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An Event Study Analysis of the Effect of Quarterly Earnings Announcement during the Bull and Bear Markets-A Case with SENSEX

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ABSTRACT

The state of equity market under the influence of either bull or bear phase has been found to have its effect on the stock price movement following earnings announcement. The present study investigates the impact of quarterly earnings announcements on the stock price movement of the firms constituting the Bombay Stock Exchange Sensitive Index (BSE-SENSEX) during the bull and bear regimes of the market. The study is based on the quarterly earnings announcements of such firms announced during the period pertaining to the first quarter of the financial year (FY) 2001-02 to the third quarter of the FY 2010-11. Event study methodology using daily returns and market model has been used for analysing the price effect of quarterly earnings announcement during the bull and bear market regimes. An event study seeks to establish whether the cross-sectional distribution of returns at the time of an event is abnormal. The null hypothesis to be tested is whether the mean abnormal return (AAR) and the cumulative average abnormal return at time '*t*' are equal to zero. In this study, an event window of 41 days has been taken up for investigation. The length of the pre-event and post-event window is 20 trading days prior to and post announcement date, respectively. The study reveals that quarterly earnings released during the bull and bear market phases have no statistically significant effect on the return behaviour of the companies constituting the BSE-SENSEX. It is also observed that irrespective of good or bad announcements, greater number of positive AARs is generated in the bear market in comparison to the bull market.

Keywords: Event study, BSE-SENSEX, Quarterly earnings announcements, Bull market, Bear market

JEL Classification: G1, G14, G140

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INTRODUCTION

Several studies have documented evidence that the economic and market conditions affect investors' reaction to otherwise identical events *(Klein and Rosenfeld, 1987; Boyd et al., 2001).* These studies indicate that the recent direction of the market or the recent state of the economy may have a bearing on the extent to which the investors respond to the new information *(Docking and Koch, 2005)*. The state of equity market under the influence of either bull or

bear phase also influences the stock price movement following earnings announcement. Research studies on the behaviour and performance of individual investor have found that the investor behaviour depends on the bull and bear market conditions *(Kim and Nofsinger, 2003)*. An investor can earn excess returns and avoid losses by identifying the trend of a stock market in advance. Although there is no generally accepted formal definition of the bull and bear markets in finance literature, the term bull market refers to the period of generalised upward trend in stock prices marked by strong investment sentiment. It is characterised by high returns with low volatility. On the other hand, the bear market refers to a downward trend in stock prices and is marked by negative or low returns with very high volatility.

The main objective of this research study is to investigate the impact of quarterly earnings announcements on stocks constituting the SENSEX during the bull and bear market regimes of the market. This paper first reviews the available literature on the impact of earnings announcement on the stock price movement in the national and international context. Then, it discusses the research methodology adopted. This is followed by analysis of the data and interpretation of the results. Finally, it concludes with the discussion.

REVIEW OF THE LITERATURE

The significance of the study on the effect of earnings announcement can be gauged from the fact that there exists a vast literature on the effect of unexpected earnings on stock prices, especially in the international arena. Most of the studies agreed that positive unexpected earnings increases stock prices, while negative unexpected earnings decreases stock prices *(Kiger, 1972; Watts, 1978; Foster et al, 1984; MacKinlay, 1997; Odabasi, 1998; Dhareshwar and Bacon, 2008; Mahmoudi et al., 2011).*

Some of the prominent studies in the international arena are as follows. Below and Johnson (1996) found that that investor expectations regarding security performance were asymmetric between the bull and the bear markets, and that these asymmetric expectations were consequently reflected in the security price reactions to information-generating events. Chaturvedi (2000) studied the stock price reaction to semi-annual earnings announcement and found abnormal returns, both during the pre- and post-announcement dates. Mallikarjunappa and Iqbal (2003) and Mallikarjunappa (2004) found that the Indian stock market did not react immediately to the quarterly earnings information and provided an opportunity to earn abnormal returns. Manickraj (2004) investigated the effect of the quarterly earnings announcements on the share price movement and found that the information conveyed by quarterly announcements was quickly reflected in the stock prices. This study confirmed the observations in similar international studies *(MacKinlay, 1997; Dhareshwar and Bacon, 2008)*, which state that the market reacts positively to positive earnings surprises and negatively to negative earnings surprises. Docking and Koch (2005) pursued a study on the sensitivity of the investor reaction to market direction and volatility, and found that dividend change announcements elicit a greater change in the stock price when the nature of news (good or bad) goes against the grain of the recent market direction during volatile times. The announcement to lower the dividend elicits a significantly greater decrease in the stock price when the market returns have been up and more volatile and vice versa. Kothari *et al.* (2006) in their research work titled 'Stock returns, aggregate earnings surprises and behavioral finance' observed that aggregate earnings and stock returns are contemporaneously negatively related. They found that investors increase (decrease) the rate of return they demand on their investments when they receive positive (negative) earnings news. This may occur because positive (aggregate) earnings

news implies that the riskiness of the projects pursued is higher than expected, which increases the required discount rates. Higher future discount rates result in lower prices, which in turn result in lower stock returns in the current period. On the contrary, Choi *et al*. (2012) proposed that aggregate earnings news is positively related to aggregate contemporaneous stock returns. Similar study by Zaima and Harjoto (2007) on the market reaction to whispers in the bull and bear markets found that investors listen to whispers in the bull market, and they help explain the post-announcement drift. In a bear market, reaction to whispers is significantly positive prior to the announcement despite a down market. However, in the bear market, both whispers and analysts contribute to the post-announcement drift. Das *et al*. (2007) studied the effect of quarterly earnings announcements made by companies constituting the SENSEX for a quarter. Contrary to most of the research studies on earning releases, they found that the quarterly earnings announcement released by the sample companies did not have substantial impact on the stock return. However, this study was limited to a single quarter earnings releases comprising only 30 announcements. Das *et al*. (2008a) investigated the effect of quarterly earnings announcements on the security returns' of the firms constituting the SENSEX over a period of 1 year from 1 June 2006 to 1 May 2007. The authors did not find evidence of significant abnormal returns for all the three portfolios, i.e. full sample, 'good news' subsample and 'bad news' subsample. Further, the study could not establish drifting up of share price in case of 'good news' announcements and drift down in case of 'bad news' announcements. Das *et al*. (2008b) further examined the impact of quarterly earnings releases on the security returns of the firms constituting SENSEX. The significance of clustering of dates of the earnings announcements in the design of the testing framework of abnormal returns was incorporated in the study. Clustering of events takes place when the period of study (event window) of the included securities overlaps. The authors did not find evidence of significant abnormal returns for all the three portfolios. Further, the study could not establish drifting up of share price in case of positive earnings surprises and drift down in case of negative earnings surprises. Studies by Mlonzi *et al*. (2011) provided empirical evidence on the information content of earnings announcements in the JSE-ALtX market. JSE-ALtX, the alternative exchange is a division of Johannesburg Stock Exchange (JSE). The study demonstrated that there existed substantial negative share price reactions to earnings announcements on the ALtX stock market. The study concluded that earnings announcements during a recessionary period result in negative share price reaction. Saravanakumar *et al*. (2012) examined the abnormal returns of earnings announcements during the pre-announcement and post-announcement periods of 50 Nifty companies listed on the National Stock Exchange. The study covered a period of one quarter, from October 2010 to December 2010. The research study concluded that announcement of quarterly earnings did not convey any useful information to the investors and the investors did not gain from earnings announcements.

From the brief review of related literature, the following research gaps in the Indian context have been identified with respect to the study of the effect of quarterly earnings announcements on the share price

(i) Scant literature on the effect of quarterly earnings announcements on the share price movement in the Indian context corroborated limited studies undertaken in this aspect in India. Hence, it remains inconclusive to understand the effect of quarterly earnings announcement on the stock prices, in the light of the limited research studies.

(ii) No research studies on the price effect of quarterly earnings announcement during the bull and bear phases have been pursued in the Indian context.

This research gap in the Indian context provided the impetus to pursue the present study.

OBJECTIVE OF THE STUDY

The main objective of the present study is to analyse the effect of quarterly earnings announcements on the stock returns of the companies constituting the SENSEX, during the bull and bear market regimes of two different periods, i.e. financial year (FY) 2001-02 to FY 2005-06 and FY 2006-07 to FY 2010-11. Through this comparative analysis, an attempt is made to understand the impact of quarterly earnings announcements on stock returns with reference to the bull and bear market regimes.

RESEARCH METHODOLOGY

Data and their Source

The data used for empirical analysis of the effect of quarterly earnings announcement on the stock returns are obtained from the corporate database of the Capital Line. In order to analyse the price effect of quarterly earnings announcements on SENSEX with reference to the bull and bear phases of the market, the present study has adopted the bull and bear phases as identified by Ahmad and Kamaiah (2011) for companies that are a part of SENSEX during the period 2001-2010. The period of the bull and bear regimes for each cycle and its corresponding duration has been given in annexure - I.

The study is based on the 747 quarterly earnings announcements corresponding to the first quarter of the FY 2001-02 to third quarter of the FY 2010-11 for the firms in the Bombay Stock Exchange (BSE), constituting the SENSEX. This index is regarded as the pulse of the domestic stock market in India. The 30 companies listed in SENSEX are some of the largest and most actively traded stocks and are representatives of various industrial sectors of the Indian economy. Hence, the selection has been made.

On 22 May 2006, the SENSEX plunged by 1100 points during intra-day trading, leading to the suspension of trading for the first time since 17 May 2004. It caused investors to lose rupees six lakh crore (US$ 131 billion) within seven trading sessions of May 2006. When the trading was suspended during that period, the then Finance Minister of India, Mr. P. Chidambaram, made an unscheduled press statement to assure investors that nothing was wrong with the fundamentals of the economy and advised retail investors to stay invested. This event in the Indian stock market is used as a base to study the price effect of quarterly earnings announcements on companies constituting the SENSEX. Analysis of quarterly earnings announcements on the stock price movement during the 5-year period prior to trading suspension (FY 2001-02 to FY 2005-06) and similar analysis during the period from first quarter of FY 2006-07 to third quarter of FY 2010-11, have been carried out separately in this study.

Out of the total 747, 379 quarterly earnings announcements correspond to the period ranging from the first quarter of the FY 2001-02 to the fourth quarter of FY 2005-06, whereas 368 quarterly earnings announcements correspond to the period from the first quarter of the FY 2006-07 to the third quarter of the FY 2010-11. All those quarterly earnings announcements of the firms are excluded from the sample in which: (i) the earnings announcement on a given date is coupled with other announcements like dividend announcements, stock splits, merger and acquisition and amalgamation. When multiple announcements are made on a given day, it becomes difficult to segregate the effect of quarterly earnings released from other announcements. Hence, such quarterly earnings releases have not been considered in the study and (ii) there is lack of availability of quarterly announcement date data.

METHODOLOGY

For the present study, event study methodology using daily returns and market model is used for the purpose of analysing the quarterly earnings announcement effect. The framework is based on the discussion of event studies by Brown and Warner (1980, 1985), MacKinlay (1997), Campbell *et al.* (1997) and Kothari and Warner (2006). An event study measures the impact of a specific economic event on the value of a firm. The efficacy of the event study rests on the fact that, given rationality in the marketplace, the effects of an event will be reflected immediately in the security prices. Thus, the impact of the event can be assessed by analysing the security prices over a relatively short time period (MacKinlay, 1997). The key focus of the event study is on measuring the sample securities' average abnormal return (AAR) around the time of an event and testing the null hypothesis that the mean of the cross-sectional distribution of abnormal returns at time '*t*' is equal to zero.

In an event study analysis, the day of announcement of quarterly earnings is considered to be the event date. If returns are indexed in event time using '*t*', then $t = 0$ is defined as announcement date. An event window of 41 days (t= -20 to t= 20) has been taken up for investigation. The length of pre-event and post-event window is 20 trading days prior to and post announcement date, respectively. The daily returns of the firms (R_{it}) and the corresponding market index (R_{mt}) can be calculated using the following formula:

Current daily return = (Current day closing price - previous day closing price) / previous day closing price.

Central to an event study analysis is the measurement of abnormal return. The abnormal return is the actual ex-post return of the firm over the event window minus the normal return of the firm over the event window. The normal return is given by the market model. For any security *i*, the market model is

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$

Where, R_{it} is the return on security *i* on day *t*

R_{mt} is the return on the market index on day *t*

ε_{it} is the zero mean disturbance term

α_i, β_i **and** ε_{it} are the parameters of the market model.

For each announcement, the 250 trading days prior to the event window (technically called 'estimation window') are used to determine the parameters for the market model. Ordinary least squares method has been applied to determine the market model parameter. Given the market model parameter estimates, one can measure and analyse the abnormal returns. The abnormal returns for firm *i* in the event window are given by the equation:

$AR_{it} = R_{it} - \alpha_i - \beta_i R_{mt}$; where, t = -20 to t = 20.

If earnings announcement convey the information to the investors, then the impact of the announcement on the stock returns depends on the magnitude of the unexpected component of the announcement. This unexpected component is measured as the deviation of the actual announced earnings from the market before expectation. Now, if the announced quarterly earnings exceed market expectation, it is expected that there should be a positive impact on the share prices, i.e. increase in the value of equity, and the announcements may be termed as 'good news' announcements and vice versa for 'bad news' announcements. Thus, a measure of the deviation of actual announced earnings from the market before expectation is required. A simple expectation model is used in order to tap market expectations of quarterly earnings. The model compares the adjusted earnings per share (adjusted EPS) for the current quarter with that of the previous quarter. Based on the model, the earnings announcements of each of the firms are

assigned to any one of the two categories - 'good news' announcement and 'bad news' announcement. 'Good news' announcements refer those announcements in which the adjusted EPS of the current quarter exceed previous quarter earnings. Whereas, 'bad news' announcement refers all those announcements in which the adjusted EPS of the current quarter is less than the earnings of the previous quarter. Gupta (2006), Das *et al*. (2007, 2008a, 2008b), Odabasi (1998) and Iqbal and Mallikarjunappa (2007) adopted similar expectation models in their event study analysis of earnings announcements.

After computation of the abnormal returns for each firm in the sample, the abnormal returns of the sample firms have been classified on the basis of two parameters - bull market /bear market phase and 'good news'/'bad news' announcements. The abnormal returns, corresponding to all the 'good news' announcements of the firms and pertaining to the bull market phase, are aggregated and averaged for each event day across the cross-section. For the sake of simplicity, the sample is called *'aggregated good news bull'* sample. Likewise, the abnormal returns, which correspond to all the 'good news' announcements of the firms and pertaining to the bear market phase, are aggregated and averaged for each event day across the cross-section and it has been termed as *'aggregated good news bear'* sample. Similar procedure is adopted with respect to all the 'bad news' announcements of all the firms and this has been construed as *'aggregated bad news bull'* and *'aggregated bad news bear'* samples corresponding to bull market and bear market phases, respectively.

In order to analyse the effect of quarterly earnings announcements on the stock prices for the period before and after the trading suspension, the aggregation of abnormal returns for each of the four portfolios (i.e. *'aggregated good news bull'* sample, *'aggregated good news bear'* sample, 'aggregated *bad news bull'* sample and *'aggregated bad news bear'* sample) has been carried out with respect to the following sets:

(a) the quarterly earnings announcements of all the companies constituting SENSEX during the period from the first quarter of the FY 2006-07 to the third quarter of the FY 2010-11. For ease of reference, the set is termed as **'set A'.**

(b) the quarterly earnings announcements of all the companies constituting SENSEX during the period from the first quarter of the FY 2001-02 to the last quarter of the FY 2005-06. This set has been termed as **'set B'.**

The abnormal return observations are then aggregated along two dimensions to draw overall inferences for the event of interest. They are as follows:

- Aggregation of abnormal returns for each event period across securities, denoted by AAR_t
- Aggregation of AAR through the event window, denoted by $CAAR(t_1, t_2)$

The aggregation has been done for each of the four portfolios, i.e. 'aggregated good news bull' sample, 'aggregated good news bear' sample, 'aggregated bad news bull' sample and 'aggregated bad news bear' sample of **'set A'** and **'set B'**.

Given N events, the AAR for the period 't' is defined by:

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

The variance of the AAR for the period 't' is given as under (MacKinlay, 1997).

$$Var(AAR_t) = \frac{\sum_{i=1}^{N} Var(AR_{it})}{N^2}$$

i.e

$$\text{Var}(\text{AAR}_t) = \frac{\sum_{i=1}^{N} \sigma_{\varepsilon_i}^2}{N^2}$$

The concept of cumulative average abnormal return (CAAR) is necessary to accommodate multiple-period event windows. The CAAR on days surrounding the event, i.e. for event days t_1 through t_2 is defined as under.

$$\text{CAAR}(t_1, t_2) = \sum_{t=t_1}^{t_2} AAR_t$$

The variance of the CAAR for event days t_1 through t_2 is defined as under (MacKinlay, 1997).

$$\text{Var}\{\text{CAAR}(t_1, t_2)\} = \sum_{t=t_1}^{t_2} Var(AR_{it})$$

With regard to each portfolio, i.e. 'aggregated good news bull' sample, 'aggregated good news bear' sample, 'aggregated bad news bull' sample and 'aggregated bad news bear' sample of **'set A'** and **'set B', the** following hypotheses are tested:

1. The AAR of the sample of firms announcing quarterly earnings is zero on the announcement date.
2. The AARs of the sample of firms announcing quarterly earnings is zero on days surrounding the announcement in the event window.
3. The CAARs of the sample of firms announcing quarterly earnings is zero during the event window.

The test of significance of AAR and CAAR with respect to each of the portfolio has been pursued in following manner.

If Ω be the test statistic for AAR, then Ω_{AAR} is defined as under.

$$\Omega_{AAR} = \frac{AAR_t}{\sqrt{Var(AAR_t)}}$$

Similar test statistic, using CAAR, has been used to test the cumulative effect of AARs on days surrounding the event. The test of significance for the CAAR is pursued using the test statistic (MacKinlay, 1997) which is given as under:

$$\Omega_{CAAR} = \frac{CAAR_t}{\sqrt{Var(CAAR_t)}}$$

In this paper, Z(AAR) and Z(CAAR) represent the values of test statistic for AAR and CAAR, respectively. The test has been carried out at 5% level of significance.

RESULT ANALYSIS AND INTERPRETATION

Analysis of the Aggregated Samples during the Period following Trading Suspension

The AARs and CAARs of the 'aggregated good news bear' sample, 'aggregated good news bull' sample, 'aggregated bad news bear' sample and 'aggregated bad news bull' sample have been analysed using the event study method during the period following temporary suspension of trading; the sample of companies belonging to this period has been referred to as 'set A'.

Event study analysis of the 'aggregated good news bear' sample during the period following trading suspension

An event study of 'aggregated good news bear' sample of 'set A' consisting of 86 quarterly earnings announcements has been undertaken. The results of the event study analysis are presented in Table 1 and are represented graphically in Figures 1 and 2.

Event study analysis of the 'aggregated good news bull' sample during the period following trading suspension

An event study of 'aggregated good news bull' sample of 'set A' consisting of 120 quarterly earnings

Table 1: Results of the 'aggregated good news bear' sample during the period following the temporary suspension of trading

Event days	AAR	*Z*(AAR)	CAAR	*Z*(CAAR)
-20	-0.1332	-0.5956	-0.1332	-0.5956
-19	-0.0787	-0.3519	-0.2120	-0.6699
-18	0.3028	1.3536	0.0909	0.2345
-17	-0.0302	-0.1350	0.0607	0.1356
-16	0.0688	0.3077	0.1295	0.2589
-15	-0.0171	-0.0763	0.1124	0.2052
-14	-0.3349	-1.4970	-0.2224	-0.3758
-13	0.0135	0.0601	-0.2090	-0.3303
-12	0.2476	1.1068	0.0386	0.0575
-11	-0.0441	-0.1972	-0.0055	-0.0078
-10	0.2157	0.9644	0.2102	0.2833
-9	0.0638	0.2850	0.2740	0.3536
-8	-0.1255	-0.5610	0.1485	0.1841
-7	0.0841	0.3758	0.2326	0.2778
-6	-0.0748	-0.3344	0.1577	0.1821
-5	-0.3645	-1.6296	-0.2068	-0.2311
-4	-0.2061	-0.9211	-0.4129	-0.4476
-3	-0.4736	-2.1170	-0.8864	-0.9340
-2	0.4813	2.1516	-0.4051	-0.4154
-1	0.5843	2.6120	0.1792	0.1791
0	0.5537	2.4752	0.7329	0.7149
1	-0.2525	-1.1287	0.4804	0.4579
2	-0.2298	-1.0271	0.2507	0.2336
3	0.1734	0.7750	0.4240	0.3869
4	-0.0503	-0.2247	0.3738	0.3341
5	0.3231	1.4442	0.6968	0.6109
6	0.0240	0.1075	0.7209	0.6201
7	0.0943	0.4216	0.8152	0.6886
8	-0.4751	-2.1237	0.3401	0.2823
9	-0.0505	-0.2259	0.2896	0.2363
10	-0.0442	-0.1975	0.2454	0.1970
11	0.1075	0.4803	0.3528	0.2788
12	-0.0602	-0.2690	0.2927	0.2277
13	0.4038	1.8051	0.6965	0.5339
14	-0.1449	-0.6475	0.5516	0.4168
15	0.2737	1.2233	0.8253	0.6148
16	-0.2179	-0.9741	0.6074	0.4463
17	-0.5045	-2.2551	0.1029	0.0746
18	-0.1923	-0.8597	-0.0894	-0.0640
19	0.0115	0.0515	-0.0779	-0.0551
20	0.0315	0.1406	-0.0465	-0.0324

Source: **Compiled from the** *Capital Line Database*.

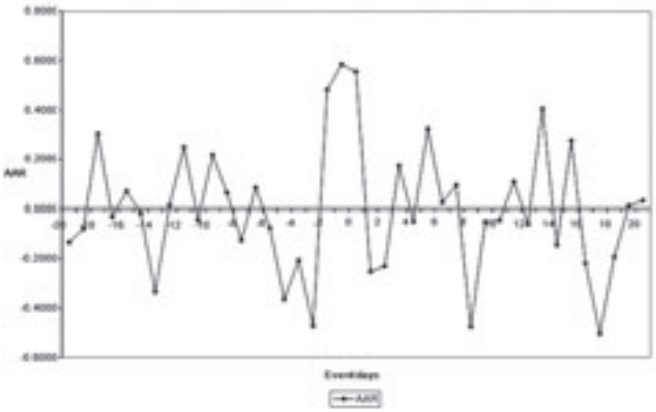

Figure 1: AAR for the aggregated good news bear sample post trading suspension

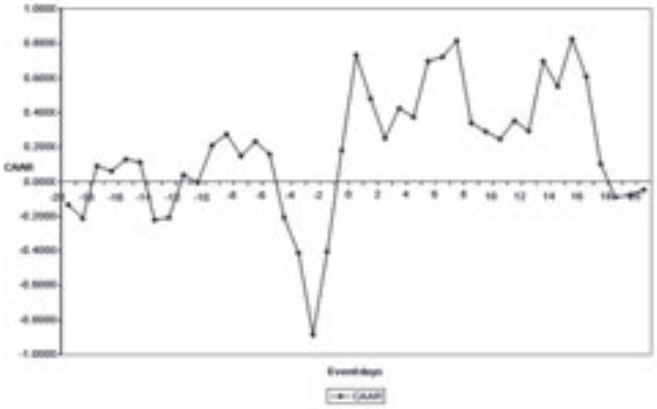

Figure 2: CAAR for the aggregated good news bear sample post trading suspension

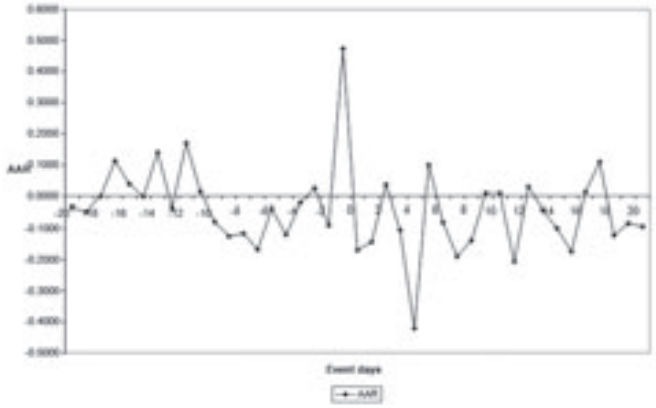

Figure 3: AAR for the aggregated good news bull sample post trading suspension

Table 2: Results of the 'aggregated good news bull' sample during the period following the temporary suspension of trading

Event days	AAR	*Z*(AAR)	CAAR	*Z*(CAAR)
-20	-0.0341	-0.1915	-0.0341	-0.1915
-19	-0.0463	-0.2598	-0.0804	-0.3192
-18	-0.0009	-0.0051	-0.0813	-0.2636
-17	0.1127	0.6327	0.0314	0.0881
-16	0.0389	0.2181	0.0702	0.1763
-15	-0.0019	-0.0104	0.0684	0.1567
-14	0.1396	0.7838	0.2080	0.4413
-13	-0.0371	-0.2080	0.1709	0.3393
-12	0.1699	0.9539	0.3409	0.6378
-11	0.0147	0.0828	0.3556	0.6313
-10	-0.0788	-0.4421	0.2769	0.4686
-9	-0.1254	-0.7039	0.1515	0.2455
-8	-0.1159	-0.6504	0.0356	0.0554
-7	-0.1674	-0.9394	-0.1317	-0.1976
-6	-0.0385	-0.2161	-0.1702	-0.2467
-5	-0.1197	-0.6720	-0.2900	-0.4069
-4	-0.0208	-0.1167	-0.3107	-0.4231
-3	0.0249	0.1398	-0.2858	-0.3782
-2	-0.0904	-0.5074	-0.3762	-0.4845
-1	0.4732	2.6563	0.0970	0.1217
0	-0.1694	-0.9510	-0.0724	-0.0887
1	-0.1433	-0.8043	-0.2157	-0.2582
2	0.0365	0.2047	-0.1793	-0.2098
3	-0.1053	-0.5912	-0.2846	-0.3261
4	-0.4207	-2.3616	-0.7053	-0.7918
5	0.1001	0.5617	-0.6052	-0.6663
6	-0.0809	-0.4540	-0.6861	-0.7412
7	-0.1898	-1.0653	-0.8759	-0.9291
8	-0.1383	-0.7761	-1.0142	-1.0571
9	0.0095	0.0530	-1.0047	-1.0297
10	0.0091	0.0509	-0.9957	-1.0038
11	-0.2066	-1.1596	-1.2022	-1.1930
12	0.0293	0.1643	-1.1730	-1.1461
13	-0.0423	-0.2374	-1.2153	-1.1699
14	-0.0995	-0.5586	-1.3148	-1.2475
15	-0.1738	-0.9756	-1.4886	-1.3926
16	0.0130	0.0731	-1.4756	-1.3617
17	0.1097	0.6159	-1.3658	-1.2437
18	-0.1217	-0.6830	-1.4875	-1.3370
19	-0.0834	-0.4681	-1.5709	-1.3942
20	-0.0941	-0.5281	-1.6650	-1.4596

Source: **Compiled from the** *Capital Line Database*.

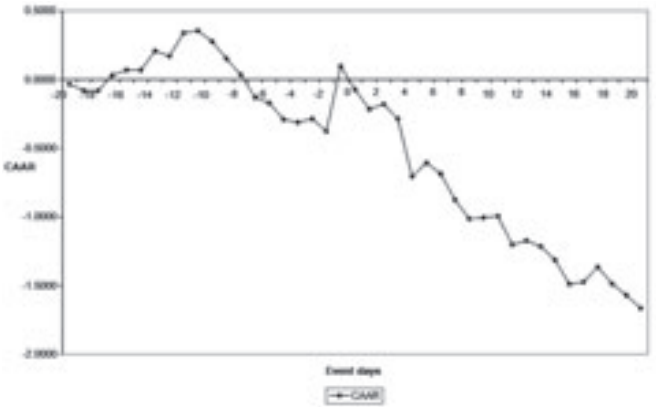

Figure 4: CAAR for the aggregated good news bull sample post trading suspension

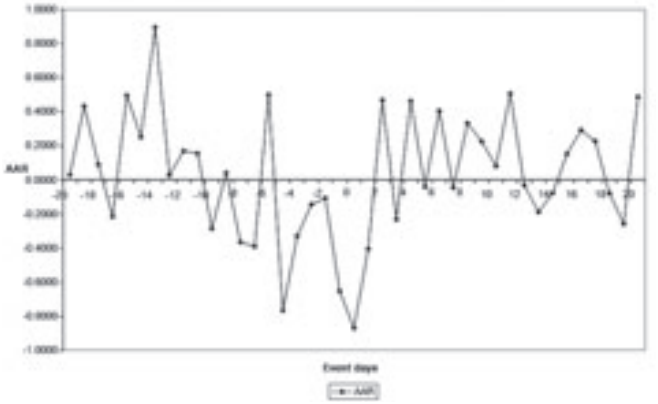

Figure 5: AAR for the aggregated bad news bear sample post trading suspension

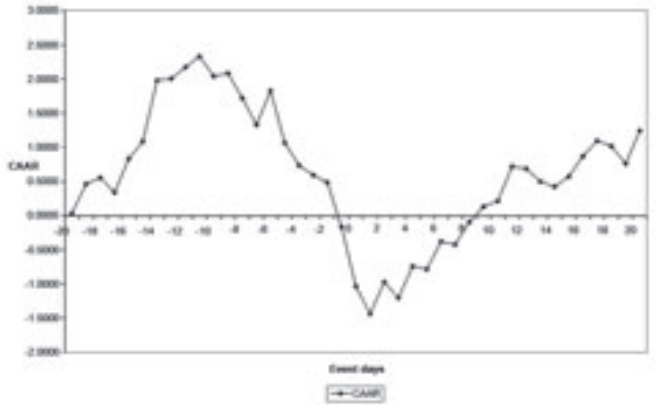

Figure 6: CAAR for the aggregated bad news bear sample post trading suspension

Table 3: Results of the 'aggregated bad news bear' sample during the period following the temporary suspension of trading

Event days	AAR	Z(AAR)	CAAR	Z(CAAR)
-20	0.0300	0.1192	0.0300	0.1192
-19	0.4329	1.7180	0.4629	1.2991
-18	0.0910	0.3610	0.5539	1.2691
-17	-0.2155	-0.8554	0.3384	0.6714
-16	0.4948	1.9638	0.8332	1.4788
-15	0.2516	0.9987	1.0848	1.7576
-14	0.8938	3.5471	1.9786	2.9679
-13	0.0271	0.1074	2.0056	2.8142
-12	0.1696	0.6730	2.1752	2.8776
-11	0.1544	0.6129	2.3296	2.9237
-10	-0.2859	-1.1347	2.0437	2.4456
-9	0.0405	0.1607	2.0842	2.3878
-8	-0.3642	-1.4456	1.7200	1.8932
-7	-0.3901	-1.5482	1.3299	1.4106
-6	0.5000	1.9843	1.8298	1.8751
-5	-0.7648	-3.0354	1.0650	1.0567
-4	-0.3286	-1.3040	0.7364	0.7089
-3	-0.1434	-0.5690	0.5931	0.5548
-2	-0.1075	-0.4266	0.4856	0.4421
-1	-0.6517	-2.5865	-0.1662	-0.1474
0	-0.8684	-3.4465	-1.0346	-0.8960
1	-0.4040	-1.6034	-1.4386	-1.2172
2	0.4672	1.8542	-0.9714	-0.8039
3	-0.2324	-0.9223	-1.2038	-0.9752
4	0.4619	1.8331	-0.7419	-0.5889
5	-0.0414	-0.1642	-0.7833	-0.6096
6	0.4041	1.6039	-0.3791	-0.2896
7	-0.0450	-0.1785	-0.4241	-0.3181
8	0.3316	1.3160	-0.0925	-0.0682
9	0.2250	0.8929	0.1325	0.0960
10	0.0813	0.3228	0.2138	0.1524
11	0.5067	2.0108	0.7205	0.5055
12	-0.0320	-0.1268	0.6885	0.4757
13	-0.1875	-0.7442	0.5010	0.3410
14	-0.0768	-0.3046	0.4242	0.2846
15	0.1523	0.6045	0.5765	0.3814
16	0.2923	1.1600	0.8688	0.5669
17	0.2267	0.8998	1.0955	0.7053
18	-0.0781	-0.3100	1.0174	0.6466
19	-0.2577	-1.0226	0.7598	0.4768
20	0.4850	1.9247	1.2447	0.7715

Source: **Compiled from the Capital Line Database.**

announcements has been undertaken. The results of the event study analysis are presented in Table 2 and are represented graphically in Figures 3 and 4.

Event study analysis of the 'aggregated bad news bear' sample during the period following trading suspension

An event study of 'aggregated bad news bear' sample of 'set A' consisting of 82 quarterly earnings announcements has been undertaken. The results of the event study analysis are presented in Table 3 and are represented graphically in Figures 5 and 6.

Event study analysis of the 'aggregated bad news bull' sample during the period following trading suspension

An event study of 'aggregated bad news bull' sample of 'set A' consisting of 80 quarterly earnings announcements has been undertaken. The results of the event study analysis are presented in Table 4 and are represented graphically in Figures 7 and 8.

Analysis of the Aggregated Samples during the Period Prior to Trading Suspension

Similar to the analysis carried in the earlier section, the AARs and the CAARs of the 'aggregated good news bear' sample, 'aggregated good news bull' sample, 'aggregated bad news bear' sample and 'aggregated bad news bull' sample of 'set B' have been analysed using event study method. 'Set B' comprises of quarterly earnings announcements made during the 5-year period before the occurrence of temporary suspension of trading.

Event study analysis of the 'aggregated good news bear' sample during the period prior to trading suspension

An event study of 'aggregated good news bear' sample of 'set B' consisting of 10 quarterly earnings

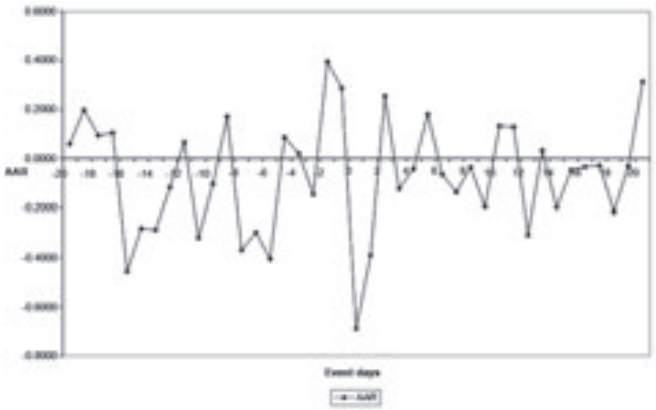

Figure 7: AAR for the aggregated bad news bull sample post trading suspension

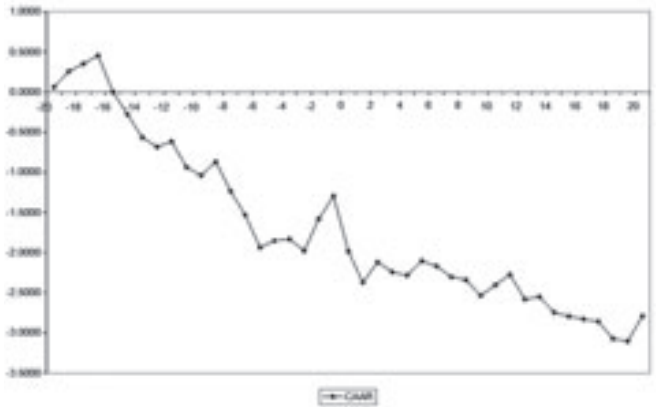

Figure 8: CAAR for the aggregated bad news bull sample post trading suspension

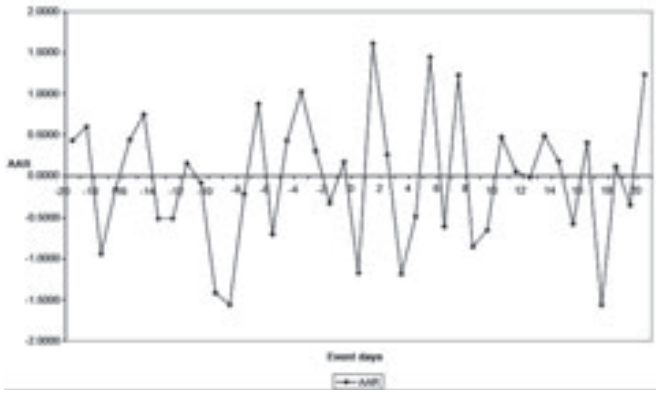

Figure 9: AAR for the aggregated good news bear sample during the period prior to temporary suspension of trading

Table 4: Results of the 'aggregated bad news bull' sample during the period following the temporary suspension of trading

Event days	AAR	*Z*(AAR)	CAAR	*Z*(CAAR)
-20	0.0595	0.2716	0.0595	0.2716
-19	0.1981	0.9036	0.2576	0.8310
-18	0.0936	0.4272	0.3513	0.9252
-17	0.1042	0.4754	0.4555	1.0389
-16	-0.4551	-2.0763	0.0003	0.0007
-15	-0.2808	-1.2811	-0.2805	-0.5224
-14	-0.2864	-1.3064	-0.5669	-0.9774
-13	-0.1166	-0.5320	-0.6835	-1.1024
-12	0.0658	0.3002	-0.6177	-0.9393
-11	-0.3193	-1.4567	-0.9370	-1.3517
-10	-0.1032	-0.4708	-1.0402	-1.4308
-9	0.1704	0.7774	-0.8698	-1.1455
-8	-0.3678	-1.6778	-1.2376	-1.5659
-7	-0.2966	-1.3532	-1.5342	-1.8706
-6	-0.4042	-1.8439	-1.9384	-2.2832
-5	0.0861	0.3928	-1.8523	-2.1125
-4	0.0203	0.0925	-1.8321	-2.0270
-3	-0.1460	-0.6662	-1.9781	-2.1269
-2	0.3946	1.7999	-1.5835	-1.6573
-1	0.2867	1.3080	-1.2968	-1.3228
0	-0.6886	-3.1415	-1.9855	-1.9765
1	-0.3887	-1.7733	-2.3742	-2.3091
2	0.2546	1.1616	-2.1196	-2.0162
3	-0.1227	-0.5596	-2.2422	-2.0879
4	-0.0426	-0.1945	-2.2849	-2.0847
5	0.1800	0.8210	-2.1049	-1.8832
6	-0.0648	-0.2957	-2.1697	-1.9049
7	-0.1361	-0.6208	-2.3058	-1.9879
8	-0.0354	-0.1616	-2.3412	-1.9833
9	-0.1956	-0.8923	-2.5368	-2.1129
10	0.1328	0.6058	-2.4040	-1.9697
11	0.1290	0.5884	-2.2750	-1.8347
12	-0.3078	-1.4041	-2.5828	-2.0511
13	0.0321	0.1464	-2.5507	-1.9956
14	-0.1990	-0.9076	-2.7497	-2.1203
15	-0.0473	-0.2156	-2.7969	-2.1265
16	-0.0334	-0.1524	-2.8303	-2.1227
17	-0.0284	-0.1295	-2.8587	-2.1156
18	-0.2147	-0.9792	-3.0734	-2.2451
19	-0.0321	-0.1465	-3.1055	-2.2400
20	0.3130	1.4280	-2.7924	-1.9895

Source: **Compiled from the** *Capital Line Database*.

Table 5: Results of the 'aggregated good news bear' sample during the period following the temporary suspension of trading

Event days	AAR	*Z*(AAR)	CAAR	*Z*(CAAR)
-20	0.4255	0.6571	0.4255	0.6571
-19	0.5965	0.9213	1.0220	1.1161
-18	-0.9390	-1.4502	0.0830	0.0740
-17	-0.1692	-0.2613	-0.0862	-0.0666
-16	0.4346	0.6712	0.3484	0.2406
-15	0.7458	1.1519	1.0942	0.6899
-14	-0.5098	-0.7873	0.5844	0.3412
-13	-0.5088	-0.7858	0.0756	0.0413
-12	0.1496	0.2310	0.2252	0.1160
-11	-0.0891	-0.1376	0.1362	0.0665
-10	-1.4160	-2.1869	-1.2798	-0.5960
-9	-1.5636	-2.4150	-2.8434	-1.2677
-8	-0.2245	-0.3467	-3.0679	-1.3142
-7	0.8755	1.3522	-2.1924	-0.9050
-6	-0.7031	-1.0859	-2.8955	-1.1547
-5	0.4261	0.6582	-2.4693	-0.9535
-4	1.0201	1.5756	-1.4492	-0.5429
-3	0.2990	0.4618	-1.1502	-0.4187
-2	-0.3219	-0.4971	-1.4721	-0.5216
-1	0.1658	0.2561	-1.3063	-0.4511
0	-1.1739	-1.8131	-2.4802	-0.8359
1	1.6128	2.4910	-0.8673	-0.2856
2	0.2551	0.3939	-0.6123	-0.1972
3	-1.1860	-1.8318	-1.7983	-0.5669
4	-0.4826	-0.7454	-2.2809	-0.7046
5	1.4455	2.2326	-0.8354	-0.2530
6	-0.6083	-0.9395	-1.4436	-0.4291
7	1.2237	1.8899	-0.2200	-0.0642
8	-0.8546	-1.3200	-1.0746	-0.3082
9	-0.6497	-1.0034	-1.7243	-0.4862
10	0.4702	0.7262	-1.2541	-0.3479
11	0.0487	0.0752	-1.2054	-0.3291
12	-0.0202	-0.0313	-1.2257	-0.3295
13	0.4830	0.7459	-0.7427	-0.1967
14	0.1714	0.2648	-0.5713	-0.1491
15	-0.5770	-0.8912	-1.1483	-0.2956
16	0.4002	0.6182	-0.7481	-0.1899
17	-1.5622	-2.4128	-2.3103	-0.5788
18	0.1093	0.1688	-2.2010	-0.5443
19	-0.3471	-0.5361	-2.5481	-0.6223
20	1.2341	1.9061	-1.3140	-0.3169

Source: **Compiled from the** *Capital Line Database*.

Table 6: Results of the 'aggregated good news bull' sample during the period prior to temporary suspension of trading

Event days	AAR	*Z*(AAR)	CAAR	*Z*(CAAR)
-20	0.0832	0.5727	0.0832	0.5727
-19	0.1196	0.8232	0.2028	0.9870
-18	0.1108	0.7629	0.3136	1.2464
-17	0.1240	0.8537	0.4376	1.5062
-16	0.1869	1.2868	0.6246	1.9227
-15	0.0869	0.5983	0.7115	1.9994
-14	-0.0046	-0.0315	0.7069	1.8392
-13	-0.2173	-1.4961	0.4896	1.1915
-12	0.1352	0.9303	0.6247	1.4334
-11	-0.0408	-0.2806	0.5840	1.2711
-10	-0.0201	-0.1382	0.5639	1.1703
-9	-0.0599	-0.4125	0.5040	1.0014
-8	0.1468	1.0105	0.6508	1.2424
-7	0.1830	1.2599	0.8338	1.5339
-6	-0.1676	-1.1535	0.6662	1.1841
-5	-0.0563	-0.3873	0.6100	1.0497
-4	0.0653	0.4498	0.6753	1.1274
-3	0.0687	0.4731	0.7440	1.2071
-2	0.0422	0.2907	0.7863	1.2416
-1	-0.0959	-0.6602	0.6904	1.0626
0	-0.1541	-1.0604	0.5363	0.8056
1	0.3090	2.1268	0.8453	1.2405
2	-0.1222	-0.8413	0.7231	1.0378
3	-0.1289	-0.8872	0.5942	0.8349
4	0.1781	1.2258	0.7723	1.0632
5	0.3675	2.5296	1.1398	1.5386
6	-0.0738	-0.5079	1.0660	1.4121
7	-0.0843	-0.5800	0.9817	1.2771
8	0.0924	0.6359	1.0741	1.3729
9	-0.1858	-1.2790	0.8883	1.1163
10	-0.0542	-0.3733	0.8341	1.0311
11	0.1252	0.8615	0.9592	1.1672
12	-0.2724	-1.8749	0.6868	0.8230
13	-0.1140	-0.7850	0.5728	0.6762
14	-0.0849	-0.5843	0.4879	0.5677
15	-0.0194	-0.1336	0.4685	0.5375
16	0.1664	1.1455	0.6349	0.7185
17	-0.1622	-1.1165	0.4727	0.5279
18	0.0627	0.4312	0.5354	0.5901
19	0.0821	0.5648	0.6174	0.6720
20	-0.2414	-1.6617	0.3760	0.4042

Source: **Compiled from the** *Capital Line Database*.

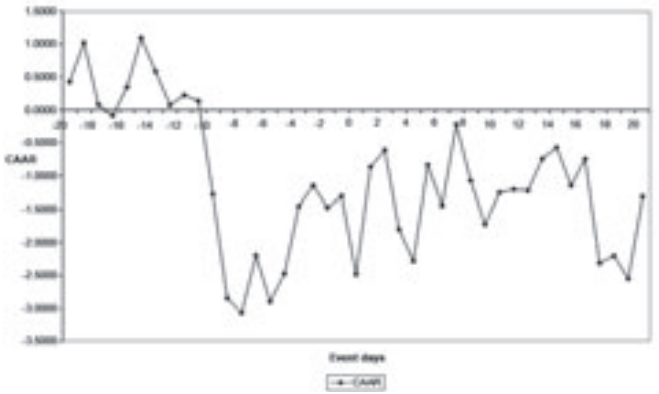

Figure 10: CAAR for the aggregated good news bear sample during the period prior to temporary suspension of trading

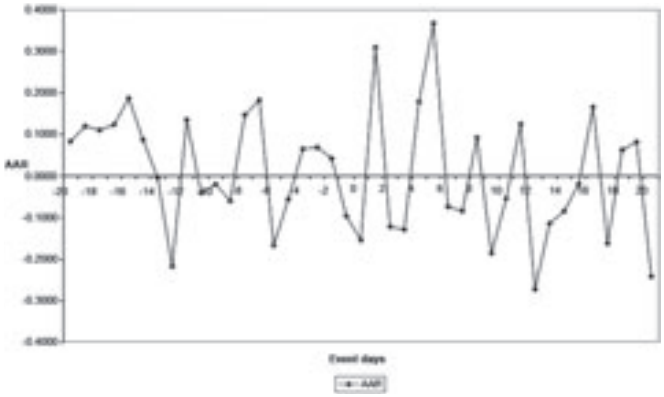

Figure 11: AAR for the aggregated good news bull sample during the period prior to temporary suspension of trading

announcements has been undertaken. The results of the event study analysis are presented in Table 5 and are represented graphically in Figures 9 and 10.

Event study analysis of the 'aggregated good news bull' sample during the period prior to trading suspension

An event study of 'aggregated good news bull' sample of 'set B' consisting of 199 quarterly earnings announcements has been undertaken. The results of the event study analysis are presented in Table 6 and are represented graphically in Figures 11 and 12.

Event study analysis of the 'aggregated bad news bear' sample during the period prior to trading suspension

Event study of the 'aggregated bad news bear' sample of 'set B' consisting of 10 quarterly earnings announcements has been undertaken. The results of the event study analysis are presented in Table 7 and are represented graphically in Figures 13 and 14.

Event study analysis of the 'aggregated bad news bull' sample during the period prior to trading suspension

Event study of the 'aggregated bad news bull' sample of 'set B' consisting of 160 quarterly earnings announcements has been undertaken. The results of

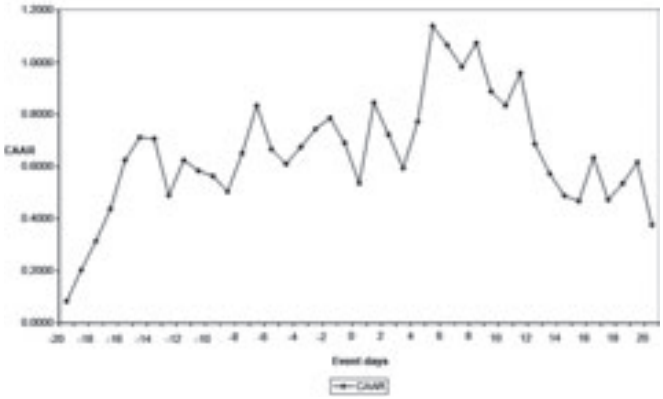

Figure 12: CAAR for the aggregated good news bull sample during the period prior to temporary suspension of trading

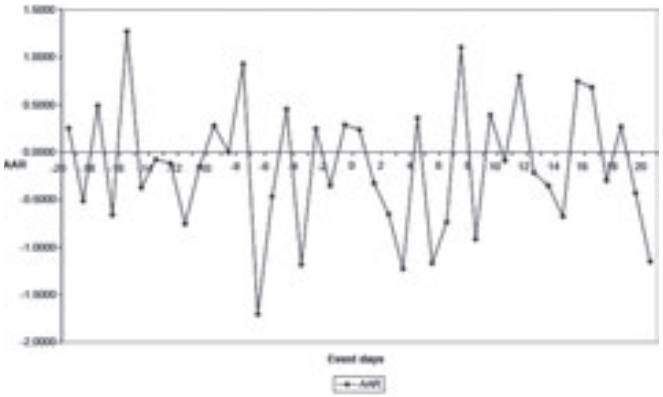

Figure 13: AAR for the aggregated bad news bear sample during the period prior to temporary suspension of trading

Table 7: Results of the 'aggregated bad news bear' sample during the period prior to temporary suspension of trading

Event days	AAR	*Z*(AAR)	CAAR	*Z*(CAAR)
-20	0.2538	0.4419	0.2538	0.4419
-19	-0.5138	-0.8946	-0.2600	-0.3201
-18	0.4921	0.8569	0.2321	0.2334
-17	-0.6591	-1.1477	-0.4270	-0.3718
-16	1.2720	2.2149	0.8450	0.6580
-15	-0.3721	-0.6480	0.4729	0.3362
-14	-0.0750	-0.1306	0.3979	0.2619
-13	-0.1192	-0.2075	0.2787	0.1716
-12	-0.7534	-1.3118	-0.4747	-0.2755
-11	-0.1497	-0.2606	-0.6243	-0.3438
-10	0.2820	0.4910	-0.3423	-0.1797
-9	0.0003	0.0005	-0.3420	-0.1719
-8	0.9330	1.6246	0.5909	0.2854
-7	-1.7068	-2.9720	-1.1159	-0.5193
-6	-0.4639	-0.8078	-1.5798	-0.7103
-5	0.4549	0.7922	-1.1249	-0.4897
-4	-1.1836	-2.0610	-2.3085	-0.9749
-3	0.2485	0.4327	-2.0600	-0.8455
-2	-0.3516	-0.6122	-2.4116	-0.9634
-1	0.2892	0.5035	-2.1224	-0.8264
0	0.2377	0.4139	-1.8848	-0.7161
1	-0.3233	-0.5629	-2.2080	-0.8197
2	-0.6495	-1.1310	-2.8575	-1.0375
3	-1.2271	-2.1366	-4.0846	-1.4518
4	0.3613	0.6291	-3.7233	-1.2966
5	-1.1695	-2.0364	-4.8928	-1.6708
6	-0.7335	-1.2772	-5.6263	-1.8854
7	1.1063	1.9264	-4.5200	-1.4874
8	-0.9154	-1.5939	-5.4354	-1.7575
9	0.3948	0.6875	-5.0406	-1.6024
10	-0.0885	-0.1541	-5.1290	-1.6040
11	0.8011	1.3949	-4.3279	-1.3322
12	-0.2123	-0.3697	-4.5402	-1.3762
13	-0.3511	-0.6113	-4.8913	-1.4607
14	-0.6763	-1.1777	-5.5677	-1.6387
15	0.7467	1.3002	-4.8210	-1.3991
16	0.6829	1.1891	-4.1381	-1.1846
17	-0.2961	-0.5155	-4.4341	-1.2525
18	0.2715	0.4727	-4.1626	-1.1606
19	-0.4286	-0.7463	-4.5912	-1.2640
20	-1.1503	-2.0029	-5.7415	-1.5613

Source: **Compiled from the** *Capital Line Database*.

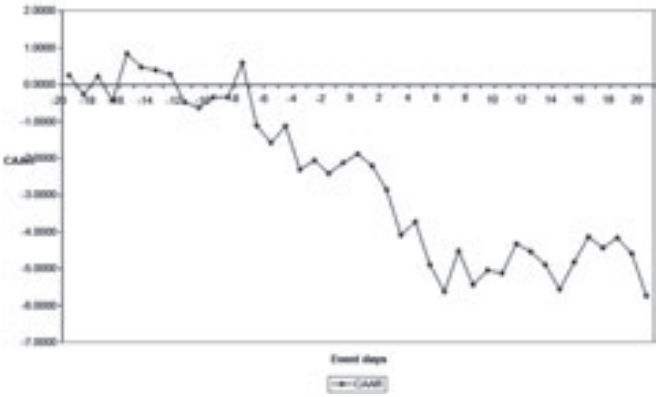

Figure 14: CAAR for the aggregated bad news bear sample during the period prior to temporary suspension of trading

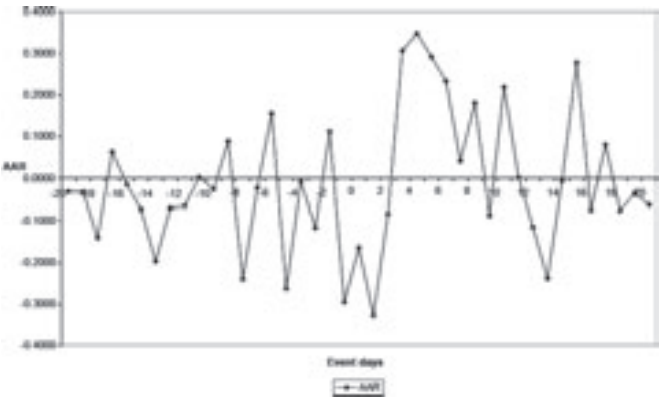

Figure 15: AAR for the aggregated bad news bull sample during the period prior to temporary suspension of trading

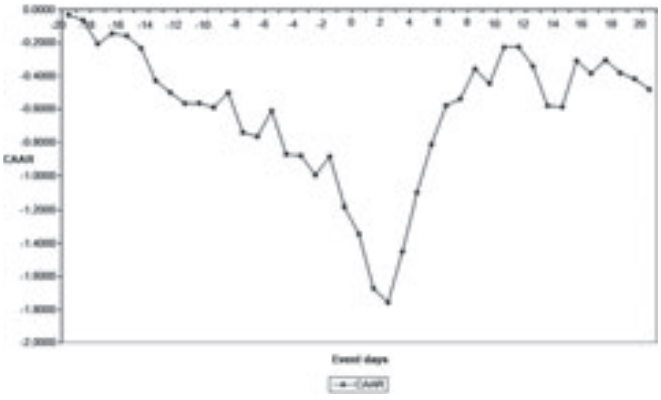

Figure 16: CAAR for the aggregated bad news bull sample during the period prior to temporary suspension of trading

the event study analysis are presented in Table 8 and are represented graphically in Figures 15 and 16.

Analysis of the 'Aggregated Good News Bear' Sample

It is observed that AAR is significant on the day of announcement for 'set A', while it is not so for the 'set B'. Maximum positive and significant AAR has been found on the day prior to the announcement (i.e. t = -1) in 'set A', while for 'set B', maximum positive and significant AAR has been found on the day post announcement (i.e. t = 1). It has been observed that during 51% of event days, the AARs are positive in 'set B', while during 46% of days, the AARs are positive in 'set A'. This implies that greater number of positive AARs is generated in 'set B' than in 'set A' with respect to good news announcements. However, the AARs are found to be insignificant for majority of days in the event window for both the sets. CAARs are found to be statistically insignificant during the event window of both the sets.

Hence, it may be concluded that during the bear phase, the good news announcement does not lead to significant effect on the stock returns for the majority of days in the event observation.

Analysis of the 'Aggregated Good News Bull' Sample

It is observed that AAR is insignificant on the day of announcement for 'set A' and 'set B'. Positive and significant AAR has been found on the day prior to the announcement (i.e. t = -1) in 'set A', while for 'set B', positive and significant AAR has been found on the day post announcement (i.e. t = 1). It has been observed that during 49% of event days, the AARs are positive in 'set B', while during 34% of days, the AARs are positive in 'set A'. This implies that greater number of positive AARs is generated in 'set B' than in 'set A' corresponding to good announcements. However, the AARs are found to be insignificant for majority of the days in the event window for both the sets. CAARs are largely found to be statistically insignificant during the event window of both the sets.

Hence, it may be concluded that during the bull phase, the good news announcement does not lead to significant effect on the stock returns for the majority of days in the event observation.

Analysis of the 'Aggregated Bad News Bear' Sample

It is observed that AAR is significant on the day of announcement for 'set A', while it is not so for 'set B'. It has been observed that during 59% of event days, the AARs are negative in 'set B', while during 46% of days, AARs are negative in 'set A'. This implies that greater number of negative AARs is generated in 'set B' than in 'set A' with reference to bad news announcements. However, the AARs are found to be insignificant for majority of days in the event window for both the sets. Majority of the CAARs are found to be statistically insignificant during the event window of both the sets.

Hence, it may be concluded that during the bear phase, the bad news announcement does not lead to significant effect on the stock returns for the majority of days in the event observation.

Analysis of the 'Aggregated Bad News Bull' Sample

It is observed that AAR is significant on the day of announcement for 'set A', while it is not so for the 'set B'. It has been observed that during 63% of event days, AARs are negative in 'set B', while during 61% of days, the AARs are negative in 'set A'. This implies that greater number of negative AARs is generated in 'set B' than in 'set A' corresponding to bad news announcements. However, the AARs are found to be insignificant for majority of days in the event window for both the sets. Majority of the CAARs (53.66%)

are found to be statistically significant during the event window of 'set A', while majority of CAARs are found to be statistically insignificant during the event window of 'set B'.

Hence, it may be concluded that during the bull phase, the bad news announcement does have a significant effect on the stock returns for the majority of days in the event observation for 'set A'. This observation is not made for the 'set B'.

Inferences on the Average Abnormal Returns with Reference to the Phase of the Market

During the bull and bear market regimes, aggregated bad news announcements and aggregated good news announcements do not result in statistically significant AAR for majority of the days in the event observations. This observation is true for '**set A**' and '**set B**'.

During the bull market phase for 'set A', the AARs are found to be positive during 34 and 39% of event days corresponding to 'good news announcements' and 'bad news announcements', respectively. Whereas, during the bear market phase for 'set A', the AARs are found to be positive during 46 and 54% of event days corresponding to 'good news announcements' and 'bad news announcements', respectively. This shows that greater number of positive abnormal returns is generated during the bear market in comparison to the bull market regime. This observation is true for good announcements as well as bad announcements. Similar observations were noticed earlier for the firms in the 'set B'.

Inferences on the Cumulative Average Abnormal Returns with Reference to the Phase of the Market

For 'aggregated bad news bull sample' of 'set A'**, the** CAARs are found to be statistically insignificant for majority of days in the event window of all samples undertaken for the study.

SUMMARY OF THE FINDINGS

The price reaction of quarterly earnings announcement on aggregated sample basis (AARs) is not significant for majority of the days in the event window during the bull and bear market regimes. Hence, it may be concluded that the phase of the market does not have any bearing on the behaviour of the stock returns. Further, it is also observed that irrespective of good or bad announcements, greater number of positive AARs is generated in the bear market in comparison to the bull market.

LIMITATIONS OF THE STUDY

The limitations of the present study are outlined as under:

1. The announcements under this study are classified as 'good news' and 'bad news' announcements on the basis of simple expectation model, which may not substantially reflect the interpretation of the investor regarding announcements.
2. The study has been undertaken using only 30 most actively traded firms listed in the BSE-SENSEX on the basis of market capitalisation. The effect of the quarterly earnings announcement with reference to firms listed in BSE-100, BSE-200, BSE-500, DOLLEX-200 (Dollex-200 is dollar equivalent to BSE-200) etc., if covered, may provide different sets of results.
3. The quarterly earnings information announced with other corporate events has been excluded in the study.

SCOPE FOR FURTHER RESEARCH

The limitations outlined above provide the genesis for undertaking further research in this area. The present study examined the effect of quarterly earnings announcements in the context of the companies constituting the SENSEX. Future studies may be carried out to study the effect of quarterly earnings

announcement with respect to companies listed in different indices, viz. BSE-100, BSE-200, BSE-500, DOLLEX-200, BSE-PSU Index, etc. The present study has adopted simple expectation model as a proxy to capture the market expectation of earnings. Future study on investors' expectation of earnings with regard to various firms and their perception of 'good news' and 'bad news' announcements may be studied in greater detail.

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Annexure I

Cycle	Period of the bull and bear regimes for each cycle				Duration of the bull and bear regimes (in days)	
	Bull regime		Bear regime		Bull	Bear
Cycle 16	2-May-01	10-Sep-01	11-Sep-01	10-Oct-01	92	21
Cycle 17	11-Oct-01	25-Feb-02	26-Feb-02	4-Mar-02	91	5
Cycle 18	5-Mar-02	17-May-02	20-May-02	28-May-02	51	7
Cycle 19	29-May-02	22-Aug-03	25-Aug-03	26-Aug-03	308	2
Cycle 20	27-Aug-03	11-Sep-03	12-Sep-03	26-Sep-03	12	11
Cycle 21	29-Sep-03	14-Jan-04	15-Jan-04	4-Feb-04	74	13
Cycle 22	5-Feb-04	5-May-04	6-May-04	3-Jun-04	61	21
Cycle 23	4-Jun-04	10-May-06	11-May-06	25-Jul-06	481	54
Cycle 24	26-Jul-06	11-Dec-06	12-Dec-06	12-Dec-06	95	1
Cycle 25	13-Dec-06	21-Feb-07	22-Feb-07	3-Apr-07	46	28
Cycle 26	4-Apr-07	26-Jul-07	27-Jul-07	27-Aug-07	79	21
Cycle 27	28-Aug-07	1-Oct-07	3-Oct-07	22-Nov-07	25	37
Cycle 28	23-Nov-07	14-Dec-07	17-Dec-07	17-Dec-07	16	1
Cycle 29	18-Dec-07	14-Jan-08	15-Jan-08	8-Apr-08	17	57
Cycle 30	9-Apr-08	29-May-08	30-May-08	24-Jul-09	33	280
Cycle 31	27-Jul-09	4-Aug-09	5-Aug-09	20-Aug-09	7	12
Cycle 32	21-Aug-09	29-Oct-09	30-Oct-09	4-Nov-09	45	3
Cycle 33	5-Nov-09	12-Nov-10	-	-	257	-

(*Source*: **Ahmad and Kamaiah (2011); retrieved from http://mpra.ub.uni-muenchen.de/37174/)**