Amity Journal of Finance
1(1), (9-35)

Quarterly Earnings and Stock Prices Reactions – A Study of BSE-500 Companies

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(Received: 08/09/2015; Accepted: 04/05/2016)

Abstract

The purpose of the study is to examine the significance of quarterly earnings announcement news on Indian stock market and to test semi-strong form Efficient Market Hypothesis (EMH). This study is based on BSE-500 companies. Masulis (1980), Cowles (1933) and Latane and Jones (1979) and Sharpe (1964) models are used to calculate the abnormal returns. The behaviour of the stock prices in Indian stock market is examined by using most widely used event study methodology. The present study applies student-t test for the statistical significance. The study also uses two non-parametric tests, Run and Sign test, to test the null hypotheses and applies Cohen, Hawawini, Maier, Schwartz & Whitcomb (1983a) methodology to see the stock market quality. The result show that Indian stock market fail to absorb publically available information and the investors can forecast the future returns based on new information flow.

Keywords: Efficient Market Hypothesis (EMH), Bombay Stock Exchange, Semi-strong Form Efficiency, Quarterly Earnings, Event Study.

JEL Classification: G14

Paper Classification: Research Paper

Introduction

Despite the global meltdown, India showed steady growth in the economy. Capital market plays a vital role in the development of any economy. In India, the capital market witnessed tremendous growth over the years in terms of up gradation of existing system, implementation of information technology, settlement process, regulations etc. These changes have taken place with the objective of attaining efficiency through fair game. The market participants should get the access to the functioning of capital market with ease and information has to disseminate equally without much cost. The regulatory authorities have taken steps to gain market efficiency so that every investor benefits by trading in the capital market. With these developments, the Indian capital market is expected to be efficient in absorbing new information and the market participant

can get the normal profits. The present study analyses the reaction of Indian capital markets to the quarterly earnings information. This study has considered BSE-500 based companies for the analysis and uses event study methodology. If the market is efficient in semi-strong form, the security prices should absorb the publically available information and should deny abnormal profits. It is believed that highly sophisticated, highly liquid and closely regulated markets are efficient. A study of share price response to quarterly earnings announcements in Indian stock market has significance to the individual and institutional investors, policy makers, academicians, researchers and for regulators. Each market participant is interested in increasing his portfolio return based on new information flow in the market. Every investor has the intention to outperform the market. This study intends to see whether the investor can beat the market based on quarterly earnings announcement in Indian capital market. This paper is organized as follows: section 2 discusses literature review, section 3 provides objectives and hypotheses, section 4 discusses the sample and data, section 5 discusses the methodology and section 6 presents the empirical results. Finally the concluding remarks are given in section 7.

Literature Review

The stock market response to earnings announcement is gained lot of attention in modem finance literature. The previous empirical studies are reviewed in this section. Bachelier (1900) examined the stock option to identify any trend in the series and found that the observed price series are random. Thereafter many researchers examined the behavior of the stock market. Working (1934) showed that the US stock prices series have random walk charecteristics. Kendall and Hill (1953) supported the view of Bachelier (1900) and stated that stock prices evolve randomly. Fama (1965, 1991, 1991) known as father of Efficient Market Hypothesis (EMH) formally developed the theory and classified EMH as weak-form, semi-strong form and strong form. To test the validity of EMH various model are developed to model the characteristic market prices which include, fair game model, submartingale model, random walk model, market model, capital asset pricing model etc. Ball and Brown (1968) and Fama et al. (1969) used event study methodology and found that the market is efficient in absorbing the publically available information. They used stock split and earnings announcement as publically available information. Basu (1977) forecasted the stock return by using P/E ratio of 1400 firms from 1956 to 1971. The results showed low P/E effect where low P/E stock outperformed high P/E stocks. Shiller (1981) criticized EMH stating that stock prices are highly volatile during dividend declaration and the investors cannot forecast the future return series.

Fama et al., (1969) and Das, Pattanayak, and Pathak (2008) supported information content in stock prices through empirical investigation. Ball and Brown (1968), and Beaver, Lambert and Morse (1980) examined the magnitude of price changes surrounding the earnings announcement and concluded that the reaction occurred quickly and market does not give opportunity for abnormal profits. Kiger (1972); Brown and Warner (1980); and Foster, Olsen, and Shevlin (1984) analysed stock price reaction to earnings announcements and found abnormal returns around the announcement dates. Lev (1989) found weak correlation between stock markets and earnings announcements information. Brown and Kennely (1972) and Jordan (1973) used quarterly earnings information to examine the behaviour of security prices and found that security prices fail to incorporate the information content and market gives opportunity to earn excess return. Watts (1978), Rendleman, Jones and Latane(1982) and Bernard and Thomas (1990) found the significant relationship between abnormal returns and quarterly earnings announcements.

Obaidullah (1992) investigated the market efficiency by considering bonus issues as an event and found that the market was efficient in reacting to bonus issues. Rao (1994), Srinivasan (1997)

and Obaidullah (1990) examined semi-strong form of market efficiency by using three events such as dividend announcement, bonus issue and equity rights. The study supported the presence of semi-strong form of market efficiency in Indian stock market. Beaver (1968), and Foster (1977) used earnings announcements news to see the presence of information content and the results showed that the trading volume is larger during the new information arrival in the market. Joy, Litzenberger and MacEnally (1977) found that stock prices fail to reflect the quarterly earnings information and concluded that market is inefficient. Chaturvedi (2000a, 2000b) provided evidence for the market inefficiency. Mallikarjunappa (2004) and Iqbal and Mallikarjunappa (2007, 2008a, 2008b, 2010, 2011) found that Indian stock market gives opportunity to traders to gain abnormal returns as the market is slow in disseminating the information. Cready and Gurun (2010) examined aggregate market reaction to earnings announcements and found negative relationship between earnings news and market returns which implied that market participants negatively reacted to the news. Rufus (2011) investigated stock price reaction on the Nigerian stock market and found that the stock market is inefficient. Mlonzi, Kruger, and Nthoesane (2011) used CAPM model to measure the abnormal performance. The companies listed in JSE-ALtX were taken as sample and the study period covers from 1st January 2009 to 31 December 2009. The results showed negative abnormal return to earnings announcement. Das et al. (2014) used SENSEX companies to investigate the impact of earnings news on stock market during boom and recession period in Indian context. The returns during these period does not show statistically significant effect on stock returns during both the periods. Zhou & Ansah (2014) investigated the value of cross listed firms. The results are positively related with trading volume and returns and there is an increase level of disclosure and review their firms value. James , Cordeiro and Tewari(2015) used event study methodology to investigate the traders reaction on first Newsweek Green Rankings. The traders reacted positively for raw and industry group ranking for both short term and long term returns. Giuseppe and Giuseppe(2015) examined the abnormal performance of sample companies during the audit report. The market reactions of the firm is measured by using event study methodology. The results revealed that the investors use audit report and it contains information. The abnormal results showed the negative impact on stock market. Nguyen, Pham and Sutton, (2015) examined the stock price reaction on stock repaurchase announcement news. The post announcement abnormal performance is measured by using calender method and matching method. The positive announcement drift is observed on those firms who have undergone the process of repurchasing of shares. Jain and Sunderman (2015) investigated the impact of mergers and acquisition announcement news on stock market and insider trading. Through regression analysis and event study methodology, it was found that there is a strong presence of insider trading on the announcement news during recession period and not in boom period in capital market. Kappou and Oikonomou(2016) examined the financial effect of additions to and deletions from social stock indices. The trading activities and short term returns are examined and results show that the addition of stock to index has not changed in stock prices and financial performance of the company but deletion led to negative cumulative abnormal returns. Rui, Hamish and Ben (2016) reviewed the literature on liquidity on international stock market and found that the most influencing factors for market liquidity is presence of market makers and stock market regulations. The impact on internationalisation of liquidity is not same across the countries as well as with firms.

Research Gap

There are some reasons to re-examine the stock market reactions to earnings announcement. The first reason is that EMH states that the new information moves the market and thereby denies abnormal return to the traders. The information dissemination during 1960s to 2000s are

different than today. The information technology played a significant role in dissemination of information faster than ever and thereby the present markets should exhibit the characteristics of EMH. Because of this, it cannot be called as just earnings announcement news but digital earnings announcement news which helps the market participants to get the information in fractions of seconds. Further it is believed that the information moves with market and if so, to what extent? Whether earnings news positively or negatively affects the Indian stock market? Our study is exposed to larger sample data of BSE-500 based companies which include the firms with 20 different industry groups and use 3 different models to measure the abnormal return to see the similarity in the results which will be more evidential in nature. The study contributed to exiting literature on EMH in Indian context. The study reveals that there is a negative behavioural response during earnings announcement by traders which call for regulatory bodies to enforce the measures for proper dissemination of information.

Objectives of the Study

After analyzing the available literature, the following objectives are developed to examine the market efficiency. This study has the following objectives:

1. To examine the semi-strong form of market efficiency in Indian stock market
   - To test information content in quarterly earnings announcement news.
   - To test the stock market reactions reflect the market efficiency.
2. To see the information quality in Indian stock market
   - To see the price quality of Indian stock market on the quarterly earnings.
   - To see the market frictions in the Indian stock market during the quarterly earnings

Hypotheses of the study

The following hypotheses are proposed to be tested

1. *The AARs and CAARs are near to zero.*
2. *There is randomness in AARs.*
3. *No significant difference exists between positive and negative AARs.*

Sample and Data

The study is based on widely used event study methodology to see the presence of information content in security prices during the earnings announcement news. The sample consists of 500 companies, which constitutes of BSE-500 index and are listed in BSE. The BSE-500 index is considered as well diversified as it has 20 different industry groups. Based on market capitalization, these companies of BSE-500 index are ranked as top companies and well traded stocks in Indian stock market. The total market capitalization of these companies is 93% on BSE. The Sensex stocks are considered most liquid stock and it has only 30 companies. To test larger sample size, the study has selected BSE-500 based companies as it represents 20 major industry groups. Further, it is normally believed that impact of earnings news is faster among liquid stocks. All companies which had announced their quarterly results of March 2011 have been considered. In 2010, the average growth of first 3 quarters was 8.9% which shows Indian economy was balanced and expected the good performance in 2011. In March 2011, Indian stock market was

geared up surprisingly which witnessed 9.10% growth in SENSEX, 7.85% and 4.59% in mid and small cap of BSE respectively. In March 2011, this substantial growth had created stability in the minds of the investors. Further, this period was treated as recovery period as the economy was hit by recession and therefore, focusing on March 2011 quarterly announcement results is relevant to study EMH even today in Indian context. The data structure consists of the adjusted closing prices of sample companies, the closing prices of BSE-500 index, the quarterly earnings announcement date and net sales and net profit of the sample companies to construct the portfolios. The data is collected from the Center for Monitoring Indian Economy (CMIE).

Classification of Companies into Portfolios

In this study net profit and net sales are used as parameters to construct the portfolios. The portfolios are of three types; good news, bad news and full sample portfolios. They are constructed based on the percentage change in the net profit and net sales. The percentage changes in the net profit and net sales in the current quarter over corresponding quarter is calculated as

(Current Quarter's Net Profit – Corresponding Quarters Net Profit in the Previous Year) / Corresponding Quarters Net Profit in the Previous Year.

(Current Quarter's Net Sales – Corresponding Quarters Net Sales in the Previous Year) / Corresponding Quarters Net Sales in the Previous Year.

The first portfolio is good news portfolio; the firms with positive change in the net profit and net sales. The second portfolio is bad news portfolio; the firms with negative percentage change in the net profit and net sales. The third is overall portfolio; all the firms selected as a sample for the study. The sign of percentage change in the net profit is considered to select the firm if the change in net profit is positive and net sales is negative and vice versa.

Methodology

The widly used event study methodology was developed by Fama et al. (1969). The study gained the popurality and the same methodoogy is used by other researchers to test the EMH. To name a few, Brown and Warner (1980); Masulis (1980); Dann (1981); Holthausen (1981); Leftwich (1981); DeAngelo and Rice (1983); McNichols and Manegold (1983); Srinivasan (1997); Mallikarjunappa (2004); and Iqbal and Mallikarjunappa (2007, 2008a, 2008b, 2010, 2011). To test the price reaction during the earnings announcement, announcement day was defined as event (t = 0). The study used 61 days event window which includes 30 days before the event day and 30 days after the event day (i.e., t = - 30,…,0,…, +30). For the estimation window, one year trading days was used which include 250 trading days starting from-280… -31. The abnormal performance of the sample company is measured by using mean adjusted model, market adjusted model and market model. The estimated abnormal returns are averaged across securities to calculate average abnormal returns (AARs) and AARs are then cumulated over time to ascertain cumulative average abnormal returns (CAARs).

Abnormal Return Measures

Let $R_{i,t}$ be the observed arithmetic return for security i on day t, $A_{i,t}$ represent the abnormal return for security i on day t. The following three models are used to estimate the abnormal return for each day in the event period.

Mean Adjusted Model

This model was initially developed by Masulis (1980). This model assumes that the expected return for the given security i is equal to constant $\bar{R}_i$. The abnormal return is equal to the difference between the real return and estimated return.

$$A_{i,t} = R_{i,t} - \bar{R}_i$$

$$\bar{R}_i = \frac{1}{250} \sum_{i=-280}^{-31} \bar{R}_{i,t}$$

Where $A_{i,t}$ represents the abnormal return for security i on day t, $\bar{R}_i$ is the average of security i's daily returns in the estimation period (-280, -31).

Market Adjusted Model

Under this model, the expected returns are identical across securities. The abnormal return is the difference between security return and market return and this model was developed by Cowles (1933) and Latane and Jones (1979).

$$A_{i,t} = R_{i,t} - R_{m,t}$$

Where $R_{m,t}$ is the return on the BSE-500 index for day t

OLS Market Model

Sharpe (1964) market model was used where, security return is regressed with market return and use α and β coefficients from simple regression to calculate expected return. The abnormal return is the difference between actual return and expected return of each security. The market model is given by:

$$A_{i,t} = \alpha_i + \beta_i R_{mt} + e_{it}$$

Where α_1 and β_1 are OLS values from the estimation period.

The Beta is calculated using the following equation.

$$\beta_i = \frac{N\sum_{t=1}^{N} R_{mt}R_{it} - (\sum_{t=1}^{N} R_{mt})(\sum_{t=1}^{N} R_{it})}{N(\sum_{t=1}^{N} R_{mt}^2) - (\sum_{t=1}^{N} R_{mt})}$$

Where, β_1 = slope of a straight line or beta coefficient of security 'i'. $R_{m,t}$ = return on market index 'm' during time period 't'. $R_{i,t}$= return on security 'i' during time period 't'. N = number of observations.

Brown and Warner (1980,) used above three models to generate excess return. The AARs and CAARs are calculated and tested for their statistical significance.

Average Abnormal Returns (AAR)

The following model is used to calculate average abnormal returns (AARs)

$$AAR_{it} = \frac{\sum_{i=1}^{N} AR_{it}}{N}$$

Where, i represent different securities in the study; N = total number of securities. t = the days surrounding the event day.

The Cumulated Average Abnormal Return (CAAR)

The AAR values are cumulated over 61-day period to find out cumulative average abnormal return (CAARs) and expect that the CAARs should be close to zero. The following formula is used for the CAARs:

$$CAAR_t = \sum_{t=-30}^{K} AAR_{it}$$

Where t = -30,…..0, …..+30

Standardized Abnormal Return (SAR) and Standardized Cumulative Average Abnormal Returns (SCAR)

The study calculated Standardized Abnormal Return (SAR) where, each excess return , is first divided by its estimated standard deviation to yield a standardized excess return, $A^t_{i,t}$. The standardized abnormal returns are then cumulated over time in order to ascertain standardized cumulative average abnormal returns (SCAR).

$$A^t_{i,t} = A_{i,t}/\hat{S}(A_{i,t}),$$

Where

$$\hat{S}(A_{i,t}) = \sqrt{\left(\sum_{t=-280}^{t=-31} (A_{i,t} - A_i^*)^2\right)/249}$$

$$A^*_i = \frac{1}{250}\sum_{t=-280}^{t=-31} A_{i,t}$$

The test statistics for any given day (t=0) is calculated as

$$\left(\sum_{i=1}^{N_t} A'_{j,t}\right) \cdot (N_t)^{-\frac{1}{2}}$$

Where, N = the number of sample securities at day t.

Parametric Significance Test

The Parametric t test is used to measure the significance of AARs and CAARs. The 5% level of significance with suitable degree of freedom is used to test the null hypothesis. It is assumed that if the market is efficient, AARs and CAARs values should be close to zero.

The t test statistic for AARs

This statistic is given by:

$$t = \frac{AAR}{\sigma(AAR)}$$

Where AAR =average abnormal return, σ (*ARR*) = standard error of average abnormal return.

The standard error is calculated by using following formula.

$$S.E = \frac{\sigma}{\sqrt{n}}$$

Where, S.E = standard error, σ = standard deviation, n = number of observation

The t test statistic for CAARs

This statistic is given by:

$$t = \frac{CAAR}{\sigma(CAAR)}$$

Where, σ (*CAAR*) is the standard error of cumulative average abnormal return.

The standard error is calculated by using the following formula:

$$S.E = \frac{\sigma}{\sqrt{n}}$$

S.E= standard error, σ = standard deviation, n= number of observations.

Non-Parametric Significance Test

The Runs and Sign tests are used to test randomness and significance of positive and negative AAR in the event window.

Runs test. Levene (1952) used Runs test for the first time to analyze the randomness observed series. The same test is applied to see the randomness in the AARs before and after the event day and also for the entire event window.

The Runs test is calculated as follows.

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

Where, μ_ρ = mean number of runs, n_1= number of positive AARs, n_2= number of negative AARs, r = number of runs (actual sequence of counts)

The standard error of the expected number of runs can be calculated by using following formula.

$$\sigma_r = \sqrt{\frac{2n_1n_2(2n_1n_2 - n_1 - n_2)}{(n_1 + n_2)^2(n_1 + n_2 - 1)}}$$

The difference between actual and expected number of the runs is calculated as:

$$Z = \frac{r - \mu_r}{\sigma_r}$$

Sign test. Sign test is developed by Mendenhall, Wackerly & Scheaffer et al. (1989) to consider the signs of the observed numbers instead of quantifiable values. The sign test is applied to examine there is no significant difference exist between positive and negative signs. The standard error is calculated by using the following formula:

$$\sigma_p = \sqrt{\frac{pq}{n}}$$

Where, σ_p =standard error of the proportion, p = expected proportion of positive AAR=0.5, q = expected proportion of negative AAR=0.5, n = number of AAR

To compute the value of Sign test we use the following equation:

$$Z = \frac{\bar{P} - P_{H0}}{\sigma_P}$$

p = actual proportion of AAR in the respective quarters having positive signs.

p_{HO} = hypothesized proportion 0.5

Cohen et al. (1983 a) Methodology

Based on Cohen et al. (1983a) methodology, the study estimated the market model regression using ordinary least squares (OLS). This method is used for each sample stock using the 20 return intervals spanning 1-20 days for both pre and post-event period. This provides i*20*2 estimates of betas. BSE-500 index is used as a market proxy.

$$R_{ijkt} = \alpha_{ijk} + \beta_{ijk} R_{mjkt} + e_{ijkt} \text{ j = 1….20, i = 1…..n k = 1, 2---------- (1)}$$

Where, R_{tjkt} is the return to stock *i* on day *t*, for return interval *j*, using the *k* sample periods (*k* has a value of 1 in the pre-call period and has a value of 2 in the post-call period). R_{mjkt} is the market return on day t, using interval j and sample k. According to Schwartz (1991), the first-pass beta is expected to reach its true value asymptotically as the measurement interval, L, approaches infinity. To test this expectancy, the study used the 40 (pre and post event) first-pass market model regression beta estimates ($b_{j,1LE}$) for each stocks to run the second-pass, stock-specific regression.

$$b_{j,1LE} = a_{j,2} + b_{j,2} \ln(1 + L^{-1}) + C_{j,2}\left(Dummy_{jE} * \ln(1 + L^{-1})\right) + e_{jLH} \text{ ---------- (2)}$$

Where $b_{j,1LE}$ is the first-pass beta estimate for security j based on L-day stock returns for the time period E; E= BSE-500 companies, and denotes either the period before or after the event; $a_{j,2}$, $b_{j,2}$, and $c_{j,2}$ are second-pass parameter estimates, L is the length of the holding period, in days, for which the stock returns were calculated; $Dummy_{jE}$ is a binary variable equal to one if the first-pass beta is estimated using the post-event data and zero if the first-pass beta is estimated using the pre-event data and e_{jLH} is a stochastic disturbance term. The event study tests are operationalized by an interaction variable that equals 1* in(1+ L^{-1}) for the post-event period and zero for the pre-event period. This variable is included to capture any changes in the relation between L and the first-pass betas after the quarterly earnings announcement. Cohen et al. (1983 a) and Schwartz and Pagano (2003) states that the first-pass beta could be a linear function of the inverse of L. Eq. (2) measures the statistical relation between the first-pass betas [b_{j1LE} in Eq. (2)'s notation] and the transformed return interval, in(1+ L^{-1}). This function provides the best linear fit between the first-pass betas and the return interval, L.

Apart from this, the study uses R square which is influencing by the choice of return intervals. This helps to see how the exploratory power of the market model, when the return interval is lengthened. R-square is an indicator of information quality and want to see whether low R-square indicate early resolution of uncertainty through the arrival of firm-specific information, or does it indicate a high level of uncertainty that remains unresolved. The low R-square firms have lower future earnings response coefficient, indicating that their current stock price incorporates a smaller amount of future earnings news.

Discussion

The study of stock price response to earnings announcement has been studied since 1960s. The relevance of EMH in India in the present scenario is growing because of changing nature and working of stock market. In Indian context, studies such as Chaturvedi (2000a, 2000b),

Mallikarjunappa (2004) and Iqbal and Mallikarjunappa (2007, 2008a, 2008b, 2010, 2011) found that market is inefficient. The results are at par with their results. But the present study is different from them as relatively large sample has been taken which constitute the BSE-500 listed companies. The methodology used in the study is different; as it focused on three models to measure the abnormal performance to test the consistency in results. The study also used Cohen et al. (1983a) methodology to see the price quality and market frictions during the announcement, which is not there in previous studies. The study of March 2011 quarter is of great importance as the economy moved from recession to recovery period and this period had great impact on investors in stock market. Further, in recent past the world is opened up for cross country listing and the findings of this paper is significant for the investors who wish to hold internationally diversified portfolios. As tremendous flow of investment is witnessed in emerging economies like India, understanding the market efficiency is of great importance to the investors and the economy as a whole.

Results and Analysis

Table 1 and Figure 1 shows the AAR and CAAR values of full sample earnings announcement of mean adjusted model, market adjusted model and market model of March -2011 quarter. In the case of mean adjusted model, the AAR values are positive and insignificant for -29, -26, -19, -17, -14, -11, -6, -2, 0, 10, 11, 19, 20, 22, 23, 24, 25, 28 and negative and insignificant on -20, -12, -10, -9, -7, -4,-3, 1, 5, 8, 9, 13, 15, 18, 27 and 29 day. The AARs are negative and significant for -8, -5, 2, 3, 4, 6, 7, 12, 14, 16, 17 and positive and significant on -30, -28, -27, -25, -24, -23, -22, -21, -18, -16, -15, -13, -1, 21, 26th and 30th day in the event window. Overall, the AARs are positive for 34 days and negative for 27 days and significant for 27 days and insignificant for 34 days during the event window of 61 days. Therefore it is accepted that the null hypothesis that AAR values are close to zero. The CAAR values are positive and insignificant on 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 29 and positive and significant on -30, -29, -28, -27, -26, -25, -24, -23, -22, -21, -20, -19, -18, -17, -16, -15, -14, -13,-12, -11, -10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 26, 27,28th and 30th day in the event period. Overall, CAARs are positive for the entire event window and significant for 47 days. Therefore it is inferred that CAARs are not close to zero. In the case of market adjusted model, the CAAR is positive and insignificant on -30, -29, -28, -27, -25, -24, -22, -21, -16, -15, -14, -12, -11, -10, -8 -7, -6, -5, -4, 2, 3, 5, 8, 9, 10, 11, 12, 13, 15, 20, 21, 22, 23, 25, 26, 27, 29, 30 and negative and insignificant on -26, -20, 0, 1, 4, 6, 7, 14, 16, 17, 18, 19 and 24th day. The AARs are positive and significant on -23, -19, -18, -17, -13, -9, -3, -2, -1 and 28th day in the event period. Of the 61 days event window, AARs positive for 48 days and negative for 13 days and significant for 9 days and insignificant for 52 days in the event period. Therefore, the null hypothesis that AARs are close to zero is accepted. The CAARs are positive and insignificant on -30th and -29th day and they are positive and significant for the reaming days in the window period. Therefore, the null hypothesis that CAARs are close to zero is rejected. When market model is observed, AARs are positive and insignificant on -29, -20, -11, -6, -2, 0, 5 ,9, 10, 11, 15, 18, 19, 24, 25,28, 29 and positive and significant on -30, -28, -27, -26, -25, -24, -23, -22, -21, -19, -18, -17, -16, -15, -14, -13, -1, 20, 21, 22, 23, 26th and 30th day. The AARs are negative and significant on -8, -5, 2, 3, 4, 7, 14, 16 and negative insignificant on -12, -10, -9, -7, -4, -3, 1, 6, 8, 12, 13, 17th and 27th day in the window period of 61 days. The overall result shows that AARs are positive for 34 days and for 27 days and significant for 31 days in the event period. The CAARs are positive and significant for the overall window period. Therefore, the null hypothesis that AARs and CAARs are close to zero is rejected.

Table 1 : AAR and CAAR values of Full Sample Earnings Announcements of March 2011 Quarter

Days	Mean adjusted model				Market adjusted model				Market model			
	AAR	t value	CAAR	t value	AAR	t value	CAAR	t value	AAR	t value	CAAR	t value
-30	0.16991	3.49187*	0.16991	3.49187*	0.08988	1.79464	0.08988	1.79464	0.20509	4.22278*	0.20509	4.22278*
-29	0.03231	0.65622	0.20222	2.90454*	0.04821	0.93210	0.13809	1.88775	0.06691	1.33794	0.27200	3.84610*
-28	0.09213	2.01523*	0.29435	3.71724*	0.07916	1.68331	0.21726	2.66722*	0.12716	2.73683*	0.39916	4.96009*
-27	0.15220	3.53644*	0.44655	5.18793*	0.01584	0.36043	0.23310	2.65174*	0.18802	4.32749*	0.58718	6.75719*
-26	0.06423	1.51897	0.51078	5.40187*	-0.00601	-0.13534	0.22709	2.28820*	0.09901	2.32166*	0.68619	7.19582*
-25	0.12089	2.52244*	0.63167	5.38062*	0.02393	0.47797	0.25102	2.04694*	0.15513	3.21816*	0.84133	7.12505*
-24	0.11976	2.71269*	0.75144	6.43304*	0.02522	0.53552	0.27624	2.21718*	0.15540	3.53098*	0.99672	8.56010*
-23	0.15149	3.44838*	0.90293	7.26691*	0.09403	1.96324	0.37027	2.73317*	0.18725	4.24029*	1.18397	9.47924*
-22	0.11024	2.18898*	1.01317	6.70580*	0.04791	0.90366	0.41818	2.62906*	0.14523	2.85014*	1.32920	8.69528*
-21	0.15664	3.20565*	1.16980	7.57073*	0.08182	1.60611	0.50000	3.10380*	0.19214	3.96474*	1.52134	9.92698*
-20	-0.00304	-0.06729	1.16676	7.77761*	-0.07993	-1.70542	0.42007	2.70225*	0.03272	0.70636	1.55406	10.11547*
-19	0.08100	1.56330	1.24776	6.95214*	0.14361	2.76547*	0.56368	3.13351*	0.11653	2.22370*	1.67060	9.20248*
-18	0.09606	2.03961*	1.34382	7.91329*	0.09716	2.03269*	0.66084	3.83438*	0.13015	2.75195*	1.80075	10.55998*
-17	0.08023	1.68231	1.42405	7.98030*	0.11772	2.58571*	0.77856	4.57029*	0.11386	2.37938*	1.91461	10.69316*
-16	0.14908	3.19976*	1.57313	8.71817*	0.01760	0.37304	0.79617	4.35602*	0.18491	4.02011*	2.09952	11.78559*
-15	0.17059	3.07242*	1.74372	7.85139*	0.09530	1.68525	0.89147	3.94097*	0.20593	3.69387*	2.30546	10.33832*
-14	0.07037	1.51571	1.81408	9.47745*	0.06959	1.40617	0.96106	4.70992*	0.10527	2.27555*	2.41073	12.63833*
-13	0.12304	2.45646*	1.93713	9.11526*	0.13611	2.60541*	1.09717	4.95028*	0.15622	3.17778*	2.56695	12.30749*
-12	-0.05357	-1.09282	1.88356	8.81482*	0.01847	0.35727	1.11564	4.95072*	-0.01817	-0.36623	2.54878	11.78533*
-11	0.02993	0.69633	1.91348	9.95569*	0.00114	0.02599	1.11678	5.71754*	0.06508	1.50899	2.61386	13.55187*
-10	-0.07938	-1.50177	1.83410	7.57167*	0.00897	0.16510	1.12575	4.52237*	-0.04579	-0.86660	2.56807	10.60619*
-9	-0.05081	-1.14480	1.78329	8.56665*	0.09606	2.04913*	1.22181	5.55667*	-0.01456	-0.31931	2.55351	11.93899*
-8	-0.16187	-3.71379*	1.62143	7.75706*	0.01472	0.32144	1.23653	5.62978*	-0.12657	-2.86213*	2.42695	11.44369*
-7	-0.06490	-1.38061	1.55653	6.75876*	0.05259	1.12166	1.28912	5.61224*	-0.02974	-0.61425	2.39721	10.10713*
-6	0.02198	0.55718	1.57850	8.00349*	0.01280	0.32085	1.30191	6.52918*	0.05747	1.42310	2.45468	12.15727*
-5	-0.13384	-3.15700*	1.44466	6.68286*	0.00535	0.12744	1.30727	6.10161*	-0.09968	-2.32926*	2.35499	10.79172*
-4	-0.04690	-1.08877	1.39776	6.24497*	0.04938	1.08521	1.35665	5.73761*	-0.01113	-0.25568	2.34387	10.36602*
-3	-0.05672	-1.27982	1.34104	5.71834*	0.10716	2.27272*	1.46381	5.86723*	-0.02139	-0.46957	2.32248	9.63528*
-2	0.05766	1.20384	1.39870	5.42308*	0.10062	2.02804*	1.56442	5.85553*	0.09177	1.91065	2.41425	9.33377*

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-1	0.12031	2.37071*	1.51901	5.46493*	0.15332	2.92856*	1.71774	5.99049*	0.15525	3.05510*	2.56949	9.23187*
0	0.02202	0.26807	1.54102	3.36998*	-0.00660	-0.07674	1.71114	3.57261*	0.05518	0.67303	2.62467	5.75025*
1	-0.12631	-1.59006	1.41471	3.14829*	-0.07238	-0.85760	1.63875	3.43223*	-0.09690	-1.23334	2.52777	5.68724*
2	-0.14325	-2.81896*	1.27146	4.35549*	0.04871	0.92448	1.68746	5.57513*	-0.10927	-2.19396*	2.41849	8.45292*
3	-0.13982	-3.02794*	1.13164	4.20281*	0.02928	0.61207	1.71674	6.15469*	-0.10461	-2.22566*	2.31389	8.44305*
4	-0.15853	-3.48652*	0.97311	3.61746*	-0.06470	-1.33213	1.65204	5.74941*	-0.12267	-2.62775*	2.19121	7.93381*
5	-0.00653	-0.14786	0.96658	3.64927*	0.02157	0.48347	1.67361	6.25131*	0.02878	0.64496	2.21999	8.29293*
6	-0.11256	-2.37109*	0.85402	2.95763*	-0.02245	-0.47193	1.65117	5.70737*	-0.07706	-1.60452	2.14292	7.33496*
7	-0.11861	-3.08971*	0.73541	3.10764*	-0.02734	-0.69000	1.62383	6.64806*	-0.08400	-2.16195*	2.05892	8.59599*
8	-0.04322	-0.90708	0.69219	2.32616*	0.05239	1.06678	1.67622	5.46557*	-0.00827	-0.17544	2.05065	6.96393*
9	-0.01502	-0.27844	0.67717	1.98454*	0.01992	0.35043	1.69613	4.71825*	0.01906	0.34314	2.06971	5.89070*
10	0.03361	0.74109	0.71078	2.44760*	0.02783	0.59428	1.72396	5.74985*	0.06850	1.50171	2.13821	7.32080*
11	0.00405	0.08345	0.71483	2.27268*	0.09378	1.95469	1.81774	5.84606*	0.03873	0.79551	2.17694	6.90001*
12	-0.10247	-2.67452*	0.61236	2.43730*	0.00455	0.11577	1.82229	7.07657*	-0.06666	-1.71424	2.11028	8.27580*
13	-0.06981	-1.58495	0.54255	1.85704	0.05836	1.28312	1.88065	6.23383*	-0.03774	-0.85566	2.07254	7.08486*
14	-0.17406	-3.68738*	0.36848	1.16365	-0.02953	-0.64547	1.85112	6.03135*	-0.13902	-2.91245*	1.93352	6.03833*
15	-0.01033	-0.24323	0.35816	1.24372	0.04283	1.03604	1.89394	6.75514*	0.02467	0.57773	1.95819	6.76103*
16	-0.12163	-3.03703*	0.23653	0.86150	-0.04068	-1.01582	1.85326	6.75012*	-0.08508	-2.06575*	1.87311	6.63382*
17	-0.08496	-2.23263*	0.15157	0.57489	-0.03055	-0.77835	1.82272	6.70363*	-0.04951	-1.29338	1.82360	6.87582*
18	-0.01728	-0.33438	0.13429	0.37115	-0.08508	-1.74055	1.73764	5.07839*	0.01709	0.33248	1.84069	5.11527*
19	0.03841	0.91729	0.17270	0.58324	-0.04771	-1.12101	1.68993	5.61523*	0.07433	1.76329	1.91502	6.42467*
20	0.06001	1.26814	0.23271	0.68857	0.00000	0.00001	1.68993	5.13589*	0.09604	2.05562*	2.01106	6.02761*
21	0.13092	2.87129*	0.36363	1.10596	0.03225	0.69226	1.72218	5.12654*	0.16733	3.63863*	2.17838	6.56914*
22	0.08396	1.89277	0.44759	1.38596	0.00848	0.19297	1.73066	5.40915*	0.11917	2.66555*	2.29755	7.05924*
23	0.05517	1.27650	0.50276	1.58304	0.04468	1.03942	1.77534	5.62035*	0.08920	2.07249*	2.38675	7.54653*
24	0.00909	0.19614	0.51185	1.48900	-0.03535	-0.72188	1.73998	4.79067*	0.04413	0.93841	2.43088	6.97006*
25	0.03698	0.86718	0.54883	1.71987	0.01696	0.41109	1.75694	5.69216*	0.07216	1.70781	2.50303	7.91662*
26	0.12253	2.79147*	0.67136	2.02581*	0.02652	0.61164	1.78346	5.44772*	0.15807	3.58357*	2.66110	7.99086*
27	-0.04683	-1.30583	0.62453	2.28668*	0.00093	0.02421	1.78439	6.10662*	-0.01065	-0.28903	2.65045	9.44382*
28	0.04218	0.97063	0.66671	1.99754*	0.09333	2.08862*	1.87772	5.47049*	0.07773	1.76784	2.72818	8.07757*
29	-0.00439	-0.09136	0.66231	1.77895	0.06503	1.29080	1.94275	4.97872*	0.03088	0.63465	2.75906	7.32080*

*Note: * indicates statistically significant at 5% level of significance.*

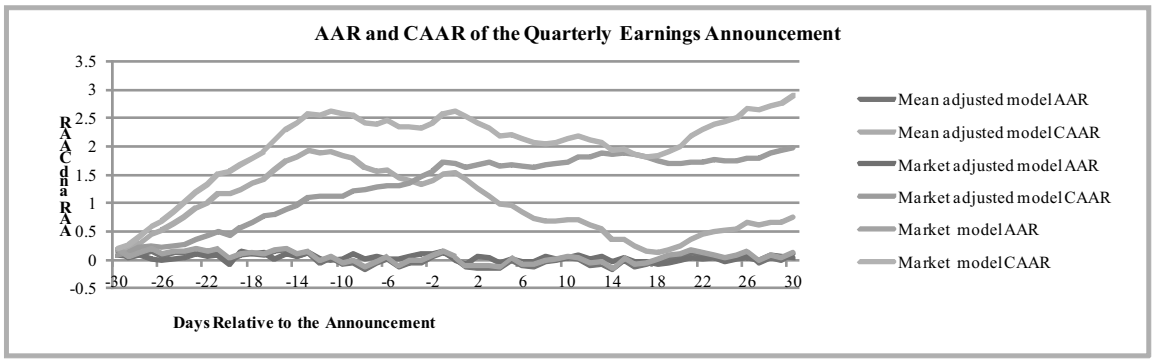

Figure 1. AARs and CAARs Trends of Three Models over the 61-Day Event Window of Full Sample Earnings Announcement of March 2011 Quarter

Table 2 and Figure 2 present the results of good news earnings announcement. In the case of mean adjusted model, AARs are negative and insignificant for-12, -11, -10, -9, -7, -4, - 3, -2, 0, 1, 4, 5, 7, 8, 12, 13, 15, 18, 24, 25, 27 and negative and significant for -8, -5, 2, 3, 6, 14, 16th and 17th day. The AARs are positive and significant on -30, -27, -25, -23, -22, -21, -15, 21, 22, 26 and positive insignificant on-29, -28, -26, -24, -20, -19, -18, -17, -16, -14, -13, -6, -1, 9, 10, 11, 19, 20, 23, 28, 29 and 30th day in the event period of 61 days. Overall the AARs are positive for 32 days and negative for 29 days and significant for 18 days and insignificant for 43 days and therefore, it is inferred that AARs are close to zero.

The CAARs are positive and insignificant on 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29th and 30th day and remaining days CAARs are positive and significant in the event period. Therefore, the null hypothesis that CAARs are close to zero is rejected. The market adjusted model shows that AARs are negative and significant on 18th and positive and significant on -19, -17, -9, 11, 26 and 28th day. The AARs are negative and insignificant on -26, -20, -16, -11, -10, -5, 1, 2, 6, 14, 16, 17, 19, 20, 24, 25, 27 and positive and insignificant on -30, -29, -28, -27, -25, -24, -23, -22, -21, -18, -15, -14, -13, -12,-8, -7, -6, -4, -3, -2, -1, 0, 3, 4, 5, 7, 8, 9, 10, 12, 13, 15, 21, 22, 23, 29th and 30th day in the window period. The AARs are positive for 43 days and insignificant for 55 days and therefore, it is inferred that AARs are close to zero. The CAARs are positive and insignificant on -30 and the CAARs are positive and significant for remaining period in the event window of 61 days. Therefore, we reject the null hypothesis that CAARs are close to zero is rejected.

The positive and insignificant values are observed on -29, -26, -20, -14, -12, -11, -9, -4, -2, -1, 0,57, 9, 10, 11,13, 15,19, 20, 23, 24, 25, 27, 29 and negative insignificant values on -10, -8, -7, -5, -3, 1, 4, 6, 8, 12, 14, 16, 17, and 18th day in the case of market model. The AARs are positive and significant for positive significant -30, -28, -27, -25, -24, -23 -22, -21, -19, -18, -17, -16, -15, -13, -6, 21, 22, 26, 28, 30 and negative and significant on 2nd and 3rd day in the event period. The AARs are insignificant for 39 days and therefore it is inferred that AARs are close to zero. The CAARs are positive and significant throughout the window and therefore the null hypothesis that CAARs are close to zero is rejected.

Table 2: AAR and CAAR values of Good News Earnings Announcements of March 2011 Quarter

Days	Mean adjusted model				Market adjusted model				Market model			
	AAR	t value	CAAR	t value	AAR	t value	CAAR	t value	AAR	t value	CAAR	t value
-30	0.20593	3.16538*	0.20593	3.16538*	0.11822	1.83590	0.11822	1.83590	0.26465	4.14245*	0.26465	4.14245*
-29	0.02437	0.38622	0.23031	2.58035*	0.06687	1.01852	0.18509	1.99351*	0.08242	1.30389	0.34706	3.88263*
-28	0.09399	1.54787	0.32430	3.08333*	0.10823	1.75614	0.29332	2.74778*	0.15201	2.47052*	0.49907	4.68292*
-27	0.21253	3.67652*	0.53683	4.64332*	0.11103	1.81963	0.40435	3.31336*	0.27202	4.68818*	0.77109	6.64477*
-26	0.04511	0.77569	0.58194	4.47531*	-0.03113	-0.50121	0.37322	2.68724*	0.10338	1.75787	0.87447	6.64998*
-25	0.14253	2.32588*	0.72447	4.82635*	0.04475	0.69414	0.41796	2.64685*	0.20031	3.24596*	1.07478	7.11034*
-24	0.10612	1.72705	0.83059	5.10901*	0.00134	0.02033	0.41930	2.40654*	0.16550	2.70863*	1.24028	7.67226*
-23	0.12527	2.03597*	0.95586	5.49243*	0.04309	0.65699	0.46239	2.49281*	0.18476	2.96173*	1.42503	8.07642*
-22	0.16865	2.38642*	1.12451	5.30406*	0.09717	1.27919	0.55956	2.45533*	0.22721	3.17820*	1.65225	7.70378*
-21	0.15242	2.42002*	1.27693	6.41140*	0.08819	1.31243	0.64776	3.04824*	0.21151	3.35881*	1.86376	9.35921*
-20	0.00609	0.09820	1.28302	6.23717*	-0.08153	-1.24711	0.56623	2.61148*	0.06569	1.04181	1.92945	9.22570*
-19	0.12275	1.85198	1.40577	6.12243*	0.17160	2.66475*	0.73783	3.30751*	0.18092	2.73901*	2.11037	9.22303*
-18	0.07449	1.17172	1.48026	6.45819*	0.06704	1.07298	0.80487	3.57279*	0.13188	2.07606*	2.24225	9.79015*
-17	0.08827	1.41441	1.56853	6.71732*	0.12217	2.09592*	0.92704	4.25051*	0.14491	2.32486*	2.38716	10.23579*
-16	0.09635	1.58305	1.66488	7.06259*	-0.01007	-0.16237	0.91697	3.81723*	0.15565	2.55454*	2.54280	10.77559*
-15	0.16943	2.22397*	1.83431	6.01954*	0.12295	1.53924	1.03992	3.25474*	0.22840	3.00378*	2.77121	9.11118*
-14	0.05808	0.93933	1.89239	7.42331*	0.05669	0.86345	1.09661	4.05086*	0.11586	1.88726	2.88707	11.40570*
-13	0.09972	1.44056	1.99211	6.78299*	0.13378	1.81590	1.23039	3.93651*	0.15609	2.29029*	3.04316	10.52476*
-12	-0.01391	-0.21185	1.97820	6.91342*	0.05242	0.73602	1.28281	4.13202*	0.04589	0.68764	3.08905	10.61823*
-11	-0.01737	-0.30653	1.96083	7.73688*	-0.02055	-0.35569	1.26227	4.88585*	0.04102	0.72345	3.13007	12.34516*
-10	-0.11216	-1.57381	1.84867	5.66088*	-0.01607	-0.22492	1.24620	3.80615*	-0.05547	-0.79296	3.07460	9.59189*
-9	-0.01215	-0.21200	1.83653	6.83388*	0.16084	2.63226*	1.40704	4.90943*	0.04894	0.83350	3.12354	11.34104*
-8	-0.12403	-2.10030*	1.71250	6.04675*	0.04932	0.81381	1.45635	5.01116*	-0.06579	-1.10412	3.05775	10.69941*
-7	-0.07948	-1.21110	1.63302	5.07961*	0.05882	0.90910	1.51517	4.78026*	-0.02070	-0.30666	3.03705	9.18337*
-6	0.05515	1.08356	1.68817	6.63398*	0.07646	1.48926	1.59163	6.20018*	0.11388	2.16562*	3.15093	11.98378*
-5	-0.15516	-2.87021*	1.53301	5.56141*	-0.04471	-0.84935	1.54692	5.76352*	-0.09770	-1.77437	3.05323	10.87451*
-4	-0.04468	-0.80968	1.48833	5.19068*	0.07529	1.34961	1.62221	5.59640*	0.01528	0.27416	3.06850	10.59840*
-3	-0.06313	-1.09686	1.42519	4.67926*	0.09426	1.50417	1.71647	5.17634*	-0.00409	-0.06841	3.06441	9.68978*
-2	-0.00115	-0.02007	1.42404	4.60386*	0.08870	1.44637	1.80517	5.46603*	0.05819	0.98762	3.12261	9.84089*

-1	0.00607	0.10495	1.43011	4.51631*	0.03109	0.54729	1.83627	5.90097*	0.06496	1.11182	3.18757	9.96045*
0	-0.00681	-0.06137	1.42329	2.30208*	0.00488	0.04231	1.84115	2.86512*	0.04758	0.43076	3.23515	5.26053*
1	-0.16680	-1.73552	1.25650	2.31117*	-0.07678	-0.75335	1.76437	3.06023*	-0.11066	-1.15701	3.12449	5.77520*
2	-0.22147	-3.76552*	1.03502	3.06334*	-0.05101	-0.83794	1.71336	4.89914*	-0.16245	-2.75085*	2.96204	8.73148*
3	-0.18222	-3.14232*	0.85280	2.52209*	0.00528	0.08853	1.71863	4.94432*	-0.12280	-2.09302*	2.83925	8.29949*
4	-0.06486	-1.01476	0.78795	2.08390*	0.03217	0.49221	1.75080	4.52813*	-0.00525	-0.08103	2.83399	7.38968*
5	-0.01410	-0.24101	0.77384	2.20405*	0.04024	0.64344	1.79104	4.77361*	0.04435	0.75326	2.87835	8.14765*
6	-0.14445	-2.28100*	0.62939	1.63391	-0.05229	-0.84985	1.73875	4.64580*	-0.08485	-1.32520	2.79349	7.17220*
7	-0.04201	-0.83401	0.58738	1.89173	0.06260	1.14609	1.80135	5.34981*	0.01623	0.31632	2.80972	8.88556*
8	-0.06392	-1.10402	0.52347	1.44783	0.05613	0.94470	1.85748	5.00579*	-0.00456	-0.07946	2.80515	7.81947*
9	0.01282	0.17255	0.53629	1.14092	0.03028	0.39464	1.88776	3.89004*	0.06910	0.89710	2.87425	5.90006*
10	0.00670	0.10343	0.54299	1.30920	0.03651	0.54501	1.92427	4.48629*	0.06483	0.99183	2.93909	7.02186*
11	0.06685	0.95220	0.60984	1.34035	0.14848	2.12670*	2.07275	4.58097*	0.12543	1.79945	3.06452	6.78371*
12	-0.09036	-1.92510	0.51949	1.68787	0.02407	0.50337	2.09682	6.68792*	-0.03039	-0.64490	3.03413	9.82004*
13	-0.01115	-0.16798	0.50834	1.15501	0.12379	1.82368	2.22061	4.93190*	0.04235	0.64793	3.07648	7.09572*
14	-0.16318	-2.70809*	0.34516	0.85388	-0.02699	-0.43049	2.19362	5.21648*	-0.10502	-1.73200	2.97146	7.30517*
15	-0.02141	-0.38215	0.32375	0.85202	0.06085	1.13839	2.25448	6.21817*	0.03686	0.66291	3.00832	7.97768*
16	-0.14172	-2.90329*	0.18202	0.54391	-0.05141	-1.01157	2.20307	6.32334*	-0.08106	-1.63331	2.92726	8.60317*
17	-0.11032	-2.02270*	0.07171	0.18978	-0.04022	-0.73707	2.16284	5.72034*	-0.05153	-0.94445	2.87573	7.60772*
18	-0.06436	-1.04731	0.00735	0.01709	-0.11181	-1.96603	2.05103	5.15186*	-0.00627	-0.10271	2.86946	6.71748*
19	0.02945	0.53409	0.03680	0.09438	-0.07274	-1.25742	1.97829	4.83601*	0.08907	1.59024	2.95853	7.46976*
20	0.03056	0.51341	0.06736	0.15847	-0.03888	-0.68012	1.93940	4.75029*	0.09273	1.58259	3.05126	7.29226*
21	0.12512	2.00657*	0.19248	0.42807	0.01483	0.23335	1.95424	4.26355*	0.18526	2.94445*	3.23652	7.13346*
22	0.14642	2.26489*	0.33890	0.72008	0.07798	1.23525	2.03221	4.42189*	0.20550	3.14563*	3.44202	7.23712*
23	0.06089	1.01005	0.39978	0.90251	0.04874	0.84586	2.08095	4.91493*	0.11736	1.95633	3.55938	8.07420*
24	-0.04893	-0.81812	0.35085	0.79099	-0.08233	-1.29049	1.99862	4.22399*	0.01005	0.16356	3.56943	7.83548*
25	-0.03258	-0.55987	0.31827	0.73099	-0.02729	-0.48397	1.97132	4.67105*	0.02538	0.44253	3.59481	8.37453*
26	0.16113	2.96094*	0.47940	1.16687	0.10685	1.98785*	2.07817	5.12117*	0.22134	4.03021*	3.81615	9.20359*
27	-0.05267	-1.07013	0.42673	1.13838	-0.00938	-0.18124	2.06879	5.25156*	0.00721	0.14237	3.82336	9.91702*
28	0.08252	1.38116	0.50925	1.10969	0.15140	2.54850*	2.22020	4.86533*	0.14098	2.36693*	3.96433	8.66534*
29	0.00722	0.11423	0.51647	1.05486	0.10214	1.53515	2.32234	4.50606*	0.06586	1.03431	4.03019	8.17166*
30	0.09494	1.53880	0.61141	1.26879	0.05319	0.83238	2.37553	4.75989*	0.15452	2.46138*	4.18470	8.53499*

*Note: * indicates statistically significant at 5% level of significance.*

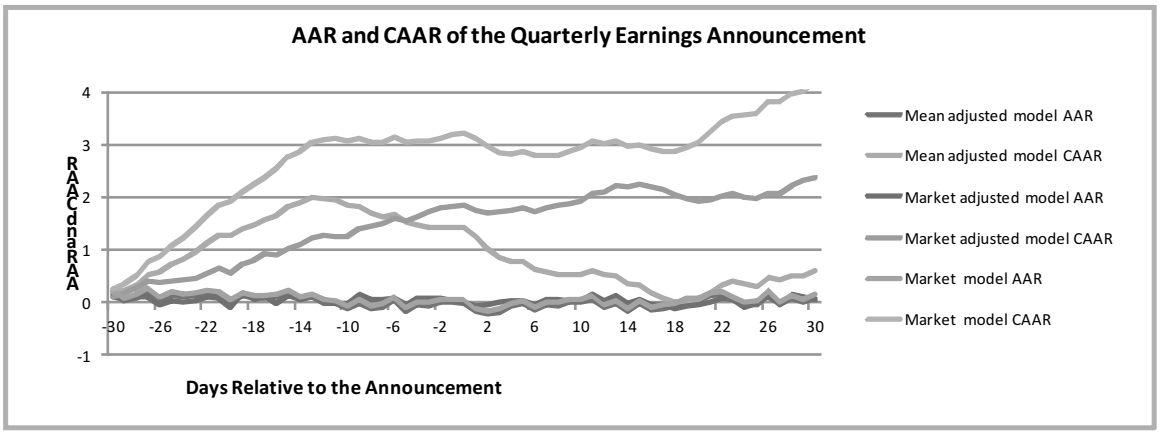

Figure 2. AARs and CAARs Trends of Three Models over the 61-Day Event Window of Good News Earnings Announcement of March 2011 Quarter

Table 3 and Figure 3 reports the AAR and CAAR values of bad sample earnings announcement of mean adjusted model, market adjusted model and market model of March -2011 quarter. In the case of mean adjusted model, the AAR values are positive and insignificant for -30, -29, -28, -27, -26, -25, -22, -19, -18, -17, -14, -11, -2, 0, 5, 10, 15, 18, 19, 20, 23, 24, 26, 30 and negative and insignificant on -20, -12, -10, -9, -7, -6, -5, -4, -3, 1, 2, 3, 6, 8, 9, 11, 12, 16, 17, 22, 27, 28th and 29th day. The AARs are positive and significant on -24, -23, -21, -16, -15, -13, -1, 21, 25 and negative and significant on -8, 4, 7, 13th and 14th day in the event period of 61 days. The AARs are positive for 33 days and insignificant for 47days and therefore, we infer that AARs are close to zero. The CAARs are positive and insignificant on -30, -29, 8, 9, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29 and positive and significant on -28, -27, -26, -25, -24, -23, -22, -21, -20, -19, -18, -17, -16, -15, -14, -13, -12, -11, -10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 10, 11, 27, 30 and therefore we reject the null hypothesis that CAARs are close to zero. In the case of market adjusted model, the AAR is positive and insignificant for -30, -29, -28, -26, -24, -21, -19, -18, -17, -16, -15, -14, -13, -11, -10, -9, -7, -5, -4, -3, -2, 3, 6, 8, 9, 10, 11, 15, 20, 21, 23, 24, 25, 27, 28, 29, 30 and negative and insignificant on -27, -25, -22, -20, -12, -8, -6, 0, 1, 5, 12, 13, 14, 16, 17, 18, 19, 22 and 26th day. The AARs are positive significant on -23, -1, 2 and negative significant on 4th and 7th day in the 61 days event period. Overall the AARs are positive for 40 days and negative for 21 days and significant for 5 days and insignificant for 56 days in the event period. Therefore, the null hypothesis that AARs are close to zero is rejected. The CAARs are positive and insignificant on -30, -29, -28, -26, -25, -24, -23, -22, -21, -20, -19, -18, and 1, negative insignificant on 27 and for remaining days they are positive and significant. Therefore it is inferred that CAARs are not close to zero. The market model is observed, AARs are positive and significant on -24, -23, -21, -16, -15, -13, -1, 21, 25 and negative significant on -8, 4, 7, 13th and 14th day. the AARs are positive insignificant on -30, -29, -28, -27, -26, -25, -22, -19, -18, -17, -14, -11, -2, 0, 5, 10, 15, 18, 19, 20, 22, 23, 24, 26, 30 and negative insignificant on -20, -12, -10, -9, -7, -6, -5, -4, -3, 1, 2, 3, 6, 8, 9, 11, 12, 16, 17, 27, 28 and 29th day. The AARs are positive for 34 days and insignificant for 47 days in the entire event window of 61 days and therefore, it is concluded that AARs are close to zero. The CAARs are positive and insignificant on -30, -29, 9, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29 and positive and significant on -28, -27, -26, -25, -24, -23, -22, -21, -20, -19, -18, -17, -16, -15, -14, -13, -12, -11, -10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13, 25, 26, 27, 28th and 30th day of the event window and therefore null hypothesis that CAARs are close to zero is rejected.

Table 3: AAR and CAAR values of Bad News Earnings Announcements of March 2011 Quarter

Days	Mean adjusted model				Market adjusted model				Market model			
	AAR	t value	CAAR	t value	AAR	t value	CAAR	t value	AAR	t value	CAAR	t value
-30	0.12036	1.64371	0.12036	1.64371	0.05089	0.63959	0.05089	0.63959	0.12316	1.65312	0.12316	1.65312
-29	0.04322	0.54989	0.16357	1.47173	0.02255	0.26996	0.07344	0.62164	0.04557	0.56148	0.16873	1.47004
-28	0.08957	1.28626	0.25314	2.09883*	0.03917	0.53752	0.11261	0.89225	0.09296	1.30973	0.26170	2.12864*
-27	0.06920	1.08322	0.32234	2.52289*	-0.11512	-1.89386	-0.00251	-0.02061	0.07246	1.12299	0.33416	2.58932*
-26	0.09054	1.48634	0.41288	3.03114*	0.02856	0.46135	0.02605	0.18822	0.09300	1.51960	0.42716	3.12139*
-25	0.09113	1.18804	0.50401	2.68260*	-0.00471	-0.05934	0.02134	0.10967	0.09299	1.21039	0.52015	2.76410*
-24	0.13853	2.22411*	0.64254	3.89899*	0.05807	0.88270	0.07941	0.45623	0.14150	2.26813*	0.66165	4.00860*
-23	0.18755	3.06674*	0.83009	4.79892*	0.16413	2.37198*	0.24354	1.24438	0.19067	3.14798*	0.85232	4.97508*
-22	0.02989	0.43015	0.85998	4.12537*	-0.01986	-0.28279	0.22367	1.06151	0.03244	0.46443	0.88476	4.22271*
-21	0.16244	2.09630*	1.02242	4.17244*	0.07305	0.93230	0.29672	1.19756	0.16549	2.17700*	1.05025	4.36885*
-20	-0.01561	-0.23820	1.00681	4.63211*	-0.07774	-1.17974	0.21898	1.00199	-0.01265	-0.18659	1.03760	4.61576*
-19	0.02354	0.28467	1.03036	3.59618*	0.10509	1.22188	0.32408	1.08771	0.02795	0.32942	1.06555	3.62530*
-18	0.12575	1.79729	1.15611	4.58290*	0.13861	1.86501	0.46268	1.72668	0.12779	1.80329	1.19334	4.67058*
-17	0.06918	0.93278	1.22528	4.41569*	0.11161	1.53293	0.57429	2.10816*	0.07115	0.95188	1.26449	4.52145*
-16	0.22161	3.06890*	1.44689	5.17343*	0.05568	0.76433	0.62997	2.23283*	0.22517	3.20730*	1.48966	5.47854*
-15	0.17219	2.14227*	1.61908	5.03589*	0.05727	0.73905	0.68724	2.21727*	0.17502	2.14873*	1.66468	5.10929*
-14	0.08727	1.23939	1.70636	5.87733*	0.08734	1.15698	0.77457	2.48866*	0.09071	1.28579	1.75539	6.03505*
-13	0.15513	2.16869*	1.86149	6.13358*	0.13931	1.93751	0.91389	2.99577*	0.15640	2.23782*	1.91179	6.44742*
-12	-0.10814	-1.47018	1.75335	5.46844*	-0.02824	-0.38082	0.88565	2.73987*	-0.10631	-1.44483	1.80548	5.62932*
-11	0.09500	1.44406	1.84834	6.28258*	0.03097	0.46320	0.91661	3.06581*	0.09819	1.47503	1.90367	6.39454*
-10	-0.03429	-0.43633	1.81405	5.03648*	0.04342	0.51801	0.96003	2.49960*	-0.03247	-0.40165	1.87120	5.05030*
-9	-0.10400	-1.48518	1.71005	5.20663*	0.00694	0.09546	0.96697	2.83635*	-0.10193	-1.41926	1.76927	5.25237*
-8	-0.21392	-3.33281*	1.49613	4.86035*	-0.03287	-0.46987	0.93409	2.78391*	-0.21018	-3.21713*	1.55909	4.97614*
-7	-0.04485	-0.68004	1.45128	4.49170*	0.04402	0.65507	0.97812	2.97091*	-0.04217	-0.61932	1.51692	4.54731*
-6	-0.02366	-0.37976	1.42763	4.58358*	-0.07480	-1.19354	0.90332	2.88291*	-0.02015	-0.32145	1.49678	4.77615*
-5	-0.10451	-1.53560	1.32312	3.81272*	0.07423	1.08321	0.97755	2.79760*	-0.10241	-1.50550	1.39436	4.01995*
-4	-0.04995	-0.72570	1.27317	3.55969*	0.01374	0.18018	0.99129	2.50147*	-0.04745	-0.68300	1.34692	3.73123*
-3	-0.04790	-0.68812	1.22527	3.32664*	0.12490	1.74134	1.11619	2.94096*	-0.04519	-0.64064	1.30172	3.48725*
-2	0.13857	1.69700	1.36383	3.10164*	0.11701	1.41785	1.23320	2.77490*	0.13797	1.71614	1.43969	3.32539*
-1	0.27748	3.10636*	1.64131	3.35470*	0.32147	3.37103*	1.55467	2.97645*	0.27946	3.12733*	1.71915	3.51240*

(Continued)

0	0.06168	0.50673	1.70299	2.51280*	-0.02240	-0.17353	1.53227	2.13192*	0.06563	0.53689	1.78478	2.62251*
1	-0.07061	-0.52335	1.63239	2.13894*	-0.06634	-0.46148	1.46593	1.80277	-0.07798	-0.58738	1.70679	2.27260*
2	-0.03563	-0.39982	1.59675	3.11892*	0.18591	2.01743*	1.65184	3.12038*	-0.03611	-0.42032	1.67068	3.38493*
3	-0.08149	-1.08254	1.51526	3.45213*	0.06230	0.79033	1.71414	3.72926*	-0.07958	-1.02899	1.59110	3.52820*
4	-0.28741	-4.67229*	1.22785	3.37395*	-0.19797	-2.78068*	1.51617	3.59962*	-0.28422	-4.44408*	1.30688	3.45402*
5	0.00390	0.05777	1.23175	3.04459*	-0.00410	-0.06608	1.51206	4.05741*	0.00735	0.10718	1.31422	3.19532*
6	-0.06868	-0.95785	1.16307	2.66668*	0.01861	0.24832	1.53068	3.35713*	-0.06635	-0.91189	1.24788	2.81966*
7	-0.22400	-3.83283*	0.93907	2.60661*	-0.15108	-2.72762*	1.37959	4.04045*	-0.22190	-3.83185*	1.02598	2.87409*
8	-0.01475	-0.18296	0.92432	1.83607	0.04724	0.56586	1.42683	2.73696*	-0.01337	-0.16797	1.01260	2.03658*
9	-0.05333	-0.68849	0.87099	1.77778	0.00566	0.06702	1.43249	2.68094*	-0.04978	-0.63310	0.96283	1.93618
10	0.07063	1.16399	0.94162	2.42337*	0.01588	0.25396	1.44838	3.61653*	0.07354	1.21146	1.03637	2.66621*
11	-0.08235	-1.31592	0.85927	2.11871*	0.01853	0.30314	1.46690	3.70328*	-0.08056	-1.26497	0.95581	2.31576*
12	-0.11914	-1.85247	0.74013	1.75490	-0.02231	-0.33655	1.44459	3.32330*	-0.11657	-1.77151	0.83924	1.94503
13	-0.15052	-2.96856*	0.58961	1.75308	-0.03166	-0.58870	1.41293	3.96047*	-0.14792	-2.80383*	0.69132	1.97554*
14	-0.18903	-2.49572*	0.40058	0.78839	-0.03303	-0.49756	1.37990	3.09832*	-0.18580	-2.41629*	0.50552	0.98003
15	0.00492	0.07538	0.40550	0.91608	0.01803	0.27632	1.39793	3.15938*	0.00791	0.11829	0.51343	1.13268
16	-0.09398	-1.39175	0.31152	0.67294	-0.02592	-0.40065	1.37200	3.09292*	-0.09061	-1.28925	0.42282	0.87757
17	-0.05008	-0.99156	0.26144	0.74715	-0.01723	-0.31066	1.35477	3.52540*	-0.04674	-0.90656	0.37609	1.05294
18	0.04748	0.53327	0.30892	0.49563	-0.04830	-0.56188	1.30647	2.17139*	0.04923	0.55390	0.42531	0.68364
19	0.05074	0.78604	0.35966	0.78799	-0.01327	-0.21244	1.29320	2.92723*	0.05404	0.84265	0.47936	1.05698
20	0.10054	1.30313	0.46020	0.83526	0.05350	0.70253	1.34670	2.47649*	0.10059	1.31449	0.57995	1.06121
21	0.13889	2.09276*	0.59909	1.25179	0.05621	0.82630	1.40291	2.85980*	0.14265	2.13424*	0.72260	1.49921
22	-0.00196	-0.03502	0.59713	1.46324	-0.08713	-1.52031	1.31577	3.15344*	0.00039	0.00697	0.72299	1.79110
23	0.04730	0.77855	0.64443	1.44341	0.03910	0.60526	1.35487	2.85407*	0.05045	0.83465	0.77344	1.74122
24	0.08892	1.21926	0.73335	1.35591	0.02928	0.38371	1.38416	2.44570*	0.09102	1.24440	0.86446	1.59358
25	0.13267	2.15743*	0.86602	1.88189	0.07783	1.30331	1.46199	3.27134*	0.13650	2.20612*	1.00097	2.16178*
26	0.06943	0.95646	0.93545	1.70682	-0.08399	-1.18311	1.37800	2.57114*	0.07102	0.98302	1.07199	1.96531
27	-0.03879	-0.74767	0.89666	2.26938*	0.01511	0.26437	1.39311	3.20152*	-0.03522	-0.66232	1.03677	2.55996*
28	-0.01332	-0.21352	0.88334	1.84277	0.01344	0.19926	1.40655	2.71462*	-0.00927	-0.14407	1.02750	2.07812*
29	-0.02037	-0.27438	0.86297	1.50089	0.01396	0.18091	1.42051	2.37660*	-0.01724	-0.22839	1.01025	1.72762
30	0.10248	1.66712	0.96545	2.01086*	0.00730	0.11736	1.42782	2.93715*	0.10520	1.66474	1.11545	2.26009*

*Note: * indicates statistically significant at 5% level of significance.*

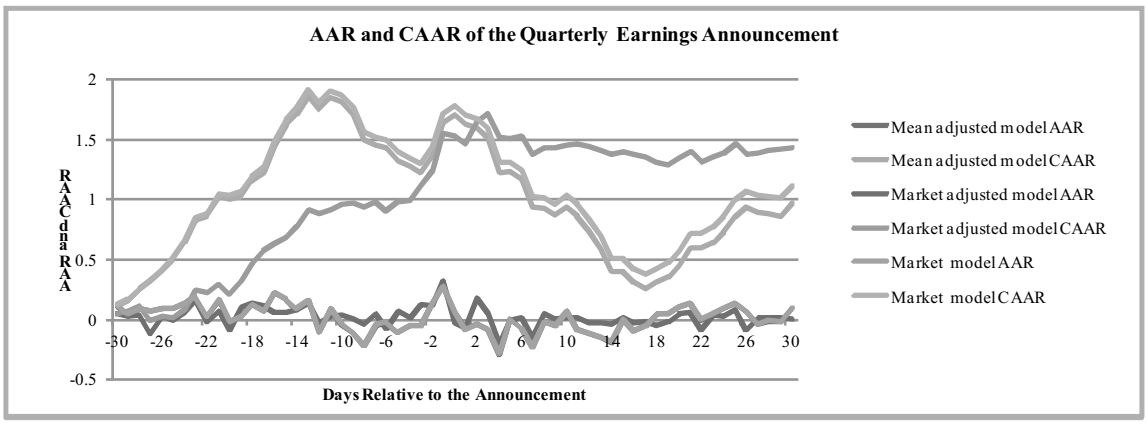

Figure 3. AARs and CAARs Trends of Three Models over the 61-Day Event Window of Bad News Earnings Announcement of March 2011 Quarter

Table 4 : Runs and Sign Test Statistics of March 2011 Quarter

	Mean adjusted model		Market adjusted model		Market model	
	Runs Statistics	Sign statistics	Runs Statistics	Sign statistics	Runs Statistics	Sign statistics
Good News Earnings Announcement						
Before	-2.2151	0.3841	0.0249	3.2009	-2.2151	3.7131
After	-0.5427	1.8257	-1.6400	3.2863	-0.5427	3.6515
Overall	-3.7169	-1.2572	-0.5492	1.2572	-3.7169	1.6164
Bad News Earnings Announcement						
Before	-1.7920	0.6402	-2.2151	2.4327	-1.7920	0.8963
After	-1.2377	1.8257	-0.8688	2.9212	-1.2377	1.8257
Overall	-4.2599	-0.8980	-0.8568	0.5388	-4.2599	-0.5388
Full Sample Earnings Announcement						
Before	-3.2565	0.8963	-0.3484	4.4813	-3.2565	2.4327
After	-1.9136	2.1909	-0.1309	4.7469	-1.9136	2.5560
Overall	-3.2168	-0.8980	-1.0727	1.6164	-3.2168	0.8980

Notes:

1. *Before: Number of Runs, Run Statistics, and Sign Statistics before the event day.*
2. *After: Number of Runs, Run Statistics, and Sign Statistics after the event day.*
3. *Overall: Number of Runs, Run Statistics, and Sign Statistics for the event window (-30 through 30 days.)*
4. *If the Run and Sign test statistics is greater than the critical value of ± 1.96, the relevant AAR is statistically significant at 5% level of Significance.*

From the above Table 4, it is observed that the AARs of mean adjusted model and market model of all the three portfolios are significant for the overall event window of 61 days and therefore, we reject the null hypothesis that AARs occur randomly at 5% level of significance for the entire event window. The AARs of market adjusted model are insignificant for all the portfolios and therefore, we accept the null hypothesis that AARs are random for the overall period. In the case of Sign test, out of 61-day event window, the AARs are insignificant for all the models for all the portfolios. Therefore, we accept the null hypothesis that there is no significant difference between the number of positive and negative AARs.

The Market Model R square and Beta Statistics

In Table 5, the pre and post- event betas of return intervals of one to twenty days are reported. The size of the betas is larger in post-event period. The betas of all intervals are positively changed. The percentage in the average betas for one day interval is about 14.96%, the fifth day interval is about 8.04%, on tenth day 4.84%, on fifteenth day 2.90%, and on 20th day is about 7.19%. The betas are positively changed during post event period and positive change in betas shows better market quality. The R2 signifies the price efficiency when there is increase in beta in the post-event period. Using a return interval of one day, the R2 are positively changes about 15.70%, the fifth day about 3.92%, tenth day about -13.50%, fifteenth day about -10.31% and 20.77% on twenty day interval. The R2 are decreasing when there is an increase in length interval. The R2 are ranges from 0.1760 to 0.4475 for pre-event and from 0.2037 to 0.3977 to post-event period. The maximum percentage change is on 24.88% on 3rd day interval. The result shows that there is a proportionate decrease in the R2 therefore, there is no price efficiency.

Table 5: The Results Of First Pass Beta And R Square Coefficients Of March 2011 Quarter

Length Intervals	Beta						R Square					
	Pre-Event		Post-Event		Change in Beta	% Change in Beta	Pre-Event		Post-Event		Change in R Square	% Change in R Square
	Average	STDEV	Average	STDEV			Average	STDEV	Average	STDEV		
1	0.788671	0.505203	0.906644	0.589264	0.117972	14.96%	0.176009	0.177784	0.20365	0.180473	0.027641	15.70%
2	0.826482	0.556271	0.942893	0.64322	0.116411	14.09%	0.214784	0.202168	0.262085	0.212538	0.047301	22.02%
3	0.846755	0.595843	0.955577	0.656972	0.108823	12.85%	0.245155	0.220955	0.306148	0.233178	0.060993	24.88%
4	0.891394	0.652032	0.974733	0.691859	0.083338	9.35%	0.292606	0.249038	0.332329	0.246775	0.039724	13.58%
5	0.912222	0.70494	0.985569	0.735951	0.073348	8.04%	0.331646	0.269308	0.344658	0.255162	0.013012	3.92%
6	0.920709	0.754179	0.982987	0.756728	0.062278	6.76%	0.362601	0.284562	0.358223	0.263867	-0.00438	-1.21%
7	0.925361	0.803334	0.98524	0.799658	0.059879	6.47%	0.380376	0.295761	0.36453	0.269787	-0.01585	-4.17%
8	0.93373	0.842477	0.985616	0.833847	0.051886	5.56%	0.396553	0.304683	0.370591	0.273892	-0.02596	-6.55%
9	0.939703	0.938525	0.991934	0.891121	0.052231	5.56%	0.409689	0.310412	0.372512	0.278545	-0.03718	-9.07%
10	0.948623	1.05242	0.994498	0.940652	0.045875	4.84%	0.431293	0.31513	0.373064	0.279482	-0.05823	-13.50%
11	0.948182	1.180973	0.994176	0.978029	0.045994	4.85%	0.444837	0.318479	0.373867	0.281739	-0.07097	-15.95%
12	0.939684	1.267032	0.99008	0.997278	0.050396	5.36%	0.447541	0.318194	0.377584	0.281817	-0.06996	-15.63%
13	0.951373	1.201208	0.992028	1.004011	0.040655	4.27%	0.441629	0.320774	0.379339	0.28384	-0.06229	-14.10%
14	0.948498	1.163979	0.995932	1.017837	0.047434	5.00%	0.434529	0.322581	0.377782	0.28556	-0.05675	-13.06%
15	0.976785	1.1146	1.005096	1.018741	0.028311	2.90%	0.419342	0.329071	0.376104	0.288038	-0.04324	-10.31%
16	0.989752	1.068468	1.007377	0.996489	0.017624	1.78%	0.400708	0.331224	0.372443	0.292989	-0.02827	-7.05%
17	0.977611	1.069709	1.011956	0.956008	0.034345	3.51%	0.387242	0.340513	0.373041	0.298482	-0.0142	-3.67%
18	0.969299	1.206727	1.01453	0.915033	0.045231	4.67%	0.358999	0.344375	0.376955	0.303963	0.017956	5.00%
19	0.945127	1.259374	1.019462	0.903616	0.074336	7.87%	0.328011	0.357841	0.384231	0.307216	0.05622	17.14%
20	0.973561	1.387554	1.043554	0.92295	0.069993	7.19%	0.329312	0.353598	0.397699	0.310281	0.068387	20.77%

Table 6: The Results of Second Pass Beta Coefficients of March-2011 Quarter

Length Intervals	Pre Event	Post Event	Difference
5	-0.22519	-0.14742	0.077779
10	-0.27852	-0.14777	0.13075
15	-0.29778	-0.14874	0.149036
20	-0.31724	-0.17135	0.145887

Table 6 reports the result of second pass beta. The average BETA2 parameters should be less negative when market frictions are less and therefore, we expect a positive change in BETA2. The BETA2 are positively changed for all the four length intervals and the betas of the post event days are negatively signed. This shows less friction in the market during quarterly earnings announcement. This result shows better market quality.

Conclusion

The study examines the announcement effects of quarterly earnings on the Indian stock market. An event study is conducted using 61 days event window. The abnormal performance is measured using mean adjusted model, market adjusted model and market model. The study used Runs test, Sign test and t test for statistical significance. Cohen et al. (1983a) methodology was also used. The study classified the sample as good news portfolio, bad news portfolio and full sample portfolio based on net profit and net sales of current and correspondent quarters. The results show that AARs and CAARs are positive for most of the days in the event window for all the three portfolios and for all the three models. The results of t test shows that AARs are statistically insignificant for most of the days in the event window of 61 days and therefore we accept the null hypothesis that AARs are close to zero. The CAARs are statistically significant for all the portfolios and therefore, the null hypothesis that CAARs are not close to zero, is rejected. The results of Runs test shows that the AARs of mean adjusted model and market model of all the three portfolios are significant for the overall event window of 61 days and therefore, the study rejects the null hypothesis that AARs occur randomly at 5% level of significance for the entire event window. The AARs of market adjusted model are insignificant for all the portfolios and therefore, the study accepts the null hypothesis that AARs are random for the overall period. In the case of Sign test, out of 61-day event window, the AARs are insignificant for all the models for all the portfolios. Therefore, the study accepts, the null hypothesis that there is no significant difference between the number of positive and negative AARs. The betas of all intervals are positively changed for March-2011 quarter. Further, the result shows that there is a proportionate decrease in the R2.The BETA2 are positively changed for all the length intervals and the betas of the post event days are negatively signed. The overall result shows that market is fail to adjust rapidly to the quarterly earnings news and therefore market is inefficient in semi-strong form. The CAARs are statistically significant and this shows delayed price response which is the indicator of market inefficiency. The results are inconsistent with theoretical model (Fama 1965, 1970) which states that security prices adjust rapidly to the publicly available information and market does not exhibit the predictability pattern. The results of this study contradict those of Working (1934), Kendall and Hill (1953); Roberts (1959); Working (1960); Fama (1965) Van and Parker (1967); Beaver (1968); Fama et al. (1969); May (1971); Simmons (1971); Foster (1973); Jordan (1973); Hong (1978); Cornell and Dietrich (1978); Nichols and Tsay (1979); Aharony and Swary (1980); Rao (1994); Kabir and William (1996); Teets and Wasley (1996); Hudson, Dempsey, and Keasey (1996); and Chang, Fang and Fawson (1996) who stated that market is efficient.

Limitation and Scope for Further Research

The present study is limited to BSE-500 companies listed in BSE, where there are more than 5000 companies listed in the stock exchange. The majority of the companies listed in BSE is not regularly traded and therefore, if included, will give vague results. The study has examined short term price movement by taking September 2013 quarterly results. Therefore, the further research can be taken up to study the long run price momentum in Indian stock market. The existence of anomaly is one of the reasons for market inefficiency and again this can be studied from the Indian context.

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