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Merger Announcements and Stock Price Behavior: Empirical Evidence from Indian Stock Market

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Abstract

The study investigates the informational value of merger announcement to the shareholders to earn abnormal return. An Event Study was conducted to find out the abnormal return gained by the 97 companies listed in Bombay Stock Exchange which enter into merger activity during the year 2010.

The behavior of Abnormal Returns (ARs), Average Abnormal Returns (AARs) and Cumulative Average Abnormal Returns (CAARs) were computed for 10 days before and after the event day by comparing the closing share price of the Acquiring Companies. The study found that the impact of the announcement of merger does not hold any significant difference on the movements of the share price and no significant abnormal return is gained during the event window of 21 days (i.e., -10 to +10) by the Acquiring companies' shareholders. Therefore the study concluded that a merger announcement does not hold important information to the Indian stock market during the study period.

Keywords: Merger and Acquisition, price volatility, Event Study, Abnormal Return.

1. Introduction

In this global era, Merger and Acquisitions has become a common parlance Companies are choosing Merger and Acquisition as a way to expand faster, capture new market and enter new boundaries. Many investors are investing in these companies, and there is a need for the study to analyse the impact of merger announcement on the share price. Many investors may like to purchase the shares on hearing merger announcements and like to book a profit before exiting the share market. This study examines whether the shareholders of the acquiring company earned any abnormal return. Many new and small investors are entering Indian stock market. This study helps them to know when they can reap abnormal profit, by investing in acquiring company.

Though many studies were made in this regard, this study helps to know whether the stock market follows the same pattern or different.

2. Literature Review

Asquithe & Kim, 1982 have found that acquiring firms' stock prices remains unaffected or not significantly affected by M&A announcement during the event periods.

Narayanan Jayaraman, Mandelkar & shastri (1991) examines the possibility that there is a leakage of information regarding a merger to the announcement of the first bid for the target firm and the market anticipates an acquisition prior to the first announcement so the return was not significant as the announcement has already been discounted by the market in advance.

Sreedhar T. Bharath and Guojun Wu (2005) examined volatility and risk of acquirers around Merger and Acquisitions and found systematic volatility and beta begin to decline in long run.

B.Rajeshkumar & Prabina Rajib (2007) studies on post merger performance of the firms in India and found that the Indian corporate performance improves after merger.

Hao Liang(2009) analyses founds that the announcement of Merger and acquisition is not significant over the event period (day -10 to day +10) for US companies but significant for Chinese companies during the 10 day period before the announcement day.

Many studies have examined the stock market reaction to various announcement made by the firm such as stock splits(Barker,1956), earnings(Zarowin,1989), bonus issue(Obaidullah,1992), capital investment(Chan, Gau & Wang,1995), dividend announcement (Bajaj and Vizh,1995), monetary policy announcement(Gaurav Agrawal,2007) etc., and find that there are abnormal returns associated with positive news release.

While reviewing the literature, many studies had done to analyse the share market reaction to the announcement made by companies like dividend, bonus issue, share splits, capital decision and even the monetary policy announcement. Only few studies are there to analyze the impact of merger announcement on the share prices in share market by using event study.

3. Hypothesis

To find the impact of Merger announcement on the Share price the following hypothesis is framed:

H_0: Merger & Acquisition announcements have no significant impact on stock returns

H_1: Merger & Acquisition announcement have a significant impact on stock returns.

4. Research Design

4.1. Data and their Sources

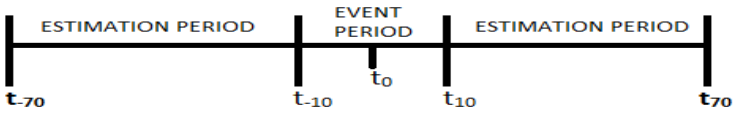
The data used for the study were collected from Centre for Monitoring Indian Economy PROWESS database with focus on Merger and Acquisitions activities in India during Jan 2010 –Dec 2010.During the period 147 companies were involved in Merger and Acquisition. Out of these 147 acquiring companies only 97 companies which are listed in Bombay Stock Exchange are taken for the analysis, because only the listed companies can trade their shares in the stock market.

4.2. Methodology

In this study 'event study' methodology is used to ascertain whether there was any abnormal returns associated with Merger and acquisition announcements in India

For this study the estimation period & event period were as follows.

Figure No 1: Showing the Event Window.



Many methods have been discussed on calculating the Abnormal Returns of each company's stock based on how we define 'abnormal' relative to a benchmark. Most of these methods and models of the return generating process on which they are based are discussed in Brown and Warner, (1980)

The Abnormal Returns are determined over the event period are as follows:

$AR_{(i,t)}=R_{(i,t)}-E(R_{(i,t)})$

$CAR = \sum_{t=t1}^{t2} AR(i,t)$

Where $CAR_{i(t1,t2)}$ is the Cumulative Abnormal Return for firm i over the specified event window (t_1,t_2). It is reasonable to test for CAR over the entire event window. Where $R_{i,t}$ is the actual ex post return on the stock price for firm i on event date t and $E(R_{i,t})$ is the normal return on the stock price for firm i on event date t. The normal return E ($R_{i,t}$) is defined as the expectation period that is typically prior to and does not overlap with the event window (McWilliams & Siegel, 1997)

Stock returns are calculated as:

$R_{(i,t)}=(P_{(i,t)}-P_{(i,t-1)})/(P_{(i,t-1)})$

Where $P_{i,t}$ is the stock price of firm i on day t and $P_{i,t-1}$ is the previous day stock price of firm i ie on day t-1

The normal return is computed using an Ordinary Least Square (OLS) market model of the normal stock price behavior (Stephen J.Brown & Jerold B. Warner, 1985)

Normal return is calculated as

$E(R_{(i,t)})=\alpha_i+\beta_i R_{(m,t)}+\varepsilon_{(i,t)}$

Where α_i is a stable component of security returns and is constant over time;

β_i is the market risk coefficient to a measurement of the systematic risk of security i and is assumed to be stable over time.

$R_{(m,t)}$ is the return of the market on day t replaced by the return on the BSE index SENSEX and ε_i is the random error,

So the Abnormal Return is calculated as

$AR_{(I,t)}=R_{(i,t)}-(\alpha_i+\beta_i R_{(m,t)})$

Where α and β are to be estimated from the estimation periods at -70 to -11 trading days prior to the event window and day 11 to 70 trading days after the event window.

Event window is a 21 day period around the announcement date (from t=-10 to t=10) event window is divided into two sub periods to calculate two sets of AR's i.e., from day -10 to 0, i.e., event day and from day 1 to day 10; using two parameter sets (α1, β1) for daily abnormal returns from day -10 to day -1 and (α_2, β2) from day 1 to day 10.

To calculate Estimation period, daily data on stock prices and SENSEX index values are collected for the period starting 70 trading days prior to the announcement date and 70 trading days after the announcement date.

Cumulative Abnormal Return over the event window is calculated by summing up the Abnormal Returns for each day in the event window.

4.3. Analysis

The daily stock prices for the companies are collected from BSE Website for the days -70 to day 70 including event date (day 0).BSE SENSEX Index values are collected for the days -70 to day 70 including event date(day 0).

Data are collected for 97 companies which are subject of this study. After collecting the data, the estimation period (day -70 to day -10), (day 10 to day 70) and event period (day -10 to day 10) are separated. Using the daily stock prices, the daily return for the each day of the whole period study (day -70 to day 70) are calculated for all 97 companies

The procedure is illustrated below through an example

4.3.1. Estimation of Return

Acquirer Company: Camlin Fine Chemicals Ltd.

Target Company: Sangam Laboratories Ltd.
Announcement Date: 11-Oct-10.

Table 1: Showing the Estimation of Return

DAY	Stock Price(Rs)	Market Index(BSE)
-70	98.7	17460.95
-69	103.8	17441.44

$$Stock\ Return\ for\ day\text{-}69 = \frac{103.8 - 98.7}{98.7} * 100 = 5.167$$

$$Market\ Return\ for\ day\text{-}69 = \frac{17441.44 - 17460.95}{17460.95} * 100 = -0.111$$

4.3.2. Estimation of Theoretical Return Before the Event

Using linear regression with data of daily return and market return for the day (-70 to -10) the α1, β1 can be estimated using the EXCEL functions INTERCEPT and SLOPE. Then using α1, β1 the theoretical stock prices for day-10 to day -1 are calculated with data of daily market return for day -10 to day -1.

The procedure is illustrated below through an example
For Camlin Fine Chemicals Ltd.
α1= -0.49656, β1= 1.535844

Table 2: Showing the Estimation of Theoretical Return before the event

Day	Market Return
-10	0.36018634
-9	-0.06223474

Theoretical Stock return for day-10 = (-0.49656) + 1.535844*0.36018634
= 0.056627591
Theoretical Stock return for day -9 = (-0.49656) + 1.535844*(-0.06223474)
= -0.592145307

4.3.3. Estimation of Theoretical Return After the Event

Similarly, using the daily and market return from day 10 to day 70, the α_2, β_2 are calculated using the EXCEL functions INTERCEPT and SLOPE. Then using α_2, β_2 the theoretical stock prices for day 0 to day 10 are calculated with data of daily market return the day 0 to day 10.

The procedure is illustrated below through an example
For Camlin Fine Chemicals Ltd.
α2= -0.13515, β2= 1.026942

Table 3: Showing the Estimation of Theoretical Return after the Event

Day	Market Return
9	0.68065533
10	-0.46750883

Theoretical Stock return for day 9 = (-0.13515) + 1.026942*0.68065533
= -0.615253935
Theoretical Stock return for day 10 = (-0.13515) + 1.026942*-0.46750883
= 0.563843895

4.3.4. Estimation of Abnormal Return

Abnormal Return are calculated from the difference between Actual return and Theoretical Return for the day -10 to day 10. Cumulative Abnormal Return for the two consecutive days is calculated by summing up the Abnormal Return of Two days. Cumulative Abnormal Return for the ten day period (day -10 to day -1) and (day 0 to day 10) are also calculated by summing up the Abnormal Return over the ten days. Cumulative Abnormal Return for the whole 21 day period (day -10 to day 0) has also been calculated by summing up the Abnormal Return of 21 days.

The procedure is illustrated below through an example

(i) Abnormal Return

Table 4: Showing the Estimation of Abnormal Return

Return	Day -10	Day -9
Actual Return	-0.50922979	-0.639795266
Theoretical Return	0.056627591	-0.592145307

Abnormal Return for day -10 =Actual Return-Theoretical Return
= (-0.50922979) - 0.056627591
= -0.565857381

Abnormal Return for day -9 =Actual Return-Theoretical Return
= (-0.639795266) – (-0.592145307)
= -0.047649958

(ii) Cumulative Abnormal Return

Table 5: Showing the CAR for day -10 and day –9

Day	Abnormal Return
Day -10	-0.565857381
Day -9	-0.047649958

Cumulative Abnormal Return for day (-10,-9) = AR for day-10 + AR for day -9
= (-0.565857381) + (-0.047649958)
= -0.61351.

4.4. Test Statistics

To determine if the abnormal returns are significant, the Z test on the event window for all stock is constructed as:

$Z = CAAR\ (t1,t2) - \mu\ / S(CAR(t1,t2))$

Where μ is the Abnormal Return being tested for significance and takes the value of zero. The test statistics for standard error of prediction S($CAR_{(t1,t2)}$) is calculated by dividing the Average Abnormal Return of all stock over a specified event period (t_1,t_2) by the standard deviation of the estimation using Z statistics

$$CAR = \frac{1}{n} \sum_{i=1}^{n} CAR_{(t1,t2)}$$

$$S(CAR_{(t1,t2)}) = \sqrt{\sigma^2 / n}$$

Where σ^2 is the estimator of the variance, n is the number of sample stocks whose excess returns are available at day t. CAAR is calculated by averaging the CAR data for 97 companies for each day i.e.,(-10,-9),(-9,-8)…(8,9),(9,10).

Standard Deviation for CAR is calculated for 97 Companies for each day i.e., (-10,-9), (-9,-8)…(8,9),(9,10). Similarly Z-Test is done for 21 day interval (-10, 10), ten day interval for before and after merger announcement i.e., (-10,-1) and (0, 10).

The statistics is assumed to follow a standard normal distribution. The study is to analyse whether Merger & Acquisition announcements made by listed firms have significant impact on the company's stock returns. If the impact is significant, the Z statistics is significantly different from zero.

To test the significance,

Null hypothesis: Ho: Merger & Acquisition announcements have no significant impact on stock returns

Alternative hypothesis: Ha: Merger & Acquisition announcement have a significant impact on stock returns.

The level of significance used at 5% and the critical value is 1.96

The procedure is illustrated below through an example.

Table 6: Showing the test statistics for day (3,4) and (4,5)

	Day (3,4)	**Day (4,5)**
CAAR	-0.31049	-0.84249
Standard Deviation	1.972361	2.929595
N	97	97
$\sqrt{n}$	9.848858	9.848858
Standard Error	0.200263	0.297455
z-value	-1.55043	-2.83231
Mod z	1.55043	2.83231
LOS	5%	5%
Critical Value	1.96	1.96
Is mod Z is < Critical Value	Yes	No
Hypothesis	Accept Null Hypothesis	Reject Null Hypothesis

5. Research and Discussions

The Z test statistics for the 97 companies for the event window, CAAR, Standard Deviation, Z value are given below.

Table 7: Showing the testing of hypothesis

Days	**CAAR**	**Std**	**n**	$\sqrt{n}$	**Std.Err**	**z value**	**mod z**	**Test**
(-10,-9)	0.38	2.82	97	9.85	0.29	1.32	1.32	1
(-9,-8)	0.29	2.68	97	9.85	0.27	1.08	1.08	1
(-8,-7)	0.00	2.11	97	9.85	0.21	0.00	0.00	1
(-7,-6)	0.30	2.40	97	9.85	0.24	1.25	1.25	1
(-6,-5)	0.42	2.42	97	9.85	0.25	1.72	1.72	1
(-5,-4)	-0.01	2.41	97	9.85	0.24	-0.05	0.05	1
(-4,-3)	0.13	2.53	97	9.85	0.26	0.51	0.51	1
(-3,-2)	0.39	2.54	97	9.85	0.26	1.49	1.49	1
(-2,-1)	0.29	2.84	97	9.85	0.29	1.02	1.02	1
(-1,0)	0.48	3.01	97	9.85	0.31	1.56	1.56	1
(0,1)	-0.03	3.45	97	9.85	0.35	-0.09	0.09	1
(1,2)	-0.57	3.38	97	9.85	0.34	-1.67	1.67	1
(2,3)	-0.28	1.98	97	9.85	0.20	-1.37	1.37	1
(3,4)	-0.31	1.97	97	9.85	0.20	-1.55	1.55	1
(4,5)	-0.84	2.93	97	9.85	0.30	-2.83	2.83	2
(5,6)	-0.85	2.77	97	9.85	0.28	-3.03	3.03	2
(6,7)	-0.16	2.09	97	9.85	0.21	-0.77	0.77	1
(7,8)	0.05	2.35	97	9.85	0.24	0.21	0.21	1

Table 7: Showing the testing of hypothesis - continued

(8,9)	-0.28	2.01	97	9.85	0.20	-1.36	1.36	1
(9,10)	-0.47	2.13	97	9.85	0.22	-2.19	2.19	2
(-10,10)	-0.05	0.86	97	9.85	0.09	-0.62	0.62	1
(-10,-1)	0.27	1.33	97	9.85	0.14	1.98	1.98	2
(0,10)	-0.38	1.22	97	9.85	0.12	-3.04	3.04	2

Note:

1. The sample size n is 97.
2. The critical value is 1.96
3. Day 0: The date of merger announcement

The table no.7 shows the Cumulative Abnormal Returns for all the days of the Event window for 10 days before and 10 days after and day -10 to day10 for 21 days, as well as each two short window during the whole 21 day event period are calculated , i.e., day-10 to day-1 and day 0 to day 10.

The CAAR is significant only on day (4,5) (CAAR=-0.84), day (5,6) (CAAR=-0.85) and on day (9,10) (CAAR=-0.47)Whereas on other days of event window the CAAR is not significant . Abnormal Returns may be obtained over day 3 to 5 by buying the firm's stock i.e., 3 days after the announcement day and sell it immediately on 5th day or 6th day after the announcement day to capture the capital gains

The results show that the 21 day CAAR (denoted as CAAR over day -10 to day 10) is -0.05399% which is not significantly different from zero. Whereas the 10 day Cumulative Average Abnormal Return before the announcement (CAAR over day-10 to day-1) is 0.2674% which is significantly different from zero

The 10 day Cumulative Average Abnormal Return after the announcement (CAAR over day 1 to day 10) is -0.37538% which is significantly different from zero.

Figure No 2: Showing CAAR over event window

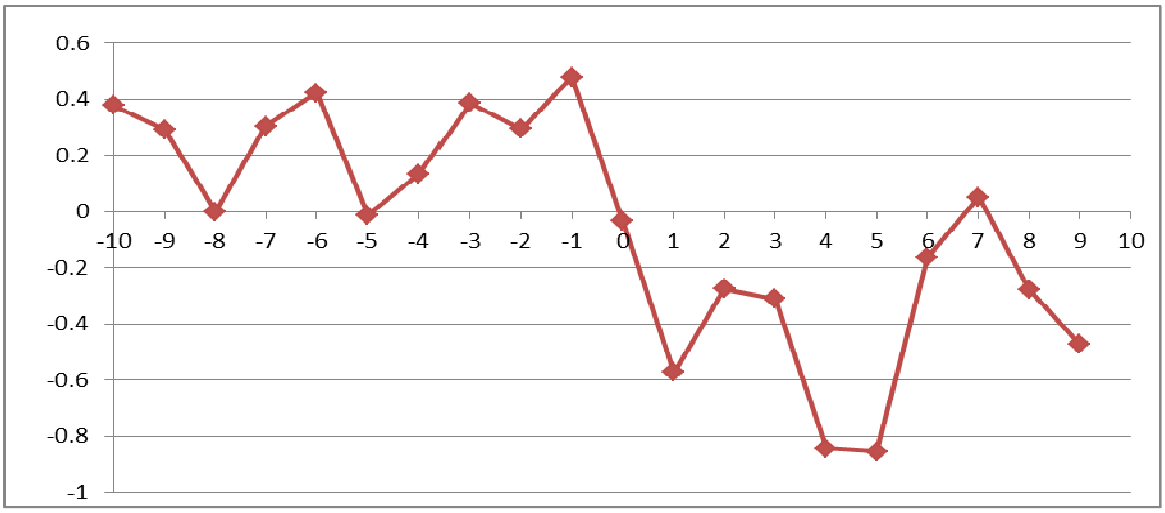


Figure-1 shows the CAAR data over the event window is positive and significant before announcement date, after the merger announcement the CAAR is significant but negative. While taking the 21 day period (day-10 to day +10) both CAAR value neutralize each other hence not significant.

The CAAR of shareholders of acquiring firm is not significantly different from zero for the 21 day event period around the announcement date. Though the CAAR is not significant for the 21 day event window, 10 day event window (-10 day to 1 day) and (1 day to 10 day) is significant.

6. Results and Conclusion

The results of the study shows that CAAR data over the event window is positive and significant before announcement date, after the merger announcement the CAAR is significant but negative.. But CAAR of 10 day before and 10 day after the Merger announcement is not significantly different from zero. From the above study it is found that the acquiring firm shareholders are not getting a significant positive Cumulative Abnormal Return from the announcement of merger and therefore the shareholders don't reap any abnormal return. Further study can be done to analyze the other factors like ROI, ROE, EPS, etc., in addition to the Share price of the Acquiring Companies to reap abnormal return.

References

[1] Abagail McWilliams and Donald Siegel. June 1997 .Event studies in management research: theoretical and empirical issues. ***The Academy of Management Journal***, 40(3)

[2] Asquith. 1983. Merger bids, uncertainty and stockholders returns. ***Journal of Financial Economics***,11: 51-83

[3] Bajaj and Vizh A.M. 1995. Trading behaviour and the unbiasedness of the market reaction to dividend announcements. ***Journal of Finance***,.50 :255-279

[4] Barker C.Austin. 1956. Effective stock splits. ***Harvard Business Review***, 34(1): 101-106

[5] Chan S,Gau G and Wang K. 1995.Stock market reaction to capital investment decisions. ***Journal of Financial and Quantitative Analysis***, 30: 81-100

[6] Fama, Eugene. 1965. The behavior of stock market prices. ***Journal of Business***, 38: 34-105

[7] Fama,E.L.Fisher, M.Jensen and R.Roll.1969. The adjustment of stock prices to new information. ***International Economic Review***, 20: 1-21

[8] Gaurav Agarwal. July-December, 2007. Monetary policy announcements & stock price Behavior: empirical evidence from CNX Nifty. ***Decision*** ,34(2): 133-153

[9] Hao Liang. 2009. The information implication of merger and acquisition announcement: evidence from US & China. International Trade & Finance Association. 19th International Conference Working Paper, (hosted by The Berkeley Electronic Press.)

[10] John W.Ashley. February,1962. Stock prices and changes in earnings and dividends: some empirical results. ***Journal of Political Economy***, 70(1): 82-85

[11] Obaidullah M. 1992. Bonus issues?. ***Vikalpa***, 17: 17-22

[12] Narayanan Jayaraman, Mandelkar& Shastri. Dec.1991. Market anticipation of merger activities: an empirical test. ***Managerial & Decision Economics***. 12(6): 439-448,

[13] Paul Zarowin. 1989. Does the stock market overreact to corporate earnings information? ***The Journal of Finance***, 44(5): 1385-1399.

[14] Rajesh Kumar & Prabina Rajib. 2007. Mergers and corporate performance in India: an empirical study. ***Decision***,34(1)

[15] Sreedhar T. Bharath &Guojun Wu .2005. Long-run volatility and risk around mergers and acquisitions. China International Conference in Finance. Kunming China.

[16] Stephen J.Brown & Jerold B. Warner. 1980. Measuring Security Price Performance. ***Journal of Financial Economics***, 8: 205-258

[17] Stephen J.Brown & Jerold B. Warner. 1985. Using daily stock returns: the case of event studies. ***Journal of Financial Economics***, 14: 3-32

[18] Steve L.Heston, Robert A.Korajczk, and Ronnie Sadka. August 2010. Intraday patterns in the cross-section of stock returns. ***The Journal of Finance***, 65(4): 1369-1406