

Effect of Credit Risk Management on Private and Public Sector Banks in India

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Abstract: *This paper examines the effect of credit risk management on private and public sector banks in India. Credit risk occurs when customers default or fail to comply with their obligation to service debt, triggering a total or partial loss. The primary cause of credit risk is poor credit risk management. When banks manage their risk better, they will get advantage to increase their performance (return). For this purpose researcher has taken one dependent return on asset (ROA) and two independent variables capital adequacy ratio (CAR) and non-performing assets (NPAs). The ROA is performance indicator. The CAR and NPAs is credit risk management indicator. Researcher has applied two way regression model.*

Keywords: Return on Asset, Capital Adequacy Ratio, Non-Performing Assets, Public Sector Banks, Private Sector Banks.

Introduction

The banking has become the foundation of modern economic development. According to the dictionary, the term bank means the side of the sea, a little hill, a shoal in the sea or a repository for money. In economics, a bank means a repository for money of the whole economy (Kapoor, 2004).

The three primary activities of a commercial bank which distinguish it from the other financial institutions. These are: (i) maintaining deposit accounts including current accounts, (ii) issue and pay cheques, and (iii) collect cheques for the bank's customers. Effective credit risk management should be a critical component of a bank's overall risk management strategy and is essential to the long-term success of any banking organization. It becomes more and more significant in order to ensure sustainable profits in banks (Singh, 2013).

Credit Risk Management (CRM) has a systematic analysis of various forms of risks that influence or has likely to influence the repayment of loan given by the bank. The issue of effective credit risk management in banks has brought in focus due to global financial crisis. It has imperative for a bank in particular and for banking system in general to regularly monitor and review the CRM practices (Colquitt, 2007). A sound credit risk management has built upon a good-quality portfolio of performing assets.

CRM of financial institutions represents all policies and procedures those financial institutions have implemented to manage, monitor and control their exposure to risk (Vasile and Nechif, 2010).

The proper credit risk architecture, policies and framework of credit risk management, credit rating system, monitoring and control has been contributed in success of credit risk

management system (Bodla & Verma, 2009; Darwish, 2015). According to them, market conditions and company structures are different, credit risk management should be adjusted by institutions to comply with their needs and circumstances.

Need of credit risk management

There are many existing tools and basic principles of management theory of credit risk management in Indian Commercial Banks; there is always scope for improvement and correction. Banks are investing a lot of funds in credit risk. Credit risk management is very important to banks as it is an integral part of the loan process. It minimizes bank risk, adjusted risk rate of return by maintaining credit risk exposure with view to shielding the bank from the adverse effects of credit risk. So strong and depth study of credit risk management give strengthening the risk control management in Indian commercial banks.

Literature review

A number of studies had provided the discipline into the practice of credit risk management within banking sector. Some related studies are given below:

Amran, *et al.* (2009), explored the availability of risk disclosures in the annual reports of Malaysian companies. The study was aimed to empirically test the characteristics of the sampled companies. The level of risk faced by these companies with the disclosure made was also assessed and compared. The findings of the research revealed that the strategic risk came on the top, followed by the operations and empowerment risks being disclosed by the selected companies. The regression analysis proved significantly that size of the companies did matter. The stakeholder theory explains well this finding by stating that “As company grows bigger, it will have a large pool of stakeholders, who would be interested in knowing the affairs of the company.” The extent of risk disclosure was also found to be influenced by the nature of industry. As explored within this study, infrastructure and technology industries influenced the companies to have more risk information disclosed.

Hassan, (2009), made a study “Risk Management Practices of Islamic Banks of Brunei Darussalam” to assess the degree to which the Islamic banks in Brunei Darussalam implemented risk management practices and carried them out thoroughly by using different techniques to deal with various kinds of risks. The results of the study showed that, like the conventional banking system, Islamic banking was also subjected to a variety of risks due to the unique range of offered products in addition to conventional products. The results showed that there was a remarkable understanding of risk and risk management by the staff working in the Islamic Banks of Brunei Darussalam, which showed their ability to pave their way towards successful risk management. The major risks that were faced by these banks were Foreign exchange risk, credit risk and operating risk. A regression model was used to elaborate the results which showed that Risk Identification, and Risk Assessment and Analysis were the most influencing variables and the Islamic banks in Brunei needed to give more attention to those variables to make their Risk Management Practices more effective by understanding the true application of Basel-II Accord to improve the efficiency of Islamic Bank’s risk management systems.

Thiagarajan et al., (2011) analyzed the role of market discipline on the behavior of commercial banks with respect to their capital adequacy. The study showed that the Capital Adequacy Ratio (CAR) in the Indian commercial banking sector showed that the commercial banks were well capitalized and the ratio was well over the regulatory minimum requirement. The private sector banks showed a higher percentage of tier-I capital over the public sector banks. However the public sector banks showed a higher level of tier-II capital. Although the full implementation of Basel II accord by the regulatory authority (RBI) might have influenced the level of capital adequacy in the banking sector. The study indicated that market forces influence the bank's behavior to keep their capital adequacy well above the regulatory norms. The Non-Performing Assets significantly influenced the cost of deposits for both public and private sector banks. The return on equity had a significant positive influence on the cost of deposits for private sector banks. The public sector banks could reduce the cost of deposits by increasing their tier-I capital.

Based upon literature review, this research paper analyzed the credit risk management of private sector and public sector banks.

Data collection

This study is based on secondary data. The required data for this study were collected from the various sources like monthly RBI bulletins, published by RBI, Govt. of India, Reports published by National Institute of Bank Management, Annual reports of various banks, publications and notifications of RBI, Reports published by Indian Bank Association (IBA) etc. The performance analysis for this study is based on selected 20 banks (10 public and 10 private sector banks). The data of ROA, CAR and NPA of banks has been taken from 2002-03 to 2012-13. For comparative analysis of performance of the private and public sector banks, multiple regression analysis tests have been applied. Researcher has applied two way regression model. The computed values of multiple regression analysis are given below:

Public Sector Banks

Run Summary Report

Item	Value	Rows	Value
Dependent Variable	ROA	Rows Processed	11
Number Ind. Variables	5	Rows Filtered Out	0
Weight Variable	None	Rows with X's Missing	0
R ²	0.8596	Rows with Weight Missing	0
Adj R ²	0.7193	Rows with Y Missing	0
Coefficient of Variation	0.0811	Rows used in Estimation	11
Mean Square Error	0.005714492	Sum of Weights	11.000
Square Root of MSE	0.07559426		
Ave Abs Pct Error	4.816		
Completion Status	Normal Completion		

Descriptive Statistics

Variable	Count	Mean	Standard Deviation	Minimum	Maximum
CAR	11	12.71818	0.3712093	12.2	13.28
NPA	11	1.808182	1.096766	0.94	4.54
CAR*CAR	11	161.8774	9.473074	148.84	176.3584
CAR*NPA	11	23.00484	13.9774	12.3234	57.204
NPA*NPA	11	4.363064	5.890894	0.8836	20.6116
ROA	11	0.9318182	0.1426757	0.78	1.27

Regression Coefficients T-Tests

Independent Variable	Regression Coefficient b(i)	Standard Error Sb (i)	Standardized Coefficient	T-Statistic to Test H0:β(i)=0	Prob Level	Reject H0 at 5%?	Power of Test at 5%
Intercept	6.966859	40.50602	0.0000	0.172	0.8702	No	0.0523
CAR	-0.7221501	6.383727	-1.8789	-0.113	0.9143	No	0.0510
NPA	-3.947682	1.392722	-30.3463	-2.835	0.0365	Yes	0.6246
CAR*CAR	0.02028805	0.2514274	1.3470	0.081	0.9388	No	0.0505
CAR*NPA	0.2961413	0.1032733	29.0118	2.868	0.0351	Yes	0.6343
NPA*NPA	0.04369923	0.02491098	1.8043	1.754	0.1398	No	0.2975

Regression Coefficients Confidence Intervals

Independent Variable	Regression Coefficient b(i)	Standard Error Sb(i)	Lower 95% Conf. Limit of β(i)	Upper 95% Conf. Limit of β(i)
Intercept	6.966859	40.50602	-97.15717	111.0909
CAR	-0.7221501	6.383727	-17.13204	15.68774
NPA	-3.947682	1.392722	-7.527787	-0.3675774
CAR*CAR	0.02028805	0.2514274	-0.6260266	0.6666027
CAR*NPA	0.2961413	0.1032733	0.03066877	0.5616139
NPA*NPA	0.04369923	0.02491098	-0.02033684	0.1077349

Note: The T-Value used to calculate these confidence limits was 2.571.

Estimated Equation

$$ROA = 6.96685890314003 - 0.722150060290219 * CAR - .94768231192395 * NPA + 0.0202880487930567 * CAR*CAR + 0.296141335027043 * CAR*NPA + 0.0436992284222498 * NPA*NPA$$

Analysis of Variance

Source	DF	R ²	Sum of Squares	Mean Square	F-Ratio	Prob Level	Power (5%)
Intercept	1		9.551136	9.551136			
Model	5	0.8596	0.1749912	0.03499823	6.124	0.0342	0.7346
Error	5	0.1404	0.02857246	0.005714492			
Total(Adjusted)	10	1.0000	0.2035636	0.02035636			

Analysis of Variance Detail

Source	DF	R ²	Sum of Squares	Mean Square	F-Ratio	Prob Level	Power (5%)
Intercept	1		9.551136	9.551136			
Model	5	0.8596	0.1749912	0.03499823	6.124	0.0342	0.7346
CAR	1	0.0004	7.312804E-05	7.312804E-05	0.013	0.9143	0.0510
NPA	1	0.2255	0.04591276	0.04591276	8.034	0.0365	0.6246
CAR*CAR	1	0.0002	3.720772E-05	3.720772E-05	0.007	0.9388	0.0505
CAR*NPA	1	0.2308	0.04698934	0.04698934	8.223	0.0351	0.6343
NPA*NPA	1	0.0864	0.01758505	0.01758505	3.077	0.1398	0.2975
Error	5	0.1404	0.005714492	0.005714492			
Total(Adjusted)	10	1.0000	0.2035636	0.02035636			

Normality Tests

Test Name	Test Statistic to Test H0: Normal	Prob Level	Reject H0 at 20%
Shapiro Wilk	0.966	0.8414	No
Anderson Darling	0.202	0.8788	No
D'Agostino Skewness	0.097	0.9229	No
D'Agostino kurtosis	-0.531	0.5952	No
D'Agostino Omnibus	0.292	0.8643	No

It has been observed from run summary report that dependent variable ROA number of independent variable 9, value of R² is 0.9367, Adj R² is 0.3674, Coefficient of variation is 0.1218, Mean Square Error is 0.01287711, Square Root of MSE is 0.1134774 and Ave Abs Pct Error is 2.621.

Descriptive Statistics: There are three main variables in descriptive statistics such as CAR, NPA and ROA. The CAR consist of mean value = 12.71818 and standard deviation = 0.3712093. The NPA consist of mean value = 1.808182 and standard deviation = 1.096766. The ROA consist of mean value = 0.9318182 and standard deviation = 0.1426757.

Regression Coefficients T-Tests: There are two main independent variable in regression coefficients T-Tests such as NPA and CAR. The CAR consist of regression coefficient = 151.3399, standard error = 585.251, standardised coefficient = 393.7516, t-statistic to test H0 = 0.259, prob level = 0.8389, reject H0 at 5% = No and power of test at 5% = 0.0517. The NPA consist of regression coefficient = - 108.8978, standard error = 361.5493, standardised coefficient = - 837.1107, t-statistic to test H0 = - 0.301, prob level = 0.8138, reject H0 at 5% = No and power of test at 5% = 0.0522.

Regression Coefficients Confidence Intervals: There are two main independent variable of regression coefficients confidence intervals such as CAR and NPA.

The CAR consist of regression coefficient = 151.3399, standard error = 585.251, lower 95% confidence limit = - 7284.979 and upper 95% confidence limit = 7587.659. The NPA consist of regression coefficient = - 108.8978, standard error = 361.5493, lower 95% confidence limit = - 4702.817 and upper 95% confidence limit = 4485.021. The T – Value used to calculate these confidence limits were 12.706.

Analysis of Variance: Analysis of variance consists of different sources such as Intercept, Model, Error and Total (Adjusted). The source Total (Adjusted) contains degree of freedom = 10, the value of R² = 1, the value of sum of squares = 0.2035636 and the value mean square = 0.02035636.

Normality Tests : The Normality Test consist of Shapiro Wilk, Anderson Darling, D’Agostino Skewness, D’ Agostino Kurtosis, D’ Agostino Omnibus.

Private Sector Banks

Run Summary Report

Item	Value	Rows	Value
Dependent Variable	ROA	Rows Processed	11
Number Ind. Variables	5	Rows Filtered Out	0
Weight Variable	None	Rows with X’s Missing	0
R ²	0.6273	Rows with Weight Missing	0
Adj R ²	0.2546	Rows with Y Missing	0
Coefficient of Variation	0.3244	Rows used in Estimation	11
Mean Square Error	0.0996022	Sum of Weights	11.000
Square Root of MSE	0.3155982		
Ave Abs Pct Error	40.837		
Completion Status	Normal completion		

Descriptive Statistics

Variable	Count	Mean	Standard Deviation	Minimum	Maximum
CAR	11	13.66818	1.746836	11.7	16.29
NPA	11	1.585455	1.379604	0.53	4.95
CAR*CAR	11	189.5932	49.50351	136.89	265.3641
CAR*NPA	11	20.7683	17.12718	7.35	63.36
NPA*NPA	11	4.243946	7.266837	0.2809	24.5025
ROA	11	0.9727273	0.3655432	0.13	1.63

Regression Coefficients T-Tests

Independent Variable	Regression Coefficient b(i)	Standard Error Sb (i)	Standardized Coefficient	T-Statistic to Test H0:β(i)=0	Prob Level	Reject H0 at 5%?	Power of Test at 5%
Intercept	-1.788702	12.29687	0.0000	-0.145	0.8900	No	0.0517
CAR	0.5960591	1.681987	2.8484	0.354	0.7375	No	0.0598
NPA	-2.594419	3.344458	-9.7917	-0.776	0.4730	No	0.0977
CAR*CAR	-0.02571046	0.0573261	-3.4818	-0.448	0.6726	No	0.0658
CAR*NPA	0.155393	0.2667032	7.2808	0.583	0.5854	No	0.0768
NPA*NPA	0.08836161	0.06498312	1.7566	1.360	0.2320	No	0.1991

Regression Coefficients Confidence Intervals

Independent Variable	Regression Coefficient b(i)	Standard Error Sb(i)	Lower 95% Conf. Limit of β(i)	Upper 95% Conf. Limit of β(i)
Intercept	6.966859	40.50602	-97.15717	111.0909
CAR	-0.7221501	6.383727	-17.13204	15.68774
NPA	-3.947682	1.392722	-7.527787	-0.3675774
CAR*CAR	0.02028805	0.2514274	-0.6260266	0.6666027
CAR*NPA	0.2961413	0.1032733	0.03066877	0.5616139
NPA*NPA	0.04369923	0.02491098	-0.02033648	0.1077349

Note: The T-Value used to calculate these confidence limits was 2.571.

Estimated Equation

$$ROA = 6.96685890314003 - 0.722150060290219 * CAR - 3.94768231192395 * NPA + 0.0202880487930567 * CAR*CAR + 0.296141335027042 * CAR*NPA + 0.0436992284222498 * NPA*NPA$$

Analysis of Variance

Source	DF	R ²	Sum of Squares	Mean Square	F-Ratio	Prob Level	Power (5%)
Intercept	1		9.551136	9.551136			
Model	5	0.8596	0.1749912	0.03499823	6.124	0.0342	0.7346
Error	5	0.1404	0.02857246	0.005714492			
Total(Adjusted)	10	1.0000	0.2035636	0.02035636			

Analysis of Variance Detail

Source	DF	R ²	Sum of Squares	Mean Square	F-Ratio	Prob Level	Power(5%)
Intercept	1		10.40818	10.40818			
Model	5	0.6237	0.8382072	0.1676414	1.683	0.2908	0.2529
CAR	1	0.0094	0.01250841	0.01250841	0.126	0.7375	0.0598
NPA	1	0.0449	0.05993741	0.05993741	0.602	0.4720	0.0977
CAR*CAR	1	0.0150	0.02003475	0.02003475	0.201	0.6726	0.0658
CAR*NPA	1	0.0253	0.03381234	0.03381234	0.339	0.5854	0.0768
NPA*NPA	1	0.1378	0.1841599	0.1841599	1.849	0.2320	0.1991
Error	5	0.3727	0.498011	0.0996022			
Total(Adjusted)	10	1.0000	1.336218	0.1336218			

Normality Tests

Test Name	Test Statistic to Test H0 Normal	Prob Level	Reject H0 at 20%
Shapiro Wilk	0.966	0.8414	No
Anderson Darling	0.202	0.8788	No
D'Agostino Skewness	0.097	0.9229	No
D'Agostino kurtosis	-0.531	0.5952	No
D'Agostino Omnibus	0.292	0.8643	No

It has been observed from run summary report that dependent variable ROA number of independent variable 9, weight variable is none, value of R² is 0.8979, Adj R² is 0.0000, Coefficient of variation is 0.3798, Mean Square Error is 0.01364885, Square Root of MSE is 0.3694435 and Ave Abs Pct Error is 12.652.

Descriptive Statistics: There are three main variables in descriptive statistics such as CAR, NPA and ROA. The CAR consist of mean value = 13.66818 and standard deviation = 1.746836. The NPA consist of mean value = 1.585455 and standard deviation = 1.379604. The ROA consist of mean value = 0.9727273 and standard deviation = 0.3655432.

Regression Coefficients T-Tests: There are two main independent variable in regression coefficients T-Tests such as NPA and CAR. The CAR consist of regression coefficient = 263.0284, standard error = 299.024, standardised coefficient = 1256.9446, t-statistic to test H0 = 0.880, prob level =0.5407, reject H0 at 5% = No and power of test at 5% = 0.0681. The NPA consist of regression coefficient = 305.0234, standard error = 259.5638, standardised coefficient =

1151.1950, t-statistic to test $H_0 = 1.175$, prob level = 0.4489, reject H_0 at 5% = No and power of test at 5% = 0.0809.

Regression Coefficients Confidence Intervals: There are two main independent variable of regression coefficients confidence intervals such as CAR and NPA.

The CAR consist of regression coefficient = 263.0284, standard error = 299.024, lower 95% confidence limit = - 3536.432 and upper 95% confidence limit = 4062.489. The NPA consist of regression coefficient = 305.0234, standard error = 259.5638, lower 95% confidence limit = - 2993.048 and upper 95% confidence limit = 3603.094. The T – Value used to calculate these confidence limits were 12.706.

Analysis of Variance: Analysis of variance consists of different sources such as Intercept, Model, Error and Total (Adjusted). The source Total (Adjusted) contains degree of freedom = 10, the value of $R^2 = 1$, the value of sum of squares = 1.336218 and the value mean square = 0.1336218.

Normality Tests : The Normality Test consist of Shapiro Wilk, Anderson Darling, D’Agostino Skewness, D’ Agostino Kurtosis, D’ Agostino Omnibus.

Conclusion

The study shows that there is a significant relationship between bank performance (in terms of return on assets) and credit risk management (in terms of loan performance). Better credit risk management results in better bank performance. The extent of NPA is comparatively higher in public sectors banks. To improve the efficiency and profitability, the NPAs have to be scheduled. Various steps have been taken by government to reduce the NPAs. CAR is higher in case of private sector banks. All public sector banks have to work on enhancing their CAR. On the basis of the above findings we can say that the performances of private sector banks are much better than public sector banks.

The banks those who are facing low competitiveness on credit risk management and positive changes in productivity should improve their credit risk management to maintain high productivity. However it needs to build up its capital adequacy ratio and control its non-performing assets. The poor credit risk management affects bank failures in India. Therefore effective credit risk management is important in banks and allows them to improve their performance and prevent bank distress.

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