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An Analytical Assessment of the Effect of Merger of Centurion Bank of Punjab with HDFC Bank

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Abstract
The article assesses the synergic effect of merger of Centurion Bank of Punjab with HDFC Bank in terms of different financial parameters. Several financial ratios, Kolmogorov-Smirnov test,Shapiro–Wilk test, Paired Sample T test,Wilcoxon Signed-Ranks Test have been widely applied to recognize the difference in pre and post merger operational performance of merged entity of HDFC bank after analyzing data for four years prior to merger and for four years after the merger .The study shows that there are significant differences between pre and post merger above mentioned financial indicators and majority of the financial indicators (13 out of 17) of Centurion Bank of Punjab (Target Bank) and HDFC Bank (Acquiring Bank) display significant improvement in their operational performance during post- merger period.
Keywords: Merger, India, Centurion Bank of Punjab with HDFC Bank.
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1. Introduction

The banking sector has become one of the most important sectors that have gained new interest from researchers and economists owing to the vital role played by banks in the progress of an economy, especially emerging economy like India. Mergers and acquisitions are progressively becoming strategic choice for organizational growth and achievement of business goals including profit, empire, building, market dominance and long term survival. It is an essential corporate strategic measure that assists the merged entity in external growth and afford it competitive advantage. It is a planned decision to maximize the value to the share holders as well as the firm. As an inorganic growth strategy, M&A are pathways to achieve efficiency and to create value. It is most extensively used strategy by firms to strengthen and maintain their position in the market place. . In India, the real momentum for growth on M&A activity had been in ushering of economic reforms introduced in the year 1991. The issue of impact of mergers on the efficiency of banks has been well studied in the literature. Merger of two weaker banks or merger of one healthy bank with one weak bank can be treated as the faster and less costly way to improve profitability than spurring internal growth (Franz, H. Khan, 2007) .One of the major motive behind the mergers and acquisition in the banking industry is to achieve economies of scale and scope. This is because as the size increases the efficiency of the system also increases. Mergers also help in the diversifications of the products, which help to reduce the risk as well (Bhan, Akil, 2009).

Merger of Centurion Bank of Punjab with HDFC Bank:

On May 23, 2008, the amalgamation of Centurion Bank of Punjab with HDFC Bank was formally approved by Reserve Bank of India to complete the statutory and regulatory approval process. As per the scheme of amalgamation, shareholders of CBoP received 1 share of HDFC Bank for every 29 shares of CBoP. The shareholders of erstwhile CBoP have been allotted 6,98,83,956 equity shares of Rs.10/- each pursuant to the share swap ratio of one equity share of Rs.10/- each of HDFC Bank Limited for every twenty nine equity shares of Re.1/- each held in Centurion Bank of Punjab Ltd. by them as on June 16, 2008. The merger has been accounted for as per the pooling of interest method of accounting in accordance with the scheme of amalgamation. Adjustments have been made to the amalgamation reserve to harmonize accounting policies of CBoP with that of HDFC Bank principally relating to provisioning norms on impaired loans and depreciation policies on fixed assets. Merger related expenses have also been adjusted against the amalgamation reserve. The amalgamation added significant value to HDFC Bank in terms of increased branch network, geographic reach, and customer base, and a bigger pool of skilled manpower.

In view of the brief prelude regarding rationale behind merger and acquisition, the objective of the study is to critically analyze and evaluate the impact of merger on the Efficiency of HDFC Bank during Post Liberalization Regime in terms of different parameters. The study has further attempted to investigate and test whether there exist any significant deviations in the results achieved by the banks after merger. Keeping in mind the significance of the present study, the objectives of the present study are:

a) To measure ‘pre merger’ performance of target bank (Centurion Bank of Punjab) as well as acquiring bank (HDFC Bank) and ‘post merger ’ financial performance of merged entity of HDFC Bank.
b) To analyze whether there exists any variation in the ‘pre merger ’ and ‘post merger’ financial performance of the sample banks undertaken into our study dividing the study period into pre-merger and post merger period.
c) To assess the nature and magnitude as well as trend in growth of performance of those sample banks under

our consideration during pre and post-merger period.

d) To evaluate the impact of merger on financial as well as operative performance of sample banks under our consideration.

2. Methodology:

2.1.Collection of data:

The present study is based on secondary data published by the Reserve Bank of India, Annual Report of Public Sector Banks, Trend and Progress of Banking in India, Study Reports of various Committees set up by the Government of India etc. Data have also been collected from the websites of various government and non-government agencies. The financial and accounting data of banks has been mainly collected from banks' Annual Report of several years to evaluate the impact of M&As on the performance of said banks. Financial data has also been collected from *www.moneycontrol.com* for the study. Moreover, several banking journals, research work published in seminar lectures etc have been carefully followed to analyse our results. The secondary data which has been collected was subjected to descriptive and inferential analysis.

2.2. Period of Study:

In order to make a comparison of the performance of the target bank and acquiring bank, in our study of the merger of the Centurion bank of Punjab with HDFC Bank Ltd , data for four years prior to merger and data for four years after the merger have been analyzed. Thus, a period of nine years (2007-08 to 2014-15) has been analyzed.

2.3. Method of Analysis:

For attaining the result vis-à-vis to analyze the impact of merger on acquirer banks, pre and post merger financial performance have been compared in terms of several suitable financial ratios. The pre and post merger financial performance have been achieved in terms of Investment- Deposit Ratio, Priority sector advance as % to total advance, Deposit per employee, Advance per employee, Interest income as a % of total income, Non-interest income as a % of total income, Interest expenses as a % of total expenses, Establishment expenses as a % of total expenses, Other operating expenses as a % of total expenses, Spread as a % to Assets, Interest Income as % to average working funds, Non-interest Income as % to average working funds, Operating profit as % to average working funds, Return on Asset, Net NPA as % to net advances, Capita Adequacy Ratio [CAR(%) etc.

The pre-merger (four years before) and post -merger (after four years) financial ratios have been compared. The year of merger is considered as base year and denoted as 0 which has been excluded from the analysis. Keeping in mind the objective of the study, we have taken into consideration the mean difference, standard deviation, independent t-test as tools of statistical evaluation of our study. In order to test the null hypothesis, paired t- test is used. This test is a parametric statistical hypothesis test for the case of two related samples on a single sample. This study has also attempted to test the hypotheses relating to the impact of M&A on the various performance parameters and thus derive a conclusion about whether the event of M&A has made a positive impact on the performance of the sample bank or not. The ratios for each of the performance parameters were estimated for the above mentioned merger individually. Thereafter, we compared means of the performance parameter over time i.e. before the merger vs after the merger.

2.4.Financial ratio used:

(i) Credit -Deposit Ratio=Total Advance/Total Deposit X 100
(ii) Investment- Deposit Ratio: Total Investment / Total Deposit X 100
(iii) Priority sector advance as % to total advance: Priority sector advance / Total Advance X 100
(iv) Deposit per employee: Total Deposit / no of employees
(v) Advance per employee: Total Advance / no of employee
(vi) Interest income as a % of total income: Interest earned / Total income X 100
(vii) Non-interest income as a % of total income: Non-interest earned / Total income X 100
(viii) Interest expenses as a % of total expenses= Total interest expended / Total expenditure
(ix) Establishment expenses as a % of total expenses = Establishment expense / Total expenditure
(x) Other operating expenses as a % of total expenses = Other operating expenses / Total expenditure
(xi) Spread as a % to Assets =spread (i.e.interest income minus interest expenses)/ Total assets
(xii) Interest Income as % to average working funds =Interest earned/Average working fund(AWF)
(xiii) Non-interest Income as % to average working funds=Non-interest earned/ Average working fund(AWF)
(xiv) Operating profit as % to average working funds= Operating profit/ Average working fund(AWF)
(xv) Return on Asset(ROA)= Net profit/ Average assets X 100
(xvi) Net NPA as % to net advances= Net NPA/ Net advances X 100
(xvii) CAR(%)=Tier-I Capital(%)+Tier-II Capital(%)

2.5. Hypotheses for testing the significant difference between Pre and Post merger financial indicators:

The present work is essentially based on secondary sources of data; hence hypothesis is being tested by using published materials. For the purpose of study, *Null Hypothesis* is that there is no difference in mean value of selected variables before merger and after merger and *Alternate Hypothesis* is that there is difference in mean value of selected variables before merger and after merger.

Hypotheses have been formulated for testing the significant difference between Pre and Post merger financial indicators which have been depicted below:

$\mathbf{H_0}$ (Null Hypothesis): There is no significance difference between the pre and post merger financial indicators like Investment- Deposit Ratio, Priority sector advance as % to total advance, Deposit per employee, Advance per employee, Interest income as a % of total income, Non-interest income as a % of total income, Interest expenses as a % of total expenses, Establishment expenses as a % of total expenses, Other operating expenses as a % of total expenses, Spread as a % to Assets, Interest Income as % to average working funds, Non-interest Income as % to average working funds, Operating profit as % to average working funds, Return on Asset, Net NPA as % to net advances, Capita Adequacy Ratio [CAR(%) etc.Alternatively,

Let Mean value before merger be X1, Mean value after merger be X2.

Ho: X1 = X2 Null Hypothesis: There is no difference in mean value of selected variables before merger and after merger.

H_1 (Alternative Hypothesis): There is significance difference between the pre and post merger financial indicators like Investment- Deposit Ratio, Priority sector advance as % to total advance, Deposit per employee, Advance per employee, Interest income as a % of total income, Non-interest income as a % of total income, Interest expenses as a % of total expenses, Establishment expenses as a % of total expenses, Other operating expenses as a % of total expenses, Spread as a % to Assets, Interest Income as % to average working funds, Non-interest Income as % to average working funds, Operating profit as % to average working funds, Return on Asset, Net NPA as % to net advances, Capita Adequacy Ratio [CAR(%) etc.Alternatively,

H1: X1≠ X2 Alternate Hypothesis: There is difference in mean value of selected Variables before merger and after merger

After the ratios for each of the performance parameters were estimated for the above mentioned mergers individually, this was followed by the Shapiro-Wilk normality test. On the basis of the normality results, paired t test at 95% confidence level was carried out for parameters following normal distribution and Wilcoxon Paired Sign-Rank test was conducted for factors not following normal distribution. We have also conducted Kolmogorov-Smirnov test to justify whether there is violation in normality assumption**.**

Thereafter, we compared means of the performance parameter over time i.e. before the merger vs after the merger. t-test and Wilcoxon test were chosen because those are popularly used for computing pre-post analysis of a phenomenon. The Shapiro–Wilk test is also conducted to test of normality. The different parameters chosen for study were ROA, CDR, IDR, PSA, DPE, APE, IITI, NIITI, IETE, EETE, OOETE, STA, IIAWF, NIIAWF, OPAWF, NNPANA, CAR.

2.6.Kolmogorov-Smirnov test

This test assesses whether there is significant departure from normality in the population distribution for each of the banks. The null hypothesis states that the normality assumption is not violated.

2.7..Shapiro–Wilk test

The Shapiro–Wilk test is a test of normality in frequentist statistics. The null-hypothesis of this test is that the population is normally distributed.

2.8. Paired Sample T Test

It checks whether there is any significant change in normal return before and after the announcement of the M&A event. The hypotheses for the test are stated below (Bhaumik and Selarka, 2008).

H_O: There is no significant difference in normal return due to the occurrence of the event.

H_1: There is a significant difference in normal return due to the occurrence of the event .

The hypotheses can be expressed in two different ways that express the same above idea and are mathematically equivalent:

H_0: $\mu_1 = \mu_2$ ("the paired population means are equal")

H_1: $\mu_1 \neq \mu_2$ ("the paired population means are not equal") or

H_0: $\mu_1 - \mu_2 = 0$ ("the difference between the paired population means is equal to 0")

H_1: $\mu_1 - \mu_2 \neq 0$ ("the difference between the paired population means is not 0")

Where μ_1 is the population mean of variable 1, and μ_2 is the population mean of variable 2.

2.9. Wilcoxon Signed-Ranks Test:

The Wilcoxon Signed-Rank test is a non-parametric statistical hypothesis test used when comparing two related samples, matched samples, or repeated measurements on a single sample to assess whether their population mean ranks differ (i.e. it is a paired difference test). It can be used as an alternative to the paired Student's t-test, *t*-test for matched pairs, or the *t*-test for dependent samples when the population cannot be assumed to be distributed. Therefore, it is the non-parametric version of a paired samples t-test. It is used when the difference between the two variables is abnormally distributed. It analyses the difference between the paired observations, taking into account the magnitude of the differences.

3. Analysis of results:

Table 1 depicts that in times of considering the case of Centurion Bank of Punjab and HDFC Bank merger, regarding Credit -Deposit Ratio, Priority sector advance as % to total advance, Deposit per employee, Advance per employee, Interest income as a % of total income , Interest expenses as a % of total expenses, Establishment expenses as a % of total expenses, Spread as a % to Assets, Interest Income as % to average working funds, Operating profit as % to average working funds, Return on Asset, Capita Adequacy Ratio [CAR(%)],null hypotheses are rejected which lead us to conclude that there are significant differences between pre and post merger above mentioned financial indicators.

Table 1:-Average Mean and Standard Deviation of Pre-merger and Post-merger Ratios of combined (Centurion Bank of Punjab and HDFC Bank) and HDFC Bank (Acquiring Bank) considering four year pre and post [Merged on May 23, 2008]

		Mean	Mean Difference	Change in ratios	Std.Deviation	Growth Rate(%)
Credit -Deposit Ratio	Pre-merger	68.27	9.73	I*	2.79	14.25%
	Post-merger	78.00			2.56	
Investment-Deposit Ratio	Pre-merger	41.72	5.17	D**	4.12	-12.40%
	Post-merger	36.55			2.51	
Priority sector advance as % to total advance	Pre-merger	29.85	3.66	I*	3.82	12.26%
	Post-merger	33.51			1.41	
Deposit per employee	Pre-merger	292.10	82.14	I*	28.92	28.12%
	Post-merger	374.25			42.56	
Advance per employee	Pre-merger	198.85	93.80	I*	18.86	47.17%
	Post-merger	292.66			42.19	
Interest income as a % of total income	Pre-merger	79.47	3.19	I*	2.29	4.01%
	Post-merger	82.65			1.38	
Non-interest income as a % of total income	Pre-merger	20.53	3.19	D**	2.29	-15.51%
	Post-merger	17.35			1.38	
Interest expenses as a % of total expenses	Pre-merger	44.55	5.79	I*	4.29	13.00%
	Post-merger	50.34			5.09	
Establishment expenses as a % of total expenses	Pre-merger	11.61	1.16	I*	1.17	10.03%
	Post-merger	12.77			1.18	
Other operating expenses as a % of total expenses	Pre-merger	29.16	8.84	D**	5.11	-30.33%
	Post-merger	20.31			0.96	
Spread as a % to Assets	Pre-merger	3.44	1.16	I*	0.18	33.86%
	Post-merger	3.79			0.13	

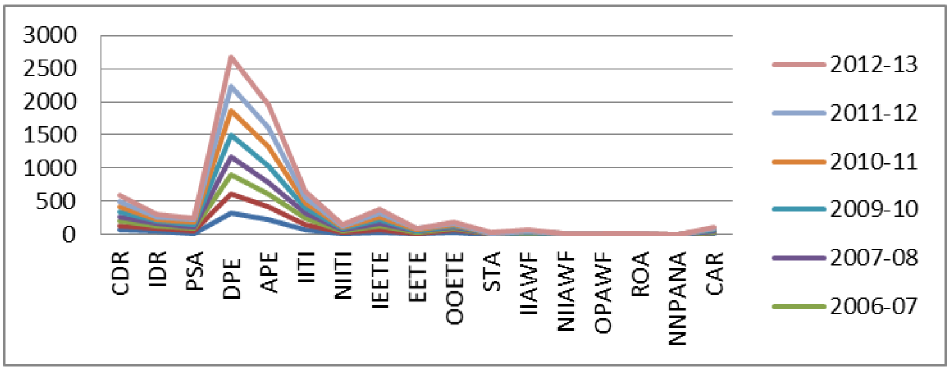
Interest Income as % to average working funds	Pre-merger	8.25	0.68	I*	0.56	8.20%
	Post-merger	8.93			0.86	
Non-interest Income as % to average working funds	Pre-merger	2.16	0.29	D**	0.30	-13.53%
	Post-merger	1.87			0.11	
Operating profit as % to average working funds	Pre-merger	2.25	0.94	I*	0.22	41.71%
	Post-merger	3.19			0.12	
Return on Asset	Pre-merger	1.05	0.65	I*	0.09	61.81%
	Post-merger	1.69			0.17	
Net NPA as % to net advances	Pre-merger	1.02	0.80	D**	0.26	-78.54%
	Post-merger	0.22			0.06	
Capita Adequacy Ratio [CAR(%)]	Pre-merger	13.33	2.49	I*	2.54	18.67%
	Post-merger	15.82			7.93	

*I stands for Increase
**D stands for Decrease
Source: Author's own estimate using e.views 5.

Regarding Investment- Deposit Ratio, Non-interest income as a % of total income, Other operating expenses as a % of total expenses, Non-interest Income as % to average working funds , Net NPA as % to net advances, null hypotheses are rejected signifying that there are significant differences between pre and post merger above mentioned financial indicators.

The results suggest that the performance of banks has been improved in terms of Credit -Deposit Ratio, Priority sector advance as % to total advance, Deposit per employee, Advance per employee, Interest income as a % of total income , Interest expenses as a % of total expenses, Establishment expenses as a % of total expenses, Spread as a % to Assets, Interest Income as % to average working funds, Operating profit as % to average working funds, Return on Asset, Net NPA as % to net advances ,Capita Adequacy Ratio [CAR(%)]but Regarding Investment- Deposit Ratio, Non-interest income as a % of total income, Other operating expenses as a % of total expenses , Non-interest Income as % to average working funds , these ratios show negative trend in post merger period.

Fig:1:Graphical presentation of pre and post merger financial performance of Centurion Bank of Punjab and HDFC Bank



Source: own estimate

The result of the normality shows that the significant value of PSA, STA, NIIAWF , CAR of the HDFC bank during entire sample period 2000-01 to 2014-15(both pre-merger and post-merger) is less than 0.05, meaning that normality assumption has been violated. Since the significant values of each of the remaining variables (in table-2) is greater than 0.05, we do not reject the null hypothesis and conclude that these data do not violate the normality assumption. The same result is also confirmed by the Shapiro-Wilk test.

Table 2: Kolmogorov-Smirnov test and Shapiro-Wilk test of normality of merged entity of HDFC bank

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
CDR	.160	15	.200[*]	.895	15	.080
IDR	.162	15	.200[*]	.918	15	.177
PSA	.225	15	.040	.869	15	.033
DPE	.109	15	.200[*]	.963	15	.748
APE	.149	15	.200[*]	.898	15	.090
IITI	.147	15	.200[*]	.948	15	.489
NIITI	.147	15	.200[*]	.948	15	.489
IETE	.176	15	.200[*]	.936	15	.339
EETE	.125	15	.200[*]	.948	15	.501
OOETE	.180	15	.200[*]	.917	15	.174
STA	.229	15	.033	.868	15	.032
IIAWF	.172	15	.200[*]	.927	15	.246
NIIAWF	.285	15	.002	.810	15	.005
OPAWF	.131	15	.200[*]	.970	15	.859
ROA	.177	15	.200[*]	.899	15	.093
NNPANA	.154	15	.200[*]	.930	15	.276
CAR	.258	15	.008	.742	15	.001
a. Lilliefors Significance Correction						
*. This is a lower bound of the true significance.						

Source: *Author's own estimate*

Table 3 shows that the negative mean rank is less than the positive mean rank of PSA, STA, NIIAWF of merged entity of HDFC bank. This suggests that the Priority sector advance as % to total advance ratio measure (PSA), Spread as a % to Assets (STA), Non-interest Income as % to average working funds (NIIAWF) in post merger period are likely higher than that in the pre merger period. So we can infer that the phenomenon of merger has accentuated these performance parameters in merged entity of HDFC bank.

Table 3: Wilcoxon Signed Ranks Test of merged entity of HDFC bank

Ranks				
		N	Mean Rank	Sum of Ranks
PSApost – PSApre	Negative Ranks	1[a]	1.00	1.00
	Positive Ranks	5[b]	4.00	20.00
	Ties	0[c]		
	Total	6		
STApost – STApre	Negative Ranks	0[d]	.00	.00
	Positive Ranks	6[e]	3.50	21.00
	Ties	0[f]		
	Total	6		
NIIAWFpost - NIIAWFpre	Negative Ranks	0[g]	1.50	3.00
	Positive Ranks	4[h]	4.50	18.00
	Ties	0[i]		
	Total	6		
CARpost – CARpre	Negative Ranks	1[j]	6.00	6.00
	Positive Ranks	5[k]	3.00	15.00
	Ties	0[l]		
	Total	6		
a. PSApost < PSApre				
b. PSApost > PSApre				
c. PSApost = PSApre				
d. STApost < STApre				
e. STApost > STApre				
f. STApost = STApre				
g. NIIAWFpost < NIIAWFpre				
h. NIIAWFpost > NIIAWFpre				
i. NIIAWFpost = NIIAWFpre				
j. CARpost < CARpre				
k. CARpost > CARpre				

Source: *Author's own estimate*

Table 3 also shows that the negative mean rank is higher than the positive mean rank in case of Capital Adequacy Ratio (CAR). This suggests that the Capital Adequacy Ratio (CAR)position in post merger period is likely lesser than that in the pre merger period. So we can infer that the phenomenon of merger has turned down the Capital Adequacy Ratio (CAR) position of the companies.

Table 4: Wilcoxon Test Ranks of merged entity of HDFC bank

Test Statistics[c]				
	PSApost - PSApre	STApost - STApre	NIIAWFpost - NIIAWFpre	CARpost - CARpre
Z	-1.992[a]	-2.201[a]	-1.572[a]	-.943[a]
Asymp. Sig. (2-tailed)	.046	.028	.116	.345
a. Based on negative ranks.				
b. Wilcoxon Signed Ranks Test				

Source: *Author's own estimate*

By applying the Wilcoxon signed rank test, we can see that for two ratios, Priority sector advance as % to total advance ratio measure (PSA), Spread as a % to Assets (STA), all the 2 ratios, the significance level is less than 0.05 (0.046 and 0.028 respectively), therefore, the null hypothesis is rejected which indicates that there is significant difference between the pre and the post-merger performance on the basis of PSA and STA of HDFC Bank . Likewise, if we compare the individual ratio, we have found that the post-merger PSA and STA performance for all the four years has been better than the pre-merger period. But in case of Non-interest Income as % to average working funds (NIIAWF) , Capital Adequacy Ratio (CAR) ratios, the significance level is more than 0.05 (0.116 and 0.345 respectively), therefore, the null hypothesis is accepted which indicates that there is no significant difference between the pre and the post-merger performance on the basis of NIIAWF and CAR of HDFC bank. But, if we compare the individual ratio, we have found that the post-merger NIIAWF performance for all the four years has been declined than the pre-merger period and better results have been found in post merger period in case of CAR ratio.

Table 5: Paired Samples Statistics of Centurion Bank of Punjab and HDFC and merged entity of HDFC bank

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	CDRpre	53.73666	6	12.68963	5.18052
	CDRpost	79.26166	6	2.82081	1.15159
Pair 2	IDRpre	59.42833	6	6.38194	2.60541
	IDRpost	36.01	6	2.46624	1.00683
Pair 3	DPEpre	446.04	6	57.66639	23.54220
	DPEpost	437.815	6	105.14092	42.92360
Pair 4	APEpre	237.92666	6	55.92914	22.83297
	APEpost	349.05	6	93.92021	38.34276
Pair 5	IITIpre	83.11666	6	2.51748	1.02776
	IITIpost	83.13333	6	1.31346	.53621
Pair 6	NIITIpre	16.88333	6	2.51748	1.02776
	NIITIpost	16.86666	6	1.31346	.53621
Pair 7	IETEpre	51.895	6	9.25421	3.77801
	IETEpost	52.06166	6	4.76428	1.9450
Pair 8	EETEpre	7.87333	6	1.58066	.64530
	EETEpost	11.90666	6	1.6269	.66418
Pair 9	OOETEpre	22.1	6	3.62707	1.48074
	OOETEpost	20.03166	6	.86605	.35356
Pair 10	IIAWFpre	7.88	6	1.06079	.43307
	IIAWFpost	9.17	6	.76834	.31367
Pair 11	OPAWFpre	2.905	6	.152545	.062276
	OPAWFpost	3.265	6	.14976	.06114
Pair 12	ROApre	1.4867	6	.07992	.03263
	ROApost	1.8	6	.21004	.08575
Pair 13	NNPANApre	.36	6	.13312	.05434
	NNPANApost	.2333	6	.05164	.02108

In case of pre and post merger cash deposit ratio,(CDR pre & CDR post),since the calculated value of t (-6.269) for N=6 (as in Table 6) is higher than the table value (2.571 at $t_{0.025}$,df =5), we reject the null hypothesis. The results are significant at 0.05 level of significance (p=.002). Therefore, the results of the above table show significant difference between pre and post M&A cash deposit ratio, because the p-value is lesser than 0.05. Therefore, after merger and acquisition taken place, there is significant difference in the performance of the said HDFC bank in India as H_0 is rejected. This indicates that the means of the pre and post merger cash deposit ratio values are different significantly.

Table-6: Paired Samples t Test of Centurion Bank of Punjab and HDFC and merged entity of HDFC bank

Pair	Variables (Pre-Post)	Paired Differences					t	df	Sig. (2 tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
1	CDRpre - CDRpost	25.525	9.974	4.072	-35.992	-15.057	-6.269	5	.002
2	IDRpre - IDRpost	23.418	6.839	2.792	16.240	30.596	8.386	5	.000
3	DPEpre - DPEpost	8.225	145.095	59.234	-144.043	160.493	0.139	5	.895
4	APEpre - APEpost	-111.123	79.137	32.307	-194.172	-28.073	-3.44	5	.018
5	IITIpre - IITIpost	-.0166	3.722	1.519	-3.922	3.889	-.011	5	0.992
6	NIITIpre - NIITIpost	.0166	3.722	1.519	-3.889	3.923	.011	5	0.992
7.	IETEpre - IETEpost	-.1666	13.453	5.492	-14.284	13.951	-0.030	5	.977
8.	EETEpre - EETEpost	-4.033	3.178	1.297	-7.368	-.698	3.109	5	0.027
9.	OOETEpre - OOETEpost	2.068	4.119	1.681	-2.255	6.391	1.23	5	.273
10.	IIAWFpre - IIAWFpost	-1.29	1.753	.7159	-3.130	.5503	-1.802	5	.131
11.	OPAWFpre - OPAWFpost	-.360	.0551	.0225	-.4178	-.30210	-15.993	5	.000
12.	ROApre - ROApost	-.3133	.2773	.1132	-.6043	-.0223	-2.769	5	.039
13.	NNPANApre - NNPANApost	.12667	.13721	.05602	-.01733	.27066	2.261	5	.073

Source: *Author's own estimate*

Even some ratios individually depicts that there is slight increase or decrease in the financial performance of banks, but paired Samples t Test shows in this study that there is no significant impact. From Table 6, we observe that in pair 1, the post merger cash deposit ratio mean is greater than that of the pre merger period. We, therefore, conclude that it is more likely to have been due to some systematic and deliberate cause. If all other confounds are eliminated, this systematic cause must have been the event of merger.

In case of pre and post merger Investment-Deposit ratio(IDRpre & IDRpost), since the calculated value of t =8.386) for N=5 (as in pair 2 in table-6) is higher than the table value (2.571 at $t_{0.025}$,df =5), we reject the null hypothesis. The results are significant at 0.05 level of significance (p=.000). Therefore, the results of the above table show significant difference between pre and post M&A Investment-Deposit ratio , because the p-value is smaller than 0.05. Therefore, after the merger and acquisition, there is significant difference in the performance of the said HDFC bank in India in terms of Investment-Deposit ratio as H_0 is rejected. This indicates that the means of the pre and post merger priority sector advance ratio values are different significantly. Following the pattern of cash deposit ratio,(CDR pre & CDR post) and Investment-Deposit ratio(IDRpre & IDRpost),,present study shows similar trend in case of pre and post merger advance per employee(APEpre & APEpost), pre and post merger establishment expenses as a % of total expenses(EETEpre & EETEpost), pre and post merger fund Operating profit as % to average working funds (OPAWFpre - OPAWFpost), pre and post merger return on total asset(ROApre& ROApost). On the contrary, in case of pre and post merger (DPEpre & DPEpost) , (IITIpre – IITIpost), (NIITIpre – NIITIpost), (IETEpre – IETEpost), (OOETEpre – OOETEpost), (IIAWFpre - IIAWFpost) and (NNPANApre - NNPANApost), since the calculated value of t (=0.139, -0.011, .011, -0.030, 1.23, -1.802and 2.261respectively) for N=6 (as in pair 3,5,6,7,9 ,10and 13 in table-6) is lesser than the table value 2.571 at $t_{0.025}$,df =5), we accept the null hypothesis. The results are not significant at 0.05 level of significance (p=0.895,0.992,0.992,0.977,0.273,0.131,0.073). Therefore, the results of the above table show insignificant difference between Pre and Post M&A ((DPEpre & DPEpost) , (IITIpre – IITIpost), (NIITIpre – NIITIpost), (IETEpre – IETEpost), (OOETEpre – OOETEpost), (IIAWFpre - IIAWFpost) and (NNPANApre - NNPANApost),.This indicates that the means of the pre and post (DPEpre & DPEpost) , (IITIpre – IITIpost), (NIITIpre – NIITIpost), (IETEpre – IETEpost), (OOETEpre – OOETEpost), (IIAWFpre - IIAWFpost) and (NNPANApre - NNPANApost) ratio values are not different significantly.

4. Findings and conclusion:

The results of the merger of Centurion Bank of Punjab with HDFC Bank suggest that the performance of banks has been improved in terms of Credit -Deposit Ratio, Priority sector advance as % to total advance, Deposit per employee, Advance per employee, Interest income as a % of total income , Interest expenses as a % of total expenses, Establishment expenses as a % of total expenses, Spread as a % to Assets, Interest Income as % to average working funds, Operating profit as % to average working funds, Return on Asset, Net NPA as % to net advances ,Capita Adequacy Ratio [CAR(%)]but regarding Investment- Deposit Ratio, Non-interest income as a % of total income, Other operating expenses as a % of total expenses , Non-interest Income as % to average working funds , these ratios show negative trend in post merger period. Therefore, we can conclude that there are significant differences between pre and post merger above mentioned financial indicators and majority of the financial indicators(13 out of 17) of Centurion Bank of Punjab and HDFC Bank display significant improvement in their operational performance during post merger period.

The result of the normality test conducted by Kolmogorov-Smirnov test as well as by the Shapiro–Wilk test shows that out of 17 parameters(financial ratios) undertaken into our study for assessing significant impact of merger on sample banks' performance ,all parameters except Priority sector advance to total advance (PSA), Spread to total Assets (STA), Non-interest Income to average working funds(NIIAWF) , Capita Adequacy Ratio (CAR) of the HDFC bank during entire sample period 2000-01 to 2014-15(both pre-merger and post-merger) do not violate the normality assumption.

Although Wilcoxon Signed Ranks Test of merged entity of HDFC bank indicates that the Priority sector advance as % to total advance ratio measure (PSA), Spread as a % to Assets (STA), Non-interest Income as % to average working funds (NIIAWF) in post merger period are likely higher than that in the pre merger period and reversely, Capital Adequacy Ratio (CAR)position in post merger period is likely lesser than that in the pre merger period., Wilcoxon Test Ranks suggest that there is significant difference between the pre and the post-merger performance on the basis of PSA and STA of HDFC Bank and there is no significant difference between the pre and the post-merger performance on the basis of NIIAWF and CAR of HDFC bank.

Paired Samples t Test suggests that there is significant difference between pre and post merger cash deposit ratio,(CDR pre & CDR post) and pre and post merger Investment-Deposit ratio(IDRpre & IDRpost),, pre and post merger advance per employee(APEpre & APEpost), pre and post merger establishment expenses as a % of total expenses(EETEpre & EETEpost), pre and post merger fund Operating profit as % to average working funds (OPAWFpre - OPAWFpost), pre and post merger return on total asset(ROApre& ROApost). There is no significant difference between between Pre and Post M&A deposit per employee((DPEpre & DPEpost) , pre and post merger interest income to total income(IITIpre – IITIpost), pre and post merger non-interest income to total income(NIITIpre – NIITIpost), (IETEpre – IETEpost),pre and post merger operating expenses to total expenses (OOETEpre – OOETEpost), pre and post merger interest income to average working fund(IIAWFpre - IIAWFpost) and pre and post merger net NPA to net asset(NNPANApre - NNPANApost),.This indicates that the means of the pre and post (DPEpre & DPEpost) , (IITIpre – IITIpost), (NIITIpre – NIITIpost), (IETEpre – IETEpost), (OOETEpre – OOETEpost), (IIAWFpre - IIAWFpost) and (NNPANApre - NNPANApost) ratio values are not different significantly.

The experiential observation of this study suggests that trend of merger in Indian banking sector has so far been confined to restructuring of fragile and financially weak banks. The Government should not be seen merger as a means of bailing out of fragile banks. The empirical findings further advocate that well-built banks should not be allowed to merge with feeble banks because it may have unfavorable impact upon the asset quality of the stronger banks. The need of the hour is that the strong banks should be merged with strong banks to compete with foreign banks and to penetrate in the international financial arena.

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