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Iqbal, Javed and Farooqi, Faraz Ahmed

Department of Statistics Karachi University

1 January 2011

Online at https://mpra.ub.uni-muenchen.de/30865/
MPRA Paper No. 30865, posted 11 May 2011 14:36 UTC

Stock Price Reaction to Earnings Announcement: The Case of an Emerging Market

By
Javed Iqbal* and Faraz Ahmed Farooqi
Department of Statistics, Karachi University
Karachi, Pakistan

Abstract

In an efficient stock market stock prices instantaneously and accurately adjust to new information. This paper conducts an event study analysis on an emerging market namely the Karachi Stock Exchange (KSE) by investigating the stock price reaction to public announcement of quarterly after tax profit by listed firms. By employing 5 year data on stock prices from January 2004 to August 2008 for 114 non financial firms we found that there is no abnormal return post earnings announcement. Moreover the study provides evidence that there is a bigger element of surprise in bad news than in good news as the market reaction to bad news is stronger.

***Javed_uniku@yahoo.com**

JEL Codes : G14
Key Words: Event Study, Earnings Announcement, Emerging Markets

1. Introduction

Timely announcement of earnings and other cash flows is an important ingredient of efficient and transparent corporate practice. The magnitude and timing of announcement related to earnings provide useful information to investors regarding the financial soundness of firms. There are many studies which point towards information content of earnings disclosure. For example Ball and Brown (1968), Chari, Jagannathan, and Ofer (1988), Kross and Schroeder (1984), Easton and Zmijewski (1989), and Gennotte and Truemann (1996) find that stock prices respond positively to announcements of increase in earnings and negatively to announcements of decrease in earnings for the U.S. firms. Khotari and Warner (2006) and MacKinlay (1997) provide a review of many articles published on the subject.

In addition in financial economics stock prices are assumed to be the discounted value of all future cash flows and incorporate all relevant information. Event studies on earnings announcement provide an important test of semi strong form efficiency of the stock market (Fama, 1991). Efficient Market Hypothesis describes that in efficient market prices fully and instantaneously absorb all the new information.

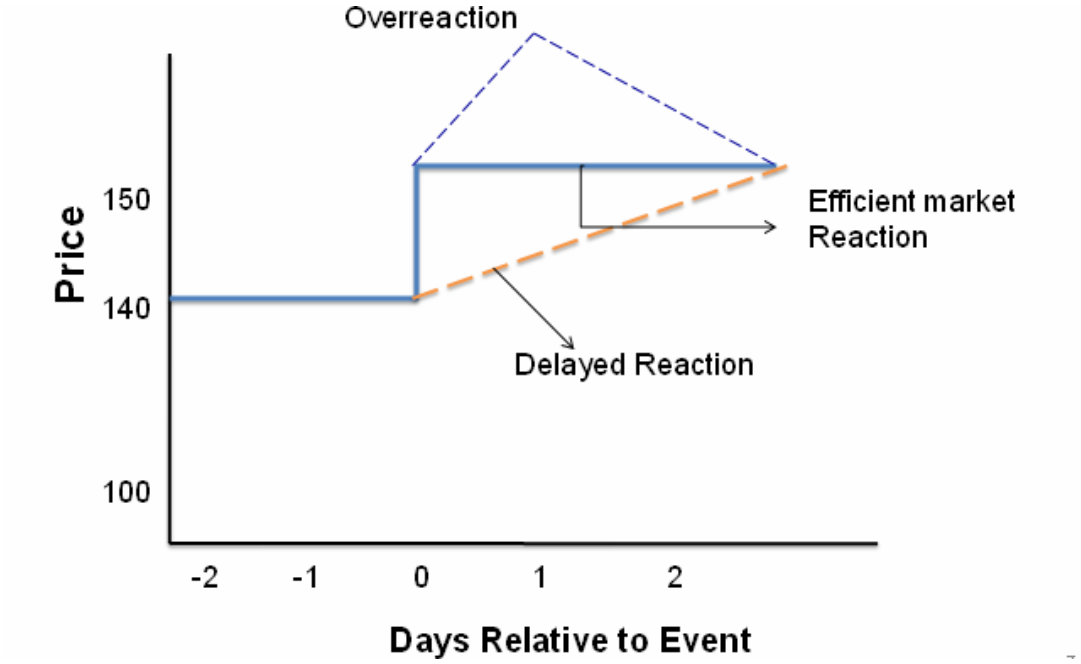

Figure1.2 Reaction of stock price to new information in efficient and inefficient markets [Adapted from Ross et al. (2005)].

Figure 1.2 shows the difference between the efficient market and inefficient market. If the market is efficient it will absorb all information at the event time and new price level is instantaneously established but in inefficient market such information is not absorbed at the event day and it takes many days to adjust to new equilibrium level.

There are very few event studies on non-US markets particularly in emerging markets. In a study on the Chinese stock market Su (2003) investigated the stock price reactions to changes in earnings per share (EPS) in the Chinese domestic A-shares and international B-share firms. The results indicate that A-shares fail to adjust new earnings information quickly, but international B-share investors can predict earnings changes better than A-shares investors. As a result, abnormal returns can be obtained by trading on the earnings information, but for A-shares only. They attribute this finding to the type of ownership of the shares. A-shares holders are usually individual investors whereas the B-shares are mostly owned by large institutions that trade on more detailed and accurate financial information not immediately available to A-share holders.

The purpose of this paper is to conduct an event study analysis of earnings announcement in an emerging market namely the Karachi Stock Exchange which is Pakistan's biggest and the most active stock exchange. For an overview of the stock market in Pakistan see Iqbal (2008). Most of the event studies are performed in the developed capital markets particularly the US and the UK markets. Conducting event studies on emerging markets is quite challenging due to their excessive prices volatility which is a consequence of the relatively instable political and macroeconomic conditions. So in emerging markets uncovering any systematic abnormal returns to a corporate action is not easy. Further, in the developed markets the firms are closely followed by financial analysts who provide the forecast of the earnings for firms they follow. Thus a database of benchmark forecasts is easily available to judge whether the actual announcement is considerably above expected, below expected or have no information content. In developing countries such database are difficult to obtain. Our contribution is to rely on the information contained in the actual earnings figures to classify the type of announcement.

The event we consider is the quarterly after tax profit announcement by firms listed on the Karachi Stock Exchange. We collected date on earnings announcement from the Karachi Stock Exchange website (www.kse.com.pk) over the period from January 2004 to August 2008. The price data for the matching firms are obtained from DataStream database. Following this introduction section 2 describes the methodology and the data for the event study, section 3 discusses the results of analysis and section 4 provides conclusion.

2. Methodology

2.1 Measuring Abnormal Returns

The event under study is after tax quarterly profit announcement by listed companies. The date and amount of profit declared by companies are obtained from the website of the Karachi Stock Exchange. Following Makinlay (1997) we include event day plus 30 surrounding days i.e. a total of 61 days as event window. The event period is not included itself in estimation period to prevent the event from influencing the parameter estimates. The next issue is the firms to include in the event study analysis.

For this study we employ the sample of non financial firms which are listed on the Karachi Stock Exchange. Initially we considered the quarterly announcement for all the listed firms. However for many firms sufficient number of announcements was not available. We therefore restrict our sample to firms that have at least ten quarterly announcements during the period. This is important since our benchmark quarterly announcement (median earring) has to be estimated from the data. Filtering in this way we finally arrived at 114 firms to be considered for the event study.

Using daily data on continuously compounded returns and returns on the KSE-100 index as the market index we estimated the parameters of the market model which forms the basis of measuring abnormal returns.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \qquad (1)$$

With $\mathrm{E}(\varepsilon_{it}) = 0$ and $\mathrm{Var}(\varepsilon_{it}) = \sigma^2_{\varepsilon i}$

Where R_{it} and R_{mt} are the period *t* return on firm *ι* and the market portfolio respectively, and ε_{it} is the zero mean disturbance term. α_i, β_i and $\sigma^2_{\varepsilon i}$ are the parameter of market model. It is difficult to separate the movement of stock price resulting from the announcement of an event by the firm from the general market movement. The use of market model eliminates the general market movement so that the residuals of the market model reflect the price reaction due to the event under study. Thus market model provides a way of extracting signals from the noise. Through market model we estimate the residuals. The average abnormal returns and cumulative abnormal returns are then computed.

Using 61 days as the event window we to calibrate the abnormal returns as follow:

$$\hat{\mathbf{AR}} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \tag{2}$$

The abnormal return is the residual of the market model calculated on an out of sample basis over the event window. The abnormal returns are then averaged across firms and announcement as follows.

$$\overline{AR_\tau} = \frac{1}{N}\sum_{i=1}^{N}\overline{AR_{i\tau}} \tag{3}$$

Next the average abnormal returns can be aggregated over the event window to calculate the cumulative abnormal returns (CAR) for each firm *i* as:

$$\overline{CAR(T_1,T_2)} = \sum_{\tau=T_1}^{T_2}\overline{AR_\tau} \tag{4}$$

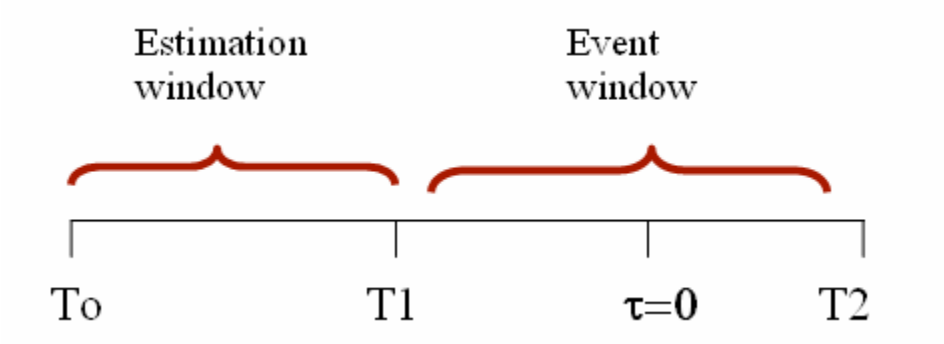

Figure 1.1 Time line for event study

Figure 1.1 shows the schematic view of event window and estimation window.

2.2 Classification of News

If earnings disclosures have information content, then 'higher than expected' earnings should be associated with increase in value of the equity and 'lower than expected' earnings with decline in equity value. These earnings announcements are classified in three categories i.e. good news, bad news and no news. This is due to the fact that the stock prices are expected to show upward movement only if they contain a positive surprise for investors. The US studies e.g. MacKinlay (1997) employed financial analyst database to classify declared earnings announcement as good news, bad news or no news. If the actual earnings announcement at a particular date is higher than 5% of the analyst forecast value then the news was declared as good news, if the actual earnings announcement at a particular date is within the 5% of the analyst forecasted value then the news was declared as no news and if the actual earnings announcement at a particular date is less than 5% of the analyst value then the news was declared as bad news.

In the developing capital markets such information about financial analyst forecast are not readily available so we have used statistical criteria to classify the type of earnings announcement. Specifically we employ median of announced quarterly earnings of a company as a benchmark to classify the announcement. According to this statistical strategy if the actual earning declared by the company at a particular date is within plus minus 10% of the median earning, it is classified as no news. If the actual earning is less than 10% of the median earning the news is classified as bad news. The announcement with earning greater than 10% of the median earning is classified as good news.
This classification may also be described as follows:
Good news: Actual Earning > 10% of Median Earning
No news: Actual Earning within ± 10% of Median Earning
Bad news: Actual Earnings < 10% of Median Earning

We have used median rather than mean as benchmark since if the earnings have outliers mean is not a representative measure of typical earnings magnitude. Median is less affected by the extreme observation. The earnings distribution is generally positively skewed.

Our data consist of 701 quarterly announcements in which the good news comprise 43%, bad news are 42.5% while the remaining 16.5% are no news.

3. Results and Discussion

Table 1 in the appendix presents the average returns (AR) and cumulative average abnormal (CAR) for all the firms at an aggregate level. Figure 3 presents the graphical display of Table 1. Appendix 3 presents graphs disaggregated into different sectors.

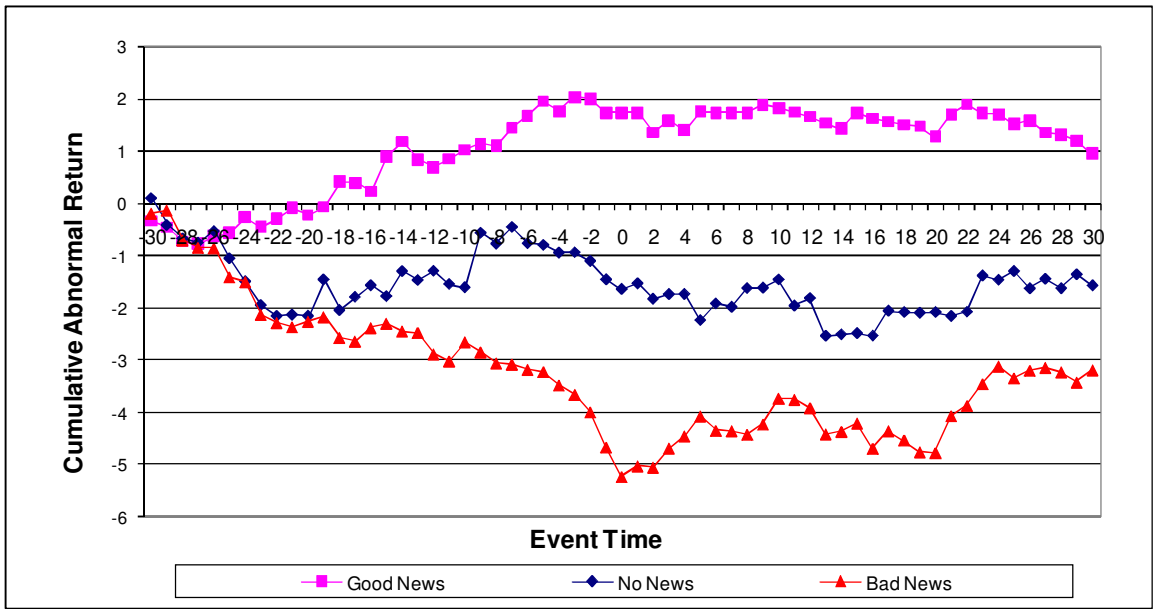

Figure 3: Average Cumulative Abnormal Returns for Earnings Announcement (all firms)

Figure 3 shows that the average CAR for good news starts moving upward prior to the event date. This is consistent with MacKinlay's argument that the market learns about the impact of forthcoming announcement. The average CAR of good news firms gradually drift up in initially. After the event date average CAR become gradually stable since after the announcement there is no more surprise for the investors. The average CAR of bad news generally decline initially but starting from the event date it shows slightly upward trend and eventually become stable near the end of event window. For no news announcement the average CAR have generally trend less pattern although during the event window the sample average CAR are negative for the no news category firms.

The graphs for the individual sectors in the appendix (panel a, c, e) show a similar pattern. Since the number of announcements in individual sectors is small the patterns we observe for average CAR are not as discerning as for the aggregate of all firms. Individual sector's CAR are subject to higher fluctuations due to small sample size.

By looking at the results of overall sectors (Figure 3) it can be observed that if an investor had invested in a company 30 day prior to the announcement of unexpected high earnings company then she would have realized approximately 2% returns on event day. This amount is about to 26.8% compounded annually. It is interesting to observe that our estimate for event day average CAR is very close to the one obtained by MaKinlay (1997) for Dow Jones 30 firms. During this period the i.e. risk free investment has rewarded much less. For example average annual yield on 6 month State Bank of Pakistan's Treasury Bill rate was nearly 6.5% during the 5 year sample period (International Financial Statistics, IMF). Thus good news firms reward nearly 20% annual risk premium. On event day good news firms on average generate about 6% return differential compared to the bad news firm. This amounts to on average about 100% compounded annually.

Post announcement there are no significant excess abnormal returns. Thus is if an investor had invested in good news firm on the event day then on average there are no cumulative abnormal returns one month later. This result points to the fact that information has been absorbed on or before the earnings announcement date. In the days after the announcement the average CAR are relatively stable. These results are consistent with semi strong form efficiency of the Karachi stock market.

Our results also corroborate the finding of earlier studies who document asymmetry of stock price reaction of good and bad news. For example Fooladi and Roberts (1988) found a stronger reaction to announcements of dividend cuts than to those of dividend increases. Similarly Conrad, Corner and Landsman (2002) find that stock prices respond more strongly to negative than positive earnings surprises. These studies provide evidence that there is a bigger element of surprise in bad news than in good news. This

can also be related to the asymmetric GARCH literature where the volatility increases following a bad news are higher than those for bad news of same magnitude.

We conduct a sequence of diagnostic and misspecification tests on the market model regression for the estimation window. In the vast majority of cases for the earnings announcement, there is no evidence of serial correlation, heteroskedasticity and model misspecification. However in most of the cases we found non-normality in residuals due to excess kurtosis. Since our analysis is based on economic significance of earning disclosure the issue of excess kurtosis is not much concerned.

4. Conclusion

In this paper we investigated the stock price reaction to earnings announcement by firms listed at the Karachi Stock Exchange. We selected the data for quarterly earnings announcement from Karachi Exchange website and selected the matching firm's stock prices from the DataStream database. For each firm and for each announcement we computed abnormal returns using market model regression. These abnormal returns and cumulative abnormal returns were then aggregated across firms for each of the date in event window.

We found that on average during the 30 day period prior to earnings announcement the investor can gain 2% cumulative average returns on event day. This return is much higher than the risk free rate during the period of study. We estimated that the firms with higher than expected earnings announcement can provide 20% annual risk premium. On event day good news firms on average generate about 6% differential in abnormal returns compared to the bad news firm. This amounts to on average about 100% on annual basis.

Our results indicate that information in earnings disclosure has been absorbed on or before the earnings announcement date. This implies that the Karachi stock market can be considered informational efficient since that stock prices quickly absorb the new information. In the days after the announcement the average cumulative abnormal returns are relatively stable consistent the market efficiency. We also observe that the stock price

react asymmetrically to the unexpectedly high and unexpectedly low earnings announcement. If the earnings announced is less than expected the price drop is much higher than the earnings increase announcement of the same magnitude. Our results thus support the finding of earlier studies who document asymmetry of stock price reaction of good and bad news. Our study provides evidence that there is a bigger element of surprise in bad news than in good news as the market reaction to bad news is stronger.

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Appendix 1: Table A1: Average AR and Average CAR over the event window for all firms

Event Days	Good News		No News		Bad News	
	AR	CAR	AR	CAR	AR	CAR
-30	-0.33	-0.33	0.11	0.11	-0.20	-0.20
-29	-0.12	-0.45	-0.51	-0.41	0.06	-0.14
-28	-0.27	-0.73	-0.26	-0.67	-0.57	-0.71
-27	-0.05	-0.77	-0.08	-0.74	-0.14	-0.85
-26	0.15	-0.62	0.22	-0.52	-0.02	-0.87
-25	0.06	-0.56	-0.52	-1.05	-0.55	-1.42
-24	0.29	-0.27	-0.44	-1.49	-0.09	-1.50
-23	-0.18	-0.44	-0.46	-1.95	-0.63	-2.13
-22	0.16	-0.29	-0.21	-2.15	-0.15	-2.29
-21	0.21	-0.08	0.02	-2.13	-0.08	-2.37
-20	-0.14	-0.22	-0.02	-2.15	0.11	-2.26
-19	0.16	-0.06	0.70	-1.45	0.08	-2.18
-18	0.49	0.42	-0.59	-2.04	-0.40	-2.57
-17	-0.03	0.40	0.25	-1.79	-0.07	-2.64
-16	-0.17	0.23	0.22	-1.56	0.26	-2.38
-15	0.68	0.90	-0.21	-1.77	0.08	-2.30
-14	0.28	1.19	0.48	-1.29	-0.15	-2.45
-13	-0.34	0.84	-0.17	-1.46	-0.03	-2.48
-12	-0.15	0.70	0.18	-1.29	-0.41	-2.89
-11	0.16	0.85	-0.26	-1.54	-0.14	-3.02
-10	0.18	1.03	-0.06	-1.60	0.37	-2.66
-9	0.11	1.14	1.05	-0.56	-0.19	-2.85
-8	-0.04	1.10	-0.21	-0.76	-0.21	-3.06
-7	0.35	1.45	0.32	-0.44	-0.02	-3.08
-6	0.23	1.68	-0.31	-0.76	-0.10	-3.18
-5	0.27	1.95	-0.03	-0.79	-0.04	-3.22
-4	-0.19	1.76	-0.15	-0.94	-0.26	-3.48
-3	0.27	2.04	0.01	-0.93	-0.18	-3.66
-2	-0.03	2.00	-0.17	-1.10	-0.33	-3.99
-1	-0.27	1.73	-0.35	-1.45	-0.67	-4.67
0	-0.01	1.73	-0.19	-1.63	-0.56	-5.23
1	0.00	1.73	0.11	-1.53	0.20	-5.03
2	-0.37	1.36	-0.30	-1.83	-0.02	-5.05
3	0.23	1.59	0.10	-1.73	0.36	-4.69
4	-0.19	1.40	0.00	-1.73	0.23	-4.45
5	0.36	1.75	-0.50	-2.23	0.38	-4.07
6	-0.02	1.73	0.32	-1.91	-0.28	-4.35
7	0.00	1.73	-0.06	-1.98	0.00	-4.35
8	0.01	1.74	0.36	-1.62	-0.07	-4.42
9	0.15	1.89	0.01	-1.61	0.19	-4.23
10	-0.06	1.83	0.16	-1.45	0.49	-3.73
11	-0.08	1.75	-0.50	-1.95	-0.02	-3.75
12	-0.09	1.66	0.14	-1.81	-0.16	-3.92
13	-0.12	1.54	-0.72	-2.53	-0.50	-4.41

14	-0.11	1.43	0.03	-2.50	0.05	-4.37
15	0.30	1.73	0.02	-2.48	0.16	-4.20
16	-0.10	1.63	-0.05	-2.53	-0.49	-4.69
17	-0.06	1.57	0.48	-2.05	0.34	-4.35
18	-0.06	1.51	-0.03	-2.08	-0.18	-4.53
19	-0.03	1.48	-0.02	-2.09	-0.22	-4.76
20	-0.20	1.28	0.02	-2.08	-0.02	-4.78
21	0.42	1.70	-0.08	-2.15	0.71	-4.07
22	0.20	1.90	0.08	-2.07	0.20	-3.87
23	-0.18	1.72	0.70	-1.37	0.42	-3.45
24	-0.02	1.70	-0.08	-1.46	0.34	-3.12
25	-0.19	1.52	0.17	-1.29	-0.23	-3.34
26	0.07	1.59	-0.33	-1.62	0.14	-3.20
27	-0.23	1.36	0.18	-1.44	0.06	-3.15
28	-0.05	1.32	-0.18	-1.62	-0.09	-3.23
29	-0.12	1.20	0.26	-1.35	-0.20	-3.43
30	-0.24	0.96	-0.21	-1.57	0.23	-3.19

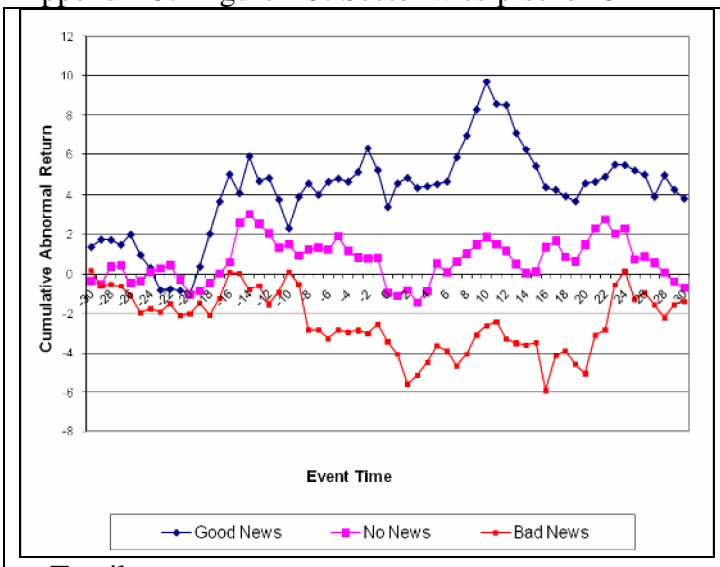
Appendix 2: Table A2: List of Companies included in the event study

S.N.	Company	Sector
1	Artistic Denim Mills Ltd.	Textile
2	Crescent Spinning Mills Ltd.	Textile
3	Gadoon Textile Mills Ltd.	Textile
4	Ideal Spinning Mills Ltd.	Textile
5	Kohinoor Textile Mills Ltd.	Textile
6	Mohammad Farooq Textile Mills Ltd.	Textile
7	Nishat Mills Ltd.	Textile
8	Nishat (Chunian) Ltd.	Textile
9	Reliance Weaving Mills Ltd.	Textile
10	Saif Textile Mills Ltd.	Textile
11	Sargodha Spinning Mills Ltd.	Textile
12	Suraj Cotton Mills Ltd.	Textile
13	Taj Textile Mills Ltd.	Textile
14	Usman Textile Mills Ltd.	Textile
15	Yousaf Weaving Mills Ltd.	Textile
16	Dewan Salman Fibre Ltd.	Fibre/Synthetic Textile
17	Gatron (Industries) Ltd.	Fibre/Synthetic Textile
18	Ibrahim Fibres Ltd.	Fibre/Synthetic Textile
19	Indus Polyester Company Ltd.	Fibre/Synthetic Textile
20	Pakistan Synthetics Ltd.	Fibre/Synthetic Textile
21	Abbott Laboratories (Pakistan) Ltd.	Chemical
22	Berger Paints Pakistan Ltd.	Chemical
23	Clariant Pakistan Ltd.	Chemical
24	Dawood Hercules Chemicals Ltd.	Chemical
25	Dynea Pakistan Ltd.	Chemical
26	Engro Chemical Pakistan Ltd.	Chemical
27	Fauji Fertilizer Company Ltd.	Chemical
28	Fauji Fertilizer Bin Qasim Ltd.	Chemical
29	Ferozsons Laboratories Ltd.	Chemical
30	Glaxo Smithkline (Pakistan) Ltd.	Chemical
31	ICI Pakistan Ltd.	Chemical
32	Nimir Resins Ltd.	Chemical
33	Pakistan Pta Ltd.	Chemical
34	Searle Pakistan Ltd.	Chemical
35	Wah Nobel Chemicals Ltd. (Pub.)	Chemical
36	Nimir Industrial Chemicals Ltd.	Chemical
37	Ados Pakistan Ltd.	Engineering/Transport
38	Agriauto Industries Ltd.	Engineering/Transport
39	Al-Ghazi Tractors Ltd.	Engineering/Transport
40	Atlas Battery Ltd.	Engineering/Transport
41	Atlas Honda Ltd.	Engineering/Transport
42	Azgard Nine Ltd.	Engineering/Transport
43	Crescent Steel And Allied Products Ltd	Engineering/Transport

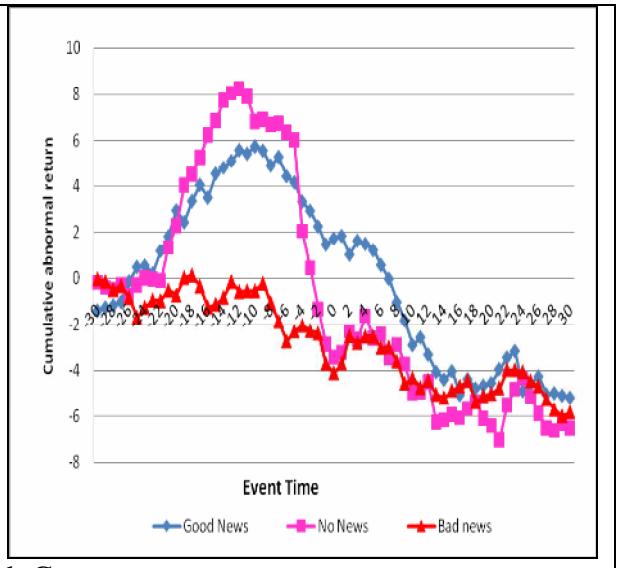
44	Dewan Farooque Motors Ltd.	Engineering/Transport
45	General Tyre & Rubber Co. Ltd.	Engineering/Transport
46	Ghandhara Nissan Ltd.	Engineering/Transport
47	Ghani Automobiles Ltd.	Engineering/Transport
48	Hinopak Motors Ltd.	Engineering/Transport
49	Honda Atlas Cars (Pakistan) Ltd.	Engineering/Transport
50	Huffaz Seamless Pipe Industries Ltd.	Engineering/Transport
51	Johnson & Philips (Pakistan) Ltd.	Engineering/Transport
52	Metropolitan Steel Corporation Ltd.	Engineering/Transport
53	Millat Tractors Ltd.	Engineering/Transport
54	Pak Elektron Ltd.	Engineering/Transport
55	Pak Suzuki Motor Company Ltd.	Engineering/Transport
56	Pakistan Cables Ltd.	Engineering/Transport
57	International Industries Ltd.	Engineering/Transport
58	Ghandhara Industries Ltd.	Engineering/Transport
59	Ados Pakistan Ltd.	Engineering/Transport
60	Al-Noor Sugar Mills Ltd.	Sugar
61	Ansari Sugar Mills Ltd	Sugar
62	Chashma Sugar Mills Ltd	Sugar
63	Dewan Sugar Mills Ltd	Sugar
64	Habib ADM Ltd	Sugar
65	Habib Sugar Mills Ltd.	Sugar
66	Haseeb Waqas Sugar Mills Ltd	Sugar
67	JDW Sugar Mills Ltd.	Sugar
68	Kohinoor Sugar Mills Ltd	Sugar
69	Mirza Suggar Mills Ltd	Sugar
70	Noon Sugar Mills Ltd.	Sugar
71	Pangrio Sugar Mills Ltd.	Sugar
72	Sakrand Sugar Mills Ltd.	Sugar
73	Shahmurad Sugar Mills Ltd	Sugar
74	Al- Abbas Cement Ltd.	Cement
75	Attock Cement Pakistan Ltd.	Cement
76	Cherat Cement Company Ltd.	Cement
77	Dadabhoy Cement Industries Ltd.	Cement
78	Dandot Cement Company Ltd.	Cement
79	Dewan Cement. Ltd. (Pakland Cem. Ltd.)	Cement
80	Fauji Cement Company Ltd.	Cement
81	Fecto Cement Ltd.	Cement
82	Gharibwal Cement Ltd.	Cement
83	Kohat Cement Ltd.	Cement
84	Lucky Cement Ltd.	Cement
85	Maple Leaf Cement Factory Ltd	Cement
86	Pioneer Cement Ltd.	Cement
87	Attock Refinery Ltd.	Fuel and Energy
88	Hub power (don't know)	Fuel and Energy

89	Japan Power Generation Ltd.	Fuel and Energy
90	Kar. Elec. Pow. Sup. Crp. Ltd. (KESC)	Fuel and Energy
91	Kohinoor Energy Ltd.	Fuel and Energy
92	Kohinoor Power Company Ltd.	Fuel and Energy
93	Mari Gas Company Ltd.	Fuel and Energy
94	National Refinery Ltd. (Pub.)	Fuel and Energy
95	Pakistan State Oil Company Ltd. (Pub.)	Fuel and Energy
96	Pakistan Refinery Ltd.	Fuel and Energy
97	S. G. Power Ltd.	Fuel and Energy
98	Shell Pakistan Ltd.	Fuel and Energy
99	Southern Electric Power Co. Ltd.	Fuel and Energy
100	Baluchistan Glass Ltd.	Miscellaneous
101	Eco. Pak. Ltd. (Plastobag Ltd.)	Miscellaneous
102	Emco Industries Ltd	Miscellaneous
103	Frontier Ceramics Ltd.	Miscellaneous
104	Ghani Glass Ltd.	Miscellaneous
105	Gillette Pakistan Ltd.	Miscellaneous
106	Leather Up Ltd.	Miscellaneous
107	Murree Brewery Company Ltd.	Miscellaneous
108	Quice Food Industries Ltd.	Miscellaneous
109	S. S. Oil Mills Ltd.	Miscellaneous
110	Packages Ltd.	Miscellaneous
111	Lakson Tobacco Company Ltd.	Miscellaneous
112	Pakistan Tobacco Company Ltd.	Miscellaneous
113	Pak. Tele. Co. Ltd. (PTCL) (Pub.)	Miscellaneous
114	Pak Datacom Ltd.	Miscellaneous

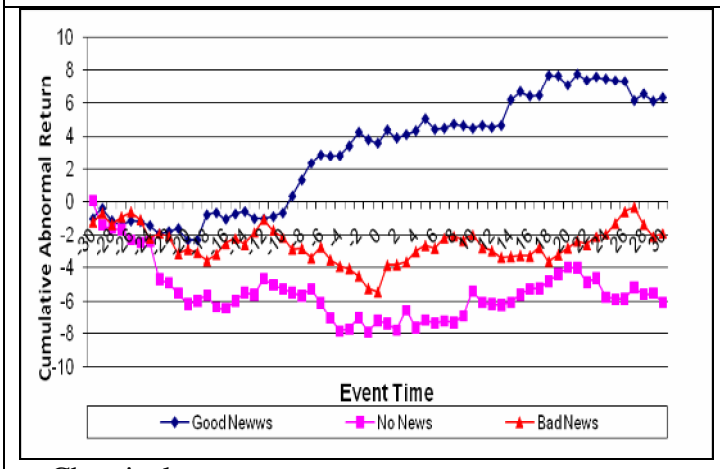
Appendix 3: Figure A3. Sector wise plot of CAR



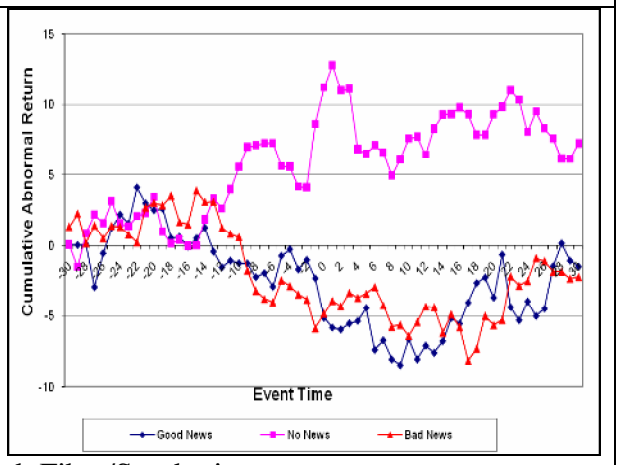
a: Textile



b:Cement

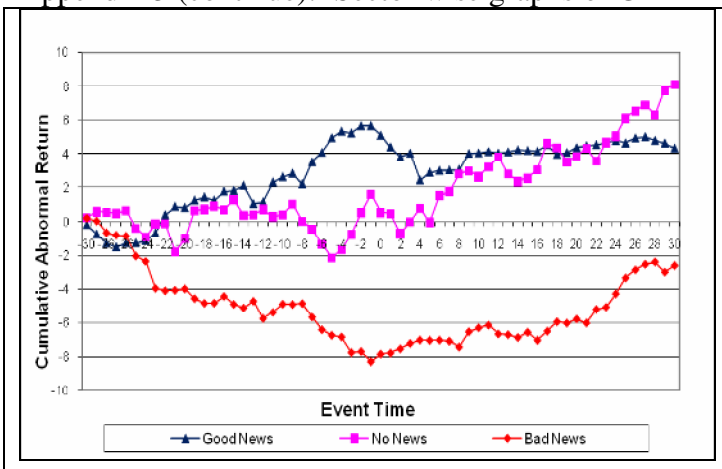


c. Chemical

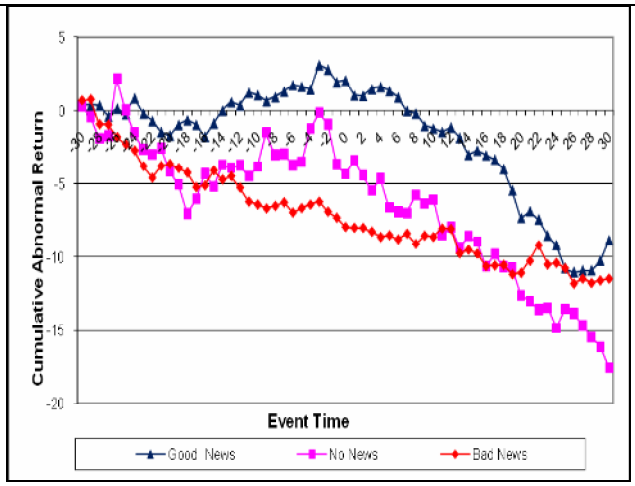


d. Fibre/Synthetic

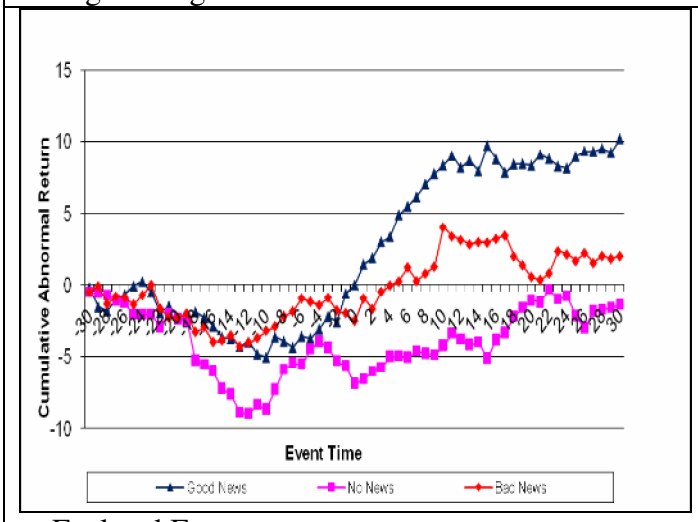
Appendix 3 (continue): Sector wise graphs of CAR



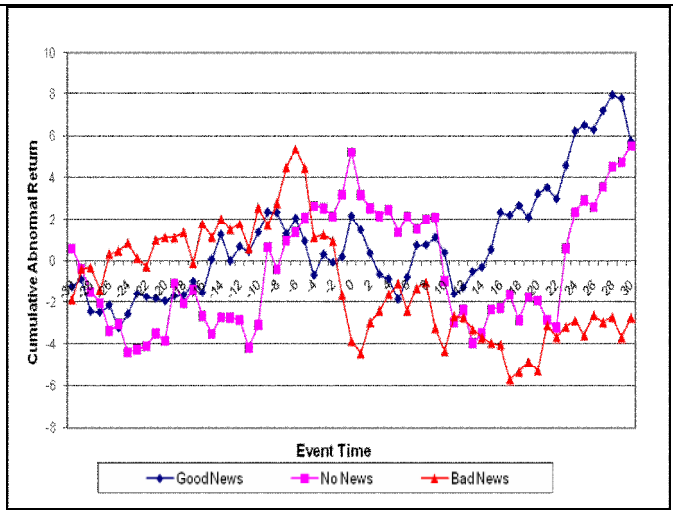
e: Engineering



f: Sugar



g: Fuel and Energy



h: Miscellaneous