Investors' Behaviour towards Earnings Announcements: An Event Study in Indian Stock Market

Dr. Shilpa Lodha
Post Doctoral Fellow

Prof. G. Soral
Dean, University College of Commerce and Management Studies, Mohanlal Sukhadia University, Udaipur

INTRODUCTION

Efficient Market Hypothesis (EMH) as proposed by Fama (1970) is a seminal work in the area of behavioural finance. The EMH proved to be a mile stone for the studies based on behavioural finance. Many times attempts were made to prove or disprove EMH. Fama stated that market exist in three forms:

Weak form Efficiency: In this state, market absorbs and reflects all historic information i.e. information about all price movements including the stock's past movements. In the least meticulous form of EMH, it is impossible to forecast future prices' movements on the basis of analysis of past prices. Since there is no correlation between past and future prices, it is not possible to earn abnormal returns based on past prices.

Semi-strong Form Efficiency: In this form, all past information together with all publicly available information is instantaneously and fully reflected in stock prices. Stock prices immediately incorporate any new information announced, published or arrived in any way. Demand and supply level shifts immediately to a new equilibrium level depending on the type of new information (good or bad).

Strong Form Efficiency: Strong form Efficiency exists in the stock market if all types of

information whether past or public or even private, is fully and accurately reflected in stock prices. This is the strongest form of EMH which implies that market fully absorbs all information whether publicly available or privately. Thus it included insider trading information also in stock prices. The current stock prices are the best predictor which can be used for intrinsic value of the stock. If it is somewhat lower (higher) than intrinsic value which should be when some private information would be available publicly, then the insiders will buy (sell) the stocks until the prices achieve the equilibrium. But this form negates the existence of this abnormal return earning opportunity.

Various kinds of anomalies were tested in different countries at different times. The important were Value Effect, Size Effect, Seasonality, Event Study etc.

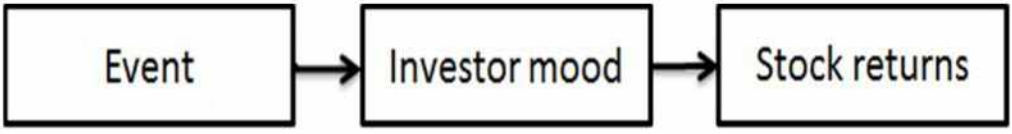
Value Effect implies the earning of abnormal returns from the stock of firms having high earnings to price ratio.

Size Effect implies that the returns earned on stocks of firms having small market capitalization are significantly higher than those from stocks large firms.

Seasonality in stock markets implies some regular and repetitive phenomenon leading to chances of earning abnormal returns during certain a time of the day, day of the week, week of the month, month of the year or around holidays. The so-called January Effect, November Effect, Sell in May and Go Away, Monday Effect, Friday Effect or Holiday effects have been tested numerous times. Seasonality or Calendar Anomalies are related with testing weak form efficiency of the stock market.

Event Study is related to the study of speed of incorporating new announcement or information into stock prices. This is related with testing of semi-strong form of efficiency of stock market. It studies the behaviour of stock prices near an event which

Figure 1: Hypothesized Event Causality



Source: Sorenson (2012)

An event may be merger & acquisition, earnings announcement, appointment of a new CEO, stock splits, bonus issue, dividend announcement, IPO's, political events, sports events, weather etc. These events may cause a change in investor's mood which in turn causes changes in stock prices as is evident from Figure 1.

STATEMENT OF THE PROBLEM

If there is a chance of earning abnormal returns at, before or after an event, the market is said to be semi-strong inefficient. Earnings announcements contain important information for the investors, may lead to earn excess returns if received in advance. This paper empirically investigates the information content of quarterly earnings announcement made by listed companies of National Stock Exchange of India (NSE) during 2012 to 2015. The methodology and analysis has been done in line with contemporary international researches, which were published recently.

REVIEW OF LITERATURE

Event study has been used since several decades back to explore semi-strong efficiency towards different types of events. An appraisal of few of them is as follows:

Kumar (2015) presented that announcement of quarterly result affected the share price in both sides. There was no significant correlation between pre-post announcement of share price and growth of the companies. Mittal (2015) investigated the impact of Quarterly Earnings announcements on the stocks constituting the Sensex. The results showed that the Indian Capital Market was semi-strong efficient as it was using the information relevant for security valuation and for investment decision-making. However, the reaction after the announcement showed that the Indian Capital Market was not perfectly efficient as abnormal returns had been observed both prior to and after the announcement.

Udhaya (2014) studied semi strong capital market efficiency with reference to the annual earnings announcement. The Automobile, Banking, Oil and gas sectors have not shown semi strong market efficiency. The Pharmaceuticals, IT, Steel have shown semi strong market efficiency.

Sharma & Pandey (2014) applied GARCH (p, q) model and non-parametric Run test for studying isolated events of dividend change announcements. The results indicated that there was no signaling effect of 'dividend increase/decrease along with financial results announcement' event on the share price of companies. Cumulative abnormal return tendency was observed if share purchase was made prior to any of the events. It was also found that adjustment in prices after event date took place with a substantial time lag reflecting inefficiencies in the market.

Kiminda, Githinji and Riro (2014) examined share returns following unexpected corporate announcements that were described as profit warnings. The results indicated that profit warning had impact on the stock return in the NSE and the impact was negative and significant for the period of pre-warning and post-warning and on the day of actual announcement. There were also indications of information leakages where there were negative abnormal returns days before the profit warning announcements.

Dsouza and Mallikarjunappa (2013) investigated the information content in security prices on the release of quarterly earnings announcement by using event study and Cohen et al. (1983 a) methodology . The result of the number of positive and negative AARs and CAARs showed that there were more numbers of positive values than negative values during the event window of 61 days. This result showed that market has positively reacted on the release of the September 2012 quarterly earnings announcement. Rono (2013) investigated how the market responds to annual earnings announcements by the NSE and JSE securities exchanges and determined the level of market efficiency by the NSE and JSE exchanges. Overall, the results from our study suggests that stock prices changes in the NSE and JSE securities exchange with respect to earnings announcements, are not random but follow a pattern which makes it possible for positive abnormal returns to be gained by trading only on the month of earnings announcement for JSE and not for NSE as it observed significant and negative abnormal returns only on the second month after announcement.

Khatua and Pradhan (2013) investigated the market over reaction during the stock split announcements. They found that these excess stock returns changed on the level of market volatility. It was also evidenced that positive CARs around the event were caused by periods of high volatility and were more significant for large firms. The study found that market overreacted more on any good news.

Prakash (2013) concluded that the scrips of Blue-chip companies were much consistently performing in the market and left no scope for investors and equally proved the market was in the track of semi-strong form efficiency. Kumar, Mahadevan & Gunasekar (2012) concluded from the stock return behavior of 10 companies studied, that the return behavior of only one company did not move with the market return. At the same time, the chance to earn abnormal return was found only in 3 companies. The announcement of results was said to have an impact only when there was an abnormal return after the announcement of dividend results.

Roy and Santhakumar (2012) tried to confer a multi-factor rationalization to the post-earnings announcement drift (PEAD). The study introduced earnings surprise factor along with other risk factors modeled by Fama and French (1993). The cumulative

abnormal return, which was significant in the multi-factor model, became trivial in the presence of earnings surprise factor.

Mlongi, Kruger and Nthoesane (2011) explored that for small ALtX stock market, investor had considerable negative reaction to earnings announcement. The market also contained weak form efficiency. They concluded that during recession shareholder's wealth declined substantially in the small ALtX market. In spite that weak form efficiency provided a chance to earn profits when the market is performing well.

Neuhierl, Scherbina & Schlusche (2011) confirmed earlier findings on the reactions to financial news and showed that less frequently researched news about corporate strategy, products, the management team, and legal developments were also highly value-relevant. Moreover, they showed that volatility tend to increase following most types of announcements, and attributed these volatility increases to higher levels of news-induced valuation uncertainty.

Mehndiratta and Gupta (2010) found that although investors did not earn much value on dividend announcement day and before the event day, but they earned significant returns during post announcement period. They confirmed the opportunity of earning higher returns in post event period through information content in dividend announcement, as investors reallocated their funds at the time of dividend announcement on NSE.

Odabasi (1998) revealed that AAR showed negative price activity on the event day and one day before. Further, AARs had significant positive value for good news subsample and significant negative value for bad news subsample. But the negative news subsample had much larger price reaction than the one in case of good news subsample. It explained the reason of having negative returns on the announcement day for the full sample. Fama, Fisher, Jensen and Roll (1969) provided evidence that the stream of expected earnings from a stock is reevaluated after announcement of a split. They concluded that in general the information content of split announcement is reflected in the stock prices.

After reviewing the work done previously, it was found that event study has been used several times for testing semi-strong form of efficiency of stock markets of developed nations but Indian stock market was less explored for its semi-strong efficiency, particularly for earnings announcements. Therefore, this paper attempts to fill the gap.

OBJECTIVE OF THE STUDY

The present study aims at exploring the speed and accuracy of reflection of earnings announcement, which is made quarterly in Indian stock market, into stock prices. In

other words, the objective of this study is to examine the information content of quarterly earnings announcement and to examine the speed of incorporation of this information into stock prices.

HYPOTHESES

The study has following two specific hypotheses:

1. All AARs are not significantly different from zero.
2. All CAARs are not significantly different from zero.

Here, AARs are average abnormal returns and CAARs are Cumulative average abnormal returns.

DATA COLLECTION

The study is based on three sets of data- the first set consists of quarterly earnings announcement made by sample companies, the second set consists of daily close, open, high and low prices of sample companies for the sample period and third set includes the daily close, open, high and low prices of S&P CNX Nifty. The universe of this event study is all companies listed on NSE, out of which 5 companies from 5 different sectors were taken.

The study period consisted of 12 quarterly earnings announcement starting from second quarter of 2012-13 to first quarter of 2015-16. All dates for the sample companies of announcing quarterly results were collected whereas daily different prices were collected for sample companies as well as Nifty from 1st April 2012 to 31st August 2015. These prices were averaged on daily basis. Thus it consisted of a total of 5070 (845 for each of 6 series) observations.

All the data including dates of earnings announcement have been collected from the website www.moneycontrol.com. The sample consisted of stocks of Reliance (Refinery), Tata Motors (Automobile), ICICI (Bank), Infosys (IT) and ITC (FMCG). The company which had highest weightage in construction of the respective sectoral index as on 31st August, 2015, was included in the sample. For example ITC has got highest weightage in S&P CNX FMCG Sectoral index and so on.

METHODOLOGY

The event study methodology aims at investigating effect of an event on stock prices which is taken as dependent variable. The present event study is based on market model which comprises of following five steps:

1. Defining an Event Window

In the present paper, quarterly earnings announcement has been taken as event and the date of this announcement is called the event date. It is the date on which a meeting of Board of Directors is held and they declare the key financial results of the company for the quarter. Since it is a regular and repetitive event, investors start anticipating the results of the company a few days ago. Event window defines how many days preceding and following the event date to be included in the study. Therefore, it was proposed to have an event window consisting of:

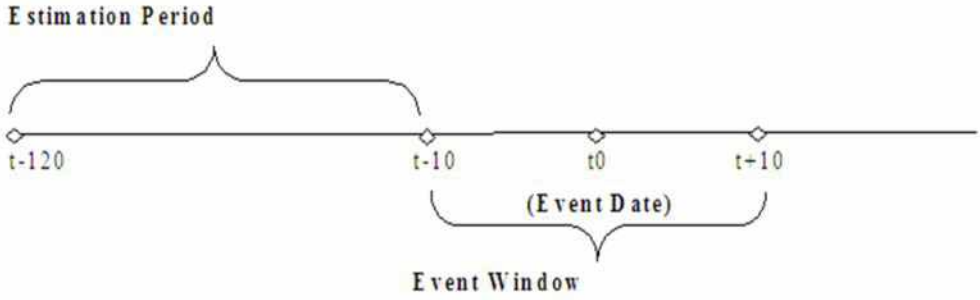
- Event date (t=0)
- Ten trading days prior to event date (t-1, t-2, ...t-10)
- Ten trading days after the event date (t+1, t+2, ...t+10)

Since there were 12 event dates for 12 quarters, the number of event windows also comes to 12 for each of the sample companies.

2. Defining Estimation Period

In order to estimate the stock returns, had the event not been occurred, an estimation period has to be specified. The estimation period gives the unbiased estimate of returns of a security if the event had not taken place. It may be prior or post event date. For the present research, an estimation period of one quarter prior to the event window was considered to be appropriate. Since different quarters may consist of differing number of days, to bring uniformity, estimation period was taken to be of 120 days. There is a separate estimation period for each of the event window. Thus 12 estimation periods were there. Figure 2 gives an overview of event window and estimation period.

Figure 2: Time Line of the Estimation Period and Event Window



3. Estimating Expected Returns

For estimating the effect of earnings announcement over stock prices, returns have been calculated as follows:

- Security Returns $R_{it} = \log (P_{it} - P_{it-1})$ Equation 1
- Market Returns $R_{mt} = \log (P_{mt} - P_{mt-1})$ Equation 2

Here, R_{it} is return from security *i* at time *t*, P_{it} is the price of security *i* at time *t*, P_{it-1} is price of security *i* at time *t-1*, R_{mt} is the return from market index *m* at time *t*, P_{mt} is the value of market index *m* at time *t* and P_{mt-1} is the value of market index *m* at time *t-1*.

These calculated returns for both individual stock and for market index are realized or actual returns. These returns are to be compared with expected returns or normal returns. The normal returns have been calculated on the basis of estimation period using market model. The market model uses the following OLS regression equation:

$$E(R_{it}) = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad \text{Equation 3}$$

The E (R_{it}) is the expected or normal return from security *i* at time *t*, α_i is intercept coefficient, β_i is the slope coefficient (or sensitivity of the stock to market returns), R_{mt} is return on market index *m* at time *t* and ε_t is residuals.

The α and β coefficients are estimated by regressing individual stock returns on market index returns for each of the estimation period. These coefficients have been used to estimate expected or normal returns from the security over the relevant event window on the basis of actual market index returns during the same window.

4. Abnormal Returns, Average Abnormal Returns and Cumulative Average Abnormal Returns (AR, AAR AND CAAR)

Once the expected returns or normal returns were calculated, next move was to corroborate whether the actual returns are different from expected ones. Therefore, abnormal returns have to be calculated by difference between actual returns and expected returns for the security over the event window.

$$AR_t = R_{it} - E(R_{it}) \quad \text{Equation 4}$$

Where AR_t is Abnormal Returns from security *i* at time *t*, R_{it} is Actual Returns from security *i* at time *t* and E (R_{it}) is the Expected or normal returns from security *i* at time *t*

These abnormal returns are then averaged first quarterly and then cross-sectionally to give out Average Abnormal Returns (AAR) for a particular day in the event window.

$$AAR_t = \frac{1}{N} \sum_{i=1}^{N} AR_i \quad \text{Equation 5}$$

While computing the average abnormal returns (AAR) it is to be remembered that instead of testing abnormal returns individually, they are looked at collectively because other events occurring and averaging across all companies should minimize the effect of other events, thereby allowing a better examination of the event under study.

For computation of cumulative average abnormal return, the individual day's average abnormal return (AAR) is added together from the beginning of the period to some specified period and is tested for significance. Average abnormal returns are then cumulated to have Cumulative Average Abnormal Returns (CAAR) as follows:

$$CAAR_{(t1,t2)} = \sum_{t=t1}^{t2} AAR_{it}$$

5. Significance Testing

The procedure by Brown & Warner (1985) was followed in the statistical analysis to test the significance of the cumulative average abnormal returns in terms of the null hypothesis that such returns are equal to zero. It follows a *t*-distribution and is formulated as:

$$t_{(AAR)} = \frac{AAR_{i,t}}{\sigma_{(AAR)}/\sqrt{N}} \qquad \text{Equation 7}$$

Here, $\sigma_{(AAR)}$ is the standard deviation of AAR and *N* is the number of earnings announcement on day *t*. Significance testing of CAAR can also be done in a similar way:

$$t_{(CAAR)} = \frac{CAAR_t}{\sigma_{(CAAR)}/\sqrt{d}} \qquad \text{Equation 8}$$

Here, $\sigma_{(AAR)}$ is the standard deviation of CAAR and *d* stands for number of days for which the AAR is cumulated. These calculated *t* values were tested at 5 % level of significance.

RESULTS AND DISCUSSION

First of all return series were generated for all individual stocks and Nifty using Equation 1 and 2 respectively for each of the estimation period and event window. After that stock returns were regressed on Nifty returns to obtain the intercept and slope coefficients for estimation period using Equation 3. Table 1 shows these coefficients for each of the stocks and for each of the quarters.

It is quite evident from Table 1 that none of the beta values for all companies is greater than one. It implies that stocks do not show movement more than Nifty. Reliance has all negative betas for all quarters. This implies that the stock of Reliance moves in the opposite direction of Nifty.

Betas for Tata Motors, ICICI and ITC show positive values which are, for most quarters, more than .6, showing strong co-movement with Nifty. But the betas for Infosys are very low as compared to other companies implying low correlation with Nifty which is positive in most of the quarters. While looking at alpha coefficients, it was found that all the values for all companies are very low which implies that individual stock neither under-perform nor outperform the market.

Using these coefficients, expected or normal returns were estimated for individual stocks for each of the event window using actual Nifty returns for that event window. Then Abnormal Returns (AR) were calculated by taking difference between actual or realized returns and expected returns. These abnormal returns were averaged cross sectionally to provide Average Abnormal Returns (AAR). Figure 3 depicts the plot of AAR obtained from Equation 5.

Figure 3: Plot of Average Abnormal Returns

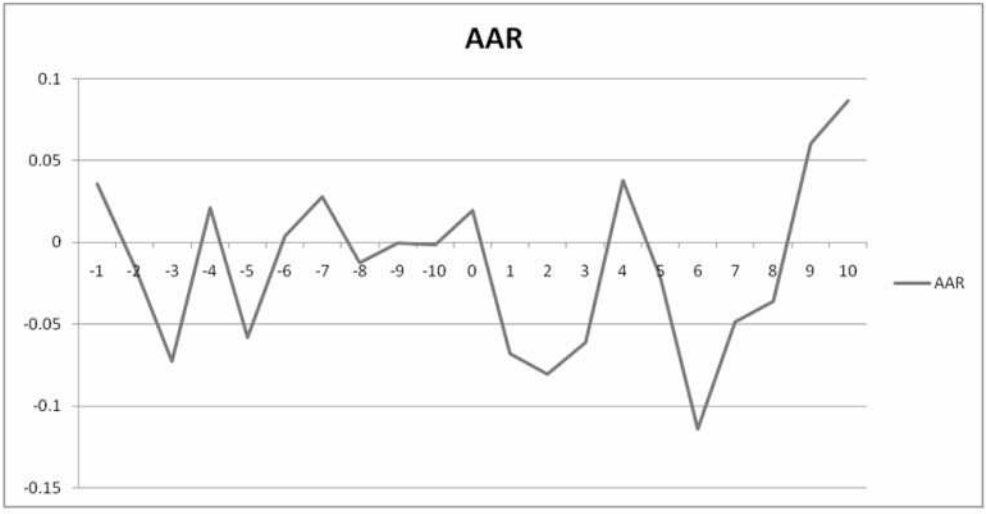
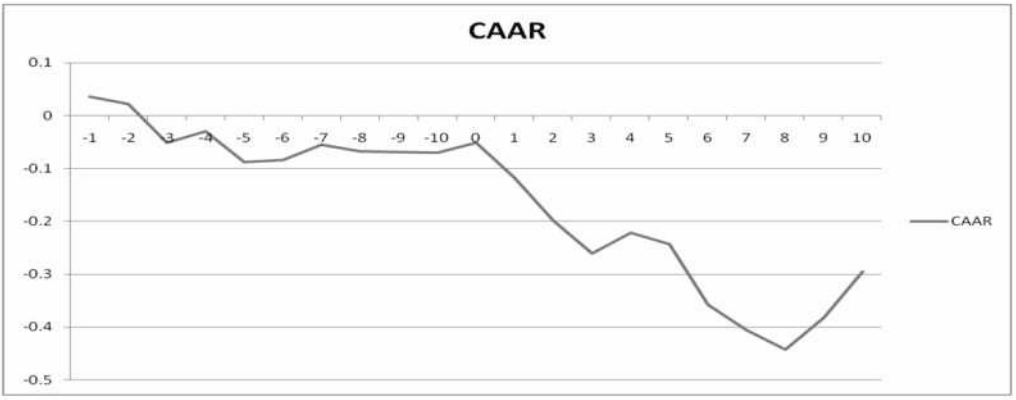


Table 1: Alpha and Beta Values of the Sample Companies for Estimation Periods

Quarters	Reliance		Tata Motors		ICICI		Infosys		ITC	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
Q1 2015-16	0.046	-0.667	-0.039	0.75873	-0.044	0.73406	-0.0514	0.54390	-0.0514	0.708042
Q4 2014-15	0.053	-0.335	-0.040	0.488	-0.027	0.40717	-0.0192	-0.0527	-0.0438	0.462184
Q3 2014-15	-0.036	-0.180	-0.005	0.372	0.000	0.35223	0.05794	0.00535	0.02754	0.22271
Q2 2014-15	0.011	-0.324	-0.006	0.260	-0.007	0.33553	-0.0065	0.16008	-0.0160	0.349638
Q1 2014-15	0.027	-0.559	-0.003	0.394	-0.00335	0.40969	-0.0211	0.20739	-0.0061	0.418572
Q4 2013-14	0.020	-0.625	0.010	0.674	-0.01679	0.61674	0.01552	0.12452	0.00907	0.639484
Q3 2013-14	0.052	-0.875	-0.050	0.880	-0.05558	0.89887	-0.012	0.20259	-0.0525	0.875364
Q2 2013-14	-0.032	-0.924	0.002	0.866	0.035233	0.91665	0.03953	0.29481	0.03523	0.91665
Q1 2013-14	-0.081	-0.696	0.075	0.664	0.072824	0.66107	0.07769	0.21718	0.07930	0.682512
Q4 2012-13	-0.036	-0.569	0.053	0.729	0.013479	0.65231	0.04111	-0.1476	0.04059	0.693445
Q3 2012-13	-0.0137	-0.655	0.020	0.668	0.000165	0.68819	0.04900	-0.0269	0.01366	0.655656
Q2 2012-13	-0.051	-0.369	0.045	0.602	0.038875	0.58242	0.0478	0.18993	0.03906	0.383612

Figure 3 shows that the values of AAR for each of the days of event window. Surprisingly, the AAR are highly volatile after event day. Dramatically, this volatility continues till the tenth post event day (t=10). The pre-event period shows less volatility in abnormal returns. On the 9th and 10th day pre-event, abnormal returns are claoe to 0. This shows that investors reap out most of the gains (bear losses) after the event day.

Figure 4: Plot of Cumulative Average Abnormal Returns



As the next step, Cumulative Average Abnormal returns (CAAR) were calculated using Equation 6. These CAAR were plotted in Figure 4, which clearly depicts that nearly zero CAAR during pre-event days turns out to be highly negative after the event day.

Table 2 contains AARs, t-statistics (AAR), CAAR and t-statistics (CAAR) for each of the daays of event window.

Table 2: AAR and CAAR along with t-statistic for Event Window

Day	AAR	t-statistics (AAR)	CAAR	t-statistics (CAAR)
-10	0.035819	-0.03212	0.035819	0
-9	-0.01432	-0.00884	0.021498	0.02507
-8	-0.07245	-0.19891	-0.05095	0.04304
-7	0.021231	0.496258	-0.02972	0.038843
-6	-0.05794	0.067449	-0.08766	0.03924
-5	0.004054	-0.9437	-0.08361	0.036008
-4	0.028021	0.285886	-0.05559	0.036
-3	-0.01257	-1.23756	-0.06815	0.033365
-2	-0.00055	-0.30675	-0.0687	0.03131
-1	-0.00162	0.721814	-0.07032	0.029575
0	0.019663	0.339679	-0.05066	0.029088

+1	-0.06777	-1.01762	-0.11843	0.032771
+2	-0.08037	-1.29652	-0.1988	0.03657
+3	-0.06135	-1.04477	-0.26015	0.037083
+4	0.038123	0.666846	-0.22202	0.038432
+5	-0.02135	-0.38347	-0.24338	0.037163
+6	-0.11411	-1.95716	-0.35749	0.042852
+7	-0.0488	-0.85032	-0.40629	0.042056
+8	-0.03607	-0.60274	-0.44236	0.040982
+9	0.060565	1.072459	-0.38179	0.043876
+10	0.086677	1.527412	-0.29512	0.048334

Table 2 depicts that when the significance of AAR and CAAR was tested using *t* test, it was found that both AAR and CAAR are not significant for any of the days of the event window. Thus both of the null hypotheses are accepted at 5% level of significance. The average abnormal returns and cumulative average abnormal returns are not significantly different from zero.

CONCLUSIONS

The study attempts to explore the existence of semi-strong form of efficiency in Indian stock market. For this purpose, daily prices were collected for five sample companies viz. Reliance, Tata Motors, ICICI, Infosys and ITC together with S&P CNX Nifty for a period of three years 2012 to 2015. Earnings announcement dates were also collected for the sample companies for 12 quarters in the study period. Estimation period consisted of 120 days before the event day whereas event window was for 21 days (event day and 10 days before and after event day). Market model was used to estimate expected returns, thereafter AAR and CAAR were calculated.

Significance testing showed that none of the t-statistic was significant. So it can be concluded that Indian stock market is semi-strong efficient. Investors quickly absorb the information regarding earnings announcement. They immediately react towards information content of earnings announcement. Indian stock market has grown in recent two decades so much. Various forecasters and analysts provide, well in advance, estimates of earnings of a company. Most of the times, these forecasts prove to be nearly accurate. This helps investors to accommodate this information quickly into stock prices. So it is not possible to earn abnormal returns using information of earnings announcements.

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APPENDIX 1

Table 1: Earnings Announcement Dates of Sample Companies

Year	Reliance	Tata Motors	ICICI	Infosys	ITC
2015-16	24th Jul. 2015	6th Aug. 2015	31st Jul. 2015	21st Jul. 2015	30th Jul. 2015
2014-15	17th Apr. 2015	26th May, 2015	27th Apr. 2015	24th Apr. 2015	22th May, 2015
	16th Jan. 2015	6th Feb. 2015	29th Jan. 2015	9th Jan. 2015	21th Jan. 2015
	13th Oct. 2014	14th Nov. 2014	30th Oct. 2014	10th Oct. 2014	31th Oct. 2014
	19th Jul. 2014	11th Aug. 2014	30th Jul. 2014	11th Jul. 2014	28th Jul. 2014
2013-14	18th Apr. 2014	29th May, 2014	24th Apr. 2014	15th Apr. 2014	23th May, 2014
	17th Jan. 2015	10th Feb. 2014	29th Jan. 2014	10th Jan. 2014	17th Jan. 2014
	14th Oct. 2013	8th Nov. 2013	25th Oct. 2013	11th Oct. 2013	25th Oct. 2013
	19th Jul. 2013	7th Aug. 2013	30th Jul. 2013	26th Jul. 2013	25th Jul. 2013
2012-13	17th Apr. 2013	29th May, 2013	26th Apr. 2013	12th Apr. 2013	17th May, 2013
	18th Jan. 2013	14th Feb. 2013	30th Jan. 2013	11th Jan. 2013	18th Jan. 2013
	16th Oct. 2012	8th Nov. 2012	26th Oct. 2012	12th Oct. 2012	19th Oct. 2012