

## Variability in volume of shares traded of selected Pharmaceuticals companies –A study on Indian Stock market

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### Abstract

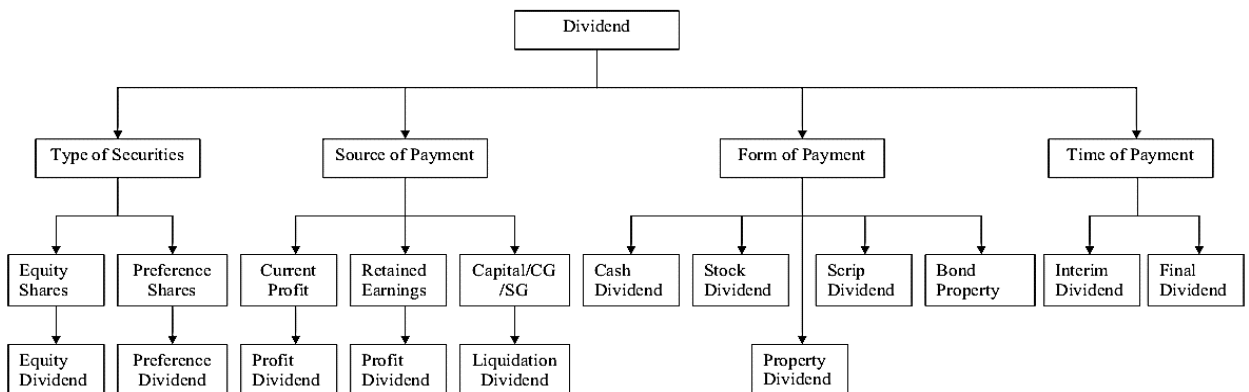
Observing the movement in volume of shares is an area of research that attracted the attention of various academicians and scholars. The present study is an effort to add and contribute to understand the behavior of fluctuations in the volume of Indian pharmaceutical share to find the effect of the dividend announcements and ex-dividend date on the volume of shares traded. Announcement of Dividend is generally considered as the positive signal to the shareholders and the same leads to demand in the shares during the period of announcement and ex-dividend date. A standard event study methodology is adopted in this paper to examine the price reactions of 15 listed pharmaceutical companies.

**Keywords:** Dividend, Announcement date, Ex-dividend date, Volume of shares traded, Pharmaceutical companies, risk and returns.

### Introduction

In recent times, Indian pharmaceutical industry has stunning and spectacular achievements which have developed it as a model industry of the country in performance. However, pharma players are required to focus on increasing their competitive positions by making the necessary technological shift because the pharmaceutical value chain would depend on it. Recent advances in the field of biotechnology and information technology should also be focused on the Indian pharmaceutical industry. For sustained future growth, Indian pharma players need to attain the right product-mix.

The dividend is a contribution from the profits of a firm that is distributed to the shareholders in share to their shareholdings. Dividend decisions concern to deciding the quantity of surplus to be disseminated to the equity investor as dividend and the amount to be retained in the business in the form of retained earnings. It involves deciding the form of dividend payment and the timing of dividend payment. The dividend can be classified based on the type of securities, the source of payment, and form of payment and time of payment. Classification of dividend on these bases is shown below:



Note: CG- Central Government; SG- State Government

Because income from the dividend in the future is unsure in both ways by quantity and period, dividend expectation is also affected by the taxable income; if the majority of investors are not falling under the taxable income then they are expecting current income (dividend) rather than capital gain. Fluctuation in prices of equity share because of the dividend is controversial

in a financial matter. An attempt is made to identify that dividends affect price of shares or not, by applying “t-test (paired), correlation, standard deviation, mean price, change in the volume of shares”. The researcher has evaluated the data with the following variables for both the tests:

1. The impact of dividend announcement date on the average share price of selected shares.
2. The impact of Effective dividend date on the average share price of selected shares.
3. The impact of dividend announcement date on the number of shares traded (Volume) of selected shares.
4. The impact of Effective dividend date on the number of shares traded (Volume) of selected shares.
5. Average percentage change in the average price of shares before & after announcing dividend
6. Average percentage change in the average price of shares before & after Effective date of dividend
7. Correlation between the average price of selected shares before and after dividend announcement date.
8. Correlation between the average price of selected shares before and after the Effective date of the dividend.
9. Correlation between numbers of share traded of selected shares before and after dividend announcement date.
10. Correlation between numbers of share traded of selected shares before and after the Effective date of the dividend.

### Literature Reviews

The discussions over the importance of dividends for company's worth carried with the significant effort of the Merton Miller and Franco Modigliani titled "Dividend Policy, Growth, and the Valuation of Shares" were issued in The Journal of Business in 1961. This research, the writers laid the "theory of irrelevance"; as per MM the payment of dividend made by the company was not necessary for owners if definite theory validate<sup>1</sup>. Researchers pointed out those investors did not care about whether they received the firm's cash flows in the form of dividends or capital gains.

**Scott D. Below & Keith H. Johnson (1996)** examined the differential share price feedback to dividend raise and reduce announcements with reference to market period. The author found that market period has a major impact on unusual income around the notice, and it come out that more information is put across by dividend change announcements which run contradict to market segment. The researcher is very strong in the conclusions that these results are regular with the information contented of dividends assumption, and have key proposition for event learning where collecting is difficult.

**Parul Bhatia (2010)** observed randomly dealing regularity of dividend paying stocks. The researcher has examined responses on every day, every month, every quarter and every year basis with probable results in a price of a share when declarations are made on the exchanges. The author has utilized event study with

stable average return model to find out the impact on everyday information. The researcher has also studied that the Dividend payout has a noteworthy optimistic relation on prices of share. The researcher conducted a study to measure relation on firms at the time it declares dividends.

The researcher has conducted research on companies; choose randomly from the NSE to identify the impact on the dividend. Event study has been conducted by the author to analyze the significance of dividend announcement on share prices. The author also concluded that there can be other factors also which have an impact on the change in the share value like the amount of retaining earnings (undistributed profit remains after distribution of dividend) also affect the share prices of the company.

**Upananda Pani (2006)** the author had found the probable linkages between companies policy for dividend and share price fluctuations for Indian companies. The researcher did an investigation on selected BSE listed companies from the years 1996-2006. The author has attempted to test particular tests before going on towards the last judgment through panel-data modeling. The regression on collective data remains minor. But the way of association between the factors is as per the previous anticipation. So retention ratio is directly connected with the share prices.

**Neetu Mehndiratta & Shuchi Gupta (2010)** the authors studied to identify the performance of stock prices in connection with the dividend declaration. The stock prices of the double stage model used to verify answers for dividend announcement. The second phase is anticipated constraints are taken for determining event abnormal returns. Research is defined as dividends declared on day zero. If the declaration is on holiday, one day later is considered to be one day. The pre-announcement period included 30 trading sessions before the dividend announcement date.

**Dr. Mohammad Salim El Essa Mr. Mohammad Mahmoud Hameedat, Dr. Jamal Ali Altaraireh, Mr. Mousa Abdelhadi Nofal (2012)** the author has studied to aim to determine the main factors that affecting dividends policy decisions. The authors have used the statistical analysis of the regression models, the researchers have found a positive relationship between dividends and net cash flows, earnings before interest and tax, earning per share, price to book value ratio, dividends yield, and firm size, have also found that earnings per share have the highest effect on dividends, then dividends yield then price to book value ratio, a negative relationship between dividends and debt ratio, that large firms have a greater impact on dividends policy than small firms.

**Husam-Aldin Nizar Al-Malkawi, Michael Rafferty & Rekha Pillai, "Dividend Policy: A Review of Theories and Empirical Evidence"** (2010), published in International Bulletin of Business Administration, ISSN: 1451-243X Issue 9 (2010) the authors have

studied reviewing the main theories and explanations of dividend policy including dividend irrelevance hypothesis of Miller and Modigliani, bird-in-the-hand, tax-preference, clientele effects, signaling, and agency costs hypotheses. The research explored the main theories that counter the irrelevancy proposition. In order to provide an understanding of dividend policy theories, this article attempted to explain the basic argument for each theory followed by the most important empirical evidence on testing of these theories. The authors have also examined various issues of dividend policy; they have produced mixed and inconclusive results.

### Research Methodology and Sampling

**Sampling Design:** The sample of the study includes of Pharmaceuticals Company of the India paying a regular dividend. This study is conducted by the researcher so it is not feasible to choose all the companies which pay dividend as the sample for the study.

15 pharmaceutical companies of India based on its market capitalization have been selected for the study.

**Reason for Pharma Industry:** Indian pharmaceutical industry has stunning and spectacular achievements which have developed it as a model industry of the country in performance. However, pharma players are required to focus on increasing their competitive positions by making the necessary technological shift because the pharmaceutical value chain would depend on it. Recent advances in the field of biotechnology and information technology should also be focused on the Indian pharmaceutical industry.

Pharmaceutical companies paying regular dividend has been list out with it's the dividend announcement date, and effective dividend date of last 10 years (2004-2013)

**Nature of the Study:** The sample size is of 15 companies selected from pharmaceutical sector to find before after effect of dividend announcement date and effective date on shares prices and volume of shares. Research is primarily based on the secondary data. The data for dividend announcement date, effective date & share prices are collected from www.nseindia.com and dividend declaring dates from www.nseindia.com, www.economicstimes.com, www.smartinvestors.com comprised the main sources of data for the study.

**Criteria for selecting 15 Companies:** The study is conducted on Indian Pharmaceutical companies selected based on top 15 market capitalization, Out of total listed pharmaceutical companies, 15 companies have been selected for the study. The selection Criteria was market capitalization of more than Rs.3, 500 cr. as on 12th July 2013.

### Event Study

Dividend is considered as an event for the share market. To analyze the impact of dividend on the volume of shares traded event study can be used.

The following steps were followed to perform event study.

- The first step was to find out the dividend announcement dates & effective dates in each of the respectively company from 2004 to 2013 .Therefore 288 dates (144 dividend announcements dates & 144 dividend effective dates) were obtained in selected Pharmaceutical companies.
- The event window of 30 days before the announcement & effective date and 30 days after the announcement & effective date
- For calculating the volatility in the volume of shares traded before and after the event number of shares traded has been taken for respective companies with the respective event window.
- Finally, t statistics were calculated to test the hypothesis

### Tools Used for Research

1. Mean: The mean is the usual tool used for analysis, it is known as the arithmetic mean. It is calculated by summation of all values divided by a total number of values.
2. Standard Deviation: The concept of standard deviation was introduced by Karl Pearson in 1823. It is a most widely used measure of dispersion. It is denoted by the Greek letter "σ" called as Sigma.
3. T-test (Paired): A paired sample t-test is used to find out whether there is a significant difference between the average values of the same measurement made fewer than two different conditions.

A set of paired observations from a normal population.

This t-test compares one set of measurements with a second set from the same sample. It is often used to compare "before" and "after" scores in experiments to determine whether a significant change has occurred.

$$t = \frac{\bar{x} - \Delta}{\frac{s}{\sqrt{n}}}$$

### Hypothesis test

1. H<sub>0</sub>: There is no significant impact of dividend announcement on the Volume of shares before & Volume of shares after dividend announcement date on shares of selected companies.
2. H<sub>0</sub>: There is no significant impact of the effective date on the Volume of shares before & after the effective date on shares of selected companies.

### ANOVA

Analysis of variance (ANOVA) is a compilation of statistical models to examine the variation within set means and their linked measures, developed by

statistician and evolutionary biologist Ronald Fisher. In the ANOVA, the observed deviation in a variable is

divided into parts attributable to special causes of deviation.

### Empirical Findings AND Discussion

**Table 1: Overall of changes in Volume of shares**

Company	Before Announced	After Announced	Before Ex-Dividend	After Ex-Dividend
Dr. Reddy	-17.48324153	29.14981022	2.00148791	63.32861512
Divis lab	51.23732405	69.68831097	78.15580676	168.8415768
Ranbaxy	69.97987562	-10.231496	26.14790806	221.8015152
Sunpharma	88.03219605	-38.17810141	138.0071966	29.10411611
Cipla	41.89678482	-22.93361041	110.0025491	15.1488241
Glenmark	44.02462616	49.3222198	178.7347207	6.464975873
Lupin	95.23738261	-49.04754916	78.2303244	59.2793461
Glaxosmith	196.6032286	95.88235231	22.78881503	-16.29666062
Wockhardt	499.3075068	-13.08456463	141.8369147	139.6430391
Cadila	47.0928398	76.76203267	379.1903443	124.64645
Pfizer	260.6692986	29.40130404	95.90000434	45.62141816
Stride	100.7917425	-35.41191692	131.4750726	44.50326367
Torrent	385.1238727	242.3486283	2979.969116	100.8217147
Biocon	351.4208115	93.07148543	36.53713349	519.2296309
AstraZeneca	152.7284284	-22.51397924	-16.83918148	552.7488052

The above table represents the overall percentage change in the volume of shares for the sample pharmaceutical companies during the period of 2004-2013. It can be seen that the maximum percentage change in the volume of shares traded can be traced in Torrent pharmaceutical company irrespective of percentage change in the dividend during the period of before the ex-dividend. Wockhardt has maximum fluctuations in the volume shares just after announcement of dividend (from 499.30% to -13.08%). The maximum fluctuations observed just after ex-dividend date was in AstraZeneca.

**Table 2: Percentage changes in Volume of shares (Dividend paid more than 100%)**

Company	Before Announced	After Announced	Before Ex-Dividend	After Ex-Dividend
Dr. Reddy	-7.099849746	-40.87151943	-5.201513553	-47.47927005
Divis Lab	65.11064565	-62.0147581	-39.13097367	217.2594927
Ranbaxy	60.45832117	-18.3668641	32.55731068	148.4648543
Sunpharma	121.7350707	-47.95962869	112.6900986	-2.253557782
Cipla	96.18539547	-48.51167256	303.4093115	-55.92109019
Glenmark	185.1785138	185.1785138	-49.823429	-9.537291812
Lupin	-24.64023039	-68.44749917	166.3381582	53.21208443
Glaxosmith	215.5989575	105.6149275	22.60234368	-19.02842023
Wockhardt	-8.782105486	-77.05334666	813.5697681	-71.75235071
Cadila	101.5681533	-63.18985112	539.5694537	21.20177468
Pfizer	363.3053539	82.99284668	149.159828	-1.604967837
Strides Acro	-0.645109451	-57.99168218	-2.29055642	-1.977644024
Torrent	34.87190062	-38.39250348	188.2391127	46.28338248
Astrazeneca	249.2172161	58.30691774	471.3572773	188.8647076

The above table represents the percentage change in the volume of shares for the sample pharmaceutical companies during the period of 2004-2013 when dividend announced more than 100%. It can be seen that the maximum percentage change in the volume of shares traded can be traced in Cadila pharmaceutical company during the period of before the ex-dividend. Glaxosmith has maximum fluctuations in the volume shares just after announcement of dividend. The maximum fluctuations observed just after ex-dividend date was in Divislab.

**Table 3: Percentage changes in Volume of shares (Dividend paid less than 100%)**

Company	Before Announced	After Announced	Before Ex-Dividend	After Ex-Dividend
Dr. Reddy	-27.8666	99.17114	9.204489	174.1365
Divis Lab	18.86624	376.9955	351.825	55.86644
Ranbaxy	79.50143	-2.09613	19.73851	295.1382
Sunpharma	-29.9279	-3.94276	226.617	138.856
Cipla	29.83265	-17.2496	67.02327	30.94214
Glenmark	3.694944	10.50614	244.037	11.03705
Lupin	245.0844	-24.7976	-31.9045	66.86342
Glexosmith	25.64167	8.289176	24.46706	8.289176
Wockhardt	571.8917	-3.94617	45.87508	169.8424
Cadila	-21.0013	251.7019	178.7165	253.9523
Pfizer	81.0562	-64.3839	2.695313	128.2676
Strides Acro	115.2827	-32.1862	150.5844	51.14339
Torrent	585.2679	402.7721	4575.243	131.9865
Biocon	351.4208	93.07149	36.53713	519.2296
Astrazeneca	-45.7391	-85.119	-53.9007	163.9344

The above table represents the percentage change in the volume of shares for the sample pharmaceutical companies during the period of 2004-2013 when dividend announced less than 100%. It can be seen that the maximum percentage change in the volume of shares traded can be traced in Torrent pharmaceutical company during the period of before the ex-dividend. Torrent has maximum fluctuations in the volume shares just after announcement of dividend. The maximum fluctuations observed just after ex-dividend date was in Biocon.

#### Hypothesis Testing

1. H<sub>0</sub>: There is no significant impact of dividend announcement on the Volume of shares before & quantity of shares after dividend announcement date on shares of selected companies.
2. H<sub>0</sub>: There is no significant impact of the Ex-dividend date on a price before & price after the ex-dividend date on shares of selected companies.

**Table 4: Anova testing between percentage change in quantity & percentage of dividend before Announcement date**  
ANOVA Calculations

Testing	Calculated Value	Tabulated Value
Percentage change in quantity before announcement date	0.2846	4.21
Percentage change in quantity after announcement date	2.95	4.21
Percentage change in quantity before ex-dividend date	0.53	4.21
Percentage change in quantity after ex-dividend date	2.15	4.21

The ANOVA of the volume of Shares traded between selected companies before and after announcement and ex-dividend date shows that fluctuations in the average volume of share within selected units are random and it does not have a significant impact of dividend announcement or ex-dividend date and also interpreted that deviation in one cannot lead to deviation in other.

#### Findings

Company	Average volume change			
	Announcement Date		Ex-dividend Date	
	Before	After	Before	After
Dr. Reddy	Positive		Positive	
Divis Lab	Positive		Positive	
Ranbaxy	Negative		Positive	
Sunpharma	Negative		Negative	
Cipla	Negative		Negative	
Glenmark	Positive		Negative	
Lupin	Negative		Negative	
Glexo	Negative		Negative	
Wock	Negative		Negative	
Cadila	Positive		Negative	
Pfizer	Negative		Negative	
Strides	Negative		Negative	
Torrent	Negative		Negative	
Biocon	Negative		Positive	
Astrazeneca	Negative		Positive	

After conducting research on Pharmaceutical Companies during 2004-2013, 4 out of 15 companies observed with positive change in the volume of share traded after announcement date as compare to before announcement of a dividend. So it can be interpreted that pharmaceutical industry as a whole is having less fluctuations on volume of shares traded during the

study period. Research on Pharmaceutical Companies during 2004-2013, 5 out of 15 companies observed with positive change in the volume of share traded after the

Ex-dividend date as compare to before announcement of a dividend.

### Findings Hypothesis Accept/Reject (In Numbers)

Company	Announcement date Price		Announcement date Quantity		Effective date Price		Effective date Quantity	
	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject
Dr. Reddy	1	9	6	4	3	7	6	4
Divis Lab	1	9	8	2	2	8	5	5
Ranbaxy	3	6	6	3	1	8	5	4
sunpharma	3	6	9	0	2	7	8	1
Cipla	3	8	6	5	2	9	7	4
Glenmark	1	8	6	3	1	8	6	3
Lupin	0	9	6	3	4	5	4	5
Glexo	1	9	8	2	3	7	7	3
Wock	1	8	7	2	1	8	5	4
Cadila	3	6	8	1	7	2	6	3
Pfizer	4	7	8	3	3	8	7	4
Strides	1	7	7	1	3	5	7	1
Torrent	1	10	8	3	1	10	8	3
Biocon	3	7	7	3	2	8	9	1
Astrazeneca	3	6	6	3	3	6	8	1
Total	29	115	106	38	38	106	98	46

The above table shows the result of a number of times null hypothesis accepted/ rejected applying the paired-t test to examine the effect of announcement date & effective date on price as well as the volume of shares for the selected sample companies during the study period

- By testing 144 paired t-test on prices before and prices after the announcement date of 15 pharmaceutical companies for the year 2004-2013, 115 times it has been observed that selected companies have a significant impact of dividend announcement on its market price.
- By testing 144 paired t-tests on volume of share before & after the announcement date of 15 pharmaceutical companies for the year 2004-2013, 106 times it has been observed that selected companies have no significant impact of dividend announcement on volume of shares traded. Statistically, 38 times dividend announcement impact had been observed for selected pharmaceutical companies.
- Using 144 paired t-test calculations on prices before and prices after the effective date of 15 pharmaceutical companies for the year 2004-2013, 106 times null hypothesis was rejected stating that effective date of dividend had a noticeable change in the price of selected companies after the effective date of dividend as compare to before the effective date of the dividend. Statistically dividend effective date have a significant impact on the price of shares after as compare to before effective date.
- Using 144 paired t-test calculations on volume of shares traded before & after effective date of 15 pharmaceutical companies for the year 2004-2013, 98 times null hypothesis was accepted stating that effective date of dividend had no significant change in quantity of shares of selected companies after effective date of dividend as compare to before effective date of dividend. Statistically dividend effective date have no significant impact on volume of shares after as compare to before effective date.

### Conclusions

#### Conclusion based on ANOVA on Pharmaceuticals Industry

Findings based on ANOVA									
Significance level 5%	Price					Quantity			
	Announcement date Price		Effective date Quantity		Announcement date Price		Effective date Price		tab value
	calculated value		calculated value		calculated value		calculated value		
4.21	Before	After	Before	after	Before	after	Before	After	
	2.34	0.04	1.39	0.06	0.28	2.96	0.53	2.15	
	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	

- The ANOVA of Share Prices between selected companies before announcing the dividend shows that fluctuations in the average price of share within selected units are random and it does not have a significant impact of dividend announcement and also interpreted that deviation in one cannot lead to deviation in other.
- The ANOVA of Share Prices between selected companies after announcing the dividend shows that fluctuations in the average price of share within selected units are random and it does not have a significant impact of dividend announcement and also interpreted that deviation in one cannot lead to deviation in other.
- The ANOVA of Share Prices between selected companies before the effective date of the dividend shows that fluctuations in the average price of share within selected units are random and it does not have a significant impact on effective date of and also interpreted that deviation in one cannot lead to deviation in other.
- The ANOVA of Share Prices between selected companies after the effective date of the dividend shows that fluctuations in the average price of share within selected units are random and it does not have significant impact of effective date and also interpreted that deviation in one cannot lead to deviation in other.
- The ANOVA of the volume of Shares traded between selected companies before announcing the dividend shows that fluctuations in the average volume of share within selected units are random and it does not have a significant impact of dividend announcement and also interpreted that deviation in one cannot lead to deviation in other.
- The ANOVA of the volume of Shares traded between selected companies after announcing the dividend shows that fluctuations in the average volume of share within selected units are random and it does not have a significant impact of dividend announcement and also interpreted that deviation in one cannot lead to deviation in other.
- The ANOVA of the volume of Shares traded between selected companies before the effective date of dividend shows that fluctuations in the average volume of share within selected units are random and it does not have a significant impact of dividend announcement and also interpreted that deviation in one cannot lead to deviation in other.
- The ANOVA of the volume of Shares traded between selected companies after the effective date of dividend shows that fluctuations in the average volume of share within selected units are random and it does not have a significant impact of dividend announcement and also interpreted that deviation in one cannot lead to deviation in other.

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