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An Empirical Study of Abnormal Returns to Merger and Acquisition Announcements in CNX-100 Companies

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Abstract

This study empirically investigates about the stock price reaction of investors due to merger announcements. The role of leakage of information around the merger announcement is also empirically tested and explained to be the cause for observed pre-announcement return behavior. For this paper, the traditional event study methodology has been adopted with various event windows along with thirty days after merger announcements. The results for the abnormal returns due to merger announcements have proved to be statistically significant. Similar results found for average cumulative abnormal returns too. In addition, the study also suggests for information leakage before the merger announcement. In the post announcement period average cumulative abnormal returns is found to be declining.

***JEL Classification**: G14, G15, G34*

Keywords: Abnormal returns, Market efficiency, Mergers and Acquisitions

Introduction

With starting of new millennium, Indian companies have realized the importance of globalization, not only for expanding the market but for becoming competitive to their global counterparts. Starting from 2000 onwards, the increasing number is a testimony to their efforts in this regard. They have seen mergers and acquisition (M&A) and other alliances as a means to counter the challenges which they are facing now and might be facing in the new era. These kinds of alliances have provided opportunities to investors also in the form of wealth creation both on short term as well as on long term basis. Usually, these alliances are thought to be due to some kind of strategic benefits which ultimately affect the businesses in a positive way. This rationale draws more investors towards it.

Many earlier studies have addressed the problem of news about M&A and the value creation for investors and have taken the abnormal stock returns assessment over the announcement period. The results are not uniform across all studies. Some indicated wealth creation to the investors but others did not find results similar to this. This has given ample opportunities for the assessment of the efficiency level of markets in which these activities does happen. Indian Capital market has also come a long way since 1990s, when the first wave of globalization took place. Overall mechanism to the capital market has paved ways for greater participation and transparency to all the participants.

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The objective of this paper is to assess the efficiency level of Indian Capital market and investigate whether M&A news generate abnormal return, alongside it is also tried to explain how the abnormal returns have changed over the period since 2000. Earlier studies have attempted to assess the market efficiency level only but our study has gone beyond it and tried to search how this efficiency level has changed over a period of time. Rest of the paper is arranged as follows: the first section presents a brief literature review of market efficiency studies and merger effect has been kept in focus. The second section contains the methodology adopted and data taken for our study and suitable hypotheses are formulated. The third section is devoted to analysis & results and final section is for conclusion of the study.

Literature Review

In Finance theories, the event study means a study in which we examine the impact of an event on the stock returns of a firm, which shows all the possible outcomes incorporated inside the stock price. According to the Efficient Markets Hypothesis, "prices reflect all publicly available information on an underlying asset" (Fama, 1970). Event studies are frequently used to test market efficiency (Brown and Warner, 1980). An event study is a statistical method used to gauge the impact of a corporate event, such as stock splits, earnings announcements and acquisition announcements. The Synergy Trap Hypothesis posits that immediately before and after an acquisition announcement, the acquiring firm's stock price is negatively affected and the target firm's stock price is positively affected. Brown and Warner (1980), Ismail and Davidson (2005), Mitchell et al (2004) each utilize a similar event study approach to examine stock market reactions to acquisition announcements.

Khotari and Warner (2005), Mackinlay (1997) and Serra (2002) provide very good reviews of the traditional event studies and its techniques. Nelson (1950) documents merger events for very old period dating back to 1898-1902. A good summarization for the assessment of merger effects on profits and efficiency with event study is done by Cox and Portes (1998). Pautler (2003) also provide a good description of the use of event studies for mergers and acquisitions.

The result of merger announcements on the stock prices has been a mixed one. Asquith (1983) have found that acquiring firms' stock prices remain either unaffected or affected but insignificantly by the M&A announcements during the event periods. Narayanan et al. (1991) investigated the possibility of information leakages regarding mergers announcement of the first bid for the target firm and the market anticipates an acquisition priod to the first announcement so the return was not significant as the announcement has already been discounted by the market in advance. Bharath and Wu (2005) tested for volatility and risk of acquirers around M&A and found systematic volatility and beta which found to be declining in the long run. Rajesh kumar & Rajib (2007) studied the post merger performance of the firms in India and concluded that Indian corporate performance improves after merger. Liang (2009) analyzed the impact of announcement and found the non-significance of M&A announcements over the event period (day -10 to day +10) for US companies but significance of Chinese companies during 10 days period before the announcement day. Other studies have been conducted for examination of stock market reactions to various other announcements also, such as Stock Splits (Barker, 1956), bonus issue (Obaidullah, 1992), capital investments (Chan *et al.*, 1995) dividend announcement (Bajaj and Vijh, 1995), Monetary policy announcement (Gaurav Agrawal, 2007). In most of the studies, the abnormal returns are found to be associated with positive news release.

After going through the above literature review, we have developed the following hypotheses for the study:

i. For abnormal returns with merger announcement

H0: There is a no abnormal return associated with an M&A announcement.

H1: There is an association of abnormal return with an M&A announcement

ii. For information leakage before an M&A announcement date.

H0: There is no information leakage before an M&A announcement date.

H1: There is information leakage before an M&A announcement date.

Data and Methodology

For our study, we have calculated the abnormal returns and analyzed this dataset for getting the value effects to investor of bidding firms for mergers and acquisition since January 1, 2000. The dataset includes the records which we fetched from the PROWESS for Mergers announcements and acquisitions announcements, bidding firms' daily stock prices as per National Stock Exchange (NSE), and NSE-100 index as a proxy for the market. The analyses are done using data over Jan 1, 2000 till Mar 31, 2012.

The data of M&A events are drawn from the PROWESS database of CMIE. PROWESS provides voluminous data for the biggest set of companies in India and has the most comprehensive dataset for many Indian companies. Though, there are some other databases also available, including the Capitaline, but the population of companies on Capitaline is less as compared to PROWESS. Apart from this, Industry also has access to this database for a longer period as compared to Capitaline hence we chose to go with it.

We chose to take the sample from the companies which are part of CNX-100 index as on April 1, 2012. CNX 100 is a well diversified 100 stock index accounting for 38 sectors of the economy. The CNX 100 Index represents about 78.58% of the free float market capitalization of the stocks listed on NSE as on December 30, 2011. The total traded value for the last six months of all index constituents approximately 70.30% of the traded value of all stocks on the NSE. Impact cost for CNX 100 for a portfolio size of Rs. 50 Lakhs is 0.08%. The common sample was selected which was valid for whole period of study, i.e. from Jan 1, 2000 till Mar 31, 2012. Taking of NSE-100 Companies is due to its unique advantage.

Since our objective of the study is to assess the efficiency of market hence we have taken only the announced deals. Usually the deals are completed after substantial gap from the date of announcement, meanwhile efficiency of market plays its role and the stock prices gets corrected according to the perceived nature of transactions. We have constituted our samples from all the announcements related with mergers and acquisitions for the companies. It was a daunting task to search for the exact date, on which the announcement was done. Here we have taken either the first media announcement occurred or the stock exchange announcement date. When the date of announcement was falling on day of market close we have considered one day preceeding as the event day. We have taken only those companies whose daily stock prices are available 180 days before the event date. There are other instances also where the M&A events have happened but we do not have the daily stock prices of companies as they were non-existent then. Such cases have been eliminated selectively for the period of non-availability of data. According to Campbell *et al.* (1997), the estimation window in an event study analysis could range from 120 days to 210 days. To reduce the chances of insufficiency observations within estimation window, we select an estimation window of 150 (-180,-31) trading days. As a result, we get 133 events during period of study. Table no. 1 gives a description of deals by year.

Table 1: M&A Transactions by Year

Year of Event	No. of Merger announcements within CNX-100
2000	3
2001	10
2002	13
2003	8
2004	15
2005	14
2006	17
2007	9
2008	7
2009	12
2010	11
2011	12
2012*	2

Source: PROWESS, CMIE

*Data is till March 31, 2012 only

We have adopted the standard event study methodology for examining the investors' reactions to M&A announcements. For computation of normal returns we take the market model abnormal returns (Brown and Warner, 1985).

Event date is the date on which an unanticipated and important event first gets reported. This event date is the central in all event studies. The market reacts to these announcements according to their efficiency levels and the intensity of these reactions usually subsided with time. There is no concrete evidence of length of time regarding the length of the event period. Hillmer and Yu (1979) find that the event window should end within hours of the initial announcement. Chang and Chen (1989) find that event windows should go on for a number of days as the market keeps responding to news. Krivin *et al.* (2003) point out that event window length may be related to the period of observation.

Generally, event window could be taken as the event day, or the event day with some days forward or somedays backwards based on daily, weekly, monthly or some other. To examine the sensitivity of the empirical results to different window length, we report daily abnormal returns from day -30 to day +30, -15 to +15 days, -10 to +10 days, -5 to +5 days, -4 to +4 days, -3 to +3 days, -2 to +2 days, -1 to +1 days, 0 to +1 day and on Event day (Day 0).

For this study, normal return is defined as the return which anyone could fetch from stock without the occurrence of any unexpected event in a particular stock. In general, three most common methods are followed for estimation of this normal return: the constant mean return model, the market model, and the CAPM model. The constant mean return model assumes that the mean return of a given security is constant through time of study. The market model assumes a stable linear relation between the market return and the security return. The CAPM model assumes that the expected return of a given security is a linear function of its co-variance with the return of the market portfolio. Here it is worth mentioning that CAPM model has a restriction of risk free return rate for normal return estimation. The estimated returns from CAPM and Market models are not varying to a great degree but the calculation through CAPM complicate the estimation process. This can be handled with the selection of Market model for

normal return estimation which again comes in between the Mean return model and the CAPM model in terms of performance. Hence, we select the Market model to estimate the normal return for our study.

The Market model gives the following linear relationship between the returns of any security and the return of the market portfolio:

$$R_{it} = \alpha_i + \beta_i R_{mt} + e_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(1)}$$

Where 't' is the time index, 'I'= 1,2,3,……,N stands for the security, R_{it} and R_{mt} are the returns on security I and the market portfolio, respectively, during period 't'. The return in the market portfolio is measured by the variation in some benchmarks, such as the BSE Sensex or S&P CNX NIFTY for BSE and NSE respectively, and e_{it} is the error term for security 'i'. The return of security 'i' and market 'm' on any day is measured as follows:

$$R_{it} = \left(\frac{P_{it} - P_{i(t-1)}}{P_{i(t-1)}}\right) * 100 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(2)}$$

Where R_{it} is the return for security 'i' at time 't', P_{it} is price of the security 'i' at time t and $P_{i(t-1)}$ is one day prior to t day price of security 'i', and

$$R_{mt} = \left(\frac{P_{mt} - P_{m(t-1)}}{P_{m(t-1)}}\right) * 100 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3)}$$

Where R_{mt} is the return for security 'i' at time 't', P_{mt} is value of Nifty at time t and $P_{m(t-1)}$ is one day prior to t day value of Nifty.

Equation (1) is estimated over a period from 180 days preceding the event date till 31 days preceding the event date. The event window can be defined as one-day window, two-day window, three-day window, five-day window, seven-day window, nine-day window, eleven-day window, thirty one day window or sixty one day window. Once the values of á (alpha) and â (beta) are estimated from equation 1 a normal return is predicted for all days covered in event window. The error terms (the difference between the actual return and the estimated normal return for each security), commonly referred to as abnormal return (AR) is then calculated from the following equation:

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(4)}$$

Where AR_{it} is the abnormal return for firm 'i' on day t, R_{it} is the actual return for the firm 'i' on day t.

Average aggregate abnormal return on day t is mean value of summed abnormal returns of sample firms (N=133):

$$AAR_t = \frac{1}{N} \sum_{i=1}^{N} AR_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(5)}$$

In our study, daily AAR has been studied for various event windows. A robust t-statistics test for checking the significance of AAR has been conducted.

Cumulative abnormal returns are calculated for different event windows in following manner:

$$CAR_{i(T1-T2)} = \sum_{t=T1}^{T2} AR_{it} \quad \text{.....(6)}$$

Where CAR_i is the cumulative abnormal return for firm 'i' over the event window (T1 to T2). An average aggregate cumulative abnormal return (ACAR) is defined as:

$$ACAR\ (T1, T2) = \frac{1}{N} \sum_{t=1}^{N} CAR_i\ (T1, T2) \quad \text{.....(7)}$$

We study the ACAR for all event windows and also have conducted the t-statistic test for the event window.

Results and Analysis

In event study analysis, we test the hypotheses for abnormal results. During the event period, Average abnormal returns (AAR) and Average cumulative abnormal return (ACAR) will be fluctuate about zero, given there is no significant abnormal returns. If the event is having significant results then the returns will fluctuate in the direction of investors' perception (in the form of negative or positive daily returns). The value of t-statistics approaches to zero and a corresponding build up in ACAR.

The value of t-statistics for AAR and ACAR is given in the following table:

Table 2: Results of AAR and ACAR

Days	AAR	ACAR	t-statistics for ACAR	Days	AAR	ACAR	t-statistics for ACAR
E-30	-0.13	-0.75	-0.477	E+1	-0.05	6.36	4.058*
E-29	-0.13	-1.29	-0.820	E+2	-0.15	5.67	3.615*
E-28	0.41	0.77	0.493	E+3	-0.24	4.38	2.794*
E-27	0.08	1.13	0.720	E+4	-0.09	3.85	2.459*
E-26	0.23	2.24	1.432	E+5	-0.25	3.21	2.048*
E-25	-0.13	1.64	1.047	E+6	-0.15	2.49	1.586
E-24	0.06	1.92	1.227	E+7	-0.10	1.94	1.239
E-23	0.17	2.64	1.686	E+8	-0.17	1.10	0.699
E-22	0.05	2.90	1.849	E+9	0.22	2.18	1.390
E-21	0.43	4.98	3.175*	E+10	0.17	2.92	1.865
E-20	-0.37	2.93	1.867	E+11	-0.27	1.90	1.215
E-19	0.03	3.07	1.961*	E+12	-0.61	1.05	0.669
E-18	0.00	3.08	1.965*	E+13	-0.24	-0.19	-0.124
E-17	-0.20	2.14	1.365	E+14	0.10	0.45	0.290
E-16	-0.16	1.27	0.809	E+15	-0.11	-0.14	-0.087
E-15	-0.22	0.24	0.151	E+16	-0.27	-1.85	-1.178
E-14	0.46	2.28	1.452	E+17	0.35	0.08	0.052
E-13	0.43	4.02	2.567*	E+18	0.40	1.93	1.228
E-12	-0.01	4.00	2.553*	E+19	-0.19	1.01	0.645
E-11	0.16	4.87	3.104*	E+20	-0.02	0.88	0.559
E-10	0.44	6.88	4.391*	E+21	-0.21	-0.43	-0.274
E-9	0.01	6.96	4.442*	E+22	-0.19	-1.53	-0.977
E-8	-0.36	5.10	3.250*	E+23	-0.10	-1.97	-1.255
E-7	-0.20	4.21	2.687*	E+24	0.04	-1.78	-1.133
E-6	-0.03	4.04	2.578*	E+25	0.18	-0.86	-0.546
E-5	-0.28	3.40	2.168*	E+26	-0.43	-1.97	-1.255
E-4	-0.30	1.92	1.226	E+27	0.15	-1.21	-0.775
E-3	0.16	2.69	1.719	E+28	0.44	1.00	0.638
E-2	0.13	3.38	2.158*	E+29	-0.17	0.15	0.096
E-1	0.37	5.16	3.293*	E+30	0.10	0.65	0.417
E-0	0.39	6.52	4.157*				

**significant at 5% level of significance*

Source: Authors' Calculation

During the complete event period of 61 days (-30 day, +30 day), the average abnormal return is found to be significant on days near to the event day. The ACAR started increasing from 28 days prior to the event, but started getting negative returns from 8 days prior to the announcement date. Since 3 days early to the event date, ACAR became positive and it again turned negative after the event day which continued till 8th day after the event. Overall, returns before the event date were mainly positive and after event it was mainly on negative side. Total number of negative returns before the event date is 13 whereas after the event date it is 20. From the above observation, it seems the market is having some prior information about the announcement. The t-statistics for average cumulative abnormal return is also found significant for majority of days prior to the event date but found significant only for five days after the event. This might have happened because of information leakage before the announcement. This is evident from the overall returns chart for the whole period (AAR and ACAR).

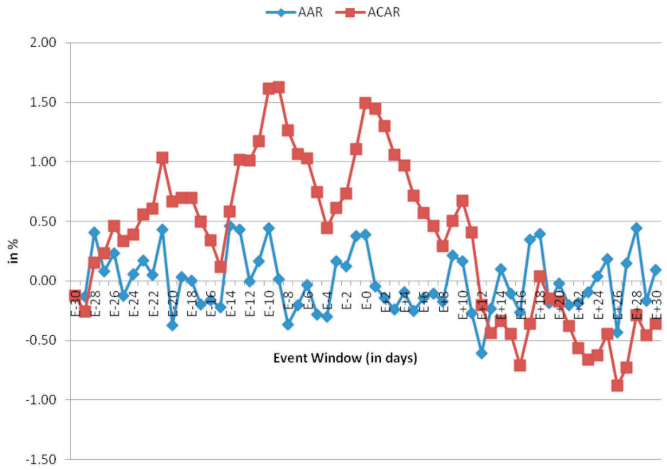

Figure 1: AAR and ACAR during the Event Window (-30 days, +30 days)

Analysis of Abnormal Average Return (AAR)

Following is the results of t-test for AAR for very short term period. The event window for this study is taken as -5 days to +days.

Table 3

Event Day	Average abnormal return (in %)	t-tstatistics
-5	-0.64	-4.44*
-4	-1.48	-10.21*
-3	0.77	5.34*
-2	0.69	4.76*
-1	1.78	12.31*
0	1.35	9.36*
1	-0.16	-1.07
2	-0.69	-4.80*
3	-1.29	-8.90*
4	-0.53	-3.64*
5	-0.64	-4.45*

significant at 5% level of significance

Source: Authors' Calculation

Above table presents the figures for AAR for 11 days only. The results are found statistically significant in all cases except one day immediately after the announcement date. The reason could be that due to information leakage, the prices are already adjusted to some extent and hence even after the rise in price; the returns are not found statistically significant. The rise of price has started taking place even before the event (three days before) and rate of increment is comparatively higher. It rose 152% from -4 day to -3 day, declined next day and again rose 148% from -2 day to -1 day. On event day it reduced by 24% and next day it fell by a good 112%. On second day of event it gained 331% and on third day after the event it again rose by 87%. With this kind of fluctuations it can be interpreted that the response is lacking a clear direction of the merger announcements.

Analysis of Average Cumulative Abnormal Return (ACAR)

Table 4: ACAR for Various Event Window

Total days	**Event Window**	**ACAR (%)**	**t-statsistics**
1-Day period	(0)	0.39	1.35
2-Days Period	(0,1)	0.34	1.60
3-Days Period	(-1, +1)	0.71	4.69*
5-Days Period	(-2,+2)	0.69	6.47*
7-Days Period	(-3, +3)	0.62	7.76*
9-Days Period	(-4, +4)	0.22	3.34*
11-Days Period	(-5, +5)	-0.32	-4.00*
21-Days Period	(-10, +10)	-0.50	-9.13*
31-Days Period	(-15, +15)	-0.78	-17.40*
61-Days Period	(-30, +30)	-0.36	-14.14*
Price run-up around Event			
Total days	**Event Window**	**ACAR (%)**	**t-statsistics**
11 Days Period	(-10,0)	0.32	4.41*
11 Days Period	(0,+10)	-0.44	-6.31*

significant at 5% level of significance

Source: Authors' Calculation

Our study has attempted to measure a cumulative effect of the announcement of merger events with various event window frame work. For general cumulating effect, we have created 10 event windows with equal number of observations around the event day. In addition to this, price accumulation pattern has been studied in period prior to and after the event dates too. For this we have created another 2 windows, each having 11 days (including event date) before and after the event. The overall ACARs are found to be significant in all event windows, except in 1-Day period and 2-Day period. This could be better explained with information leakage to market prior to the actual event phenomenon.

When we look at the specific event window before and after the event dates, we find the ACAR for both the cases are statistically significant. Which again give evidence of significant abnormal returns. On the basis of these results, we can reject the hypothesis that no abnormal return is

associated with merger announcements. Similarly, for second hypothesis too, we also reject the hypothesis that there is no information leakage of merger announcement.

Conclusion

This study tries to assess the investor perception around the merger announcement date for 133 merger announcement from CNX-100 companies for a period from Jan 1, 2000 till Mar 31, 2012. An event study methodology is followed using several event windows to examine the price run ups during the period. It has been observed that abnormal returns have happened not after the event only but it has started some days before the event. This was attributed to the leakage of information before the event which got confirmed with statistical results also. It is also found in the study that the ACAR of the companies have started falling suddenly from the day after the announcement which continues till twenty sixth day after the event with some minor aberration. In general, the behavior of AAR's and ACAR's is found to be in accordance with earlier similar studies which lends support to the hypothesis of semi-strong form of Indian capital market.

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