A CRITICAL EVALUATION OF EVENT STUDY APPROACH USING M&A EVENTS IN THE INDIAN BANKING INDUSTRY

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Abstract

The present study seeks to critically evaluate the most extensively used technique – Event Study methodology – employed to capture the returns generated from M&A events on the wealth status of shareholders. Notwithstanding the popularity of the technique, authors in this paper argue that conceptual bases on which the methodology is founded is flawed. In the light of the extensive limitations attributable to Event Study methodology, there exists an urgent need to suggest improvement in the conceptual framework of the traditional method capable of lending application to capture the wealth effects of M&A events. The authors believe that application of such a modified approach will be much more salvageable as the results derived therefrom will command greater credibility as well as reliability. In order to highlight the inherent limitation of the Event Study approach, the authors have used the sample of Indian Banking M&A events retrieved from the M&A data available at etintelligence.com . Given the conceptual flaws of the Event Study approach, the authors argue that researchers must exercise great caution while commenting on the t-statistic observed for CAR (Cumulative Abnormal Returns) values as the statistical insignificance could be arising more out of the conceptual deficiency of the Event Study approach than pointing towards the neutral impact of an M&A event on the wealth status of the shareholders.

Keywords: Event Study methodology; wealth status of shareholders; statistical reliability
JEL Codes: C01; C12; G34

1. INTRODUCTION

Mergers & Acquisitions (M&A) have generated enormous amount of attention from policy makers and regulators representing the banking sector in India in recent times. As India is at an interesting cusp of socio-economic development, reforms in the banking sector have been touted as one of the significant initiatives necessary to achieve the larger goals of financial inclusion and creation of a robust financial eco-system. In this backdrop, it is interesting to observe that while the penetration of the banking system encompasses a wider geographic net, yet in terms of the sheer asset-size, Indian banks continue to be laggards when compared with global peers. For instance, State Bank of India (SBI) as India's largest lender is only $1/10^{th}$ of the total asset size of China's 3rd largest bank – Industrial Commercial Bank of China (ICBC). Policy makers in India are therefore at complete unanimity on the need to have fewer and dedicated banking institutions having asset size comparable to global peers. This idea has also found credence from policy makers at multilateral financial institutions led by the World Bank and IMF. As a natural corollary to the above, the need to create a financial eco-system fostering M&A within the banking sector assumes enormous significance.

India's resurgent banking sector while not remaining alien to M&A has nevertheless fomented concerns over the pace of these activities. In this backdrop, the present study endeavours to capture the implications of M&A activity in the banking sector in India on the wealth status of shareholders. After-all, M&A activity would find favour among investors when it accrues economic benefits both to the acquiring and target entities' shareholders. In the Indian context, it has been generally observed that given the government as a primary shareholder with both the acquiring and target banking entitles (w.r.t public sector commercial banks), the observed Cumulative Abnormal Returns (CAR) appear to be statistically insignificant. Such an observed phenomenon points towards the relatively lower attention accorded to the shareholders' interests as M&A among the public-sector banks are driven as fallout of implementation of an executive order. Alternatively, as we demonstrate in our paper, the observed statistical insignificance might be more plausibly and credibly attributable to the underlying conceptual deficiencies of the traditional Event Study technique.

2. WHAT ARE THE MOTIVATING FACTORS FOR BANK MERGERS?

2.1. Economies of Scale and Scope

The main motive behind the wave of bank mergers in 1990s was primarily attributable to economies of scale resulting from horizontal and vertical combination of banks specializing and rendering different but related services. If the merging firms were to benefit from each other's' knowledge of specialized functions then economies of scope could be realized. These benefits were particularly realized when the merging firms were inefficient prior to merger (Hughes, Lang, & Moon, 1999).

In a study, it was found that improvement of management efficiency could be achieved through economies of scope which resulted when critical size was achieved (Copeland, Weston, & Shastri, 2003). Many

academic studies have provided that realization of operating efficiencies and cutting costs are among the primary motivations for consolidation in the banking industry.

It was noted that the wave of bank consolidations witnessed in developed regions comprising the North America, European and Japan regions were attributable to factors such as globalization of financial services, growing financial deregulation and technological advancements that took place in the recent past (Bae & Aldrich).

2.2. Increased Market Power

Bank acquisitions resulted in accessing the vast market already captured by banks being acquired with no loss of time and effort (Hughes, Lang, & Moon, 1999).

3. REVIEW OF PREVIOUS STUDIES (USING EVENT-STUDIES APPROACH)

In this paper, we seek to evaluate the performance of acquisitions undertaken by Indian Banks on shareholders by employing the traditional Event Study econometric approach. Our primary objective rests upon highlighting the conceptual deficiencies of the traditional Event Study technique by resorting to empirical evidence in the context of selected M&A within the banking industry. Presented below is a review of select studies on gauging the impact of M&A on shareholder wealth using the conventional Event Study methodology.

In a study that sought to add to the understanding of European banking M&A employing the standard Event Study methodology on a sample of 89 acquiring and 89 target firms over 1987-1999, the authors found positive returns accruing to target banks while the returns to acquiring banks varied across deals. The deals were found to be value accretive for bank-to-bank deals than cross-product deals[6]. Further, it was found that merger deals were more value enhancing than acquisition deals (Ismail & Davidson, 2005).

In a study undertaken to analyze the effects of mergers or acquisition announcements on shareholders of individual banks and bank holding companies, the authors found an upward shift in abnormal returns for targets during the period between announcement and consumption of events, while for the acquirers, returns were slightly negative during the acquisition announcement period, but the cumulative average abnormal returns (CAAR) for the period following the acquisitions were found to be positive. The study used the standard Event Study approach on a sample that consisted of 26 successfully acquired and acquiring banking firms over the period 1979-1985 (Neely, 1987).

In a study that sought to analyze value gains to acquirers in the European bank M&A wave of 1996-2004, it was found that European acquirers earned positive and statistically significant abnormal returns around the time of deal announcement. The results were more robust for domestic transactions than for cross-border transactions. The study employed the Event Study approach using the Fama-French three-factor model (Lensink & Maslennikova, 2008).

In a study seeking to identify the differences in trends in banking mergers between January 1994 and October 19995 on a sample of 30 acquisitions, it was found that effects were negative for shareholders of acquiring banks around the announcement period. Within the sample, medium-to-small acquisitions under $ US 1 billion witnessed negative but insignificant abnormal returns; however, large acquisitions over $ US 1 billion witnessed significant negative abnormal returns. Shareholders of target banks in both the cases earned significant positive abnormal returns (Chavaltanpipat, Kholdy, & Sohrabian, 1999).

With the objective of studying the wealth effects of US takeovers from 1980-1990 based on a sample of 107 bank takeovers, it was found that in general, bank takeovers led to wealth creation. In fact, the CAAR's of acquiring banks in most of the cases were found to be statistically significant. This observation seems to be consistent with the economic belief that better efficiency can be achieved by economies of scale and diversification (Zhang, 1995).

In a study aimed at capturing wealth effects of inter-state bank mergers consisting of a sample of 21 mergers, it was found that shareholders of acquired banks earned statistically large significant abnormal returns while shareholders of acquiring banks earned insignificant abnormal returns around the announcement of the merger. Acquiring banks involved in large acquisitions significantly outperformed those involved in minor acquisitions and banks with small acquisitions earned negative abnormal returns (Trifts & Scanlon, 1987). The study employed the Event Study methodology using the market model.

The basic limitations of all the above studies (though they try to evaluate the impact of mergers and takeovers in the banking industry) are that….

a) The Event Study methodology employed suffers from the theoretical limitations as delineated in the subsequent section. An attempt to inter-relate rate of earnings on market index to rate of earnings on share price would be a futile exercise as such a regression function would result in very poor R^2 values.

b) Further, computations of CAARs on the basis of predicted expected returns based on such a poor regression function are questionable.

c) Any averaging of CAARs based on such poor calculations would definitely lead to highly objectionable and unreliable findings and inferences.

d) In most of the cases such average CARs suffer from statistical invalidity.

4. CONCEPTUAL DEFICIENCIES OF EVENT STUDY METHODOLOGY

Initially, under Event Study methodology, we regress the relationship between the return on market index and the return on individual stocks to arrive at a function that would help the researchers to determine the expected return on the individual stocks over a given period of time during which the event would have occurred. It is interesting to observe that the rate of return resulting from price fluctuations of individual securities can behave differently from the original movement of prices of the market.

Observe that…..

i) a series of market price of shares (or market index),

ii) change in the price of shares (or market index) representing earnings on shares (or market index) and,

iii) the rate of earnings on shares (or market index) are three different concepts.

The time related behavior of these concepts, as shown in the following table and graphs, can be totally different and opposed to each other:-

[6] Cross–Product deals entail deals where the acquiring firms are banks but the target firms are non–banking firms like insurance firms, brokerage securities firms etc.

Table 1-1. Movement of Earnings and Rate of Earnings

Days	*Share Prices ($)*	*Earnings due to price change ($)*	*Rate of earnings*
0	500	-	
1	600	100	20.00%
2	680	80	13.33%
3	740	60	8.82%
4	780	40	5.41%
5	800	20	2.56%

Figure 1. Movement of Share Prices

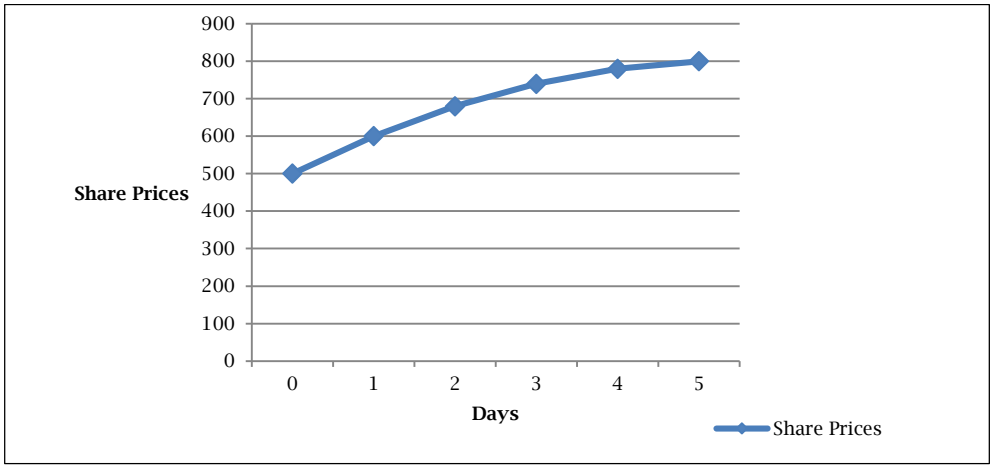


Figure 2. Movement of Earnings

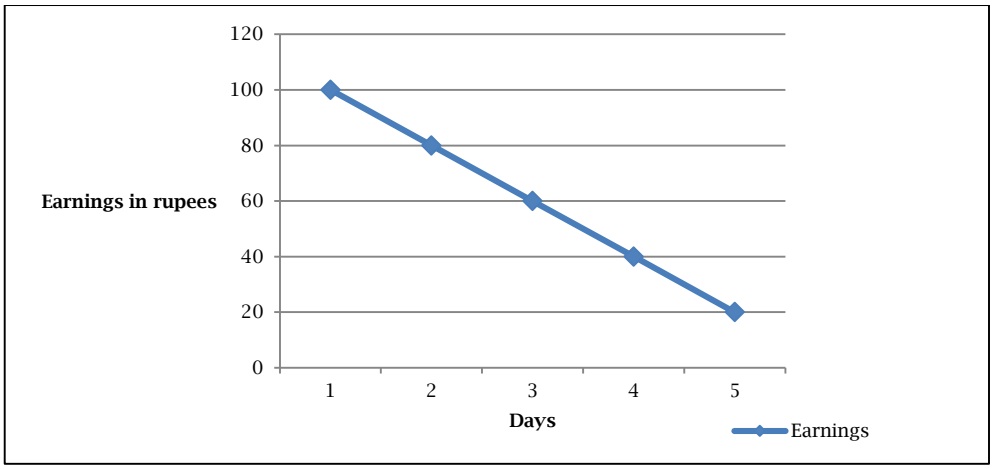
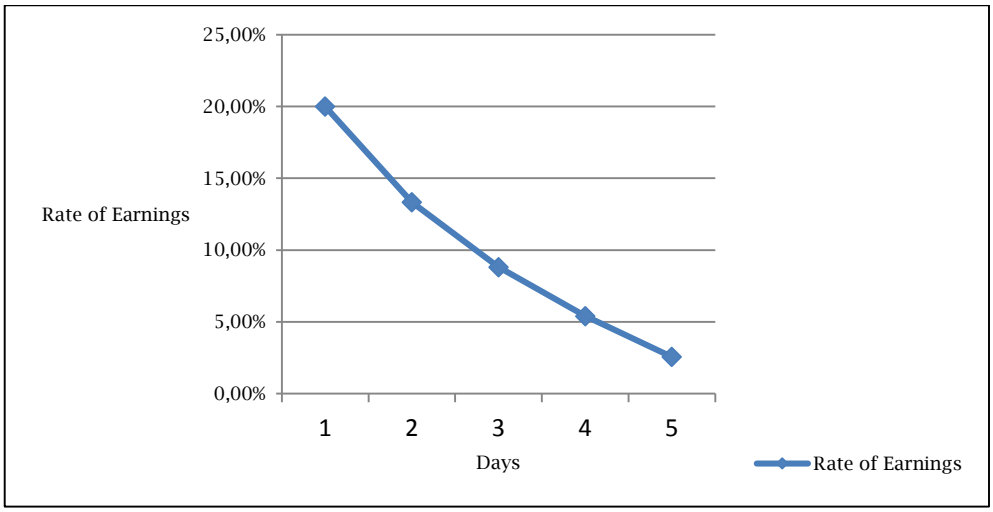


Figure 3. Movement of Rate of Earnings



It may be observed that while the share prices **increase** over time, the earnings on share prices and the rate of earnings on share prices continuously **decrease** over time. This represents a totally opposed behavior of different concepts.

Table 1-2. Movement of Earnings and Rate of Earnings

Days	Share Prices ($)	Earnings due to price change ($)	Rate of earnings
0	500	-	-
1	520	20	4.00%
2	540	20	3.85%
3	560	20	3.70%
4	580	20	3.57%
5	600	20	3.45%

Figure 4. Movement of Share Prices

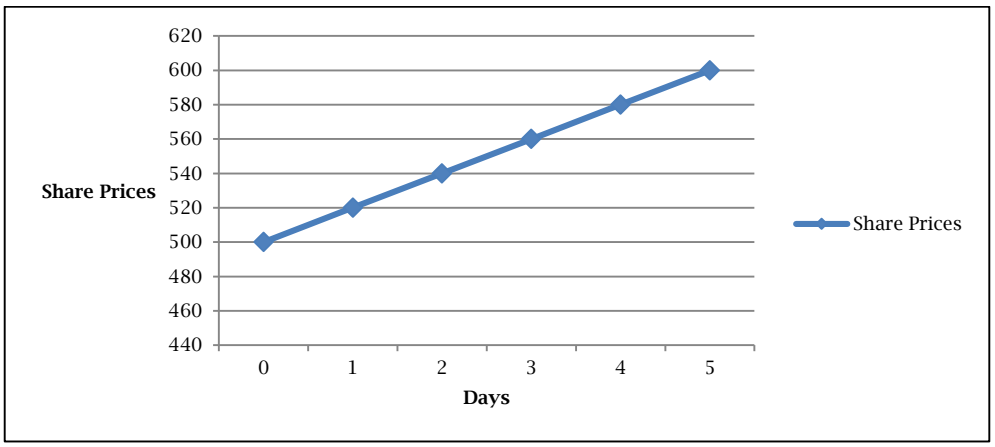


Figure 5. Movement of Earnings

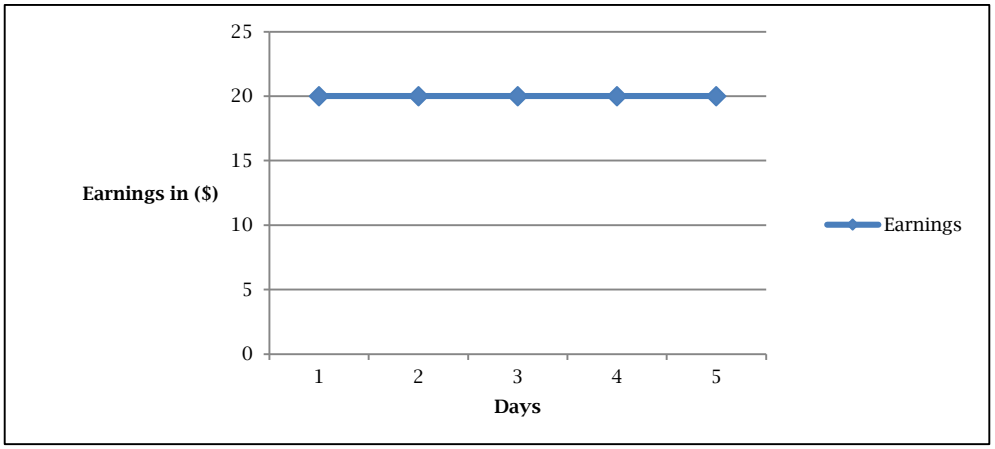
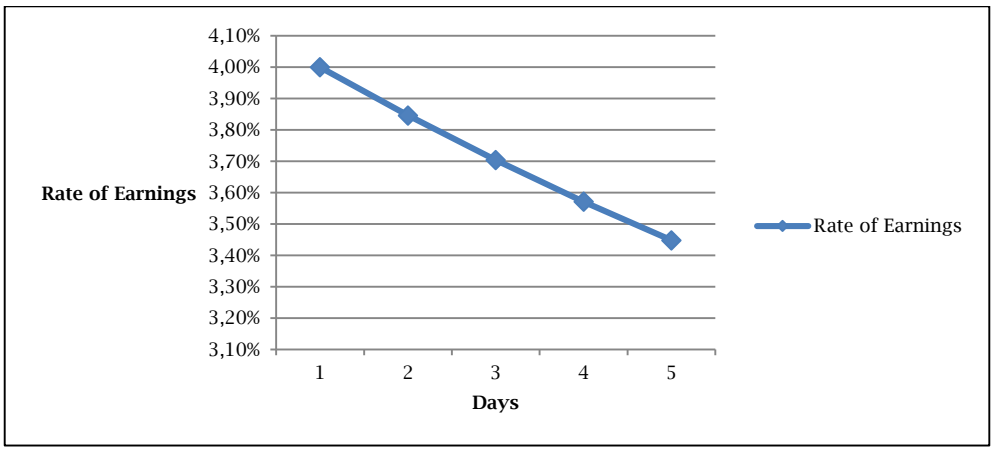


Figure 6. Movement of Rate of Earnings



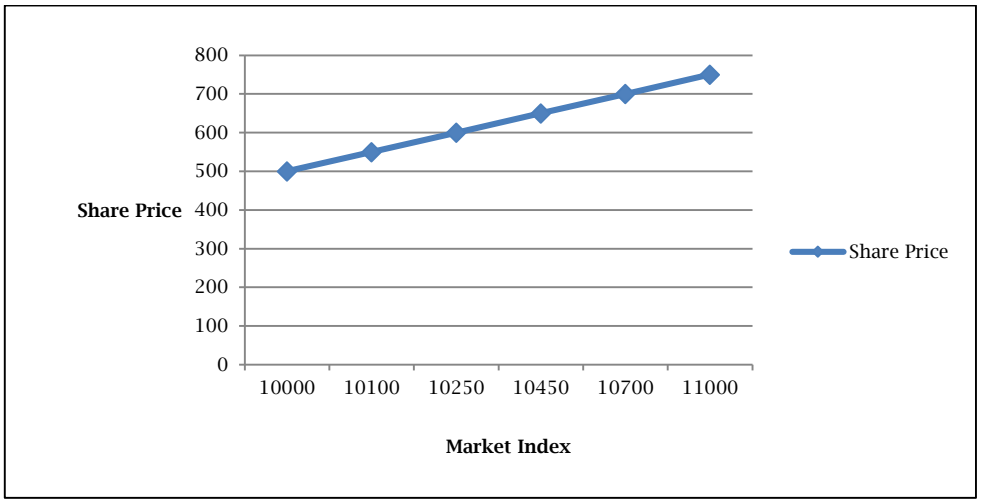
It may be observed that while the share prices **increase** over time, the earnings on share prices remain **constant** and rate of earnings on share prices **decrease** over time. This again represents a totally opposed behavior of different concepts.

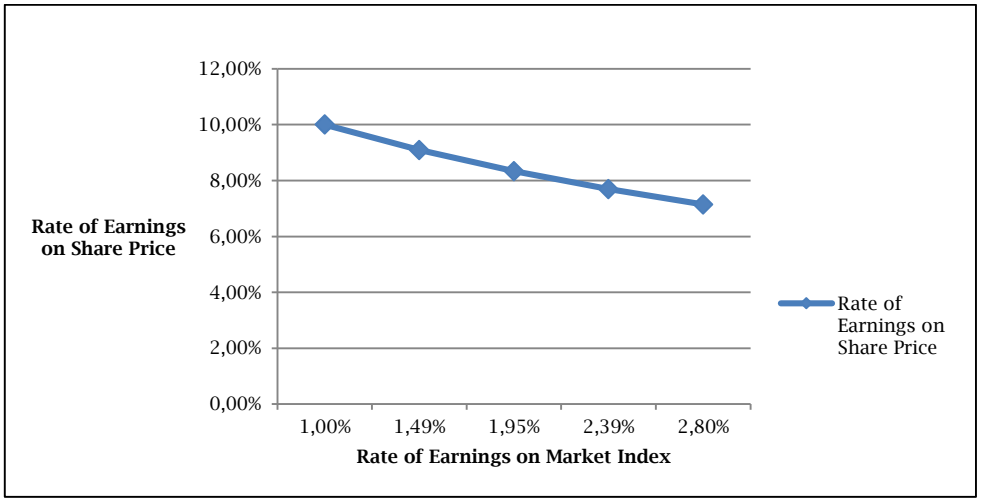
It follows from the above that the statistical relationship between market index and share price need not be reflected and represented by the relationship between earnings on market index and share prices as depicted in the following table and graphs.

Table 1-3. Movement of Rate of Earnings on Index and Rate of Earnings on Share Prices

Day	Market Index	Rate of earnings on Index	Share Price	Rate of earnings on Share Price
0	10000	-	500	-
1	10100	1.00%	550	10.00%
2	10250	1.49%	600	9.09%
3	10450	1.95%	650	8.33%
4	10700	2.39%	700	7.69%
5	11000	2.80%	800	14.29%

Figure 7 &8. Movement of Share Prices against Market Index and Movement of Rate of Earnings on Share Prices against Rate of Earnings on Market Index





It is observed that the relationship between the market index and share price is "proportional" with coefficient of correlation= 0.99 as opposed to the relationship between rate of earnings on index and rate of earnings on share price which is "inverse" with coefficient of correlation = -0.99!!The above discussions based on hypothetical data illustrate that even a totally dichotomous relationship is possible when we regress the relationship between the rate of earnings on market index and the rate of earnings on share prices of an individual firm as against the direct relationship between the market index and share price of an individual firm. Now, let us consider practical stock market data of 7 prominent Indian banks and consider R^2 values of regression functions….

1) regressing the direct relationship between market index and share prices, and
2) regressing the relationship between rates of return on market index and share prices.

Table 1-4. R^2 value of Regression Functions

M&A Event	*Acquiring Bank*	*Target Bank*	R^2	
			Direct Regression between Market Index and Share Price	*Regression between Rate of Return on Market Index and Rate of Return on Share Price*
1	Bank of Baroda	Benares State Bank	0.70	0.09
2	ICICI Bank	Invetitsionno Kerditny Bank	0.95	0.36
3	Bank of India	Bank Swadesi TBK PT	0.89	0.39
4	ICICI Bank	Radian Research Inc	0.94	0.50
5	HDFC Bank	Centurion Bank of Punjab	0.98	0.53
6	State Bank of India	State Bank of Saurashtra	0.76	0.57
7	ICICI Bank	Bank of Rajasthan	0.85	0.65

We observe from above table that the large and significant R^2 values underlying direct relationship between market index and share prices are reduced to insignificance for regression functions based on rates of return on market index and share prices. This is because…

a) the return function is different from the price function,

b) though the price function is the primary function and the return function is the first derivative of the price function, as already illustrated, the behaviour of the primary function would not be reflected by the derivative function,

c) in fact, the poor R^2 values suggest that the relationship between the rates of return may be too feeble or even non-existant.

Any further calculations based on regression functions with very poor R^2 values would necessarily generate values like CAR, the sanctity of which would become questionable. As we see from Table (1-5), we have CAR values calculated for the 7 banks already illustrated. We observe that t-statistic representing statistical significance of these CAR values is very poor - less than the table value of 1.96. Does this represent the statistical insignificance of CAR values? In other words, does it indicate that CAR can be treated as a value equal to 'zero'?

In answer, we have to carefully analyze as to what a poor value of t-statistic might represent:

a) it might represent true statistical insignificance of CAR values, implying that they can be treated as zero for all practical purposes; or

b) it might represent high degree of errors underlying the calculations of the CAR.

When R^2 value of the regression function is quite large and significant, the poor t-statistic less than the table value necessarily represents statistical insignificance of CAR. However, when R^2 value of regression function is very poor, a poor t-statistic necessarily implies that the calculations underlying original regression function and thus the CAR are very poor, erroneous and hence, questionable.

In the above example of Event Study methodology applied to M&A events in banking industry, we find that the poor t-statistic, because of poor R^2 values underlying regression functions, simply represents the erroneousness and hence non-acceptability of the whole analytical procedure.

Table 1-5. Final Impact of M&A Activity in the Indian Banking Industry on the Cumulative Abnormal Returns (CAR)

Acquiring Bank	*Target Bank*	*CAR*	*Est SD*	*n*	*t-statistic*[7]	*Inference*
Bank of Baroda	Benares State Bank	0.1982	0.0337	21	1.2845	Statistically Insignificant
ICICI Bank	Invetitsionno Kerditny Bank	0.0161	0.0136	21	0.2579	Statistically Insignificant
Bank of India	Bank Swadesi TBK PT	0.0285	0.0262	21	0.2375	Statistically Insignificant
ICICI Bank	Radian Research Inc	-0.0098	0.0156	21	-0.1369	Statistically Insignificant
HDFC Bank	Centurion Bank of Punjab	0.0550	0.0169	21	0.7114	Statistically Insignificant
State Bank of India	State Bank of Saurashtra	0.0906	0.0181	21	1.0907	Statistically Insignificant
ICICI Bank	Bank of Rajasthan	-0.0977	0.0148	21	-1.4450	Statistically Insignificant

Table 1-6. Cumulative Average Abnormal Returns (CAAR) & their corresponding t-statistic values

Event Window	**Cumulative Average Abnormal Return (CAAR)**	**Estimated Standard Deviation**	**Number of days**	**t-statistic**[8] **(modular values)**	**Inference**
(-20,+20)	0.0639	0.0075	41	1.3367	Statistically Insignificant
(-10,+10)	0.0565	0.0075	21	1.6521	Statistically Insignificant
(0,+10)	-0.0100	0.0075	11	0.4048	Statistically Insignificant
(0,+20)	-0.0004	0.0075	21	0.0125	Statistically Insignificant

[7] All the observed t-statistic values are to be read with significance level at 95% where the observed t-statistic value is given as 1.96.

[8] All the observed t-statistic values are to be read with significance level at 95% where the observed t-statistic value is given as 1.96.

4.1. Event Study Methodology as applied for Collective Evaluation of M&A Events

It follows from the discussions in the previous sections, that the errors underlying computation of regression functions based on rates of return would have their cumulative effect on CAAR values computed for collective evaluation of M&A events. As we see from the following calculations for 7 banks already illustrated (see Table 1-5), the CAAR values for all the different event windows seem to represent 'zero impact' for all event windows under collective evaluation when we consider all the 15 banks! This inference of statistical insignificance under collective evaluation follows from the poor t-statistic values for all the different event windows. However, as already stated in previous sections, the poor t-statistic values are the result of cumulative effect of errors underlying basic regression functions of individual banks, as already implied by poor R^2 values (Table 1-4). Hence, the t-statistic values in Table 4-5 and the inferences based on such values become questionable. In other words, the poor t-values underlying collective evaluation represent erroneousness of traditional Event Study methodology rather than the real zero impact of M&A events on banking industry. The collective evaluation procedure underlying traditional Event Study methodology also suffers from another serious limitation. While computing CAAR values, the rates of return values of individual M&A events are simply considered without any consideration for weights to represent the size of individual entities. This is incorrect and would once again lead to erroneous computations and inferences.

5. CONCLUSION

In this paper, we sought to critically examine the Event Study econometric approach by employing it on a sample of prominent Indian banks' M&A. We sought to pinpoint the serious conceptual deficiencies of the traditional Event Study approach by highlighting the poor R^2 values and consequently the statistically insignificant t-statistic values obtained as a result of the above.

In conclusion, we observe the following serious theoretical deficiencies with respect to the traditional Event Study methodology:-

a) The time related behaviour of concepts underlying rates of return on market index and stock prices are totally different and opposed to each other.
b) The virtually non-existant relationship between the rates of return on market index and stock prices leads to very poor R^2 values.
c) The poor R^2 values generate values like CAR which are represented by poor t-statistic values implying that the underlying calculations are erroneous.
d) The statistical insignificance of CAAR values computed under collective evaluation are the result of cumulative effect of errors underlying basic regression function of individual M&A events.

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