy has been widely discussed, this is still an

unresolved topic, many researchers further examine the relationship between dividend policy and stock price variation in different market settings.

2.1. Dividend policy, stock price, firm's value, and stock return

Starting from last few decades, dividend policy is one of the most important topics to discuss in corporate finance, lots of research papers studied the topic of dividend policy (Gordon, 1959; Miller and Modigliani, 1961). Lintner (1956) proposed a model for corporate dividend policy, it was the first discussion of the dividend policy, Lintner investigated some research questions, for instance, should the current level of dividend payment needed to be changed or maintained. Based on the result, Lintner found the evidence that the share prices are affected by dividend policy. Moreover, these arguments are supported by later researches (Allen & Rachim, 1996; Hussainey, 2011; Oyinlola & Ajeigbe, 2014). Oyinlola & Ajeigbe, (2014) tested the determinants of the stock price using the sample of listed firms in the Nigerian Stock Exchange during the period of 2009 to 2013. The authors found that dividend payout and retained earnings are both the most significant determinants of stock prices in the Nigerian stock market, which proved a dividend payout could affect the stock prices. This conclusion is in conformity with the argument of Lintner (1956). In the 1950s, another research paper (Gordon, 1959) came up with dividend hypothesis and earning hypothesis and further tested the association between the dividends and earnings. In light of the result, he analyzed that two factors, namely dividends and earnings, would be considered when investors pay for common stocks.

In addition, Gordon (1963) suggested that dividend policy has an impact on not only the firm's value but also on stock prices. These arguments are endorsed by other researches, Amidu (2007) tested whether dividend policy could affect the firm's value. 25 listed firms in the Ghana Stock Exchange during the period of 1997 to 2004 in Ghana are included as a sample. In the regression model, return on assets and return on equity are dependent variables, dividend policy and payout ratio are independent variables and three control variables are added. Amidu (2007) showed that the firm's value could be affected by dividend policy, negative relationship between dividend payout ratio and return on assets are described derived from the results. An additional study, Kajola and Adewumi and Oworu (2015) examined 25 non-financial listed firms on the Nigerian Stock Exchange

from 2004 to 2013. The results indicated that dividend payout has a positive relationship with the firms' value, the dividend is a signal to the shareholders.

As stock price is affected by dividend policy, dividend policy is expected to have an impact on stock returns, Naranjo and Nimalendran and Ryngaert (1998) examined the association between stock return of the NYSE stocks and dividend yield covering from 1963 to 1994. Based on the results, NYSE stock returns were positively affected by dividend yield, therefore, a positive relationship could be described between dividend yield and stock returns in the American stock market during the period from 1963 to 1964. Positive relationship between dividend yield and stock return is further supported by other researches. Lemmon and Nguyen (2015) indicated that there is the positive relationship between the dividend yield and stock return in Hong Kong, which consistent with the conclusion of the paper (Naranjo & Nimalendran & Ryngaert, 1998). Furthermore, aggregate dividend yields is significant positively correlated with aggregate stock price volatility.

2.2. Dividend irrelevant theory

The dividend irrelevant theory suggests that dividend payout policy has no impact on shareholders' wealth under the assumptions such as there is no transaction costs, no tax, in other word, share prices are not affected by dividend policy. Miller and Modigliani (1961)'s dividend irrelevant theory are encouraged by later studies. The paper (Uddin, M. H., & Chowdhury, G. M., 2005) found that dividend announcement does not bring any information for the stock prices and does not affect shareholders' value, in fact, after comparing shareholders' wealth between the period of 30 days of dividend announcement and 30 days after dividend announcement, it decreased 20 percent, which means shareholders do not gain extra value from the dividend announcement. Other papers gave supportive evidence to the dividend irrelevance theory, Black and Scholes (1974) found that dividend policies do not have influence on stock prices from the period of 1951 to 1970, which indicated that stock with higher payout ratio does not have the corresponding higher stock return. Conversely, some researches have doubt attitudes towards the dividend irrelevant theory, the paper (Allen and Rachim, 1996) indicated that stock price is affected by dividend policy, a negative correlation showed between dividend policy and stock price variation.

2.2.1. Bird-in-hand theory

The Bird-in-Hand hypothesis explains that risk-averse investors are more likely to hold the stocks with consistent high dividends. In the Bird-in-hands theory, the dividend is represented as "bird-in-hand" and capital gain is considered as "Two in Bushes". Though the Bird-in-Hand hypothesis is not widely-accepted, this theory is endorsed by Linter (1962) and Gorden (1963). In the book (Gordon, 1963), the author includes that investors are willing to have dividends rather than capital gains. Additionally, though dividend policy could affect the value of a firm, future cash flow is full of uncertainty since private information is existed in nowadays' world, investors prefer dividends (Bird in hand) rather than capital gains (Two in bushes) because of the uncertainty of capital gain and certainty of dividends, Al-Malkawi (2007) further supports this theory.

2.2.2. Agency cost theory

Managers are expected to present shareholders' interest in the financial market, agency cost problem arises when there is conflict interest between the shareholders and managers, according to the paper (Ross et al, 2008), in detail, agency cost problem takes place when the managers do not make investment decision considering the best interest of shareholders but act in their own interests, for instance, the managers evolve in negative NPV projects, which is costly to their shareholders. The agency cost hypothesis mentions that dividend payment is way to reduce the agency cost problem. Studies by Jensen (1986) and Kajola and Adewumi and Oworu (2015) carried out efficient evidences to this argument. On the contrary, Miller and Modigliani (1961) stated that managers are working as best agent of shareholders and there are no interest conflicts between them.

2.2.3. Signaling theory

On one hand, Miller and Modigliani (1961)'s dividend irrelevant theory carried out that dividend is not related to firm's value, a firm could pay out dividend by raising extra debts or use external sources but not affecting value of the firm. On the other hand, owing to the information asymmetry and market inefficiency, investors are sensitive to the dividend announcement since it provides information about the future position of a firm. Shareholders consider dividend announcement as a signal to buy and sell their stocks, which influence the stock prices. The finding of the paper (Anwar, S., Singh, S., & Jain, P. K., 2017) showed that the cash dividends announcement carries positive abnormal

return, the announcement of cash dividends generates positive market reactions in Indian stock market. The paper (Chen, D. H., Liu, H. H., & Huang, C. T., 2009) took the changes of cash dividend policy from all listed A-shares firms in China during the period from 2000 to 2004 as sample, the authors suggested that cash dividend policy changes have positive impact on the share prices, no matter the cash dividend increases or decreases. On the basis of the results, the announcement effect of changes of cash dividend is positive, which implies that the investors react differently in terms of the change of cash dividends. Therefore, shareholders' wealth are affected by dividend policy in different market settings based on above studies.

2.2.4. Clientele effect

According to the definition of Clientele effect, change of other policy, such as transaction cost and tax, would affect the demand of stocks and goal of current investors. Additionally, due to the different tax treatment of dividend and capital gains, different kinds of investors have various reaction to the dividend payment. The paper (Pettit, R. R., 1977) investigated how the investors change their portfolios when facing different transaction costs and tax regimes on dividend, there is strong clientele effect according to the results. Another study by Muñoz and Rodriguez (2017) suggested that the price drop ratio is affected by the reduction of dividend tax around the ex-dividend day, but the amount of stock price reduction is fewer than the dividend payout, the results are in line with Clientele effect hypothesis.

2.3. Dividend policy and stock price volatility

Previous academic articles researched relationship between the dividend policy and the volatility of stock price in both developed and developing economies. Most of the academic articles investigated the relationship between dividend policy (dividend yield and dividend payout) on stock price in developed economies, for example, UK, the U.S. To start with, the paper written by Allen and Rachim (1996) revealed the linkage between the dividend policy and stock price volatility using the sample containing 173 listed firms in Australian covering the period from 1972 to 1985. After adding the control variables such as size, leverage, the cross-sectional regression model is used to examine this relationship. The result describes significant negative relationship between dividend policy and the stock price movement, but contradictory to the results of the paper (Baskin,

1989). Furthermore, the author suggested that payout ratio, size, debt and earnings volatility are the main determinants of share price volatility.

Secondly, Hussainey et al., (2011) mentioned that the payout ratio is the dominant determinant of the stock price volatility. Moreover, in the paper (Hussainey et al., 2011), the most important conclusion the author found is there is significant and negative relationship between dividend yield and dividend payout (Dividend policy) and the stock price volatility respectively in the UK stock market during the years from 1998 to 2007, which indicates that the higher payout ratio, the less volatile of stock price. These conclusions are consistent with the paper (Allen, D. E., & Rachim, V. S., 1996).

Thirdly, another study (Profilet, K. A., & Bacon, F. W., 2013) examined the relationship between the dividend policy and the stock price risk in the U.S equity market. In the paper, 599 listed companies in S&P 500 during three-year period are selected as the sample. Compare to the previous two studies, the object of study (Profilet, K. A., & Bacon, F. W., 2013) showed that how well the payout ratio influences the volatility of common stock price. Consistent with the previous studies, Profilet and Bacon (2013) found that there is the negative relationship between the dividend yield and stock price volatility, and size is positively related to stock price volatility, financial leverage and growth are negatively related to the dependent variables (stock price volatility). The most important finding is the payout ratio has the most significant influence on the stock price volatility than other variables.

Alternatively, with the development of developing economies during the last decades, many articles figured out the linkage between the dividend policy and stock price movement in developing economies. According to the paper (Hashemijoo, M., Mahdavi-Ardekani, A., & Younesi, N., 2012), the relationship between the dividend policy and the volatility of share price is examined but focus on the consumer product industry in Malaysian stock market. The authors selected the sample of 84 consumer product listed firms in Malaysia stock market, multiple regression model was used and time framework ranging from 2005 to 2010. According to the result, a significant negative relationship between dividend policy (dividend yield and dividend payout) and the volatility of stock price is reported.

Zakaria and Muhammad and Zulkifli (2012) examined the impact of dividend policy (dividend yield and dividend payout ratio) on the movement of the stock price of the construction and material industry in Malaysia. The sample period covers from 2005 to 2009 and 77 listed construction and material firms are included as the sample. In the paper, the authors divided the time periods as pre-crisis and during the crisis as well as post-crisis. Overall, the result of the paper suggests that the dividend payout ratio has a significant negative impact on stock price volatility. And the dividend yield is insignificant and has the negative influence on the movement of stock price. Difference is shown between two papers, the paper (Zakaria, Z., Muhammad, J., & Zulkifli, A. H., 2012) found that only size and leverage have high association with the movement of stock prices, but according to the paper (Allen, D. E., & Rachim, V. S., 1996), not only the payout ratio but also size, debt and earnings volatility are the main determinants. Nevertheless, both the articles (Hashemijoo & Mahdavi-Ardekani & Younesi, 2012; Zakaria & Muhammad & Zulkifli, 2012) only paid attention to single industry, though the sample selection might lack the representativeness, these articles carry more specific information and conclusions.

Prior to the two papers, the paper (Hooi, S. E., Albaity, M., & Ibrahimy, A. I., 2015) is not focused on one single industry, all the industries are examined in this paper, total 319 firms covering from 2003 to 2013 in Malaysian stock market is included in the sample. Since previous studies have confirmed that control variables, such as size and leverage, growth in assets, have the impact on both dividend policy and stock price variation, hence, they are added in the regression model. The study used the same methodology from Baskin (1989). In conclusion, the dividend yield and the dividend payout, are significant negative correlated with stock price volatility in all industries in the Malaysian stock market. Moreover, firms' size as well as earning volatility and long-term debts have the positive effect on stock price volatility based on the results.

The paper (Khan, M. Y., Al Bassam, W. M. H., Khan, W., & Javeed, A., 2017) concentrated on the Pakistan capital market but only three main industries such as Textile, Sugar are used in investigating the impact of dividend policy on the volatility of stock price. The data containing 42 firms across three main sectors are selected and the timeframe ranging from 2006 to 2009 in the paper. In the regression model, dividend

policy which included dividend payout and the dividend yield is considered to be the independent variable and added size and debt as control variables, stock price volatility is the independent variable. Consistent with the results of previous studies, there is a significant relationship between stock price movement and dividend policy, stock price variance is affected by payout ratios, debt and firm's size. However, the study makes a conclusion that no significant relationship is showed between price and dividend yield.

The paper (Nazir, M. S., Nawaz, M. M., Anwar, W., & Ahmed, F., 2010) figured out the determinants of movement of stock price in an emerging market in Pakistan. The sample data includes 73 listed firms selected from Karachi Stock Exchange indexed and sample period covers from 2003 to 2008. By comparison by the paper (Khan, M. Y., Al Bassam, W. M. H., Khan, W., & Javeed, A., 2017), the sample data range is wider and different market settings are used. According to the paper (Nazir, M. S., Nawaz, M. M., Anwar, W., & Ahmed, F., 2010), the authors investigated that dividend policy has influence on the risk of stock price, furthermore, dividend policy has significant impact on the volatility of stock price in emerging market in Pakistan. But the most important finding of the paper (Khan, M. Y., Al Bassam, W. M. H., Khan, W., & Javeed, A., 2017) was, different from the finding of developed countries, the authors suggested that size and leverage do not show a strong significance when determining the volatility of stock price in emerging market in Pakistan. Different market settings have various influences on control variables and the control variables would further affect the volatility of stock price differently.

In conclusion, many prior studies suggested that a negative correlation showed between stock price volatility and dividend policy both in the developing economies and developed economies, Allen and Rachim (1996) and Hussainey et al., (2011) investigated this correlation in all industries but pay attention to the Australian stock market and UK stock market respectively. Nazir and Nawaz and Anwar and Ahmed (2010) and Hooi and Albaity and Ibrahimy (2015) moved the target market to Malaysian stock market and Pakistan stock market. Additionally, Hashemijoo & Mahdavi-Ardekani & Younesi (2012) and Zakaria & Muhammad & Zulkifli (2012) centered on one single industry when investigating the relationship between dividend policy and stock price volatility in Malaysian stock market. Few studies focus on the in mainland China stock market and investigate the relationship between the stock price volatility and dividend policy of six-

main industries in mainland China. Hence, this paper aims to examine the relationship between stock price variance and dividend policy in six main industries of mainland China from 2011 to 2016.

2.4. Theoretical predictions

In light of previous studies (Allen & Rachim, 1996; Hussainey, 2011; Hashemijoo & Mahdavi-Ardekani & Younesi, 2012; Zakaria & Muhammad & Zulkifli, 2012; Khan & Al Bassam & Khan & Javeed, 2017), dividend policy is expected to show a significant negative impact on stock price variation, since dividend yield and dividend payout ratio are two proxies of dividend policy, the following two hypotheses are put forward:

H1: There is a significant negative relationship between the dividend yield and stock price volatility of six main industries in mainland China.

H2: There is a significant negative relationship between dividend payout ratio and stock price volatility of six main industries in mainland China.

In addition, dividend policy is not the only factor affected the stock price variance, other determinants are suggested that they could influence the stock price volatility, for example, size, leverage, growth in assets. As the first research examined the association between share price volatility and dividend policy, Baskin (1989) indicated that size, long-term debt, earnings volatility, growth have impact on dividend policy as well as share price variance. Therefore, four hypotheses are described as follows.

H3: There is a significant negative association between a firm's size and stock price volatility of six main industries in mainland China.

H4: There is a positive association between leverage and stock price volatility of six main industries in mainland China.

H5: There is a negative relationship between growth in assets and share price volatility of six main industries in mainland China.

H6: There is a positive relationship between earning volatility and price volatility of the stock of six main industries in mainland China.

3. Data

3.1. Sample

The dataset is obtained by searching the Datastream, the keywords of the dataset are price, high-low price, market value, dividend payout ratio, total asset, long-term debt, net

income, etc. Although three kinds of dividend policies could be chosen for all listed firms in mainland China, only cash dividend is included. The sample contains 6 years of cross-sectional panel data during the years from 2011 to 2016. Additionally, six largest industries are chosen in the sample, to be specific, there are automobiles & parts, construction & materials, general retailers, industrial engineering, technology hardware & equipment, electronic & electrical equipment. In total, 1476 listed firms on Shanghai Stock Exchange are selected from Datastream. However, several constraints are included when entering into a sample, the firms who do not fulfill the constraints are dropped.

1) Listed firms which have complete data;

2) Firms listed in SSE since 2011;

3) The listed firm should have at least one cash dividend from the years of 2011 to 2016.

Furthermore, the listed firms with outliers are excluded from the sample. Finally, the sample size contains 409 listed firms in mainland China with complete data ranging from 2011 to 2016. In total, there are 2870 observations.

3.2. Variables measurement

3.2.1. Price volatility: stock price volatility is dependent variables in the regression model. According to the formula proposed by Baskin (1989), first of all, the annual range of adjusted high and low price is obtained. Secondly, raises the second power of the sample prices for each year, then calculates the average value of the high and low price range by dividing the number of sample years. Last, the price volatility is obtained by applying a square root. In order to measure the stock price volatility, the following formula is used:

$$P.VOL_i = \sqrt{\frac{\sum_{i=1}^{n}(\frac{HighP_i - LowPi}{\frac{HighPi + LowPi}{2}})^2}{n}}$$

Where: $HighP_i$= Highest adjusted stock price for year i

$LowP_i$= Lowest adjusted stock price for year i.

n= Number of years

3.2.2. Dividend yield: Dividend yield and dividend payout ratio are two proxies of the dividend policy. Dividend yield (D.Yield) is defined as one of the independent variables in the regression model. Based on the definition, dividend yield means

the percentage of dividend a firm paid out each year relative to its stock price. Thus, the dividend yield could be computed as the sum of cash dividend payments to the common shareholders divided by market value of each firm. Then, the average value is needed. According to the paper (Baskin, 1989), the formula in terms of calculating the dividend yield are shown below:

$$D. Yield = \frac{\sum_{i=1}^{n}(\frac{Div_i}{MV})}{n}$$

Where: Div_i=Dividend yield in year i

MV_i = Market value for year i

n= Number of years

3.2.3. Payout ratio: Dividend payout is the second proxy of the dividend policy, the dividend payout ratio is one of the independent variables in the regression model. Dividend payout is computed as the total cash dividend paid to the common shareholders relative to the net income after tax of each stock. When computing payout ratio per share, the dividend per share is needed, and divide by earning per share for each year

$$D. Payout = \sum_{i=1}^{n} \frac{CH.Dividend_i/NIAT_i}{n}$$

Where: $CH. Dividend_i$ = Total cash dividend to common shareholders during the year i.

$NIAT_i$= Net income after taxes during the year i.

n= Number of years

3.2.4. Size: When a firm is making a decision on dividend policy, size is one of the dominant variables that a firm is taken into considerations. Many previous papers (Zakaria, & Muhammad & Zulkifli, 2012; Profilet & Bacon, 2013; Hooi & Albaity & Ibrahimy, 2015) came up with same conclusions that size has the positive impact on the stock price variance, and firm's size could affect dividend policy. The first step to obtaining the size variable is to compute the averaged value of the total amount of market value for n years. The following step is the transformation of the natural logarithm. The control variable: Size, is computed on the grounds of the following formula:

$$Size = LN(\sum_{i=1}^{n} MV_i/n)$$

Where: MV_i= Market value of a company at the end of year i.

n= Number of years

3.2.5. Leverage: Jensen (1986) illustrated that firms' free cash flow is decreased by raising companies' debt, which decreases the agency cost of cash flow. Other research proved this argument. The paper (Brockman, P., & Unlu, E., 2009) stated that agency cost of debts play a significant role when making dividend policy decision. Leverage is one of the control variables in the regression model. For the sake of computing the leverage, first of all, the ratio between the long-term debt and total assets is obtained. Then, the ratio is divided by the number of years, the average level of leverage of each firm is obtained finally.

$$Leverage = \frac{\sum_{i=1}^{n}(LTdebt_i/TA_i)}{n}$$

Where: $LTdebt_i$ = Long term debt of a firm at the end of year i.

TA_i= Total assets of a firm at the end of year i

n= Number of years

3.2.6. Growth in assets: Growth is included as one of the control variables in the regression model. Baskin (1989) stated that growth rate influences the dividend policy as well as stock price variation. Other paper (Hashemijoo, M., Mahdavi-Ardekani, A., & Younesi, N., 2012) asserted that a firm in the growing phase tends to pay less dividend since more investments are needed to the firm, large firms are more likely to have a lower growth rate and relatively higher dividend payout ratio, hence, negative relationship between the dividend policy and growth rate is shown. In this study, growth is computed in two steps. First of all, the ratio of change of total assets at the end of the year i divided by the total assets at the beginning of year i is obtained. Secondly, the total amount of ratio is divided by the number of years. The following formula is used in calculating the growth control variable:

$$Growth = \frac{\sum_{i=1}^{n}(\Delta TA_i / TA_i)}{N}$$

Where: ΔTA_i = Change of total assets at the end of year i.

TA_i= Total assets at the beginning of the year i.

n= Number of years

3.2.7. Earning volatility: Earning is more likely to affect the decision of dividend policy since dividend payment depends on the earning of the firm. Earning volatility is set as one of the control variables and three steps are used in calculating the earnings volatility in this study. First of all, the mean values of the ratio between operating income (before tax and interest) and total assets for n years are obtained. Secondly, the mean square deviation is applied by computing the difference between the ratio of operating income to total assets and the ratio obtained from step 1. Thirdly, square root transformation is needed when obtaining the earnings volatility

$$E.VOL_i = \sqrt{\frac{\sum_{i-1}^{n}(R_i - R_a)^2}{n}}$$

Where: R_i= ratio of operating income to total assets during the year i.

$$R_a = \sum_{i=1}^{n}(R_i/n),$$

n= number of years.

4. Empirical specification

This study uses multiple regression model, the independent variable is considered to be dividend payout as well as dividend yield. Moreover, the dependent variable is share price volatility. In the beginning, a simple regression model between stock price variation and dividend policy (dividend yield and dividend payout ratio) is conducted. The regression model is suggested:

$$PVOL_i = a_1 + a_2 * D.Yield + a_3 * D.Payout$$

Where: $PVOL_i$=Stock price volatility

$D.Yield$= Dividend Yield

$D.Payout$= Dividend payout ratio

On the basis of the empirical studies, other determinants have the impact on stock price variation and dividend policy, four control variables are added in the regression model to offset the biases, for instance, size, debt, growth, leverage. In one word, the regression model is used to investigating the relationship between the stock price volatility and dividend policy.

$$PVOL_i = a_1 + a_2 * D.Yield + a_3 * D.Payout + a_4 * Size + a_5 * Levergae + a_6 * Growth + a_7 * E.VOL + e$$

In this equation, $PVOL_i$=Stock price volatility

$D.Yield$= Dividend yield

$D.Payout$= Dividend payout ratio

$Size$= Size of the firms

$Levergae$=Long term debt

$Growth$= Growth in assets

$E.VOL$= Earning volatility

5. Results

5.1. Descriptive results

From the descriptive statistics which includes mean and standard deviation showed in Table 1, size has the highest mean among all the variables which reports the value of 8.882 and control variable, earning volatility obtains the lowest average value among all variables which reports the value of 0.0307. Additionally, stock price volatility has the lowest standard deviation among variables, the dividend yield has the highest standard deviation among all the variables.

According to the Table 1, first of all, the average value of stock volatility is 0.378 ranging from 2011 to 2016 in the mainland China market. Subsequently, the stock price volatility refers to 0.378, which is comparable with the result of the paper (Hooi, S. E., Albaity, M., & Ibrahimy, A. I., 2015) which illustrated the price volatility of stock of 0.45 ranging from 2003 to 2013 in the Malaysian market. Furthermore, the average value of stock price volatility of this study is similar with the result of the paper (Allen, D. E., & Rachim, V. S., 1996) which reported the value of 0.49 during the period of 1972 to 1985 in the Australian market. On the contrary, the paper (Hashemijoo, M., Mahdavi-Ardekani, A., & Younesi, N., 2012) described the stock price volatility of 0. 659, which is not comparable with the result of 0.378 of Table 1.

Secondly, on the basis of Table 1, dividend yield shows a mean of 0.846 during the period of 2011 to 2016 in mainland China stock market. However, this result is not close to the findings of other researches, for instance, the paper (Hashemijoo & Mahdavi-Ardekani & Younesi, 2012) revealed that dividend yield has the average value of 0.038057936 during the years of 2005 to 2010 in the Malaysian market. In addition, the paper (Hussainey, K., Oscar Mgbame, C., & Chijoke-Mgbame, A. M., 2011) manifested dividend yield has the

average value of 3.1197 in the UK stock market. In conclusion, Australian listed firms pay higher dividend yield than listed firms of mainland China, and listed firms of main-land China pay higher dividend yield than the Malaysian listed firms.

Thirdly, the mean dividend payout in mainland China during the years of 2011 to 2016 reported as 0.2432. The mean of dividend payout ratio is comparable with two previous studies (Hashemijoo & Mahdavi-Ardekani & Younesi, 2012; Hooi &Albaity & Ibrahimy, 2015) which described the mean of dividend payout is 0.372579996 and 0.3 respectively. On the contrary, the result of dividend payout ratio is not comparable with the finding of the paper (Allen, D. E., & Rachim, V. S., 1996) which showed the average value of dividend payout is 0.495. Among the four control variables, size has the highest value and earning volatility reports the lowest average value among all control variables. Consequently, the average value of size according to Table 1 is 8.882 during the years of 2011 to 2016 in mainland China stock market. The finding is not comparable with the result of the paper (Hussainey, K., Oscar Mgbame, C., & Chijoke-Mgbame, A. M., 2011) which mean of size is 3.2121. The mean value of earning volatility is 0.37 during the years of 2011 to 2016 in mainland China derived from Table 1, which is similar with the result of the paper (Hooi, S. E., Albaity, M., & Ibrahimy, A. I., 2015) which showed mean of 0.04. Furthermore, the average value of earning volatility according to Table 1 is comparable to the result of the paper (Hashemijoo & Mahdavi-Ardekani & Younesi, 2012) which reported the average value of 0.042833146.

Table 1: The descriptive statistics of variables.

	P.VOL	D.Yield	D.Payout	E.VOL	Growth	Size	Leverage
Mean	0.3783	0.8457	0.2432	0.0367	0.2320	8.8815	0.1815
Standard Error	0.0018	0.0462	0.0072	0.0040	0.0395	0.0429	0.0097
Standard Deviation	0.0359	0.9349	0.1458	0.0801	0.7981	0.8675	0.1967
Count	409	409	409	409	409	409	409
Confidence Level (95.0%)	0.0035	0.0909	0.0142	0.0078	0.0776	0.0843	0.0191

*Note: * and ** and *** implies significant at 1% and 5% and 10% level.*
Where D.Yield =Dividend yield, D.Payout= Dividend payout, Growth= Growth rate of listed firms, E.VOL= Earning volatility of listed firms, Leverage= Leverage of listed firms, Size= Size of listed firms. The dependent variable is stock price volatility and the independent variables are dividend payout and dividend yield. Growth and E.VOL (Earning volatility) and leverage and size are control variables.

Table 2: Covariance statistics

	P.VOL	D.Yield	D.Payout	Growth	E.VOL	Leverage

P.VOL	1.0000					
D.Yield	-0.1852***	1.0000				
D.Payout	-0.1994***	0.5248***	1.0000			
Growth	-0.0227	-0.0427	0.0398	1.0000		
E.VOL	0.0279	-0.0459	-0.0071	0.4339***	1.0000	
Leverage	0.1581***	-0.0869	-0.1352***	-0.0663	-0.0493	1.0000
Size	0.1294***	0.1042	0.0878***	0.0600***	0.1295	0.0857

*Note: * and ** and *** implies significant at 1% and 5% and 10% level.*
Where D.Yield =Dividend yield, D.Payout= Dividend payout, Growth= Growth rate of listed firms, E.VOL= Earning volatility of listed firms, Leverage= Leverage of listed firms, Size= Size of listed firms. The dependent variable is stock price volatility and the independent variables are dividend payout and dividend yield. Growth and E.VOL (Earning volatility) and leverage and size are control variables.

Stock price variance (P.VOL) is negatively correlated with dividend yield and dividend payout at 1%, 5% and 10% level of significance, according to the Table 2. Correlation between stock price volatility (P.VOL) and dividend yield equals to -0.1852, and the correlation between dividend payout and stock price volatility (P.VOL) is -0.1994. These two results present that the listed firms with higher dividend yield and the dividend payout ratio have lower stock price volatility. The results of the correlation are similar with the paper (Nazir, M. S., Nawaz, M. M., Anwar, W., & Ahmed, F., 2010) reported -0.101 for stock price volatility and dividend yield and -0.138 for stock price volatility (P.VOL) and dividend payout which covered the research period of 2003 to 2008 in Karachi stock market. Although the value of correlation between dividend and stock price volatility in this study is not comparable with the results of the papers (Allen& Rachim, 1996; Hussainey& Oscar Mgbame & Chijoke-Mgbame, 2011; Hashemijoo & Mahdavi-Ardekani & Younesi, 2012), significant negative correlation between stock price volatility and dividend policy can be pointed out. For instance, the paper (Hashemijoo & Mahdavi-Ardekani & Younesi, 2012) illustrated the result for stock price volatility, which is significantly negatively correlated with both dividend yield (-0.524) and dividend payout ratio (-0.382) at 1% as well as 5% significant level. Hussainey and Oscar Mgbame and Chijoke-Mgbame (2011) manifested the correlation between stock price movement and dividend yield leveled at -0.2583 and the correlation between stock price volatility and dividend payout is -0.4446.

Stock price volatility (PVOL) is significantly positively correlated with leverage at 1% and 5% as well as 10% level of significance, the correlation between stock price volatility (PVOL) to size is reported at 0.1294 and the correlation between stock price volatility to

leverage is found to be 0.1581. The correlation between price volatility and leverage tally with the finding of the paper (Hussainey, K., Oscar Mgbame, C., & Chijoke-Mgbame, A. M., 2011) which was obtained at 0.1528 for stock price variance to leverage. On the contrary, in terms of the correlation between dividend policy and leverage, negative correlation between dividend yield and leverage with the value of -0.0869 is showed. What is more, the dividend payout ratio has a negative significant correlation to leverage with the value of -0.1352. These results are comparable with the studies (Hashemijoo & Mahdavi-Ardekani & Younesi, 2012; Hooi & Albaity & Ibrahimy, 2015) since both dividend yield and dividend payout is found to have the negative correlation with leverage, but stock price volatility is positively correlated with leverage.

Stock price volatility (PVOL) is positively correlated with size at 1% and 5% and 10% level of significance with the value of 0.1294. This result tally with the findings of the papers (Allen & Rachim, 1996; Khan, Bassam, Khan, & Javeed, 2017) which showed the positive correlation between stock price volatility and size with the value of 0.298 and 0.5912 respectively. Nevertheless, other papers (Hussainey & Oscar Mgbame & Chijoke-Mgbame, 2011; Ramadan, 2013) is contradicted by the findings of this study since they indicated that stock price volatility is negatively correlated with size. Furthermore, the dividend yield is positively correlated with size at the 1% and 5% as well as 10% level of significance. Dividend payout ratio reports positive correlation to listed firms' size. In detail, large listed firms are more likely to pay more dividend based on the results. The papers (Hashemijoo & Mahdavi-Ardekani & Younesi, 2012; Hooi & Albaity & Ibrahimy, 2015; Khan, Bassam, Khan& Javeed, 2017) obtained the positive correlation between dividend policy and listed firms' size. Derived from Table 2, stock price volatility and growth are negatively correlated reporting the value of -0.0227, and stock price volatility has the positive relationship with earnings volatility. Eventually, the correlation between dividend yield and dividend payout has the highest value of 0.5248 at 1% and 5% and 10% level of significance. The result is in line with the paper (Hashemijoo & Mahdavi-Ardekani & Younesi, 2012) and the paper (Hooi & Albaity & Ibrahimy, 2015), which implied the correlation between dividend yield and dividend payout ratio is 0.537 and 0.76 at 1% significant level respectively.

5.2. Regression results

Since the significant correlation between dividend payout ratio and dividend yield is described with the value of 0.5248, and on the ground of Table 2, stock price volatility is significantly correlated with dividend yield and dividend payout ratio, hence, a regression model is conducted containing the stock price volatility as dependent variable and dividend policy as independent variables. Based on Table 3, stock price volatility has a significant negative association with dividend yield reporting the t-statistics of -1.955 and p-value of 0.05. Subsequently, the significant positive relationship is presented between stock price volatility and dividend payout ratio, according to Table 3, the p-value is 0.01 and t-statistics is -2.480. In conclusion, stock price volatility has the significant positive relationship with dividend policy (dividend yield and dividend payout ratio).

Table 3: The regression result of the model: $PVOL_i = a_1 + a_2 * D.Yield + a_3 * D.Payout$.

	Coefficients	Standard Error	t-Statistics	p-value
(Constant)	0.390	0.003	115.565	0.00
D.Yield	-0.004	0.002	-1.955	0.05***
D.Payout	-0.035	0.014	-2.480	0.01***

*Note: * and ** and *** implies significant at 1% and 5% and 10% level.*
Where D.Yield =Dividend yield, D.Payout= Dividend payout. The dependent variable is stock price volatility and the independent variables are dividend payout and dividend yield.

Table 4: The regression result of the model: $PVOL_i = a_1 + a_2 * D.Yield + a_3 * D.Payout + a_4 * Size + a_5 * Levergae + a_6 * Growth + a_7 * E.VOL + e$.

	Coefficients	Standard Error	t-Statistics	p-value
(Constant)	0.3338	0.0177	18.8081	0.0000***
D.Yield	-0.0047	0.0022	-2.1585	0.0315***
D.Payout	-0.0322	0.0139	-2.3152	0.0211***
Growth	-0.0015	0.0024	-0.6329	0.5272
E.VOL	0.0104	0.0239	0.4368	0.6625
Leverage	0.0213	0.0088	2.4028	0.0167***
Size	0.0059	0.0020	2.9287	0.0036***

*Note: * and ** and *** implies significant at 1% and 5% and 10% respectively*
Where D.Yield= Dividend yield, D.Payout= Dividend payout, Growth= Growth rate of listed firms, E.VOL= Earning volatility of listed firms, Leverage= Leverage of listed firms, Size= Size of listed firms. The dependent variable is stock price volatility and the independent variables are dividend payout and dividend yield. Growth and E.VOL (Earning volatility) and leverage and size are control variables.

Table 4 reports the regression model including independent and dependent variables and control variables. Based on Table 4, stock price volatility describes the significant negative relationship with dividend policy (dividend yield and dividend payout ratio), the coefficient of dividend yield is -0.0047 and the coefficient of dividend payout ratio is -0.0322 at 1% and 5% and 10% level of significance. Stock price volatility is significant

negatively affected by dividend yield and dividend payout ratio, in other words, when the stock price experiences higher volatility, less dividend yield and dividend payout ratio would be. This conclusion is consistent with previous studies (Hussainey, Oscar Mgbame & Chijoke-Mgbame, 2011; Hashemijoo & Mahdavi-Ardekani & Younesi, 2012; Hooi & Albaity & Ibrahimy, 2015) which stated negative relationship between the stock price volatility and dividend policy. However, the coefficient of dividend policy is not in line with the paper (Profilet, K. A., 2013), which covered 599 listed firms from 2009 to 2012 in American stock market and indicated that the coefficient of dividend yield is -2.503475361 and the coefficient of payout ratio is 0.00020516. The findings of this study are not comparable to the research paper (Hussainey, Oscar Mgbame & Chijoke-Mgbame, 2011) which stated that the coefficient of dividend yield is -0.04016. What is more, the coefficient of the dividend payout is not comparable to the paper (Hashemijoo & Mahdavi-Ardekani & Younesi, 2012) indicating that the coefficient of the dividend payout ratio is -0.042. Secondly, negative relationship existed between stock price volatility and growth which suggested the coefficient -0.0015, for instance, the listed firms with lower growth rate tends to have higher stock price volatility. This conclusion is along with the paper (Nazir, M. S., Nawaz, M. M., Anwar, W., & Ahmed, F., 2010) which implied that growth is positively correlated with stock price volatility and reported the value of -0.000934. Besides, there is the positive association between stock price volatility and earnings volatility which has the coefficient value of 0.0104. The findings of previous studies also found that a positive relationship existed between the share price volatility and earnings volatility.

Afterward, leverage is positively correlated with stock price movement according to Table 4 and reach the coefficient of 0.0213. It is reasonable that leverage is positively affected by stock price volatility, since more debt the listed firm has, the more risk the stock price has. Moreover, a positive association is indicated between share price volatility and leverage on the basis of the paper (Hooi & Albaity & Ibrahimy, 2015), which stated that the coefficient of leverage is 0.281. Nevertheless, the result of leverage in this study is not in line with the paper (Profilet, K. A., 2013), which showed a significant negative relationship between the stock price volatility and leverage and reported the coefficient value of -0.03487033. Finally, the share price volatility has the significant positive

association with size at 1% and 5% and 10% significant level. On one hand, the finding is consistent with the paper (Nazir, M. S., Nawaz, M. M., Anwar, W., & Ahmed, F., 2010) which demonstrated that size is positively correlated with the movement of stock prices. Besides, the significant positive relationship between size and stock price volatility is concluded from the paper (Dewasiri, N. J., & Weerakoon Banda, Y. K., 2014). On the contrary, the positive result is not consistent with the other papers (Nazir, Nawaz, Anwar, & Ahmed, 2010; Khan, Al Bassam, Khan, & Javeed, 2017) as negative relationship are revealed between the size and stock price volatility. It is rational that growth is negatively correlated with stock price volatility and size has positive relationship to stock price volatility, in other word, large listed firms in six main industries in mainland China intend to have higher price volatility since large listed firms invest more than small listed firms in mainland China, and the uncertainty of investments leads to higher price volatility.

As the high correlation between dividend yield and dividend payout ratio reported as 0.5248 in Table 3, multicollinearity problem might be occurred in light of the result. Therefore, in order to decrease the standard errors, four control variables which might affect the independent and dependent variables are added to the regression model, the following two regression models are formulated to solve the multicollinearity problem:

$$PVOL_i = a_1 + a_2 * D.Yield + a_3 * Size + a_4 * Levergae + a_5 * Growth + a_6 * E.VOL + e$$

$$PVOL_i = a_1 + a_2 * D.Payout + a_3 * Size + a_4 * Levergae + a_5 * Growth + a_6 * E.VOL + e$$

Concerning the first regression equation, the regression includes dividend yield and four control variables, in other words, stock price volatility is dependent variables and the dividend yield is independent variables in the first regression equation. Besides, the second regression model excludes the dividend yield but contains dividend payout and four control variables, which means that stock price volatility is used as dependent variables and dividend payout is independent variables in the second regression equation.

Table 5: Regression result of the regression equation: $PVOL_i = a_1 + a_2 * D.Yield + a_3 * Size + a_4 * Levergae + a_5 * Growth + a_6 * E.VOL + e$.

	Coefficients	Standard Error	t-Statistics	p-value
(Constant)	0.3298	0.0178	18.5708	0.0000***

D.Yield	-0.0073	0.0019	-3.8924	0.0001***
Growth	-0.0019	0.0024	-0.7831	0.4340
E.VOL	0.0116	0.0240	0.4836	0.6289
Leverage	0.0234	0.0088	2.6486	0.0084***
Size	0.0057	0.0020	2.8070	0.0052***

*Note: * and ** and *** implies significant at 1% and 5% and 10% respectively*
Where D.Yield =Dividend yield, D.Payout= Dividend payout, Growth= Growth rate of listed firms, E.VOL= Earning volatility of listed firms, Leverage= Leverage of listed firms, Size= Size of listed firms. The dependent variable is stock price volatility and the independent variables is dividend yield. Growth and E.VOL (Earning volatility) and leverage and size are control variables.

Table 5 suggests the result of the first regression equation which dividend payout is excluded. Significant negative relationship with stock price volatility reporting the value of -0.0073 is showed according to Table 5. It means when the dividend yield increases with 1, the stock price volatility decreases to 0.0073. The regression result is in line with the papers (Hooi & Albaity & Ibrahimy, 2015; Hashemijoo & Mahdavi-Ardekani & Younesi, 2012) which also suggested the significant negative relationship between dividend yield and stock price variance. Although the significant negative relationship is consistent with the other papers, the coefficient is not comparable since the coefficient of dividend yield based from the paper (Hashemijoo & Mahdavi-Ardekani & Younesi, 2012) indicated as -2.537 and obtained from the paper (Hooi & Albaity & Ibrahimy, 2015) is -3.149. Furthermore, there is the negative relationship between the growth and stock price volatility, which reported the value of -0.0019. Earning volatility shows a positive relationship with stock price volatility, in detail, when the earning volatility increase with 0.0116, the stock price volatility increase with 1. Subsequently, size is significantly positively correlated with stock price variance, which means that when the size increases with 1, the stock price volatility increases with 0.0057, since the coefficient of size is 0.0057. Last but not the least, a significant positive relationship is indicated between leverage and stock price volatility given the result from Table 5 with the value of 0.0234. For instance, higher stock price volatility might occur if the listed firms with higher debt.

Table 6: Regression result of the regression equation: $PVOL_i = a_1 + a_2 * D.Payout + a_3 * Size + a_4 * Levergae + a_5 * Growth + a_6 * E.VOL + e.$

	Coefficients	Standard Error	t-Statistics	p-value
(Constant)	0.3364	0.0178	18.9149	0.0000***
D.Payout	-0.0477	0.0120	-3.9838	0.0001***
Growth	-0.0012	0.0024	-0.5004	0.6171

E.VOL	0.0120	0.0240	0.4978	0.6189
Leverage	0.0219	0.0089	2.4632	0.0142***
Size	0.0056	0.0020	2.7544	0.0061***

*Note: * and ** and *** implies significant at 1% and 5% and 10% respectively*
Where D.Yield =Dividend yield, D.Payout= Dividend payout, Growth= Growth rate of listed firms, E.VOL= Earning volatility of listed firms, Leverage= Leverage of listed firms, Size= Size of listed firms. The dependent variable is stock price volatility and the independent variables is dividend yield. Growth and E.VOL (Earning volatility) and leverage and size are control variables.

Based on Table 6, a negative relationship between stock price volatility and dividend payout with the value of -0.0477 is found at 1% and 5% and 10% level of significance. It can be concluded as when dividend payout increases with 1, the stock price volatility decreases with 0.0477, which means listed firms with lower dividend payout would have higher stock price volatility. This result is in line with Hashemijoo & Mahdavi-Ardekani & Younesi (2012) and Hooi & Albaity & Ibrahimy (2015) that reported the level at -0.114 and -0.346 respectively. Concerning control variables and stock price volatility, growth is negatively correlated with stock price volatility and reported the value of -0.0012, the analysis means the higher growth the listed firms have, the higher price volatility the listed firms will experience. Earnings volatility has the positive relationship with stock price volatility and the coefficient is 0.0120. Last but not the least, the leverage and size suggest have positive linkage with stock price variance according to Table 6 and state the value of 0.0219 and 0.0056 respectively at the 1% and 5% and 10% significant level. In conclusion, the leverage of the listed firms is higher, stock price will experience higher volatility, furthermore, the larger firms are perceived to have higher stock price volatility in mainland China.

6. Discussion and conclusion

The aim of this paper is to investigate the relationship between stock price volatility and dividend policy in six main industries in mainland China during the years from 2011 to 2016. The panel sample contains overall 408 listed firms on Shanghai Stock Exchange, all the data are taken from Datastream. The dependent variable in this paper is stock price volatility and independent variables are dividend yield and dividend payout. In addition, this study also examines the linkage between stock price volatility and the other variables, therefore, four control variable, for instance, size, growth, leverage, earnings volatility are included in the regression model. The OLS regression is used in the paper

by examining the relationship between stock price volatility and independent variables. Thereafter, since the high correlation between dividend yield and dividend payout, in order to mitigate the multicollinearity problem, another two regression models excluded dividend payout and dividend yield are operated as robustness model.

Derived from the result of regression models, significant negative relationship are found between stock price volatility and dividend policy (dividend yield and dividend payout), we accept the first two hypotheses. Derived from the results the conclusion in this study tally with the papers (Baskin, 1989; Hussainey, Oscar Mgbame & Chijoke-Mgbame, 2011; Hashemijoo & Mahdavi-Ardekani & Younesi, 2012; Hooi & Albaity & Ibrahimy, 2015; Khan, Al Bassam, Khan, & Javeed, 2017), which demonstrated stock price volatility are supposed to be lower when the dividend payout and dividend yield are higher. Higher dividend present the listed firm operates on a stable path, and less volatile on stock prices, hence, dividend payout and dividend yield are expected to have negative correlation with stock price volatility based on information effect, the results are in line with this expectation. Moreover, dividend payout is suggested to be the main determinants of stock price variation based on the regression results.

Additionally, a significant negative relationship is suggested between stock price volatility and size based on the papers (Hussainey, Oscar Mgbame & Chijoke-Mgbame, 2011; Hooi & Albaity & Ibrahimy, 2015) which examined the relationship between stock price volatility and dividend policy in the UK market, on the contrary, a positive relationship is found between size and stock price variance of six main industries in mainland China in this study, therefore, we reject the third hypothesis. In addition, we accept the fourth hypothesis since significant positive correlation is presented between the leverage and stock price volatility according to the results, leverage has the most impact on stock price volatility of all four control variables. However, the fifth hypothesis which suggests a positive relationship existed between growth and stock price volatility is rejected based on the regression results and no significant relationship existed between earning volatility and stock price volatility. It means listed firms with higher growth rate intend to have higher stock price movement. What's more, earning volatility has the positive correlation with stock price volatility based on Table 4, in other words, we accept the sixth hypothesis. In detail, stock price movement has the same direction as earnings volatility, which also

means listed firms with lower the earning volatility are expected to have lower stock price volatility. Nevertheless, there are no significant relationship between earning volatility and stock price volatility.

7. Limitation and suggestion

The limitation of this paper is only six main industries, for example, industrial engineering, electronic and electrical equipment, general retailing, construction and materials, software and computer service, automobile & part in Shanghai Stock Exchange, are included in the sample. Moreover, the adjusted R-square is fairly low in this paper, which only reaches the level at 7.3%. With regard to future studies, sample could be expanded and investigated the correlation between stock price volatility and dividend yield and dividend payout ratio in entire industries in Shanghai Stock Exchange. In future studies, the comparison between regions or countries could be further examined.

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