Comparative Analysis of Asset Quality: Evidence from the Public and Private Sector Banks of Pakistan

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Abstract

This study is aimed to compare the asset quality of public and private sector banks of Pakistan covering the period from 2006 to 2014 using the secondary data collected from the official document issued by the State Bank of Pakistan (SBP). Five ratios were used as a measure of asset quality consisting of Non-performing loans (NPLs) to gross advances, Provision against NPLs to gross advances, NPLs to shareholders' equity, NPLs write-off to NPLs provision and provision against NPL to NPLs. The independent t-test was used to determine the difference between means of these ratios of both the banks. Tukey's Hinges formula, Shapiro-Wilk Test and Levene's Test were used to check the assumptions of t-test along with Welch Test to validate the results of t-test in case of non-homogeneity of variances. The significant difference was noted between the means of two banks in case of first and third ratio with high mean values for public sector banks whereas means of second and fourth ratio were high for private sector banks, however, these ratios were not significantly different. The last ratio of both banks was significantly not different from each other although its mean value was slightly greater for private sector banks. Overall, the asset quality measures of public sector were not favorable which demanded (i). better administration of credit policies, (ii). due assessment of borrower including risk exposure, monitoring, profit and cash flow evaluation and business potential (iii). capacity building and training of credit staff (iv). automation of loan sanctioning and monitoring process (v). improvement of loan collection procedures and (vi). proper care in drafting of loan contract by including the legal covenants and on time initiation of legal proceedings in case of potential loan default.

Keywords: Public sector banks, Private sector banks, Asset quality, non-performing loans.

The management of banks duly focuses on different parameters which may affect the performance of a bank. Among these one of the important factors is the asset quality or loan quality being having the same identical meaning (Gadhia, 2015). Loans are the primary source of earnings of a bank; therefore, their quality may predominantly affect the overall bank's performance. A bank's job is to strengthen its credit department which is charged with the responsibility of processing and provision of loans. However, it is evident that some of the loans may be turned out to be non-performing or bad quality assets. The management of such loans is one of the key tasks for which a bank is responsible.

Non-performing loans are those loans on which the bank does not receive income or receive reduced income and include (i). non-accrual loans (on which payment has fallen considerably and for that reason no interest is accrued on such loans) (ii). renegotiated loans (which are under negotiation with the customer because of the customer's inability to meet the terms and conditions of the loan contract) and other real estate loans which are under the process of foreclosure (Gibson, 2011).

The important factors affecting the quality of loan portfolio may include the following:-

- The effectiveness of the credit department to process and approve the loan application.
- The careful diversification of loan portfolio.
- The formulation and implementation of investment and loan policies.
- The overall ability of the management to administer loans.
- The concentration risk associated with spreading of loans on a number and variety of debtors.
- The proper allocation of provisions for non-performing loans.
- The writing-off the non-performing loans.

Although studies have been conducted in Pakistan regarding the comparison of overall performance of public and private sector banks, no specific study is conducted to compare the asset quality of two banks with the relevant measures of asset quality using the pertinent statistical tools. Therefore, this study aims to evaluate the variables of asset quality of Pakistani Public Sector and Private Sector Banks. The findings of this study may have implications for the banks' management to frame and implement policies and steps conducive to the better administration of loans/assets which affect performance of the banks.

2. Objectives

Objectives of the study are as under:-

- To investigate the effect of variables which may influence the banks' asset quality.
- To compare the variables affecting the quality of loans/assets of public sector and private sector banks of Pakistan.
- To enhance the relevant literature with the purpose to have implications for banks' managers to properly manage the loan portfolio.

Literature review

Pradhan (2015), based on a study conducted on the Indian banking sector noted improvement in asset quality of private sector banks as compare to the public sector banks. His measures of asset quality were gross non-performing loans, net non-performing loans, percentage of gross non-performing loans to gross advances and percentage of net NPAs to net advances. The same view for Indian banks

was supported in another study by Murari (2014) who noticed a steady upward trend in the gross and net non-performing loans for public sector banks in contrast to the private sector banks. Khompi (2013) also noted a high share of non-performing loans for Indian Public Sector Banks as compare to the private sector and foreign banks.

On the other hand, Trivedi, Rehman & Elahi (2015) noticed a low level of non-performing loans for a private sector bank in a study conducted on two public sector and two private sector banks in India asserting the overall view of better asset quality for the later banks.

Islam, Siddiqui & Hossain (2014) analyzed the asset quality ratios of Bangladeshi banks. Their results indicated that private commercial banks are better in asset quality management in comparison to the stated owned commercial banks in terms of non-performing loans to total loans ratio, net non-performing loans to total loans ratio and writing-of bad loans.

Saptal (2014) documented high extent of non-performing loans as measure of asset quality for public sector banks than private sector banks in terms of gross and net non-performing loans.

Garg (2016) in a study covering the 10 years period from 2005-06 to 2014-15, noted high level of non-performing assets (loans) for public sector banks in comparison to the private sector banks. The results also revealed that public sector banks maintained high proportion of such assets from the beginning years of the study and have not properly administered the same at lower end. Joseph & Prakash (2014) documented high level of gross non-performing assets/loans for public sector banks than the private sector banks. The gross non-performing assets/loans to gross advances ratio of the former banks was also high as compare to the later banks.

Rao & Patel (2015) found increasing percentage of gross non-performing assets to gross advances for public sector banks whereas loss advances to gross advances ratio was higher for the foreign banks. Their study was based on the Indian public sector banks, private sector banks and foreign banks covering the period from 2009 to 2013. They also estimated high gross non-performing assets for 2014 in comparison to other two banks. Overall an unfavorable position of non-performing assets was noticed for the public sector banks. Jha & Hui (2012) identified extremely high share of non-performing loans for Nepali Public Sector Banks. The non-performing loans ratio of these banks was high in comparison to the domestic private banks and joint venture banks. A continuous improvement was noted in the quality of assets of joint venture banks whereas domestic private banks showed reasonable performance with respect to the same measure.

Hypotheses

To compare the asset quality variables of public and private sector banks, the following hypotheses are formulated:-

Hypothesis 1: There is no significant difference between the mean of non-performing loans (NPLs) to gross advances ratio of public sector and private sector banks of Pakistan.

Hypothesis 2: There is no significant difference between the mean of Provision against NPLs to gross advances ratio of public sector and private sector banks of Pakistan.

Hypothesis 3: There is no significant difference between the mean of NPLs to shareholders' equity ratio of public sector and private sector banks of Pakistan.

Hypothesis 4: There is no significant difference between the mean of NPLs write-off to NPLs provision ratio of public sector and private sector banks of Pakistan.

Hypothesis 5: There is no significant difference between the mean of Provision against NPL to NPLs ratio of public sector and private sector banks of Pakistan.

Research Methodology

Secondary data was used for this study collected from the official document issued by of the State Bank of Pakistan (SBP) namely the "Financial Statements Analysis of Financial Sector". The data was related to the public sector and private sector banks covering the period from 2006 to 2014. There are four public sector and twenty four private sector banks in Pakistan. List of these banks is given at Annexure-A. The collected data represents five important ratios related to the asset quality of both public and private sector banks.

6.1 Variables of the Study

The variables related to the asset quality are as under:-

6.1.1 Non-performing loans (NPLs) to gross advances

This ratio indicates the quality of bank's loan portfolio and expresses the percentage of non-performing loans as gross advances. The higher ratio suggests the high proportion of non-performing loans in comparison to the total advances which may affect the asset quality of a bank. The formula of this ratio is as follows:-

$$= \frac{\text{Nonperforming loans (NPLs)}}{\text{Grosss Advances}} \times 100$$

6.1.2 Provision against NPLs and gross advances

This ratio shows the amount of provisions against non-performing loans with respect to the gross advances. The increased provision shows due consideration to properly manage the bad quality loans whereas the inadequate provision may affect the bank's ability to have cover against the poor quality loans.

$$= \frac{\text{Provision aganist nonperforming loans (NPLs)}}{\text{Grosss Advances}} \times 100$$

6.1.3 NPLs to shareholders' equity ratio

This ratio compares the non-performing loans with the bank's shareholders' equity and affects the asset quality. The high ratio indicates

that shareholders are more exposed to the bad quality loans and their equity may be insufficient to cover such loans. Moreover, the shareholders' equity may also be tempered by these loans. Following is the formula of the ratio:-

$$= \frac{\text{Nonperforming loans (NPLs)}}{\text{Total shareholders'equity}} \times 100$$

6.1.4 NPLs write-off to NPLs Provision Ratio

This ratio shows non-performing loans in contrast to the provision for non-performing loans. The high ratio suggests the increase in write-off of the non-performing loans with low provision kept for such loans which may either indicate the poor performance with respect to the administration of loans or the management's desire to write-off loans at appropriate times as considered accordingly. The formula of the ratio is as under:-

$$= \frac{\text{Nonperforming loans (NPLs) write} - \text{off}}{\text{Nonperforimg laons (NPLs) provision}} \times 100$$

Provision against NPL to NPLs

This ratio indicates shows the provision for nonperforming loans to the amount of the non-performing loans. The high ratio may show the management's ability to allocate increased amount to provide cover against the non-performing loans. Following is the formula of the ratio:-

$$= \frac{\text{Provision for nonperforming loans}}{\text{Nonperforimg laons (NPLs)}} \times 100$$

Assumptions of the independent t-test

The independent samples t-test will be used to analyze data of the study. Through this test the means of unrelated samples can be compared on the same dependent variable. There are following assumptions of using the independent t-test:

Assumption No.1

The continuous scale should be used for the measurement of dependent variable which implies that the underlying scale may either be interval scale or ratio scale.

Assumption No.2

The independent variable should comprise of two independent (categorical) groups.

Assumption No.3

The observations related to the variables should be independent which calls for no relationship between the respective observations of each group. This suggests that participants of each group must be different from each other.

Assumption No.4

There should be no outliers in the set of data. Outliers are the extreme values which violate the general pattern of data and may reduce validity of results of t-test. Tukey's Hinges upper and lower boundaries will be used to check outliers in the data.

Assumption No.5

The dependent variable of each group should follow the normal distribution. Moreover, the distribution should be approximately normal because t-test may be robust to violate the normality and yet it provides the valid results. The Shapiro-Wilk test will be used to check the normality of data.

Assumption No.6

The variances of the two groups of data need to be homogenous. In this regard, Levene's test for homogeneity of variances will be used to check the inter-group homogeneity of variances. The effect associated with non-homogeneity of variances can be reduced when size of the two samples are equal due to which the t-test reasonably becomes robust against the non-homogeneity of variances. As two samples of this study are equal in size, therefore, using the t-test will be robust against the effect of inequality of variances. In case of non-homogeneity of variances of groups, the Welch Test will be used to validate the result of t-test as this test is more robust in case variances of samples are not equal.

Data Analysis and Results

As discussed, the first three assumptions of using the independent t-test are already fulfilled as underlying variables of the study are continuous. Furthermore, groups (public and private sector banks) observations of two data of data are also independent. Therefore, only the last three assumptions are checked.

Non-performing loans (NPLs) to gross advances

In the first stage, outliers are checked in the set of data related to the ratio of non-performing loans (NPLs) to gross advances. For this, we need 25^{th} and 75^{th} percentiles to determine upper and lower boundaries if there are outliers crossing the boundaries. These values are put in the following formula developed by Tukey's Hinges to determine the respective boundaries.

$$\text{Upper} = Q3 + 2.2\,(Q3 - Q1)$$

$$\text{Lower} = Q1 - 2.2\,(Q3 - Q1)$$

As can be seen from the table, it is clear that the highest four values are not greater than the upper boundary. Similarly, the lowest four values are not less than the lower boundary which indicates that there are no outliers in the data.

Table 1. *Percentiles*

		Percentiles					Tukey's Hinges	
		5	10	25	50	75	Upper Boundary	Lower Boundary
Weighted Average (Definitio	Non-performing loans	7.3400	7.3400	8.6800	17.2300	19.8500	44.424	-15.894

n 1)	(NPLs) to gross advances – Public Sector Banks						24.948	-6.048
	Non-performing loans (NPLs) to gross advances – Private Sector Banks	5.2700	5.2700	6.5800	10.3800	12.3200		
Tukey's Hinges	Non-performing loans (NPLs) to gross advances – Public Sector Banks			9.0000	17.2300	18.6100		
	Non-performing loans (NPLs) to gross advances – Private Sector Banks			7.1500	10.3800	12.1900		

		Case Number	Value
Non-performing loans (NPLs) to gross advances (Public Sector Banks)	Highest	1	23.51
		2	21.09
		3	18.61
		4	17.94
	Lowest	1	7.34
		2	8.36
		3	9.00
		4	16.87
Non-performing loans (NPLs) to gross advances (Private Sector Banks)	Highest	1	12.74
		2	12.45
		3	12.19
		4	11.38
	Lowest	1	5.27
		2	6.01
		3	7.15
		4	10.16

In the second step, the Shapiro-Wilk test is used to check the normality of data. As can be seen the p-value for both groups of data are greater than .05 which means that null hypothesis will be accepted and we can infer that values of data of the groups are normally distributed.

Table 2. *Tests of Normality*

	Shapiro-Wilk		
	Statistic	df	Sig.
Non-performing loans (NPLs) to gross advances – Public Sector Banks	.889	9	.194
Non-performing loans (NPLs) to gross advances – Private Sector Banks	.872	9	.130

The table shows the group statistics. The value of mean for non-performing loans (NPLs) to gross advances is greater in case of public sector banks than private sector banks which shows that the private banks are effective to control their non-performing loans as percentage of gross advances. In comparison, the high value of mean for public sector banks suggests bad quality of loans outstanding. Moreover, the standard deviation for public sector banks is much greater which shows substantial dispersion in the data.

Table 3. *Descriptive Statistics*

		Mean	Std. Deviation	Std. Error Mean
Non-performing loans (NPLs) to gross advances	Public Banks	15.5500	5.87044	1.95681
	Private Banks	9.7478	2.87714	.95905

The following table shows significance difference between the means of the two groups of data. The p-value for Levene's Test for Equality of Variances is less than 0.05 which means that variances cannot be assumed to be equal or the two groups are not assumed to be from the same population. Therefore, we will focus on the bottom row of the table. We can see that that there is significance difference between non-performing loans (NPLs) to gross advances ratio of public and private sector banks as indicated by the p-value of t-test which is less than 0.05.

Table 4. *Levene's Test for Equality of Variances and independent t-test*

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Non-performing loans (NPLs) to gross advances	5.81	.02	2.66	11.63	.021	5.80

As variances of two samples are not equal, therefore, to authenticate the results of the t-test, Welch test is used. The following tables shows the results of the Welch -test. As can be noted, if square root of statistic (Welch test) = 7.089 is taken, that equals to 2.663 which is the same value of t-test when equal variances are not assumed. Moreover, p-value of Welch test is equal to 0.021 which is the same when equal variances are not assumed. Therefore, the Welch test confirms that if the variances are not equal, the alternate hypothesis will be accepted to assert that the ratio of non-performing loan to gross advances are significantly different as discussed above.

Table 5. *Robust Welch Test of Equality of Means*

Non-performing loans (NPLs) to gross advances				
	Statistic[a]	df1	df2	Sig.
Welch	7.089	1	11.634	.021

a. Asymptotically F distributed.

Provisions against NPLs to gross advances

The following table shows details pertaining of 25th and 75th percentiles to determine upper and lower boundaries for the ratio of Provisions against NPLs to gross advances. There are no outliers as no individual value is crossing the limits of upper and lower boundary for each group.

Table 6. *Percentiles*

		Percentiles					Tukey's Hinges	
		5	10	25	50	75	Upper Boundary	Lower Boundary
Weighted Average (Definition 1)	Provisions against NPLs to gross advances – Public Sector Banks	3.5200	3.5200	5.0650	11.4500	12.7650	29.795	-11.875
	Provisions against NPLs to gross advances – Private Sector Banks	7.4500	7.4500	8.7250	9.3300	22.1700	51.749	-20.854
Tukey's Hinges	Provisions against NPLs to gross advances – Public Sector Banks			5.6400	11.4500	12.5500		
	Provision			8.740	9.3300	20.830		

	s against NPLs to gross advances – Private Sector Banks	0	0	
			Case Number	Value
Provisions against NPLs to gross advances (Public Sector Banks)		Highest	1	13.07
			2	12.98
			3	12.55
			4	12.29
		Lowest	1	3.52
			2	4.49
			3	5.64
			4	10.88
Provisions against NPLs to gross advances (Private Sector Banks)		Highest	1	25.24
			2	23.51
			3	20.83
			4	9.54
		Lowest	1	7.45
			2	8.71
			3	8.74
			4	9.31

The p-values of Shapiro-Wilk test for data of both banks are less than 0.05 which supports the acceptance of alternate hypothesis and we can infer that the underlying data is not normally distributed. However, owing to robustness of t-test to non-normality, this assumption of non-normality may be relaxed.

Table 7. *Tests of Normality*

	Shapiro-Wilk		
	Statistic	Df	Sig.
Provisions against NPLs to gross advances – Public Sector Banks	.792	9	.017
Provisions against NPLs to gross advances – Private Sector Banks	.737	9	.004

The mean value of the ratio for private banks are greater in comparison to the public sector banks. This increase suggests that private banks are more committed to allocate provision against the non-performing loans as non-provisioning may expose the bank to the systemic risk. The high provisioning lowers the bank's exposure to the systemic risk.

Table 8. *Descriptive Statistics*

	Mean	Std. Deviation	Std. Error Mean
Provisions against NPLs to gross Public Banks	9.6522	3.92429	1.30810

advances	Private Banks	13.6289	7.28387	2.42796

The p-value for Levene's Test for Equality of Variances is less than 0.05. Therefore, variances of two groups of data are not equal and for that reason the bottom values of the table may be considered to determine the significance of difference between the means of public and private sector banks. As noted, the view of difference is not supported as p-value is greater than 0.05. Hence, it can be inferred although individual mean values are different; there are is no significance difference between the mean values of both banks.

Table 9. *Levene's Test for Equality of Variances and independent t-test*

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference
Provisions against NPLs to gross advances	8.212	.011	-1.442	12.283	.174	-3.97667

The variances of two banks are not equal. Therefore, Welch test is used to validate the results of t-test. The square root of Welch test statistic = 2.079 is 1.442 which is equal to the values when variances are not assumed to be equal. Also, p-value of Welch test is 0.174 which is the same when variances were not equal. Thus, the Welch test validates that even when variances are not the equal, the results can be confirmed to assert that there is no significance difference between the mean values of both the banks.

Table 10. *Robust Welch Test of Equality of Means*

Provisions against NPLs to gross advances				
St	Statistic[a]	df1	df2	Sig.
Welch	2.079	1	12.283	.174

a. Asymptotically F distributed.

NPLs to shareholders' equity

There are no outliers in pertaining to the ratio of NPLs to shareholders' equity as the highest and lowest values for both banks are not crossing the limits of the upper and lower boundaries.

Table 11. *Percentiles*

	Percentiles					Tukey's Hinges	
	5	10	25	50	75	Upper	Lower

							Boundary	Boundary
Weighted Average (Definition 1)	NPLs to shareholders' equity – Public Sector Banks	48.42	48.42	55.82	121.66	135.48	310.73	-119.43
	NPLs to shareholders' equity – Private Sector Banks	37.27	37.27	43.03	56.96	60.34	98.43	4.93
Tukey's Hinges	NPLs to shareholders' equity – Public Sector Banks			62.11	121.66	132.75		
	NPLs to shareholders' equity – Private Sector Banks			47.89	56.96	60.25		

		Case Number	Value
NPLs to shareholders equity (Public Sector Banks)	Highest	1	160.37
		2	138.22
		3	132.75
		4	130.34
	Lowest	1	48.42
		2	49.53
		3	62.11
		4	110.76
NPLs to shareholders equity (Private Sector Banks)	Highest	1	74.64
		2	60.44
		3	60.25
		4	59.53
	Lowest	1	37.27
		2	38.17
		3	47.89
		4	51.54

The data for both groups follows the normal distribution as the related p-values are greater than 0.05. Therefore, null hypothesis may be accepted to infer the normality of distribution.

Table 12. *Tests of Normality*

	Shapiro-Wilk		
	Statistic	df	Sig.
NPLs to shareholders' equity – Public Sector Banks	.872	9	.131
NPLs to shareholders' equity – Private Sector Banks	.939	9	.574

The mean value of NPL to shareholders' equity for public banks is greater as compare to the private sector banks which shows high level of non-performing loans in relation to shareholders' equity. In this regard, private sector banks are more efficient as they have controlled the level of non-performing loans relative to the shareholders' equity.

Table 13. *Descriptive Statistics*

		Mean	Std. Deviation	Std. Error Mean
NPLs to shareholders' equity	Public Banks	106.02	41.83414	13.94471
	Private Banks	54.0767	11.83058	3.94353

The variances of both banks are not equal as p-value for Levene's Test for Equality of Variances is less than 0.05. The p-value of t-test in case of non-homogeneity of variances is less than 0.05. Hence, it can be asserted that means of two banks are significantly different from each other.

Table 14. *Levene's Test for Equality of Variances and independent t-test*

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	f	Sig.	t	df	Sig. (2-tailed)	Mean Difference
NPLs to shareholders' equity	14.803	.001	3.584	9.271	.006	51.94111

The Welch test is validating the results of t-test even when the variances are not equal as the square root of the Welch test statistic = 12.847 is 3.584 which is equal to the value of t-test when variances are not assumed to be equal. Furthermore, p-value of Welch test is 0.006 which is again equal to the p-value of t-test when variances are heterogeneous. Therefore, results are validated to say that means of two groups for NPLs to shareholders' equity ratio are significantly are different from each other.

Table 15. Robust Welch Test of Equality of Means

	NPLs to shareholders' equity			
	Statistic[a]	df1	df2	Sig.
Welch	12.847	1	9.271	.006

a. Asymptotically F distributed.

NPLs write-off to NPLs provisions

The data related to the ratio of NPLs write-off to NPLs provisions has no outliers as highest and lowest values of both groups are not violating the limits of upper and lower boundaries.

Table 16. *Percentiles*

		Percentiles					Tukey's Hinges	
		5	10	25	50	75	Upper Boundary	Lower Boundary
Weighted Average (Definition 1)	NPLs write-off to NPLs provisions – Public Sector Banks	7.2600	7.2600	8.6800	14.6400	29.4900	75.272	-37.102
	NPLs write-off to NPLs provisions – Private Sector Banks	4.7700	4.7700	8.2050	19.8300	42.1500	116.829	-66.474
Tukey's Hinges	NPLs write-off to NPLs provisions – Public Sector Banks			8.7900	14.6400	18.5900		
	NPLs write-off to NPLs provisions – Private Sector Banks			10.2600	19.8300	37.7000		

		Case Number	Value
NPLs write-off to NPLs provisions (Public Sector	Highest	1	44.37
		2	40.39
		3	18.59

Banks)		4	15.75
	Lowest	1	7.26
		2	8.57
		3	8.79
		4	9.68
	Highest	1	48.67
		2	46.60
NPLs write-off to NPLs provisions (Private Sector		3	37.70
Banks)		4	23.90
	Lowest	1	4.77
		2	6.15
		3	10.26
		4	14.69

The data of public sector banks is not normally distributed as supported by the p-value which is less than 0.05 showing that null hypothesis of normality may be rejected for public sector banks. Yet we can relax this assumption as t-test is robust to violation of assumption of non-normality. On the other hand, data of private sector banks follows the normal distribution as the pertinent p-value is greater than 0.05.

Table 17. *Tests of Normality*

	Shapiro-Wilk		
	Statistic	Df	Sig.
NPLs write-off to NPLs provisions – Public Sector Banks	.767	9	.009
NPLs write-off to NPLs provisions – Private Sector Banks	.896	9	.231

The mean value of NPLs write off to NPLs provisions of private banks is greater in comparison to the public sector banks which indicates that private banks have written off more non-performing loans in relation to the provisions kept for such types of loans. This either may suggest that private sector banks needs due consideration to control the write offs of these loans or given the high level of non-performing loans for public sector banks, it may also show the private sector banks' management strategy to clean up their books as compare to the public sector banks which should be considered a favorable measure to deal with such loans.

Table 18. *Descriptive Statistics*

		Mean	Std. Deviation	Std. Error Mean
NPLs write-off to NPLs provisions	Public Banks	18.6711	13.99846	4.66615
	Private	23.6189	16.90795	5.63598

Banks

The p-value for Levene's Test for Equality of Variances is greater than 0.05 which shows that variances of both groups are equal which is an assumption for using the independent t-test. Coming to the p-value of t-test, the table shows that it is greater than 0.05. Thus although, the means of both banks look different, there is no statistically significant evidence to indicate that means are different.

Table 19. *Levene's Test for Equality of Variances and independent t-test*

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference
NPLs write- off to NPLs provisions	.709	.412	-.676	16	.509	-4.94778

Provision against NPL to NPLs

There was one outlier (148.81) in the data of public sector banks which was removed and the following table shows results excluding this value leaving the remaining eight values. The table shows that there is no outlier in the data related to both the banks as no individual values is crossing the upper and lower boundary.

Table 20. *Percentiles*

		Percentiles					Tukey's Hinges	
		5	10	25	50	75	Upper Boundary	Lower Boundary
Weighted Average (Definition 1)	Provision against NPL to NPLs – Public Sector Banks	55.5800	55.5800	59.4925	67.6700	81.5175	129.9725	11.0375
	Provision against NPL to NPLs – Private Sector Banks	66.8200	66.8200	72.0900	74.8000	80.0625	97.602	54.5505
Tukey's Hinges	Provision against NPL to			60.7050	67.6700	78.4750		

	NPLs – Public Sector Banks					
	Provision against NPL to NPLs – Private Sector Banks	72.5000	74.8000	78.3450		
					Case Number	Value
Provision against NPL to NPLs (Public Sector Banks)				Highest	2	88.99
					1	84.56
					8	72.39
					3	67.88
				Lowest	4	55.58
					5	58.28
					6	63.13
					7	67.46
Provision against NPL to NPLs (Private Sector Banks)				Highest	8	83.89
					7	81.78
					5	74.91
					6	74.90
				Lowest	1	66.82
					4	71.68
					3	73.32
					2	74.70

The data of both the banks follow the normal distribution as p-values are greater than .05.

Table 21. *Tests of Normality*

	Shapiro-Wilk		
	Statistic	Df	Sig.
Provision against NPL to NPLs – Public Sector Banks	.928	8	.495
Provision against NPL to NPLs – Private Sector Banks	.929	8	.507

The mean value of ratio for private sector banks is greater which again indicates allocating high provision against non-performing loans with respect the non-performing loans. This in turn suggests that the private sector banks are favorably keeping the provision to provide a cover against the non-performing loans contrary to the public sector banks.

Table 22. Descriptive Statistics

		Mean	Std. Deviation	Std. Error Mean
Provision against NPL to NPLs	Public Banks	69.7838	11.84054	4.18626
	Private	75.2500	5.41645	1.91501

Banks

The p-value for Levene's Test for Equality of Variances is greater than .05 which suggests that variances of data of both banks are equal which is a pre-condition for using the independent t-test. The p-value of t-test is greater than .05, therefore, null hypothesis may be accepted to assert that the means of both banks are not significantly different from each other although the individual mean values of both the banks are different.

Table 23. *Levene's Test for Equality of Variances and independent t-test*

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	f	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Provision against NPL to NPLs	3.991	.066	-1.187	14	.255	-5.46625

Conclusion & Recommendations

This study is conducted to compare the asset quality of public and private sector banks of Pakistan. For this purpose, nine years secondary data of both banks was collected covering the period from 2006 to 2014. The source of data was a document namely the financial statement analysis issued by the State Bank of Pakistan (SBP). The data represented five ratios as a measure of asset quality which included Non-performing loans (NPLs) to gross advances, Provision against NPLs to gross advances, NPLs to shareholders' equity, NPLs write-off to NPLs provision and Provision against NPL to NPLs. In order to determine the significant difference between the means of the above ratios of both banks, the independent t-test was used. The assumptions of t-test were checked through Tukey's Hinges formula (outliers check), Shapiro-Wilk Test (normality test) and Levene's Test for Equality of Variances (checking of homogeneity of variances). Moreover, Welch Test was used to validate the results of t-test in case of non-homogeneity of variances.

The results indicated that there is significant difference between the non-performing loans (NPLs) to gross advances ratio (mean high for public banks) and NPLs to shareholders' equity ratio (mean high for public banks). This signified that private sector banks are more sound to control the level of non-performing loans as percentage of gross advances and in comparison to the shareholders' equity. On the other hand, mean value of Provision against NPLs to gross advances ratio for private sector banks was greater suggesting increased allocation of

provision to have cover against the non-performing loans. However, this ratio was not significantly different.

Moreover, the mean of NPLs write off to NPLs provisions ratio of private banks is greater than that of public sector bank which either may require the apt control of write-offs of non-performing loans or indicating the banks' management strategy to clean their books, however, there is no significant difference between the mean value of both the banks. On the other hand, the individual mean values of Provision against NPL to NPLs ratio for private banks are high again suggesting greater allocation of provision against the non-performing loans to provide cover against these loans. However, no significant difference was noted in the mean values of this ratio. Overall, the asset quality measures of public sector banks are poor as compare to the private sector banks. In this regard, the public sector banks should do the due appraisal of the loan applicant and better administer the credit policies. The risk exposure of the borrower should adequately be evaluated to properly include the protective clauses in the loan contract along with legal covenants. Also, follow up may be required to have check on the use of funds sanctioned so as to ensure the utilization of funds for the intended use. Such follow-up may be required on continuous basis so that the possibility of conversion of a fund into non-performing loans may be avoided well in time. The ongoing assessment profit and cash flow streams of borrower may consistently be carried out as a preventive measure. The borrower's potential may also be assessed to determine that his business is likely to be a going concern or otherwise. Again this requires continuous check up. The collection procedures should be improved. On time legal proceedings need to be initiated in case of the potential default of loan. Moreover, the process of loan sanctioning and monitoring should properly be automated to provide a knowledge database in order to regularly manage the non-performing loans including the effective check on the borrower which is one of the important pre-requisite. Furthermore, the credit department may be strengthened by means of capacity building and proper training of credit staff. This all requires the focus of bank's management which is currently not that much effective.

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List of Public Sector Banks

1. First Women Bank Limited.
2. National Bank of Pakistan.
3. The Bank of Khyber.
4. The Bank of Punjab.

List of Private Sector Banks

1. Albaraka (Pakistan) Limited.
2. Allied Bank Limited.
3. Askari Bank Limited.
4. Atlas Bank Ltd.
5. Bank Al-Habib Limited.
6. Bank Alfalah Limited.
7. Bank Islami Pakistan Limited.
8. Burj Bank Limited.
9. Dubai Islamic Bank Pakistan Limited.
10. Faysal Bank Limited.
11. Habib Bank Limited.
12. Habib Metropolitan Bank Limited.

13. JS Bank.
14. KASB Bank Limited.
15. MCB Bank Limited.
16. Meezan Bank Limited.
17. MyBank Limited.
18. NIB Bank.
19. SAMBA Bank Limited.
20. Silkbank Limited.
21. Soneri Bank Limited.
22. Standard Chartered Bank (Pakistan) Limited.
23. Summit Bank.
24. United Bank Limited.