

## **An Examination of Stock Price Behavior and Trading Volume around Ex-Dividend Day: Empirical Evidence from Pakistan**

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### **Abstract**

*The underlying study aims to examine the movement of stock price and trading volumes around ex-dividend dates in Pakistan Stock Exchange-listed companies for the period 2018 - 2020. We used standard event study research technique to investigate the presence of abnormal returns and trading volume. Lower drop off ratios are found and significant positive abnormal returns are reported on ex-dividend day. In addition, positive abnormal returns are found before the event day and negative abnormal returns are reported after the event day. Similarly, positive trading volumes are observed in pre and post-event windows. The results of abnormal returns and trade volumes surrounding ex-dividend day verify the existence of short-term trading evidence, which confirms the existence of dividend-capturing activities. The results of this study demonstrate that stock price behavior and volumes of trade around ex-dividend day are better explained by the short-term trading hypothesis.*

**Keywords:** *ex - dividend day, trading volume, abnormal returns, event study, short term trading, Pakistan Stock Exchange, price drop ratios*

## **Introduction**

Stock pricing behavior surrounding ex-dividend day is considered the most debated issue in corporate finance theory. According to the standard financial theory, ex-dividend day stock prices decrease with a magnitude equal to the dividend amount (Akhmedov & Jakob, 2010). Various researchers have tested this proposition, and empirical results showed that stock prices drop with the amount different from the dividend amount (Akhmedov & Jakob, 2010 & Dasilas, 2009). There is consensus that ex-dividend day prices of stocks fall, but the magnitude of this drop is still debatable. In addition, there is still no consensus on the factors that bring changes in prices and stock trade volume around ex-dividend day. This study aims to test various factors that may significantly contribute in ex-dividend stock price movement. The most commonly used indicators for measuring stock price movement on ex-dividend day are abnormal returns and price drop ratios. In an ideal world, where no transaction cost, taxes and risk exist, the stock price should fall equal to the dividend amount, reflecting that new stockholders are not entitled to get the declared dividend on ex-dividend day. However, various empirical studies tested this phenomenon and reported different outcomes (Graham et al., 2003; French et al., 2005; Akhmedov & Jakob, 2010; Chowdhury, 2015). It is essential to mention that stock price anomaly results in abnormal trade volume on ex-dividend day. Several studies have tested the price fluctuations and trading behavior of shares around ex-dividends. However, this puzzle is not solved yet. Most studies about stock price movements around ex-dividend day are conducted in developed countries like the USA and the U.K. (Lasfer, 1995; Whitworth & Rao, 2010; Chowdhury, 2015). Graham et al. (2003) studied the ex-dividend stock price movement in the U.S.A. They reported that stock prices dropped with an amount less than the dividend and found positive abnormal returns on the ex-day. Lasfer (1995) studied the ex-dividend day stock price in the U.K. and observed insignificant abnormal returns. In developing countries, few types of research have been conducted to examine the effect of change in stock price and returns around ex-dividend day like in India (Agarwal 2020; Dhaliwal and Li 2006); Greece (Dasilas, 2009); Vietnam (Tran et al., 2017); Thailand (Anantarak, 2011) and Oman (Dupuis 2019).

Consequently, the stock price behavior before and after ex-dividend day is unclear in the context of less developed countries, especially in financial markets of developing/emerging economies like Pakistan. Recently, some studies have examined stock price behavior in Pakistan as well.

Aamir & Shah (2011) reviewed the stock price movement surrounding dividend announcement date considering stocks of 19 listed firms in the Karachi Stock Exchange. They covered the period 2004-2008 by using an event window of 41 days. They reported significant stock returns around dividend announcement day.

Similarly, Akbar & Baig (2010) examined the Pakistan Stock Exchange market efficiency. They used an event window of 41 days and found insignificant stock returns. Moreover, they observed negative stock returns around dividend announcement days. Tauseef and Nishat (2015) conducted research at KSE to inspect the ex-dividend day stock price for 2009-2010. Their results supported the existence of short-term trading.

Little research has been done in developing markets related to stock price behavior on ex-dividend day. That is why there is room to investigate this phenomenon in those regions. The underlying study adds to the chunk of existing literature by examining stock price and trading volumes around ex-dividend day by considering the time period when dividends and capital gain are taxable. To the best of the researchers' knowledge, it is the first study in Pakistan that has examined the ex-dividend day price phenomenon along with trading volumes by considering the duration.

### **Review of Literature**

The movement of stock prices around ex-dividend days has been studied over the last 50 years, yet most researchers disagreed with a single explanation about its determinants. The ex-dividend day is generally the first day of trading when new investors, who buy the shares, have no right to get the next dividend. Therefore, the share price on ex-dividend day is assumed to be lower with an amount equal to the dividend. However, on practical grounds, many factors can affect the ex-dividend day stock price return, for example, taxes, transaction costs etc.

Campbell and Beranek (1955) are pioneers who introduced ex-dividend day price anomaly. They introduced tax-driven clientele by researching a small sample of NYSE. They reported that the prices of stocks decreased by less than dividends. Elton and Gruber (1970) justified the ex-dividend phenomenon. They introduced the tax-driven clientele effect. According to them, tax is an essential factor influencing the investors' choice of capital gain or dividend. This factor is critical for investors because they are more interested in after-tax stock returns. Elton and Gruber

(1970) pointed out that the price drop ratio is highly affected by specific tax clientele who receive dividends. They proposed the presence of an equilibrium price drop ratio. Their presented model is known as the “Theory of Tax.” Under different tax regimes, investors have different tax rates on capital gain and dividends. In an equilibrium market, potential investors must be neutral about buying shares before the ex-dividend or afterward. Elton and Gruber (1970) suggested that price drop ratio on an ex-dividend day can be determined by using a differential tax ratio between capital gains and dividends.

Moreover, their reported results encouraged many researchers to further explore stock price's ex-dividend day behavior. Many researchers second Elton and Gruber's explanation of the price drop, but some others disagreed with their justification. Kalay (1982) was among the first who disagreed with Elton and Gruber's findings. He gave a different explanation known as the “Theory of Transaction Cost.”

Various researchers have started to examine ex-dividend day phenomenon across the world. Hariyanto & Murhadi (2021) studied the stock price behavior of companies listed in the stock markets of the ASEAN group of countries. They used event study methodology and empirically analyzed stock price reactions around the dividend announcement date. Their results confirmed the existence of abnormal returns. Agarwal, S. (2020) examined the impact of the ex-dividend date on stock price volatility in the Indian tire industry. This study covered a period of 10 years, i.e., from 2008 to 2017. His results confirmed the presence of abnormal returns around the ex-dividend date. Tamara et al., (2020) investigated the stock price change and trading volumes before and after the ex-dividend date using event study methodology from 2012 to 2016. They confirmed the tax hypothesis's evidence explaining the share prices' behavior. Koo & Chae (2020) examined the dividend month premium for the years January 1999 to December 2016 in the stock market of Korea and found positive abnormal returns around the ex-dividend day.

Moreover, a study by Kreidl, F. (2020) on German stocks examined the behavior of share prices and shares volume traded around ex-dividend dates covering the period from 2002 to 2019. A standard event study methodology empirically tested stocks' pricing behavior. They did not find any existence of short-term trading. Instead, the results of this study strengthened tax-motivated reasoning. Moreover, no evidence of abnormal trading volume was seen. Dupuis (2019)

investigated whether liquidity affects the ex-dividend day share prices in Oman and found it essential to explain the ex-dividend day price anomaly.

In contrast, Octaviani et al., (2019) could not find any significant difference between abnormal returns around ex-dividend day. Their results showed considerable price changes before and after the ex-dividend date. Tran, Q. T. (2017) investigated the fluctuations in the Vietnamese stock market stocks by examining both trading volume and abnormal returns. His results supported the evidence of short-term trading. Chowdhury et al., (2015) studied the stock behavior on ex-dividend day by considering special dividends for 1960 – 2012. Their findings were more consistent with the tax hypothesis.

Furthermore, Tauseef and Nishat (2015) conducted research at KSE to investigate the pricing behavior of stocks on ex-dividend day for the period of 2009-2010. Their results supported the presence of short-term trading behavior surrounding ex-dividend day at KSE. Similarly, Blandon et al., (2011) studied the same phenomenon in the Spanish stock market after the tax reform of 2006. They found a tax-based explanation of stock price behavior. Anantarak (2011) supported short-term trading evidence in the stock market of Thailand.

In the same way, Dasilas (2009) investigated the stock price movement of Greece's financial market by considering the ex-dividend day phenomenon. Capital gain and dividends were tax exempted during Greece's studied time duration. His results supported the short-term trading hypothesis. Tinashe (2015) also examined the stock price behavior around the ex-dividend date and reported increasing share price trends before the event day and decreasing trends after the event day. In contrast, Larasati and Nuraya (2018) did not find any significant difference in abnormal returns before and after ex-dividend day.

Existing literature recommends that examining price drop ratios alone would make it difficult to distinguish between short-term and tax hypotheses to justify ex-dividend stock price movement (Dasilas, 2009). This issue was first identified by Lakonishkok & Vermaelen in 1986, and they proposed a new angle to clarify this distinction. According to them, examining trading volume in addition to price behavior will help distinguish between short-term and tax hypotheses. They claimed that abnormal volume could be observed if short-term trading holds. However, the tax hypothesis does not claim any such prediction. Dhaliwal and Li (2006) also confirmed the

excessive trade volume around ex-dividend day. Cherkasova and Petrukhin (2017) studied the ex-dividend day price phenomenon in BRIC countries using various theories. They confirmed the existence of dividend capturing theory along with the disposition effect.

### Data and Methodology

Following the methodology suggested by Dasilas (2009) and Asimakopoulos (2015), price drop ratios, abnormal returns and abnormal trading volumes are examined using the standard event study method for 2018 – 2020. All companies that paid annual cash dividends are included in the sample. Data related to ex-dividend dates, daily prices of shares, the annual amount of dividends, and daily trading volumes turnover is collected from Data Stream. Based on the availability of data, all listed companies meeting the following mentioned selection criteria are considered in this study:

a) Annual cash dividends must be paid by companies annually for the period under investigation, i.e., 2018-2020. b) ex-dividend dates must be available publicly c) Price data of companies would be accessible for 250 days before and 20 days after the ex-dividend day. d) Trading volume data would be available for 100 days before and after the event window.

### Price Drop Ratios and Abnormal Returns:

Price drop ratios for each ex-dividend day listed stock is computed as follows:

$$\text{Price Drop Ratio} = \frac{P_{cum} - P_{ex}}{D} \quad (1)$$

Where  $P_{cum}$  = cum – dividend day stock price;  $P_{ex}$  = ex–dividend day stock price, and  $D$  = annual cash dividend paid by the firm.

On ex–dividend day, the closing prices of share are influenced by daily stock returns that's why it is considered necessary to calculate market \_ adjusted \_ price \_ drop \_ ratio (MAPDR).

$$\text{Market\_Adjusted\_Price\_Drop\_Ratio} = \frac{P_{cum} - \{P_{ex} / (1 + R_m)\}}{D} \quad (2)$$

$R_m$  is the proxy of the market return of the PSX index.

The drop in price ratio should reflect the share price reduction equal to the dividend amount in the absence of risk, transaction cost and taxes. On the contrary, when dividends and capital gains are taxable, the ex-dividend stock price drop should reflect these marginal rates. For this, price drop ratio can be calculated as

$$Price\ Drop\ Ratio\ (PDR) = \frac{1 - t_d}{1 - t_g} \quad (3)$$

Where  $t_d$  = dividend tax and  $t_g$  = capital gain tax.

Elton and Gruber (1970) observed the indifferent behavior of marginal shareholders regarding the selling of stock either on ex-dividend day or cum dividend date. This point of indifference is also called the equilibrium point.

Considering the tax structure of Pakistan, the following equilibrium outcomes are expected around ex – the dividend date. For this, tax rates are taken from the Federal Board of Revenue.

Years	$t_d$	$t_g$	Expected value
2018-2020	15%	15%	1

Source: Federal Board of Revenue

Based on the above calculated ratios, the average drop in price ratio should be equal to 1.

Hence, following null hypotheses are tested:

$$H_a = \text{Mean of PDR (2018 - 2020)} = 1$$

$$H_b = \text{Mean of MAPDR (2018 - 2020)} = 1$$

The abnormal raw returns (ARR) are also computed to assess the stock price behavior by using the following formula:

$$ARR = \frac{P_e + D - P_c}{P_c} \quad (4)$$

$P_e$  = ex – dividend day price,  $P_c$  = cum dividend day price and D = annual cash dividend.

An event study method is used to examine market reaction on and surrounding ex – dividend day. The event window stems from – 20 to +20 days from event day. The single-factor market model has been used to calculate market returns. The market model parameters are calculated considering the length of 230 days estimation period length. The parameters of the market model are as follows:

$$AR_{it} = R_{it} - E(R_{it}) \quad (5)$$

$AR_{it}$  = abnormal return

$R_{it}$  = actual return

$E(R_{it})$  = expected return of stock i at time t

Following equation is used to measure expected return:

$$E(R_{it}) = \alpha + \beta R_{mt} \quad (6)$$

$\alpha$  = intercept of market model

$\beta$  = beta coefficient of market model

The cumulative abnormal returns (CAR) are calculated for the event window of 41 days. It is anticipated that AR on ex–dividend day and CAR surrounding ex-dividend day are equal to zero. Hence

$H_c =$  The mean of  $AR_0 = 0$

$H_d =$  The CAR around the ex day in event window = 0

### **Trading volume**

Trading volumes are essential to analyze around ex-dividend day because it would help draw a clear line between the groups of investors that may influence stock price behavior. It will further help investigate how the change in dividend and capital gain tax rates affect the trading activity around ex–dividend days. Trading volumes are computed by following the methodology of Graham et al., (2003):



$$\text{Abnormal Volume} = \left[ \frac{\text{TurnOver}}{\text{Normal Turnover}_i} - 1 \right] \quad (5)$$

Normal Turnover<sub>i</sub> = Average daily stock turnover in estimation period

Turnover = Actual daily stock turnover

Abnormal Volume = actual daily turnover relative to normal volume minus 1

Like abnormal returns, abnormal trading activity during 41 days event window is analyzed. Following Dasilas (2009), normal trading volume is computed by considering daily trading turnover 100 days surrounding the event window. The total of average abnormal volume is called Cumulative abnormal volume (CAV). Following hypotheses are tested:

H<sub>e</sub> = Mean of abnormal trading volume on ex – dividend day = 0

H<sub>f</sub> = CAV around ex – day in event window = 0

## Results

Table: 1  
 Descriptive

2018-2020	DY	PDR	MAPDR	ARR	AV
Mean	0.0667	0.4031	0.3922	0.0601	0.2733
Std. Deviation	0.0345	0.5313	0.4806	0.0350	1.8602
Minimum	0.0017	-0.8840	-0.8641	-0.0037	-1.000
Maximum	0.2196	1.7222	1.4236	0.2141	11.7394
Range	0.2176	2.6062	2.2877	0.2179	12.73

Table 1 represents the descriptive of the underlying studied sample. The mean of DY is 0.0667, with a standard deviation of 0.0345. The Mean of PDR and MAPDR are 0.4031 and 0.3922, with the standard deviations 0.5313 and 0.4806, respectively. The average ARR (0.0601) has a standard deviation of 0.0350, and AV has a mean of 0.2733 with a standard deviation of 1.8602.

Table No. 2

Stock Price Behavior (ex – dividend day)

	Theoretical Value	Mean	t – Stat
PDR	1	0.4031	-9.195***
MAPDR	1	0.3922	-10.117***
ARR	0.000	0.0601	14.275***
AV	0.000	0.2733	1.080

The mean and theoretical values of PDR, MAPDR and ARR are presented in table No.2. t–test is used to measure the mean difference between observed values from their theoretical values. The mean values of PDR and MAPDR are comparatively minimal from their theoretical (expected) values which are 0.4031 with a t value of -9.195 and 0.3922 with t- statistics -10.117 respectively. Both observed values of PDR and MAPDR are statistically significant and lower than their theoretical values. Thus rejecting the null hypothesis, i.e., if dividends and capital gain are taxed with equal rates, PDR and MAPDR should be equal to 1. Thus tax differential hypothesis is not justifiable explanation regarding the stock price drop on ex-dividend day.

Finally, abnormal returns are examined on ex–dividend day. It is concluded that a smaller drop in price drop ratios resulted in a significant positive mean of AR, which is equal to 6.01%, with a t-value of 14.275. The positive abnormal volume having a mean value equals to 0.2733 is being observed indicating the selling pressure on ex- dividend day.

Tables 3 & 4 present the average and cumulative abnormal returns considering 41 days window around ex-dividend day.

Table: 3  
 Abnormal Returns

	AR	t-value		AR	t-value
-20	-0.00103	-0.4296	1	-0.00117	-0.4843
-19	-0.00063	-0.2632	2	-0.00117	-0.4864
-18	0.004596	1.9086*	3	-0.00159	-0.6610
-17	0.000108	0.0447	4	0.001069	0.4440
-16	0.003242	1.3461	5	-0.00145	-0.6012
-15	0.00116	0.4818	6	-0.00406	-1.6874*
-14	-0.00193	-0.8028	7	-0.00172	-0.7141

-13	-3.6E-05	-0.0148	8	0.004175	1.7335*
-12	0.002619	1.0876	9	7.35E-05	0.0305
-11	0.000776	0.3221	10	-0.00101	-0.4193
-10	-0.00255	-1.0606	11	-0.00241	-1.0026
-9	0.000442	0.1837	12	0.004968	2.0632**
-8	0.00074	0.3072	13	-0.00016	-0.0667
-7	-0.00139	-0.5767	14	0.003132	1.3007
-6	0.006194	2.5721***	15	0.002664	1.1064
-5	0.005286	2.1950**	16	0.000593	0.2461
-4	-0.00211	-0.8754	17	0.000601	0.2496
-3	0.002176	0.9037	18	-0.00067	-0.2780
-2	0.000162	0.0674	19	0.000392	0.1627
-1	0.000105	0.0435	20	-0.00182	-0.7564
0	0.060196	14.9970***			

Table 3 shows that Mean AR is 0.060 on ex-

dividend day and statistically significant at 1%. Positive and statistically significant abnormal returns can be seen in pre-event time frames on -6 and -5 days before the event day. AR is 0.61% on day -6 and 0.52% on day -5, respectively, with t – values of 2.572 and 2.195.

Table: 4  
 Mean CARs (around ex – dividend days)

Time Interval	(-20, -10)	(-10, -5)	(-5, -1)	(+1, +5)	(+6, +10)	(+11, +20)
<b>CAR</b>	0.6309171	0.871934	0.5620995	-0.4307974	-0.2544762	0.728448

Table 4 exhibits mean CARs over various time intervals of the event window. The values of CAR show positive price change before the event day due to increased pressure of buying shares and negative price change after the event period due to selling pressure. The values of CARs are agreed with the short-term trading hypothesis.

Table 5  
 Trading Volume (Abnormal)

2018-2020					
	AV	t- value		AV	t- value
-20	-0.0532	-0.3433	1	0.1432	0.9251
-19	-0.1351	-0.8428	2	0.0246	0.1349
-18	0.3008	1.1109	3	0.0876	0.4240
-17	0.4394	1.6686*	4	0.2441	1.0605
-16	0.3657	1.5823	5	-0.0261	-0.1600
-15	0.5640	1.2470	6	0.0742	0.2878

-14	0.2355	1.0100	7	0.2081	0.6468
-13	-0.1194	-0.6209	8	0.2376	0.8740
-12	-0.0906	-0.6601	9	0.3532	1.2650
-11	-0.1103	-0.7017	10	0.2197	0.8753
-10	0.5908	1.0244	11	0.2066	0.9905
-9	-0.2339	-2.6264***	12	0.3171	0.7443
-8	0.0213	0.1443	13	0.2051	0.7346
-7	0.0412	0.2300	14	0.3114	0.8193
-6	0.7161	1.5679	15	0.3146	0.8513
-5	1.2982	1.1838	16	-0.1003	-0.5498
-4	0.1934	0.9295	17	0.0958	0.2466
-3	0.0712	0.3757	18	0.0053	0.0264
-2	-0.0100	-0.0748	19	-0.1167	-0.8324
-1	0.7079	1.7225*	20	-0.0294	-0.1708
0	0.2785	1.0797			

Table 5 demonstrates the findings of trading volume for the event window of 41. On cum dividend day, a positive (0.7079) and significant (at 10%) abnormal volume is observed. Moreover, on the ex-dividend day, a positive (0.2785) but insignificant trading volume confirms the presence of short-term trading.

Table 6  
 CAV (surrounding ex – dividend days)

	2018-2020	
	CAV	t-Statistic
CAV (-20 -1)	4.793167035	3.64***
CAV (-10 -1)	3.396292862	3.65***
CAV (-5 -1)	2.260782593	3.44***
CAV (-1 0)	0.986410209	2.37**
CAV (+1 +20)	2.489261945	1.89*
CAV (+1 +10)	1.279741099	1.38
CAV (+1 +5)	0.186877813	0.28
CAV (-1 +1)	0.843164703	1.66*

Table 6 demonstrates the cumulative abnormal volume in different sub-periods. CAVs for all sub-periods are positive. CAV (-20,-1) is 4.793, statistically significant at 1%. Mean CAV on (-10, -1) and (-5,-1) are 3.396 and 2.260 are statistically significant at 1%. All positive CAVs are consistent with short-term trading.

### **Conclusion**

This paper studies the stock price behavior and trading volumes around ex-dividend day for 2018 – 2020. Lower price drop ratios have been ascertained as compared to their theoretical values. Patterns of Positive abnormal returns are reported before the event of ex-dividend day and negative returns are observed after the event of ex-dividend day. These findings support the theory of short-term trading, which implies the buying pressure in pre-event duration and selling pressure in the post-event period. These results are in agreement with the findings of previous researches Asimakopoulos (2015) & Tauseef & Nishat (2015). In addition to that, positive trading volumes are examined around ex-dividend day, which supports the short-term trading evidence and the existence of dividend-capturing activities. Thus, it is evident that the short-term trading hypothesis better explicates stock pricing behavior and trading volumes around ex-dividend day. As this study considered the daily returns and trading volumes, more trading strategies can be chosen in the future. Ex-dividend day stock prices and trading volumes can be studied by considering different tax regimes for future studies.

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