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A STUDY OF QUARTERLY EARNINGS ANNOUNCEMENT AND STOCK PRICE REACTIONS – WITH REFERENCE TO NIFTY MIDCAP 150

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Abstract *Market efficiency is a factor that has been marked as an important aspect since late 1950s. Researchers know three forms of EMH[1] for analyzing market efficiency. Many researchers like (Akinyi & Melissa, 2017), (Kendirli & Elmali, 2016), (Shah & Arora, 2014), (Suwanna, 2012), and (Yvonne & Mukora, 2014) had tried to identify the relationship between corporate announcements like earnings, dividend declaration, and the latter's impact on the market as a performance indicator. In this paper, we have tried to examine the impact of quarterly results on Nifty Midcap 150 index. The study is based on quarterly announcement of financial results for 148 companies. The whole portfolio is classified as good-news and bad-news portfolio on the basis of comparative study of quarterly financial results announcement with the same time period as of previous year. In good-news portfolio, there is an increase in the percentage of net profit as compared to the same quarter of previous year. We have used t-test, Sign and Runs test for checking of hypothesis. AARs[2] and CAARs[3] have been found to be mostly positive rather than negative and the market is found to be efficient under the semi-strong form.*

Keywords: *Event Study, Efficient Market Hypothesis (EMH), Average Abnormal Return (AAR), Nifty Midcap 150, Quarterly Earnings Announcement*

INTRODUCTION

The Efficient Market Hypothesis (EMH) theorem assumes that market is efficient, which means it would be impossible for an investor to earn abnormal returns by investing in the market on the basis of certain information as other investors would also be aware of the information. In the past, several models had shown up like the Fair-Game model, Sub-martingale model, the Random-walk model. However, the present form the hypothesis is the most accepted form, which includes the previous models in it. The primary difference between the three forms of the hypotheses namely the strong, weak, and semi-strong form lies with the type of information which is available to the investors. According to (Degutis, 2014), the weak form takes into consideration of prices, volume, etc., whereas the semi-strong form suggests that market is efficient for only publicly available information and historical stock prices, the strong form of the theory considers both public as well as privately available information. It has been widely accepted that the disclosure of earnings figures have significant impact on stock markets. Several researches such as (Dsouza, 2015), (Mallikarjunappa & Manjunatha, 2009), (Mallikarjunappa & Dsouza, 2014) have been done, which found market was either efficient or inefficient. We have attempted to identify the same in our study that whether there exists any correlation between quarterly earnings announcement and market sentiments, which in turn impacts the prices of the stocks.

LITERATURE REVIEW

(Mallikarjunappa & Manjunatha, 2009) studied the response of earnings announcement on stock prices of BSE-500 companies. The objective was to test if stock-market reactions reflect market efficiency. The study used event study method for analyzing the response of price movement of securities to publicly available data. 469 companies under the index were considered for the study using several market models such as mean-adjusted model and market-adjusted model. The companies were classified as good-

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news and bad-news portfolios on the basis of their quarterly earnings as compared to previous year. 248 companies were considered as positive/good news and the rest were classified as negative/bad news. The criteria for differentiating a good-news and bad-news portfolio were based on net sales and net profit of quarterly earnings. If net sales and net profits stood at cross heads, net profit was given the priority. The results of the test varied across different models and were summarized that market was positively related to announcement of quarterly result for the September quarter of 2012 because there were more number of positive values of AAR and CAAR as compared to negative values during the span of 61 days. The study finally concluded by saying that investors could earn abnormal returns on the basis of the earnings announcement for that respective quarter.

(Mallikarjunappa & Dsouza, 2014) tried to analyses the stock market of India following the semi-strong form of the EMH. Event study methodology was used for the study and the sample was taken as BSE-200 index. The time frame for the study was December 2011's quarterly earnings. Earnings news for most of the companies were obtained except for 14 companies whose quarterly earnings data were not available publicly. Data collection and analysis part was same as for the earlier two and several models were applied to come to the result like the Cowles, Sharpe's model. Run and Sign tests were also employed to draw conclusion. The study concluded that investors could use buy-and-hold strategy and Indian Stock Market is not efficient under the semi-strong form.

(Poshakwale, 1996) studied the weak form of the EMH on Indian stock market. Assumptions included that market was efficient until five time lags. The sample used for the analysis was the BSENI and included daily data of the market from 2nd January 1987 to 31st October 1994. In order to compare the BSE National Index with the world portfolio, Morgan Stanley World portfolio was used. Kolmogorov-Smirnov test, runs test, and serial-correlation coefficient test were used for checking the distribution, dependence of share-price movement on randomness of the process and checking the weak form of market efficiency, respectively. The study concluded that market was inefficient under the weak form of the EMH after considering the results of the previous three tests, which suggested that there was no randomness in the data and the average returns from the market were different on each day during the study time span.

(Naseer & Tariq, 2015) studied the collection of several theories of the EMH like the Fair-Game model, Sub-martingale, the random-walk model, the latter's forms, and their impact on stock market. They also studied market efficiency in developing countries with special reference to Karachi stock exchange. The study found the flow of information to be not symmetrical. The study viewed unit root test, autocorrelation test, and autoregressive models as most common tools for checking the efficiency of the markets. The study concluded by saying that EMH has the most acceptance among all other market-efficiency theories. The concept of behavioral finance was explained to show the difference in approach in explaining the theory of market efficiency and how it was attributed to psychology. Finally, the consolidated findings of several research reports and theories said in most markets researchers have found efficiency. However, significant number of researchers have pointed out at markets for not being efficient at particular periods.

(Chander et al., 2008) studied the weak form of the EMH. He studied weekly data of 145 Group A stocks listed in the BSE. The time period for the study was from July 1996 to December 2005. For the purpose of comparison, BSE 100 index was considered as the market. Both parametric and non-parametric tests were used for checking the efficiency. The study concluded by saying that the market was found to be efficient for the weekly data collected under the weak form of the hypothesis. However, certain minor drifts were observed. The technical analysts were made aware by this study to find some other stocks for their survival.

OBJECTIVES AND ASSUMPTIONS OF THE STUDY

Objectives of the Study

The objectives of the study were constructed after the thorough study of the literature. The objectives are to test the following:

- Effect of quarterly earnings announcement on change in prices of respective stocks.
- To check if the Nifty-midcap 150 index follows random walk.

Hypothesis of the Study

The following hypotheses are to be tested:

H_{01}: There is no scope for earning abnormal return by trading in stocks after quarterly earnings announcement.

H_{02}: The average annual return and the cumulative average annual return are close to zero.

H_{03}: The average annual returns are stochastic.

H_{04}: Positive and negative AARs don't have significant numeric difference.

DATA & SAMPLE FOR THE STUDY

We have tried to establish the relationship between quarterly earnings on the stock-price movement and hence the event study methodology was used. The data are collected on the Nifty Midcap 150 index and daily data are considered for the analysis. The Nifty Midcap 150 index is based out of Nifty 500 index and consists of all Midcap companies listed on NSE. The methodology used for calculating this index is based on free-float market capitalization of each stock. A stock is eligible in the index if it is among the top 225 stocks on the basis of free-float market capitalization in the Nifty 500 companies' list. Out of a total of 18 sectors constituting the Nifty 500 index, 17 sectors are considered in the Nifty Midcap 150 stocks. The data are collected based on a factor, which was event date of stocks and Nifty. The data are collected for the stocks on daily basis for a total of 312 days. The event day is considered as the 0^{th} day and the data for the next 30 days and previous 281 days are considered. The event day is the day of the quarterly earnings announcement. We have typically considered the announcement dates from NSE, BSE's corporate announcements portal, and from www.moneycontrol.com. Two sets of data are collected for the analysis. The first set of data includes collecting the daily closing prices and the second set of data involves collecting the sales and profit/loss for the quarter of both the current and the previous year for the companies under consideration.

Portfolio Creation

The stocks of the companies are divided into good-news and bad-news portfolio on the basis of net sales and net profit of the respective companies. Net profit percentage = (Current year's quarterly profit – Previous year's quarterly profit)/ Previous year's quarterly profit.

Net sales percentage = (Current year's quarterly sales – Previous year's quarterly sales)/ Previous year's quarterly sales.

Table 1: Portfolio Classification Matrix

	Net Sales	Net Profit	Portfolio
Growth	✓	✓	Good News
	×/✓	✓/×	Bad News

As we can see from the above matrix, the stock is as good-news stock only if both of net sales and profits are positive; whereas for all other combinations, it is considered as bad news.

METHODOLOGY

We have collected the data for all stocks listed in the index and observed the fluctuation in prices in response to quarterly earnings announcement. Event study methodology of (Iqbal and Mallikarjunappa, 2011) is employed for understanding the same. The date of the quarterly earnings announcement is termed as "Zeroth" day or event day. We have considered 61 days' data for analysis, which are distributed evenly across both positive and negative axis (–31 to +30 days). The remaining days till –281 are considered as "non-event" period. The returns for each stock are calculated on the basis of Mean-Adjusted Model, Market-Adjusted Model, and the OLS market model. Regression estimators have been used for calculating the values of AARs and CAARs.

Measuring Variables for Abnormal Return

$R_{i,t}$ = arithmetic return for any security i on t.

$A_{i,t}$ = abnormal return of security i on t day.

We have used the following three models for calculating the return:

Mean Adjusted Model

The mean-adjusted model considers two returns, $R_{i,t}$ and $\bar{R}_i$ which are absolute and expected returns, respectively. This model assumes the expected return to be equal to $\bar{R}_i$.

$$A_{i,t} = R_{i,t} - \bar{R}_i \quad \text{(i)}$$

$$R_i = \frac{1}{250}\sum_{i=-280}^{-31} \bar{R}_{i,t} \quad \text{(ii)}$$

Here, $A_{i,t}$ represents the abnormal return on security i on day t. $\bar{R}_i$ is arithmetic mean of security i's daily returns during the period (–280, –31).

Market-Adjusted Model

The abnormal return is calculated by subtracting market return from individual security return.

$$A_{i,t} = R_{i,t} - R_{m,t} \quad \text{(iii)}$$

Where, $R_{m,t}$ is the return of Nifty for t day.

OLS Market Model

Compared to the mean adjusted and the market-adjusted model, this model uses both firm and security oriented factors

and hence is more sophisticated. It takes into consideration β_i and α_i which are calculated from the OLS regression. The dependent and independent variables in this model are Nifty returns and security return, respectively. The model is as follows:

$$A_{i,t} = \alpha_i + \beta_i R_{mt} + e_{it} \quad \text{(iv)}$$

The beta for the securities and the market is calculated by using the following formula:

$$\beta_i = \frac{N\sum_{t=1}^{N} R_{mt}R_{it} - (\sum_{t=1}^{N} R_{mt})(\sum_{t=1}^{N} R_{it})}{N\left(\sum_{t=1}^{N} R^2{}_{mt}\right) - N(\sum_{t=1}^{N} R_{mt})^2} \quad \text{(v)}$$

Where, β_i is the slope of a straight line, R_{mt} is the market return during time t and R_{it} is the return on security at time t. N is the total number of observations.

This model was followed by calculating AAR and CAAR. We assume that stock prices are affected by earnings announcement.

Average Abnormal Return (AAR)

The average abnormal return of the index is calculated for a period of –30 to +30 days where 0^{th} day is the event day. The average abnormal return is calculated using the following formula:

$$AAR_{it} = \frac{\sum_{i=1}^{N} AR_{it}}{N} \quad \text{(vi)}$$

Cumulative Average Abnormal Return (CAAR)

The CAAR is obtained by taking the summation of AARs for a period of 61 days.

The CAAR is calculated by using the following model:

$$CAAR = \sum_{t=-30}^{K} AAR_{it} \quad \text{(vii)}$$

Parametric test for Checking Significance

Parametric *t*-test is used to check the significance of the previous AAR and CAAR models. The LOS assumed for testing the hypothesis is considered as 5%. The AAR is expected to be close to 0. *t*-value for AAR is obtained by dividing the AAR by standard deviation of the AAR. Similarly, the *t*-value for the CAAR is determined by dividing the CAAR by standard deviation of the CAAR.

Non-parametric test for checking significance:

We have used Runs test for checking the stochastic nature of the collected data sample. The test is run on the AAR, before and after the event day to check the possibility of abnormal returns.

The null hypothesis for this test: H_0: The data collected are stochastic.

We have used the sign test for checking the order of the sample. The null hypothesis for this test is:

H_0: There exists randomness in the order of one's and two's.

H_1: Stochasticity is absent in the order of one's and two's.

The standard error is calculated for both the Runs and the Sign test using their respective model.

Runs Test

This test was developed to check the stochastic nature of the sample under study. Three periods, before, after, and during the event window have been tested for stochasticity. The mean number of runs is obtained as follows:

$$\mu_r = \left(\frac{2n_1n_2}{n_1+n_2}\right) + 1 \quad \text{(viii)}$$

Where, n_1 and n_2 represents the number of positive and negative AARs, respectively.

μ_r: Average number of runs.

For the expected number of runs, the standard errors is calculated as follows:

$$\bar{\sigma}_r = \sqrt{\frac{2n_1n_2\left(2n_1n_2 - n_1 - n_2\right)}{\left(n_1+n_2\right)^2\left(n_1+n_2-1\right)}} \quad \text{(ix)}$$

Here, r: number of runs

The deviation of the actual from the expected number of runs is calculated as:

$$Z = \frac{r - \mu_r}{\sigma} \quad \text{(x)}$$

Sign Test

The Sign test was developed by (Mendenhall et al., 1989) which considers positive and negative signs of sample values.

H_0: Number of positive and negative AARs doesn't vary significantly.

The sign test is applied before, after the event day and for the entire period. The standard error is calculated as follows:

$$\sigma_p = \sqrt{\frac{pq}{n}} \quad \text{(xi)}$$

Where, σ_p is standard error of the proportion, p and q are the probability of positive and negative AARs.

The sign test value is calculated as follows:

$$Z = \frac{\bar{P} - P_{H_0}}{\sigma_p} \quad \text{(xii)}$$

Where, $\bar{P}$ is the actual probability of AARs having positive signs and $P_{H0} = 0.5$.

RESULTS & ANALYSIS

The AAR and CAAR of the Mean-Adjusted, Market-Adjusted, and the OLS Market Model are shown in Table 2 and Figure 1 for the 3rd quarter of FY 17. –17, –13, –12, –8, –7, –6, –5, –3, 5, and 30 are the days for which the mean-adjusted model showed positive and significant AARs. The model showed negative and insignificant values for –29, –25, –21, 3, 4, 11, 13, 15, and 24 days. The remaining days are insignificant as well. Hence, we can say that for the Mean-Adjusted Model total significant days are 10 whereas rest 41 days are insignificant. Hence, the null hypothesis of probability of AARs being close to zero is not rejected. The CAARs are not significant for the entire 61-day period in the Mean-Adjusted Model. The only negative days are –29 and –28 days. Hence, we will accept the null hypothesis of CAAR being close to zero. The market-adjusted model observed positive and significant AARs for only 3 days, –27, –8, 19 days, while it observed positive and insignificant AARs for 25 days, –30, –29, –28, –20, –18, –17, –14, –13, –12, –7, –3, –2, 3, 5, 7, 8, 9, 14, 19, 22, 23, 24, 25, 29, and 30. The rest of the days are found to be both negative and insignificant. The previous results helps us in inferring the chances of AAR, which is obtained by not rejecting the hypothesis of close to zero AARs. The CAARs in this model are only significant for –27th day and are insignificant for the remaining days. Total positive CAARs are 7 and the rest 54 are negative. We can accept the null hypothesis of CAARs being close to zero. Positive and significant AARs for the ordinary least square model are on –17, –13, –12, –8, –7, –5, –3 and 5 days. The AARs are negative and insignificant for –29, –25,–21, –16, 3, 4, 11, 13, 15, and 24. For the rest 43 days, AARs are positive but insignificant. So, we can accept the null hypothesis of AAR close to zero. Positive and significant CAARs for this model are for 5, 6, 7, 8, 9, 10, 12, 14, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, and 30 days. CAARs are found to be negative and significant for 11, 13, 15, and 24 days. CAARs are observed to be positive and insignificant for a total of 29 days and negative and insignificant for a total of 4 days. Total insignificant days are 35 and significant days are 26 days. Hence, we can accept the null hypothesis of CAAR close to zero.

Table 2: AAR and CAAR Values for Full-Sample Earnings Announcement

	Mean adjusted				Market adjusted				OLS market model			
Days	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**
-30	0.0006	0.2985	0.0006	0.0006	0.0009	0.1064	0.0009	0.0546	0.0004	0.2045	0.0004	0.0110
-29	-0.0033	-1.6831	-0.0027	-0.0027	0.0084	1.0476	0.0093	0.5919	-0.0030	-1.5138	-0.0026	-0.0704
-28	0.0015	0.7600	-0.0012	-0.0012	0.0022	0.2710	0.0115	0.7308	0.0013	0.6725	-0.0013	-0.0342
-27	0.0025	1.2518	0.0012	0.0012	0.0253	3.1447	0.0367	2.3436	0.0033	1.6475	0.0020	0.0543
-26	0.0011	0.5341	0.0023	0.0023	-0.0141	-1.7506	0.0227	1.4458	0.0002	0.1008	0.0022	0.0598
-25	-0.0001	-0.0571	0.0022	0.0022	-0.0081	-1.0039	0.0146	0.9310	-0.0007	-0.3296	0.0016	0.0420
-24	0.0013	0.6308	0.0034	0.0034	-0.0134	-1.6614	0.0012	0.0789	0.0004	0.2084	0.0020	0.0532
-23	0.0028	1.4319	0.0063	0.0063	-0.0028	-0.3517	-0.0016	-0.1015	0.0024	1.2015	0.0044	0.1178
-22	0.0029	1.4746	0.0092	0.0092	-0.0059	-0.7354	-0.0075	-0.4786	0.0023	1.1744	0.0067	0.1810
-21	-0.0010	-0.5112	0.0082	0.0082	-0.0074	-0.9247	-0.0149	-0.9529	-0.0015	-0.7476	0.0052	0.1408
-20	0.0038	1.8923	0.0119	0.0119	0.0017	0.2092	-0.0133	-0.8456	0.0035	1.7384	0.0087	0.2343
-19	0.0032	1.6343	0.0152	0.0151	-0.0063	-0.7879	-0.0196	-1.2497	0.0026	1.3170	0.0113	0.3051
-18	0.0010	0.4812	0.0161	0.0161	0.0036	0.4424	-0.0160	-1.0228	0.0009	0.4376	0.0122	0.3286
-17	0.0053	2.6951	0.0215	0.0214	0.0020	0.2472	-0.0140	-0.8961	0.0050	2.5085	0.0172	0.4635
-16	0.0003	0.1301	0.0217	0.0217	-0.0033	-0.4079	-0.0173	-1.1053	-0.0001	-0.0464	0.0171	0.4610
-15	0.0037	1.8478	0.0254	0.0253	-0.0093	-1.1533	-0.0266	-1.6967	0.0029	1.4555	0.0200	0.5392
-14	0.0026	1.3005	0.0280	0.0279	0.0020	0.2476	-0.0246	-1.5697	0.0024	1.1823	0.0223	0.6028

	Mean adjusted				Market adjusted				OLS market model			
Days	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**
-13	0.0041	2.0922	0.0321	0.0320	0.0054	0.6755	-0.0192	-1.2233	0.0040	2.0108	0.0264	0.7109
-12	0.0048	2.4366	0.0370	0.0368	0.0017	0.2121	-0.0175	-1.1145	0.0045	2.2565	0.0309	0.8322
-11	0.0029	1.4635	0.0399	0.0397	-0.0006	-0.0798	-0.0181	-1.1555	0.0026	1.2795	0.0334	0.9010
-10	0.0010	0.5080	0.0409	0.0407	-0.0050	-0.6171	-0.0231	-1.4720	0.0006	0.2761	0.0340	0.9159
-9	0.0032	1.6271	0.0441	0.0440	-0.0017	-0.2074	-0.0247	-1.5783	0.0028	1.4126	0.0368	0.9918
-8	0.0047	2.3649	0.0488	0.0486	0.0192	2.3858	-0.0056	-0.3548	0.0051	2.5721	0.0419	1.1301
-7	0.0049	2.4768	0.0537	0.0535	0.0005	0.0647	-0.0050	-0.3216	0.0045	2.2687	0.0464	1.2521
-6	0.0044	2.2183	0.0581	0.0579	-0.0072	-0.8903	-0.0122	-0.7782	0.0037	1.8543	0.0501	1.3518
-5	0.0076	3.8365	0.0657	0.0655	-0.0040	-0.4938	-0.0162	-1.0314	0.0069	3.4633	0.0570	1.5380
-4	0.0021	1.0426	0.0678	0.0676	-0.0046	-0.5715	-0.0208	-1.3245	0.0016	0.7925	0.0586	1.5806
-3	0.0041	2.0768	0.0719	0.0717	0.0071	0.8886	-0.0136	-0.8688	0.0041	2.0338	0.0626	1.6899
-2	0.0036	1.7949	0.0754	0.0752	0.0141	1.7570	0.0005	0.0323	0.0038	1.9190	0.0665	1.7931
-1	0.0024	1.1888	0.0778	0.0776	-0.0159	-1.9751	-0.0154	-0.9807	0.0014	0.6837	0.0678	1.8299
0	0.0011	0.5341	0.0788	0.0786	-0.0074	-0.9209	-0.0228	-1.4529	0.0005	0.2473	0.0683	1.8432
1	0.0027	1.3768	0.0816	0.0813	-0.0079	-0.9846	-0.0307	-1.9579	0.0021	1.0374	0.0704	1.8989
2	0.0008	0.4273	0.0824	0.0822	-0.0062	-0.7718	-0.0369	-2.3537	0.0003	0.1720	0.0707	1.9082
3	-0.0009	-0.4576	0.0815	0.0813	0.0015	0.1820	-0.0354	-2.2604	-0.0010	-0.5012	0.0697	1.8812
4	-0.0005	-0.2596	0.0810	0.0808	-0.0041	-0.5079	-0.0395	-2.5209	-0.0009	-0.4346	0.0689	1.8579
5	0.0065	3.2909	0.0875	0.0873	0.0044	0.5510	-0.0351	-2.2383	0.0062	3.1288	0.0751	2.0261
6	0.0009	0.4589	0.0884	0.0882	-0.0005	-0.0566	-0.0355	-2.2673	0.0007	0.3283	0.0758	2.0437
7	0.0036	1.8350	0.0921	0.0918	0.0098	1.2176	-0.0257	-1.6428	0.0037	1.8619	0.0795	2.1439
8	0.0014	0.7039	0.0935	0.0932	0.0023	0.2816	-0.0235	-1.4984	0.0012	0.6210	0.0807	2.1772
9	0.0026	1.2982	0.0960	0.0958	0.0153	1.8981	-0.0082	-0.5250	0.0029	1.4715	0.0836	2.2564
10	0.0017	0.8458	0.0977	0.0974	-0.0118	-1.4734	-0.0201	-1.2806	0.0009	0.4461	0.0845	2.2804
11	-0.0009	-0.4362	0.0968	0.0966	-0.0037	-0.4653	-0.0238	-1.5192	-0.0012	-0.5951	0.0834	2.2484
12	0.0024	1.2010	0.0992	0.0990	-0.0065	-0.8043	-0.0303	-1.9317	0.0018	0.9021	0.0851	2.2969
13	-0.0001	-0.0606	0.0991	0.0988	-0.0052	-0.6524	-0.0355	-2.2662	-0.0005	-0.2709	0.0846	2.2823
14	0.0015	0.7463	0.1006	0.1003	0.0064	0.7987	-0.0291	-1.8566	0.0015	0.7526	0.0861	2.3228
15	-0.0002	-0.0856	0.1004	0.1001	-0.0041	-0.5082	-0.0332	-2.1173	-0.0005	-0.2693	0.0856	2.3083
16	0.0003	0.1643	0.1007	0.1005	-0.0013	-0.1559	-0.0344	-2.1972	0.0001	0.0306	0.0856	2.3099
17	0.0015	0.7589	0.1022	0.1020	-0.0031	-0.3898	-0.0376	-2.3972	0.0011	0.5548	0.0867	2.3397
18	0.0013	0.6517	0.1035	0.1033	-0.0014	-0.1777	-0.0390	-2.4883	0.0010	0.4902	0.0877	2.3661
19	0.0025	1.2606	0.1060	0.1057	0.0167	2.0817	-0.0223	-1.4207	0.0029	1.4682	0.0906	2.4450
20	0.0036	1.8386	0.1097	0.1094	-0.0005	-0.0650	-0.0228	-1.4540	0.0033	1.6389	0.0939	2.5332
21	0.0025	1.2770	0.1122	0.1119	-0.0005	-0.0667	-0.0233	-1.4882	0.0022	1.1046	0.0961	2.5925
22	0.0037	1.8643	0.1159	0.1156	0.0038	0.4745	-0.0195	-1.2448	0.0035	1.7586	0.0996	2.6871
23	0.0028	1.4339	0.1188	0.1184	0.0079	0.9836	-0.0116	-0.7404	0.0029	1.4392	0.1025	2.7645
24	-0.0005	-0.2664	0.1182	0.1179	0.0002	0.0249	-0.0114	-0.7276	-0.0007	-0.3471	0.1018	2.7458
25	0.0004	0.2197	0.1187	0.1183	0.0010	0.1297	-0.0104	-0.6611	0.0003	0.1337	0.1021	2.7530
26	0.0032	1.5939	0.1218	0.1215	-0.0107	-1.3364	-0.0211	-1.3465	0.0024	1.1818	0.1044	2.8165
27	0.0038	1.9338	0.1257	0.1253	-0.0044	-0.5462	-0.0255	-1.6266	0.0033	1.6445	0.1077	2.9050
28	0.0012	0.5902	0.1268	0.1265	-0.0120	-1.4933	-0.0375	-2.3924	0.0004	0.1995	0.1081	2.9157
29	0.0035	1.7580	0.1303	0.1299	0.0012	0.1445	-0.0363	-2.3183	0.0032	1.5993	0.1113	3.0017
30	0.0042	2.1065	0.1345	0.1341	0.0010	0.1304	-0.0353	-2.2515	0.0038	1.9282	0.1151	3.1053

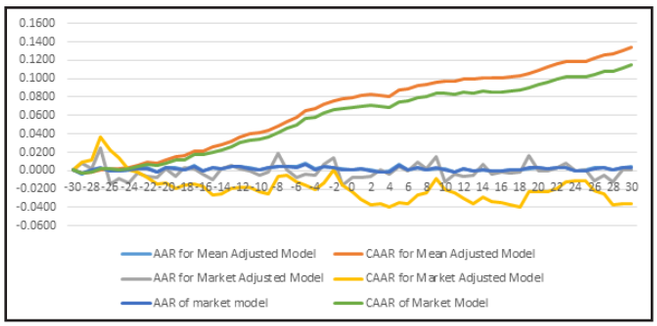

Fig. 1: Trends of AAR and CAAR for 61 Days on Earnings Announcement

Table 3 and Figure 2 show the results of good news earnings announcement. In the mean-adjusted model, AARs are positive and significant for 3 days, which are observed as –12, –6, –5 days. Negative and insignificant days in this model are –30, –29, –21, –18, –10, 3, 4, 6, 11, 16, and 17 and rest are positive and insignificant. Total insignificant days are 58 and significant days are 3. So, we can accept the null hypothesis of close to no abnormal earnings during this event period of 61 days in the "Good News" samples. Positive CAARs in the good-news portfolio are found in the mean-adjusted model from 9th – 30th day during the event window. Total significant days which are all positive comes as 22 whereas the rest 39 days are insignificant. Hence, we can infer that chances of CAAR are close to zero. Significant and positive AARs in the market-adjusted model are observed on –12, –6, and –5 days. Positive and insignificant AARs have been observed for –28, –27, –26, –25, –24, –23, –22, –20, –19, –17, –16, 15, 14, –13, –11, –9, –8, –7, 4, 3, 2, 1, 0, 1, 2, 5, 7, 8, 9, 10, 12, 16, 14, 15, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, and 30 days. AARs are negative and insignificant for the remaining 11 days. Hence, we can say that AARs are close to zero. For the CAARs, the positive and significant days are from 9–30, which is a total of 22 days. Total observed insignificant days are found to be 39 and hence not rejecting the null hypothesis of CAARs being close to zero. AARs have been found to be positive as well as significant for a total of 3 days while using the OLS model. AARs are negative and insignificant on –30, –29, –21, –18, –10, 3, 4, 6, 11, 16, and 17 days as can be observed from the above table. Total insignificant days are 58. Hence, we can say that AAR is close to zero. Positive and significant CAARs have been observed from 9th to 30th day. The CAARs are insignificant for 39 days over the 61-day event period. Thus, we can conclude that probability of earning cumulative abnormal returns on the basis of quarterly earnings announcement is close to zero.

Table 3: AAR and CAAR for Good-News Portfolio

	Mean adjusted model				Market adjusted model				OLS market model			
	GOOD NEWS				GOOD NEWS				GOOD NEWS			
Days	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**
-30	-0.0001	-0.1100	-0.0001	-0.0083	-0.0001	-0.1100	-0.0001	-0.0083	-0.0001	-0.1100	-0.0001	-0.0083
-29	-0.0050	-3.6856	-0.0052	-0.2866	-0.0050	-3.6856	-0.0052	-0.2866	-0.0050	-3.6856	-0.0052	-0.2866
-28	0.0006	0.4537	-0.0045	-0.2524	0.0006	0.4537	-0.0045	-0.2524	0.0006	0.4537	-0.0045	-0.2524
-27	0.0014	1.0404	-0.0031	-0.1738	0.0014	1.0404	-0.0031	-0.1738	0.0014	1.0404	-0.0031	-0.1738
-26	0.0012	0.8653	-0.0019	-0.1085	0.0012	0.8653	-0.0019	-0.1085	0.0012	0.8653	-0.0019	-0.1085
-25	0.0013	0.9423	-0.0007	-0.0373	0.0013	0.9423	-0.0007	-0.0373	0.0013	0.9423	-0.0007	-0.0373
-24	0.0002	0.1729	-0.0004	-0.0242	0.0002	0.1729	-0.0004	-0.0242	0.0002	0.1729	-0.0004	-0.0242
-23	0.0020	1.4415	0.0015	0.0846	0.0020	1.4415	0.0015	0.0846	0.0020	1.4415	0.0015	0.0846
-22	0.0015	1.1298	0.0031	0.1700	0.0015	1.1298	0.0031	0.1700	0.0015	1.1298	0.0031	0.1700
-21	-0.0012	-0.8991	0.0018	0.1021	-0.0012	-0.8991	0.0018	0.1021	-0.0012	-0.8991	0.0018	0.1021
-20	0.0011	0.8359	0.0030	0.1652	0.0011	0.8359	0.0030	0.1652	0.0011	0.8359	0.0030	0.1652
-19	0.0021	1.5762	0.0051	0.2842	0.0021	1.5762	0.0051	0.2842	0.0021	1.5762	0.0051	0.2842
-18	-0.0002	-0.1397	0.0049	0.2737	-0.0002	-0.1397	0.0049	0.2737	-0.0002	-0.1397	0.0049	0.2737
-17	0.0025	1.8160	0.0074	0.4108	0.0025	1.8160	0.0074	0.4108	0.0025	1.8160	0.0074	0.4108
-16	0.0001	0.1010	0.0075	0.4184	0.0001	0.1010	0.0075	0.4184	0.0001	0.1010	0.0075	0.4184
-15	0.0008	0.5565	0.0083	0.4605	0.0008	0.5565	0.0083	0.4605	0.0008	0.5565	0.0083	0.4605
-14	0.0007	0.4957	0.0089	0.4979	0.0007	0.4957	0.0089	0.4979	0.0007	0.4957	0.0089	0.4979
-13	0.0023	1.6610	0.0112	0.6233	0.0023	1.6610	0.0112	0.6233	0.0023	1.6610	0.0112	0.6233

	Mean adjusted model				Market adjusted model				OLS market model			
	GOOD NEWS				GOOD NEWS				GOOD NEWS			
Days	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**
-12	0.0037	2.7299	0.0149	0.8295	0.0037	2.7299	0.0149	0.8295	0.0037	2.7299	0.0149	0.8295
-11	0.0017	1.2338	0.0166	0.9227	0.0017	1.2338	0.0166	0.9227	0.0017	1.2338	0.0166	0.9227
-10	-0.0001	-0.0679	0.0165	0.9176	-0.0001	-0.0679	0.0165	0.9176	-0.0001	-0.0679	0.0165	0.9176
-9	0.0012	0.8576	0.0177	0.9823	0.0012	0.8576	0.0177	0.9823	0.0012	0.8576	0.0177	0.9823
-8	0.0018	1.3214	0.0194	1.0821	0.0018	1.3214	0.0194	1.0821	0.0018	1.3214	0.0194	1.0821
-7	0.0015	1.1409	0.0210	1.1683	0.0015	1.1409	0.0210	1.1683	0.0015	1.1409	0.0210	1.1683
-6	0.0034	2.4774	0.0244	1.3554	0.0034	2.4774	0.0244	1.3554	0.0034	2.4774	0.0244	1.3554
-5	0.0031	2.2936	0.0275	1.5286	0.0031	2.2936	0.0275	1.5286	0.0031	2.2936	0.0275	1.5286
-4	0.0001	0.0846	0.0276	1.5350	0.0001	0.0846	0.0276	1.5350	0.0001	0.0846	0.0276	1.5350
-3	0.0023	1.7252	0.0299	1.6653	0.0023	1.7252	0.0299	1.6653	0.0023	1.7252	0.0299	1.6653
-2	0.0024	1.7513	0.0323	1.7975	0.0024	1.7513	0.0323	1.7975	0.0024	1.7513	0.0323	1.7975
-1	0.0007	0.5141	0.0330	1.8364	0.0007	0.5141	0.0330	1.8364	0.0007	0.5141	0.0330	1.8364
0	0.0008	0.5714	0.0338	1.8795	0.0008	0.5714	0.0338	1.8795	0.0008	0.5714	0.0338	1.8795
1	0.0001	0.0878	0.0339	1.8861	0.0001	0.0878	0.0339	1.8861	0.0001	0.0878	0.0339	1.8861
2	0.0001	0.0561	0.0340	1.8904	0.0001	0.0561	0.0340	1.8904	0.0001	0.0561	0.0340	1.8904
3	-0.0004	-0.3023	0.0336	1.8675	-0.0004	-0.3023	0.0336	1.8675	-0.0004	-0.3023	0.0336	1.8675
4	-0.0022	-1.6408	0.0313	1.7436	-0.0022	-1.6408	0.0313	1.7436	-0.0022	-1.6408	0.0313	1.7436
5	0.0024	1.7579	0.0337	1.8764	0.0024	1.7579	0.0337	1.8764	0.0024	1.7579	0.0337	1.8764
6	-0.0007	-0.5321	0.0330	1.8362	-0.0007	-0.5321	0.0330	1.8362	-0.0007	-0.5321	0.0330	1.8362
7	0.0020	1.4642	0.0350	1.9468	0.0020	1.4642	0.0350	1.9468	0.0020	1.4642	0.0350	1.9468
8	0.0005	0.3598	0.0355	1.9740	0.0005	0.3598	0.0355	1.9740	0.0005	0.3598	0.0355	1.9740
9	0.0018	1.3106	0.0373	2.0729	0.0018	1.3106	0.0373	2.0729	0.0018	1.3106	0.0373	2.0729
10	0.0008	0.5798	0.0380	2.1167	0.0008	0.5798	0.0380	2.1167	0.0008	0.5798	0.0380	2.1167
11	-0.0005	-0.3660	0.0375	2.0891	-0.0005	-0.3660	0.0375	2.0891	-0.0005	-0.3660	0.0375	2.0891
12	0.0010	0.7225	0.0385	2.1436	0.0010	0.7225	0.0385	2.1436	0.0010	0.7225	0.0385	2.1436
13	0.0007	0.4878	0.0392	2.1805	0.0007	0.4878	0.0392	2.1805	0.0007	0.4878	0.0392	2.1805
14	0.0017	1.2834	0.0409	2.2774	0.0017	1.2834	0.0409	2.2774	0.0017	1.2834	0.0409	2.2774
15	0.0000	0.0057	0.0409	2.2778	0.0000	0.0057	0.0409	2.2778	0.0000	0.0057	0.0409	2.2778
16	-0.0005	-0.3709	0.0404	2.2498	-0.0005	-0.3709	0.0404	2.2498	-0.0005	-0.3709	0.0404	2.2498
17	-0.0005	-0.3435	0.0400	2.2239	-0.0005	-0.3435	0.0400	2.2239	-0.0005	-0.3435	0.0400	2.2239
18	0.0003	0.2420	0.0403	2.2422	0.0003	0.2420	0.0403	2.2422	0.0003	0.2420	0.0403	2.2422
19	0.0021	1.5117	0.0424	2.3563	0.0021	1.5117	0.0424	2.3563	0.0021	1.5117	0.0424	2.3563
20	0.0016	1.2046	0.0440	2.4473	0.0016	1.2046	0.0440	2.4473	0.0016	1.2046	0.0440	2.4473
21	0.0011	0.7829	0.0450	2.5064	0.0011	0.7829	0.0450	2.5064	0.0011	0.7829	0.0450	2.5064
22	0.0012	0.8954	0.0463	2.5741	0.0012	0.8954	0.0463	2.5741	0.0012	0.8954	0.0463	2.5741
23	0.0011	0.8152	0.0474	2.6356	0.0011	0.8152	0.0474	2.6356	0.0011	0.8152	0.0474	2.6356
24	0.0007	0.5217	0.0481	2.6750	0.0007	0.5217	0.0481	2.6750	0.0007	0.5217	0.0481	2.6750
25	0.0006	0.4691	0.0487	2.7104	0.0006	0.4691	0.0487	2.7104	0.0006	0.4691	0.0487	2.7104
26	0.0004	0.3301	0.0492	2.7354	0.0004	0.3301	0.0492	2.7354	0.0004	0.3301	0.0492	2.7354
27	0.0020	1.4677	0.0512	2.8462	0.0020	1.4677	0.0512	2.8462	0.0020	1.4677	0.0512	2.8462

	Mean adjusted model				Market adjusted model				OLS market model			
	GOOD NEWS				GOOD NEWS				GOOD NEWS			
Days	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**
28	0.0005	0.3343	0.0516	2.8715	0.0005	0.3343	0.0516	2.8715	0.0005	0.3343	0.0516	2.8715
29	0.0014	1.0471	0.0530	2.9505	0.0014	1.0471	0.0530	2.9505	0.0014	1.0471	0.0530	2.9505
30	0.0022	1.6443	0.0553	3.0747	0.0022	1.6443	0.0553	3.0747	0.0022	1.6443	0.0553	3.0747

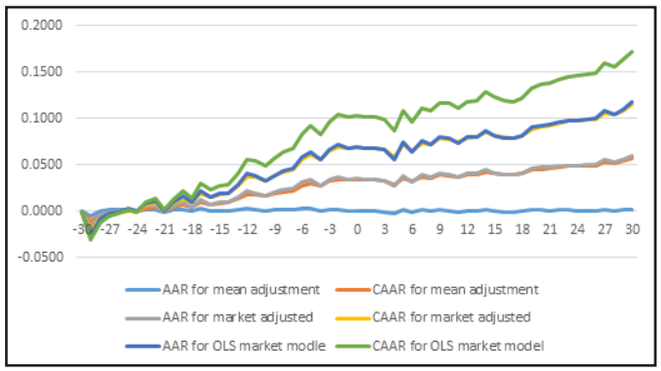

Fig. 2: Trends of AAR and CAAR for Good-News Portfolio

The mean-adjusted model for the bad-news portfolio shows positive and significant AARs for –20, –17, –15, –8, –7, –5, 1, 5, 22, and 26 days and insignificant for the remaining 51 days. Hence, we can accept the null hypothesis of AAR close to zero. The CAARs for this portfolio are significant on 27 positive days, whereas these are positive and insignificant from –30 to 3 days. CAARs are found to be positive for the entire event period and insignificant for 34 out of 61 days of the event period. Hence, we can say that CAARs are close to zero. The market-adjusted model for the previous portfolio has positive and significant AARs for –20, –17, –15, –8, –7, –5, 1, 5, 22, and 26 days. No AAR is negative and significant. Total significant days are 10 and rest 51 days are insignificant. Hence, we will accept the null hypothesis of no average abnormal return. In the entire portfolio, CAARs are found to be positive but are significant for only 22 days, from 4^{th} to 30^{th} day of the event period. Since, the number of insignificant days, i.e., 39 exceeds the number of significant days, we can't reject the null hypothesis of CAARs being close to zero. For the OLS model, significant and positive AARs are found for 8 days, negative and insignificant for 6 days. The remaining days are found to be positive and insignificant. Total significant days are 8 and total insignificant days are 53. So, we can say that AARs are close to zero. The CAARs are positive for -20^{th} to 30^{th} event days and significant from 7^{th} to 30^{th} evet days. Total significant event days are 24 and the remaining 37 days are insignificant. Hence, we can infer that CAARs are close to zero.

Table 4: AAR and CAAR for Bad-News Quarterly Earnings

	Mean adjusted model				Market adjusted model				OLS market model			
	BAD NEWS				BAD NEWS				BAD NEWS			
Days	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**
-30	0.0008	0.7219	0.0008	0.0339	0.0008	0.7219	0.0008	0.0339	-0.0001	-0.0747	-0.0001	-0.0041
-29	0.0017	1.4631	0.0025	0.1026	0.0017	1.4631	0.0025	0.1026	-0.0045	-3.6480	-0.0046	-0.2049
-28	0.0009	0.7621	0.0034	0.1384	0.0009	0.7621	0.0034	0.1384	0.0009	0.7535	-0.0037	-0.1635
-27	0.0010	0.8284	0.0044	0.1774	0.0010	0.8284	0.0044	0.1774	0.0012	0.9459	-0.0025	-0.1114
-26	-0.0002	-0.1424	0.0042	0.1707	-0.0002	-0.1424	0.0042	0.1707	0.0002	0.1777	-0.0023	-0.1016
-25	-0.0015	-1.3249	0.0027	0.1084	-0.0015	-1.3249	0.0027	0.1084	0.0006	0.4463	-0.0017	-0.0770
-24	0.0013	1.1394	0.0040	0.1620	0.0013	1.1394	0.0040	0.1620	0.0004	0.3122	-0.0013	-0.0598
-23	0.0010	0.8974	0.0050	0.2041	0.0010	0.8974	0.0050	0.2041	0.0004	0.3559	-0.0009	-0.0402
-22	0.0015	1.2967	0.0065	0.2650	0.0015	1.2967	0.0065	0.2650	0.0005	0.4332	-0.0004	-0.0164
-21	0.0001	0.0839	0.0066	0.2690	0.0001	1.1267	0.0066	0.2690	0.0003	0.8961	-0.0001	-0.0029
-20	0.0028	2.3853	0.0094	0.3810	0.0028	2.3853	0.0094	0.3810	0.0017	1.3912	0.0017	0.0737
-19	0.0011	0.9620	0.0105	0.4262	0.0011	0.9620	0.0105	0.4262	0.0029	2.3437	0.0046	0.2028
-18	0.0013	1.1364	0.0118	0.4796	0.0013	1.1364	0.0118	0.4796	0.0005	0.4061	0.0051	0.2251
-17	0.0028	2.4022	0.0145	0.5924	0.0028	2.4022	0.0145	0.5924	0.0024	1.9034	0.0074	0.3299
-16	-0.0001	-0.0780	0.0145	0.5888	-0.0001	-0.0780	0.0145	0.5888	0.0004	0.2958	0.0078	0.3462

	Mean adjusted model				Market adjusted model				OLS market model			
	BAD NEWS				BAD NEWS				BAD NEWS			
Days	AAR	t-value	CAAR	t-value	AAR	t-value	CAAR	t-value	AAR	t-value	CAAR	t-value
-15	0.0024	2.0901	0.0169	0.6870	0.0024	2.0901	0.0169	0.6870	0.0021	1.6696	0.0098	0.4381
-14	0.0021	1.8098	0.0190	0.7720	0.0021	1.8098	0.0190	0.7720	-0.0001	-0.0841	0.0097	0.4335
-13	0.0021	1.7823	0.0210	0.8557	0.0021	1.7823	0.0210	0.8557	0.0023	1.8246	0.0120	0.5339
-12	0.0011	0.9550	0.0221	0.9006	0.0011	0.9550	0.0221	0.9006	0.0018	1.4804	0.0138	0.6154
-11	0.0011	0.9546	0.0232	0.9454	0.0011	0.9546	0.0232	0.9454	0.0006	0.4820	0.0144	0.6420
-10	0.0011	0.9601	0.0243	0.9905	0.0011	0.9601	0.0243	0.9905	0.0005	0.3747	0.0149	0.6626
-9	0.0020	1.7105	0.0263	1.0709	0.0020	1.7105	0.0263	1.0709	0.0016	1.3272	0.0165	0.7356
-8	0.0026	2.2889	0.0289	1.1784	0.0026	2.2889	0.0289	1.1784	0.0024	1.9797	0.0190	0.8446
-7	0.0033	2.8926	0.0323	1.3143	0.0033	2.8926	0.0323	1.3143	0.0026	2.1205	0.0216	0.9614
-6	0.0012	1.0079	0.0334	1.3616	0.0012	1.0079	0.0334	1.3616	0.0027	2.2155	0.0243	1.0833
-5	0.0044	3.8163	0.0378	1.5409	0.0044	3.8163	0.0378	1.5409	0.0037	2.9823	0.0280	1.2475
-4	0.0019	1.6850	0.0398	1.6200	0.0019	1.6850	0.0398	1.6200	0.0003	0.2820	0.0284	1.2630
-3	0.0016	1.4034	0.0414	1.6860	0.0016	1.4034	0.0414	1.6860	0.0007	0.5331	0.0290	1.2924
-2	0.0012	1.0400	0.0426	1.7348	0.0012	1.0400	0.0426	1.7348	0.0026	2.0864	0.0316	1.4073
-1	0.0017	1.4463	0.0443	1.8028	0.0017	1.4463	0.0443	1.8028	0.0008	0.6781	0.0324	1.4446
0	0.0002	0.1615	0.0444	1.8104	0.0002	0.1615	0.0444	1.8104	0.0023	1.8972	0.0348	1.5490
1	0.0027	2.3181	0.0471	1.9193	0.0027	2.3181	0.0471	1.9193	0.0029	2.3199	0.0376	1.6767
2	0.0008	0.6966	0.0479	1.9520	0.0008	0.6966	0.0479	1.9520	0.0001	0.0691	0.0377	1.6805
3	-0.0005	-0.4706	0.0474	1.9299	-0.0005	-0.4706	0.0474	1.9299	0.0000	0.0205	0.0378	1.6817
4	0.0020	1.7439	0.0494	2.0118	0.0020	1.7439	0.0494	2.0118	0.0014	1.0996	0.0391	1.7422
5	0.0041	3.5339	0.0535	2.1778	0.0041	3.5339	0.0535	2.1778	0.0026	2.0833	0.0417	1.8569
6	0.0015	1.3392	0.0550	2.2407	0.0015	1.3392	0.0550	2.2407	0.0011	0.8762	0.0428	1.9051
7	0.0016	1.3858	0.0566	2.3058	0.0016	1.3858	0.0566	2.3058	0.0022	1.7591	0.0449	2.0020
8	0.0009	0.8196	0.0576	2.3443	0.0009	0.8196	0.0576	2.3443	0.0007	0.5802	0.0457	2.0339
9	0.0006	0.5421	0.0582	2.3698	0.0006	0.5421	0.0582	2.3698	0.0009	0.7214	0.0466	2.0736
10	0.0010	0.8729	0.0592	2.4108	0.0010	0.8729	0.0592	2.4108	0.0004	0.3491	0.0470	2.0929
11	-0.0002	-0.1802	0.0590	2.4023	-0.0002	-0.1802	0.0590	2.4023	-0.0005	-0.4019	0.0465	2.0707
12	0.0014	1.2013	0.0604	2.4587	0.0014	1.2013	0.0604	2.4587	0.0020	1.5886	0.0485	2.1582
13	-0.0009	-0.8177	0.0594	2.4203	-0.0009	-0.8177	0.0594	2.4203	-0.0010	-0.7912	0.0475	2.1146
14	-0.0002	-0.1532	0.0592	2.4131	-0.0002	-0.1532	0.0592	2.4131	0.0013	1.0278	0.0487	2.1712
15	-0.0003	-0.2273	0.0590	2.4025	-0.0003	-0.2273	0.0590	2.4025	0.0006	0.4689	0.0493	2.1970
16	0.0011	0.9222	0.0601	2.4458	0.0011	0.9222	0.0601	2.4458	0.0003	0.2453	0.0496	2.2105
17	0.0019	1.6390	0.0619	2.5228	0.0019	1.6390	0.0619	2.5228	0.0009	0.6994	0.0505	2.2490
18	0.0008	0.6978	0.0627	2.5556	0.0008	0.6978	0.0627	2.5556	0.0009	0.7574	0.0514	2.2907
19	0.0005	0.3980	0.0632	2.5743	0.0005	0.3980	0.0632	2.5743	0.0013	1.0342	0.0527	2.3477
20	0.0020	1.7168	0.0652	2.6549	0.0020	1.7168	0.0652	2.6549	0.0012	0.9452	0.0539	2.3997
21	0.0013	1.1107	0.0665	2.7071	0.0013	1.1107	0.0665	2.7071	0.0012	0.9505	0.0551	2.4520
22	0.0024	2.1035	0.0689	2.8059	0.0024	2.1035	0.0689	2.8059	0.0019	1.5714	0.0570	2.5385
23	0.0016	1.4237	0.0705	2.8728	0.0016	1.4237	0.0705	2.8728	-0.0001	-0.0961	0.0569	2.5332
24	-0.0009	-0.8231	0.0696	2.8341	-0.0009	-0.8231	0.0696	2.8341	0.0006	0.4537	0.0574	2.5582
25	-0.0006	-0.5096	0.0690	2.8102	-0.0006	-0.5096	0.0690	2.8102	0.0008	0.6323	0.0582	2.5930

	Mean adjusted model				Market adjusted model				OLS market model			
	BAD NEWS				BAD NEWS				BAD NEWS			
Days	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**	**AAR**	**t-value**	**CAAR**	**t-value**
26	0.0026	2.2480	0.0716	2.9158	0.0026	2.2480	0.0716	2.9158	0.0024	1.9483	0.0606	2.7003
27	0.0017	1.4447	0.0733	2.9836	0.0017	1.4447	0.0733	2.9836	0.0014	1.1048	0.0620	2.7611
28	0.0011	0.9634	0.0744	3.0289	0.0011	0.9634	0.0744	3.0289	0.0001	0.1127	0.0621	2.7673
29	0.0018	1.5835	0.0762	3.1033	0.0018	1.5835	0.0762	3.1033	0.0026	2.1171	0.0648	2.8839
30	0.0019	1.6242	0.0781	3.1796	0.0019	1.6242	0.0781	3.1796	0.0020	1.6272	0.0668	2.9734

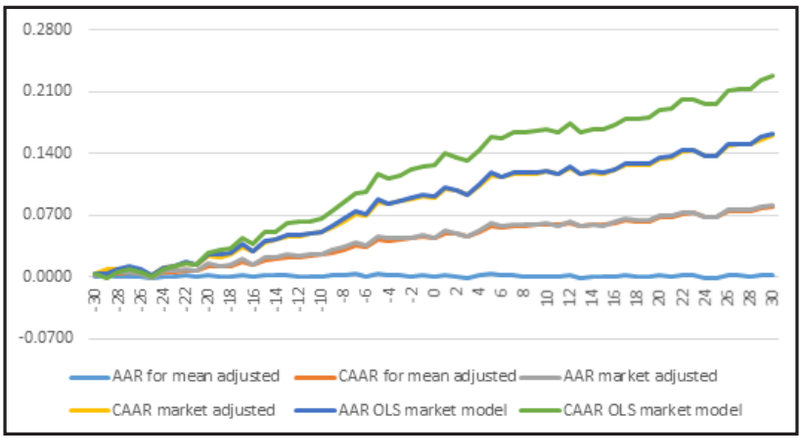

Fig. 3: Trends of AAR and CAAR for the Bad-News Portfolio

Table 5: Run and Sign Test Statistic of Q3, FY 17

	Mean Adjusted		Market adjusted		OLS market model	
	Runs	**Sign**	**Runs**	**Sign**	**Runs**	**Sign**
	Good News					
Before	-0.918	3.652	-0.918	3.652	-0.918	3.652
After	-0.948	3.286	-0.948	3.286	-0.948	3.286
Overall	-2.475	4.993	-1.340	4.993	-1.340	4.993
	Bad News					
Before	-1.152	4.382	-1.152	4.382	-1.975	4.382
After	-1.440	2.921	-1.566	2.921	0.663	4.382
Overall	-2.256	5.240	-2.256	5.249	-1.367	6.274
	Full Sample Earnings					
Before	0.663	4.382	-1.468	-0.365	0.896	4.017
After	0.237	3.286	-0.656	-0.730	0.237	3.286
Overall	0.342	5.506	-1.596	-0.896	0.611	5.250

Notes:

1. Before: Runs and Sign statistics pre-event day
2. After: Runs and Sign statistics post event day
3. Overall: Considering full 61-day sample period for Runs and Sign statistics
4. AARs are statistically significant for both Runs and Sign test if AAR > ± 1.96.

From the above table we can see that, for the full sample earnings in all portfolios, the null hypothesis of random AARs are accepted. Insignificant AARs have been observed for the OLS and market-adjusted model of the good-news portfolio. Whereas for the mean-adjusted model, it is observed to be significant for the entire study period. For the

mean- and market-adjusted model of the bad news portfolio, AARs are found to be significant for the entire event window. However, AARs are random by the OLS model for a sample period of 61 days. After the event day, the mean- and OLS-market model observed insignificant AARs, whereas the market-adjusted model observed significant AARs. OLS model showed significant AARs, whereas both the mean- and market-adjusted model showed insignificant AARs for the bad-news sample before the event day.

The sign test highlights the chances of existence of significant differences between positive and negative AARs. For the full-sample earnings announcement, there exists significant difference between the positive and negative AARs for the mean-adjusted and the OLS-market model for all portfolio categories and there exists no significant difference between positive and the negative AARs for the market-adjusted model. There exists significant difference between positive and negative AARs for the good news and bad news for all portfolios.

CONCLUSION

We have employed mean-adjusted model, market-adjusted model, and OLS-market model to evaluate the performance of the Nifty Midcap 150 index. Non-parametric tests have been used for the previous analysis. This paper analyzed the returns of the market based on information, which is publicly available. The result of the number of positive and negative AARs as obtained from the Sign test suggests that the number of positive AARs outweigh the number of negative AARs during the event period of 61 days. This suggests that the market has positively reacted to the December 2016 earnings announcement for most of the companies. Even though the number of AARs are positive, the study suggests that AAR and CAAR are insignificant for all portfolios. Hence, it can be concluded that chances of making abnormal returns during the event period of 61 days are close to zero. Hence, we can say that market acted efficiently under the semi-strong form of the hypothesis.

FUTURE SCOPE OF WORK

Scope of research is wide, as over the years, researchers have not come to similar conclusions after conducting their research. A group of researchers have found market to be efficient while others have found it inefficient.

- The quality of information may be determined and then relationship can be established with market efficiency.
- Apart from earnings announcement, the event-study methodology would also be applicable for other shocks like the mergers and acquisitions announcements, demonetization, etc.
- The weak form of the hypothesis may be checked for a study, which is conducted for a short span of time.
- The weak form of the study can be used to analyses the price and volume movement for a major announcement in the market.

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