Article

Dividend Announcement and Market Response in Indian Stock Market: An Event-Study Analysis

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Abstract

Event study has remained one of the highly pursued areas of research in corporate finance. Studies reported in this realm empirically show that the economic model or the capital asset pricing model (CAPM) yields relatively better results with respect to the abnormal return of stocks preceded by dividend announcement by the dividend payers as compared to the statistical model, namely, constant return or market model approaches. Both models are incorporated in the study to triangulate the outcomes more accurately. A few hypotheses posited in this paper are namely, there will be significant differences in share prices of sampled companies mediated (moderated) by dividend announcement, and there will be significant differences between positive and negative average abnormal returns along with the ranks of firms.

Keywords

Capital asset pricing model (CAPM), market model, non-parametric tests, abnormal return (AR), average abnormal return (AAR), cumulative average abnormal return (CAAR)

Introduction

Dividend policy is always a challenge to any firm's financing decision. It always drives the firm to decide how much would be the dividend payout (ratio) considering the proportion of retained earnings to be kept for future investment. A big question is always raised on many occasions whether dividend is a passive residual, as it is not an active decision taken by firms; rather an outcome of the investment proposals which firms project in the future. As opposed to this proposition, Baker and Wurgler (2004) proposed 'catering theory of dividend' which asserts that dividend is not a residual and is driven by a prevailing demand for dividend distributors or payers (mostly firms which actually pay dividend

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distribution tax). Managers only cater to the demands of investors by paying dividends when investors show an interest to pay a premium on dividend-paying stocks and not by paying dividend when investors put a premium on non-dividend paying stocks. The 'Clientele effect' also argues that investors orient themselves around the new policies of firms, such as dividend announcements. So, the share price keeps its pace with the demands of the investors in response to new policies. There are many theories which unveil and unearth many dimensions in view of the effectiveness of dividend on share price vis-à-vis on the value of firms. Hence, it leaves the justification up to the findings of empirical investigations. Event study seeks well to measure the return effect on securities due to occurrence of economic and/or financial changes, namely, dividend announcements, bonus issues, stock splits, buy-back shares, mergers and acquisitions, etc. Thus, event study is applied to ascertain a security's price reaction by comparing actual returns to estimated expected returns (Fama et al., 1969).

The remainder of paper proceeds as follows. The first section succinctly describes the rationale behind the paper. The second section tries to come out with a systematic literature review followed by research objectives. The third section posits a few testable hypotheses supported by methodological relevance and congruence. The fourth section discusses results and analyzes the impact of an event on return of stock price. The last section summarizes the whole paper and concludes.

Rationale Behind the Study

In this backdrop, it is required to analyze the effect of the dividend announcement on share price or stock return. Despite the presence of a large literature base with respect to event study, reported studies have been restricted to only parametric tests. A few are only based on non-parametric measures. Many a time, it is assumed that market is efficient which implies that it reflects the envelope of full information including historical, publicly- and privately-held information through stocks prices. When any new event or new information appears in the market, it instantaneously and unbiasedly seizes the information and elucidates in the current market price and in this regard the event study would explain how investors behave upon the arrival of new information and how it does influence the value of the firms. This information also precedes the extent to which other information about long-run earnings of firms are already available or accessible to the market participants. If more information about the present and future earnings is in the hand of the public along with consistency of the information with actual performance, then a dividend announcement would be contained with less information. But in most of the cases managers are not able to fully forecast and communicate the future earnings of the firm. Some factors also play a vital restrictive role from achieving long-run normalized returns and market participants cannot also comprehend those causes or factors' implications. Therefore, dividend announcements come with a new bunch of information indicating the firm's earning power and liquidity (Brittain, 1966; Friend and Blume, 1970; Linter, 1956). Dividend policy also takes care of the 'Agency problem' (La Porta et al., 2000; Zwiebel, 1996). Dividend payout makes a tinge of balance between insiders and outside shareholders. If dividend is not paid out, then the money can be routed for the use of some unviable risky projects which may benefit the insiders at the expense of outside shareholders. Hence, the role of dividend cannot be discounted at all. In view of this, this paper makes an attempt to deliver the opportunities to the managers in finding the effect of dividend announcement on share prices so that they can find a common thread between investment, financing and dividend policies.

Literature Review

Event studies have a long history. Dolley (1933) first empirically studied the price effects of stock splits, examining the price changes at the time of split. Using a sample of 95 splits as data points from 1921 to 1931, he found that the price increased in 57 of the cases and the price declined in only 26 instances. There was no effect in the other 12 cases. Myers and Bakay (1948), Barker (1956, 1957, 1958) and Ashley (1962) also studied during this time period and explored the applicability of event study to remove general stock price movements and to separate out the confounding events. As time rolled on sophistication in the study has gradually increased. Ball and Brown (1968) applied the concept of information contained on earnings and Fama et al. (1969) examined the effects of stock splits after removing the effects of simultaneous dividend increases. In a later period of time Brown and Warner (1980, 1985) presented papers from a methodological perspective which discussed the use of monthly and daily data and their implication on results of event study. In theory, the objective of a dividend policy is to maximise shareholder's returns so that the value of the investment is maximized in the future. Walter (1963) argued that the choice of dividend policy almost always affects the value of the firm. He clearly depicted the relationship between the firm's rate of return (r) and its cost of capital (k) in designing the dividend policy that will maximize the wealth of the shareholders. In case of a 'growth firm', if the firm's rate of return (r) is greater than its cost of capital (k) then value of per share increases if the policy is to retain earnings for internal investment. In case of 'normal firms', where the firm's rate of return (r) is equal to its cost of capital (k) a dividend policy has no influence on the market value per share. On contrary, in 'declining firms', where internal rate of return (r) is less than the cost of capital (k), a robust dividend policy influences the market value per share.

In 1967, Myron Gordon came out with a new dividend model which is, indeed, dynamic in nature considering time value of money, popularly known as the 'discount growth or dividend ratio' model (Gordon, 1967). He developed his model based on the assumptions of all equity firms, no external financing, constant returns, constant cost of capital, perpetual earning, no taxes, constant retention and cost of capital. Krishnan (1933) had put forward a 'bird-in the hand argument' which implies that

> Of two stocks with identical earning record and prospects but the one paying a larger dividend than the other, the former will undoubtedly command a higher price merely because stockholders prefer present to future values. Myopic vision plays a part in the price-making process. Stockholders often act upon the principle that bird in the hand is worth. For this reason they are willing to pay a premium for stocks with higher dividend rate, just as they discount the one with the lower rate (Pandey, 2004, p. 384).

But a different view was again hypothesized, popularly known as the Modigliani and Miller (M–M) hypothesis (1961). It reiterates that under a perfect market situation, the dividend policy of a firm is irrelevant as it remains insensitive towards the value of the firm. They commented that the value of the firm depends on the firm's earnings that result in its investment policy. Thus, when an investment decision is given the dividend decision, the proportion of dividends and retained earnings, produces hardly any significant impact on the value of the firm. During the same period it was arguably contested by Solomon (1963). He concluded that dividend announcements always come out with new information. Dividend payment could better disseminate the information about its expected earnings growth. It conveys the impression that the firms are earning profits.

Ross (1977) postulated the 'dividend signalling hypothesis' which says that dividend payments can signal the future earnings of the firm. It may change the investors' perceptions about the riskiness of the firm when it remains unchanged.

In India, quite a few literatures to illuminate the impact of dividend announcement on share prices are found. Agarwal (1991) studied the impact of dividend announcement on share prices of the commercial automobile sector and observed that dividend announcement has a great impact on share prices and in addition to this, he also attempted to explain the current dividend behaviour by the current level of net profits and the dividends of the past two years. Chaturvedi (2000) studied a different issue like half-yearly financial results and share prices in India. Though it is not directly related to event study, nonetheless it indicates the relevance of information contents in influencing the share price behaviour and he obtained cumulative abnormal returns in a post-announcement period of 21 days to 40 days, indicating stock prices do not appropriate speedily to the Price/Earning (P–E) ratio information. Kaur (2005) examined the stock price reaction to dividend announcement and presented positive stock prices in response to a positive dividend announcement. But Chander et al. (2007), in their study of share price and dividend announcement illustrated that dividend income does not inspire over-enthused investors in the rising capital markets. They can earn abnormal returns formulating well-planned investment strategies based on fundamental analysis rather than on technical analysis. Selvan et al. (2010) declared that dividend announcements serve as a signalling mechanism to the management as it starts yielding statistically significant abnormal returns around the announcement date.

In Denmark, Sponholtz (2005) discovered that response of stock market to the announcement is attributed to information obscured in the current dividend and management's forecast or prediction of the next year's earnings.

The market immediately follows an upward swing in the share price movements. But, the positive impact stays only for a day; as the day passes on the positive effect starts diminishing or follows a declining trend.

Any event or information needs to be analyzed to assess market efficiency on account of the speed of adjustment of those news. It is an integral part of any event study which also sheds light on efficiency issues. Efficiency is measured by the speed of adjustment of any new information or innovation that appears in the market. In this respect, Patell and Wolfson (1984) observed the intra-day adjustment of stock prices to earnings and dividend announcement. Ball and Brown (1968) found that after announcement of earnings, cumulative abnormal returns continue to move up for good news and move down in the wake of bad news. Many researchers viewed the Indian capital market as a semi-strong efficient one (Manickaraj, 2004). But Mallikarjunappa and Iqbal (2003), Mallikarjunappa (2004 a, b) and Iqbal (2005) found that prices did not adjust instantaneously to quarterly earnings which corroborated that the Indian stock market is not semi-strong efficient.

Objectives and Scope of the Paper

The objective of the paper is to understand the impact of dividend announcements on share prices. Most of the studies focus either only on the statistical model (constant-mean-return model or market model) or the economic model (Capital Asset Pricing Model [CAPM] or Arbitrage Pricing Theory [APT][1]). Our objective is to use both the models to analyze comprehensively the effect of such an event on equity shares during the period from April 2009 to March 2010. In addition to this, it is also objectified to study

whether the dividend announcement does really cause any statistically significant movement in the prices both positive and negative.

Hypotheses

In this backdrop, the study attempts to test the following hypotheses concerning the dividend announcement on share prices. The hypotheses posited here are related to signalling the effect of dividend announcement. In an informationally efficient market when a dividend announcement is announced the share prices should adjust rapidly to new information.

H_1

There is a significant difference in share prices of sampled companies mediated by the dividend announcement or there will be significant abnormal returns upon dividend announcement.

The sign test judges the proportion of positive and negative abnormal returns against an assumed 50 per cent split under the null hypothesis of no reaction to the event.

H_2

There is significant difference between positive and negative average abnormal returns.

H_3

There will be significant differences between the ranks of the firms in the event period and expected average ranks with no abnormal returns.

Methodology

In this study both the CAPM and market model are considered. At first using both models abnormal returns are estimated and then they are averaged to obtain Average Abnormal Return (AAR) which are further cumulated in order to estimate Cumulative Average Abnormal Return (CAAR).

The market model can be mathematically shown as,

$$R_{it} = a_i + \beta_i * R_{mt} + \varepsilon_{it} \quad \text{for i} = 1, 2....\text{N} \tag{1}$$

where, R_{it} = Expected return on security 'i' for time period of 't'.
a_i = intercept or OLS parameters of security return on market return.
β_i = Beta coefficient estimated through OLS measurement.

R_{mt} = Market return on time 't' (Index return *viz*. S&P CNX NIFTY).
ε_t = Error term with mean zero and constant variance and zero co-variance

Abnormal returns are then calculated as,

$$AR_{it} = R_{it} - [a_i + \beta_i * R_{mt}] \tag{2}$$

After calculating the abnormal return (AR), AAR is estimated.

$$\text{AAR}_{it} = (1/\text{N}) * \sum \text{AR}_{it} \tag{3}$$

AAR = Average Abnormal Return
N = Total number of securities.
AR_{it} = Abnormal Return of security 'i' on time 't'.

To sense the effect of dividend announcement on the share price, CAAR is calculated. The CAAR is estimated as follows,

$$\text{CAAR}_{\text{it}} = \sum \text{AAR}_{it} \tag{4}$$

But sometimes the market model has been found with some inherent flaws, as Hays and Upton (1986) identified the market model is subject to the non-stationarity of the ordinary least squares (OLS) parameters estimates. But this becomes factual when event study is applied to the sample of momentum securities. In this regard, it has also been opined by Pettengill and Clark (2001) that there is serious bias resulting from positive average alpha. So, apart from the market model the CAPM model is also advocated to note the difference from the market model. The CAPM model being an economic model gives the advantage of having both statistical assumptions and an opportunity to calculate more precise measures of the normal returns using economic restrictions (Campbell et al., 2007). Thus, it provides another check to ascertain the result.

The CAPM model is estimated to calculate required rate of return as mentioned below,

$$R_{it} = R_{ft} + \beta_i * (R_m - R_f) \tag{5}$$

$$AR_{it} = [R_{it} - \{R_{ft} + \beta_i * (R_{mt} - R_{ft})\}] \tag{6}$$

Where,
R_{ft} = Risk free return (364 days T-bill return),
βi =Market risk (systematic risk),
R_{mt} = Market index return,
R_{it} =Expected return of security 'i' on time 't'.

Test of Significance

To assess the market efficiency in terms of significance of AAR and CAAR at the 5 per cent level of significance, a t-test with appropriate degrees of freedom is incorporated and performed. The significance tests are of two kinds, (*a*) Parametric tests; and (*b*) Non-parametric tests.

Parametric Test

$$\text{t-test} = \text{AAR}/\ [\text{S(AAR)}/\sqrt{\text{N}}) \tag{7}$$

$$\text{t-test} = \text{CAAR}/[\text{S(CAAR)}/\sqrt{\text{N}}) \tag{8}$$

S(AAR) = Standard deviation of average abnormal return calculated over estimation period
S(CAAR) = Standard deviation of cumulative average abnormal return calculated over estimation period
N = Number of observations.

Non-parametric Test

Alternative to the parametric test, a non-parametric test is also executed. The non-parametric test is devoid of specific assumptions concerning the distribution of returns which handicaps the parametric test. Non-parametric tests are of two types, (*a*) Sign tests; and (*b*) Rank tests.

Generalized Sign Test

The sign test is performed to assess whether the stocks under study having a positive cumulative abnormal return in the event window exceed the expected in the absence of the event (namely, dividend announcements). The sign test is to examine the null hypothesis that there is no significant difference between the number of positive and negative AARs.

To test the statistics, it is imperative to know the abnormal return with positive sign (N^+) and the total number of cases, N. So, the test would be a 'binomial test' which is as follows:

$$J_{\text{sign}} = [(N^+/N)–0.5]*N^{1/2}/0.5 \sim N\ (0,\ 1). \tag{9}$$

0.5 = Expected proportion of positive AAR.

Rank Test

A significant weakness of the sign test is that if the data is skewed as in the case of daily returns, then this test may not be well specified. If the daily return is originally skewed, then even under the null hypothesis the proportion of positive abnormal returns would differ from 0.5. The test compares each firm's rank during the event period with the average rank under the assumption (null hypothesis) that there is no abnormal return.

From the explanation of Corrado (1989) K_{jt} is the rank of abnormal return (ARj_t) in the total time period of stock *j*. Rank one implies the smallest abnormal return; the total period rank is the highest. The mean rank is *total period/2*.

So the Rank test is,

$$J_{\text{rank}} = d^{1/2}[(K_d\text{-Mean rank})/\sum ((K_t\text{-Mean rank})^{2}/\text{Total period})^{1/2}] \tag{10}$$

K_d = Average rank across the *n* stocks across and d days of the event.
K_t = is the average rank across *n* stocks on day t of the total period combined estimation and event period.
d = number of event days

Data Characteristics and Sample

The study is based on 50 S&P 500 CNX NIFTY companies that were part of the index from 2008 to 2010. S&P CNX NIFTY is recognised as a benchmark stock index based on the selected stocks traded at the National Stock Exchange (NSE). The S&P CNX NIFTY is a well diversified 50-stock index accounting for 23 sectors of the economy (for details, see Nath and Dalvi, 2004). From electronic sources about the exchanges, NSE and the Bombay Stock Exchange (BSE) it has been observed that capitalization of the NIFTY capital market segment accounted for around 37 per cent whereas capitalization of the SENSEX excluding BSE-100, BSE-500, BSE-IPO, MIDCAP, SMLCAP and other sectoral indices, reported around 63 per cent as on 30 October 2009. In case of free-floating market cap, the former contributed about 54 per cent, which was, evidently, more than the latter one (about 46 per cent) on the BSE. S&P 500 CNX NIFTY has been considered as a proxy to or a surrogate of the market. Average yields of 364 day's Government of India (GOI) securities are used as risk-free rate of the respective years. In this paper, the date of dividend announcement is defined as day 0 or event day. We have included 15 days as pre-announcement days and 15 days as post-announcement days. So, our event window consists of 31 days including day-0 and the estimation window contains 160 days. The index under study has 50 companies across the industry. Only the companies that showed consistency in dividend announcement are included in this study. After passing through all the checks and filtration process, only a sample of 24 companies deserved to be present in this study and the sample is non-normal. The study is kept limited to only S&P CNX NIFTY index based companies. Daily returns are calculated as

$$Ri,\ t = \ln (P_t/P_{t-1}) \tag{13}$$

P_t = price of security on time 't'.
P_{t-1} = Price of security on time 't–1'.

The data were collected from the Centre of Monitoring Indian Economy (CMIE-Prowess database), BSE, NSE, RBI and SEBI websites.

Results and Discussions

Index data with respect to index value and stock prices are retrieved from CMIE for 191 trading day-counts, comprising 160 days for estimation and 31 days for the event window, respectively. The regressing index or market return on individual stock return, beta is calculated for each of the 24 companies. Then using proper methodologies, both under the market model and the CAPM model, AAR and CAAR are calculated (see Table 1). Under the market model, it is observed that AARs are negative for six days (40 per cent) and are positive for nine days (60 per cent) during the pre-announcement period. AARs are also found negative for five days (33.33 per cent) and positive for 10 days (66.67 per cent) during the post-announcement period. Only two AARs are found insignificant at the 5 per cent level of significance on the thirteenth day and fifth day during the pre-announcement period. When CAAR is calculated under the same model, it is found that it is negative for four days (27 per cent) and positive for 11 days (73 per cent) during the pre-announcement period but during the post-announcement period no negative CAAR is noticed. But for the (–)fifteenth to the (–)twelfth day the CAAR is insignificant. Only one negative

Table 1. AAR and CAAR under the Market Model and CAPM Model

We calculate the Average Abnormal Return and Cumulative Average Abnormal Return both under Market Model and CAPM Model. Afterwards the significance of both AAR and CAAR are tested using t-statistics.

	Market Model				CAPM Model			
Event Period	AAR	CAAR	t-STAT (AAR)	t-STAT (CAAR)	AAR	CAAR	t-STAT (AAR)	t-STAT (CAAR)
−15	−0.0024	−0.0024	−4.18579*	−0.81870795	0.00427	0.0043	7.85966*	0.152176
−14	0.0026	0.0002	4.511019*	0.06361133	0.01183	0.0161	21.7682*	0.573643
−13	−0.0009	−0.0007	−1.56023	−0.24155758	0.00068	0.0168	1.24972	0.597839
−12	−0.0015	−0.0022	−2.57074*	−0.74437393	0.00459	0.0214	8.43685*	0.76119
−11	−0.0093	−0.0115	−16.0841*	−3.89030172*	−0.00069	0.0207	−1.2784	0.736438
−10	0.01768	0.0062	30.63983*	2.10260524*	0.02255	0.0432	41.4896*	1.539742
−9	−0.0039	0.0023	−6.80297*	0.77199878	0.00121	0.0444	2.22608*	1.582842
−8	0.00615	0.0084	10.65813*	2.85664319*	0.00977	0.0542	17.9759*	1.930884*
−7	0.00467	0.0131	8.092846*	4.43953939*	0.01416	0.0684	26.0568*	2.435386*
−6	0.01725	0.0303	29.90146*	10.2880256*	0.01946	0.0878	35.8059*	3.128645*
−5	0.00028	0.0306	0.493451	10.3845407*	0.00268	0.0905	4.93791*	3.22425*
−4	0.00363	0.0343	6.288096*	11.6144421*	0.00835	0.0989	15.3593*	3.521631*
−3	0.01053	0.0448	18.24658*	15.1833276*	0.01269	0.1116	23.3487*	3.973698*
−2	−0.0121	0.0327	−21.0162*	11.0727212*	0.00080	0.1124	1.47753*	4.002305*
−1	0.00517	0.0378	8.961703*	12.8255589*	0.00976	0.1221	17.9571*	4.349982*
0	**0.00222**	**0.0401**	**3.850634***	**13.5787122***	**0.01241**	**0.1345**	**22.8269***	**4.791948**
1	0.00544	0.0455	9.435105*	15.4241435*	0.00911	0.1436	16.7602*	5.116451*
2	0.01182	0.0573	20.48266*	19.4303886*	0.01933	0.163	35.5547*	5.804846*
3	0.00906	0.0664	15.70404*	22.501974*	0.01701	0.18	31.3026*	6.410914*
4	−0.0059	0.0605	−10.2408*	20.4989507*	0.00049	0.1805	0.89643*	6.428271*
5	0.01967	0.0801	34.08939*	27.1665632*	0.02555	0.206	47.004*	7.338343*
6	0.00801	0.0881	13.87529*	29.8804602*	0.01843	0.2244	33.9049*	7.994795*
7	0.00406	0.0922	7.033793*	31.256214*	0.01010	0.2345	18.5805*	8.354544*
8	0.00582	0.0980	10.09238*	33.2302021*	0.00952	0.2441	17.5124*	8.693612*
9	0.00364	0.1017	6.315121*	34.4653895*	0.01162	0.2557	21.369*	9.107349*
10	−0.0061	0.0956	−10.5962*	32.3928513*	0.00444	0.2601	8.1705*	9.265543*
11	−0.006	0.0895	−10.4809*	30.3428768*	0.00135	0.2615	2.48043*	9.313568*
12	−0.0002	0.0893	−0.39391*	30.2658303*	0.01130	0.2728	20.7922*	9.716138*
13	0.01539	0.1047	26.68153*	35.484525*	0.02203	0.2948	40.5345*	10.50095*
14	0.01025	0.1149	17.76746*	38.9596981*	0.02156	0.3164	39.6592*	11.26881*
15	−0.0005	0.1145	−0.81925	38.7994586*	0.01209	0.3285	22.2362*	11.69934*

Source: Authors' estimates.

CAAR is found significant. The highest AAR is found on the tenth day (1.768 per cent) prior to announcement whereas during the post-announcement it is seen on the fifth day (1.967 per cent). On day zero, AAR is very less, only 0.2 per cent. Figure 1 depicts that the AAR is highly fluctuating. A negative AAR is evident during the initial days of the event period after which it becomes positive. But after the event day, most of the negative AAR is seen during the later days of the event window. CAAR is continuously increasing with peaks and valleys.

A different set of results are attained under the CAPM model. In this model, highest return is gained on the fifth day during post-announcement period (2.5 per cent). A negative AAR is noticed only on the (–)eleventh day during the pre-announcement period. On day zero, the return remains 1.2 per cent. More returns are observed during the post-announcement period rather than during the pre-announcement period. During the (–)tenth, (–)sixth and (–)third days (pre-announcement) the returns are 2.25 per cent, 1.94 per cent and 1.26 per cent respectively; whereas during post-announcement, on the second, third, fifth, sixth, thirteenth and fourteenth days the returns are 1.93 per cent, 1.70 per cent, 2.55 per cent, 1.84 per cent, 2.20 per cent and 2.15 per cent respectively. Only two AARs are found insignificant, viz. on the (–)thirteenth day and (–)eleventh day during the pre-announcement period, whereas only one return on day four (post-announcement) is found insignificant at the 5 per cent level of significance. Under the same model CAAR is found continuously increasing. CAAR on day 0 is 13.45 per cent. From the (–)fifteenth day to the (–)ninth day all the CAARs are observed statistically insignificant. But during the post-announcement period CAARs are found to be statistically significant. The same result is reported in Figure 2 also. Figure 2 apparently portrays that CAAR is continuously increasing which is very smooth. Under this model AAR is less fluctuating than the market model.

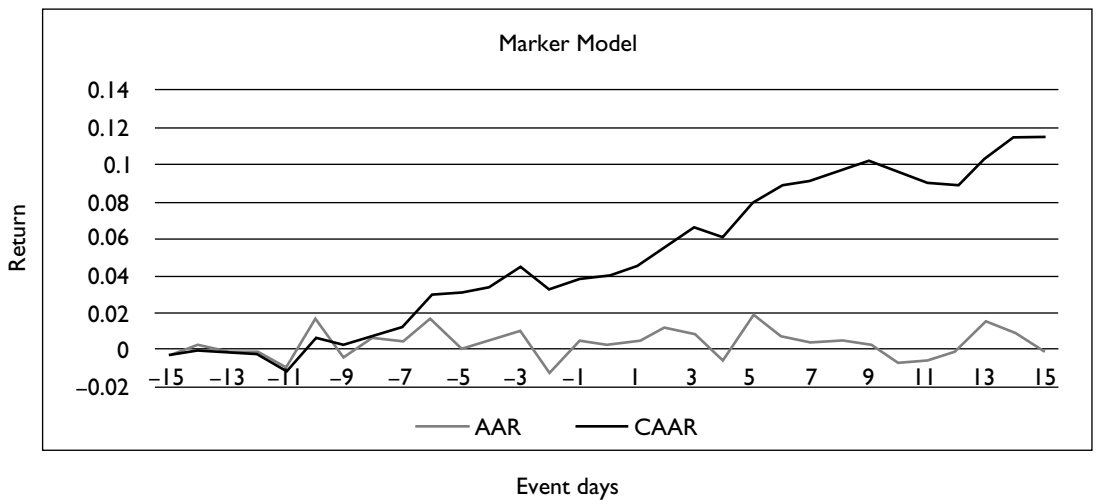

Figure 1. AAR and CAAR under the Market Model

Source: Authors' estimates.

Notes: We represent both AAR and CAAR under the Market model in a graphical form. It shows clearly the fluctuation of AAR and CAAR under the Market Model. We plot the return in absolute terms on the vertical axis and the pre- and post-15 days around the event day which is denoted by day '0'. The returns on the y-axis should be multiplied by 100 to obtain the value in percentage (per cent).

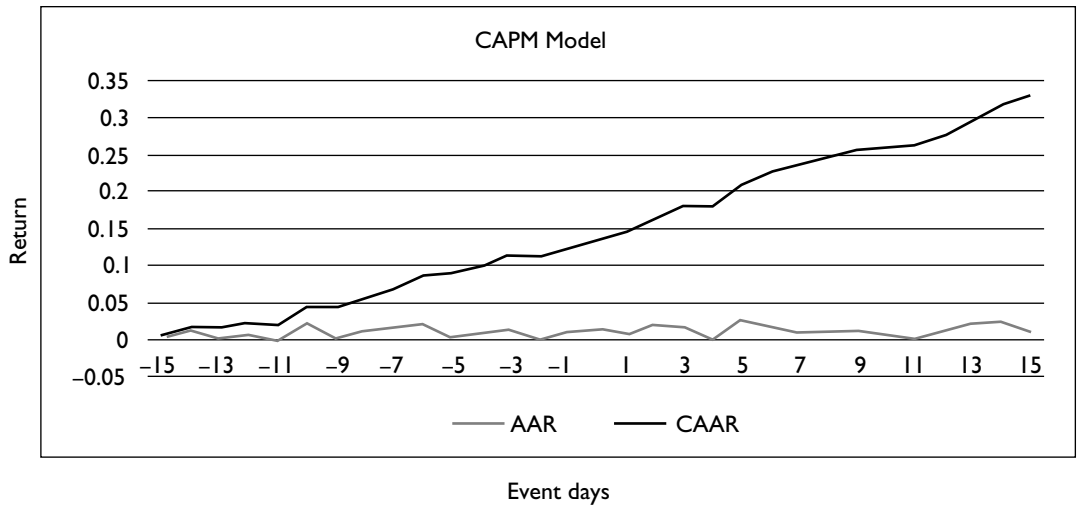

Figure 2. AAR and CAAR under the CAPM Model

Source: Authors' estimates.

Notes: We represent both AAR and CAAR under the CAPM model in a graphical form. It shows clearly the fluctuation of AAR and CAAR under the CAPM model. We plot the returns in absolute terms on the vertical axis and the pre- and post-15 days around the event day which is denoted by day '0'. The returns on the y-axis should be multiplied by 100 to obtain the value in percentage (per cent).

Apart from the parametric tests, non-parametric tests are also employed. Table 2 illustrates the significance of the sign test both during the pre-event and the post-event along with overall significance of each individual firm taken for the study. Evidently, it is found that test values are more statistically significant under the CAPM model. Test statistics after the event announcement are found to be more significant than those before the event occurred. Hence, for many firms though the null hypothesis of no difference between positive and negative return is not rejected, but the same is rejected during the post-announcement period under the CAPM model.

Table 3 represents the result of the average sign test and rank test of the firms selected for the study. Under the market model, it is noticed that the null hypothesis of no significant difference between negative and positive returns cannot be rejected, both during pre-event and post-event. It is also true even for the entire event period. But, under the CAPM model the result appears entirely different. All the test-scores are found statistically significant at the 5 per cent level of significance. So, under the CAPM model the null hypothesis is rejected and it is evident that there is a significant difference between negative and positive signs.

The rank test is performed to test whether there is a significant difference between the ranks of the firms in the event period and expected average ranks with no abnormal returns. Again it is found that test statistics of the rank test under the market model is significant ($p < 0.05$) at the 5 per cent level of significance, but under the CAPM model the same test statistic is found insignificant ($p = 0.005709$ which exceeds 0.05 by a very thin margin). It is inferred that there is no significant difference between the average ranks obtained during the event period and the expected ranks without any abnormal return.

Table 2. Sign Test of each firm under the Market model and CAPM model
We run sign test to estimate the sign (+/–) of the return of each firm statistically. The test shows whether sign of the return is statistically significant or not.

	Market Model			CAPM Model		
Event	Before Event	After Event	Overall	Before Event	After Event	Overall
Axis Bank	1.29099	1.29099	1.82574	1.807392	2.32379*	2.92118*
BPCL	0.77459	−0.77459	0.0000	−2.32379	−2.84018*	−3.65148*
CIPLA	1.29099	0.25819	1.0954	−3.87298*	−3.87298*	−5.47722*
DLF	0.77459	0.25819	0.7303	1.80739	3.35658*	3.65148*
HDFC	0.25819	−1.29099	−0.7303	1.29099	−0.25819	0.73029
HINDALCO	0.25819	0.25819	0.3651	0.25819	0.77459	0.73029
ICICI	0.77459	0.25819	0.7303	1.80739	2.84018*	3.28633*
ITC	−2.32379	−0.77459	−2.1909*	−3.35658*	−2.32379*	−4.016632*
IDFC	−0.25819	1.29099	0.7303	2.32379*	2.32379*	3.28633*
JINDAL STEEL	−0.25819	0.25819	0.0000	2.32379*	3.35658*	4.01663*
KOTAK BANK	1.29099	0.25819	1.0954	1.29099	1.80739	2.19089*
L&T	1.29099	1.80739	2.1909*	1.29099	1.80739	2.19089*
M&M	−0.77459	2.32379	1.0954	−0.77459	1.80739	0.73029
MARUTI	−0.25819	0.25819	0.0000	−2.32379*	−2.32379*	−3.28633*
REL. INDUS	−0.25819	0.77459	0.3651	2.32379*	3.35658*	4.01663*
REL. INFRA	−0.25819	−0.77459	−0.7303	3.35658*	3.35658*	4.74692*
SIEMENS	0.25819	0.25819	0.3651	0.77459	−0.25819	0.36514
STERLITE	−0.25819	−0.25819	−0.3651	0.77459	0.25819	0.73029
SUN PHARMA	−1.29099	0.25819	−0.7303	−3.87298*	−3.87298*	−5.47722*
TATA MTS	−0.25819	0.25819	0.0000	0.77459	0.25819	0.73029
TATA POWER	0.77459	−0.25819	0.3651	0.77459	0.25819	0.73029
TATA STEEL	−0.25819889	0.7745967	0.3651	0.774596669	2.323790008*	2.19089*
UNITECH	0.774596669	−0.7745967	0.0000	2.840187787	2.840187787*	4.016632*
WIPRO	1.290994449	1.2909944	1.8257	1.290994449	0.774596669	1.46059

Source: Authors' estimates.
Note: *If the test value is more than ±1.96 or 2 SD then the test score is statistically significant at 5 per cent level of significance.

Table 3. Sign Test and Rank Test under the Market model and CAPM model
We calculate the average rank firms and average sign of the returns under both Market Model and CAPM Model to test the significance.

	Market Model			CAPM Model		
Test	Before Event	After Event	Overall	Before Event	After Event	Overall
Sign Test	0.77459*	1.29099*	1.46059*	3.35658*	3.87298*	5.11208*
Rank Test		**0.013088****			**0.05709****	

Source: Authors' estimates.

Notes: *If the test value is more than ±1.96 or 2 SD then the test score is statistically significant at 5 per cent level of significance.

**If the value is less than 0.05 (p = 0.05), then the score is statistically significant at 5 per cent level of significance.

Summary and Conclusion

Our present study has not only delimited event study based on the parametric tests, but has also considered methodological purposiveness employing a few non-parametric tests. The paper has also included the study of the economic model along with the statistical model to elaborate the situation better. It has already been argued how better results can be approximated under the CAPM model rather than the market model. We have chosen the NIFTY index as it serves a better proxy of the market than any other index, namely, BSE-SENSEX, BSE-midcap, BSE-100 etc., in the Indian context. Twenty-four stocks were selected for the study based on a set of criteria for selecting stocks. Under the market model beta (β) is calculated by regressing the stock returns on index returns (S&P 500 CNX NIFTY) where as in the CAPM model risk-free-returns (R_f) is applied along with beta. Then AAR and CAAR are calculated to probe the effect of dividend announcement on the share prices in terms of significant positive or negative abnormal returns. It has been observed that the amount of AARs are statistically significant and those are different for both market model and the CAPM model. On day zero, AAR under the market model is only 0.2 per cent whereas under the CAPM model it is 1.2 per cent. On the other hand, CAAR on day zero is 4.01 per cent under the market model whereas it is reported as 13.45 per cent under the CAPM model, which is statistically insignificant. It has also been quite palpable that under the market model investors mostly suffered from a negative average abnormal return whereas under the CAPM model, investors consistently enjoyed a positive average abnormal return (Selvan et al., 2010). Evidently, it can be inferred that there are significant abnormal returns (positive or negative or both) upon dividend announcement which is more evident under the CAPM model. Although abnormal returns are found significant even before the announcement of dividend both under the market model and the CAPM model, still more cumulative average abnormal returns are not found significant well before the announcement (see Table 1 for (–)fifteenth to the (–)ninth day) under the CAPM model. Under the CAPM model the rate of increase of CAAR becomes faster during the post-announcement period. When focus has shifted towards other statistical measurements, two different sets of results have been obtained. Under the market model, the null hypothesis that there is no significant difference between positive and negative average abnormal return fails to be rejected, whereas under the CAPM model the null hypothesis is found to be rejected. When the sign test is operated for all firms together against the null hypothesis of no significant difference, it is rejected under the CAPM model. The rank test is also performed to examine the rank and its significance and consecutively, it has been found that under the market model, there is a

significant difference between the rank of the firms during the event period and the expected average rank with no abnormal returns. On the contrary, under CAPM, the null hypothesis at significant difference (of abnormal returns) cannot be rejected.

Though event analysis is followed considering both the market model and the CAPM model, it has already been put forward with a logical and valid proposition that the CAPM model offers better results, which can be used for more precise interpretations. It can also be drawn, intuitively, from this paper that the Indian capital market does not capture the information very rapidly just after the announcement of dividend, which is portrayed by the magnitude of average abnormal return under the CAPM model.

Notes

1. Statistical models follow assumptions concerning the behaviour of asset returns and do not depend on any economic arguments. As opposed to this, economic models rely on assumptions concerning investors' behaviour and are not based solely on statistical assumption. The market model is a statistical model which relates the return of any given security to the return of the market portfolio. Economic models like CAPM or APT restricts the parameters of statistical models to provide more constrained normal return models (Campbell et al., 2007).

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