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RESEARCH ARTICLE

A PRAGMATIC ANALYSIS OF NON-PERFORMING ASSETS OF INDIAN BANKING SECTOR

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ABSTRACT

Indian banking sector is facing the problem of Non Performing Assets (NPAs) in the recent years. Years before, Indian banking sector was in booming condition, but due to various social and economical issues, financial strength of the banks got worse and leads to the problem of NPAs. Though, Indian banks have concentrated more on controlling NPAs, miserably they have failed to do it. Hence, this study analyses the growth rate of NPAs of different banks of Indian banking sector. For analysing the data, non parametric methods of Mann Whitney U test and Kruskal Wallis test have been used. The research data were collected from the annual reports of Reserve Bank of India (RBI). The results of the analysis showed that growth rate of NPAs of over the previous year, differences between and among the growth rate of NPAs of different banks of Indian banking sector.

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INTRODUCTION

Non-Performing Assets (NPAs) of banks are considered as a major issue in Indian banking sector for last few decades. The abrupt result of large amount of NPAs in the banking system leads to bank failure (Nkusu 2011). Numbers of researches have been done on problem of NPAs and the study found that asset quality is a significant factor for the insolvency of banks and the majority of the failed banks have high level of NPAs prior to failure (Barr and Siems, 1994). The foremost reason for the increment of NPAs is concentrating more on the quantitative stretch and less on qualitative stretch of issuing loans (Rupa Rathee and Deepthi Kuhar 2015). NPAs are the sum of total loans and leases past due for 90 days or more and non-accrual loans (Amit Ghosh 2017). A high level of NPAs shows high probability of credit defaults that affect the profitability and net-worth of banks thereby reduce the value of the asset. NPAs affect the liquidity and profitability, in addition to posing threat on quality of asset and survival of banks (Rajan and Dhal 2003). Growth of NPAs has a direct impact on profitability of banks and it involves in the creation of compulsory provisions, which reduces the overall profits and shareholders' value. The problem of NPAs is not only affected the banks but also the whole economy.

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Hence, the NPAs called as financial pollution (Barseghyan 2010). In the recent years Indian banking sector is under financial pressure due to the problem of NPAs. Years before, Indian banking sector was in booming condition, but after sometimes strength of the banks got worsened because of NPAs. Some of the Indian banks have concentrated more on controlling the NPAs, but some banks miserably they have failed to control it (Laveena and Meenakshi Malhotra 2014).

Indian banking sector has comprised with 26 public Sector Banks (6 State Bank of India (SBI) and Associated banks, 19 Nationalized Banks (NBs) and one Public Sector Bank (PSB), 25 Private Sector Banks (14 Old Private Sector Banks (OPSBs) and 11 New Private Sector Banks (NPSBs), 43 Foreign Banks (FBs), 56 Regional Rural Banks (RRBs), 1589 Urban Co-operative banks (UCBs) and 93550 Rural Co-operative banks (RCBs) (RBI Guidelines 2017). Irrespective of banking size and structure all the banks are facing the problem of NPAs. Though, highest volume of NPAs is root cause of bank failure, it can be considered as a symbol of bank crisis (Klein 2013). Hence, reduction of NPAs is an important one to reinstate a strong banking setup and endorse the financial stability (Reinhart and Rogoff 2010). As long as loans and advances due in bank records, some amount of loan accounts have to write as NPAs for various reasons. Though, NPAs cannot be fully avoid, they can be reduced as much as possible by monitoring the accounts regularly and following certain protective measures at the time of new loan

sanction, annual review of existing loan accounts performance, loan renewal and enhancements of existing limits (Espinoza and Prasad 2010). The rehabilitation of viable units, re-phasing loan installments wherever necessary, applying for settlement of the due from Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) and Export Credit Guarantee Corporation (ECGC), Compromise settlements like One Time Settlement (OTS), Out of Court Settlement (OCS) and writing off non-recoverable assets are parts of the process involved in reducing NPAs (Surendra Naik 2017). Pre and post sanction credit monitoring has a foremost role in the minimization of NPAs. Qualitative assessment of financial declarations help to identify the unhealthy progress in accounts and working position of the company, proper assessment of the viability of the project before sanctioning the financial assistance to a borrowing unit are the indispensable aspects in reducing NPAs (Beck and Jakubik 2015). With this background the study analyse and compare the NPAs of the different banks of the Indian banking sector.

Through this article we have examined the trend of NPAs over the past 16 years from 2001-02 to 2016-17 and analysed the difference between the median growth rate of the NPAs of different banks. Followed by the introduction section the trends in NPAs of Indian banking sector presented. Methodology section provides the detail of data set, hypotheses of the study, statistical methods and measuring methods has followed. Results of the analysis have been presented in the results and discussion section. Final section concludes the study.

Trends of npas in Indian banking sector

As mentioned earlier NPAs are the sum of total loans and leases due for past 90 days or more and non-accrual loans, divided by total loans. It can be seen the trend of NPAs of Indian banking sector from the below mention figure.

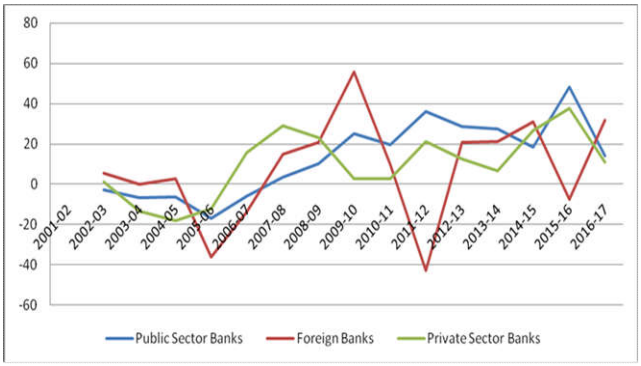

Figure 1. Growth of NPAs of Indian Banking Sector (Growth rate in percent)

Figure one provides ocular view of total NPAs of the different banks of Indian banking sector such as PSBs, FBs and Private sector banks for the period 1st April 2001-02 to 31st March 2016-17. It was found that there was a negative growth rate of public sector banks from 2001-02 to 2006-07 and it showed that the banks have controlled the NPAs certain level over the previous years and in the rest of the years there was ups and downs have been seen. A highest growth rate of 45 percent of NPAs has been found in PSBs during 2015-16. As far as the FBs concerned in the 16 years of period in all the year there was a upward trend in the growth of NPAs over the previous year, except 2006-07, 07-08, 2011-12 and 2015-16.

Private sector banks growth rate is concerned, there was negative growth has been found from 2001-02 to 2005-06 and it showed that the banks managed the NPAs in a manner. In the reaming period there were ups and downs have been seen.

METHODOLOGY

Data Set

The present work is purely based on the second hand data that have been derived from RBI annual records. The collected data have covered the period of 16 years from 2001-02 to 2016-17. The aim of the collected data is to compare the NPAs of the NBs, SBI and its group, PSBs, OPSBs, NPSBs and FBs.

Hypotheses of the Study

The following hypotheses have framed for the study.

H1: There is a significance difference in the growth of NPAs of NBs and SBI and its group in India.

H2: There is a significance difference in the growth of NPAs of PSBs and FBs in India.

***H2*:** There is a significance difference in the growth of NPAs of OPSBs and NPSBs in India.

H4: There is a significance difference among the growth of NPAs of the NBs, SBI and its group, FBs, OPSB and NPSB.

Methods for Data Analysis

Non-parametric tests called Maan-Whitney U test and Kruskal Wallis test have been used to analyse the collected data. The Maan-Whitney U test has been used to compare the NPAs of one bank group with other bank group. The Mann-Whitney procedure is one in which the exact permutation null distribution is compiled for the actual data. This test enjoys great popularity among scientists comparing two groups of observations, especially when measurements made on a continuous scale are non-normally distributed (Reinhard Bergmaan, John Ludbrook and Will P.J.M.Spooren 2012). Formula for the test is:

$$U = NM + \frac{N(N+1)}{2} - \sum_{x1} Rank(x_i) \qquad [\text{Eqn } 1]$$

Where, *NM* denotes sum of ranks of sample 1 and sample 2. *Rank* (x_i) shows sum of ranks of sample 1. With the help of Maan-Whitney U test, all the six banks have been divided into three groups with two banks. In which one bank median growth rate been compared to identify the difference between median growth rates of NPAs of two banks. Thus, all the three groups have been compared with other banks such as NBs compared with SBI and its group, PSBs compared with FBs, OPSBs compared with NPSBs. The Kruskal-Wallis test is the non-parametric version of ANOVA that is used to assess whether the samples come from populations with equal medians. Kruskal-Wallis test is a needed one when the variable calculated at the ordinal level, or when the statement of normality is not met. As with any other hypothesis test, the Kruskal-Wallis test employs a null and the alternative hypothesis. The main assumptions necessary to perform the Kruskal-Wallis test are the dependent variable does not need to be interval, but it needs to be measured at least at the ordinal

level. The samples are selected independently. The samples must come from populations with identical shape (Shlomo Sawilowsky and Gail Fahoome 2014).

Formula for the Kruskal-Wallis test is:

$$H = \frac{12}{N(N+1)}\left(\frac{R_1^2}{n1} + \frac{R_2^2}{n2} + \cdots + \frac{R_k^2}{nk}\right) - 3(N+1) \quad \text{[Eqn 2]}$$

Where *N* is the total sample sizes (the sum of the sample sizes), *Ri* is the sum of ranks for sample

i, from a total of k samples.

Measuring Methods

The collected data have been related to six banks that have mentioned earlier. With a view to compare the differences in of NPAs of each bank, growth rate has been calculated over the previous year with the help of the following formula:

$$Growth\ Rate = \frac{CY - PY}{CY} X\ 100 \quad \text{[Eqn 3]}$$

where *CY* is current year and *PY* is previous year

After calculated the growth rate has been observed. All the observations were arranged in ascending order with a view to assign ranks from smaller value to larger value. Thus the numeric ranks have been assigned to all the observations from both groups in one set, beginning with 1 for the smallest value. Finally, add up all the ranks for the observations which came from sample 1 and 2.

RESULTS AND DISCUSSION

It is understand from the table one that the position NPAs of NBs and SBI and its group banks. In which NBs scoring the sum of ranks of 240.5 and SBI and its group banks securing total ranks of 224.5 and thus the test statistics value of U = 104.5 is derived. The value reveals that, since the U-value 104.5 is greater than 64 the result is not significant at $p < .05$. On the other hand the Z score also adding values to the U test result by its score of 0.31109.

The p-value is .75656 and hence the result is not significant at $p < .05$. Thus it is concluded that the null hypothesis has been accepted and it is proved that there is a difference in the growth of the NPAs of NBs and SBI and its group.

Table 1: Growth rate of NPAs of NBs and SBI and its group banks

Year	NPAs of NBs (Amount in Crores)	Growth Rate over the previous year in %	Array of values	Ranks	NPAs of SBI and its Group (Amount in Crores)	Growth Rate over the previous year in %	Array of values	Ranks
2001-02	37453	---	---	---	19115	---	---	---
2002-03	37128	-0.87	-13.83	3	17861	-7.02	-18.05	1
2003-04	36378	-2.06	-10.1	4	15159	-17.82	-17.82	2
2004-05	33591	-2.39	-8.49	6	14809	-2.36	-8.58	5
2005-06	32804	-8.49	-4.79	8	14818	0.06	-7.02	7
2006-07	28817	-13.83	-2.39	9	12552	-18.05	-2.36	10
2007-08	26172	-10.1	-2.06	11	12683	1.03	0.06	13
2008-09	24974	-4.79	-0.87	12	15428	17.79	1.03	14
2009-10	26543	5.91	5.91	15	18483	16.52	16.52	16
2010-11	36395	27.06	17.79	17.5	23609	21.71	17.79	17.5
2011-12	44272	17.79	27.06	23	30393	22.32	21.34	19
2012-13	69048	35.88	28.05	24	48215	36.96	21.71	20
2013-14	101679	32.09	31.04	25	62779	23.19	22.32	21
2014-15	147448	31.04	32.09	26	79817	21.34	23.19	22
2015-16	204959	28.05	35.88	27	73508	-8.58	36.96	28
2016-17	419788	51.17	51.17	30	121986	39.74	39.74	29
		Sum of Ranks		240.5		Sum of Ranks		224.5
		U – value		104.5		U - value		120.5

Source: Annual Reports of the RBI, NBs- Nationalised Banks, SBI- State Bank of India

Table 2. Growth rate of NPAs of Public sector banks and FBs

Year	NPAs of PSBs (Amount in Crores)	Growth Rate over the previous year in %	Array of values	Ranks	NPAs of FBs (Amount in Crores)	Growth Rate over the previous year in %	Array of values	Ranks
2001-02	56568	---	---	---	2726	---	---	---
2002-03	54989	-2.87	-17.02	3	2889	5.64	-42.66	1
2003-04	51537	-6.69	-6.69	6	2894	0.17	-35.85	2
2004-05	48399	-6.48	-6.48	7	2978	2.82	-13.69	4
2005-06	41358	-17.02	-6.13	8	2192	-35.85	-7.47	5
2006-07	38968	-6.13	-2.87	9	1928	-13.69	0.17	10
2007-08	40452	3.66	3.66	12	2263	14.82	2.82	11
2008-09	44957	10.02	10.02	15	2859	20.84	5.64	13
2009-10	59926	24.97	14.08	16	6444	55.63	9.65	14
2010-11	74600	19.67	18.38	18	7133	9.65	14.82	17
2011-12	117262	36.38	19.67	19	5000	-42.66	20.59	20
2012-13	164461	28.69	24.97	23	6297	20.59	20.84	21
2013-14	227264	27.63	27.63	24	7977	21.06	21.06	22
2014-15	278468	18.38	28.69	25	11565	31.02	31.02	26
2015-16	539956	48.42	36.38	28	10761	-7.47	31.91	27
2016-17	628471	14.08	48.42	29	15805	31.91	55.63	30
		Sum of Ranks		242		Sum of Ranks		223
		U – value		103		U – value		122

Source: Annual Reports of the RBI, PSBs – Public Sector Banks, FBs – Foreign Banks

Table 3. Growth rate of NPAs of OPSBs and NPSBs

Year	NPAs of OPSBs	Growth Rate over the previous year in %	Array of values	Ranks	NPAs of NPSBs	Growth Rate over the previous year in %	Array of values	Ranks
2001-02	4851	---	---	---	6811	---	---	---
2002-03	4550	-6.61	-43.76	1	7232	5.82	-30.57	2
2003-04	4398	-3.47	-26.6	3	5983	-20.87	-20.87	4
2004-05	4200	-4.71	-16.11	5	4582	-30.57	-13.07	6
2005-06	3759	-11.73	-11.73	7	4052	-13.07	1.16	12
2006-07	2969	-26.6	-6.61	8	6287	35.54	3.33	13
2007-08	2557	-16.11	-4.71	9	10440	39.77	5.82	14
2008-09	3072	16.76	-3.47	10	13854	24.64	10.01	15
2009-10	3622	15.18	-0.61	11	14017	1.16	10.92	16
2010-11	3600	-0.61	14.04	17	14500	3.33	14.14	18
2011-12	4200	14.28	14.28	19	18768	22.74	22.74	25
2012-13	5210	19.38	15.18	20	21071	10.92	24.64	26
2013-14	3624	-43.76	16.76	21	24542	14.14	28.04	27
2014-15	4216	14.04	17.33	22	34106	28.04	35.54	28
2015-16	5208	19.04	19.04	23	56186	39.29	39.29	29
2016-17	6300	17.33	19.38	24	62437	10.01	39.77	30
		Sum of the Ranks		200		Sum of the Ranks		265
		U – value		145		U - value		80

Source: Annual Reports of the RBI, OPSBs – Old Private Sector Banks, NPSBs – New Private Sector Banks

Table 4. Growth Rate of the NPAs of NBs, SBI and its Groups, FBs, OPSB and NPSBs

Year	NBS	Ranks	SBI	Ranks	FBS	Ranks	OPSB	Ranks	NPSB	Ranks
2001-02	---	---	---	---	---	---	---	---	---	---
2002-03	-18.33	10	-18.05	7	-42.66	2	-43.76	1	-30.57	4
2003-04	-10.10	14	-17.82	8	-35.85	3	-26.60	5	-20.87	6
2004-05	-8.49	16	-8.58	15	-13.69	11	-16.11	9	-13.07	12
2005-06	-4.79	20	-7.02	18	-7.47	17	-11.73	13	1.16	31
2006-07	-2.39	23	-2.36	24	0.17	29	-6.61	19	3.33	33
2007-08	-2.06	25	0.06	28	2.82	32	-4.71	21	5.82	35
2008-09	-0.87	26	1.03	30	5.64	34	-3.47	22	10.01	38
2009-10	5.91	36	16.52	45	9.65	37	-0.61	27	10.92	39
2010-11	17.79	48.5	17.79	48.5	14.82	43	14.04	40	14.14	41
2011-12	27.06	61	21.34	55	20.59	52	14.28	42	22.74	58
2012-13	28.05	63	21.71	56	20.84	53	15.18	44	24.64	60
2013-14	31.04	65	22.32	57	21.06	54	16.76	46	28.04	62
2014-15	32.09	67	23.19	59	31.02	64	17.33	47	35.54	68
2015-16	35.88	69	36.96	70	31.91	66	19.04	50	39.29	71
2016-17	51.17	74	39.74	72	55.63	75	19.38	51	39.77	73
Sum of Ranks		617.5		592.5		572		437		631

Source: Annual Reports of the RBI, NBs, SBI and its Group, FBs, OPSBs, NPSBs

The 'U' value and 'Z' score of the PSBs and FBs have been presented in Table two. Sum of ranks of PSBs and FBs is 242 and 223 respectively and the 'U' value is 103 and 122 respectively. The critical value of the test at $p < .05$ is 64 but the calculated value of 'U' is 103. Therefore, the result is not significant at $p < .05$. On the other hand, the Z-Score is 0.3733 and the p-value is .71138. Therefore result is not significant at $p < .05$, and it concludes that there is a significant difference in the growth rate of the NPAs of the public sector and FBs. Table three shows that the results of 'U' and 'Z' score of OPSBs and NPSBs. The result is not significant since 'U' value 80 is more than the critical value of 64 at $p < .05$. Therefore, the result is not significant at $p < .05$. It is concluded that the *H0* cannot be rejected because 80 > 64 and it is proved that there is a significant difference in the median growth rate of the NPAs of the old private sector and NPSBs.

Table four provides the detail of the growth rate of the NPAs of nationlised banks, SBI and its group banks, FBs, old and NPSBs over the previous year. Based on the information provided, the significance level is $\alpha = 0.05$, and the number of degrees of freedom is 5-1 = 4. Therefore, the rejection region for this Chi-Square test is R ($\chi 2$: $\chi 2 > 1.2\ E + 308$). Since it is observed that $\chi 2 = 3.393 \leq \chi 2U = 1.2\ \underline{E} + 308$ and it is concluded that the null hypothesis not rejected. By using the P-value approach it is said that since the $p = 0.4943 \geq 0.05$ and it is concluded that the null hypothesis is not rejected.

Therefore, there is no evidence to claim that some of the population medians are unequal, at $\alpha = 0.05$ significance level. Hence it is concluded that there is a significance difference exist in the median value of the NPAs of the NBs, SBI and its group, PSBs, FBs, OPSBs and NPSBs.

Conclusion

Out of the 16 years data it is observed that the public sector banks have managed the NPAs in a manner over the previous year from 201-02 to 2006-07. Foreign bank is concerned, it has faced the swift ups and downs during the mentioned period and it faced a highest NPAs growth rate of 55.63 percent in the year 2009-10. Private sector banks are concerned, its growth rate over the previous year having gradual ups and downs and the highest growth rate of NPAs has been recorded in the year 2015-16 as 37.58 percent. From the Mann Whitney U test it is understand that, there is a difference in the growth rate of the NPAs of NBs and SBI and its group, public sector and FBs and old private sector and NPSBs. Through the Kruskal Wallis test it is understand that the significance difference exist in the growth of NPAs of the NBs, SBI and its group, PSBs, FBs, OPSBs and NPSBs. With the help of both statistical tools, it is proved that all the banks have the problem of NPAs irrespective of their size and operation. NPAs mean allocation of funds in terms of bad asset, which arises due to the selection of clients mistakenly.

Hence banks should pay attention on the process of lending money and recovery of the loans. If it is possible, it will help to eradicate the financial pollution called NPAs.

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