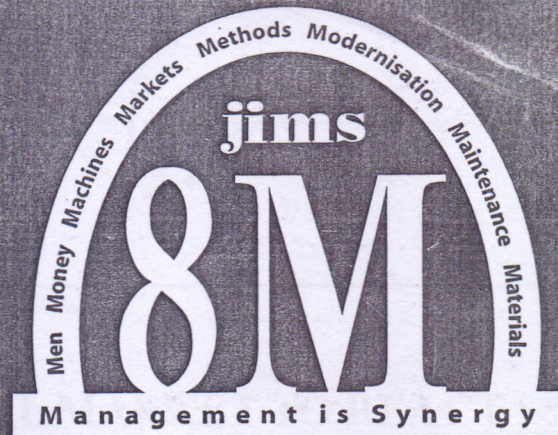


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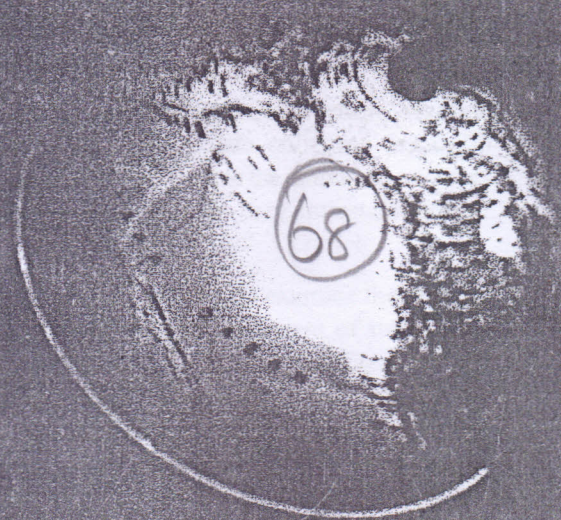
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# EFFICIENCY OF INDIAN CAPITAL MARKET TO REACT ADEQUATELY TO THE ANNOUNCEMENT OF QUARTERLY EARNINGS : A STUDY IN CAPITAL GOODS INDUSTRY

Dr. M. Selvam ★

*An efficient and integrated capital market is an important infrastructure that facilitates capital formation. The efficiency with which the capital formation is carried out depends on the efficiency of the capital markets and financial institutions. A capital market is said to be efficient with respect to an information item if the prices of securities fully impound the returns implications of that item. The present study has empirically examined the informational efficiency of Indian capital market with regard to quarterly earnings released by the automobile sector companies in the semi-strong form of EMH. The study found that the Indian Capital market is near efficient in the semi- strong form of EMH, which can be used by the investors to make abnormal returns.*

A capital market is said to be efficient with respect to an information item if the prices of securities fully impound the returns implications of that item. In an efficient market, when a new information item is added to the market, its revaluation implications for security returns are instantaneously and unbiasedly impounded in the current market price. Several studies have empirically tested the reaction of security prices to the release of different information. Beaver (1968), Foster (1981), Richardson (1984), Maingot (1984), Ball and Brown (1968), McEnally (1971), and Beaver, Clarke, Wright (1979) are some of the studies which find significant reaction in the security prices to the release of accounting information. Another finding of these studies is that during the announcement period, there is abnormal returns. On the Indian capital market, M. Obaidullah (1992), R. Srinivasan, and Dutta, Abhijit (2001), Jijo Lukose and Narayan Rao (2002) have tested the efficiency of the Indian capital market with respect to the release of accounting information.

One explanation for market efficiency is the competitive activities of security analysts. Larger the number of analysts, the more efficient will be the market. Market efficiencies are most likely for stocks followed by large number of analysts and least likely for stocks with limited coverage by analysts. The more visible a company, the

more perfect its market is likely to be. 'Perfect' implies that most of the likely factors affecting the price of its securities are presumably known to the market and vice versa.

## I Literature Review

A brief review of select studies is presented here. This provides an overview of earlier studies carried out in the area of research.

Abhijit Dutta (2001), has examined the investors' reaction to information using primary data collected from 600 individual investors and observes that the individual investors are less reactive to bad news as they invest for longer period.

Jijo Lukose and Narayan Rao (2002) examine the security price behaviour around the announcement of stock splits and around ex-split date. They find that there is 7.69 percent abnormal returns during the two days (i.e. the day of announcement of stock split and the next day). The study also finds significant abnormal returns around

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ex-split date.

Prabina Das, S.Srinivasan and A.K.Dutta (2000) have studied the reaction of GDR prices and the underlying share prices to the announcement of dividends. The study finds that the CAR for GDR is mostly negative irrespective of the rate of dividend, whereas the domestic share prices react in a more synchronous manner.

Hari Om Chaturvedi (2000), in his doctoral thesis, observed that the cumulative abnormal return (CAR) between the portfolios with positive and negative unexpected half- yearly earnings was significant. He further observes that more than half of the stock price adjustment occurred in the post announcement period.

A few Indian studies have tested the efficiency of the Indian capital market with respect to quarterly earnings information. However, these studies could not find out the exact period during which the market reacts to an information item.

#### Capital Market Efficiency

The capital market plays a pivotal role in the allocation of economic resources into productive activities of the economy and this is possible only if the securities traded in the markets are priced appropriately. A capital market in which stock prices fully reflect all available information can be termed as efficient. Eugene Fama (1960) classified the market efficiency into the following three categories depending on the information set that is fully reflected in the security prices.

- Weak - Form of efficiency, popularly known as Random Walk Theory asserts that the current stock prices reflect all the information that is contained in the historical sequence of prices.
- Semi - Strong Form of efficiency theory states that current market prices not only reflect all information content of historical prices but also reflect all the information, which are publicly available about the companies being studied.
- Strong - Form of efficiency theory states that current market prices reflect all information whether it is publicly available or available through private information (insiders information).

The objectives of the present study are as follows

- To examine the information content of the Quarterly Earnings Announcement made by the automobiles sector companies
- To test the speed with which the quarterly earnings information are impounded in the share prices

- To test the direction of change in the security prices to the direction of changes in the earnings
- To test the magnitude of change in the security prices to the magnitude of changes in the earnings

#### Scope of the Study

The present study tests the informational efficiency of the Indian Capital Market in the Semi- Strong Form of Efficient Market Hypothesis (EMH) with respect to capital goods sector companies. The study covers five financial years ranging from 2000-01 to 2004-05. The study is restricted to first and third quarter because, second quarter coincides with half yearly earnings and fourth quarter coincides with annual earnings. For some of the sample companies, the quarterly earnings information and / or the dates of announcement were not available. Finally the total number of quarterly earnings announcement considered for the study was 108 out of which 72 quarters had positive earnings change and 36 quarters had negative earnings change.

## II Research Design and Methods

The study intends to cover the stock of Capital Goods Industry Stocks listed in NSE. Out of all the companies in the capital goods sector, only 21 companies, which satisfy the following criteria, were selected.

- The companies, which find a place in capital goods sectoral index of NSE, are selected. This ensures active trading and availability of daily share price quotations,
- Availability of the dates of announcement of quarterly earnings, and
- Availability of quarterly earnings information

#### Sources of Data

The informations regarding adjusted share price, the quarterly earnings, the dates of quarterly earnings announcements, and the values of S&P CNX 500 were obtained from "PROWESS" published by CMIE. Other relevant information are also obtained from the NSE website (<http://www.nseindia.com/>), books, and journals.

#### Tools used for the Analysis

- Daily returns

$$R_{i,t} = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100 \quad \dots \dots \dots (1.0)$$

The daily returns were calculated for both individual securities as well as market index using the following equation.

Where,

$R_{i,t}$  = Returns on Security i on time t.

$P_t$  = Price of the security at time t

$P_{t-1}$  = Price of the security at time t-1

- Security Returns Variability (SRV)

SRV model is used to know the reaction of the market. Symbolically, the model is

$$SRV_{i,t} = \frac{AR^2_{i,t}}{V(AR)} \dots\dots\dots (1.1)$$

Where,

$SRV_{i,t}$  = Security Returns Variability of security i in time t

$AR^2_{i,t}$  = Abnormal returns on security i on day t

$V(AR)$  = Variance of Abnormal Returns during the announcement period

Abnormal Return (AR) under market-adjusted abnormal returns is calculated by using the equation as below;

$$AR_{i,t} = R_{i,t} - R_{m,t} \dots\dots\dots (1.2)$$

Where,

$AR_{i,t}$  = Abnormal Returns on security i at time t

$R_{i,t}$  = Actual returns on security i at time t

$R_{i,m}$  = Actual returns on market index, which is proxied by S&P CNX 500, a weighted average index of 500 companies published by NSE, at time t.

Whereby daily actual returns over the announcement period (41days) were adjusted against their corresponding market returns.

- Average Security Returns Variability (ASRV)

The  $SRV_{i,t}$  so calculated for all the quarters are averaged to find the Average Security Returns Variability (ASRV<sub>t</sub>) by using the following equation

$$ASRV_t = SRV_{i,t} \times (1/n) \dots\dots\dots (1.3)$$

Where,

$ASRV_t$  = Average Security Returns Variability at time t

$SRV_{i,t}$  = Security Returns Variability i security at time t

n = Number of quarters in the sample

- Average Abnormal Returns

The Average Abnormal Return is calculated by equation given below

$$AAR_t = \frac{1}{n} \sum_{i=1}^n AR_{i,t} \dots\dots\dots (1.5)$$

Where,

$AAR_t$  = Average Abnormal Returns on day t

$AR_{i,t}$  = Abnormal Returns on security i at time t which is calculated by using the equation (1.2)

- Cumulative Abnormal Returns (CAR)

The CAR is calculated as

$$CAAR_k = \sum_{t=1}^k AAR_t \dots\dots\dots (1.7)$$

Where,

$CAAR_k$  = Cumulative Average Abnormal Returns for the k<sup>th</sup> period. (Hereafter, it is referred to as CAR),

$AAR_t$  = Average Abnormal Returns of sample quarters at time t which is calculated by using the equation (1.5)

- E. T-Test

i) The significance of reaction in security prices (ASRV<sub>t</sub>) is tested using the T- statistics as follows:

$$t_{stat} = (ASRV - 1) \times \sqrt{n} / s \dots\dots\dots (1.4)$$

Where, n is the number of quarters in the sample and s is the Standard Deviation of Abnormal Returns.

ii) The significance of the  $AAR_t$  is tested using the t-test as follows;

$$t_{stat} = AAR_t \times \sqrt{n} / s \dots\dots\dots (1.6)$$

Where,  $AAR_t$  is the Average Abnormal Returns on time t, n is the number of quarters in the sample and s is the Standard Deviation of Average Abnormal Returns. The  $AAR_t$  is calculated for the positive and negative earnings change separately.

### III Results and Discussion

The analysis has been done in the following way to empirically test the informational efficiency of the Indian capital market with special reference to the shares of selected capital goods Companies.

- Analysis of Average Security Returns Variability (ASRV or SRV)
- Analysis of Average Abnormal Returns (AAR)
- Analysis of Cumulative Abnormal Returns (CAR)

#### Average Security Return Variability: (ASRV)

In order to find out whether there is reaction in the prices of securities studied to the announcement of quarterly earnings, and to know the length of the period of reaction, the SRV model is used. It is the ratio of abnormal returns squared on a particular day to the variance of abnormal returns during the announcement period. In an informationally efficient market, the ASRV is expected to be one. If the SRV is greater than one, it may be said that there is significant reaction in the security prices (i.e. the market is not informationally efficient).

The results of ASRV for Capital Goods Industry are shown in Table - I. The capital goods stocks react significantly on day one where the ASRV is 2.14, which is 114 % greater than the average. It should be noted that there is a continuous reaction in the security prices from day 0 to day 4. The ASRV values are 1.53, 2.14, 1.14, 1.03, and 1.13 respectively. This apart, there has been minor reaction during the pre as well as post announcement periods. That is, the ASRV is significantly higher than one on days during the pre announcement period [-17 (1.39), -15 (1.16), -14 (1.13), -13 (1.19), -12 (1.27), -11 (1.19), -4(1.16)] and during the post announcement period [8 (1.12), 9 (1.13), 19(1.10)]. These values were greater than one. On an average, the average ASRV during the 41 days of the announcement period was 0.99. However, the average ASRV during the pre announcement period of 20 days was 1.00 and during the post announcement period of 21 days was 0.98. However, during the period of 7 days (from day -3 to day 3), the average ASRV was 1.18.

The results of ASRV for Capital Goods Industry are shown in the form of curve in Figure -I. It shows that there is a sharp reaction in the share prices on days 0, and on day one. There was minor reaction in the later post announcement period (from day 3 to day 15).

The foregoing discussion reflects the following:

- Quarterly earnings announcements have information relevant for the security valuation and the market uses

this information for valuation of securities.

- Capital market for capital goods company stocks reacted heavily on the day of the announcement (day 0) and the next day of the announcement. Thus, the market has been eagerly waiting for the information and reacts immediately once the information is announced.
- However, the reaction on day one is much greater than on day 0.

One of the possible reasons for this reaction may be the date and timing of Board Meeting (which approves the announcement of quarterly earnings). Generally, the Board Meeting is conducted in the evening hours (i.e. after trading hours of the stock exchanges). As a result, the investors receive quarterly earnings information after the trading hours and they could react to the information only on the next day. Hence, it may be said that the market reacted to the announcement of quarterly earnings information, a day next to its announcement. It has been noted that there was reaction on the day of announcement and previous day of the announcement, may be, due to expectations of the investors, etc.

- Apart from the sharp reaction from day -3 to day 4, there has been reaction during the pre announcement period as well as post announcement period. The pre announcement reaction shows that the market is able to capture the earnings information before its announcement. However, the post announcement reaction shows that the market is not able to capture the information fully immediately.
- As the market reacts to the quarterly earnings announcement, the Indian capital market may said to be informationally inefficient in the semi-strong form. However, it is not perfectly efficient. Of course, no market can be expected to be perfectly efficient.

#### Abnormal Returns for the Automobiles Industry

The earlier discussion showed that the quarterly earnings contain information for valuing the securities. The SRV (or ASRV) model helps to find the reaction of securities prices but it failed to show whether there was positive reaction or negative reaction. Further, it did not show the magnitude of change in the security prices. The abnormal returns and cumulative abnormal returns are used in order to find out the direction and magnitude of changes in the security prices around the quarterly earnings announcement. The average abnormal returns for both positive earnings change and the negative earnings changes are calculated separately to know the direction of security price movements to the direction of reported earnings change

and the magnitude of change.

Abnormal returns calculated for the 41 days around announcement of quarterly earnings for the sample of 108 quarters was averaged to get the Average Abnormal Returns (AAR). AAR is calculated for the positive earnings change and negative earnings change separately. The earnings change in a quarter is considered to be positive if the net profit margin for the quarter is greater than the net profit margin of the same quarter in the preceding year and it is considered to be negative if it is less than net profit margin of the same quarter in the preceding year.

The results of the AAR for the capital goods industry stocks along with t-value are presented in Table-I. The results were given separately for positive earnings change (AAR+) and negative earnings change (AAR-). The AAR+ shows that from day-20 to day 20, generally, there were positive abnormal returns available to the investors. On day 0 (announcement day), it was 0.39 percent. It is interesting to note that there was consistent negative abnormal returns from day 1 to day 5 except day 3, when the abnormal returns was 0.14. It interesting to note that for about 8 days during the pre announcement period, there was a negative abnormal returns and it was 6 days during post announcement period. Table-II shows that, on an average 0.12 percent of abnormal returns were available during the announcement period of 41 days (from day-20 to day +20). While the average abnormal returns during the post announcement period of 21 days (from day 0 to day +20) were 0.14, the average abnormal returns during the pre announcement period of 20 days (from day -20 to day -1) was 0.11. Further, the average abnormal returns during the period of 7 days (starting from day-3 to day +3) were 0.08. It is understood from this that the market participants have reaped all returns content of quarterly earnings information before its announcement or around the day of the announcement. From this one could conclude that the Indian capital market for capital goods sector securities was efficient (quarterly earnings came with positive earnings change) in the semi-strong form of EMH in the sense that the market was able to capture part of the quarterly informations, but it was not perfectly efficient since the average AAR+ of 0.14 were available during the post announcement period. That is, only part of the returns content of quarterly earnings informations were captured by the various market participants before announcement.

Table-I also presents the value of AAR-. The negative earnings change should lead to negative abnormal returns. As shown in Table-I, there was negative abnormal returns

on most of the days during the post announcement period. There was significant negative abnormal returns of -2.27 on day one. The average AAR- stood at 0.11 during the post announcement period. During the announcement period of 41 days, the average AAR- was 0.17 but it was 0.24 during the pre announcement period. According to EMH, the reaction in the security prices took place on or before the announcement of an event. As far as this study is concerned, the reaction took place before the announcement as well as after the announcement of the quarterly earnings. This clearly indicates the informational inefficiency of the Indian capital market for the quarterly earnings announcement (with negative earnings change) made by the automobile sector companies. One of the possible reasons for this delayed reaction may be the positive expectation of the investors, if they are long-term investors, about the automobile sector stocks.

Cumulative Abnormal Returns (CAR) for the Automobiles industry

The Cumulative Abnormal Returns (CAR) indicates the relationship between the magnitude of earnings change and the magnitude of price change. Besides, it shows the direction (positive or negative) in the stock price change to the given direction of earnings change. For the purpose of this study, CAR was calculated separately for positive earnings change (CAR+) as well as negative earnings change (CAR-).

The results are presented in Table-I and depicted in Figure-II. According to EMH, the positive earnings change result in positive CAR while negative earnings change result in negative CAR. Further, the CAR (whether positive or negative) increases till the announcement day and thereafter it is stabilised (there should not be much volatility in the security prices).

From Table-I, it is observed that the CAR+ has steadily increased with minor fluctuations during the announcement period of 41 days. On day 0, the CAR+ climbed to 2.60. The CAR+ started to rise from day -15 with the value of 0.25 and reached as high as 5.33 on day 19 and came to a stop on day 20 with the value at 5.09. The CAR+ curve given in Figure-II, which expresses the above discussions graphically, registers a significant decrease of CAR+ to 1.70 on day 5 from 2.60 on day 0.

As inferred from Table - I, the CAR- values showed that there was a greater volatility in the security prices due to inefficient assessment of quarterly earnings by the various market participants. That is, as shown in Figure -II, the CAR- was rising consistently, but there was relatively wider

fluctuations in the curve. It was decreased to 2.44 on day one from 4.71 on day 0 (day of the announcement), and decreased further to 1.93 on day 2. Again (after day 2) it started to rise, and it reached 7.06 on day 14. Again it decreased to 5.92 on day 16 from 6.16 on day 15. The CAR- came to a stop on day 20 with the CAR- value at 6.97. It indicates that the reaction was extended upto day 20. Such a delayed reaction indicated the informational inefficiency of the Indian capital market for the announcement of quarterly earnings (quarterly earnings came with negative earnings change). It is important to note that the investors wishing to make superior returns could use this informational inefficiency.

From the above discussions of Abnormal Returns and Cumulative Abnormal Returns, the following notable informations are derived

- The quarterly earnings information released by the sample banking companies contained useful informations for valuing the securities. Further, this was confirmed by the results of SRV model discussed earlier.
- For the quarterly earnings with positive earnings change, the market reacts quickly.
- The reaction was extended upto +20 days for the quarterly earnings with negatively earnings change.
- Information of negative earnings change can be used by the investors for making abnormal returns at any point of the announcement period, through the strategy of short selling.

#### IV Conclusion

This study has empirically examined the informational efficiency of capital market with regard to quarterly earnings released by the banking sector companies. The results of the study showed that the security prices reacted to the announcement of quarterly earnings made by the companies. The reaction took place for the very few days surrounding day 0, for the quarterly earnings with positive earnings change while the reaction was extended upto +20 days for the quarterly earnings with negative earnings change. Thus one can safely concluded from the foregoing discussions that the Indian capital market for the banking stocks, in general, are efficient, but not perfectly efficient, to the announcement of quarterly earnings (comes with positive earnings change information) and inefficient for the negative earnings change information. This informational inefficiency can be used by the investors for making abnormal returns at any point of the announcement period.

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Table 1  
Analysis of ASRV, AAR+, AAR-, CAR + and CAR - of Capital Goods Industry

Days	ASRV	t-value	AAR +	t-value	AAR -	t-value	CAR +	CAR -
-20	1.07	0.46*	0.03	0.10*	-0.19	0.37*	0.03	0.19
-19	1.04	0.25*	-0.01	-0.04*	0.77	1.49*	0.02	0.97
-18	0.97	-0.18*	-0.29	-0.90*	-0.34	-0.74*	-0.27	0.63
-17	1.39	1.42*	0.70	1.52*	0.66	1.02*	0.43	1.28
-16	0.79	-2.31@	-0.49	-1.67**	-0.11	-0.25*	-0.06	1.17
-15	1.16	0.67*	0.31	0.77*	0.57	1.00*	0.25	1.74
-14	1.13	0.71*	0.44	1.09*	0.11	0.26*	0.69	1.85
-13	1.19	0.60*	0.27	0.75*	0.42	0.86*	0.95	2.27
-12	1.27	1.00*	0.19	0.46*	-0.89	-1.78**	1.14	1.38
-11	1.19	0.92*	0.34	0.78*	0.58	1.12*	1.49	1.96
-10	1.03	0.15*	-0.34	-1.02*	0.48	0.69*	1.15	2.44
-9	0.84	-1.00*	0.46	1.64*	0.25	0.61*	1.61	2.69
-8	0.79	-1.99**	-0.19	-0.63*	-0.23	-0.53*	1.42	2.46
-7	1.02	0.12*	0.23	0.79*	-0.16	-0.28*	1.65	2.30
-6	0.71	-2.69@	-0.31	-1.15*	0.99	1.57*	1.34	3.29
-5	0.79	-1.66**	-0.57	-1.94**	0.98	1.66*	0.76	4.27
-4	1.16	0.77*	1.16	3.28@	-0.27	-0.65*	1.92	4.00
-3	0.67	-2.30@	0.25	0.85*	-0.06*	-0.17*	2.17	3.94
-2	0.97	-0.17*	-0.24	-0.90*	0.40	0.63*	1.93	4.34
-1	0.81	-1.36*	0.28	1.05*	0.41	0.62*	2.21	4.75
0	1.53	2.17@	0.39	1.08*	-0.04	-0.05*	2.60	4.71
1	2.14	3.96@	-0.17	-0.36*	-2.27	-4.03@	2.43	2.44
2	1.14	0.76*	-0.10	-0.31*	-0.52	-1.13*	2.33	1.93
3	1.03	0.16*	0.14	0.44*	0.14	0.31*	2.47	2.06
4	1.13	0.71*	-0.51	-1.78**	1.01	1.40*	1.96	3.08
5	0.76	-2.25@	-0.27	-1.00*	-0.02	-0.05*	1.70	3.05
6	0.79	-1.30*	0.43	1.38*	0.10	0.26*	2.12	3.16
7	0.87	-0.83*	0.05	0.17*	0.40	0.91*	2.17	3.55
8	1.12	0.65*	0.40	0.99*	0.94	1.22*	2.57	4.50
9	1.13	0.53*	0.36	0.87*	0.59	0.80*	2.94	5.08
10	0.75	-2.10@	0.60	1.89**	-0.27	-0.64*	3.53	4.82
11	0.74	-2.52	0.02	0.07*	0.44	0.72*	3.55	5.26
12	0.80	-1.87**	0.39	1.53*	0.83	1.25*	3.94	6.09
13	0.69	-2.80@	0.02	0.09*	0.21	0.50*	3.97	6.30
14	0.84	-1.04*	0.21	0.81*	0.76	1.46*	4.18	7.06
15	0.80	-1.33*	0.24	0.85*	-0.90	-2.29@	4.42	6.16
16	0.86	-1.03*	0.49	1.31*	-0.24	-0.58*	4.91	5.92
17	0.86	-0.86*	-0.26	-0.86*	0.83	1.26*	4.65	6.75
18	0.87	-0.90*	0.35	1.12*	-0.04	-0.10*	5.01	6.70
19	1.10	0.49*	0.32	0.82*	0.04	0.07*	5.33	6.74
20	0.95	-0.35*	-0.24	-0.84*	0.23	0.44*	5.09	6.97

Source: Computed from "PROWESS", a corporate database.

Notes: \* refers to significant 10%, \*\* refers to significant at 5 %, @ refers to significant 1 %



Table 2  
Average Values of ASRV, AAR+ and AAR-

Period	ASRV	AAR+	AAR-
From day -20 to day 20	1.00	0.12	0.17
From day -20 to day -1	1.00	0.11	0.24
From day 0 to day 20	1.00	0.14	0.11
From day -3 to day 3	1.18	0.08	-0.28

Figure 1  
Average Security Returns Variability for the Capital Goods industry

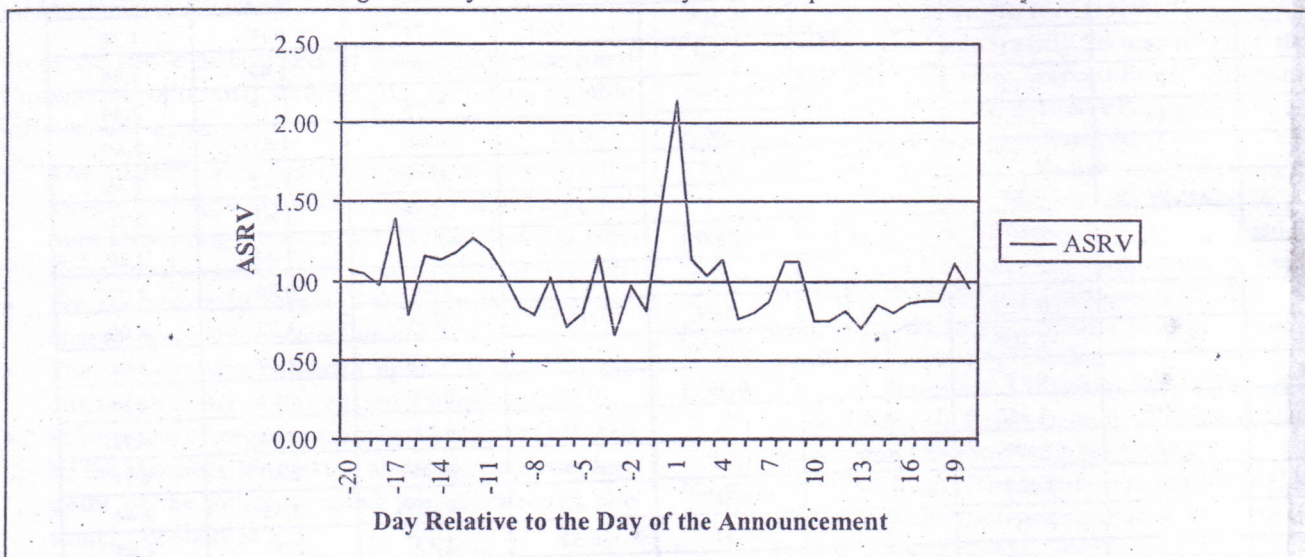


Figure 2  
Cumulative Average Abnormal Returns (CAR) for the Capital Goods industry

