Do Dividends affect price risk: evidence from ASE

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Abstract
The study aims to explore the influence of dividends on stock price fluctuations in the context of Jordan. We use cross-sectional data statistical approach for analysis. The results show an inverse association between dividend payout ratio and stock price volatility. Also, we find a positive relationship between stock price volatility and the following variables: book-to-market equity, leverage, firm size, earnings volatility, and growth in assets.
Keywords: Dividend Payout Ratio, Dividend Yield, Price Risk, Cross-Sectional, ASE.

Introduction

Dividend policy is a central strategic concern around which other corporate financial policies rotate. Ross *et al* (2005) define corporate dividend policy, simply, as determining the amount to be paid to the shareholders and that to be retained in the company to reinvest in profitable projects or for retention in case of future needs.
Corporate dividend policy and its role in determining the market value of the company is a very important topic which has attracted the interest of many researchers. A group of researchers has argued that corporate dividend policy leads to increase the wealth of stockholders through its influence on the firm's stock price and hence increases firm value (e.g. Gordon, 1963; and Salih, 2010). Another group has argued that dividend payments lead to decrease the wealth of shareholders by reducing stock price, and hence decreasing firm value (e.g. Pettit, 1972). The last group has adopted the notion of irrelevance of dividend policy, i.e., for stock prices, and hence firm value is not affected by corporate dividend policy (e.g. Miller and Modigliani, 1961; Baker *et al.*, 1985; and Farrelly *et al*, 1986).

Study Objectives

This study attempts to achieve the following objectives:
The relationship between the dividend policy measures (dividend yield and dividend payout ratio) and the volatility of common stock prices in Jordan?
The relationship between the control variables (growth in assets, the size of the firm, earnings volatility, financial leverage, and the ratio of the book value per share to the market value per share) and the volatility of common stock prices in Jordan?
The industry effect on the relationship between dividend policy and the volatility of common stock prices.

Study questions

This study attempts to answer the following questions:
What is the relationship between the dividend policy measures (dividend yield and dividend payout ratio) and the volatility of common stock prices in Jordan?
What is the relationship between the control variables (growth in assets, the size of the firm, earnings volatility, financial leverage, and the ratio of the book value per share to the market value per share) and the volatility of common stock prices in Jordan?

literature review

The relationship between corporate dividend policy and the changes (movements) in stock prices has been examined by a number of researchers in developed markets as well as in emerging markets (e.g. Baskin, 1989; Ackert and Smith, 1993; Mohamed and Nassir, 1993; Sadka, 2007; Carper, 2008; Rashid and Rahman, 2008; Suleman *et al*., 2011; and Hussainey *et al*., 2011). The volatility of common stock price might be affected by the two dividend policy measures (dividend yield and dividend payout ratio) and the

set of control variables (the size of the firm, earnings volatility, growth in assets, financial leverage, book to market value of stock) and hence would assist investors to forecast the risk of holding equities (Baskin, 1989).

Baskin (1989) examines the relationship between dividend policy and the volatility of common stock prices in the US context. He introduces four essential models may explain the inverse relationship between dividend policy and stock price volatility. These are as follows: the duration effect, the rate of return effect, the arbitrage realization effect, and the information effect. The duration effect based on the notion of stocks which have high dividend yield will be less sensitive to fluctuations in discount rates because high dividend yields imply more near cash flow and hence are expected to display lower price volatility. The rate of return effect implies that a company with a low dividend yield and low dividend payout ratio might be valued more in terms of its future investment opportunities than its assets in place. The arbitrage realization effect is based on the assumption that the financial market might be materially inefficient; therefore, the realization of profits from mispricing may be difficult if not impossible because the forces of equilibrium may take effect slowly. The information effect implies that the firm's managers may be able to reduce the volatility of stock prices by increasing the target dividend payout ratio because dividends convey information to the firm's stockholders. The results indicate that there is statistically significant negative relationship between the volatility of common stock prices and dividend policy, where the correlation coefficient between the volatility of stock prices and the dividend yield is -0.643 and between dividend payout and stock price volatility is -0.542. He also finds that the dividend yield coefficient is large and significant after the addition of some independent variables, where the regression coefficients of dividend yield and dividend payout ratio are -4.187, -.037 respectively. However, the largest regression coefficient is the earnings volatility which equals 1.284, that means, the earnings volatility is the most important determinant of the volatility of stock prices.

Allen and Rachim (1996) investigate the effect of dividend policy on the volatility of stock prices in Australia. The results of this study show that the correlation coefficient between the volatility of stock prices and dividend yield is positive and very small (0.006) which is in contrast with Baskin (1989), while negative (-0.210) and significant for dividend payout, which is in line with Baskin (1989). Furthermore, the results nearly remain the same after the addition of control variables, which is consistent with Baskin (1989).

Nishat and Irfan (2003) investigate the influence of the two measures of dividend policy (dividend yield and dividend payout ratio) on the volatility of stock prices in the long-term. The results show that the correlation coefficient between dividend yield (and payout ratio) and the volatility of the prices of stock is negative and significant, which is consistent with Baskin (1989) while in contrast with Allen and Rachim (1996). Moreover, the effect of the two dividend policy measures (dividend yield and payout ratio) on the volatility of stock prices remains the same by the addition of other control variables such as the size of the firm, growth in assets, earnings volatility and long-term debt, which is consistent Baskin (1989); and Allen and Rachim (1996).

Suleman *et al* (2011) examine the effect of dividend policy on stock price volatility for firms listed on Karachi Stock Exchange over the period from 2005 to 2009. The results show a significant correlation between dividend yield and stock price volatility as well as a negative correlation between growth in assets and stock price volatility which is in line with Asaykin, 2011.

Hussainey *et al* (2011) investigate the relationship between dividend policy and the volatility of stock prices in the UK context. They find a strong and positive correlation between the two dividend policy measures (dividend yield and dividend payout ratio). The results also show an inverse link between dividend payout ratio and the volatility of stock prices, which is similar to Baskin (1989) and Allen and Rachim (1996), while a positive relation with dividend yield, which is in contrast with Baskin (1989) and in line with Allen and Rachim (1996). In addition, stock price volatility significantly affected by long-term debt, which is consistent with Baskin (1989) and Allen and Rachim (1996). However, the results show a non-significant relationship between stock price volatility and the size of the firm, growth in assets and earnings volatility, which is different from Baskin (1989) and Allen and Rachim (1996).

The contributions of this study

This study contributes to the literature in the following respects:
It extends prior work (Baskin, 1989; Allen and Rachim, 1996; Rashid and Rahman, 2008; Nazir *et al*., 2010; and Hussainey *et al*., 2011) which examines the empirical relationship between dividend policy and stock price volatility by adding a new independent variable (the ratio of the book value per share to the market value per share) and studying the Jordanian context. In general, the contribution of this thesis is to reduce the dearth of previous research on dividend policy in emerging markets regarding (i) the effect of the two dividend policy measures (dividend yield and dividend payout ratio) on the volatility of stock prices.

The methodology of the study

The hypotheses

This study has an empirical focus. The cross-sectional ordinary least squares regression analysis is used to examine the relationship between the two dividend policy measures (dividend yield and dividend payout ratio) and stock price volatility after controlling for growth in assets, the size of the firm, financial leverage, the ratio of the book value per share to the market value per share, and earnings volatility. In addition, the correlation coefficients will be used to test the strength and the direction of the relationship between each pair of independent variables as well as between each explanatory and dependent variable.

Previous research suggests that there is a relationship between the two dividend policy measures (dividend yield and dividend payout ratio) and common stock price volatility as well as a relationship with other control variables (e.g. Baskin, 1989; Allen and Rachim, 1996; Irfan and Nishat, 2003; and Rashid and Rahman, 2008). Those relations are constructed in the form of hypotheses (seven hypotheses); each hypothesis represents an expected relationship between one independent variable and the dependent variable (common stock price volatility).

H1: *there is a negative relationship between dividend yield and the volatility of stock prices in Jordan.*
H2: *there is a negative relationship between dividend payout ratio and the volatility of stock prices in Jordan.*
H3: *there is a negative relationship between the size of the firm and the volatility of stock prices in Jordan.*
H4: *there is a positive relationship between growth opportunities and the volatility of stock prices in Jordan.*
H5*: there is a positive relationship between financial leverage and the volatility of stock prices in Jordan.*
H6: *there is a positive relationship between earnings volatility and the volatility of stock prices in Jordan.*
H7: *there is a positive relationship between the ratio of the book value per share to the market value per share and the volatility of stock prices in Jordan.*

The regression model

The following regression model is used in this study in an attempt to examine the empirical relationship between the two dividend policy measures (dividend yield and dividend payout ratio) and the volatility of stock prices in the Jordanian context after controlling for the size of the firm, growth in assets, financial leverage, earnings volatility, and the ratio of the book value per share to the market value per share that are likely affect the relationship between dividend policy and stock price volatility. This model is based on Baskin (1989), Allen and Rachim (1996), Rashid and Rahman (2008), and Hussainey *et al* (2011). I extend these models by the addition of one independent variable (the ratio of the book value per share to the market value per share).

$$P-VOL_t = \ _0 + \ _1PR_t + \ _2(B/M)_t + \ _3LEV_t + \ _4LNSIZE_t + \ _5E-VOL_t + \ _6DUM_1 + \ _7DUM_2 + e_t$$

Where, PR_t denotes the dividend payout ratio; B/M denotes the ratio of the book value per share to the market value per share, LEV denotes the financial leverage, LNSIZE denotes (the natural logarithm of) the size of the firm, GROWTH denotes the growth in assets, E-VOL denotes the earnings volatility, P-VOL denotes the common stock price volatility, DUM1 denotes the financial sector; DUM2 denotes the services sector, e_t is a random variable referred to as the error term.

Variables definition

The variables of the relationship between dividend policy and stock price volatility are derived from the studies of a number of the previous researchers (e.g. Gordon, 1959; Lintner, 1962; Fama and French, 1988; Baskin, 1989; Nishat, 1992; Allen and Rachim, 1996; Nishat and Irfan, 2003; Rashid and Rahman, 2008, and Hussainney *et al*., 2011).

Dependent variable

This variable is used in this study to measure the standard deviation in the annual rates of return. While the perceived efficient portfolio is used to measure the systematic risk (beta), the estimation of the volatility of an individual security will be less ambiguous. By using this method, the possibility of averaging the variations in time series is high, which is necessary to estimate dividend payouts and the volatility of stock prices (Baskin, 1989).

Price volatility (P-VOL)

Parkinson's (1980) extreme value method for estimating the variance of the rate of return is used to derive the independent variable (price volatility) that will be used in this study (see Baskin, 1989; Allen and Rachim, 1996; and Rashid and Rahman 2008).

In order to measure this variable, for every year, the lowest value of stock price is subtracted from the highest value of stock price (the range of stock price) is calculated firstly, then the yield of subtraction will be divided by the mean of low and high stock prices (the addition of high stock price to low stock price, then divided the sum by two), and then raised to the second power. The square root transformation can be used to convert these average measures of variance for all available years. Therefore, this method is better than the previous one (traditional method) which depends upon only the closing and opening stock prices in calculating stock price volatility (Baskin, 1989; Allen and Rachim, 1996). Using closing and opening price might lead to zero stock price volatility if the two prices are identical while it is so difficult, if not impossible, to find like this result in case of using high and low stock prices. This is represented algebraically as follows.

$$P-VOL_t = \sqrt{(\frac{H-L}{\frac{H+L}{2}})\text{^}2}$$

Where, H denotes the highest price of stock, L denotes the lowest price of stock.

Independent variables

Dividend yield (D-YIELD)

To calculate this variable, the sum of all annual cash dividends paid to common stockholders divided by the market value of share (market capitalization) at the beginning of the year, and then the average is taken for all available years. In case of Jordan, unlike the US, the cash dividends paid once a year, while in the US, the cash dividend usually paid quarterly (four times per year). Therefore, the annual cash dividends paid to common stockholders is used in the numerator instead of the sum of annual dividends. This is represented algebraically as follows.

$$DY_t = \sum \frac{DIV_t}{P_{t-1}}$$

Earnings volatility (E-V0L)
There are two steps to calculate the earnings volatility. In the first step and for each year, operating earnings (earnings before interest and taxes) is divided by total assets and then the average for all years is calculated. In the second step, the yield of the division of operating earnings by total assets for every year is subtracted from the average of all years or vice versa , and then raised to the second power; the mean will be taken to the squared deviation for all available years. The square root transformation can be used to the mean squared deviation to obtain estimates of standard deviation of the return on assets (ROA).

Payout Ratio (PR)
This variable can be calculated by dividing cash dividends paid to common stockholders by earnings (net income available to common stock holders) for each year and then the mean for all years will be taken. This is represented algebraically as follows.

$$PR_t = \frac{DIV_t}{NI_t}$$

Where, DIV denotes the cash dividends, NI denotes the net income.

Logarithm of market value (SIZE)
This variable is calculated by multiplying the number of subscribed shares by the market value of stock at the beginning of the year for each year and then the natural logarithm is applied. The mean for all available year is then taken. This is represented algebraically as follows.

$$SIZE_t = Ln(P_{t-1} * \#shares)$$

Long-term Debt (DEBT)
To obtain this variable, the sum of debentures, mortgages and all the long-term debt (debt with maturity more than one year) is divided by the total assets and then the mean is taken over all available years, however regarding to the case of Jordan it is very difficult to distinguish between long-term debt and current liabilities for banks and insurance companies (financial firms), so, financial leverage will be used to express the long-term debt. The ratio of total debt to total assets will be calculated for each year then the average will be taken for all available years. This is represented algebraically as follows.

$$LEV_t = \frac{\sum DEBT_t}{\sum ASSET_t}$$

Where, $\sum DEBT_t, ASSET_t$ are the total liabilities and total assets, respectively.

Growth in Assets (GROWTH)
This variable is calculated for each year by subtracting the total assets in the current year from the total assets in the previous year (change in total assets) then dividing the yield by the total assets in the previous year. Then the ratio is averaged over all available years. This is represented algebraically as follows.

$$GROWTH_t = \frac{(TA_t - TA_{t-1})}{TA_{t-1}}$$

Where, TA_t , $TAt-1$ are the total assets in the current and previous year, respectively.

Book to Market ratio (B/M):
For every year the book value per share is divided by the market value per share. The average will be taken for all available years. According to the financial statements for all the Jordanian companies listed with Amman Stock Exchange, the market value of the stock refers to the closing price. So, closing price is used in denominator to express the market value of stock. This is represented algebraically as follows.

$$(B/M)_t = \frac{B_t}{M_t}$$

Where, B_t denotes the book value per share, M_t denotes the market value per share.

Data collection and Summary Statistics

Generally, all the data utilized in this study to test the hypotheses related to the variables affecting stock price volatility are extracted from the website of the Amman Stock Exchange (www.ase.com.jo). The data concerning the high and the low prices of stocks that are required to compute the volatility of stock prices (the dependent variable) are obtained from the Amman Stock Exchange Annual reports. The value of cash dividends, net income available to common stockholders, operating earnings (income before interest and taxes), stockholders equity, closing prices of stocks, number of shares outstanding, total assets and total liabilities which are required to compute the set of independent variables are gathered from the annual financial statements of the firms for the years of study (2002-2008) through the Amman Stock Exchange's annual bulletins. Therefore, the source of the data is considered as secondary data.

The sample of the study

As a sample, all companies listed on the Amman Stock Exchange during the period from 2002 to 2008 are taken to examine the empirical relationship between dividend policy and stock price volatility. This study includes both firms which are dividend-paying and those not paying cash dividends. The exclusion of non-dividend-paying firms would result in a well-known selection bias problem (AL-Malkawi, 2007). In fact, the total number of firms listed on the Amman Stock Exchange at the beginning of year 2002 (the beginning of the period of study) is 158, however, this number is reduced to 116 due to four reasons; (i) Some firms did not continue their businesses until the end of year 2008 (the end of the period of study), (ii) Missing some financial data such as high/low stock prices, closing prices, total assets, total liabilities and so on in certain years, that are required to calculate the dependent variable and explanatory variables as well, (iii) Some firms have negative book value per share (all-debt listed firms), and (iv) Some firms have zero price volatility (highly illiquid shares).

Therefore, the final number of firms included in this study to examine the empirical relationship between dividend policy and stock price volatility is 116, however, in parts of this study, the average values (of cross-sectional observations) for seven years (2002-2008) are used instead of the individual data. By using this method, the variations of time series can be averaged as much as possible, which is especially important in estimating dividend payouts and stock price volatility (Baskin, 1989). Therefore, in these cases the averages will lead to 116 observations for each relevant variable. Furthermore, the companies are officially classified into four sectors according to the Amman Stock Exchange as follows; (i) The banking sector that includes 14 banks, (ii) The insurance sector that has 20 firms, (iii) The industrial sector that has 45 firms, and (iv) The services sector that includes 37 companies.

Statistical approach

First of all, summary statistics such as minimum, maximum, mean, and standard deviation are utilized to provide a broad description of the characteristics of all variables that are used in the analysis. The cross-sectional ordinary least squares regression analysis is used to examine the empirical relationship between the two dividend policy measures (dividend yield and dividend payout ratio) and stock price volatility after controlling for growth in assets, the size of the firm, financial leverage, the ratio of the book value per share to the market value per share, and earnings volatility. In addition, the correlation coefficients are used to test the strength and the direction of the relationship between each pair of independent variables as well as between each explanatory variable and dependent variable. Therefore, the quantitative methods are used to

examine the previous relationships. SPSS statistical software package (version 18) is used for running the multiple regressions in order to obtain the results.

Descriptive statistics

Table 1 presents the minimum, maximum, mean, standard deviation, and the number of observations for the whole period of study (2002-2008) and for all firms.

Table 1 Descriptive Statistics of dependent and independent variables for all firms 2002-2008 (Averages of years)

Variable	Minimum	Maximum	Mean	Std. Deviation
DY	.0000	.0720	.0265	.0201
PR	.0000	1.0572	.3428	.2693
B/M	.2782	1.7220	.7640	.2665
LEV	.0136	.9312	.4064	.2413
LNSIZE	13.9141	22.7862	16.8288	1.5434
GROWTH	-.1420	1.3624	.1639	.2107
E-VOL	.0041	.3140	.0613	.0568
P-VOL	.2144	1.0463	.6331	.1485

N = 116, Note: DY denotes the dividend yield (%), PR denotes the dividend payout ratio (%), B/M denotes the ratio of the book value per share to the market value per share (%), LEV denotes the financial leverage (%), LNSIZE denotes (the natural logarithm of) the size of the firm (JD thousands), GROWTH denotes the growth in assets (%), E-VOL denotes the earnings volatility (%), P-VOL denotes the common stock price volatility(%), N denotes the number of observations.

Table 1 shows that the value of dividend yield (the first explanatory variable) varies from .0000 to .0720; whereas its mean is .0265, which means that one Jordanian Dinar (JD1) invested in firms yields approximately 2.5 cents in the form of cash dividends, and standard deviation is .0201, indicating slight variations among firms across the years of study. The second variable is dividend payout ratio. Its values range from minimum of .0000 to maximum of 1.0572. The mean of the dividend payout ratio of the 116 firms indicates that these firms paid an average of 34.29% of their net income in the form cash dividends. The standard deviation of the dividend payout ratio is 26.93%, suggesting that dividend payout ratio varies among the firms listed on the Amman Stock Exchange. The book value per share to the market value per share is the third explanatory variable. It ranges from .2782 to 1.7220, which means some firms have book value per share greater than the market value per share, with mean of .7640, indicating that the book value per share is worth about 76% of the market value per share, on average, and standard deviation of .2665, which means firms vary among them in terms of their book value per share to the market value per share.

Financial leverage is the fourth independent variable. Its values range from .0136 to .9312, having mean value equal to .4064, which shows that firms, in general, do not depend highly on debts to finance their assets, where approximately 41% of firms' assets finance by debts, and standard deviation equaling .2413, implying that high variations among firms in terms of financial leverage. The size of the firm is the fifth independent variable. Its values vary from 13.914 (the natural logarithm of market capitalization) to 22.786, its mean equal to 16.828 and standard deviation of 1.543, showing high variations among the firms in their size. You can find some firms in Jordan have a huge number of shares and, at the same time, the price of their stocks is also high, while, on the other hand, you can find other ones have small number of shares and the price of their stocks is also low. The next independent variable is growth in assets. The range of the growth in assets varies from -.142, indicating that some firms sold (reduced) part of their assets, to 1.362, which shows that some firms bought (increased) more assets or might be merger-related growth during the years 2002-2008. The mean value of growth in assets is .163, which shows a significant growth in firms, in general, and standard deviation equaling .210, indicating high variations among firms in terms of growth in assets. The last independent variable in the proposed regression model is earnings volatility. The minimum value for this variable is .004 and the maximum value is .314. The mean value of earnings volatility is .061 and its standard deviation is .056, which shows slight variations among firms in terms of

the variable of earnings volatility. Lastly, price volatility (the dependent variable) ranges from .214 to 1.046 with mean value equal to .633 and standard deviation measuring .148, indicating high variations among firms in terms of their stock price volatility. If it is assumed that the prices of common stock follow a normal distribution, the standard deviation of the stock market returns is equivalent to the measurement of the stock price volatility (Baskin, 1989; and Allen and Rachim, 1996). By using the constant derived by Parkinson (1980), the standard deviation of the stock market returns can be estimated by multiplying the mean of stock price volatility .63316, from Table 6.1, by the constant 0.6008. The result is 38.04% standard deviation, compared to Baskin's (1989) US result of 36.9%, Allen and Rachim (1996) Australian results of 29.42%, Nishat and Irfan (2003) Pakistan results of 29.91%, Rashid and Rahman (2008) Bangladesh results of 48.18%, Nazir *et al* (2010) Pakistan results of 35.45%, and Hussainey *et al* (2011) UK results of 17.66%. It can be seen that the value of common stock price volatility (standard deviation of stock market return) of this study is broadly in line with these prior study; especially these of emerging markets.

Results and Discussion

This section examines the expected relationship between the two dividend policy measures (dividend yield and dividend payout ratio) and common stock price volatility.

In order to test H1 and H2, the following multiple regression model is used.

$$P-VOL_t = \quad _0 + \quad _1DY_t + \quad _2PR_t + e_t$$

Where, $P-VOL_t$ denotes the price volatility; DY_t denotes the dividend yield; PR_t denotes the dividend payout ratio; e_t is a random variable referred to as the error term.

The results of this regression regarding the relationship between (dividend yield and payout ratio) and stock price volatility are presented in the following table.

Table 2 Regression Coefficients of dividend yield and payout ratio[a]

	B	Std. Error	t	Sig.
Constant	.690	.022	31.690	.000
DY	1.868	.877	2.130	.035
PR	-.311	.066	-4.745	.000

a. Dependent Variable: P-VOL

Table 2 shows that the Sig. value associated with the *t* test for dividend yield of .035 is less than .05 (the significance level), therefore, there is a positive and significant relationship between dividend yield and common stock price volatility. The slope of the coefficient of this variable is 1.868, suggesting that a 1 unit increase in dividend yield would have an increase of 1.868 units in the volatility of common stock prices, other things being constant. For firms listed on the Amman Stock Exchange, the lower the dividend yield, the lower the common stock price volatility and the higher the dividend yield, the higher the common stock price volatility. So, this result is puzzling and might be because of the highly significant correlation (multicollinearity) between dividend yield and dividend payout ratio (the two measures of dividend policy). This surprising result might be addressed by dropping the dividend payout ratio variable from the multiple regression as seen later in Table 6.9. The coefficient of dividend yield is large and significant. The *t* statistics suggests that it is dividend yield which has less impact on the volatility of common stock prices. The coefficient estimate of 1.868 implies that a 1% increase in the dividend yield will result in an increasing of approximately 1.12% in the annual standard deviation of the market return. Furthermore, this results inconsistent with Baskin, 1989; and Nishat and Irfan, 2003, who find a negative and significant relationship between dividend yield and common stock price volatility as well as different from Allen and Rachim, 1996; Rashid and Rahman, 2008; and Hussainey *et al*., 2011, who find a positive and non-significant relationship between dividend yield and common stock price volatility. On the other hand, this

result is in line with Nazir *et al*., 2010, who finds a positive and significant relationship between dividend yield and common stock price volatility. So, the result of the regression coefficient from Table 6.3 does not support H1 hypothesis. Table 2 also reports that the Sig. value associated with the *t* test for dividend payout ratio of .000 is too much less than .05 and .01(two levels of significance), therefore, the relationship between dividend payout ratio and common stock price volatility is negative and highly significant. The coefficient of dividend payout ratio is large and highly significant. The slope of the coefficient of this variable is -.311, suggesting that a 1 unit increase in dividend payout ratio would have a decrease of .311 units in the volatility of common stock prices, other things remain constant. For firms listed on the Amman Stock Exchange, the lower the dividend payout ratio, the higher the volatility of common stock prices and the higher the dividend payout ratio, the lower the volatility of common stock prices. The *t* statistics suggests that it is dividend payout ratio which has more effect on the volatility of common stock prices. Moreover, this result is in line with Baskin, 1989; Allen and Rachim, 1996; Nishat and Irfan, 2003; Rashid and Rahman, 2008; Nazir *et al.,* 2010; and Hussainey *et al.,* 2011. Therefore, the result of the coefficient of dividend payout ratio confirmed H2 hypothesis.

Table 3 shows how much the variability in common stock price volatility (the dependent variable) can be explained by the two dividend policy measures (dividend yield and dividend payout ratio) as independent variables.

Table 3 Model Summary for Eq. (1)

R	R Square	Adjusted R Square	Std. Error of the Estimate
.427[a]	.183	.168	.13549147

a. Predictors: (Constant), PR, DY

Table 3 shows that approximately 18% of the variability in common stock price volatility for the firms listed on the Amman Stock Exchange can be explained by the linear relationship between the two dividend policy measures (dividend yield and dividend payout ratio) and common stock price volatility, while 82% of the variability in common stock price volatility caused by external factors.

Dividend policy and stock price volatility (with control variables)

This section examine whether the relationship between the two dividend policy measures (dividend yield and dividend payout ratio) and common stock price volatility is affected or not by the addition of controls. The multiple regression model used to test the relationship between dividend policy and common stock price volatility is amended to include control variables. The model is stated as follows.

$$P-VOL_t = \ _0 + \ _1DY_t + \ _2PR_t + \ _3(B/M)_t + \ _4LEV_t + \ _5LNSIZE_t + \ _6E-VOL_t + e_t$$

Table 4 Regression Coefficients of independent variables

	B	Std. Error	t	Sig.
Constant	.003	.177	.018	.986
DY	.799	.841	.950	.344
PR	-.179	.071	-2.515	.013
B/M	.142	.053	2.708	.008
LEV	.176	.060	2.907	.004
LNSIZE	.025	.010	2.635	.010
E-VOL	1.106	.242	4.581	.000

N = 116 **a. Dependent Variable: P-VOL**

Table 4 shows that the coefficients of dividend yield and dividend payout ratio are reduced from (1.868, -.311) to (.799, -.179), respectively, after the addition of control variables.

Remarkably, the relationship between dividend yield and common stock price volatility now is non-significant by the addition of control variables but for dividend payout ratio still significant. Logically, this result might arise because the correlation between dividend yield and common stock price volatility was very small and non-significant as identified in Table 2, while the correlation between common stock price volatility and the control variables are higher than that of dividend yield, so the addition of those variables might absorb the significance of dividend yield, as well as might be because of the high correlation between dividend yield and dividend payout ratio (multicollinearity). To investigate the above interpretation, the variable of dividend payout ratio should be dropped from the multiple regression model and the new model becomes as follows.

$$P-VOL_t = \ _0 + \ _1DY_t + \ _2(B/M)_t + \ _3LEV_t + \ _4LNSIZE_t + \ _5E-VOL_t + e_t$$

By running the multiple regression after the exclusion of the dividend payout ratio variable, the results are presented in Table 5.

Table 5 Regression Coefficients of independent Variables[a]

	B	Std. Error	t	Sig.
Constant	-.001	.181	-.007	.995
DY	-.694	.610	-1.138	.257
B/M	.174	.052	3.324	.001
LEV	.229	.058	3.965	.000
LNSIZE	.020	.010	2.129	.035
E-VOL	1.377	.221	6.221	.000

N = 116 **a. Dependent Variable: P-VOL**

Table 5 shows that the relationship between dividend yield and the volatility of common stock prices remains non-significant but the direction of that relationship has been changed from positive to negative. This might be because of the highly significant correlation between dividend yield and dividend payout ratio. Because of the multicollinearity between dividend yield and dividend payout ratio, dividend yield will be excluded from the subsequent regression specifications and I will concentrate on analyzing the role of dividend payout ratio.

The following model is used to test the remaining hypotheses, excluding the hypothesis regarding the relationship between common stock price volatility and growth in assets. The variable (growth in assets) will be added to the multiple regression model later to examine the existence of the rate of return effect, arbitrage realization, information effect, and duration effect.

$$P-VOL_t = \ _0 + \ _1PR_t + \ _2(B/M)_t + \ _3LEV_t + \ _4LNSIZE_t + \ _5E-VOL_t + e_t$$

Table 6 Regression Coefficients of independent variables[a]

	B	Std. Error	t	Sig.
Constant	.002	.177	.009	.993
PR	-.131	.050	-2.605	.010
B/M	.147	.052	2.804	.006
LEV	.180	.060	2.981	.004
LNSIZE	.025	.010	2.616	.010
E-VOL	1.183	.228	5.201	.000

N = 116 **a. Dependent Variable: P-VOL**

Table 6 reports that the Sig. value associated with the *t* test for (the natural logarithm of) the size of the firm is .010, which is less than .05 (the significance level), therefore, the relationship between (the natural logarithm of) the size of the firm and common stock price volatility is positive and significant. That means large firms are more diversified, have more assets, more access to the financial markets to borrow money than small firms, more risky and might tend to display more common stock price volatility. The coefficient of (the natural logarithm of) the size of the firm is small and significant. This result is similar to Baskin, 1989; Allen and Rachim, 1996; Rashid and Rahman, 2008; and Hussainey *et al.,* 2011, but in the opposite direction, but in the same direction with Nazir *et al.,* 2010; Nishat and Irfan, 2003. So, H3 hypothesis is not supported by the regression coefficient result.

Table 6 reports that the Sig. value associated with the *t* test for the financial leverage is .004, which is much less than .05 and .01 (the significance levels), therefore, the relationship between financial leverage and common stock price volatility is positive and highly significant. The coefficient of financial leverage is .180, and *t* statistic associated with financial leverage is 2.981. Furthermore, this result is consistent with Ben-Zion and Shalit, 1975; Baskin, 1989; Allen and Rachim, 1996; Nishat and Irfan, 2003; and Hussainey *et al*., 2011, while different from Rashid and Rahman, 2008; and Nazir *et al.,* 2010. So, H4 hypothesis is supported by the regression coefficient result. Table 6 shows that the Sig. value associated with the *t* test for the earnings volatility is .000, which is so much less than .05 and .01(the significance levels), therefore, the relationship between earnings volatility and common stock price volatility is positive and highly significant. The coefficient of earnings volatility is large and highly significant, and the t statistic associated with earnings volatility is equal to 5.201 (the highest value), which means that earnings volatility is the dominant variable. This result is similar to Baskin, 1989; Allen and Rachim, 1996; and Hussainey *et al.*, 2011, while different from Nishat and Irfan, 2003; Rashid and Rahman, 2008; and Nazir *et al.*, 2010. So, H5 hypothesis is supported by the regression coefficient result.

Table 6 shows that the Sig. value associated with the *t* test for the ratio of the book value per share to the market value per share is .006, which is much less than .05 and .01(the significance levels); therefore, the relationship between the ratio of the book value per share to the market value per share and common stock price volatility is positive and highly significant. The coefficient of the ratio of the book value per share to the market value per share is highly significant, and the t statistic associated with the ratio of the book value per share to the market value per share is 2.804. This result is consistent with Stattman, 1980; Rosenberg *et al*., 1985; Chan *et al*., 1990; and Fama and French (1992). Therefore, H6 hypothesis is supported by the regression coefficient result.

Table 7 uses to examine whether the coefficient of determination (R^2) is affected largely by the addition of control variables (the natural logarithm of) the size of the firm, the ratio of the book value per share to the market value per share, earnings volatility and financial leverage.

Table 7 Model Summary for Eq. (6.5)

R	R Square	Adjusted R Square	Std. Error of the Estimate
.603[a]	.363	.334	.12119989

a. Predictors: (Constant), E-VOL, B/M, PR, LEV, LNSIZE

Table 7 shows that the value of the coefficient of determination (R^2) is increased largely. Before the addition of control variables, the (R^2) was about 18%, while after the addition of control variables; the (R^2) is about 36% as identified in Table 6.9. Stock price volatility is affected by the control variables rather than the dividend yield and dividend payout ratio. So, it is worthwhile to study the effect of control variables on the relationship between dividend policy and the common stock price volatility for the firms listed on the Amman Stock Exchange.

Dividend policy and stock price volatility (with control and dummy variables)

The empirical relationship between dividend policy and the volatility of common stock prices could be a result of broad industry pattern more than individual differences among firms and also likely to vary across industries. To examine this further, the sample of firms is divided into three sections to examine the effect of broad industry characteristics, which namely, financial sector which includes banks and insurance firms, industrial sector and service sector.

So, the multiple regression model used to examine the impact of broad industry features of the addition of dummy variables, which represent industry classifications, as follows.

$$P-VOL_t = \ _0 + \ _1PR_t + \ _2(B/M)_t + \ _3LEV_t + \ _4LNSIZE_t + \ _5E-VOL_t + \ _6DUM_1 + \ _7DUM_2 + e_t$$

Note: DUM1 denotes the financial sector; DUM2 denotes the services sector.

In fact, the number of dummy variables that included in the analysis will be the number of sectors (three in this case) minus one, so, the number of dummy variables expressing the sectors will be two (Anderson *et al*., 2007). Therefore, the dummy variable of industrial sector is dropped from the multiple regression for two reasons: (i) industrial sector is the main corporate sector, hence is used as the benchmark case, and (ii) it has the largest number of firms.

Table 8 Regression Coefficients of independent and dummy variables[a]

	B	Std. Error	t	Sig.
Constant	.014	.173	.081	.935
PR	-.133	.050	-2.682	.008
B/M	.147	.051	2.861	.005
LEV	.298	.073	4.068	.000
LNSIZE	.022	.009	2.369	.020
E-VOL	1.209	.225	5.370	.000
DUM1	-.077	.035	-2.212	.029
DUM2	.022	.027	.799	.426

N = 116 **a. Dependent Variable: P-VOL**

Table 8 shows the effect of the addition of dummy variables on the relationship between dividend policy and the volatility of common stock prices after controlling for (the natural logarithm of) the size of the firm, earnings volatility, financial leverage, and the book value per share to the market value per share. It can be seen from the values of the coefficients, the addition of broad industry dummies does not materially change the estimated regression coefficients.

On the other hand, the variables that have statistically significant relationship with stock price volatility (dividend payout ratio, (the natural logarithm of) the size of the firm, financial leverage, earnings volatility, the book value per share to the market value per share) remain significant at the 5% level. In addition, the negative coefficient of the financial sector is significant. So, price volatility is lower for this sector and price volatility for services is not significant different to price volatility in industrial.

Table 9 Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.637[a]	.405	.367	.11820532

a. Predictors: (Constant), DUM3, B/M, E-VOL, PR, DUM1, LNSIZE, LEV

Table 9 shows that the coefficient of determination (R^2) is increased after the addition of dummy variables, which means it is affected by the variations across industries.

Table 10 ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1.029	7	.147	10.519	.000[a]
Residual	1.509	108	.014		
Total	2.538	115			

a. Predictors: (Constant), DUM3, B/M, E-VOL, PR, DUM1, LNSIZE, LEV
b. Dependent Variable: P-VOL

Table 10 shows that the Sig. value associated with the *F* test is equal to .000, which is much less than .05 and .01(levels of significance), which means the relationship between independent variables and dependent variable is highly significant and remains significant with the addition of dummy variables.

As an additional test, new regression is running for each industry sector, separately, to examine the sensitivity of stock price volatility to every independent variable within industry. The results of this regression are presented in the following tables.

Table 11 Regression Coefficients of independent variables (Financial sector)[a]

	B	Std. Error	t	Sig.
Constant	-.576	.236	-2.444	.021
PR	-.104	.081	-1.283	.210
BM	.171	.075	2.282	.030
LEV	.162	.130	1.240	.225
SIZE	.054	.014	3.825	.001
E-VOL	1.839	.444	4.139	.000

a. Dependent Variable: P-VOL, N = 34

Table 11 shows that there are three independent variables are significant (the ratio of book value per share to the market value per share, the size of the firm and earnings volatility), implying that the stock price volatility is sensitive to these independent variables within financial sector.

Table 12 Regression Coefficients of independent variables (Industrial sector)[a]

	B	Std. Error	t	Sig.
Constant	.025	.228	.109	.914
PR	-.085	.061	-1.386	.174
BM	.120	.060	1.990	.054
LEV	.406	.090	4.486	.000
SIZE	.019	.012	1.525	.135
E-VOL	1.392	.401	3.476	.001

a. Dependent Variable: P-VOL, N = 45

Table 12 shows that there are two independent variables are significant (financial leverage and earnings volatility), implying that the stock price volatility is sensitive to these independent variables within industrial sector.

Table 13 Regression Coefficients of independent variables (Services sector)[a]

	B	Std. Error	t	Sig.
Constant	.473	.509	.930	.360
PR	-.195	.126	-1.553	.131
BM	.131	.147	.890	.381
LEV	.202	.182	1.107	.277
SIZE	.001	.026	.048	.962
E-VOL	.903	.404	2.237	.033

a. Dependent Variable: P-VOL, N = 37

Table 13 shows that there are one independent variables is significant (earnings volatility), implying that the stock price volatility is sensitive to this independent variable within services sector. Overall, earnings volatility is significant in all sectors, that is, the volatility of stock prices is sensitive to this variable in all sectors.

Dividend policy and stock price volatility (with growth in assets)

To investigate if the rate of return and duration effects is likely to be related with the rate of growth in firm's capital, the regression model will be formed as follows after the addition of the growth in assets variable.

$$P-VOL_t = \ _0 + \ _1PR_t + \ _2(B/M)_t + \ _3LEV_t + \ _4LNSIZE_t + \ _5E-VOL_t + \ _6GROWTH_t + \ _7DUM1 + \ _8DUM2 + e_t$$

The results of the above mutiple regression model (after the addition of growth in assets) are presented in the following table.

Table 14 Regression Coefficients of independent and dummy variables[a]

	B	Std. Error	t	Sig.
Constant	-.016	.162	-.100	.921
PR	-.105	.047	-2.237	.027
B/M	.141	.048	2.949	.004
LEV	.278	.069	4.057	.000
LNSIZE	.023	.009	2.603	.011
E-VOL	1.129	.211	5.342	.000
GROWTH	.210	.052	4.051	.000
DUM1	-.081	.033	-2.483	.015
DUM2	.001	.026	.031	.976

N = 116 **a. Dependent Variable: P-VOL**

Table 14 reports that the Sig. value associated with the *t* test for growth in assets variable is .000, which is much less than .05 and .01 (the significance levels), therefore, the relationship between growth in assets

and common stock price volatility is positive and highly significant. That is, the higher the growth in assets, the higher the stock price volatility and vice versa.

Furthermore, this result is consistent with Baskin, 1989, whereas it contrasts with Allen and Rachim, 1996; Nishat and Irfan, 2003; Rashid and Rahman, 2008; Nazir *et al.*, 2010; and Hussainey *et al.*, 2011. So, hypothesis H7 is supported by the regression coefficient results. It can also be seen that the coefficients of the set of independent variables remain significant, the direction of relationships does not change and their values not materially affected after the addition of the growth in assets. Therefore, there is no evidence on the existence of the rate of return effect and the duration effect. On the other hand, the results provide added evidence in favour of the arbitrage effect and the information effect.

Conclusion

Stock price volatility is inversely associated with dividend payout ratio. That is, the higher the dividend payout ratio, the lower the volatility of stock prices for the firms listed on the Amman Stock Exchange. A positive and significant relationship exists between the ratio of the book value per share to the market value per share and stock price volatility, implying that the higher the ratio of the book value per share to the market value per share, the higher the stock price volatility. A Positive and significant association between financial leverage and stock price volatility, implying that high leverage leads to high risk and hence high stock price volatility. That is, the higher the financial leverage, the higher the stock price volatility. Stock price volatility is positively associated with the size of the firm, represented by the natural logarithm of the market capitalization, implying that larger firms display more stock price volatility than smaller firms. A strongly significant and positive relationship exists between earnings volatility and stock price volatility, implying that firms which have high earnings volatility, also have high stock price volatility. That is, the higher the earnings volatility, the higher the stock price volatility. Positive and significant relationship between growth in assets and stock price volatility, implying that firms which have more growth opportunities display higher stock price volatility than firms which have little growth opportunities. That is, the higher the growth in assets, the higher the stock price volatility for the firms listed on the Amman Stock Exchange.

The implications of the study

Stock price volatility is affected by dividend policy, as identified in Chapter 6. Therefore, dividend policy might help investors to predict the risk of their holding stocks. In addition, this study identifies other important factors which affect the stock price volatility which can form investment decisions. The results of this study show an inverse relationship between dividend payout ratio and stock price volatility. Therefore, firms' managers might influence stock risk and hence stock price volatility through increasing dividend payout ratio. Furthermore, firms' managers could depend on the results of this study in making firms' dividend policies. Based on the results of this study, firms might attract more risk-averse investors by increasing dividend payments.

Suggestions for future research

Based on the empirical results of this study, a number of avenues for future research can be recommended.

Future researchers could further investigate the relationship between dividend policy and stock price volatility by including more independent variables such as operating cash flows, earnings per share, the ratio of market value per share to book value per share, and interest rates. Future researchers could conduct similar studies in other emerging markets where little evidence exists on dividend policy. Future researchers could examine the effect of stock dividends on stock price volatility as well as recommend firms to expand the using of stock dividends.

References

Ackert, L.F. and Smith, B.F. (1993), Stock price volatility, ordinary dividends, and other cash flows to shareholders, Journal of Finance, Vol. 48, No. 4, pp. 1147-1160.

Allen, D. and Rachim, V. (1996), Dividend policy and stock price volatility: Australian evidence, Applied Financial Economics, Vol. 6, Issue 2, pp.175-188.

Al-Malkawi, H. (2007), Determinants of corporate dividend policy in Jordan: An application of the Tobit model, Journal of Economic and Administrative Sciences, Vol. 23, No. 2, December, PP. 44-70.

Amman Stock Exchange (2010), Amman, Jordan. http://www.ase.com.jo.

Baker, H., Farrelly, G. and Edelman, R. (1985), A survey of management views on dividend policy, Financial Management, Vol. 14, No. 3, pp. 78-84.

Baskin, J. (1989), Dividend policy and the volatility of common stock, Journal of Portfolio Management, Vol. 15, No. 3, pp.19-25.

Carper, W.B. (2008), Dividend policy and stock price volatility: A re-examination of the evidence, Working Paper, Black Hills State University, USA.

Chan, L., Hamao, Y. and Lakonishok, J. (1991), Fundamentals and stock returns in Japan, Journal of Finance, Vol. 46, pp. 1739- 1764.

Fama, E. F. and French, K. (1988), Dividend yield and expected stock returns, Journal of Financial Economics, Vol. 22, pp. 3-25.

Fama, E. F. and French, K. (1992), The cross-section of expected stock returns, Journal of Finance, Vol. 47, pp. 427-465.

Farrelly, G., Baker, H. and Edelman, R. (1986), Corporate dividends: Views of the policy makers, Akron Business and Economic Review, Vol. 17, No. 4, 62−74.

Gordon, M. (1959), Dividends, earnings and stock prices, Review of Economics and Statistics, Vol. 41, Issue 2, Part 1, pp. 99-105.

Gordon, M. (1963), Optimal investment and financing policy, Journal of Finance, Vol. 18, Issue 2, pp. 264-272.

Hussainey, K., Mgbame, C. and Mgbame, A. (2011), Dividend policy and share price volatility: UK evidence, Journal of Risk Finance, Vol. 12, Issue 1, pp. 57-68.

Lintner, J. (1956), Distribution of incomes of corporations among dividends, retained earnings, and taxes, American Economic Review, Vol. 46, No. 2, pp. 97-113.

Lintner, J. (1962), Dividends, earnings, leverages, stock prices and the supply of capital to corporations, Review of Economics and Statistics, Vol. 44, Issue 3, pp. 243-269.

Miller, M. and Modigliani, F. (1961), Dividend policy, growth and the valuation of share, Journal of Business, Vol. 34, Issue 4, pp. 411-433.

Mohamad, S. and Nassir, A.M. (1993), Factors associated with stock price volatility and evaluation of Gordon's share valuation model on the Kuala Lumpur Stock Exchange, Pertanika Journal of Social Sciences and Humanities, Vol. 1, No. 2, pp. 179-186.

Nazir, M., Nawaz, M., Anwar, W. and Ahmed, F. (2010), Determinants of stock price volatility in Karachi Stock Exchange: The mediating role of corporate dividend policy, International Research Journal of Finance and Economics, Vol. 55, pp. 100-107.

Nishat, M. and Irfan, C. M. (2003), Dividend policy and stock price volatility in Pakistan, Economics and Accounting conference, University of Karachi, Pakistan.

Parkinson, M. (1980), The extreme value method for estimating the variance of the rate of return, Journal of Business, Vol. 53, pp. 61- 65.

Pettit, R. (1972), Dividend announcements, security performance, and capital market efficiency, Journal of Finance, Vol. 27, No. 5, pp. 993-1007.

Rashid, A., and Rahman, A. (2008), Dividend policy and stock price volatility: Evidence from Bangladesh, Journal of Applied Business and Economics, Vol. 8, Issue 4, pp. 71-81.

Rosenberg, B., Reid, K. and Lanstein, R. (1985), Persuasive evidence of market inefficiency, Journal of Portfolio Management, Vol. 11, No. 3, pp. 9-17.

Ross, S.A., Westerfield, R. W. and Jaffe, J. (2005), Corporate Finance, Seventh edition, McGraw-Hill, USA.

Sadka, G. (2007), Understanding stock price volatility: The role of earnings, Journal of Accounting Research, Vol. 45, Issue 1, pp. 199-228.

Salih, A.A. (2010), The effect of dividend policy on market value: UK empirical study, Doctoral thesis, Durham University. Available at Durham e-theses online: http:// etheses.dur.ac.uk/556/.

Stattman, D., (1980), Book values and stock returns, The Chicago MBA: A Journal of Selected Papers Vol. 4, pp. 25-45.

Suleman, M.T., Asqhar, M., Shah, S.Z. and Hamid, K. (2011), Impact of dividends policy on stock price risk: Empirical evidence from equity market of Pakistan. Available at SSRN: http:// ssrn.com/abstract = 1795963.