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Credit Risk Management Operations and Systems: Does Ownership Matter?

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ABSTRACT

The credit risk management (CRM) operations and systems provide the tools, procedures and techniques to effectively perform the CRM process. The underlying objectives of implementing CRM operations and systems, namely, measuring risks underlying credit risk in a timely manner; ensuring that actual risk positions match with the defined acceptable total risk; applying risk mitigation measures in time if there is any breach of guidelines, as defined by the CRM policy, etc. make a strong case for an empirical study on the CRM operations and systems at the transaction level and at the portfolio level. Various recent studies have shown that the Indian banking sector now compares favourably with banking sectors in the region on metrics like growth, profitability and non-performing assets. Increased competition, deregulation of interest rates, more functional autonomy and operational flexibility to commercial banks in India make a strong case for investigating closely their CRM operations and systems. The present study offers an empirical evidence regarding impact of ownership on practices of commercial banks in India relating to CRM operations and systems, both at the transaction level and at the portfolio level and lists down significant difference in their strategies, if any. Using primary data from 35 Indian scheduled commercial banks (24 public sector banks and 11 private sector banks) the present study further compares them with benchmark practices in this regard. It also identifies specific CRM operations and systems at the transaction level and at the portfolio level that the public sector banks and the private sector banks in India should improve upon in the near future. The study shall be useful for bank management, regulatory authority, policy makers, bank depositors and academicians in gaining insight into the impact of bank ownership, an important distinguishing bank characteristic, on the CRM operations and systems.

KEYWORDS: Credit risk management; Operations and systems; Credit portfolio risk; Credit risk rating framework; Public sector banks; Private sector banks; Indian banking sector

JEL CLASSIFICATION: G20, G21, G32

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INTRODUCTION

Unsound risk management practices governing bank lending played a central role in the recent episodes of financial turmoil (*Rahman et al., 2004; Atikogullari, 2009*). For the effective implementation of credit risk management (CRM) approaches and practices, it is necessary to install operations and systems. An operation/system is a set of pre-defined procedures or activities for performing a given task. Accordingly, the CRM operations and systems provide the tools, procedures and techniques to effectively perform CRM process, specifically, to identify, measure, monitor, manage and control credit risk in accordance with the bank's defined approach towards CRM. For CRM operations to be effectively performed, first, it is necessary to design all the necessary operations and

systems and then to ensure that they are implemented properly. They should also be harmonised with the relevant regulations in the country and be consistent with the bank-specific characteristics, such as, size, geographical spread and complexity of operations at the bank. The focus of a given CRM operation may be individual credit transaction or aggregate credit portfolio. The operations and systems for CRM at the transaction level and at credit portfolio level may be different, but they need to work in tandem. At the transaction level, the CRM operations and systems relate to credit risk rating framework, monitoring credit risk and estimation of credit risk. At the portfolio level, CRM operations and systems primarily focus on credit portfolio monitoring, measurement of portfolio risk, sensitivity analysis, stress testing, etc. It has been argued that if firms are subjected to competitive forces, they would perform efficiently irrespective of their ownership or the sector to which they belong (*Bhaumik and Dimova, 2003*). Thus, it would be interesting to examine prior research in these issues.

LITEARTURE REVIEW

Numerous authors in various countries, such as in the USA (Treacy and Carey, 1998), in Australia (*Gray, 1998*), in Turkey (*Anbar, 2005*), in four Asian emerging markets (Parrenas, 2005), in Northern Cyprus (Shefakli, 2007), in UAE (*Hussein, 2007*) and in Pakistan (*Aman and Zaman, 2010*) have given empirical evidence of CRM practices in their research works. Studies by national authors Sarkar *et al*. (1998), Bhaumik and Dimova (2003), Rajaraman (2002), Rajan and Dhal (2003), Bhaumik and Piesse (2003), Sathye (2005), De (2003), Chaudhari and Seasame (2004) and Das and Shanmugam (2004), have focused on issues relating to default probability, non-performing advances (NPA), impact of privatisation on management, risk management policies and on the impact of ownership on bank performance, efficiency, profitability, productivity, etc. However, none of the existing studies focus on investigating the impact of bank ownership on CRM operations and systems. Further, the existing research analyses only limited number of essential strategies of CRM, thereby offering only a partial view of the CRM operations and systems. Thus, the existing literature on the association between CRM operations and systems and ownership of the commercial banks is ambiguous. The present study attempts to fill this gap. It identifies and analyses CRM operations and systems of both the public and the private sector banks in India to list down significant difference in their strategies, if any. India, an emerging economy, is chosen for this study because the Reserve Bank of India (RBI), as the regulator of the Indian banking industry, has shown keen interest in strengthening the CRM operations and systems by issuing a very detailed Guidance Note on Asset Liability Management in 1998 and on CRM in 2000. The RBI has imposed various prudential norms and recently announced that the banks should not pay dividends at more than 33.33% of their net profit. It has further provided that the banks having NPA levels less than 3% and having Capital Adequacy Reserve Ratio (CARR) of more than 11% for the last 2 years will only be eligible to declare dividends without the permission from the RBI. The Indian commercial banks in the public and the private sectors, both have responded in good measure in orienting themselves towards the suggested best practices to improve upon their NPA ratio and CARR, internationally accepted indicators of CRM. As observed by Dr. Rakesh Mohan, former Deputy Governor, Reserve Bank of India (2002), "The traditional face of banks in India as mere financial intermediaries has since altered and risk management has emerged as their defining attribute".

OBJECTIVE AND RESEARCH DESIGN

This section lists down the objective of the study and the research design.

Objective of the study

The objective of the study is to compare CRM operations and systems followed by the public sector and the Indian private sector commercial banks in India and draw inferences from them with regard to their approaches towards CRM. Specifically, the study focuses on the following objectives:

a) To examine the impact of ownership of the bank on choice of CRM operations and systems.

b) To highlight the difference between the public and the private sector banks in their respective CRM operations and systems at the transaction level and at the portfolio level, both if any.

c) To identify specific CRM operations and systems at the transaction level and at the portfolio level that the public and the private sector banks in India should improve upon in near future.

Sample profile

The present study is based on the data regarding CRM operations and systems at the transaction level and at the portfolio level of 35 Indian scheduled commercial banks (70% of population size), classified on the basis of ownership into two categories, namely, 24 public sector banks and 11 Indian private sector banks. Public sector banks are the ones in which the government has a major holding. The sample comprises 24 public sector banks out of a population size of 28 public sector banks, which implies that the response rate is 85.71% for the public sector banks. They are further divided into two sub-groups, i.e. (i) State Bank of India and its associates (overall six banks) and remaining 18 as (ii) other nationalised banks. The sample included banks with varying size and geographical spread, so the sample fairly represents the population.

Sources of data

The study is based on analysis of primary data collected during the year 2007-08 through a structured questionnaire. The questionnaire sought information regarding CRM operations and systems classified into two heads, namely, (i) at the transaction level and (ii) at the portfolio level. CRM professionals interviewed included chief risk officers and their direct reports. In an effort to facilitate candid and honest discussions, the author agreed to the requests by the banks to remain anonymous.

FINDINGS AND ANALYSIS OF DATA

The findings are analysed under two broad heads, namely, (A) CRM operations and systems at the transaction level and (B) CRM operations and systems at the portfolio level.

Transaction-level CRM operations and systems

As listed out in an empirical study by Arora. (2011), CRM operations and systems involve following elements, namely, credit risk rating framework, operating design of credit risk rating framework, monitoring and control of individual accounts, classification of credits and finally estimation of credit risk. The present study accordingly examines the impact of ownership on them. The findings in this regard are elaborated further.

(**A**) **Credit risk rating framework:** A credit risk rating framework must be able to forecast a credit risk based on all available information so that the actual outcomes match with the predictions made earlier at the time of sanction. The specifics of internal rating system architecture and operation may differ substantially across banks, as examined further.

(**i**) ***Classification of exposures*****:** For the purpose of applicability of different credit risk rating models, exposures may be classified on various bases, such as, size of facility, type of facility applied for, type of client, type of business organisation, term of exposure, etc. The management, while deciding

about the basis of applicability of a credit risk rating model, may take multiple bases also. The strategies regarding classification of exposure are presented in Table 1.

Table 1: Classification of exposure (for application of credit risk rating model)

Basis of classification	Public sector banks	Private sector banks	Number of banks(Overall)
Size of account	16(66.67)	5(45.45)	21(60.0)
Type of facility applied for	9(37.5)	5(45.45)	14(40.0)
Type of client (existing/new)	8(33.33)	2(18.18)	10(28.55)
Type of business organisation	8(33.33)	4(36.36)	12(34.28)
Term of exposure	0(0)	1(9.09)	1(2.08)
Total*	24	11	35

Note: Figures in brackets indicate percentages of total. Also * represents that total percentage do not add to 100 due to multiple responses.

As may be observed from the table, both types of banks were using multiple basis of classification of exposure for application of credit risk rating model and the size of exposure was most commonly used basis.

(ii) ***Minimum size of account for applicability of credit risk rating framework***: Some banks may follow the practice of rating only exposures above a given size. However, to ensure tighter credit risk control, it shall be prudent to rate all exposures in the credit portfolio. Table 2 summarises the findings in this regard. As may be observed from the table, nearly one-fourth of both types of sample banks were only following the prudent practice of applying CRF mandatory for all accounts irrespective of size.

Table 2: Scope of applicability of credit risk rating framework

Ownership-wise distribution			
Size of account	Public sector banks	Private sector banks	Number of banks (Overall)
All accounts	6(25.0)	3(27.27)	9(25.71)
Specified minimum size of account	18(75.0)	8(72.73)	7(74.29)
Total	24	11	35

(Figure in parentheses represents percentages of total).

To analyse further about the specified minimum account size, Table 3 is drawn. It may be observed from the table that Rs. 25 lakhs is the most commonly specified minimum account size.

Table 3: Scope of applicability of CRF

Minimum account size	SBI and its associates	Other nationalised banks	Private sector banks	Total
Above Rs. 2 lakhs	1	5	1	7
Rs. 10 lakhs	0	2	2	4
Rs. 25 lakhs	5	4	2	11
Any other	0	1	3	4
Total	6	18	11	35

(iii) ***Choice of credit risk rating model***: Credit risk rating model enables the bank to systematically assess the credit risk associated with a new transaction. A bank may devise the credit risk rating model on its own or it may be generated with the help of outside specialised agencies. The credit risk rating model developed by the bank internally shall yield many benefits for the bank. The use of internal resources will generally result in more model experimentation, testing several models, with different characteristics or performance definitions for the same products, in order to create the best-predictive and most cost-effective model (Mays, 2006). However, the model developed with outside specilaised agencies helps the bank to gain from the vast experience that external vendors have gained from developing models for a wide variety of clients, products and situations. Table 4 depicts the types of credit risk rating models used by the sample banks. As may be observed from the Table 4, there was no significant difference between the practices of both public and private sector banks in this regard, as majority of them were using self-developed credit risk rating model. It seems that both banks attempted to save cost, avoid inflexibility and preferred to self-develop the rating model.

As regards to the assistance from outside specialised agency, it was observed from Table 5 that CRISIL was

Table 4: Type of credit risk rating model employed

Type of credit risk rating model	Number of banks (Overall)	Ownership-wise distribution	
		Public sector	Private sector
Self-developed	26(74.3)	17(70.8)	9(81.8)
Developed with outside specialised agencies	9(25.7)	7(29.2)	2(18.2)
Total	35	24	11
Chi-square test		Chi-square value = 0.426, df = 1, Asymp. Sig. (2 sided) = 0.490	

(Figure in parentheses represents percentages of total.)

Table 5: Developing credit risk rating model

Credit risk rating model employed	SBI and its associates	Other nationalised banks	Other cheduleds banks	Total
Self-made	6	11	9	26
Made with CRISIL	0	6	2	8
Made with ICRA	0	0	0	0
Made with NIBM	0	1	0	1
Total	6	18	11	35

ICRA is a Public Limited Company, with its shares listed on the Bombay Stock Exchange and the National Stock Exchange. (formerly Investment Information and Credit Rating Agency of India Limited)
NIBM: National institute of Bank Management, Pune, India

the most popular specilaised agency hired by the banks for developing rating model and SBI or its associates used only self-developed model.

(iv) ***Experience of using new CRF***: As the new CRF has replaced the old mechanism of risk ratings only recently, most of the sample banks (73%) had less than 10 years of experience of using new CRF. However, almost one-fourth of sample banks had fairly good amount of experience of using the new CRF. No significant difference could be noticed in the pattern of amount of experience between the public and the private sector banks.

(v) ***Revision in credit risk rating model***: As credit risk assessment models involve extensive judgment, effective model validation procedures are crucial. During the process of validation, it is possible that some of the weaknesses of credit risk rating model might emerge. Credit risk rating model may be revised to improve upon these weaknesses. The CRM strategies of sample banks in this regard are summarised in Table 6 below.

Table 6: Revision in credit risk rating model

Revision made in (base year 2007)	Number of banks (Overall)	Ownership-wise distribution	
		Public sector	Private sector
Current year	8(22.9)	4(16.7)	4(36.4)
Previous year	16(45.7)	12(50.0)	4(36.4)
2 years ago	11(31.4)	8(33.3)	3(27.3)
Total	35	24	11
Chi-square test		Chi-square value = 1.675, df = 2, Asymp. Sig. (2 sided) = 0.433	

(Figure in parentheses represents percentages of total.)

This indicates that both types of sample banks were following the generally accepted practice of making regular revisions in the credit risk rating model. It may be also taken as an indicator of presence of strong credit culture among them. As regards to public sector banks, it may be observed from Table 7 that SBI and its associates have revised this model in 2006, whereas 8 others had revised it earlier than 2006, indicating a potential area of improvement in these banks.

Table 7: Revision in credit risk rating model by public sector banks

Credit rating model revised (base 2007)	SBI and its associates	Other nationalised banks	Total
Current year	0	4	8
Previous year	6	8	16
2 years ago	0	8	11
Total	6	18	35

(B)Monitoring credit risk: As the credit risk underlying each individual transaction may change over the term of credit facility, it is necessary to follow appropriate procedures for monitoring it, as discussed further.

(i) ***Unit responsible for monitoring credit risk rating***: A bank needs to specify the unit responsible for monitoring credit risk rating over the term of credit facility. The unit may be same as that which assigned credit risk rating at the time of sanction or

it may be distinct from that responsible for assigning original credit risk rating. To ensure accuracy of these ratings and enforce better credit risk control, the responsibility for monitoring the ratings should vest with the personnel independent of those who assigned the original credit risk rating. The findings in this regard are summarised in Table 8 below.

It was observed from Table 8 that the sample private sector banks were following more cautious approach than the sample public sector banks in monitoring the credit risk rating, as relatively higher percentage of private sector banks had assigned the responsibility

Table 8: Unit responsible for monitoring credit risk rating

Unit for monitoring credit risk rating	Number of banks (Overall)	Ownership- wise distribution	
		Public sector	Private sector
Same unit	12(34.3)	10(41.7)	2(18.2)
Distinct unit	23(65.7)	14(58.3)	9(81.8)
Total	35	24	11
Chi-square test		Chi-square value =1.846, df = 1, Asymp. Sig. (2 sided) = 0.174	

(Figure in parentheses represents percentages of total.)

of such monitoring to a distinct unit than the public sector banks. Further, the accuracy in credit risk ratings of sample private sector banks was perhaps more assured than the sample public sector banks. From Table 9, it may be observed that other nationalised banks were the specific category of public sector banks that were following lax monitoring procedures.

Table 9: Monitoring credit risk rating in public sector banks

Unit for moni oring credit risk rating	SBI and its associates	Other nationalised banks	Total
Same unit	2	8	10
Distinct unit	4	10	14
Total	6	18	24

(ii) ***Frequency of review of credit risk rating*:** Along with the credit risk rating at the time of sanction of facility, the banks follow the procedures for reviewing this rating on timely basis to detect any unfavourable downward migrations in credit rating. The earlier the risks are detected, the more effectively they can be countered; therefore, the frequency of review of credit risk rating is an important issue.

As shown in Table 10 around 30% of the public sector banks linked the frequency of reviewing the credit risk rating with the grade, whereas this percentage was lower at 18.2% for the private sector banks. One may infer that credit risk staff shall be more able to follow additional oversight and monitoring over the credits with deteriorating ratings at the public sector banks than the private sector banks. Further, more than 60% of the private sector banks reviewed the credit risk ratings yearly, again indicating that systems for generating early warning signals for risk controlling were not appropriate in these banks. However, the difference in the practices of public sector banks and the private sector banks in this regard was not found to be statistically significant.

Table 10: Frequency of review of credit risk rating

Frequency of review	Number of banks(Overall)	Ownership-wise distribution	
		Public sector	Private sector
Yearly	14(40.0)	7(29.2)	7(63.6)
Less than yearly	12(34.3)	10(41.6)	2(18.2)
Varies with grade	9(25.7)	7(29.2)	2(18.2)
Total	35	24	11
Chi-square test		Chi-square value =3.808, df = 2, Asymp. Sig. (2-sided) = 0.149	

(Figure in parentheses represents percentages of total.)

(C) **Estimation of credit risk:** The CRM operations and systems relating to estimation of credit risk seek to determine reliable, responsive measures of credit quality and default probability. Various statistical measures that may be commonly employed are as follows: default probability, exposure at default, expected loss, loss given default and others, such as, standard deviation, etc. The measures employed by the sample banks are summarised in the Table 11. It was observed that both types of sample banks, irrespective of their ownership, were following procedures for measuring risk by multiple measures.

Table 11: Estimation of credit risk at the transaction level

Statistical measure of individual risk	Ownership-wise distribution			Number of banks (Overall)
	Public Sector Banks		Private sector banks	
	SBI and its associates	Other nationalised banks		
Default probability	5(83.33)	13(72.22)	5(45.45)	23(47.92)
Exposure at default	2(33.33)	11(61.11)	2(18.18)	15(31.25)
Loss given default	2(33.33)	11(61.11)	2(18.18)	15(31.25)
Others, including standard deviation	1(16.66)	4	3(27.27)	8(16.67)
Not estimated	-(0)	-(0)	2(18.18)	2(4.16)
Total*	6	18	11	35

Note: Figures in brackets indicate percentages of total. Also * represents that total percentage do not add to 100 due to multiple responses.

However, the proportion of private sector banks estimating these statistical measures was much lower than the public sector banks and, alarmingly, two (small sized) private sector banks did not estimate any of these measures. These findings indicate perusal of better credit risk analytical strategies at the transaction-level of public sector banks.

CRM operations and systems at the portfolio level

In addition to strengthening the CRM operations and systems at the transaction level, a bank needs to put in place effective operations and systems to manage the credit risk at the portfolio level. CRM operations and systems at the portfolio level are targeted towards the identification, measurement, monitoring and control of concentration risk and intrinsic risk arising out of the correlations between the borrowers in the credit portfolio. Such correlations, which primarily arise out of economic, technical, financial and/or managerial factors, are difficult to measure, making CRM operations and systems at the portfolio level a challenging task in the CRM process. CRM operations and systems at the portfolio level encompass issues such as, portfolio risk modeling, monitoring credit portfolio risk, measurement of aggregate portfolio risk and credit portfolio risk analysis. The sample banks' procedures with regard to each of these are examined further.

(i) **Application of credit portfolio risk model:** A credit portfolio risk model offers a framework for estimating credit risk exposure in a timely manner, centralising data and analysing marginal and absolute contributions to risk. Various models that are commonly employed include credit metrics, credit portfolio view (CPV), credit risk+, etc. Table 12 depicts the systems regarding use of credit portfolio risk model.

It was observed from Table 12 that three-fourth of the private sector banks were using one or the other model, whereas this percentage was only 50% for the public sector banks. This finding indicates relatively matured/ refined credit portfolio risk estimation techniques of the private sector banks. Table 13 depicts that credit risk+ and CPV were equally popular credit portfolio

Table 12: Use of credit portfolio risk model

Credit portfolio risk model	Number of banks (Overall)	Ownership-wise distribution	
		Public sector	Private sector
Employed	20(57.1)	12(50.0)	8(72.7)
Not employed	15(42.9)	12(50.0)	3(27.3)
Total	35	24	11
Chi-square test		Chi-square value = 4.088, df = 3, Asymp. Sig. (2-sided) = 0.252	

Table 13: Type of credit portfolio risk model employed by the commercial banks in India

Portfolio model employed	SBI and its associates	Other nationalised banks	Private sector banks	Total
Self-made	2	3	1	6
Credit risk+	0	3	4	7
CPV	2	2	3	7
Total	4	8	8	20

risk models among the sample banks.

(ii) **Monitoring credit portfolio risk:** As the portfolio risk keeps changing, it is necessary to put in place operations and systems for its monitoring. Monitoring of credit portfolio risk helps the bank management in checking compliance with the risk strategy and at ensuring the effectiveness of the control measures. For the purpose of such monitoring, banks may classify its exposures on the basis of risk rating categories/different economic sectors/types of credit facility/size of advances/ different geographical regions. The findings in this regard are depicted in Table 14.

Table 14: Basis of monitoring credit portfolio risk

Basis of classification	SBI and its associates	Other nationalised banks	Private sector banks	Number of banks (Overall)
Rating category	4(75.0)	15(83.33)	7(63.63)	26(75.30)
Type of industry /sector	5(83.33)	15(83.33)	8(72.72)	28(80.0)
Type of credit facility	0	7(28.88)	6(54.54)	13(37.15)
Size of advances	2(33.33)	14(77.77)	6(54.54)	22(62.86)
Geographical region	1(16.66)	11(61.11)	2(18.18)	13(37.15)
Total*	6	18	11	35

Note: Figures in brackets indicate percentages of total. Also * represents that total percentage do not add to 100 due to multiple responses.

As may be observed from the Table 14, both types of sample banks, irrespective of their ownership, were following procedures for monitoring portfolio risk, with rating category and type of industry as most commonly used basis. However, higher proportion of public sector banks were monitoring portfolio credit risk on multiple bases than the private sector banks, indicating potential area of improvement in monitoring procedures in the sample private sector banks. As expected, associate banks of SBI were not monitoring credit exposures on the basis of geographical regions, primarily because of the fact that their operations were limited to specific regions.

(iii) **Estimation of credit risk at the portfolio level:** A number of measures may be used to get a complete view of various dimensions of credit risk at the portfolio level, such as, default correlations, diversification ratio, probability distribution of losses, credit value at risk, etc. Only 22 out of 35 sample banks shared information in this regard. Various parameters that were estimated by these sample banks are listed in Table 15. It was observed that private sector banks outnumbered public sector banks in estimation of each of these measures, indicating their superior credit risk analytical operations and systems and perhaps more informed strategy making (it being based on a larger number of quantitative inputs). Thus, public sector banks, more specifically, other nationalised banks, may be also encouraged to follow the practice of estimation of portfolio risk measures in CRM operations.

Table 15: Estimation of credit portfolio risk

Parameter employed	SBI and its associates	Other nationalised banks	Private s ector banks	Number of banks (Overall)
Default correlations	2(33.33)	6(33.33)	5(45.45)	13(37.14)
Diversification ratio	3(50.0)	7(38.88)	5(45.45)	15(42.85)
Probability distribution of losses	3(50.0)	4(22.22)	4(36.36)	11(31.43)
Credit value at risk	3(50.0)	4(22.22)	3(27.27)	10(28.57)
Total*	6	18	11	35

Note: Figures in brackets indicate percentages of total. Also * represents that total percentage do not add to 100 due to multiple responses.

(iv) **Stress testing of credit portfolio:** Banks may undertake evaluation of their credit portfolio with a view to test the quality of advanced portfolio under stress conditions or at the time of adverse events.

Adverse events are beyond management control and could jeopardise loan repayments. Common adverse events include economic recessions, interest rate increases, stock market decline and foreign market downturns. The stress tests would also reveal undetected areas of potential credit risk exposure and linkages between different categories of risk. The complete information regarding the stress

testing of advanced portfolio was provided by only 32 sample banks. As may be observed from the Table 16, nearly 74% of the public sector banks were following the practice of stress testing their advanced portfolio, against relatively lower 67% private sector banks. It seems that the public sector banks were using more analytical procedures than the private sector banks. However, chi-square test results show no significant difference between them with regard to this practice. Within the category of public sector banks, it was further observed that SBI and all its associate banks were using stress testing procedures. The Table 17 investigates the type of change evaluated in stress testing by the sample banks.

As may be observed from the Table 17, relatively higher proportion of public sector banks, particularly other nationalised banks, evaluated all the three changes, namely, economic/industry downturn, market risk events and liquidity conditions, during stress testing their advanced portfolio.

Table 16: Stress testing of credit portfolio

Stress testing made	Number of banks (Overall)	Ownership-wise distribution	
		Public sector	Private sector
Yes	23(71.9)	17(73.9)	6(66.7)
Not done	9(28.1)	6(26.1)	3(33.3)
Total	32	23	9
Chi-square test		Chi-square value = 0.168, df = 1 Asymp. Sig. (2-sided) = 0.682	

(Figure in parentheses represents percentages of total.)

Table 17: Kind of change evaluated in stress testing

Kind of change evaluated	SBI and its associates	Other nationalised banks	Private sector banks	Number of banks (Overall)
Economic/industry downturn only	0	0(0)	2(33.33)	2(8.70)
Market risk events only	0	2(14.28.)	1(16.67)	3(13.05)
Liquidity conditions only	0	0(0)	0(0)	0(0)
Economic/industry downturn and market risk events both	0	0	0(0)	3(13.05)
Economic/industry downturn and liquidity conditions both	0	1(7.14)	0(0)	1(4.35)
All three changes	3(100.0)	8(57.14)	3(50.0)	14(60.90)
Total	3	14	6	23

(Figures in brackets indicate percentages of total.)

CONCLUSIONS

Thus, commercial banks in India were following a wide range of CRM operations and systems at both the transaction level and at the portfolio level. The operations and systems of the public and the private sector commercial banks in India were similar with regard to some CRM processes, such as, both types of banks were using multiple basis of classification of exposure for application of credit risk rating model and the size of exposure was most commonly used basis, making revisions and regular testing of CRF and monitoring of credit portfolio.

In some CRM procedures, relatively higher proportion of public sector banks were following the internationally accepted operations and systems, such as, varying the frequency of reviewing the credit risk rating with the grade already assigned, statistical estimation of credit risk at the transaction level, monitoring portfolio credit risk on multiple bases and stress testing of their advances portfolio. On the other hand, relatively higher proportion of private sector banks were following better procedures than the public sector banks in regard to some CRM operations, such as, forming a distinct unit for monitoring credit risk rating, use of credit portfolio risk model and estimation of statistical measures of credit portfolio risk. Further, the association between ownership and CRM

operations and systems was not found to be statistically significant in any case; so the study concludes that ownership of bank does not matter much with regard to choice of CRM operations and systems.

The study also identified potential areas for improving upon CRM operations and systems in the Indian banking sector in the near future, such as, credit risk monitoring procedures at transaction level, credit portfolio risk analysis, statistical estimation of credit portfolio risks and stress testing procedures.

CONTRIBUTION/MANAGERIAL IMPLICATIONS OF THE STUDY

This study is one of the first that attempts to make a comparative study of CRM operations and systems at both the transaction level and at the portfolio level in banks, classified on the basis of ownership using primary data, which is a significant contribution in the area of finance. The CRM operations and systems are defining elements in the CRM process; therefore, such comparative analysis shall be useful to both the bank management and the bank supervisors by revealing the range of CRM practices followed in the Indian banking industry and may also provide useful information about the relative strengths and weaknesses of both the public and the private sector banks. The study reinforces that each bank needs to have in place an array of technical systems and management processes to not only identify the credit risks associated with its lending activities, but also to effectively assess, monitor, mitigate and control them.

Since the credit risk associated with lending activities is a major banking risk, the present study, by identifying relatively weak CRM operations and systems in the Indian banking sector, contributes to gaining insights into the process of strengthening the risk management and CRM in banks in emerging economies. Individual commercial banks can themselves use this study to explore CRM operations and systems and benchmark with others to verify whether appropriate procedures are in place. It shall also provide the regulatory authority of India, RBI, with useful overall observation of the CRM operations and systems implemented by the Indian banks.

LIMITATIONS OF THE STUDY

Present study suffers from the limitations commonly associated with a questionnaire survey method. The validity of the questionnaire responses rely upon the goodwill and accuracy of the participants. In a sensitive area such as credit risk and related tools/techniques, there is no guarantee that the responses will truly reflect the actual practices. However, to overcome this, response was sought from such senior level officials in a bank whose primary job was to design and implement CRM operations and systems in their respective banks, and internal consistency of the responses were verified before data analysis. Also, it is to be noted that survey research is the only technique for making an empirical assessment of the impact of ownership, an important bank-specific characteristic on the CRM operations and systems, and thus offers unique insights about research issues unexplored so far.

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