

Effect of Dividend Policy Measures on Stock Pricevolatility in Tehran Stock Exchange

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Nooshin Salari

MSc. Student, University of Economic Sciences,
nooshinsalari@ues.ac.ir

Ezatollah Abbasian

Associate Prof. University of Bou Ali Sina,
abbasian@basu.ac.ir

Kamran Pakizeh

Assistant Prof. University of Economic Sciences,
k.pakizeh@ues.ac.ir

Abstract

This paper aims to determine the impact of dividend policy on stock price volatility by taking firms listed on Tehran stock exchange. A sample of 68 listed companies from Tehran stock exchange is examined for a period from 2001 to 2012. The estimation is based on cross-sectional ordinary least square regression analysis to find the relationship between share price volatility and dividend policy measures (dividend payout ratio and dividend yield). Control variables taken by the study are: size, earning volatility, debt and growth. Results show, there is a significant negative relationship between share price volatility and two main dividend policy measures: payout ratio and dividend yield. It has also identified that there is a positive relationship between price volatility and size and also debt of firms. The other finding of this study is that there is no relationship between stock price volatility and earning volatility and also growth of the firms

Keywords: Dividend policy, Dividend yield, Dividend payout, Share price volatility

1- Introduction

Stock price volatility means ups and downs in the stock prices during a time period [12]. Price volatility of stock affects value of firm and also it reflects important news about the firm. Dividends are commonly defined as the distribution of earnings (past or present) in real assets among the shareholders of the firm in proportion to their ownership [7]. Dividend policy is one of the important aspects of corporate finance and it has been a popular topic for financial researchers. Managers should decide what percentage of the firm's earnings to be divided between shareholders and what percentage of them to be retained for reinvesting in new projects. According to Brealey and Myers (2002) dividend policy has been kept as the top ten puzzles in finance [4]. Managers should pay attention to the dividend policy which lead to maximization of shareholder's wealth and at the other hand they should consider the effect of their decision on stock's price. One of the most important indicators for investors to invest on a share is share price. Share price is not independent of dividend policy. Dividend may influence the return and share prices because of signaling effect [17]. The dividend announcement provides information about the flow of funds and allows the market to estimate the firm's current earnings [10].

Many researchers have worked out to understand the effects of dividend policy measures and other accounting variables on stock prices but there are no conclusive findings. These different findings are due to differences between financial systems and economic conditions that state for different stock markets in different countries.

Tehran stock exchange is an emerging market and there are researches which

analyze the behavior of the market but there are not enough researches on the effects of dividend policy and other control variables on share price volatility. The objective of this research is to determine the relationship between dividend policy and share price volatility in the long run. On the other hand, the results of the research can be helpful for policy makers, stakeholders, investors and the future financial researchers.

2- LITERATURE REVIEW

Researchers have different views about the effect of dividend policy on the long term share prices. Miller and Modigliani (1961) showed that in a perfect capital market dividends are irrelevant to the market value of the firm. They assume that in a perfect world of capital market, the value of the firm is not affected by dividends. They argued that firm's value is determined by the earning power of the firm [11].

However, there are models which suggest that dividends are relevant. This school of thought argued that the firm's dividend policy is dependent to its investment policy. Due to this controversy the firm dividend policy remained mysterious and one of the puzzles in corporate finance [6].

Hussainey et al., 2011 examined the relationship between share price volatility and dividend policy in UK. They selected 123 English companies and the period of their study was from 1998 to 2007. They found a significant negative relationship between share price volatility and payout ratio. They also found a negative relationship between share price volatility and dividend yield. Their findings discovered that payout ratio as a dependent variable and size and debt amongst control

variables have the strongest relationship with price volatility[9]

Some studies found positive relationship between the dividend yield, dividend payout ratio and stock price volatility (Steven and Jose, 1989; Khan et al 2011)and other found the negative relationship(Easton and Sinclair, 1989; Naziret al, 2010). For example, In United States, Friend and Puckett, (1964)found a positive effect of dividend on share price volatility [8];Baskin (1989) studied the 2344 U.S. firms over a period of 1967 to 1986 and he reported a significant negative correlation between dividend yield and stock price volatility[3].

In Australia Ball et al(1979) found positive impact of dividend yield on post announcement rates of return[2]. However, Allen and Rachim (1996) failed to find any evidence that dividend yield influence the stock price volatility in Australia [1].

Conroy et al(2000) in a study found that earnings announcement has no material impact on stock price in Japan [5].

Sen and Ray (2003) in their study in India revealed that dividend pay-out is by farthe single important factor affecting stock prices [16].

3- Research Methodology

Hypothesis of Study:

Hypothesis 1

H₀: there is no significant association between share price volatility and dividend policy.

H₁: There is a significant association between share price volatility and dividend policy.

Our main hypothesis has two subsidiary hypotheses:

Hypothesis 1.1

H₀: There is no significant association between share price volatility and dividend yield.

H₁: There is a significant association between share price volatility and dividend yield.

Baskin, explained a negative impact of dividend yield on share price volatility

Hypothesis 1.2

H₀: there is no significant association between share price volatility and payout ratio.

H₁: There is a significant association between share price volatility and payout ratio.

Baskin, explained a negative impact of dividend payout on share price volatility based on the rate of return. He explained that high dividend payout can be interpreted as stability of a firm and reduce the fluctuation in share price of the firm.

The analysis is based on cross-sectional ordinary least square regression. The regression model in this study relates price volatility with the two main measures of dividend policy (dividend yield and dividend payout).

Study of Baskin (1989) shapes the theoretical frame work of this study. The regression model which primarily links volatility of share price to dividend yield and payout ratio has been expanded by the control variables. These control variables include firm's size, earning volatility, debt and growth and have impact on both dividend policy and stock price volatility [3].

Firstly, the dependent variable is regressed against the dividend yield by adding control variables to the regression:

$$Pvol = a_1 + \beta_2 Dividy + \beta_3 Size + \beta_4 Evol + \beta_5 Debt + \beta_6 Growth + e \quad (1)$$

Where;

Pvol= Stock price volatility

Dividy= Dividend Yield

Size= Size of the firm

Evol= Earnings volatility

Debt= Long term debt

e= Error term

Then, to test the hypothesis 1.2 we have the regression below:

$$Pvol = \alpha_1 + \beta_2 \text{ Payout} + \beta_3 \text{ Size} + \beta_4 \text{Evol} + \beta_5 \text{ Debt} + \beta_6 \text{ Growth} + e \quad (2)$$

Where;

Pvol= Stock price volatility

Payout= Payout rate

Size= Size of the firm

Evol= Earnings volatility

Debt= Long term debt

e= Error term

At last we can conclude from the secondary hypothesis about the main hypothesis and also we regress price volatility on dividend payout and dividend yield with control variables to conclude about the correct regression model for the study.

$$Pvol = \alpha_1 + \beta_2 \text{ Dividy} + \beta_3 \text{ Payout} + \beta_4 \text{ Size} + \beta_5 \text{Evol} + \beta_6 \text{ Debt} + \beta_7 \text{ Growth} + e \quad (3)$$

Variable definition:

Price volatility (Pvol): Price volatility is the dependent variable in this research. For measuring this variable, the annual range of stock prices is divided by the mean value of high and low stock prices in that year and then raised to the second power. Then the average is measured for these 11 years and by using square root, it is transformed to a standard deviation (Parkinson 1980 formula used [15]).

Dividend yield (Dividy): This variable is calculated as the ratio of cash dividend paid to stock holders each year divided by the average market value of the stock at the end of the year. Then the average is taken for 11 years.

Payout ratio (Payout): this ratio is calculated by dividing dividends per share to earnings per share and the average is taken.

Size: There are potential links between size and volatility. Size of the firm may affect price volatility because small firms usually are less diversified and they have less information about their stock market available to their investors[1]. This variable is calculated by averaging the market value of the firm for 11 years and then transformation of natural logarithm.

Earning volatility (Evol): For developing this variable, the first step is to calculate an average of the ratio of operating earnings to total assets. Then an average of the squared deviation from the overall average is calculated. Then, for obtaining estimates of standard deviation, a square root transformation is applied to the mean square deviation.

Long term debt (Debt): This variable is calculated by taking the average of ratio of the sum of all long term debts to total assets for the available years.

Growth: Firms in their growth stage, tend to invest their income in their new investment opportunities, therefore, it may have an inverse effect on dividend policy [13]. Growth rate is calculated by taking the ratio of change in total assets in a year. Then the average is taken for the available years.

Sample and data:

A sample of 68 companies out of 343 companies listed in Tehran Stock Exchange from 2001 to 2012 has been selected. A period of 11 years is long enough to find the relationship between the study variables. The data is taken from the companies' annual reports. These companies have the following properties:

- They have cash dividends for each year during 2001 to 2012
- They are non-financial companies
- Their information is available

4- Data analysis and Results
Descriptive statistics of the variables

Summary statistics for the variables utilized are calculated and reported in table1. The range, mean and standard deviation of variables of this study is indicated in table 1.

As we can observe, size has the highest mean and earning volatility has the lowest mean among variables. Dividend yield has the least standard deviation and size has the highest standard deviation among all the variables. The highest range of change is for size and the lowest range of change is for dividend yield.

Correlation analysis

Table 2 shows the correlation among variables. Table 2, shows that payout ratio has the highest correlation with price volatility with value of -0.53 and it is in line with Allen and Rachim’s finding but it is not in line with Baskin’s result. Dividend yield has a high negative correlation with price volatility with value of -0.503 and it is significant at level of

1%. This is in line with Baskin’s results. Another two variables which have the highest correlations are payout ratio and dividend yield. It is also consistent with Baskin’s findings.

The results presented in table 2 show that price volatility and size have positive association which is not consistent with our expectation. Because larger firms are expected to have low risk and have less share price volatility.

Earning volatility and price volatility correlated with value of -0.075 and this negative correlation is not consistent with our expectation. Earning volatility and size are positively correlated with value of 0.26 showing that larger firms may have more volatility in their earnings. The correlation between dividend yield and debt is -0.106 and implies that companies with high debt may have less divided payment.

According to table 2, dividend yield and payout ratio are positively correlated with value of 0.45 and therefore, it is possible of having multicollinearity between dividend yield and payout ratio.

Table1. Summary Statistics

Variable	Range	Standard deviation	Mean
Price volatility	0.395466	0.076805063	0.559422
Payout ratio	0.472943	0.112254086	0.745754
Dividend yield	0.21795	0.046518184	0.1554
Size	5.915211	1.325063755	33.97562
Earning volatility	0.734197	0.09426277	0.087982
Long Debt	0.6205	0.089970284	0.089348
Growth	0.446195	0.085362776	0.209534

Table 2. Correlation between variables

	Price volatility	Payout	Dividend yield	size	Earning volatility	Debt	Growth
Price volatility	1	-0.5352	-0.5036	0.0724	-0.0757	0.1948	0.1325
Payout	-0.5352	1	0.4516	0.4516	0.2112	0.1017	0.0365
Dividend yield	-0.5036	0.4516	1	-0.0266	0.0434	-0.1061	-0.2802
size	0.0724	0.4516	-0.0266	1	0.2641	0.1098	0.3715
Earnings volatility	-0.0757	0.2112	0.0434	0.2641	1	0.1456	0.0789
Debt	0.1948	0.1017	-0.1061	0.1098	0.1456	1	0.0259
Growth	0.1325	0.0365	-0.2802	0.3715	0.0789	0.0259	1

5- Regressions' result:

Table 3 represents results of the regression based on equation 1. The regression result of share price volatility with dividend yield shows a significant negative relationship between dividend yield and share price volatility. Hypothesis 1.1 stated that dividend yield has no significant effect on share price volatility. However results in table 3 show that hypothesis does not hold as evidence $\rho < 0.05$, thus, dividend yield affects share price volatility. There is not any significant relationship between control variables and stock price volatility.

The model can explain %23 of variability of response data around its mean. Based on Durbin-Watson table, $d_l = 1.46$ and $d_u = 1.77$ and DW for this model is between d_u and $4 - d_u$ ($1.77 < 2.14 < 2.23$). Therefore the error terms are distributed independently. P value for the JB statistic is higher than 0.05 and it means that error terms are normally distributed. In the white test statistic, $nR^2 = 4.48$ which has a chi-

square distribution with 5 degrees of freedom. By referring to the chi-square table, we can observe that the 5 percent critical chi-square value for 5 df is 11.07, and we can conclude that on the basis of the White test, there is no heteroscedasticity. By checking the basic assumptions for the regression, we show that the regression shows a reliable relationship between variables.

By replacing dividend yield with dividend payout in the previous regression, based on equation 2, we obtain table 4. As the results show, there is a significant negative association between dividend payout and price volatility. This finding is consistent with Nazir et al (2010) findings that payout ratio had negative association with stock price volatility [14]. There is a significant positive association between size and price volatility. Another variable that has a significant positive association with price volatility is debt.

Table 3. Results of regression $PV = \alpha_1 + \beta_2 DY + \beta_3 Size + \beta_4 Growth + \beta_5 Debt + \beta_6 EV + e$

Variable	Coefficient	Std. Error	T Value	Prob
Constant	0.538462	0.214919	2.505415	0.0149
DIVIDY	-0.809536	0.187018	-4.328647	0.0001
SIZE	0.004366	0.006611	0.660455	0.5114
DEBT	0.126894	0.093628	1.355310	0.1802
GROWTH	-0.027706	0.108938	-0.254327	0.8001
EVOL	-0.077123	0.091615	-0.841826	0.4031
R ² = 0.284761; Adjusted R ² = 0.227080 F = 4.936862; Prob (F-Statistic) = 0.000723 Durbin-Watson stat: 2.145290 Jarque-Bera: 0.052727 Probability: 0.973981 White test: Obs*R-squared = 4.481267 Prob. Chi-Square(5) = 0.4824				

Hypothesis 1.2 stated that dividend payout has no significant effect on share price volatility. However results in table 4 show that hypothesis does not hold as evidence $\rho < 0.05$, thus, dividend payout affects share price volatility.

The model can explain %36 of variability of response data around its mean. $d_l = 1.46$ and $d_u = 1.77$ for our Durbin-Watson statistic and DW for this model is between d_u and $4 - d_u$ ($1.77 < 1.95 < 2.23$), so the error terms are distributed

independently. P value for the JB statistic is higher than 0.05 and it means that error terms are normally distributed. In the white test statistic, $nR^2=6.62$ which has a chi-square distribution with 5 degrees of freedom. The 5 percent critical chi-square value for 5 df is 11.07, and we can conclude that on the basis of the White test, there is no heteroscedasticity. By checking the basic assumptions for the regression, we show that the regression shows a reliable relationship between the variables.

Based on above results about the rejection of null hypothesis for secondary hypotheses, we can conclude that dividend policy affects stock price volatility, and the null hypothesis for the hypothesis 1 is rejected.

Table 5 represents results of regression based on equation 3. From table 5, the coefficient of dividend yield and payout are negative as expected. In the other hand, the coefficient of size is positive and it is not in line with our expectation.

Based on Durbin-Watson table, $d_l= 1.25$ and $d_u= 1.64$ and DW for this model is between d_l and $4-d_u$ ($1.64 < 2.01 < 2.36$). Therefore the error terms are distributed independently. P value for the JB statistic is higher than 0.05 and it means that error terms are normally distributed. In the white test statistic, $nR^2=8.005$ which has a chi-square distribution with 6 degrees of freedom. by referring to the chi-square table, we can observe that the 5 percent critical chi-square value for 2 df is 12.59, and we can conclude that on the basis of the White test, there is no heteroscedasticity.

By a close examination of t-statistics and p-value of the variables in table 5, it is discovered that some of the control variables are insignificant. By using stepwise method, we have size and debt as significant control variables in our regression. The result is shown in table 6.

Table 4. Results of regression $PV=a_1+\beta_2 POR + \beta_3 Size+ \beta_4 EV+ \beta_5 Debt+ \beta_6 Growth+e$

Variable	Coefficient	Std.Error	T_Value	Prob
Constant	0.409516	0.194280	2.107858	0.0391
PAYOUT	-0.430715	0.071496	-6.024294	0.0000
SIZE	0.013100	0.006247	2.096890	0.0401
DEBT	0.202840	0.084359	2.404473	0.0192
GROWTH	0.057903	0.094777	0.610937	0.5435
EVOL	-0.037016	0.083567	-0.442945	0.6593
R2= 0.412502; AdjustedR2= 0.365124 F= 8.706468; Prob (F-Statistic)= 0.000003 Durbin-Watson stat: 1.950253 Jarque-Bera:0.123195Probability: 0.939322 White test: Obs*R-squared=6.622589 Prob. Chi-Square(5)=0.2503				

Table 5. Results of regression $PV=a_1+\beta_2 DY+\beta_3 POR+\beta_4 Size+\beta_5 EV+\beta_6 Debt+ \beta_7 Growth+ e$

Variable	Coefficient	Std.Error	T_Value	Prob
Constant	0.458607	0.190243	2.410639	0.0190
DIVIDY	-0.406016	0.189148	-2.146555	0.0358
PAYOUT	-0.346613	0.079786	-4.344304	0.0001
SIZE	0.012108	0.006091	1.987909	0.0513
DEBT	0.173070	0.083172	2.080880	0.0417

GROWTH	-0.001280	0.096171	-0.013312	0.9894
EVOL	-0.037215	0.081237	-0.458102	0.6485
R2= 0.453763; Adjusted R2= 0.400035 F= 8.445521; Prob (F-Statistic)= 0.000001 Durbin-Watson stat: 2.015043 Jarque-Bera:0.738034Probability:0.691414 White test: Obs*R-squared=8.005559 Prob. Chi-Square(6)=0.2377				

Table 6. Results of regression $PV = \alpha_1 + \beta_2 DY + \beta_3 POR + \beta_4 Size + \beta_5 Debt + e$

Variable	Coefficient	Std.Error	T_Value	Prob
Constant	0.477197	0.178258	2.677005	0.0095
DIVIDY	-0.405380	0.178615	-2.269570	0.0267
PAYOUT	-0.350795	0.077985	-4.498231	0.0000
SIZE	0.011555	0.005541	2.085540	0.0411
DEBT	0.168870	0.081338	2.076159	0.0420
R2= 0.451883; Adjusted R2= 0.417082 F= 12.98473; Prob (F-Statistic)= 0.000000 Durbin-Watson stat: 2.033548 Jarque-Bera:0.731886 Probability: 0.693542 White test: Obs*R-squared=6.306193 Prob. Chi-Square(4)=0.1774				

As table 6 represents, this model can explain 0.42 of variability of response data around its mean. DW for this model is between d_u and $4-d_u$ ($d_l=1.49$, $d_u=1.74$ and $1.74 < 2.03 < 2.26$) and the error terms are distributed independently. Error terms are normally distributed because P value for the JB statistic is higher than 0.05. $nR^2=6.30$ by a chi-square distribution with 4 degrees of freedom, and 5 percent critical chi-square value for 4 df is 9.49. So, there is no heteroscedasticity. By checking the assumptions, we can say that our regression model is reliable.

Our main measures of dividend policy have negative association with stock price volatility. Generally, from the results of different stages of regression, dividend yield and dividend payout have the most significant negative impact on share price volatility and this is consistent with Baskin's results. These findings are similar to Nazir et al (2010) findings. He found a negative relationship between share price volatility and dividend yield and dividend payout [14].

Size has a positive relation with dependent variable and it means that larger firms have more volatility in their stock price. Our findings in this regard is not consistent with our expectation and findings of Baskin. The differences of our findings are probably due the differences in institutional settings of Iranian firms with other countries. Debt has a positive relationship with stock price volatility and it means that the highly leveraged firms can collapse and would create volatility in stock prices. On the other hand, firms with less degree of leverage in the capital structure would generate less volatility and it is consistent with findings of Baskin.

6- conclusion

The objective of this study is to examine the relationship between dividend policy and volatility of stock price. This was done for a period of 11 years from 2001 to 2012 .We also examined the relationship between stock price volatility and other control variables such as size, debt, growth, earning volatility.

The results suggest that there is a significant negative relationship between payout ratio and volatility of stock price and a negative relationship between dividend yield and volatility of stock price. This is consistent with findings of Baskin. The findings suggest that the higher the payout ratio, the less volatile a stock price would be.

Based on results of this study, it can be concluded that managers of companies may be able to change their volatility of their share prices by changing their dividend policy. Indeed, it may be possible for them to use dividend policy as a device for controlling their share price volatility. They may be able to reduce their share price volatility by increasing their dividend payout.

Among the control variables, size and debt have the highest correlation with price volatility. Size has a significant positive relationship with price volatility, suggesting that larger firms are more volatile in their stock price. This relationship is not consistent with our expectations. On the other hand, debt shows a significant positive relationship with price volatility and suggesting that firms with high leverage are more volatile in their stock prices. The results show no significant relationship between investment growth and earnings volatility on the changes of the firm share prices.

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