

Impact of merger & acquisition on accounting-based indicators - A study on BSE-listed companies in India

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ABSTRACT

This paper aims to investigate the impact of mergers on accounting indicators in the long, medium, and short term with the contrast of manufacturing and service sector segregation. This study is based on the mergers happened in India on listed companies in Bombay Stock Exchange with 56 firms with 5 years pre and 5 years post-the merger. Normality test found the data were not normal. Thus, a similar non-parametric test, “Wilcoxon sign rank,” is applied to find the impact of mergers in different time horizons, like 5 years, 3 years, and 1 year, to find the impact of post-merger with the pre-merger situation. Contrast of the test applied and observed in two ways, one is all the companies as a whole and another is manufacturing companies and service sector companies separately. Manufacturing sector companies perform better than service sector companies in the post-merger and acquisition period in the profitability indicator, profit after tax, but in another profitability indicator, return on capital employed, service sector companies perform better. In liquidity indicator, current ratio performs better in manufacturing sector companies. Solvency position indicator debt-to-equity ratio shows a better result in the case of service sector companies. This study finds a mixed reaction after the merger and acquisition on some specific accounting-based indicators on acquirer companies with contrasting effect on the manufacturing and service sector.

KEYWORDS: Accounting based indicators, Acquisition, Merger, Profitability, Liquidity, Solvency, India

Introduction

Merger and acquisitions become a significant restructuring strategy for companies in all over the world to achieve growth, eliminate the competition among rivalries and increase the market share. Significant and impactful M&A deals witnessed in recent years in India across different industries including cross-border merger. However, impact of M&A on financial factor is an ongoing debate among practitioners and researchers.

M&A resulting saving in cost, financial leverage, synergy, access to new market etc. but it also increases risk like cultural integration, existing operation conflicts. Post-merger integration and its key to success depends on various factors of both the involved companies those are on M&A deal. In a study in India on 305 companies by (Rani et al., 2015) found that in post M&A time profitability and liquidity improved. In another study by (Kumar and Bansal, 2008) it was found that many M&A get the synergy benefit in long-term for the acquiring companies, which could take in the form of increased cash flow, additional business, diversification, cost savings, and so on. For both manufacturing and services sector companies (Reddy et al., 2013) observed that Indian M&A companies performed better during the post-merger period in long-run. (Kumar, 2009) found in his study that on average, post-merger profitability, asset turnover, and solvency of acquiring companies not improved compared to pre-merger levels. Thus, it is contrary to popular assumption and expectation that acquisitions boost the acquirer's financial performance. (Zuhri et al., 2020) found in their study after the statistical examination of the Wilcoxon signed rank test that there is no such significant difference in return on equity before and after the merger and acquisition and debt to equity ratio was low in the pre-merger and acquisition period than the post-merger and acquisition period which indicates that merger and acquisition has no such positive impact. Whereas, in a study (Gupta et al., 2023) found that the profitability and liquidity ratios have improved significantly, while the leverage ratio has remained unchanged. The fixed-asset turnover ratio improves significantly in the efficiency ratio, whereas the total asset turnover and current asset turnover ratios improve little. In this study it was seen that the financial performance of Indian construction and real estate companies increased overall for the acquiring corporations during the post-M&A period.

Literature review

Data were taken from 68 mergers and acquisitions by (Aggarwal and Garg, 2019) in India from 2007 to 2012, and different parameters were measured to draw the conclusion that acquirers of service sector companies perform better than those of manufacturing sector companies and it was also found that profitability and solvency had a major positive impact on mergers on the acquirer firms, but solvency position had no such impact. Different sectoral data collected from 2003 to 2007 of 115 companies were collected by (Leepsa and Mishra, 2012) and analysed on different parameters which gave the output that liquidity position improved due to merger, but it is statistically insignificant, solvency position from the viewpoint of net capital to sales ratio is in negative situation and it is statistically insignificant, debt to income ratio and interest to income ratio both increased, but they are statistically insignificant. The profitability position from the viewpoint of return on capital employed has improved and is statistically significant, but it has decreased in return on net worth and is statistically insignificant. The majority of the outcomes, like the current ratio, quick ratio, and interest coverage ratio, are statistically insignificant, but they increased in the post-merger time period. To test management's perspectives for assessing post-merger performance (Kukalis, 2007) collected the data from 400 organisations on M&A transactions between 1995 and 2000 between 1992 and 1995 where post-merger performance was examined using a sample of the 80 largest equity-financed (stock-for-stock transactions) mergers in the United States and found that there is no statistically significant difference between the pre-merger operating performance of the target firm and the post-merger performance of the merged entity. The findings also show that the acquiring corporation outperformed the merged entity on average. Finally, the study's findings lend support to the inefficient management theory in terms of long-term operating performance. Post-merger operating performance of merged enterprises of 57 significant mergers between 1995 and 2002 analysed by (Kumar and Rajib, 2007) where pre- and post-acquisition operating cash flow performance of merging firms is compared to see if operating performance improves following mergers and the results from the book value of assets and sales model provide some evidence that company performance improves after mergers. (Singh and Mogla, 2008) found how mergers affect business performance in India by comparing merged firms' operational performance before and after the merger. A sample of 56 companies that merged between 1994 and 2002 shows that profitability fell dramatically after the mergers. However, the profitability of matched enterprises fell dramatically throughout the same period. As a result, mergers alone cannot account for the reduction in profitability. Mergers only provide benefits in terms of expanded size and an improved interest coverage ratio. According to regression research, the current ratio, debt equity ratio, and size are all negatively connected to profitability, whereas the interest coverage ratio and

age are positively related. Group enterprises outperform individual firms.

Research Gap

After reviewing different literature, it is found that the studies on impact of merger and acquisition in long-term, medium-term and short-term on accounting-based indicators are very few with all the sectors, service sector and manufacturing sector separately.

Objectives of the Paper

The present study is an attempt to check the performance of merger deals in India in the long, medium and short term, with the following aims:

- To study the impact of mergers on the accounting performance of the outcomes in long, medium, and short term.
- To compare the results of merger deals in the service sector in contrast with manufacturing sector companies.

Research question

To achieve the objectives of the study the main research question is to find that;

- If there is any effect of merger and acquisition after the merger in long, medium and short term?
- Which sector impacts the most by merger and acquisition, service sector or manufacturing sector?

Methodology of the Paper

In order to fulfil the objectives of the study, the following method of analysis has been applied on the selected variables of individual companies, where the pre-merger and post-merger periods are taken as 5 years. Before any sort of analysis on the selected firms, it is better to check the normality of the data, and for that, the Kolmogorov-Smirnov and Shapiro-Wilk tests for normality are applied. After conducting that test on the 5, 3, and 1 year year pre- and post-period on the data set and it is found that the data is not normal in of both tests as the significance level in all the samples is less than .05, which rejects the null hypothesis that the data is normally distributed and accepts the alternative hypothesis that the data is not normal.

So, a parametric test (paired sample t-test) on the data could not be applied, and a non-parametric equivalent test, the Wilcoxon sign rank test, is used here to find significant differences in the paired sample on each of the variables in the 5, 3, and 1 year pre- and post-time period.

Research Hypotheses

Research hypotheses for normality test

H₀: Null Hypotheses (The data follow a normal distribution)

Research Hypotheses for all the companies as a whole

Keeping the objectives of the study in mind and on the basis of the variables selected, the following are the null hypotheses of the present study:

H₀₁. There is no significant difference in profits after tax (PAT) between the pre-merger and post-merger periods.

H₀₂. There is no significant difference in return on capital employed (ROCE) between the pre-merger and post-merger periods.

H₀₃. There is no significant difference in the current ratio (CR) between the pre-merger and post-merger periods.

H₀₄. There is no significant difference in debt-to-equity ratio (DER) between the pre-merger and post-merger periods.

Research hypotheses for service sector companies

H₀₅. There is no significant difference in profits after tax (PAT) between pre-merger and post-merger periods in service sector companies.

H₀₆. There is no significant difference in return on capital employed (ROCE) between pre-merger and post-merger periods in service sector companies.

H₀₇. There is no significant difference in the current ratio (CR) between the pre-merger and post-merger periods in service sector companies.

H₀₈. There is no significant difference in debt-to-equity ratio (DER) between pre-merger and post-merger periods in service sector companies.

Research hypotheses for manufacturing sector companies

H₀₉. There is no significant difference in profits after tax (PAT) between pre-merger and post-merger periods in manufacturing sector companies.

H₁₀. There is no significant difference in return on capital employed (ROCE) between pre-merger and post-merger periods in manufacturing sector companies.

H₁₁. There is no significant difference in Current ratio (CR) between pre-merger and post-merger periods

in manufacturing sector companies.

H₁₂. There is no significant difference in debt-to-equity ratio (DER) between pre-merger and post-merger periods in manufacturing sector companies.

Here, pre-merger period is equal to 5 years (01.04.2008–31.03.2009 to 01.04.2012–31.03.2013), and post-merger period is equal to 5 years (2014–2015 to 2018–2019), and the acquisition year for the acquirer company is considered here between (01.04.2013–31.03.2014).

Variables used in the study

- Profit after tax (PAT) is considered here as the profitability position indicator.
- Return on capital employed (ROCE) is considered here as the profitability position indicator.
- Current ratio (CR) is considered here as the liquidity position indicator.
- Debt to equity ratio (DER) is considered here as the solvency position indicator.

Table I: List of all acquirer 56 companies and their main product/service group

Srl. No.	Company Name	Main product/service group	Manufacturing / Service/Diversified
1	A I A Engineering Ltd.	Castings	Manufacturing
2	A P L Apollo Tubes Ltd.	Tubes & pipes	Manufacturing
3	Ambuja Cements Ltd.	Cement	Manufacturing
4	Ashok Leyland Ltd.	Heavy commercial vehicles (HCV)	Manufacturing
5	Aurionpro Solutions Ltd.	Software services	Service
6	Balkrishna Industries Ltd.	Tyres	Manufacturing
7	Bharti Airtel Ltd.	Cellular mobile phone service	Service

Srl. No.	Company Name	Main product/service group	Manufacturing / Service/Diversified
8	Binani Industries Ltd.	Fund based financial services	Service
9	Birla Corporation Ltd.	Cement	Manufacturing
10	Birlasoft Ltd.	Software services	Service
11	C E S Ltd.	Information technology enabled service/BPO	Service
12	Delta Corp Ltd.	Other recreational & cultural services nec	Service
13	E I D-Parry (India) Ltd.	Sugar	Manufacturing
14	Future Consumer Ltd.	Wholesale trade in miscellaneous manufactured articles	Manufacturing
15	Gati Ltd.	Retail trade in petroleum products	Manufacturing
16	Glenmark Pharmaceuticals Ltd.	Drug formulations	Manufacturing
17	Godrej Agrovvet Ltd.	Animal and bird feeds	Manufacturing
18	Godrej Properties Ltd.	Housing real estate	Manufacturing
19	Granules India Ltd.	Drug formulations	Manufacturing
20	Grindwell Norton Ltd.	Abrasive powder or grain on a base	Manufacturing
21	Hindustan Mills Ltd.	Cotton fabrics	Manufacturing
22	India Cements Ltd.	Cement	Manufacturing

Srl. No.	Company Name	Main product/service group	Manufacturing / Service/Diversified
23	J T E K T India Ltd.	Steering gears	Manufacturing
24	Jatalia Global Ventures Ltd.	Securities investment services	Service
25	Kolte Patil Developers Ltd.	Housing real estate	Manufacturing
26	Macrotech Developers Ltd.	Housing real estate	Manufacturing
27	Maruti Suzuki India Ltd.	Passenger cars	Manufacturing
28	Mphasis Ltd.	Software services	Service
29	P C S Technology Ltd.	Fund based financial services	Service
30	P I Industries Ltd.	Pesticides	Manufacturing
31	P V R Ltd.	Motion picture exhibition	Manufacturing
32	Peninsula Land Ltd.	Diversified	Diversified
33	Pfizer Ltd.	Drug formulations	Manufacturing
34	Polo Queen Indl. & Fintech Ltd.	Wholesale trade in chemicals & chemical products	Manufacturing
35	Polycab India Ltd.	Wires & cables, insulated	Manufacturing
36	Pricol Ltd. [Merged]	Automobile ancillaries	Manufacturing
37	Rane (Madras) Ltd.	Steering linkages	Manufacturing

Srl. No.	Company Name	Main product/service group	Manufacturing / Service/Diversified
38	Reliance Infrastructure Ltd.	Construction of other industrial plants	Manufacturing
39	Reliance Power Ltd.	Diversified	Diversified
40	Sandhar Technologies Ltd.	Automobile ancillaries, nec	Manufacturing
41	Shree Global Tradefin Ltd.	Securities investment services	Service
42	Sunteck Realty Ltd.	Real estate	Manufacturing
43	Syngene International Ltd.	Other organic compounds nec	Manufacturing
44	T T K Healthcare Ltd.	Wholesale trade in drugs, medicines & allied products	Manufacturing
45	Tata Coffee Ltd.	Instant coffee	Manufacturing
46	Tata Consumer Products Ltd.	Tea, processed	Manufacturing
47	Tech Mahindra Ltd.	Software services	Service
48	Thomas Cook (India) Ltd.	Tourism	Service
49	Trident Ltd.	Textiles	Manufacturing
50	Trio Mercantile & Trdg. Ltd.	Wholesale trade in marble, alabaster	Manufacturing
51	United Spirits Ltd.	Ethyl alcohol (strength less than 80%) - (potable alcohol)	Manufacturing

Srl. No.	Company Name	Main product/service group	Manufacturing / Service/Diversified
52	Wellness Noni Ltd.	Wholesale trade in miscellaneous manufactured articles	Manufacturing
53	Wipro Ltd.	Software services	Service
54	Yamini Investments Co. Ltd.	Fund based financial services	Service
55	Zee Media Corpn. Ltd.	Television broadcasting media	Service
56	Zydus Lifesciences Ltd.	Drug formulations	Manufacturing

This study is based on Indian mergers on all companies as a whole from April 1, 2013 to March 31, 2014. The data on 216 mergers during the research period is sourced from the CMIE Prowess database. Out of total 216 firms, 139 firm stocks were not listed in the BSE database. After removing these 139 firms, as the data is not readily available in the BSE database, we remove those companies from our study and left with 77 companies. After that it is found that 5 companies are on the list that underwent cross-border mergers in that specific time period, and the data of 16 companies was not found in all the periods of our study. Finally, after removing those 11 companies this study left with 56 companies listed at the Bombay Stock Exchange that went into M&A from April 1, 2013 to March 31, 2014. To avoid any abnormality or inconsistency in the calculation in the database here, the merger and acquisition year is considered as 0 and eliminated from the study. The 56 firms (given in Table I) reflect all of the 5 years of pre- and post-study data, mostly on a parity basis. The effective year of merger given in the Prowess database was checked and validated on the Bombay Stock Exchange website's corporate announcements section. Here, diversified companies considered as manufacturing sector companies as their operational activity is based on manufacturing process.

Analysis

Table II: Normality test for all companies

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PREPAT5	0.354	56	0.000	0.352	56	0.000
POSTPAT5	0.323	56	0.000	0.531	56	0.000
PREPAT3	0.369	56	0.000	0.352	56	0.000
POSTPAT3	0.378	56	0.000	0.475	56	0.000
PREPAT1	0.382	56	0.000	0.412	56	0.000
POSTPAT1	0.388	56	0.000	0.386	56	0.000
PREROCE5	0.152	56	0.003	0.901	56	0.000
POSTROCE5	0.281	56	0.000	0.462	56	0.000
PREROCE3	0.123	56	0.034	0.934	56	0.004
POSTROCE3	0.098	56	0.200*	0.971	56	0.204*
PREROCE1	0.157	56	0.002	0.915	56	0.001
POSTROCE1	0.136	56	0.012	0.950	56	0.022
PRECR5	0.390	56	0.000	0.276	56	0.000
POSTCR5	0.448	56	0.000	0.200	56	0.000
PRECR3	0.222	56	0.000	0.755	56	0.000
POSTCR3	0.446	56	0.000	0.214	56	0.000
PRECR1	0.332	56	0.000	0.298	56	0.000

POSTCR1	0.503	56	0.000	0.130	56	0.000
PREDER5	0.225	56	0.000	0.677	56	0.000
POSTDER5	0.270	56	0.000	0.586	56	0.000
PREDER3	0.303	56	0.000	0.481	56	0.000
POSTDER3	0.208	56	0.000	0.739	56	0.000
PREDER1	0.321	56	0.000	0.436	56	0.000
POSTDER1	0.324	56	0.000	0.396	56	0.000

From Table II, it is found that all the indicators or variables are non-normal except return on capital employed in the post 3 year in both tests of normality in Kolmogrov-Smirnov and Shapiro-Wilk in which the first test interpret that if the p value is less than .05 then we would reject the null hypotheses that the data follows normal distribution and the second test finds the goodness of fit or it is to find whether the data follows the normal distribution or not. So, here we reject the null hypothesis H_0 for the test of normality in every case except ROCE in 3-year time period. where, the null hypothesis of the test is that the data is normally distributed. But, when the p value is less than .05, then the data is non-normal or not normally distributed, and due to that, the parametric test could not be applied in this study. Since the majority of the variables shows non-normal results, a parallel non-parametric test, namely the Wilcoxon sign rank test, will be applied to all the companies where Z score is used to analyse the pre and post M&A situation. Here, 5 years is taken as long-term, 3 year is taken as medium-term and 1 year as short-term.

Table III: Wilcoxon Sign Rank Test Result for all companies for All Variable

Paired sample(pre, post)	Median pre	Median post	Median change	Z-value	Significance	Null Hypotheses status
Profitability Ratio PAT all companies Wilcoxon sign rank test						

-5,+5(Long-term)	32.880	132.0850	99.205	-2.537**	0.011	Rejected
- 3,+3(Medium-term)	58.3850	104.4650	46.08	-3.050**	0.022	Rejected
-1,+1(Short-term)	60.2600	39.2350	-21.025	-179	0.858	Accepted
Profitability Ratio ROCE all companies Wilcoxon sign rank test						
-5,+5(Long-term)	7.8050	6.6650	-1.14	-1.464	0.143	Accepted
- 3,+3(Medium-term)	7.4300	6.4300	-1	-1.130	0.259	Accepted
-1,+1(Short-term)	6.5600	4.3950	-2.165	-1.433	0.152	Accepted
Liquidity Ratio CR all companies Wilcoxon sign rank test						
-5,+5(Long-term)	1.0850	1.2250	0.14	-1.171	0.242	Accepted
- 3,+3(Medium-term)	1.1350	1.2550	0.12	-.117	0.907	Accepted
1,+1(Short-term)	1.2050	1.2450	0.04	-.502	0.616	Accepted
Solvency Ratio DER all companies Wilcoxon sign rank test						

-5,+5(Long-term)	0.5600	0.2050	-0.355	-3.006*	0.003	Rejected
-3,+3(Medium-term)	0.3450	0.3150	-0.03	-.911	0.362	Accepted
-1,+1(Short-term)	0.3200	0.3250	0.005	-1.011	0.312	Accepted

*, ** Significant at 1% & 5% level of significance

Source: Authors Calculation

It is found from Table III that, after the M&A, median ratio of the profitability indicator (PAT) has increased in two of the pairs out of the total three pairs which is also statistically significant. The median ratio is the difference between the median in the pre-M&A period and the median in the post-M&A period. In PAT, the comparison of median provides a Z statistics of -2.537 ($p = 0.011 < 0.05$), -3.050 ($p = 0.022 < 0.05$), and -1.179 ($p = 0.858 > 0.05$) for (-5, +5), (-3, +3), and (-1, +1), respectively. Here, after the M&A, both in the long-term and medium-term, the median value of PAT increased, but in the short term, the median value of PAT decreased. Null hypotheses for all the companies in PAT (H_{01}) in 5 and 3 years are rejected, and in 1 year it is accepted it means that there is significant difference in profits after tax (PAT) between the pre-merger and post-merger periods in 5 and 3 years but there is no significant difference in profits after tax (PAT) between the pre-merger and post-merger periods in 1 year.

After the M&A, median ratio of the profitability indicator (ROCE) has decreased in all the pairs and it is statistically insignificant. In ROCE, the comparison of median provides a Z statistics of -1.464 ($p = 0.143 > 0.05$), -1.130 ($p = 0.259 > 0.05$), and -1.433 ($p = 0.152 > 0.05$) for (-5, +5), (-3, +3), and (-1, +1), respectively. Here, after the merger, ROCE decreased in all the tested pairs. This indicates that after the M&A, acquirer firms will not be able to utilise the capital assets effectively and efficiently to create more income. Null hypotheses for all the companies in ROCE (H_{02}) are accepted in 5, 3, and 1 year it means that there is no significant difference in return on capital employed (ROCE) in any of the period between the pre and post-merger.

After the M&A, the median ratio of the liquidity indicator (CR) has increased in all the pairs, but it is statistically insignificant. In CR, the comparison of median provides a Z statistics of -1.171 ($p = 0.242 > 0.05$), -1.117 ($p = 0.907 > 0.05$), and -0.502 ($p = 0.616 > 0.05$) for (-5, +5), (-3, +3), and (-1, +1), respectively. In this case, CR increases, but with an insignificant value after the M&A, which indicates a slight change in the liquidity position. Null hypotheses for all the companies in CR (H_{03}) are accepted in 5, 3, and 1 year it means that there is no significant difference in any of the period in the current ratio (CR) between the pre-merger and post-merger.

After the M&A, the median ratio of the solvency indicator (DER) has decreased in two of the pairs out of the total three pairs but it is statistically significant in 5 years pair. In DER, the comparison of median provides a Z statistics of -3.006 ($p = 0.003 < 0.01$), -0.911 ($p = 0.362 > 0.05$), and -1.011 ($p = 0.312 > 0.05$) for (-5, +5), (-3, +3), and (-1, +1), respectively. The higher the DER, the higher the risk to investors and lenders for a business after the M&A. It can be observed that in the long term, after the M&A, median DER decreased in two of the pairs, which are in long-term and medium-term, but there is no such effect of this declining situation observed in the short term. Due to M&A, acquirer companies can easily reap the benefits of loan availability from borrowers and investors. Null hypotheses for all the companies in DER (H_{04}) are accepted in 3 and 1 year it means that there is no significant difference in debt-to-equity ratio (DER) between the pre-merger and post-merger periods and rejected in 5 years that signifies there is significant difference in debt-to-equity ratio (DER) between the pre and post-merger period.

Table IV: Normality test for service sector companies

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PRE5PATSERVICE	0.39	15	0.000	0.506	15	0.000

POST5PATSERVICE	0.423	15	0.000	0.526	15	0.000
PRE3PATSERVICE	0.421	15	0.000	0.482	15	0.000
POST3PATSERVICE	0.407	15	0.000	0.652	15	0.000
PRE1PATSERVICE	0.441	15	0.000	0.541	15	0.000
POST1PATSERVICE	0.385	15	0.000	0.651	15	0.000
PRE5ROCESERVICE	0.204	15	0.095*	0.894	15	0.078*
POST5ROCESERVICE	0.209	15	0.07*	0.921	15	0.201*
PRE3ROCESERVICE	0.21	15	0.073*	0.914	15	0.159*
POST3ROCESERVICE	0.167	15	0.200*	0.903	15	0.107*
PRE1ROCESERVICE	0.275	15	0.003	0.812	15	0.005
POST1ROCESERVICE	0.377	15	0.000	0.54	15	0.000
PRE5CRSERVICE	0.325	15	0.000	0.523	15	0.000
POST5CRSERVICE	0.521	15	0.000	0.299	15	0.000
PRE3CRSERVICE	0.251	15	0.012	0.746	15	0.001
POST3CRSERVICE	0.416	15	0.000	0.437	15	0.000
PRE1CRSERVICE	0.419	15	0.000	0.411	15	0.000
POST1CRSERVICE	0.46	15	0.000	0.388	15	0.000
PRE5DERSERVICE	0.238	15	0.022	0.735	15	0.001
POST5DERSERVICE	0.282	15	0.002	0.792	15	0.003
PRE3DERSERVICE	0.327	15	0.000	0.588	15	0.000
POST3DERSERVICE	0.181	15	0.197*	0.829	15	0.009
PRE1DERSERVICE	0.486	15	0.000	0.335	15	0.000
POST1DERSERVICE	0.244	15	0.017	0.722	15	0.000

Source: Authors Calculation

From Table IV, it is found that all the indicators or variables are non-normal except return on capital employed in the pre and post of 5 and 3-year periods and debt equity ratio in the post-3-year period in the test of normality in Kolmogrov-Smirnov and Shapiro-Wilk test in which the first test interpret that if the p value is less than .05 then we would reject the null hypotheses that the data follows normal distribution and the second test finds the goodness of fit or it is to find whether the data follows the normal distribution

or not.

So, here we reject the null hypothesis H_0 for the test of normality in every case except ROCE in 5 and 3 year and DER in the post 3year time period. Where, the null hypothesis of the test is that the data is normally distributed. But, when the p value is less than .05, then the data is non-normal or not normally distributed due to that, a parametric test could not be applied to those parameters. Since the majority of the variables show non-normal results, a parallel non-parametric test, namely the Wilcoxon sign rank test, will be applied to the service sector companies where Z score except ROCE in 5 and 3 year and DER in the post 3 year time period.

Table V: Wilcoxon Sign Rank Test Result for service sector companies for All Variable

Paired sample(pre,post)	Median pre	Median post	Median change	Z-value	Significance	Null Hypothesis status
Profitability Ratio PAT Service sector Wilcoxon sign rank test						
-5,+5(Long-term)	30.200	9.770	-20.43	-.795	.427	Accepted
-3,+3(Medium-term)	14.6000	9.8200	-4.78	-.511	.609	Accepted
-1,+1(Short-term)	21.6200	4.7700	-16.85	-.454	.650	Accepted
Profitability Ratio ROCE Service sector Wilcoxon sign rank test						
-5,+5(Long-term)	8.0400	2.9900	-5.05	-2.953*	.003	Rejected
-3,+3(Medium-term)	5.3500	5.2800	-0.07	-.994	.320	Accepted

*, **

-1,+1(Short-term)	5.8000	6.6200	0.82	-1.477	.140	Accepted
Liquidity CR Service sector Wilcoxon sign rank test						
-5,+5(Long-term)	.8900	1.7900	0.9	-1.306	.191	Accepted
- 3,+3(Medium-term)	1.9700	1.6400	-0.33	-.847	.397	Accepted
-1,+1(Short-term)	1.4400	1.3000	-0.14	-.284	.776	Accepted
Solvency Ratio DER Service sector Wilcoxon sign rank test						
-5,+5(Long-term)	.5200	.1600	-0.36	-2.355**	.0198	Rejected
- 3,+3(Medium-term)	.2200	.1600	-0.06	-1.602	.109	Accepted
-1,+1(Short-term)	.1600	.0800	-0.08	-.629	.530	Accepted

Significant at 1% & 5% level of significance

Source: Authors Calculation

It is found from Table V that, after the M&A, median ratio of the profitability indicator (PAT) for service sector companies, when separately measured it is found that PAT has decreased in all three pairs and is also statistically insignificant. The median ratio is the difference between the median in the pre-M&A period and the median in the post-M&A period. In PAT, the comparison of median provides Z statistics of -.795 ($p = 0.427 > 0.05$), -.511 ($p = 0.609 > 0.05$), and -.454 ($p = 0.650 > 0.05$) for (-5, +5), (-3, +3), and (-1, +1), respectively. Here, after the M&A in each of the pairs, the median value of PAT decreased,

which indicates service sector companies perform poorer after the M&A in this profitability ratio. Null hypotheses for all the service sector companies in PAT (H_{05}) in 5, 3, and 1 years are accepted it means that There is no significant difference in profits after tax (PAT) between pre-merger and post-merger periods in service sector companies in all the pairs.

After the M&A, median ratio of profitability indicator (ROCE) for service sector companies, when separately measured, was observed that the median ratio decreased in long-term and medium-term but statistically significant in the long-term. A slight increase is observed in the short-term pair after the merger, but it is statistically insignificant. In ROCE, the comparison of median provides a Z statistics of -2.953 ($p = 0.003 < 0.01$), -.994 ($p = 0.320 > 0.05$), and -1.477 ($p = 0.140 > 0.05$) for (-5, +5), (-3, +3), and (-1, +1), respectively. Here, after the merger, ROCE decreased in two of the tested pairs, but in the short-term pair, it slightly increased. This indicates that service sector companies perform slightly better in the short term after the M&A, but after a period of time, the results are not satisfactory in comparison to the results when all firms are analysed as a whole. As a result, service sector acquirer firms will not be able to utilise the capital assets effectively and efficiently to create more income. Null hypotheses for service sector companies in ROCE (H_{06}) are accepted in 3 and 1 years it means that there is no significant difference in return on capital employed (ROCE) between pre-merger and post-merger periods in service sector companies and rejected in 5 years it signifies that there is significant difference in return on capital employed (ROCE) between pre-merger and post-merger periods in service sector companies.

After the M&A, median ratio of the liquidity indicator (CR) for service sector companies, when separately measured, is observed to median ratio has increased in the long-term pair only out of the total three pairs, but it is statistically insignificant in all the pairs. In CR, the comparison of median provides a Z statistics of -1.306 ($p = 0.191 > 0.05$), -.847 ($p = 0.397 > 0.05$), and -.284 ($p = 0.776 > 0.05$) for (-5, +5), (-3, +3), and (-1, +1), respectively. In this case, CR decreased with an insignificant value after the M&A in service sector companies, which indicates the liquidity position of service sector acquirer firms was poorer when measured separately in comparison to the results when all firms were analysed as a whole. Null hypotheses for service sector companies in CR (H_{07}) are accepted in 5, 3, and 1 year it means there is no significant difference in the current ratio (CR) between the pre-merger and post-merger periods in service sector companies.

After the M&A, median ratio of the solvency indicator (DER) for service sector companies, when

separately measured, is observed that median ratio has fallen, which is a good indication for M&A and in all the pairs, but a statistically significant result was only observed in long-term pair. In DER, the comparison of median provides a t-statistic (here, Z statistics) of -2.355 ($p = 0.0198 < 0.05$), -1.602 ($p = 0.109 > 0.05$), and -.629 ($p = 0.530 > 0.05$) for (-5, +5), (-3, +3), and (-1, +1), respectively. The higher the DER, the higher the risk to investors and lenders for a business after the M&A. So, a lower DER is better for the companies. It can be observed that in the long-term after the M&A, the median DER decreased in each of the pairs. Due to that reason, M&A acquirer companies can easily reap the benefits of loan availability from borrowers and investors. In this case, DER decreases with an insignificant value after the M&A in service sector companies, which indicates the solvency position of service sector acquirer firms is stronger when measured separately in comparison to the results when all firms are analysed as a whole. Null hypotheses for service sector companies in DER (H_{08}) are accepted in 3 and 1 year it means that there is no significant difference in debt-to-equity ratio (DER) between pre-merger and post-merger periods in service sector companies and rejected in 5 years it means that there is significant difference in debt-to-equity ratio (DER) between pre-merger and post-merger periods in service sector companies.

Table VI: Normality test for manufacturing sector companies

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PRE5PATMANUFACTURING	0.221	41	0.000	0.669	41	0.000
POST5PATMANUFACTURING	0.304	41	0.000	0.466	41	0.000
PRE3PATMANUFACTURING	0.3	41	0.000	0.541	41	0.000
POST3MANUFACTURING	0.335	41	0.000	0.397	41	0.000
PRE1PATMANUFACTURING	0.287	41	0.000	0.553	41	0.000
POST1PATMANUFACTURING	0.309	41	0.000	0.591	41	0.000
PRE5ROCEMANUFACTURING	0.152	41	0.019	0.857	41	0.000
POST5ROCEMANUFACTURING	0.078	41	0.200*	0.975	41	0.488*
PRE3ROCEMANUFACTURING	0.123	41	0.119*	0.933	41	0.018
POST3ROCEMANUFACTURING	0.117	41	0.177*	0.963	41	0.204*
PRE1ROCEMANUFACTURING	0.108	41	0.200*	0.954	41	0.097*

POST1ROCEMANUFACTURING	0.159	41	0.011	0.939	41	0.03
PRE5CRMANUFACTURING	0.417	41	0.000	0.273	41	0.000
POST5CRMANUFACTURING	0.243	41	0.000	0.675	41	0.000
PRE3CRMANUFACTURING	0.284	41	0.000	0.735	41	0.000
POST3CRMANUFACTURING	0.225	41	0.000	0.768	41	0.000
PRE1CRMANUFACTURING	0.202	41	0.000	0.782	41	0.000
POST1CRMANUFACTURING	0.156	41	0.014	0.847	41	0.000
PRE5DERMANUFACTURING	0.231	41	0.000	0.65	41	0.000
POST5DERMANUFACTURING	0.251	41	0.000	0.623	41	0.000
PRE3DERMANUFACTURING	0.31	41	0.000	0.486	41	0.000
POST3DERMANUFACTURING	0.187	41	0.001	0.779	41	0.000
PRE1DERMANUFACTURING	0.242	41	0.000	0.628	41	0.000
POST1DERMANUFACTURING	0.306	41	0.000	0.435	41	0.000

Source: Authors Calculation

From Table VI, it is found that all the indicators or variables are non-normal except return on capital employed in the post 5 year, pre & post 3 year, and pre 1 year, and in the test of normality in Kolmogorov-Smirnov and Shapiro-Wilk test in which the first test interpret that if the p value is less than .05 then we would reject the null hypotheses that the data follows normal distribution and the second test finds the goodness of fit or it is to find whether the data follows the normal distribution or not. So, we reject the null hypothesis for the test of normality in every case except ROCE in 5 and 3year time period. where, the null hypothesis of the test is that, when the p value is less than.05, the data is non-normal or not normally distributed and due to that, a parametric test could not be applied on those parameters. Since the majority of the variables show non-normal results, a parallel non-parametric test, namely the Wilcoxon sign rank test, will be applied to the manufacturing sector companies where Z score is used to analyse the pre and post M&A situation. Here, 5 years is taken as long-term, 3 year is taken as medium-term and 1 year as short-term.

Table VII: Wilcoxon Sign Rank test result for manufacturing sector companies for all Variable

Paired sample(pre,post)	Median pre	Median post	Median change	Z-value	Significance	Null Hypothesis status
Profitability Ratio PAT Manufacturing sector Wilcoxon sign rank test						
-5,+5(Long-term)	55.01	163.13	108.12	-2.469**	0.014	Rejected
-3,+3(Medium-term)	67.08	169.9	102.82	-3.105*	0.002	Rejected
-1,+1(Short-term)	96.34	74.97	-21.37	-.460	0.646	Accepted
Profitability Ratio ROCE Manufacturing sector Wilcoxon sign rank test						
-5,+5(Long-term)	7.57	6.94	-0.63	-.311	0.756	Accepted
-3,+3(Medium-term)	7.51	6.64	-0.87	-.823	0.411	Accepted
-1,+1(Short-term)	6.73	4.45	-2.28	-.733	0.464	Accepted
Liquidity Ratio CR Manufacturing sector Wilcoxon sign rank test						
-5,+5(Long-term)	1.1	1.22	0.21	-.849	0.396	Accepted

- 3,+3(Medium -term)	1.08	1.21	0.13	-.706	0.48	Accepted
-1,+1(Short- term)	1.16	1.21	0.05	-.052	0.959	Accepted
Solvency Ratio DER Manufacturing sector Wilcoxon sign rank test						
-5,+5(Long- term)	0.56	0.33	-0.23	-2.103**	0.035	Rejected
- 3,+3(Medium -term)	0.56	0.45	-0.09	-.160	0.873	Accepted
-1,+1(Short- term)	0.37	0.45	0.08	-1.430	0.153	Accepted

*, ** Significant at 1% & 5% level of significance

Source: Authors Calculation

It is observed from Table VII that, after the M&A, the median ratio of profitability indicator (PAT) for manufacturing sector companies, when separately measured, it is found that PAT is increased in two of the pairs out of the total three pairs, and it is also statistically significant in that 2 pair. The median ratio is the difference between the median in the pre- M&A period and the median in the post- M&A period. In PAT, the comparison of median provides a Z statistics of -2.469 ($p = 0.014 < 0.05$), -3.105 ($p = 0.002 < 0.01$), and -.460 ($p = 0.646 > 0.05$) for (-5, +5), (-3, +3) and (-1, +1), respectively. Here, after the M&A, both in long-term and medium-term median value of PAT increased but in short- term, the median value of PAT decreased, that indicates manufacturing sector companies performs better after the M&A in this profitability ratio.

The null hypotheses for all the manufacturing sector companies in PAT (H_{09}) were rejected in 5, 3 year it means that there is no significant difference in profits after tax (PAT) between pre-merger and post-merger

periods in manufacturing sector companies and accepted in 1 year it means that there is no significant difference in profits after tax (PAT) between pre-merger and post-merger periods in manufacturing sector companies.

After the M&A, the median ratio of profitability indicator (ROCE) for manufacturing sector companies, when separately measured, was found that ROCE has decreased in all the pairs and also statistically insignificant. In ROCE, the comparison of median provides a Z statistics of -0.311 ($p = 0.756 > 0.05$), -0.823 ($p = 0.411 > 0.05$), and -0.733 ($p = 0.464 > 0.05$) for $(-5, +5)$, $(-3, +3)$, and $(-1, +1)$, respectively. Here, after the merger, ROCE decreased in all the tested pairs. This indicates that after the M&A, acquirer firms will not be able to utilise the capital assets effectively and efficiently to create more income from the point of view of manufacturing sector acquirer companies when it is separately measured. Null hypotheses for manufacturing sector companies in ROCE (H_{10}) are accepted in 5, 3, and 1 year it means that there is no significant difference in return on capital employed (ROCE) between pre-merger and post-merger periods in manufacturing sector companies.

After the M&A, the median ratio the liquidity indicator (CR) for manufacturing sector companies, when separately measured, was found that it has increased in all the pairs, but it was statistically insignificant. In CR, the comparison of median provides a Z statistics of -0.849 ($p = 0.396 > 0.05$), -0.706 ($p = 0.48 > 0.05$), and -0.052 ($p = 0.959 > 0.05$) for $(-5, +5)$, $(-3, +3)$, and $(-1, +1)$, respectively. In this case, CR increases slightly but with an insignificant value after the M&A, which indicates a slight change in the liquidity position. Null hypotheses for manufacturing sector companies in CR (H_{11}) are accepted in 5, 3, and 1 year it means that there is no significant difference in Current ratio (CR) between pre-merger and post-merger periods in manufacturing sector companies.

After the M&A, median ratio of solvency indicator (DER) for manufacturing sector companies, when separately measured it is found that it has decreased in two of the pair out of total three pairs, which is significant in long-term but insignificant in medium-term. In short-term, the median value increases, but it is statistically insignificant. In DER, the comparison of median provides a Z statistics of -2.103 ($p = 0.035 < 0.05$), -0.160 ($p = 0.873 > 0.05$), and -1.430 ($p = 0.153 > 0.05$) for $(-5, +5)$, $(-3, +3)$, and $(-1, +1)$, respectively. The higher the DER, the higher the risk to investors and lenders for a business after the M&A. It can be observed that in the long-term after the M&A, median DER decreased in two of the pairs, which are in long-term and in medium-term but there is no such effect of this declining situation observed

in the short-term. Due to that reason, M&A acquirer companies can reap the benefits of loan availability easily from borrowers and investors in long-term and medium-term but when it is measured separately in comparison to the results when all firms are analysed as a whole, it indicates that the solvency position of manufacturing sector acquirer firms is better. Null hypotheses for manufacturing sector companies in DER (H_{12}) are accepted in 3 and 1 year it means that there is no significant difference in debt-to-equity ratio (DER) between pre-merger and post-merger periods in manufacturing sector companies and rejected in 5 years that signifies there is significant difference in debt-to-equity ratio (DER) between pre-merger and post-merger periods in manufacturing sector companies.

Findings

It is evident from Table III that there is a significant impact in the medium and long-term on the profitability indicator PAT, but in short-term no such impact is seen for all 56 companies as a whole after the merger. Another profitability indicator, ROCE, has not shown any impact after the merger in any of the periods and the results also remain the same for the liquidity indicator, CR. Debt to equity ratio, which is an indicator of solvency ratio, is showing a long-term impact after 5 years of the merger but is non-responsive in medium or short-term period.

After segregating the companies into manufacturing and service sector, it is found in Table V which shows the results for 15 service sector companies, on profitability indicator PAT, there is no such significant impact was seen in long, medium or short-run which means service sector companies perform poorer in profitability indicator PAT, but another profitability indicator ROCE, significant impact is found only in long-term or 5 years, but not in medium-term period 3 years, or in short-term period 1 year but apart from its significance in short-term ROCE improved but the improvement is insignificant. There is no such impact after the merger in any of the periods for the liquidity indicator CR, which is in line with the results of all 56 companies as a whole indicating that the service sector firms performed poor after the M&A. Debt to equity ratio, which is an indicator of solvency ratio, is showing a significant long-term impact after 5 years of the merger. But in medium-term 3 years and short-term 1 year period in spite of its insignificant result the solvency is in better position.

Segregated results in case of manufacturing sector 41 companies shown in Table VII that there is a significant impact in medium and long-term on the Profitability indicator PAT but in short-term, no such impact is seen after the merger. There is no such impact found after the merger in any of the periods for another profitability indicator ROCE. It is found that for the liquidity indicator CR that liquidity position became better in manufacturing sector companies but the results are not significant after the merger in any of the periods. Debt to equity ratio, which is an indicator for solvency ratio, is showing a long-term impact after the 5 years of the merger but also remain non-responsive in medium or short-term period, which indicates that manufacturing sector companies has no such significant impact on the manufacturing sector companies.

Conclusions

After the merger, it was observed that profitability indicator PAT highly impacted the long and medium term and solvency indicator impacted the long-term but other indicators does not create any impact when all the companies tested as a whole.

Comparative results of manufacturing with service sector companies shows that PAT (profitability) impacted positively after the M&A more on the manufacturing sector companies than the service sector companies, which indicates that after the M&A, a higher value remains in the hand of the manufacturing companies after paid-off different expenses and taxes and also shareholders dividend can be paid-off timely or to create more amount for the specific or general reserve. Another profitability indicator, ROCE, impacted more in service sector companies, which indicates service sector firms has made better and more effective use of its resources to create profits after M&A. Liquidity indicator current ratio is better in manufacturing sector companies than service sector which indicates that service sector acquirer companies can pay-off their short-term liabilities timely and quickly convert its assets into cash to mitigate short-term obligations without default . Solvency ratio DER has impacted slightly better in service sector companies, which indicates loan availability is better for service sector companies after the merger.

Recommendations

In this research paper, data has solely taken into account from BSE-listed companies that underwent mergers between April 1, 2013 and March 31, 2014. Only companies with 10 years' worth of financial

data, 5 years prior to a merger, and 5 years after the merger that were available in the CMIE Prowess database. Furthermore, aside from mergers and acquisition, various macro and micro-economic factors may have a long-term impact on the accounting performance of the acquiring organization. In the current study, we have seen how merger and acquisition affect the accounting performance of the acquiring firm, but there is still opportunity for further study with the marketing- based indicators. Additionally, impact of cross-border mergers can be examined separately. Inclusion of control firms can also add some insights.

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