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Analyzing the market and financial impacts of the State Bank of India's Merger: A comprehensive Event Study

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Abstract: This article presents detailed information about the event study that analyzed the market and financial impacts of the State Bank of India's (SBI) merger. The merger of the SBI with its associate banks plays a significant role in the banking sector. The main aim of this study is to estimate the abnormal return and cumulative abnormal return test the significance of the shares of the SBI and also examine the impact of the merger of the SBI using Event study methodology. The market model is to be used in this study. The researcher has used the Wilcoxon Signed Ranked test for the event study to test the significance. The study reveals no significant difference in abnormal return of the SBI-merger during the pre and post-window periods. By applying the market model, a linear relationship between a stock return and market return be assumed. The findings of the study indicate that there is no significant relation between the pre and post-event windows in the abnormal returns. This suggests the market has already anticipated the effects of the merger. Moreover, the research will analyse the broader implications of the merger such as profitability, asset quality, and operational efficiency. The study contributes to the ongoing disclosure of the effectiveness of mergers in the banking sector and provides valuable insights for policymakers and investors.

Keywords: *Financial impacts, Event study.*

1. Introduction

The merger of the bank plays a vital role in the corporate landscape. This event has not only redefined the limits of the Indian banking sector but also helped to grow the development of the banks across the global financial domain. On 1st April 2017, the five associates namely the State Bank of Bikaner and Jaipur (SBBJ), State Bank of Hyderabad (SBH), State Bank of Travancore, State Bank of Mysore (SBM), State Bank of Patiala (SBP) and Bharatiya Mahila Bank (BMB) were merged with SBI. This merger of the SBI with its associate banks notified a significant milestone in Indian banking history initiated by the government. The study made a comprehensive examination of the merger of the SBI, one of India's largest public sector banks. Also, it provided deep knowledge about the event study, unraveling the economic dynamics, market responses, and the underlying for the stakeholders involved.

2. Review of Literature

Simran Shrimali et al[1]., 2021 studied the impact of lockdown announcements on stock prices of the banking sector. The main objective of this study is to examine how COVID-19 impacted the Indian banking sector. The study used the event study methodology to calculate the abnormal returns. The market model is preferably used to study the impact of an event out of the major models such as the market index adjusted return rate, and the average adjusted return rate model. The data are collected

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from the National Stock Exchange (NSE), the Nifty Bank Index, and the Nifty 50 index as the sample size to analyze the overall performance of the banking sector. The researcher concluded that the Indian banking sector was negatively impacted by Covid-19. The study used the Panel regression model to find out the results. Yunchuan Sun et al[2]., 2021 examined the COVID-19 impact on the Chinese stock market and the effects of individual investor sentiment on returns by using event study methodology. Stock-related data were collected from 25th July 2019 to 31st March 2020. The sample covers the share listed companies. The study has concluded that the stock returns have a more significant impact with high PB and CMV, low net assets, and low institutional shareholding for the enterprises. Riste Ichev et al[3]., 2018 emphasized the impact of the ebola outbreak events on U.S. stock prices. The study employed the event study methodology and regression to evaluate the outbreak results and also focused on the ebola pandemic outbreak in 2014-16 based on the World Health Organization and mass-media news. The researcher found that the negative returns in the financial markets occurred due to the Ebola outbreak. Buch C.M. et al[4]., 2007., examined the determinants of cross-border mergers of commercial banks, the effects of cross-border mergers on the efficiency of banks, and the risk effects of international bank mergers. The study found that the implicit and explicit barriers to the integration of markets could hold back cross-border merger activity, the foreign-owned banks performed domestically-owned banks in developing countries and eventually, international banking could have an impact on financial stability. Anjali Gupta[5], (2016), studied share price behaviour during specific events and share price reaction to such events. The study applied the event study methodology concerning the market model. The researcher concluded that the significant reaction to past occurrences or events in the financial markets affects the companies' market value.

2.1. Objectives of the Study

1. To analyze the impact on the share return during pre and post-event.
2. To examine the abnormal return during the pre and post-window period

2.2. Hypothesis of the Study

H_0: There is no significant difference in the AR of the SBI due to the merger
H_1: There is a significant difference in the AR of the SBI due to the merger

4. Methodology

The study used the event methodology to analyze the impact of the SBI merger on the stock of SBI and nifty values. The study employed the market model by calculating the normal return, abnormal return, and cumulative abnormal return. The market model can be calculated as follows.

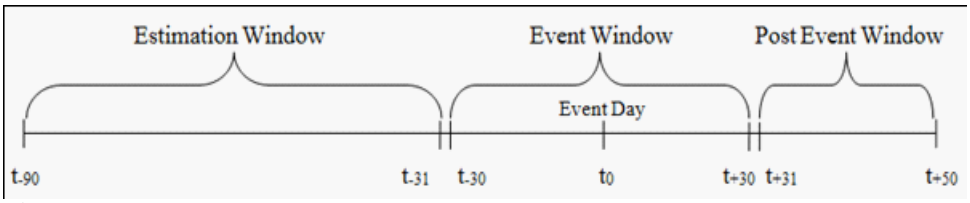

Figure 1.
Estimation window.

The estimation window is used to determine the normal behavior of the stock market factors.

4.1. Event Window

The event window is the period during and after the occurrence of the event of interest. By comparing the observed data during this window with the expected behavior established the estimation window, the impact of the event is assessed. In this study, the event window is considered as -30 days to

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+30 days. 0 is considered as the event date i.e., the announcement of the merger. The merger was announced on April 1st 2017.

4.2. Regression of the Market Model

If the firm's stock return is highly synchronized with the overall market return, the market model may work well but in the case of the performance of a security which related to many factors, the regression model only to be used.

A single-factor model:

$R_{it} = \alpha i + \beta i\, R_{mt} + \epsilon_{it}$

where R_{it} is the return on stock i at time t,

R_{mt} is the return on the market index at time t,

αi is the stock-specific constant,

βi is the stock's beta,

ϵ_{it} is the error term.

4.3. Estimation of Abnormal Returns

The following three steps are generally done

The abnormal return (AR) is the difference between the firm's actual return and predicted return on a specific date. It is calculated by using the following formula:

$$AR_{jt} = Rjt = {}_{E\,(}Rjt_{)} \qquad (1)$$

Here, ARjt demotes abnormal return of stock j at time t,

Rjt denotes the actual return of stock j at time t, and

E(Rjt) denotes the expected normal return of stock j at time t.

Before calculating the ARjt, we must estimate the alpha (α) and beta (β) co-efficient for individual stocks (j) according to the market model.

$$Rjt = \alpha j + \beta j * Rmt + Ejt \qquad (2)$$

Here the estimation period is event days. From equation 2, an estimate is obtained based on the alpha (αj) and beta (βj).

The expected return during the event window period (-30, +30) of the SBI is calculated as follows:

$E\,(Rjt) = \alpha j + \beta j\,(Rmt)$

Here, E (Rjt) denotes the expected return on stock j during the event window.

Rmt = market return during event window (-30, +30)

4.4. Cumulative Abnormal Return (CAR)

Cumulative Abnormal Return is the measure of the total abnormal returns during the event period. It has been calculated as the sum of the ARs during the event period.

4.4. Analysis

Table 1.
Abnormal return, cumulative abnormal return, and t-statistics in an event day of 30 days.

Daily ARs, CARs, and test statistics during the event window (-30 to +30) for the State Bank India with State Bank associates									
Days	**AR**	**t_{AR}**	**CAR**	**t_{CAR}**	**Days**	**AR**	**t_{AR}**	**CAR**	**t_{CAR}**
-30	-0.016	-1.623	0.153	2.723	0	0.008	0.812	0.008	-
-29	0.0158	1.540	0.169	3.071	1	0.010	1.033	0.018	1.845
-28	0.004	0.389	0.154	2.834	2	0.019	1.882	0.029	2.061
-27	0.011	1.151	0.150	2.812	3	-0.015	-1.501	0.014	0.816
-26	0.009	0.908	0.146	2.799	4	-0.022	-2.176	-0.007	-0.380

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Daily ARs, CARs, and test statistics during the event window (-30 to +30) for the State Bank India with State Bank associates

Days	AR	t_{AR}	CAR	t_{CAR}	Days	AR	t_{AR}	CAR	t_{CAR}
-25	0.009	0.935	0.128	2.510	5	-0.003	-0.293	-0.010	-0.471
-24	-0.004	-0.415	0.127	2.537	6	0.027	2.703	0.016	0.672
-23	-0.015	-1.512	0.131	2.678	7	-0.020	-1.978	-0.003	-0.124
-22	0.000	0.071	0.139	2.887	8	-0.004	-0.396	-0.007	-0.256
-21	0.021	2.111	0.146	3.117	9	-0.007	-0.720	-0.014	-0.482
-20	-0.024	-2.371	0.125	2.722	10	-0.004	-0.422	-0.019	-0.591
-19	-0.008	-0.831	0.141	3.150	11	-0.021	-2.098	-0.040	-1.196
-18	0.030	2.945	0.149	3.432	12	0.008	0.847	-0.032	-0.900
-17	-0.010	-1.001	0.119	2.818	13	-0.011	-1.152	-0.043	-1.185
-16	0.004	0.395	0.137	3.358	14	0.031	3.040	-0.012	-0.329
-15	0.013	1.282	0.133	3.366	15	0.015	1.526	0.003	0.075
-14	-0.002	-0.269	0.120	3.141	16	0.009	0.921	0.012	0.303
-13	0.037	3.618	0.123	3.335	17	-0.016	-1.631	-0.004	-0.101
-12	0.009	0.945	0.086	2.426	18	0.021	2.048	0.016	0.384
-11	0.019	1.894	0.076	2.249	19	-0.003	-0.297	0.013	0.306
-10	-0.017	-1.660	0.057	1.760	20	0.005	0.501	0.018	0.410
-9	-0.006	-0.628	0.074	2.408	21	0.040	3.937	0.059	1.259
-8	-0.006	-0.616	0.080	2.777	22	-0.022	-2.210	0.036	0.759
-7	-0.033	-3.265	0.087	3.201	23	0.016	1.627	0.053	1.082
-6	0.013	1.355	0.120	4.791	24	-0.008	-0.87	0.044	0.882
-5	0.033	3.300	0.106	4.642	25	0.008	0.867	0.053	1.037
-4	-0.000	-0.010	0.072	3.540	26	0.015	1.483	0.068	1.308
-3	0.0196	1.908	6.278	352.979	27	-0.004	-0.395	0.064	1.208
-2	0.030	2.955	0.044	3.090	28	0.019	1.908	0.084	1.547
-1	0.014	1.414	0.014	1.414	29	0.031	3.101	0.115	2.096
0	0.008	0.812	0.008	-	30	0.003	0.295	0.118	2.114

Source: Computed by the author using secondary data in MS-excel.

4.5. Interpretation

The above table explains the AR, CAR, and t-statistics of the values. The merger of State Bank of Bikaner and Jaipur, State Bank of Maharashtra, State Bank of Hyderabad, State Bank of Travancore, State Bank of Mysore, State Bank of Patiala and Bharatiya Mahila Bank with State Bank of India have happened on 1st April 2017. To compare the pre and post-window periods, 30 days before the merger has been considered as the pre-window period, and 30 days after the merger as the post-window period. calculated estimation window is (-30, -31). There are different kinds of results have been identified. During the pre-window period, AR was positive except for the ten days i.e., t-30, t-24, t-23, t-20, t-19, t-17, t-14, t-10, t-9, t-8, t-7. In the post-window period, fourteen days got a negative value compared to the other days. They are t+3, t+4, t+5, t+7, t+8, t+9, t+10, t+11, t+13, t+17, t-19, t+22, t+24, t+27. The CAR is significant for only two days in the pre-window period. it is significant in t-23 at 2.24 per cent and t-22 at 2.17 per cent. But during the post-window period, there is no significant level at 1.96 per cent.

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Table 2.
Regression analysis for market and bank nifty.

R	R^2	Beta	Standard error
0.44	0.197	0.491	0.011
ANOVA			
Model	df	f	p-value
Regression	60	14.534	3.81

Source: Computed by the author using SPSS.

The above table explains the linear regression of the market and bank nifty of the SBI. It found that the 0.44 variance had a collective significant effect. The beta value of 0.491 indicates the market returns positively impacted the bank nifty. The R^2 shows that the 19.7 per cent variance denotes by the market return.

Table 3.
Wilcoxon signed ranks test for pre and post-event of AR.

Ranks				
		N	Mean rank	Sum of ranks
ARPOST - ARPRE	Negative ranks	17[a]	15.59	265.00
	Positive ranks	13[b]	15.38	200.00
	Ties	0[c]		
	Total	30		
a. ARPOST < ARPRE				
b. ARPOST > ARPRE				
c. ARPOST = ARPRE				

Source: Computed by the author using SPSS.

Table 4.
Test statistics.

	ARPOST - ARPRE
Z	-0.668[b]
Asymp. sig. (2-tailed)	0.504
a. Wilcoxon signed ranks test	
b. Based on positive ranks.	

Source: Computed by the author using SPSS.

4.6. Interpretation

Table 3 shows the Wilcoxon signed ranks test for pre and post-event of AR. Table 4 explains the t-statistics of the Wilcoxon signed-rank test. The positive rank is 15.59 and the negative rank is 15.38. The Z value is -.668 while the significance value is .504, greater than 0.05. so, the null hypothesis is accepted i.e., there is no significant difference in the AR of the SBI due to the merger. Thus, the alternative hypothesis that there is a significant difference in the AR of the SBI due to the merger is rejected.

5. Conclusion

In the capital market, an event study is important in testing the market efficiency. Many event studies have been done in the previous studies in the different disciplines. However, this article mainly discussed the event study of mergers and acquisition of banks and their impact on the bank's nifty and market returns. The findings of this study explain that the merger did not lead to a significant difference in abnormal returns during the pre and post-event windows. The study revealed that the abnormal return (AR) was positive for 20 days during the pre-event window whereas, 14 days of

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negative abnormal returns found during the post-event window indicates the varied impact on stock returns around the merger event. The CAR shows the significant level only on two days in the pre-event window i.e., t-23 at 2.24 per cent and t-22 at 2.17 per cent. During the post-event window, no days attained the significant level at 1.96 per cent, indicating the limited cumulative effects of the merger announcement. However, the study concludes that the merger of SBI with its associate banks did not result in a significant difference in abnormal returns, with the evidence by both the statistical analyses employed in this study.

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