

Impact Of Economic And Banks Specific Determinants Of Credit Risk Of Select Indian Private Sector Banks In The Post Financial Crisis Period

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Abstract: The main objective of the study is to analyse the determinants of credit risk of select private sector banks in the post financial crises period. The study period covers ten years (post financial crisis period) from 2008-2009 to 2017-2018. For the purpose of the study, top ten private sector banks have been selected based on the banks which have the highest share in Non-performing Assets. The sample private sector banks namely, ICICI Bank, Axis Bank, HDFC Bank, Jammu and Kashmir Bank, Kotak Mahindra Bank, Karur Vysya Bank, Federal Bank, Yes Bank, Lakshmi Vilas Bank, and South Indian Banks are chosen for the study. The data analysis was done using ratio analysis and statistical tools like mean, standard deviation, co-efficient of variation, compound annual growth rate, hausman test and panel data regression. The findings also reveals that the most influencing factors of credit risk of select private sector banks are GDP growth rate, inflation rate, operational inefficiency, return on assets, bank branch growth and bank size, are moreover significant effect of credit risk thereby presenting them to incredible danger of banks financial health. Therefore, the study concludes that the banks must take strict essential steps recover their loans and follow the reserve banks guidelines like Prompt Corrective Action (PCA) framework and maintain enough capital to absorb the risks.

Index Terms - Bank Specific Determinants, Credit Risk, Descriptive Statistics, Macroeconomic Determinants, Post Financial Crises Period, Private Sector Banks, Panel Data Regression and Ratio Analysis

1 INTRODUCTION

Credit risk resources are one of the major concerns for banks in India and it reflects the execution of the banks. The large level of credit risk is dissolves the esteem of the resource. The NPAs diminishes the value of shareholders and profitability of banks as well as the Indian economy. The bank's health is incredibly determined by the non-performing assets, thus the banks should have proper NPAs management and it is fundamental part for it loans process and reduces the credit risk and retaining the credit exposure for that the government has induced to invent advisable risk mechanism in recent years of banking system weakness. Credit risk is a major concern for lenders worldwide as it is the most critical of all risks faced by the banking institution. Credit risk exists because an expected payment might not occur. Poorly managed credit risk will result in financial losses for banks, donors, investors, lenders, borrowers and savers. This is because all tend to lose confidence in banks and funds begin to dry up and when funds dry up, the banks are not able to meet its objective of providing services to the poor and quickly goes out of business. In the case of banks, credit risk is the most important factor which has to be managed. Although credit risk can be the result of different causes, these kinds of risks mainly arise from economic crises, the companies' bankruptcy, lack of rules and regulations in the companies accountancy and auditing process, the increase of off-balance sheet obligations, the devaluation of collaterals and etc. due to the increasing spate of Nonperforming loans the Basel II accord emphasized on credit risk management practices. Compliance with accord means a sound approach to tackling credit risk has been taken and this ultimately improves bank performance. Through the effective management of credit risk exposure, banks not only support the viability and profitability of their own business, they also contribute to systematic stability and to an efficient allocation of capital in the economy.

2 STATEMENT OF THE PROBLEM

The banking sector has a prominent role in the expansion of an economy. It is the input driver of economic enlargement of the nation and has an energetic task to play in converting the idle investment resources for their most favourable operation so as to achieve greatest efficiency. After liberalization, credit risk management plays a prominent role in the Indian economy. Nature of banking business is assimilated by the risk. Biggest challenges are resisted by the banking industry by managing the risk and measuring the risk with the Non-performing assets (NPAs). NPAs are under hard-pressure risk for the banks as credit risk not only indicates internal factors but also macro economic factors. In future, banks will unquestionably repose on the dynamics of credit risk management. In order to sustain in the market, the banks should have efficient management of credit risk so that they can retain the success for a longer period of time. Inappropriate credit practice and poor credit quality will lead to failure of banks. At the same time as banks make progress towards an incorporated comprehension of their risk profiles, much data is regularly scattered among specialty units. There is no way to know whether the capital is precisely reflecting dangers or the adequacy of loan loss reserves in order to save the potential short term credit losses without an intensive risk evaluation. Banks with inefficient credit risk management should focus on investigating the exhausting losses by regulators and investors. The Non-Performing Assets influence the operational productivity, which in turn affects profitability; liquidity and dissolvability position of banks and it also demonstrate credit risk management. In March 2018, share of the gross NPAs in Public sectors banks represented by 88.74 per cent and a share of banking assets is under 70 per cent, with reference to bad loans NPAs amounted to 87 percent of contribution. The public sector banks, which account for over 80 per cent of NPAs in the system, should see their gross NPAs peak of 14.6 percent in march 2018 and as per Reserve Bank of India provisional data on global operations, as on

currently, the aggregate amount of gross NPAs of public sector banks and schedule commercial banks were Rs. 8, 06,412 crore and Rs. 9, 49, 279 crores respectively. This will destroy the bank's profitability gradually and the investors will be affected and as well as the Indian economy, for this Indians planned to capital infusion are sufficient to determine administrative capital needs however, will deficient to credit growth, credit risk exposures proceed to problems of loaning so, In this context, the researcher has undertaken a study on impact of economic and banks specific determinants of credit risk of select Indian private sector banks in the post financial crisis period. This raises the following research question: What are the various macroeconomic and bank specific determinants influence the banks credit risk?

2.1 Objective of the Study

To examine the determinants of credit risk of private sector banks.

2.3 Hypothesis of the Study

There is no significant difference in bank credit risk on macroeconomic and bank specific determinants of Indian private sector banks in the post financial crisis period.

3 RESEARCH METHODOLOGY

The present study is based on analytical in nature

3.1 Sources of Data

The present study is mainly based on secondary data. The data for this study have been collected from CMIE proress database and also from annual reports published by the Reserve Bank of India (RBI), Department of banking

supervision, money control website and annual reports published by respective banks.

3.2 Period of the Study

The study period covers ten years (post financial crisis period) from 2008-2009 to 2017-2018.

3.3 Selection of the Sample

For the purpose of the study, top ten private sector banks have been selected based on the highest share in Non-performing Assets. The sample private sector banks namely, ICICI Bank, Axis Bank, HDFC Bank, Jammu and Kashmir Bank, Kotak Mahindra Bank, Karur Vysya Bank, Federal Bank, Yes Bank, Lakshmi Vilas Bank, and South Indian Banks are chosen for the study.

3.4 Tools for Analysis

The data analysis was done using ratio analysis and statistical tools like mean, standard deviation, co-efficient of variation, compound annual growth rate, hausman test and panel data regression.

3.5 Variable Specification

Credit Risk - Non-Performing Loans to Total Loans

Macroeconomic Variables - GDP Growth Rate, Inflation Rate, Exchange Rate and Real Interest Rate

Bank Specific Variables - Capital Adequacy Ratio, Growth in Advances, Operating Inefficiency Ratio, Total Loan to Total Deposits Ratio, Total Loan to Total Assets Ratio, Return on Assets, Loan Loss Provisions to Total Loans, Bank Size and Bank Branch Growth.

DESCRIPTIVE STATISTICS AND COMPOUND ANNUAL GROWTH RATE OF MACROECONOMIC AND BANK SPECIFIC DETERMINANTS OF CREDIT RISK OF SELECT PRIVATE SECTOR BANKS

Credit Risk (Non-Performing loans to total Loans)										
Banks	ICICI	Axis	HDFC	JK&B	KMB	KVB	FB	YB	LVB	SIB
MEAN	5.37	2.32	1.13	4.91	2.44	2.20	2.87	0.59	3.75	1.97
SD	2.47	2.33	0.37	4.12	0.93	1.81	0.49	0.48	2.61	1.05
CV	45.95	100.57	32.47	84.06	37.92	82.40	17.04	80.44	69.68	53.11
CAGR	8.92	21.71	-4.19	14.73	-6.46	13.03	1.45	6.54	14.30	5.14
Macroeconomic Determinants										
	GDP Growth Rate		Inflation Rate		Exchange Rate			Real Interest Rate		
MEAN	7.38		7.70		57.54			4.62		
SD	1.33		3.06		8.34			2.71		
CV	18.02		39.73		14.50			58.52		
CAGR	-1.62		-7.05		2.75			1.20		
Bank Specific Determinants										
Capital Adequacy Ratio										
	ICICI	Axis	HDFC	JK&B	KMB	KVB	FB	YB	LVB	SIB
MEAN	17.93	15.08	16.04	12.96	17.92	13.89	15.84	17.18	11.68	13.34
SD	1.30	1.39	0.91	1.50	1.39	1.02	2.26	1.72	1.61	1.23
CV	7.24	9.20	5.67	11.57	7.78	7.38	14.24	9.98	13.81	9.25
CAGR	1.94	1.93	-0.57	-2.35	-0.93	-0.33	-3.14	1.03	-0.48	-1.49
Growth in Advances										
MEAN	9.78	22.38	26.73	11.99	28.32	18.57	17.38	37.23	21.18	18.36
SD	10.62	8.76	10.77	8.91	20.69	20.11	7.67	20.19	8.54	10.28
CV	108.66	39.14	40.31	74.26	73.05	108.31	44.11	54.24	40.32	56.00
CAGR	12.35	-6.96	-10.37	2.77	13.61	-0.97	3.25	5.51	-13.33	2.79
Operating Inefficiency Ratio										
MEAN	1.96	2.14	2.70	1.69	3.09	1.82	1.94	1.61	1.96	1.61
SD	0.47	0.27	0.58	0.32	0.67	0.29	0.30	0.29	0.34	0.11
CV	23.75	12.77	21.49	18.84	21.79	15.72	15.48	17.93	17.49	6.83
CAGR	-4.55	-1.82	-6.04	4.78	-6.29	3.26	-2.84	-2.17	0.51	-0.70

Total Loan to Total Deposits Ratio										
MEAN	56.41	59.99	60.11	57.59	60.06	62.82	61.97	56.50	64.32	63.82
SD	3.56	2.84	3.60	3.97	2.83	5.34	2.56	5.52	2.90	2.71
CV	6.31	4.73	5.98	6.89	4.70	8.50	4.13	9.77	4.51	4.25
CAGR	0.13	1.42	1.38	1.41	1.02	0.93	1.44	1.86	0.15	1.29
Total Loans to Total Assets Ratio										
MEAN	56.41	59.99	60.11	57.59	60.06	62.82	61.97	56.50	64.32	63.82
SD	3.56	2.84	3.60	3.97	2.83	5.34	2.56	5.52	2.90	2.71
CV	6.31	4.73	5.98	6.89	4.70	8.50	4.13	9.77	4.51	4.25
CAGR	0.13	1.42	1.38	1.41	1.02	0.93	1.44	1.86	0.15	1.29
Return on Assets										
MEAN	1.39	1.42	1.75	0.80	1.56	1.22	1.13	1.54	0.70	0.67
SD	0.35	0.60	0.24	1.11	0.39	0.42	0.33	0.41	0.30	0.78
CV	25.30	41.98	13.54	139.87	24.99	34.38	29.27	26.78	42.46	116.31
CAGR	-2.38	-32.10	2.51	-14.79	2.11	-10.17	-8.19	-12.89	6.64	-22.82
Loan Loss Provisions to Total Loans										
MEAN	1.53	1.43	0.93	1.54	0.71	0.84	0.95	0.48	1.48	0.68
SD	0.99	1.11	0.43	1.62	0.68	0.79	0.45	0.16	1.37	0.46
CV	64.55	77.29	46.02	105.52	95.78	94.33	47.71	34.19	92.77	67.77
CAGR	4.88	13.04	-7.27	17.79	-12.51	26.85	-5.86	-0.95	38.00	20.39
Bank Size										
MEAN	5.74	5.54	5.65	4.81	4.95	4.61	4.85	4.98	4.28	4.66
SD	0.13	0.22	0.25	0.13	0.32	0.20	0.18	0.35	0.22	0.20
CV	2.34	4.02	4.50	2.72	6.56	4.40	3.65	6.99	5.21	4.29
CAGR	0.64	1.23	1.36	0.79	1.98	1.32	1.14	2.34	1.62	1.33
Bank Branch Growth										
MEAN	14.95	19.24	21.88	6.03	24.97	10.66	7.94	26.33	8.86	5.55
SD	11.64	8.28	23.76	4.71	27.07	6.38	8.79	18.94	7.26	3.59
CV	77.83	43.03	108.56	78.18	108.40	59.88	110.61	71.92	81.86	64.57
CAGR	-30.02	-8.15	-33.14	0.40	-24.11	4.41	-12.37	27.88	10.74	-22.47

Source: Computed data

credit Risk

The above table describes the descriptive statistics of Non-Performing Loans to Total Loans of select private sector banks. The credit risk shows the positive and high growth in the banks except HDFC bank and Kotak Mahindra Bank. It is clearly disclosed that the non-performing loans is increased in select private sector banks.

Macroeconomic Determinants

The exchange rate and real interest rates are demonstrated the positive growth and other two variables like, GDP Growth rate and inflation rate show the negative growth.

Bank Specific Determinants

The positive aspects of the banks like, capital adequacy ratio, return on assets and operating inefficiency are depict the negative growth in majority of banks and at the same time the negative aspects of banks i.e the credit risk determinants growing positively.

4 PANEL DATA REGRESSION ANALYSIS OF SELECT INDIAN PRIVATE SECTOR BANKS

Based on the review of literature the following variables have been used for the analysis in the term of determinant of credit risk in the private sector banks in India. Natural Logged value has been taken for all the dependent and independent determinants to build a panel data regression model. This model is a fixed effect panel data regression function that links the ratio of non-performing loans to total loans, key macroeconomic and bank specific determinants. Through considering both sets of determinants the exact specification of the fixed effect panel regression model is constructed as follows.

Name of Variables	Proxy of variables	References
Credit Risk		
Non-Performing Loans to Total Loans (NPL to TL _{it})	Ratio of Non-Performing Loans to Total Loans (<i>i</i> at time <i>t</i>).	➤ Edward I. Altman and Anthony Saunders (1998). ➤ Shu ling lin (2007).
Macro Economic Variables		
GDP Growth Rate (ΔGDP _t)	The annual growth in real GDP (at time <i>t</i>)	➤ Abhiman Das and Saibal Ghosh (RBI, 2007). ➤ Muhammad Imaduddin (2008).
Inflation Rate (ΔI R _t)	Annual inflation growth rate (at time <i>t</i>) (Measured by consumer price index)	➤ Somanadevi Thiagarajan et al (2011).
Exchange Rate (E R _t)	Exchange Rate (at time <i>t</i>)	➤ Ekanayake E.M.N.N and Azeez A.A (2015). ➤ Atakelt hailu Asfa W and P.Veni (2015).
Real Interest Rate (RIR _t)	Real Interest Rate (at time <i>t</i>)	➤ Yuga Raj Bhattarai (2016). ➤ Yu Zhang and Xiaosong Zheng (2016). ➤ Sohaib Iqbal Kasana (2016). ➤ Nguyen Thuy Duong and Tran Thi Thu Huong (2017). ➤ Trust R. Mpfu and Eftychia Nikolaidou (2018).
Bank Specific Variables		
Capital Adequacy Ratio (CAR _{it})	CAR = Tier I capital + Tier II Capital/Risk Weighted Assets (<i>i</i> at time <i>t</i>).	
Growth in Advances (ΔGA _t)	Total Advances in Current Year – Total Advances in Previous Year / Total Advances in Previous Year × 100 (<i>i</i> at time <i>t</i>)	
Ratio of Operating Inefficiency (OI _{it})	Operating expenses/ Total Assets (<i>i</i> at time <i>t</i>).	
Ratio of Total Loans to Total Deposits (TL to TD _{it})	Total Loans / Total Deposits (<i>i</i> at time <i>t</i>).	
Ratio of Total Loans to Total Assets (TL to TA _{it})	Total Loans / Total Assets (<i>i</i> at time <i>t</i>)	
Return on Assets (ROA _{it})	Net Income / Total Assets × 100 (<i>i</i> at time <i>t</i>)	
Ratio of Loan Loss Provisions to Total Loans	Loan Loss Provisions / Total Loans (<i>i</i> at time <i>t</i>).	

(LLP to TL _{i,t})		Shahriyar Mukhtarov et al (2018).
Bank Size (BS _{i,t})	Log value of Total Assets (i at time t).	
Bank Branch Growth (ΔBBG _i)	Total Branches in Current Year – Total Branches in Previous Year / Total Branches in Previous Year × 100 (i at time t)	

5 ECONOMETRIC MODEL FOR SELECT PRIVATE SECTOR BANKS

$NPL\ to\ TL_{i,t} = \beta_1 i_t + \beta_2 \Delta GDP_t + \beta_3 \Delta I R_t + \beta_4 E R_t + \beta_5 RIR_t + \beta_6 CAR_{i,t} + \beta_7 \Delta GA_t + \beta_8 OI_{i,t} + \beta_9 TL\ to\ TD_{i,t} + \beta_{10} TL\ to\ TA_{i,t} + \beta_{11} LLP\ to\ TL_{i,t} + \beta_{12} BS_{i,t} + \beta_{13} \Delta BBG_t + \eta + v_{i,t}$
 Where: NPL to TL_{i,t} represents ratio of non-performing loans to total loans for bank i in year t; ΔGDP_t represents the annual growth in real GDP at time t; ΔI R_t represents the annual inflation rate at time t; E R_t represents Exchange Rate at time t; RIR_t represents Real Interest Rate at time t; CAR_{i,t}

represents capital adequacy ratio i at time t; Δ GA_t represents the growth in advances i at time t; OI_{i,t} represents the ratio of operating inefficiency i at time t; TL to TD_{i,t} represents the total loans to total deposits ratio i at time t; TL to TA_{i,t} represents the total loans to total assets i at time t; ROA_{i,t} represents the ratio of return on assets i at time t; LLP to TL_{i,t} represents the loan loss provisions to total loans ratio i at time t; BS_{i,t} represents the bank size i at time t; BBG_t represents the bank branch growth i at time t;

Table 1
 Hausman Test of Select Private Sector Banks
 $H_0 =$ Random effect model is appropriate $H_1 =$ Fixed effect model is appropriate

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	119.875507	13	0.0000*

* indicates statistically significant at 5 percent level

He above table 1 shows the Hausman test of credit risk determinants of select private sector banks. The test shows the significant value of 0.0000, it is statistically significant at 5 percent level. Hence, the Random effect model is rejected and the fixed effect model is adopted to find the determinants of credit risk of select private sector banks.

Table 2
 Fixed Effect Model of Panel Data Regression for Macroeconomic and Bank Specific Determinants of Select Private Sector Banks
 $H_{01} =$ There is no significant differences in bank credit risk on macroeconomic and bank specific determinants of Indian private sector banks in the post financial crisis period.

Dependent Variable: Non-Performing Loans to Total Loans
Method: Panel Least Squares
Sample: 2009 – 2018
Periods included: 10 Years

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.025858	0.925103	-2.189872	0.0314
Macro Economic Determinants				
GDP Growth Rate	0.777205	0.331157	2.346938	0.0212*
Inflation Rate	-0.704806	0.233282	-3.021267	0.0033*
Exchange Rate	-0.591910	0.907637	-0.652144	0.5160
Real Interest Rate	0.083239	0.128104	0.649780	0.5176
Bank Specific Determinants				
Capital Adequacy Ratio	0.081333	0.259818	0.313037	0.7551
Growth in Advances	-0.051161	0.034063	-1.501973	0.1370
Operating Inefficiency	0.948870	0.169195	5.608155	0.0000*
Total Loans to Total Deposits	-0.136149	0.497681	-0.273566	0.7851
Total Loans to Total Assets	0.528308	0.650891	0.811670	0.4194
Return on Assets	-0.153338	0.049060	-3.125539	0.0025*
Loan Loss Provisions to Total Loans	0.737581	0.061129	12.06594	0.0000*
Bank Size	0.277293	0.041851	6.625664	0.0000*
Bank Branch Growth	-0.043215	0.021357	-2.023401	0.0463*
Effects Specification				
R-squared	0.944338	Mean dependent var	0.297759	
Adjusted R-squared	0.931969	S.D. dependent var	0.366029	
S.E. of regression	0.095471	Akaike info criterion	-1.690716	
Sum squared resid	0.738287	Schwarz criterion	-1.195734	
Log likelihood	103.5358	Hannan-Quinn criter.	-1.490388	
F-statistic	76.34518	Durbin-Watson stat	1.800121	
Prob.(F-statistic)			0.000000*	

Source: Computed Data

The table 2 portrays the Fixed Effect model of Panel Data Regression for macroeconomic and bank specific determinants of select private sector banks. In macroeconomic

determinants, GDP growth rate and inflation rate are the statistically impact on credit risk at 5 percent significant level with the significant value of 0.0212 and 0.0033 respectively. In

bank specific determinants, operating inefficiency (0.0000), return on assets (0.0025), loan loss provisions to total loans ratio (0.0000), bank size (0.0000) and bank branch growth (0.0463) are the significantly impact on the credit risk at 5 percent level. The table also explains the R square value 0.9443 and adjusted R square value 0.9320 it means, the independent variables more than 93 percent statistically influence the dependent variable. It also depicts the Prob. (F-statistic) value is 0.000 which is statistically significant at 5 percent level. Hence the null hypothesis is rejected. It is concluded that there is significant difference in credit risk and macroeconomic determinants and bank specific determinants of the banks in the post financial crisis period.

6 CONCLUSION

The present study indicates that during the study period the most influencing factors of credit risk of select private sector banks are GDP growth rate, inflation rate, operational inefficiency, return on assets, bank branch growth and bank size. They are moreover significant effect of credit risk thereby presenting them to incredible danger of banks financial health. Therefore, the study concludes that the banks must take strict essential steps recover their loans and follow the reserve banks guidelines like PCA framework and maintain enough capital to absorb the risks. Furthermore the banks should manage the efficient credit risk management strategies in order to motivating investors and confidence savers in banks which lead to efficient financial stability of banks. This will help to enable to overall growth of economy and bring trust among the investors across the globe it will help to develop the Indian

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