Measurement and Comparision of Credit Risk Management Practice of Public and Private Banks Using Lending Ratios

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ABSTRACT

One of the most important service sectors for the development of Indian economy is the banking sector. Any harm to the banking sector will endanger the Indian economy. This harm can be due to improper management of Credit Risk Management Practices (CRMP) resulting into increased NPA's. This demands a need for proper use of credit risk measurement tools such as lending ratios for management of credit risk. In practice, the application of credit risk measurement tools vary from bank to bank. Therefore, the present study is based on the aim, to measure the Credit Risk Management Practices of public and private banks using lending ratios as a credit risk measurement tools. The hypothesis for the present study states that, there is significant difference in the credit risk management practices used by public and private banks in India. The study used Independent sample T-test and ANNOVA on eight lending ratios to seek the significant mean difference in the CRMP of public and private banks in India. The result reveals that, although there is similarity in the trend of certain ratios over the thirteen years period under study, the sector wise comparison showed statistical significant differences between the public and private banks with regards to certain six lending ratios used in the paper. However there was no significant difference in the other two ratios used in the paper. The study can be further extended to cover other lending ratios that have impact on the credit risk and can include foreign banks in the other studies.

Keywords: Credit Risk Management Practices (CRMP), Banking Sector, Credit Risk Tools, India.

INTRODUCTION:

In today's era, banks are more serious about their long term success and survival, due to increased Non Performing Asset (NPA) over a period of time. NPA's is an asset which ceases to generate income for the bank. When the borrower could not pay interest or installment on loan which remains overdue for more than 180 days then it becomes Non- performing. As per RBI data the gross NPA ratio shows an increasing trend from the year 2009 (2.31%), 2013 (4.27%) and in 2018 (14.6%). (Pasha, 2013), found in his studies that NPA of banks showed an increasing trend. An increased NPA's shows that, banks are facing credit risk. Credit risk is the potential that the banks borrower or the counterparty fails to meet obligation according to agreed terms, resulting into NPA's. The efficiency and the strength of banking companies depend on their ability to absorb and adjust to the ever-changing environment as quickly as possible (Verlekar and Kamat, 2017). Credit risk is most important because it has substantial effect on the return on investment of the bank. Also, according to (Ngoroge & Ngahu, 2017), credit risk is a big threat for banks as the value of any organization is measured by its credit worthiness. According to (Verlekar & Kamat, 2015)Kamat and Verlekar (2015) credit risk is critical, as the default of a small number of important customers can generate large losses. Effective Credit Risk Management Practice (CRMP) need to be followed by banks, to reduce credit risk . CRMP are even essential today for compliance of regulations. Banks are

required to maintain a significant and adequate level of capital adequacy to avoid bank failures and protect the interest of the stakeholders. Credit Risk Management Practice (CRMP) means establishing an appropriate credit risk management environment. This environment can be created by developing sound policies to identify, manage and measure credit risk. Thus CRMP covers –framing of policies on different aspects of credit risk, identification of determinants of CRMP and measurement of credit risk using lending ratios.

Present paper focuses on measurement aspects of credit risk using credit risk tools such as lending ratios. Lending ratios are the accounting ratios used to measure credit risk. These lending ratios are Gross NPA to Gross Advance Ratio, Net NPA to Net Advance ratio, Total loan to Total Asset, Total Loan to Total Deposit Ratio, Total loan to Total Equity, Provision for NPA to NPA, ROA (Return on Asset), and CAR (Capital Adequacy Ratio) etc. Today, it is routine good practice of the bank to deploy powerful credit risk assessment and measurement tools such as lending ratios to make sound decisions of lending's. (Ghadia, 2015) used these tools and techniques to assess the asset quality of the banks. Similarly, (Thiagarajan, 2011), conducted empirical analysis of commercial banks in India using lending ratios. Thus credit risk tool such as lending ratios is one of the methods adopted by banks for conduct of better CRMP.

 The studies of (Kattel, 2016) states that risk management practices vary from bank to bank depending on its policies on credit granting decision. This is due to the fact that, (Kattel, 2016) conducted study to find the difference in credit risk management practices of public and private banks, the result indicate that credit measuring tools and techniques are practically different in public and private banks. Though all banks apply uniform credit risk management tools such as lending ratios to measure and manage risk but in reality there is difference in risk management practices of public and private banks, hence the present study is based on the hypothesis that, there is difference in the Credit Risk Management Practices (CRMP) used by public and private banks in India. Thus the main motto of present paper is to measure the Credit Risk Management Practices of public and private banks through using lending ratios as a credit risk measurement tools. The future of banking, rest on risk management dynamics. Only those banks that have efficient risk management system will survive in the market in the long run (Arunkumar & Kotreshwar, 2005). There is need for strategic approach to CRMP due to higher NPA levels in comparison with global benchmark.

THEORIES AND LITERATURE REVIEW:

Theory of Credit Risk Assessment and pricing through business Cycle:

Thakor (2016) developed this theory with the help of Piketty's model of "Left wing" and "Right Wing" dynasties. His theory states that assessment of risk and pricing of risk is based on business cycle, provided that outcome of risk management depends on the "skill of banker" or based on the "Luck" factor. According to him Credit spreads shrinks during expansion and widens during recession. Normally the trend is such that, credit terms become easier for borrower during economic expansion and tightens in recession and if this trend continues it will trigger to an economic crisis. Thus lax credit standards during expansion sow the seeds of future crisis resulting into a decline in lending. Banks can choose either relatively safe loan in which outcomes are based by luck or professionally risky loan, if the outcomes are based on skill of banker. This will build a structure in which banks in the beginning invest in safety loan after understanding successful repayment of these loans will switch over to more risky loans.

Following are some of the important observations noted from the theory of Credit Risk Assessment and pricing through business Cycle. Firstly if the skill of the banker is good it will result into a powerful Credit Risk Management Practice (CRMP). Secondly lax credit regulations during expansion will sow a seed for financial crisis resulting into a decrease in lending. This demands a need for better Credit Risk Management Practices (CRMP),

Theory of Asymmetric Information:

Kenneth Arrow and Gerald Debreas made contribution to this theory. As per this theory there is no guarantee that borrower will give all the information to the banker for the purpose of taking loan from bank. Thus borrower may hide certain information as this information may act as a hurdle for the loan granted to him. This type of information is called asymmetric information. However according to Healy and Patepak (2001) information asymmetry does not only take on borrower's side but it can take place on the banker's side too. Thus to have a better credit risk management it is always better that better that both parties should have adequate and reliable information about each other.

Following are the observations: borrower may intentionally hide the information in order to make a willful default; hence the banker should play a precautionary role through adopting a good CRMP. Borrower's full information plays an important role credit grant decision by the banker.

LITERATURE REVIEW:

The recent history of financial crisis 2008 induced the financial analyst to develop literature on the Credit Risk Management Practices (CRMP). The literature review says that, different banks follow different techniques for management of risk, even though the banks face same risk but credit risk management techniques differ. (Kattel, 2016), in his paper found the significant difference of mean value of credit risk tools and techniques of private and joint venture banks. One way ANNOVA has been used to see the difference between private banks and joint venture banks in usage of tools and techniques such as Matrix method, Internal Judgment, standard approach, Causal method VAR linear probability, and linear Discriminant analysis. There found a significant difference of mean value of credit risk tools and techniques in private and joint venture banks. (Thiagarajan, 2011) made a comparison of credit risk measurement tools between 22 public and 16 private banks using ratio analysis and ANNOVA test. The result shows that there is a significant difference between two sectors with regard to certain key ratios. (Kumar & Pourkiaei, 2016) made a comparison of credit risk measurement tools between Public, Private and Foreign banks using ratio analysis technique and T-test. The result shows that there is a significant difference between three sectors (public, private and foreign) with regard to certain ratios. (Rekhi & Goel, 2013), compared the performance of public and private banks based on proxy indicators such as NIM, ROA, ROE and CAR. They used statistical tool such as mean, Standard Deviation, Co-relation Coefficient etc. their study concludes that new banks are more efficient then old ones.

Great deal of literature is available on credit risk measuring tools and techniques; however the credit risk measuring tools and techniques differs among private and joint venture banks (Kattel, 2016). Similarly, risk management policies of private sector banks are different from public banks (Velling, 2010 and Kattel 2016), also the extent of Credit risk in public banks is more than private banks as per RBI report on NPA- the gross NPA shows increasing trend from the year 2009 (2.31%) to 2013 (4.21%). All these studies shows that there is difference in the risk management practices of public and private banks but there is a research gap on how there is difference in risk management practices of public and private banks. Although in (Kattel, 2016) studies used parameters like matrix method, Internal judgment method to find the difference in risk management practices of public and private banks, but in present study some more parameters could be added such as Capital Adequacy Ratio (CAR), Ratio of Total loan to Total Asset, Ratio of NPA to Total Loan, ratio of Total loan to Total Deposit, Ratio of Total Loan to Total Equity, Ratio of Provision for Loan Loss to NPA, Ratio of NPA to Total Equity, Net Interest Income (NII) et to find the difference in the risk management practices of public and private banks. .

RESEARCH METHODOLOGIES:

In the present study, the required data have been sourced from audited statements of individual banks and RBI. Part of data is collected from reputed data sources such as Centre for Monitoring Indian Economy (CMIE) and Indian stats.com. The data was taken for thirteen years period from the year 2004-5 to 2016-17. A total of thirty nine commercial banks (Twenty one Public banks and eighteen private banks) were chosen as sample based on the availability of data.

Lending ratios are used as a tool for measurement of credit risk. Eight lending ratios are selected based on its impact on credit risk. These ratios for each bank was calculated for each year and used as sample to measure the credit risk of public and private banks in India. These ratios are Gross NPA to Gross Advance Ratio, Net NPA to Net Advance ratio, Total loan to Total Asset, Total loan to total deposit, Total loan to Total Equity, Provision for NPA to NPA, CAR and ROA. Present study is carried, based on the hypothesis that, there is significant difference in the CRMP of public and private banks. To prove this difference statistical test, such as Independent sample T-test is used in the present study. All the assumptions require to run the independent sample T-test were checked, such as normal distributions and homogeneity of variance. Normal distribution is one of the most important continuous theoretical distributions in statistics. The null hypothesis of normality test is – data is subject to normal distribution at 5% level of significance. For certain tools the data is subject to normal distribution, hence parametric test such as Independent sample T-test is used to compare means of two sets of data –public and private banks. Whereas, for other tools the data is not subject to normal distribution, hence Non-Parametric test such as Mann Whiteny U –test was used to compare the means of two sets of data –Public and Private Banks. The data was also checked for homogeneity of variance. The null hypothesis used to check the homogeneity of variance – variance in data is less. Levin's Test of equality of variance was used to check the homogeneity of variance. The result of the Levin's test shows that, out of the eight tools used in the sample – five tools have less variance in data. The standard One Way ANNOVA was conducted to test the difference is statistical significant in the twenty one public and eighteen private banks. The null hypothesis of the test is – all

group population means are equal at 5% level of significance. All the assumption required running ANNOVA such as continuous dependent variable, independence of observation, normal distribution, and homogeneity of variance were checked before application of ANNOVA. Further, a post hoc test was conducted to find which bank reveals a statistical significant difference in the group.

FINDINGS AND DISCUSSION:

Banks face three types of risk –Credit risk, Market Risk and Operational risk. Among these risk credit risk is most important because it has substantial effect on the return on investment of the bank. Thus, effective credit risk management practice needs to be followed by banks to reduce credit risk. Credit Risk Management Practice (CRMP) means establishing an appropriate credit risk management environment. This environment can be created by developing sound policies to identify, manage and measure credit risk. To measure credit risk one of the tool used in present study is utility of the lending ratios. However, history of literature review shows that, there is difference in the CRMP followed by public and private banks; hence the present study tries to find this difference using credit risk measurement tools such as lending ratios and prove this difference using statistical tool.

Ratio analysis is the most powerful tool of financial analysis. The significance of ratio analysis lies in fact that it affords a basis for comparing. It is relevant in assessing the performance in respect of liquidity position, operating efficiency, asset quality etc. The relationship between two related items of financial statements is known as ratio. A ratio is just one number expressed in terms of another. The Ratio is customarily expressed in three different ways. It may be expressed as a proportion between the two figures. Second it may be expressed in terms of percentage. Third, it may be expressed in terms of rates. The use of ratio has become increasingly popular during the last few years only. Originally, the bankers used the current ratio to judge the capacity of the borrowing business enterprises to repay the loan and make regular interest payments. Today it has assumed to be important tool that anybody connected with the business turns to ratio for measuring the financial strength and the earning capacity. In the present paper eight lending ratios are used to measure credit risk of public and private banks. These ratios are Gross NPA to Gross Advance ratio, Net NPA to Net Advance ratio, Total loan to Total Asset Ratio, Total Loan to Total Deposit Ratio, Total Loan to Total Deposit Ratio, Total Loan to Total Equity Ratio, and Provision for NPA to NPA ratio, Capital Adequacy Ratio, Return on Asset ratio.

Gross NPA to Gross Advance ratio:
Gross NPAs are the sum total of all loan assets that are classified as NPAs as per RBI guidelines as on Balance Sheet date. Gross NPA reflects the quality of the loans made by banks. It consists of all the non-standard assets like as sub-standard, doubtful and loss assets. This ratio is lower the better it is. The gross NPA is always shown as a percentage of advances.

Table 1: Result of Independent sample T-test and ANNOVA of twenty one public and eighteen pvt banks for a period 2005-2017

Tool	Bank	Kolmogorov Test Of normality		Levin's Test of equality of variance		Independent Sample T-test					One way ANNOVA
		Test Result	Remark	Test result	Remark	S.D.	Mean	F-value	P-value	Remark	
Gross NPA to Gross Advances	Public	0.2	Data: Normal	0.089	Less Variance in Data	1.02	4.5	3.75	0.001	SD in ratio among Public and private banks	F(15,192)=0.897, P<0.001--NSD
	Private	0.2	Data: Normal			1.40	3.0				F(21,251)=5.986, P<0.001----SD

Notes and Sources: Significant Difference (SD), NSD: Non-Significant Difference (NSD) and Authors Calculation using data from India stat.com and Annual reports of banks

All the public sector banks show the decreasing trend of this ratio from the year 2005 to 2012. The ratio is gradually increased from 2013 to 2017. This increase may be due to improper Credit risk management practices leading to high Gross NPA to Gross Advance ratio. The ratio was risen by almost 100% in the year 2016

compared to 2017. This rise could be on account of increase in the ratio of Punjab National Bank, IDBI, Indian Overseas Bank, UCO bank, ratios as these banks ratio is also increased in same proportion. Similarly all the private banks also shows the decreasing trend of this ratio from the year 2005 to 2013 and it shows a gradual increase in the ratio from 2014 to 2017. This rise could be on account of increase in the ratio of Catholic Syrian banks, City Union bank, ICICI bank, and Nainital bank as these banks ratio shows an increasing trend continuously for a period of four years (2014 – 2017). The ratio was consistently low 2007 to 2015 for both the sector of banks. This may be due to the impact of implementation of Basel II norms.

Over a period of thirteen years, the mean ratio was highest for the Central bank of India i.e. 6.34 and the lowest for Vijaya bank i.e. 3.15. The difference in the ratio is almost 50%. In case of private banks the mean ratio was highest for the Dhanalaxmi bank i.e. 6.03 and the lowest for Yes bank i.e. 0.47. In total Yes bank has the lowest Gross NPA to Gross advance ratio, depicting the best risk management policy of this bank. Also, there is a statistical significant difference in the mean gross NPA to gross advance ratio in the group of private banks as per one way ANNOVA table. A post hoc test result shows the statistical difference lies in the Yes bank in the private bank group. However, One Way-ANNOVA result for public sector banks shows that, there was no statistical difference in the mean Gross NPA to Gross Advance ratio between different banks in public sector group.

In recent year public sector banks mean gross NPA to gross advance ratio is 13% but in case of private banks it is 4%, this shows the ratio is high in case of public banks. As per the recent RBI guidelines Gross NPA to Gross Advance ratio of a bank should be less than 10% to pay dividend. This trend shows that, there is difference in this ratio among public and private banks, however to prove this difference statistically, Independent sample T- test was conducted. The result of the test shows that, there is significant difference in Gross NPA to Gross advance ratio among public and private banks with T-value of 3.75. Thus the difference in the Gross NPA to Gross Advance ratio depicts a difference in the Credit Risk Management Practices of public and private banks. The

In total, the ratio is showing unfavorable scenario, especially for the last five years, hence the banks need to take a precautionary measures to discontinue the increasing trend of NPA. Banks need to carefully monitor NPA in order to avoid the upcoming financial distress.

Net NPA to Net Advance ratio:
This ratio measures the relationship between Net NPA to Net Advances. Net NPA's are calculated by deducting provisions from Gross NPA. Net NPA is expressed as a percentage of advances. Lower the ratio better it is for the banks prosperity.

Table 2: Result of Independent sample T-test and ANNOVA of twenty one public and eighteen pvt banks for a period 2005-2017

Tool	Bank	Kolmogorov Test Of normality		Levin's Test of equality of variance		Independent Sample T-test					One Way ANNOVA
		Test Result	Remark	Test result	Remark	S.D.	Mean	F-value	P-value	Remark	
Net NPA to Net Advances Ratio	Public	0.2	Data: Normal	0.79	Less variance in data	0.66	2.46	5.56	0.000	SD in ratio among Public and private banks	F(21,251)=0.875 P<0.001—NSD
	Private	0.2	Data: Normal			0.72	1.24				F(15,192)=5.408, P<0.001—SD

Notes and Sources: Significant Difference (SD), NSD: Non-Significant Difference (NSD) and Authors Calculation using data from India stat.com and Annual reports of banks

Non-performing loans to total loans is an important indicator that each individual bank can monitor carefully and make corrective measures as necessary. This ratio shows a decreasing trend for public sector banks from 2005-2009; however it started rising from 2010-2017. It reached at the peak position in the year 2017 to the extent of 8.10 which is highly deviating from the mean ratio of 2.46. This depicts that NPAs of the public sector banks are increasing from 2010 onwards and the financial position of the banks are worsen year after year. The trend of this ratio is matching with the trend of Gross NPA to Gross advance ratio. From the year 2005 and 2017 this ratio shows an increase by more than 250 %. All these facts, demands a tight policy on the part of public banks to avoid future bankruptcy. The private banks however show a fluctuating trend in this ratio over a period

of time of thirteen years. This ratio was consistently low for last 13 years for private banks. This shows the difference in the trend of public and private banks. Also the extent of ratio is high in case of public banks and low in case of private banks. This indicates that private banks has low and manageable NPAs, hence credit risk is less in private banks. The ratio reached at the level 8.10 and 2.69 for public and private banks respectively. These figures also show a huge difference in ratios of public and private banks. All these facts reveal a difference in this ratio of public and private banks. To prove this difference statistically, independent sample T-test was conducted. The result of the test shown in table no.2 depicts that, there is significant difference in Net NPA to Net advance ratio among public and private banks with T-value of 5.56.

The However,

As per the individual bank analysis, the ratio was highest for united bank of India and lowest for Indian bank in public sector category. However One Way-ANNOVA table shows that, there was no statistical difference in the mean Net NPA to Net Advance ratio between different banks in public sector group. In case of private banks the ratio was highest for Catholic Syrian bank and lowest for the Yes bank. Also, one way ANNOVA table shows that, there is a statistical significant difference in the mean Net NPA to Net advance ratio in the group of private banks. This means that not all the banks means are equal in proportion. A post hoc test was conducted to find which bank reveals a statistical difference. The test result shows the statistical difference lies in the Catholic Syrian bank and Yes bank in the private bank group at 1percent level of significance.

 Thus, those banks which shows highest ratio should keep a close watch on NPA's, as this can pose a problem if the trend continues and macroeconomic conditions change. A study by RBI (Reserve Bank of India, 2010) suggests that there is a lag period of at least two years between the credit growth and growth in NPAs. This underlines the pro-cyclical nature of banking system where asset quality is compromised during the period of high credit growth and this can lead to the increase in the Non Performing Assets in the later years.

Total Loan to Total Asset Ratio:
Loan to Asset ratio measures the total loan outstanding as a percentage of total assets. Banks that have a relatively higher loan to asset ratio derive more of their income from loan and investment.

Table 3: Result of Independent sample T-test and ANNOVA of twenty one public and eighteen pvt banks for a period 2005-2017

Tool	Bank	Kolmogorov Test Of normality		Levin's Test of equality of variance		Mann Whiteny U-test					One Way ANNOVA
		Test Result	Remark	Test result	Remark	S.D.	Mean	F-value	P-value	Remark	
Total Loan to Total Asset	Public	0.01	Data : not Normal	0.038	Variance in data	0.22	23.69	2.22	0.03	SD in ratio among Public and private banks	F(21,251)= 2.53 P≤0.05—NSD
	Private	0.02	Data : not Normal			0.46	15.69				F(15,192)=7.217, P ≤0.05—NSD

Notes and Sources: Significant Difference (SD), NSD: Non-Significant Difference (NSD) and Authors Calculation using data from India stat.com and Annual reports of banks

This ratio showed an increasing trend from 2005 to 2017 in case of public and private banks, as both the sectors have crossed the ratio over 0.5 .This depicts bank has increased lending business over a period of time. Both the sectors have increased their business in order to face tough competition with each other and with the foreign players. The loan business may also be improved to meet the needs of excess loan demand generated due to improvement in the corporate business. In case of public sector banks the ratio was highest in the year 2012 and in the year 2017 in case of private banks. In both cases, ratio has crossed 0.5 showing that the loan sanctioned by the banks is more than half of the assets present with the bank. The ratio was low for united bank of India and Nainital bank belonging to public and private sector respectively. The ratio was high for Syndicate and City Union bank, belonging to public and private sector banks respectively. The One Way-ANNOVA table shows the result for public sector banks. There was statistical significant difference in the mean Total Loan to Total Asset ratio of different banks in public sector group. Therefore, post hoc test was conducted to find a, which bank reveals a statistical difference in the public sector group. The test result shows that, a statistical difference lies due to mean

ratio of Syndicate and United Bank of India. There was also a statistical significant difference in the mean of Total loan to Total Asset ratio of private banks. This means that not all the banks means are equal in proportion. A post hoc test was conducted to find which bank reveals a statistical difference. The test result shows the statistical difference lies in the City Union bank in the private bank group at 1percent level of significance.

The difference in the mean ratio among the public banks is low, which shows there is homogeneity in data, whereas the difference in the ratio among the private bank is high which shows variance in data. These factors shows a difference in the ratio of public and private banks.The data of thirteen years shows that, every year the mean ratio of public sector bank is more than private banks. This again shows a difference in the ratio of public and private banks. To prove this difference statistically, Mann Whitny U-test was conducted. The result of the test shown in table no.3 depicts that, there is significant difference in Total Loan to Total Asset ratio among public and private banks with T-value of 2.21.

Total Loan to Total Deposit Ratio:
This ratio helps to assess the liquidity and aggressiveness of banks management. This ratio tells how much a bank lends out of deposits it has mobilized. A higher the ratio indicates more dependent on deposits for lending and vice versa. The higher this ratio indicates the bank is loaned up and its liquidity is low. The higher the ratio more risky a bank may be at higher defaults. A very low ratio indicates banks are not making full use of their resources. If the ratio is above certain level it indicates pressure on the resources. if the loan to deposit ratio is too high, the bank could be vulnerable to sudden adverse changes in its deposit base.

Table 4: Result of Independent sample T-test and ANNOVA of twenty one public and eighteen pvt banks for a period 2005-2017

Tool	Bank	Kolmogorov Test Of normality		Levin's Test of equality of variance		Mann-Whiteny U-test					One Way ANNOVA – Kruskal Wallis Test
		Test Result	Remark	Test result	Remark	S.D.	Mean	F-value	P-value	Remark	
Total Loan to Total Deposit	Public	0.00	Data: Not Normal	0.68	Less Variance in data	0.12	18.10	1.130	0.25	NSD in ratio of Public and private banks	F(21,251)= 5.63 P≤0.05--SD
	Private	0.04	Data: Not Normal			0.99					F(15,192)=18.08 ≤0.05--SD

Notes and Sources: Significant Difference (SD), NSD: Non-Significant Difference (NSD) and Authors Calculation using data from India stat.com and Annual reports of banks

The total loan to total deposit ratio of public sector bank as well as private banks shows an increasing trend over a period of time of thirteen years from 2005-2017, the increasing trend signifies that banks have increased their loan business over a period of thirteen years. At present a credit deposit ratio over 70% indicates pressure on resources as banks have to set aside funds to maintain a cash reserve ratio of 4.5% and Statutory Liquidity Ratio of 23%. Recently, both these sectors of banks crossed this margin, indicating a pressure on the resources. It also indicates bank borrowed money which it re-loaned at higher rates. This pattern shows there is no difference in the total loan to total deposit ratio of public and private banks. As an evidence for the same, Mann Whiteny U - test was conducted to check the mean difference of this ratio between public and private banks. The result of the test shows that there is no significant difference in the ratio between public and private banks.

The ratio was highest in the year 2012 for public a banks which was 78% and highest in the year 2016 in case of private bank which was 80 %. Thus both these banks have crossed the margin of 70% indicating low liquidity and more dependent on deposits for lending. Thus it is advised to the banks to maintain its margin to avoid bankruptcy position in future.

Individual bank analysis shows that, the mean ratio of IDBI bank is highest almost crossing 100% which shows use of the other funds for the purpose of lending apart from deposits. In contrast the mean ratio was lowest for Punjab and Sind bank which is 67% indicating maintenance of margin. Also, One Way-ANNOVA table shows that, there was statistical significant difference in the mean Total Loan to Total Deposit ratio of different banks in public sector group. Therefore, post hoc test was conducted to find a, which bank reveals a statistical

difference in the public sector group. The test result shows that, a statistical difference lies due to mean ratio of IDBI . In case of private banks, the mean ratio of ICICI bank is highest almost 100% indicating full utilization of deposits and endangering the liquidity position of bank. In contrast the mean ratio was lowest for Jammu and Kashmir bank which was 64% which is below the standards, indicating better liquidity position of banks. Also, One way ANNOVA table shows that, there was also a statistical significant difference in the mean of Total loan to Total Asset ratio of private banks. This means that not all the banks means are equal in proportion. A post hoc test was conducted to find which bank reveals a statistical difference. The test result shows the statistical difference lies in the ICICI bank in the private bank group at 1percent level of significance. Therefore, banks are advised to maintain margin to keep the strong financial position, as some of the banks, with the temptation of making profit endangers its liquidity position.

Total Loan to Total Equity Ratio:
This ratio expresses the relationship between total loan outstanding and the total equity of the bank. This ratio helps the investor to analyse the equity position of the bank to take investment decision. This ratio explains the extent to which shareholders equity can fulfill the loan obligations of banks. Lower the ratio better it is for the stakeholders.

Table 5: Result of Independent sample T-test and ANNOVA of twenty one public and eighteen pvt banks for a period 2005-2017

Tool	Bank	Kolmogorov Test Of normality		Levin's Test of equality of variance		Mann Whiteny U- test					One Way ANNOVA
		Test Result	Remark	Test result	Remark	S.D.	Mean	F-value	P-value	Remark	
Total Loan to Total Equity	Public	0.00	Data: Not Normal	0.13	Less Variance in data	269	288	-1.2	0.2	NSD in ratio of Public and private banks	F(21,251)= 27.43 P≤0.05--SD
	Private	0.15	Normal data			160	193				F(15,192)=18.90, P ≤0.05--SD

Notes and Sources: Significant Difference (SD), NSD: Non-Significant Difference (NSD) and Authors Calculation using data from India stat.com and Annual reports of banks

All the banks have high loan outstanding compared to its equity capital. This shows that banks have financed its loan through deposits and other borrowed funds. Although, this strategy is favorable to equity holders in terms of getting the benefit of "Trading on Equity", however it may endanger the banks financial position if the loan turns into NPA. The total loan to total equity ratio of public and private banks shows an increasing trend over a period of time of thirteen years from 2005-2017. An increasing trend signifies that, banks have expanded its lending business. In the year 2014-15, public sector banks show the highest average total loan to total equity ratio depicting greater extent of loan sanction in this year. This increase is on account of increase in the lending business of Bank of Baroda and State bank of India. The data of these banks shows that, lending business enhances by 18% and 15 % respectively in the year 2014-15 compared to the previous year. Similarly private banks also show the highest lending in the same year. This hike may be due to increase in the lending business of HDFC bank. The data of this banks shows that, lending business enhances by 24% in the year 2014-15 compared to the previous year. All the public and selected private banks show the highest lending in the same year. This hike could be on account of policies of RBI or may be due to market factor such as entry of new player. Since both the sector of banks, shows the increasing trend in this ratio and the hike in the ratio in the same year. Therefore there is no difference in this ratio of public and private banks. To prove this statement statistically, Mann Whiteny U test T-test was conducted. The result of Independent Sample T-test shows that there is no significant difference in the ratio of public and private banks.

Individual bank analysis shows that, State Bank of India from public sector banks and HDFC bank from private category has the highest total loan to total equity ratio. Similarly Bank of Maharashtra from Public sector and DCB from private sector has the lowest total loan to total equity ratio. The One Way-ANNOVA table shows the result for public sector banks. There was statistical significant difference in the mean Total Loan to Total Equity ratio of different banks in public sector group. Therefore, post hoc test was conducted to find a, which bank

reveals a statistical difference in the public sector group. The test result shows that, a statistical difference lies due to mean ratio of State Bank of India and Bank of Maharashtra. There was also a statistical significant difference in the mean of Total loan to Total Equity ratio of private banks. A post hoc test was conducted to find which bank reveals a statistical difference. The test result shows the statistical difference lies in the ratio of HDFC and DCB bank in the private bank group at 1percent level of significance.Thus some of the banks have expanded their lending business at the cost of equity which may endanger the financial position of the banks in long term due to financial instability.

Provision for NPA to NPA ratio:
This ratio indicates the extent of provisioning already done on the existing NPA thereby indicating future provisioning requirement in the event of no recovery from stock of NPA. It indicates the degree of safety measures adopted by banks. It has direct bearing on profitability dividend and safety of shareholders. Higher the ratio better it is for the banks from safety point.

Table 6: Result of Independent sample T-test and ANNOVA of twenty one public and eighteen pvt banks for a period 2005-2017

Tool	Bank	Kolmogorov Test Of normality		Levin's Test of equality of variance		Mann Whiteny U-Test					One way ANNOVA
		Test Result	Remark	Test result	Remark	S.D.	Mean	F-value	P-value	Remark	
Provision for NPA to NPA	Public	0.00	Data: Not normal	0.11	Less Variance	0.70	16.81	-1.8	0.06	. SD in ratio of Public and private banks	F(21,251)= 44.77 P≤0.05--SD
	Private	0.111	Data: Normal			0.5					F(15,192)=6.088, P ≤0.05--SD

Notes and Sources: Significant Difference (SD), NSD: Non-Significant Difference (NSD) and Authors Calculation using data from India stat.com and Annual reports of banks

This ratio was calculated for a period of thirteen years from 2005-2017 for all public and private banks. The result of public sector bank shows - decreasing trend in the ratio up to 2012 and it increased in 2013 but after that again the ratio showed the decreasing trend. This ratio has risen in 2013 may be due to the impact of syndicate bank, as this ratio is constantly increasing for syndicate bank as per the data of thirteen years and finally this bank has the highest ratio among all the public sector banks. A high ratio indicates a safer financial position of this bank. This ratio is lowest for SBI where it is suggested to the bank to take steps to improve this ratio for the safe financial position in future. Private Banks shows a fluctuating trend in this ratio. The ratio was highest in the year 2011. This ratio was high may be due to the impact of Nainital bank as this ratio is constantly increasing for Nainital bank as per the data of thirteen years and finally this bank has the highest ratio among all the selected private banks. However this ratio is lowest for the Laxmi Vilas bank from the selected private banks in the study. One way ANOVA table shows that there was also a statistical significant difference in the mean of Provision for NPA to NPA ratio of private banks. This means that not all the banks means are equal in proportion. A post hoc test was conducted to find which bank reveals a statistical difference. The test result shows the statistical difference lies in the Nainital and Laxmi Vials bank in the private bank group at 1percent level of significance. Also, The One Way-ANNOVA table shows that there was statistical significant difference in the mean Provision for NPA to NPA ratio of different banks in public sector group. Therefore, post hoc test was conducted to find a, which bank reveals a statistical difference in the public sector group. The test result shows that, a statistical difference lies due to mean ratio of Union Bank of India and State Bank of India.
On an average provision for NPA ratio of private bank is less compared to public sector banks, and the trend of this ratio differs among public and private banks, this depicts a difference in this ratio among public and private banks. To prove this statement statistically, Mann Whiteny U-test was conducted. The result of this test in table no 6 shows that there is no significant mean difference in the ratio of public and private banks.

Return on Asset (ROA):
It is profitability ratio measured in terms of the relationship between net profit and total asset. The ROA is frequently applied to banks, because cash flow analysis is more difficult to accurately construct. ROA tells

about the ability of company to use its asset to create profit. ROA of Just 1% as a good profitability as they are highly leveraged and carry a large amount of asset.

Table 7: Result of Independent sample T-test and ANNOVA of twenty one public and eighteen pvt banks for a period 2005-2017

Tool	Bank	Kolmogorov Test Of normality		Levin's Test of equality of variance		Mann Whiteny U-test					One Way ANNOVA
		Test Result	Remark	Test result	Remark	S.D.	Mean	F-value	P-value	Remark	
ROA	Public	0.2	Data: normal	0.008	Variance In data	.22	15.60	-2.60	0.009	SD in ratio of Public and private banks	F(21,251)= 2.368, P≤0.05-- SD
	Private	0.04	Data: Not Normal			.98	25.1				F(15,192)= 2.20 P ≤0.05-- SD

Notes and Sources: Significant Difference (SD), NSD: Non-Significant Difference (NSD) and Authors Calculation using data from India stat.com and Annual reports of banks

ROA is a profitability ratio was calculated for public and private banks for a period of thirteen years 2005-2017. This ratio for public sector banks showed minor fluctuations in the trend from 2005-2013, however it has decreased drastically in the year 2014 to 2017 may be due to negative returns of United Bank of India and Indian Overseas bank, Corporation bank, Dena, IDBI and Central bank of India. Since these banks have negative returns it may likely to go into bankruptcy position in future. Hence it is advised to these banks to take precautionary measure to avoid financial distress. The ROA was highest for Indian bank in case of public sector category. The One Way-ANNOVA table shows the result for public sector banks. There was statistical significant difference in the mean ROA ratio of different banks in public sector group. Therefore, post hoc test was conducted to find a, which bank reveals a statistical difference in the public sector group. The test result shows that, a statistical difference lies due to mean ratio of Indian bank and Central bank of India. ROA of private bank has increased over a period of time but in 2005 it was low due to poor performance of Yes and RBL bank. However the ROA of Kotak Mahindra bank have the highest ROA in selected private banks in the study. One way ANNOVA table shows that there was also a statistical significant difference in the mean of ROA of private banks. This means that not all the banks means are equal in proportion. A post hoc test result reveals that there was a statistical difference on account of Kotak Mahindra bank, HDFC, Catholic Syrian bank, in the private bank group at 1percent level of significance.

During the latest year i.e. 2017 the ROA of private bank is almost 200% higher than public banks. Overall ROA of private bank is better than public sector banks indicating a better profitability position and credit risk management strategy of private bank. This shows a difference in the ROA of public and private bank. To prove this difference statistically, Mann Whiteny U- test was conducted. The result of the test put in table no 7 shows that there is significant difference in the ROA of public and private bank.

Capital Adequacy Ratio (CAR):
It is a ratio which measures the amount of banks capital expressed as a percentage of its risk weighted credit exposure. This ratio is used to protect depositors and promote the stability and efficiency of financial system of the banks. The bank may run into bankruptcy if there reserves are considered to be inadequate in the market due to credit risk, hence banks must maintain adequate capital in their vaults if they want to survive. This adequate capital is maintained by bank though capital adequacy ratio (CAR). The CAR is important from the point of view of solvency of banks and their protection from The Basel III norms stipulated a capital to risk weighted assets of 8%. However, as per RBI norms, Indian scheduled commercial banks are required to maintain a CAR of 9% while Indian public sector banks are emphasized to maintain a CAR of 12%,this is not the case in case of private sector banks. This shows the difference in CAR of public and private banks.

Table 8: Result of Independent sample T-test and ANNOVA of twenty one public and eighteen pvt banks for a period 2005-2017

Tool	Bank	Kolmogorov Test Of normality		Levin's Test of equality of variance		Mann Whiteny U -test					One Way ANNOVA
		Test Result	Remark	Test result	Remark	S.D.	Mean	F-value	P-value	Remark	
CAR	Public	0.00	Data: Not normal	0.033	Variance In data	0.74	15.7	-2.60	0.009	. SD in ratio of Public and private banks	F(21,251)= 4.144, P≤0.05--SD
	Private	0.001	Data: Not Normal			4.3	25				F(15,192)= 7.53 P ≤0.05--SD

Notes and Sources: Significant Difference (SD), NSD: Non-Significant Difference (NSD) and Authors Calculation using data from India stat.com and Annual reports of banks

CAR is a precautionary ratio banks need to maintain to face their NPA's. The CAR of all the public banks and private banks was collected for the period of 2005-2013. All the public and private banks have consistently maintained the CRAR norm of 8% as prescribed by BCBS and 9% prescribed by RBI. This shows the precautionary role played by all banks to avoid financial distress. The trend for the thirteen years shows that, there is stability in maintaining the CRAR as per the RBI norms.

In case of public banks Bank of Baroda (14%) in case of private banks YES bank (17%) has the highest CAR. Overall, private sector banks CAR is more than Public banks. This shows the difference in the CAR of public and private banks. To prove this difference statistically, Mann Whiteny U-test was conducted. The result of this test in the table no.8 shows that, there is significant difference in CAR of public and private banks, also the interval of difference between public and private bank is more than zero, which means the mean difference, is more than zero.

The One Way-ANNOVA table shows the result for public sector banks. There was statistical significant difference in the mean CAR ratio of different banks in public sector group. Therefore, post hoc test was conducted to find a, which bank reveals a statistical difference in the public sector group. The test result shows that, a statistical difference lies due to mean ratio of Bank of Baroda. There was also a statistical significant difference in the mean of CAR of private banks. This means that not all the banks means are equal in proportion. A post hoc test was conducted to find which bank reveals a statistical difference. The test result shows the statistical difference lies in the Yes bank, Catholic Syrian bank, and Karur bank in the private bank group at 1percent level of significance.

CONCLUSION:

Banks today are judged not only on the basis of number of branches, volume of deposits but on the basis of quality of assets. For the last few years Non-performing assets (NPA's) has emerged as inevitable burden on the government and RBI. Several steps have been undertaken by government and RBI to curb increasing NPA of Indian banks but these steps proved to be unsuccessful. Over a period of time NPA's of bank is increasing tremendously. This increase in NPA may be on account of improper CRMP. Therefore, the present study is based on the aim, to measure the Credit Risk Management Practices of public and private banks using techniques lending ratios as a credit risk measurement tool.

Present study analysed various lending ratios that could be useful as an internal risk monitoring tool for the scheduled commercial banks. Although there is similarity in the trend of certain ratios over the thirteen years period under study, the sector wise comparison showed that, there is statistical significant differences between the two sectors with regards to certain key ratios such as Gross NPA to Gross Advances, Net NPA to Net Advances, Total Loans to Total Asset, Provisions for NPA to NPA, CAR, ROA. However there is no significant difference in the two ratios such as Total Loan to Total Deposit, Total Loan to Total Equity. Since there is a statistical significant difference in majority of ratios selected, this helps in proving null hypothesis. The null hypothesis was – there is significant difference in the CRMP of public and private banks. This difference may be on account of larger volume of loan of public sector banks and it is a serious issue for them due to recent trend of increase NPA. Another tool used to analyse the lending ratios were One way ANNOVA. The result of this test shows a statistical significant difference in all the public banks for all the ratios with an exception of

Gross NPA to gross Advance ratio and Net NPA to Net Advance ratio. Similarly there was a statistical significant difference in the mean ratio of all the private banks. Also a post hoc test was conducted to find which bank reveals a statistical significant difference. The literature review reveals that increasing NPA worsens the efficiency of banks and in turn profitability decreases. The bad loan Scenario of private banks as compared to their counterparts in public sector is much better (Firstpost April 2018). Also an Analysis of NPA of different bank group indicates public sector banks hold larger NPA then private banks (Arunkumar & Kotreshwar, 2005). Thus banks needs better monitoring and requires necessary corrective measures to improve their NPA position. To effectively manage the credit risk in the Indian Scheduled Commercial Banking sector (SCBs), the Reserve Bank of India has developed policies and guidelines in accordance with the norms set out by Basel Committee on Banking Supervision. These guidelines provide for improved risk management systems in banks. Present study supports a theory of Asymmetric information, whereby a banker should play a precautionary role through adopting a good CRMP. It also supports "Theory of Credit Risk Assessment and Pricing through Business Cycle" as if the skill of the banker is good it will result into a powerful Credit Risk Management Practice (CRMP). Based on the indication of lending ratios a banker will take fruitful decision, whether to follow a stringent credit risk policy or lax credit risk regulations during the business cycle. The study can be further extended to cover other lending ratios that have impact on the credit risk and can include foreign banks in the other studies.

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