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All Commercial Banks
(Excluding RRBs and LABs)

Guidance Note on Credit Risk Management

Table of Contents

| | |
|---|-----------|
| Chapter 1 - Policy Framework | 3 |
| 1.3 Building Blocks of Credit Risk Management: | 3 |
| 1.5 Organisational Structure | 5 |
| 1.6 Operations / Systems | 7 |
| Chapter 2 - Credit Rating Framework | 10 |
| 2.1 Background..... | 10 |
| 2.2 End Use of Risk-Ratings made on the CRF | 10 |
| 2.3 Basic Architecture of CRFs | 10 |
| 2.4 Grading System for Calibration of Credit Risk | 11 |
| 2.5 Operating Design of the CRF | 14 |
| 2.6 CRFs and aggregation of Credit-Risk..... | 18 |
| Chapter 3 - Credit Risk Models | 21 |
| 3.3 Credit Risk Models: Approaches | 23 |
| Chapter 4 - Portfolio Management and Risk Limits | 26 |
| Chapter 5 – Managing Credit Risk in Inter-bank Exposure..... | 29 |
| 5.2.1 Capital Adequacy | 29 |
| 5.2.2 Asset Quality | 30 |
| 5.2.3 Liquidity | 31 |
| 5.2.4 Profitability | 32 |
| 5.5 Facilities | 34 |
| Chapter 6 – Credit Risk in Off-balance sheet Exposures..... | 35 |

| | |
|---|----|
| Risk Identification and Assessment of Limits | 35 |
| Risk Monitoring and Control | 35 |
| Chapter 7 – Country Risk | 36 |
| 7.2 Broad Contours of Country Risk Management (CRM) | 37 |
| Chapter 8 – Loan Review Mechanism/ Credit Audit | 40 |
| 8.1 Objectives of Credit Audit | 40 |
| 8.2 Structure of Credit Audit Department..... | 40 |
| 8.3 Functions of Credit Audit Department | 40 |
| 8.4 Scope and Coverage | 40 |
| 8.4.3 Action Points for Review..... | 41 |
| 8.4.4 Frequency of Review | 41 |
| 8.5 Procedure to be followed for Credit Audit | 42 |
| Chapter 9 – RAROC Pricing/ Economic Profit | 43 |
| Risk Adjusted Return on Capital (RAROC)..... | 45 |
| Chapter 10 – New Capital Accord: Implications for Credit Risk Management..... | 47 |
| 10.4.1 Standardised Approach..... | 47 |
| 10.4.2 IRB Approach | 48 |



Chapter 1 - Policy Framework

1.1 Credit risk is defined as *the possibility of losses associated with diminution in the credit quality of borrowers or counterparties. In a bank's portfolio, losses stem from outright default due to inability or unwillingness of a customer or counterparty to meet commitments in relation to lending, trading, settlement and other financial transactions. Alternatively, losses result from reduction in portfolio value arising from actual or perceived deterioration in credit quality.* Credit risk emanates from a bank's dealings with an individual, corporate, bank, financial institution or a sovereign. Credit risk may take the following forms:

- ⇒ in the case of direct lending: principal/and or interest amount may not be repaid;
- ⇒ in the case of guarantees or letters of credit: funds may not be forthcoming from the constituents upon crystallization of the liability;
- ⇒ in the case of treasury operations: the payment or series of payments due from the counter parties under the respective contracts may not be forthcoming or ceases;
- ⇒ in the case of securities trading businesses: funds/ securities settlement may not be effected;
- ⇒ in the case of cross-border exposure: the availability and free transfer of foreign currency funds may either cease or restrictions may be imposed by the sovereign.

1.2 In this backdrop, it is imperative that banks have a robust credit risk management system which is sensitive and responsive to these factors. The effective management of credit risk is a critical component of comprehensive risk management and is essential for the long term success of any banking organisation. Credit risk management encompasses identification, measurement, monitoring and control of the credit risk exposures.

1.3 Building Blocks of Credit Risk Management:

In a bank, an effective credit risk management framework would comprise



of the following distinct building blocks:

- a) Policy and Strategy
- b) Organisational Structure
- c) Operations/ Systems

1.4 Policy and Strategy

The Board of Directors of each bank shall be responsible for approving and periodically reviewing the credit risk strategy and significant credit risk policies.

1.4.1 Credit Risk Policy

- ❖ Every bank should have a credit risk policy document approved by the Board. The document should include risk identification, risk measurement, risk grading/ aggregation techniques, reporting and risk control/ mitigation techniques, documentation, legal issues and management of problem loans.
- ❖ Credit risk policies should also define target markets, risk acceptance criteria, credit approval authority, credit origination/ maintenance procedures and guidelines for portfolio management.
- ❖ The credit risk policies approved by the Board should be communicated to branches/controlling offices. All dealing officials should clearly understand the bank's approach for credit sanction and should be held accountable for complying with established policies and procedures.
- ❖ Senior management of a bank shall be responsible for implementing the credit risk policy approved by the Board.

1.4.2 Credit Risk Strategy

- ❖ Each bank should develop, with the approval of its Board, its own credit risk strategy or plan that establishes the objectives guiding the bank's credit-granting activities and adopt necessary policies/ procedures for conducting such activities. This strategy should spell out clearly the organisation's credit appetite and the acceptable level of risk-reward trade-off for its activities.
- ❖ The strategy would, therefore, include a statement of the bank's willingness to grant loans based on the type of economic activity, geographical location, currency, market, maturity and anticipated profitability. This would necessarily translate into the identification of target markets and business sectors, preferred levels of diversification



and concentration, the cost of capital in granting credit and the cost of bad debts.

- ❖ The credit risk strategy should provide continuity in approach as also take into account the cyclical aspects of the economy and the resulting shifts in the composition/ quality of the overall credit portfolio. This strategy should be viable in the long run and through various credit cycles.
- ❖ Senior management of a bank shall be responsible for implementing the credit risk strategy approved by the Board.

1.5 Organisational Structure

Sound organizational structure is sine qua non for successful implementation of an effective credit risk management system. The organizational structure for credit risk management should have the following basic features:

The **Board of Directors** should have the overall responsibility for management of risks. The Board should decide the risk management policy of the bank and set limits for liquidity, interest rate, foreign exchange and equity price risks.

The **Risk Management Committee** will be a Board level Sub committee including CEO and heads of Credit, Market and Operational Risk Management Committees. It will devise the policy and strategy for integrated risk management containing various risk exposures of the bank including the credit risk. For this purpose, this Committee should effectively coordinate between the Credit Risk Management Committee (CRMC), the Asset Liability Management Committee and other risk committees of the bank, if any. It is imperative that the independence of this Committee is preserved. The Board should, therefore, ensure that this is not compromised at any cost. In the event of the Board not accepting any recommendation of this Committee, systems should be put in place to spell out the rationale for such an action and should be properly documented. This document should be made available to the internal and external auditors for their scrutiny and comments. The credit risk strategy and policies adopted by the committee should be effectively communicated throughout the organisation.



1.5.1 Each bank may, depending on the size of the organization or loan/investment book, constitute a high level **Credit Risk Management Committee (CRMC)**. The Committee should be headed by the Chairman/CEO/ED, and should comprise of heads of Credit Department, Treasury, Credit Risk Management Department (CRMD) and the Chief Economist. The functions of the Credit Risk Management Committee should be as under:

- ❖ Be responsible for the implementation of the credit risk policy/strategy approved by the Board.
- ❖ Monitor credit risk on a bank wide basis and ensure compliance with limits approved by the Board.
- ❖ Recommend to the Board, for its approval, clear policies on standards for presentation of credit proposals, financial covenants, rating standards and benchmarks,
- ❖ Decide delegation of credit approving powers, prudential limits on large credit exposures, standards for loan collateral, portfolio management, loan review mechanism, risk concentrations, risk monitoring and evaluation, pricing of loans, provisioning, regulatory/legal compliance, etc.

1.5.2 Concurrently, each bank should also set up **Credit Risk Management Department (CRMD)**, independent of the Credit Administration Department. The CRMD should:

- ❖ Measure, control and manage credit risk on a bank-wide basis within the limits set by the Board/ CRMC
- ❖ Enforce compliance with the risk parameters and prudential limits set by the Board/ CRMC.
- ❖ Lay down risk assessment systems, develop MIS, monitor quality of loan/ investment portfolio, identify problems, correct deficiencies and undertake loan review/audit. Large banks could consider separate set up for loan review/audit.
- ❖ Be accountable for protecting the quality of the entire loan/investment portfolio. The Department should undertake portfolio evaluations and conduct comprehensive studies on the environment to test the resilience of the loan portfolio.



1.6 Operations / Systems

Banks should have in place an appropriate credit administration, credit risk measurement and monitoring processes. The credit administration process typically involves the following phases:

- ❖ *Relationship management phase* i.e. business development.
- ❖ *Transaction management phase* covers risk assessment, loan pricing, structuring the facilities, internal approvals, documentation, loan administration, on going monitoring and risk measurement.
- ❖ *Portfolio management phase* entails monitoring of the portfolio at a macro level and the management of problem loans.

On the basis of the broad management framework stated above, the banks should have the following credit risk measurement and monitoring procedures:

- Banks should establish proactive credit risk management practices like annual / half yearly industry studies and individual obligor reviews, periodic credit calls that are documented, periodic visits of plant and business site, and at least quarterly management reviews of troubled exposures/weak credits.
- Banks should have a system of checks and balances in place for extension of credit viz.:
 - Separation of credit risk management from credit sanction
 - Multiple credit approvers making financial sanction subject to approvals at various stages viz. credit ratings, risk approvals, credit approval grid, etc.
 - An independent audit and risk review function.
- The level of authority required to approve credit will increase as amounts and transaction risks increase and as risk ratings worsen.
- Every obligor and facility must be assigned a risk rating.
- Mechanism to price facilities depending on the risk grading of the customer, and to attribute accurately the associated risk weightings to the facilities.



- Banks should ensure that there are consistent standards for the origination, documentation and maintenance for extensions of credit.
- Banks should have a consistent approach towards early problem recognition, the classification of problem exposures, and remedial action.
- Banks should maintain a diversified portfolio of risk assets; have a system to conduct regular analysis of the portfolio and to ensure on-going control of risk concentrations.
- Credit risk limits include, obligor limits and concentration limits by industry or geography. The Boards should authorize efficient and effective credit approval processes for operating within the approval limits.
- In order to ensure transparency of risks taken, it is the responsibility of banks to accurately, completely and in a timely fashion, report the comprehensive set of credit risk data into the independent risk system.
- Banks should have systems and procedures for monitoring financial performance of customers and for controlling outstanding within limits.
- A conservative policy for provisioning in respect of non-performing advances may be adopted.
- Successful credit management requires experience, judgement and commitment to technical development. Banks should have a clear, well-documented scheme of delegation of powers for credit sanction.

Banks must have a Management Information System (MIS), which should enable them to manage and measure the credit risk inherent in all on- and off-balance sheet activities. The MIS should provide adequate information on the composition of the credit portfolio, including identification of any concentration of risk. Banks should price their loans according to the risk profile of the borrower and the risks associated with the loans.





Chapter 2 - Credit Rating Framework

2.1 Background

A Credit-risk Rating Framework (CRF) is necessary to avoid the limitations associated with a simplistic and broad classification of loans/exposures into a “good” or a “bad” category. The CRF deploys a number/ alphabet/ symbol as a primary summary indicator of risks associated with a credit exposure. Such a rating framework is the basic module for developing a credit risk management system and all advanced models/approaches are based on this structure. In spite of the advancement in risk management techniques, CRF is continued to be used to a great extent. These frameworks have been primarily driven by a need to standardise and uniformly communicate the “judgement” in credit selection procedures and are not a substitute to the vast lending experience accumulated by the banks' professional staff.

2.2 End Use of Risk-Ratings made on the CRF

Broadly, CRF can be used for the following purposes:

- a. Individual credit selection, wherein either a borrower or a particular exposure/ facility is rated on the CRF.
- b. Pricing (credit spread) and specific features of the loan facility. This would largely constitute transaction-level analysis.
- c. Portfolio-level analysis.
- d. Surveillance, monitoring and internal MIS
- e. Assessing the aggregate risk profile of bank/ lender. These would be relevant for portfolio-level analysis. For instance, the spread of credit exposures across various CRF categories, the mean and the standard deviation of losses occurring in each CRF category and the overall migration of exposures would highlight the aggregated credit-risk for the entire portfolio of the bank.

2.3 Basic Architecture of CRFs

The following elements outline the basic architecture and the operating principles of any CRF.



2.3.1 Grading system for calibration of credit risk

- Nature of grading system
- Number of grades used
- Key outputs of CRF

2.3.2 Operating design of CRF

- Which exposures are rated?
- The risk rating process
- Assigning and monitoring risk ratings
- The mechanism of arriving at risk ratings
- Standardisation and benchmark for risk ratings
- Written communications and formality of procedures

2.3.3 CRFs and Portfolio Credit Risk

- Portfolio surveillance and reporting
- Adequate levels of provisioning for credit events
- Guidelines for asset build up, aggregate profitability and pricing
- Interaction with external credit assessment institutions

The architecture and operating principles are discussed in detail in the ensuing paragraphs.

2.4 Grading System for Calibration of Credit Risk

The grades (symbols, numbers, alphabets, descriptive terms) used in the internal credit-risk grading system should represent, without any ambiguity, the default risks associated with an exposure. The grading system should enable comparisons of risks for purposes of analysis and top management decision-making. It should also reflect regulatory requirements of the supervisor on asset classification (e.g. the RBI asset classification). It is anticipated that, over a period of time, the process of risk identification and risk assessment will be further refined. The grading system should, therefore, be flexible and should accommodate the refinements in risk categorisation.

2.4.1 Nature of Grading System for the CRF

The grading system adopted in a CRF could be an alphabetic or numeric or an alpha-numeric scale. Since rating agencies follow a particular scale



(AAA, AA+, BBB etc.), it would be prudent to adopt a different rating scale to avoid confusion in internal communications. Besides, adoption of a different rating scale would permit comparable benchmarking between the two mechanisms. Several banks utilise a numeric rating scale. The number of grades for the “acceptable” and the “unacceptable” credit risk categories would depend on the finesse of risk gradation. Normally, numeric scales developed for CRFs are such that the lower the credit-risk, the lower is the calibration on the scale.

Illustration

A rating scale could consist of 9 levels, of which levels 1 to 5 represent various grades of acceptable credit risk and levels 6 to 9 represent various grades of unacceptable credit risk associated with an exposure.

The scale, starting from “1” (which would represent lowest level credit risk and highest level of safety/ comfort) and ending at “9” (which would represent the highest level of credit risk and lowest level of safety/ comfort), could be deployed to calibrate, benchmark, compare and monitor credit risk associated with the bank’s exposures and give indicative guidelines for credit risk management activities. Each bank may consider adopting suitable alphabetic prefix to their rating scales, which would make their individual ratings scale distinct and unique.

2.4.2 Number of Grades Used in the CRF

The number of grades used in the CRF depends on the anticipated spread in credit quality of the exposures taken by the bank. This, in turn, is dependent on the present and the future business profile of the bank and the anticipated level of specialisation/ diversification in the credit portfolio. CRFs with a large number of levels/ grades on the rating scale are, as evident, more expensive to operate as the costs of additional information for (very) fine gradation of credit-quality increase sharply. A bank can initiate the risk-grading activity on a relative smaller/ narrower scale and introduce new categories as the risk-gradation improves.



2.4.3 Key Outputs of the CRF

- a. The calibration on the rating scale is expected to define the pricing and related terms and conditions for the accepted credit exposures. It is possible to define broad pricing bands and directly link the band with the calibration on the rating scale. Further refinement in the pricing proposal would be based on the bank's judgement of the prominent elements of the loan proposal and the relationship with the borrower.
- b. In addition to the pricing related decisions, the calibration on the rating scale would allow prescription of limits on the maximum quantum of exposure permissible for any credit proposal. The quantum (or amount of facility sanctioned) would depend on the credit-score on the CRF. These limits could be linked to an internal parameter (viz. a certain percentage of bank's capital funds) or could be linked to an external parameter (viz. a certain percentage of the total debt required by the borrower). This would help in a larger dispersion of risk amongst lenders and limit risk concentration in moderate credit-quality projects.
- c. The rating scale could also be used for deciding on the tenure of the proposed assistance.
- d. The rating scale could also be used to decide on the frequency/intensity of monitoring of the exposure. Banks may also use the rating scale to keep a close track of deteriorating credit quality and decide on the remedial measures which the deterioration may warrant. For instance, the frequency of surveillance on category 5 exposures could be kept at quarterly intervals, while those on category 3 loans could be half-yearly. More importantly, movement of an existing exposure to the "unacceptable" category of credit risk (grades 6 to 9) should directly identify the extent of provisioning (loan loss reserves) that need to be earmarked for expected losses.



- e. Though loss-provisions are often specified by the regulator (e.g. the RBI provisioning norms), banks should develop their own internal norms and maintain certain level of “reasonable over-provisioning” as a best practice. Specifically, while the credit exposure/ asset is clearly facing rapid/ steady erosion and is on the downhill transition path, anticipatory provisioning can be done based on the calibrations on the risk-rating scale. These provisions could be in the nature of general provisions.

2.5 Operating Design of the CRF

2.5.1 Which Exposures are Rated?

The first element of the operating design is to determine which exposures are required to be rated through the CRF. There may be a case for size-based classification of exposures and linking the risk-rating process to these size-based categories. The shortcoming of this arrangement is that though significant credit migration/deterioration/erosion occurs in the smaller sized exposures, these are not captured by the CRF. In addition, the size-criteria are also linked with the tenure-criteria for an exposure. In several instances, large-sized exposures over a short tenure may not require the extent of surveillance and credit monitoring that is required for a smaller sized long-tenure exposure. Given this apparent lack of clarity, a policy of **‘all exposures are to be rated’** should be followed.

2.5.2 The Risk-Rating Process

The credit approval process within the bank is expected to replicate the flow of analysis/ appraisal of credit-risk calibration on the CRF. As indicated above the CRF may be designed in such a way that the risk rating has certain linkages with the amount, tenure and pricing of exposure. These default linkages may be either specified upfront or may be developed with empirical details over a period of time. The risk rating assigned to each credit proposal would thus directly lead into the related decisions of acceptance (or rejection), amount, tenure and pricing of the (accepted) proposal.



For each proposal, the credit/ risk staff would assign a rating and forward the recommendation to the higher level of credit selection process. The proposed risk rating is either reaffirmed or re-calibrated at the time of final credit approval and sanction. Any revisions that may become necessary in the risk-ratings are utilised to upgrade the CRF system and the operating guidelines. In this manner, the CRF maintains its “incremental upgradation” feature and changes in the lending environment are captured by the system. The risk-rating process would be equally relevant in the credit-monitoring/ surveillance stage. All changes in the underlying credit-quality are calibrated on the risk-scale and corresponding remedial actions are initiated.

2.5.3 Assigning & Monitoring Risk-Ratings

In conventional banks, the practice of segregating the “relationship management” and the “credit appraisal” functions is quite prevalent. One of the variants of this arrangement is that responsibilities for calibration on the risk-rating scale are divided between the “relationship” and the “credit” groups. All large sized exposures (above a limit) are appraised independently by the “credit” group. Generally, the activities of assigning and approving risk-ratings need to be segregated. Though the front-office or conventional relationship staff can assign the risk-ratings, the responsibilities of final approval and monitoring should be vested with a separate credit staff.

2.5.4 Mechanism of Arriving at Risk-Ratings

The risk ratings, as specified above, are collective readings on the pre-specified scale and reflect the underlying credit-risk for a prospective exposure. The CRF could be separate for relatively peculiar businesses like banking, finance companies, real-estate developers, etc. For all industries (manufacturing sector), a common CRF may be used. The peculiarity of a particular industry can be captured by assigning different weights to aspects like entry barriers, access to technology, ability of new



entrants to access raw materials, etc. The following step-wise activities outline the indicative process for arriving at risk-ratings.

| | |
|-----------|---|
| Step I | Identify all the principal business and financial risk elements |
| Step II | Allocate weights to principal risk components |
| Step III | Compare with weights given in similar sectors and check for consistency |
| Step IV | Establish the key parameters (sub-components of the principal risk elements) |
| Step V | Assign weights to each of the key parameters |
| Step VI | Rank the key parameters on the specified scale |
| Step VII | Arrive at the credit-risk rating on the CRF |
| Step VIII | Compare with previous risk-ratings of similar exposures and check for consistency |
| Step IX | Conclude the credit-risk calibration on the CRF |

The risk-rating process would represent collective decision making principles and as indicated above, would involve some in-built arrangements for ensuring the consistency of the output. The rankings would be largely comparative. As a bank's perception of the exposure improves/changes during the course of the appraisal, it may be necessary to adjust the weights and the rankings given to specific risk-parameters in the CRF. Such changes would be deliberated and the arguments for substantiating these adjustments would be clearly communicated in the appraisal documents.

2.5.5 Standardisation and Benchmarks for Risk-Ratings

In a lending environment dominated by industrial and corporate credits, the assignors of risk-ratings utilise benchmarks or pre-specified standards for assessing the risk profile of a potential borrower. These standards usually consist of financial ratios and credit-migration statistics, which capture the financial risks faced by the potential borrower (e.g. operating and financial leverage, profitability, liquidity, debt-servicing ability, etc.). The business risks associated with an exposure (e.g. cyclicalities of industry, threats of product or technology substitution etc.) are also addressed in the CRF. The output of the credit-



appraisal process, specifically the financial ratios, is directly compared with the specified benchmarks for a particular risk category. In these cases, the risk rating is fairly standardised and CRF allocates a grade or a numeric value for the overall risk profile of the proposed exposure.

| <u>Illustration</u> | |
|--|---------------------|
| The CRF may specify that for the risk-rating exercise: | |
| If Gross Revenues are between Rs.800 to Rs.1000 crore | assign a score of 2 |
| If Operating Margin is 20% or more | assign a score of 2 |
| If Return on Capital Employed (ROCE) is 25% or more | assign a score of 1 |
| If Debt : Equity is between 0.60 and 0.80 | assign a score of 2 |
| If interest cover is 3.50 or more | assign a score of 1 |
| If Debt Service Coverage Ratio (DSCR) is 1.80 or more | assign a score of 1 |

The next step would be to assign weights to these risk-parameters. In an industrial credit environment, the CRF may place higher weights on size (as captured in gross revenues), profitability of operations (operating margins), financial leverage (debt: equity) and debt-servicing ability (interest cover). Assume that the CRF assigns a 20% weightage to each of these four parameters and the ROCE and DSCR are given a 10% weightage each. The weighted-average score for the financial risk of the proposed exposure is 1.40, which would correspond with the extremely low risk/highest safety level-category of the CRF (category 1). Similarly, the business and the management risk of the proposed exposure are assessed and an overall/comprehensive risk rating is assigned.

The industrial credit environment permits a significantly higher level of benchmarking and standardisation, specifically in reference to calibration of financial risks associated with credit exposures. For all prominent industry-categories, any lender can compile profitability, leverage and debt-servicing details and utilise these to develop internal benchmarks for the CRF. As evident, developing such benchmarks and risk-standards for a portfolio of project finance exposures, as in the case of the bank, would be an altogether diverse exercise.

The CRF may also use qualitative/ subjective factors in the credit decisions. Such factors are both internal and external to the company. Internal factors could include integrity and quality of management of the borrower, quality of inventories/ receivables and the ability of borrowers



to raise finance from other sources. External factors would include views on the economy and industry such as growth prospects, technological change and options.

2.5.6 Written Communications and Formality of Procedure

The two critical aspects of the formality of procedure in the risk-rating process are

- (i) the process-flow through which a credit-transaction would flow across various units and
- (ii) the written communication on the risk-ratings assigned to a particular proposal.

The process-flow required for the credit appraisal exercise, may be explicitly drafted and communicated. It may clearly identify the transactions and linkages between various operating units of the bank.

The above discussion broadly presents some of the essential dimensions in the design of a CRF by banks. These details are indicative of the scope of work required for the CRF. Banks may make appropriate modifications to suit their requirements.

2.6 CRFs and aggregation of Credit-Risk

Analysing exposures using the CRF technique would highlight the spread (or frequency-distribution) of the credit-risk in the bank's asset portfolio and would give an indication for its future asset build-up efforts. This section briefly covers some aspects of portfolio credit-risk management, a process which would possibly be facilitated by implementing the CRF.

2.6.1 Portfolio Surveillance and Reporting

The conventional internal MIS of a bank would identify the problem-loans in the asset portfolio, as per the guidelines given by the regulator (i.e. the asset-classification guidelines of RBI). These details, however, represent only a component of the credit-risks accumulated in the asset portfolio of a bank. The CRF can be used for informing the top management on the



frequency distribution of assets across risk-rating scale, the extent of migration in the past (e.g. movement of exposures from higher to lower risk-categories or vice-versa) and the anticipated developments in the aggregated credit portfolio. The senior management may benefit from such outputs in terms of steering the organisation through various risk-cycles (e.g. initial low-risk low-return phase to consolidation and further to an incremental rise in relatively high-risk high-return exposures).

2.6.2 Adequate Levels of Provisioning for Credit Events

The spread of the asset portfolio across the risk-rating scale and the trends in rating migration would allow the bank management to determine the level of provisioning required, in addition to the regulatory minimum, to absorb unanticipated erosions in the credit quality of the assets. In most cases, provisions for loan-losses are based on the prevailing regulatory and accounting directives. However, the management may find merit in certain prudent level of “over-provisioning”. This exercise may add stability and resilience to the capital adequacy and profitability of the bank.

The extent of provisioning required could be estimated from the Expected Loss on Default (which is a product of the Probability of Default (PD) and Loss Given Default (LGD)). Since these probabilities can be assigned only after significant empirical details are available, an alternative would be to adopt a policy of allocating/ provisioning an amount which may be a proportion of the aggregate exposures in the risk-rating scale which reflect the likelihood of the assets slipping into the NPA category.

2.6.3 Guidelines for Asset Build-up, Aggregate Profitability and Pricing

As discussed earlier, a clear analysis of the prevailing risk-posture of the bank, facilitated by the CRF, would give strong recommendations for future asset build-up and business development activities. The extent of provisioning would be based on actual and anticipated erosion in credit quality and would define the “cost” of maintaining an exposure in the



bank's credit portfolio. A similar analysis could be undertaken for a specific credit-product and the risk-adjusted return can be assessed. This will involve an analysis of the pricing-decisions, provisioning requirements, loss on default and the incremental impact on bank's profitability.

2.6.4 Interaction with External Credit Assessment Institutions (ECAI)

The benefits of such a CRF system, in addition to those described above, could include a more amenable interaction with rating agencies and regulatory bodies. As regards investment ratings the parameters laid down in para 4.1 of the Risk Management Guidelines issued by RBI in October, 1999 may be followed, i.e., the proposals for investments should also be subjected to the same degree of credit risk analysis, as any loan proposals. The proposals should be subjected to detailed appraisal and rating framework that factors in financial and non-financial parameters of issuers, sensitivity to external developments, etc. The maximum exposure to a customer should be bank-wide and include all exposures assumed by the Credit and Treasury Departments. The coupon on non-sovereign papers should be commensurate with their risk profile. The banks should exercise due caution, particularly in investment proposals, which are not rated and should ensure comprehensive risk evaluation. There should be greater interaction between Credit and Treasury Departments and the portfolio analysis should also cover the total exposures, including investments. The rating migration of the issuers and the consequent diminution in the portfolio quality should also be tracked at periodic intervals.



Chapter 3 - Credit Risk Models

3.1 A credit risk model seeks to determine, directly or indirectly, the answer to the following question: Given our past experience and our assumptions about the future, what is the present value of a given loan or fixed income security? A credit risk model would also seek to determine the (quantifiable) risk that the promised cash flows will not be forthcoming. The techniques for measuring credit risk that have evolved over the last twenty years are prompted by these questions and dynamic changes in the loan market.

3.1.1 The increasing importance of credit risk modelling should be seen as the consequence of the following three factors:

- Banks are becoming increasingly quantitative in their treatment of credit risk.
- New markets are emerging in credit derivatives and the marketability of existing loans is increasing through securitisation/ loan sales market.
- Regulators are concerned to improve the current system of bank capital requirements especially as it relates to credit risk.

3.1.2 Credit Risk Models have assumed importance because they provide the decision maker with insight or knowledge that would not otherwise be readily available or that could be marshalled at prohibitive cost. In a marketplace where margins are fast disappearing and the pressure to lower pricing is unrelenting, models give their users a competitive edge. The credit risk models are intended to aid banks in quantifying, aggregating and managing risk across geographical and product lines. The outputs of these models also play increasingly important roles in banks' risk management and performance measurement processes, customer profitability analysis, risk-based pricing, active portfolio management and capital structure decisions. Credit risk modeling may result in better internal risk management and may have the potential to be used in the supervisory oversight of banking organisations.



3.2 In the measurement of credit risk, models may be classified along three different dimensions: the techniques employed, the domain of applications in the credit process and the products to which they are applied.

3.2.1 **Techniques:** The following are the more commonly used techniques:

- (a) **Econometric Techniques** such as linear and multiple discriminant analysis, multiple regression, logic analysis and probability of default, etc.
- (b) **Neural networks** are computer-based systems that use the same data employed in the econometric techniques but arrive at the decision model using alternative implementations of a trial and error method.
- (c) **Optimisation models** are mathematical programming techniques that discover the optimum weights for borrower and loan attributes that minimize lender error and maximise profits.
- (d) **Rule-based or expert systems** are characterised by a set of decision rules, a knowledge base consisting of data such as industry financial ratios, and a structured inquiry process to be used by the analyst in obtaining the data on a particular borrower.
- (e) **Hybrid Systems** In these systems simulation are driven in part by a direct causal relationship, the parameters of which are determined through estimation techniques.

3.2.2 **Domain of application:** These models are used in a variety of domains:

- (a) **Credit approval:** Models are used on a stand alone basis or in conjunction with a judgemental override system for approving credit in the consumer lending business. The use of such models has expanded to include small business lending. They are generally not used in approving large corporate loans, but they may be one of the inputs to a decision.
- (b) **Credit rating determination:** Quantitative models are used in deriving 'shadow bond rating' for unrated securities and commercial loans. These ratings in turn influence portfolio limits and other lending limits used by the institution. In some instances, the credit rating predicted by the model is used within



an institution to challenge the rating assigned by the traditional credit analysis process.

- (c) Credit risk models may be used to suggest the **risk premia** that should be charged in view of the probability of loss and the size of the loss given default. Using a mark-to-market model, an institution may evaluate the costs and benefits of holding a financial asset. Unexpected losses implied by a credit model may be used to set the capital charge in pricing.
- (d) **Early warning:** Credit models are used to flag potential problems in the portfolio to facilitate early corrective action.
- (e) **Common credit language:** Credit models may be used to select assets from a pool to construct a portfolio acceptable to investors at the time of asset securitisation or to achieve the minimum credit quality needed to obtain the desired credit rating. Underwriters may use such models for due diligence on the portfolio (such as a collateralized pool of commercial loans).
- (f) **Collection strategies:** Credit models may be used in deciding on the best collection or workout strategy to pursue. If, for example, a credit model indicates that a borrower is experiencing short-term liquidity problems rather than a decline in credit fundamentals, then an appropriate workout may be devised.

3.3 Credit Risk Models: Approaches

3.3.1 The literature on quantitative risk modelling has two different approaches to credit risk measurement. The first approach is the development of statistical models through analysis of historical data. This approach was frequently used in the last two decades. The second type of modelling approach tries to capture distribution of the firm's asset-value over a period of time.

3.3.2 The statistical approach tries to rate the firms on a discrete or continuous scale. The linear model introduced by Altman (1967), also known as the Z-score Model, separates defaulting firms from non-defaulting ones on the basis of certain financial ratios. Altman, Hartzell, and Peck (1995,1996) have modified the original Z-score model to develop a model specific to emerging markets. This model is known as the Emerging Market Scoring (EMS) model.



3.3.3 The second type of modelling approach tries to capture distribution of the firm's asset-value over a period of time. This model is based on the expected default frequency (EDF) model. It calculates the asset value of a firm from the market value of its equity using an option pricing based approach that recognizes equity as a call option on the underlying asset of the firm. It tries to estimate the asset value path of the firm over a time horizon. The default risk is the probability of the estimated asset value falling below a pre-specified default point. This model is based conceptually on Merton's (1974) contingent claim framework and has been working very well for estimating default risk in a liquid market.

3.3.4 Closely related to credit risk models are **portfolio risk models**. In the last three years, important advances have been made in modelling credit risk in lending portfolios. The new models are designed to quantify credit risk on a portfolio basis, and thus are applied at the time of diversification as well as portfolio based pricing. These models estimate the loss distribution associated with the portfolio and identify the risky components by assessing the risk contribution of each member in the portfolio.

3.4 Banks may adopt any model depending on their size, complexity, risk bearing capacity and risk appetite, etc. However, the credit risk models followed by banks should, at the least, achieve the following:

- ❖ Result in differentiating the degree of credit risk in different credit exposures of a bank. The system could provide for transaction-based or borrower-based rating or both. It is recommended that all exposures are to be rated. Restricting risk measurement to only large sized exposures may fail to capture the portfolio risk in entirety for variety of reasons. For instance, a large sized exposure for a short time may be less risky than a small sized exposure for a long time
- ❖ Identify concentration in the portfolios
- ❖ Identify problem credits before they become NPAs
- ❖ Identify adequacy/ inadequacy of loan provisions



- ❖ Help in pricing of credit
- ❖ Recognise variations in macro-economic factors and a possible impact under alternative scenarios
- ❖ Determine the impact on profitability of transactions and relationship.



Chapter 4 - Portfolio Management and Risk Limits

4.1. The need for credit portfolio management emanates from the necessity to optimize the benefits associated with diversification and reduce the potential adverse impact of concentration of exposures to a particular borrower, sector or industry. The conventional approach to credit portfolio management has been largely based on the counter party exposure limits, which largely provides the guideline for incremental asset/ exposure build-up. This “forward” or incremental approach to credit portfolio management is, to an extent, a reactive strategy and though it does guide the decision-making process, it has limited contribution for managing the existing credit portfolio of the bank.

4.2 The recent developments in the measurement and management of portfolio credit risk have been based on two key attributes: ***correlation*** and ***volatility***. Consider two companies, one operates large capacities in the steel sector and the other a large player in the cement sector, promoted by two entirely unrelated promoters. Though these would classify as two separate counter parties, both of them may be highly sensitive to the Government’s expenditure in new projects/ investments. Thus, reduction in Government investments could impact these two companies simultaneously (correlation), impacting the credit-quality of such a portfolio (volatility), even though from a regulatory or conventional perspective, the risk had been diversified (2 separate promoters, 2 separate industries). Thus, though the credit portfolio may be well diversified and fulfils the prescribed criteria for counter party exposure limits, the high correlation in potential performance between two counter parties may impact the portfolio quality (default levels) under stress conditions.

4.3 In addition to the widespread instances of high correlation and resultant volatility, the emergence of new techniques for managing a bank’s credit portfolio have actively contributed to the development and adoption of broader credit risk management practices. Specifically, the



adoption and wider acceptance of securitisation of loan assets in the developed markets has permitted banks to pursue credit portfolio management on a proactive manner. These have usually been in the nature of collateralised loan obligations. Though securitisation of loan receivables, mainly consumer and auto loans, has been prevalent in India, it has usually been deployed as an asset acquisition or a hive-off approach rather than active credit portfolio management. The steps taken to enhance the liquidity and depth of debt markets in India and simplify the process of securitisation are expected to improve the prospects of credit portfolio management in the near future.

4.4 The measurement of credit-portfolio concentration has been elaborated in detail in the regulatory prescriptions for counter-party exposures in India. The issue of credit portfolio correlation is discussed here in some detail. In statistical terms, credit portfolio correlation would mean the number of times companies/ counter-parties in a portfolio defaulted simultaneously. As evident, this analysis is impossible in practice and the number of such instances for developing a reasonable generalisation would be too few. Some credit portfolio management techniques developed overseas estimate the correlation between defaults and bond-market spreads and generalise this for assessing the correlation in a given portfolio. Given the limited data on corporate bond market spreads and their statistical linkages with ratings in India, this approach may not be appropriate for Indian banks at this stage. Banks should, however, direct their data management efforts in this direction so that a beginning in active portfolio management can be made.

4.5 One possible technique for analysing credit-portfolio correlation is based on a macro-economic factor model. This approach involves projecting the performance (volatility) of a credit portfolio under altering macro-economic environments. In specific terms, this would involve a stress-test on the debt-servicing ability of a portfolio of borrowers under alternative scenarios. The input data would consist of the projected financial performance (income statement and balance sheet details) of



each of these portfolio constituents. In the appraisal system adopted by Indian banks in general, these are normally developed for individual borrowers for seeking credit approvals from the specific internal authorities. Such portfolio constituents could be relatively independent counterparties, spanning a relatively wide spectrum of region, industry, size of operation, adoption of technology and promoters. The key financial parameters of these counterparties (growth, profitability, access to funds, etc.) should be linked to the macro-economic parameters under consideration. Some of the relevant macro-economic parameters could include overall growth rates, growth in exports/ industrial/ agricultural sectors, interest rates, exchange rates, import duties, equity market and liquidity conditions. By developing alternative scenarios for these parameters, the credit-portfolio's aggregate performance (default rates and levels) can be assessed and possible correlation between a set of obligors (even though they constitute entirely separate counterparties) may be established. For instance, under the assumptions of low overall economic growth, poor growth in agriculture sector and reduction in import duties, the assessment may give some correlation between the borrowers in the petrochemicals industry and the consumer-electronics industry. Though there may not be any "counter party" relationship in this set of borrowers, both of them are possibly susceptible to reduced import duties and low economic growth. These illustrations are relatively simplistic and the detailed analysis, as discussed above, may give critical inputs for minimising the credit risk of the given portfolio. A possible advantage of starting with the macro-economic factor model is that it is amenable to the current levels of credit risk assessment practices in Indian banks and can be correspondingly adopted with relative ease. Though superior and more sophisticated tools have been developed, their findings may be limited due to the lack of representative data. Such options can be considered as Indian banks further enhance their internal systems and processes in credit risk management.



Chapter 5 – Managing Credit Risk in Inter-bank Exposure

5.1 During the course of its business, a bank may assume exposures on other banks, arising from trade transactions, money placements for liquidity management purposes, hedging, trading and transactional banking services such as clearing and custody, etc. Such transactions entail a credit risk, as defined, and therefore, it is important that a proper credit evaluation of the banks is undertaken. It must cover both the interpretation of the bank's financial statements as well as forming a judgement on non-financial areas such as management, ownership, peer/market perception and country factors.

5.2 The key financial parameters to be evaluated for any bank are:

- a) Capital Adequacy
- b) Asset Quality
- c) Liquidity
- d) Profitability

Banks will normally have access to information available publicly to assess the credit risk posed by the counter party bank.

5.2.1 Capital Adequacy

5.2.1.1 Banks with high capital ratios above the regulatory minimum levels, particularly Tier I, will be assigned a high rating whereas the banks with low ratios well below the standards and with low ability to access capital will be at the other end of the spectrum.

5.2.1.2 Capital adequacy needs to be appropriate to the size and structure of the balance sheet as it represents the buffer to absorb losses during difficult times. Over capitalization can impact overall profitability. Related to the issue of capitalization, is also the ability to raise fresh capital as and when required. Publicly listed banks and state owned banks may be best positioned to raise capital whilst the unlisted private banks or regional banks are dependant entirely on the wealth and/ or credibility of their owners.



5.2.1.3 The capital adequacy ratio is normally indicated in the published audited accounts. In addition, it will be useful to calculate the Capital to Total Assets ratio which indicates the owners' share in the assets of the business. The ratio of Tier I capital to Total Assets represents the extent to which the bank can absorb a counterparty collapse. Tier I capital is not owed to anyone and is available to cover possible losses. It has no maturity or repayment requirement, and is expected to remain a permanent component of the counter party's capital.

5.2.1.4 The Basel standards currently require banks to have a capital adequacy ratio of 8% with Tier I ratio not less than 4%. The Reserve Bank of India requirement is 9%. The Basel Committee is planning to introduce the New Capital Accord and these requirements could change the dimension of the capital of banks.

5.2.2 Asset Quality

5.2.2.1 The asset portfolio in its entirety should be evaluated and should include an assessment of both funded items and off-balance sheet items. Whilst non performing assets and provisioning ratios will reflect the quality of the loan book, high volatility of valuations and earnings will reflect exposure to the capital market and sensitive sectors.

The key ratios to be analysed are

- Gross NPAs to Gross Advances ratio,
- Net NPAs to Net Advances ratio
- Provisions Held to Gross Advances ratio and
- Provisions Held to Gross NPAs ratio.

5.2.2.3 Some issues which should be taken cognisance of, and which require further critical examination are:

- where exposure to a particular sector is above a certain level, say, 10% of total assets
- where a significant part of the portfolio is to counter parties based in countries which are considered to be very risky



- where Net NPAs are above a certain level, say, 5% of the loan assets.
- where loan loss provision is less than a certain level, say, 50% of the Gross NPA.
- where high risk/ return lending accounts for the majority of the assets.
- where there are rapid rates of loan growth. (These can be a precursor to reducing asset quality as periods of rapid expansion are often followed by slow downs which make the bank vulnerable.)
- net impact of mark-to-market values of treasury transactions.

5.2.2.4 Commercial banks are increasingly venturing into investment banking activities where asset considerations additionally focus on the marketability of the assets, as well as the quality of the instruments. Preferably banks should mark-to-market their entire investment portfolio and treat sticky investments as "non-performing", which should also be adequately provided for.

5.2.3 Liquidity

5.2.3.1 Commercial bank deposits generally have a much shorter contractual maturity than loans, and liquidity management needs to provide a cushion to cover anticipated deposit withdrawals. The key ratios to be analysed are

- Total Liquid Assets to Total Assets ratio (the higher the ratio the more liquid the bank is),
- Total Liquid Assets to Total Deposits ratio (this measures the bank's ability to meet withdrawals),
- Loans to Deposits ratio and
- Inter-bank deposits to total deposits ratio.

5.2.3.2 It is necessary to develop an appropriate level of correlation between assets and liabilities. Account should be taken of the extent to which borrowed funds are required to bolster capital and the respective redemption profiles.



5.2.4 Profitability

5.2.4.1 A consistent year on year growth in profitability is required to provide an acceptable return to shareholders and retain resources to fund future growth. The key ratios to be analysed are:

- Return on Average Assets (measures a bank's growth/ decline in profits in comparison with its balance sheet expansion/ contraction),
- Return on Equity (provides an indication of how well the bank is performing for its owners),
- Net Interest Margin (measures the difference between interest paid and interest earned, and therefore a bank's ability to earn interest income) and
- Operating Expenses to Net Revenue ratio (the cost/income ratio of the bank).

5.2.4.2 The degree of reliance upon interest income compared with fees earned, heavy dependency on certain sectors, and the sustainability of income streams are relevant factors to be borne in mind.

5.2.4.3 The ability of a bank to analyse another bank on the above lines will depend upon the information available publicly and also the strength of disclosures in the financial statements.

5.3 In addition to the quantitative indices, other key parameters to be assessed are:

- Ownership
- Management ability
- Peer comparison/ Market perception
- Country of incorporation/ Regulatory environment

Ownership

5.3.1 The spread and nature of the ownership structure is important, as it impinges on the propensity to induct additional capital. Support from a large body of shareholders is difficult to obtain if the bank's performance is adverse, whilst a smaller shareholder base constrains the ability to garner funds.



Management Ability

5.3.2 Frequent changes in senior management, change in a key figure, and the lack of succession planning need to be viewed with suspicion. Risk management is a key indicator of the management's ability as it is integral to the health of any institution. Risk management should be deeply embedded and respected in the culture of the financial institution.

Peer Comparison/ Market Perception

5.3.3 It is recognized that balance sheets tend to show different structures from one country to another, and from one type of bank to another. Accordingly, it is appropriate to assess a bank's financial statements against those of its comparable peers. Similarly market sentiment is highly important to a bank's ability to maintain an adequate funding base, but is not necessarily reflective of published information. Special notice should be taken where the overall performance of the peer sector, in general, falls below international standards.

Country of Incorporation/ Regulatory Environment

5.3.4 Country risk needs to be evaluated since a bank which is financially strong may not be permitted to meet its commitments in view of the regulatory environment or the financial state of the country in which it is operating in.

5.4 Banks should be rated (called Bank Tierings) on the basis of the above factors. An indicative tiering scale is:¹

| <u>Bank Tier</u> | <u>Description</u> |
|-------------------------|---------------------------|
| 1 | Low risk |
| 2 | Modest risk |
| 3 | Satisfactory risk |
| 4 | Fair Risk |
| 5 | Acceptable Risk |
| 6 | Watch List |
| 7 | Substandard |
| 8 | Doubtful |
| 9 | Loss |



5.5 Facilities

Facilities to banks can be classified into three categories:

- a) On balance sheet items such as cash advances, bond holdings and investments, and off-balance sheet items which are not subject to market fluctuation risk such as guarantees, acceptances and letters of credit.
- b) Facilities which are off-balance sheet and subject to market fluctuation risk such as foreign exchange and derivative products.
- c) Settlement facilities: These cover risks arising through payment systems or through settlement of treasury and securities transactions.

The tiering system enables a bank to establish internal parameters to help determine acceptable limits of exposure to a particular bank/ banking group. These parameters should be used to determine the maximum level of (a) and (b) above, maximum tenors for term products which may be considered prudent for a bank and settlement limits. Medium term loan facilities and standby facilities should be sanctioned very exceptionally. Standby lines, by their very nature, are likely to be drawn only at a time when the risk in making funds available is generally perceived to be unattractive.

Bank-wise exposure limits should be set taking into account the counter party and country risks. The credit risk management of exposure to banks should be centralised on a bank-wide basis.

¹ The rating scale for bank rating should be in tandem with CRF to synthesize credit risk on account of all activities for the bank as a whole.



Chapter 6 – Credit Risk in Off-balance sheet Exposures

Risk Identification and Assessment of Limits

6.1. Credit Risk in non-fund based business of banks need to be assessed in a manner similar to the assessment of fund based business since it has the potential to become a funded liability in case the customer is not able to meet his commitments. Financial guarantees are generally long term in nature, and assessment of these requirements should be similar to the evaluation of requests for term loans. As contracts are generally for a term of 2-3 years, banks must obtain cash flows over this time horizon, arising from the specific contract they intend to support, and determine the viability of financing the contract.

Risk Monitoring and Control

6.2 For reducing credit risk on account of such off balance sheet exposures, banks may adopt a variety of measures some of which are indicated below:

- i) Banks must ensure that the security, which is available to the funded lines, also covers the LC lines and the guarantee facilities. On some occasions, it will be appropriate to take a charge over the fixed assets as well, especially in the case of long-term guarantees.
- ii) In the case of guarantees covering contracts, banks must ensure that the clients have the requisite technical skills and experience to execute the contracts. The value of the contracts must be determined on a case-by-case basis, and separate limits should be set up for each contract. The progress vis-à-vis physical and financial indicators should be monitored regularly, and any slippages should be highlighted in the credit review.
- iii) The strategy to sanction non-fund facilities with a view to increase earnings should be properly balanced vis-à-vis the risk involved and extended only after a thorough assessment of credit risk is undertaken.



Chapter 7 – Country Risk

7.1 Country risk is the possibility that a country will be unable to service or repay its debts to foreign lenders in a timely manner. In banking, this risk arises on account of cross border lending and investment. The risk manifests itself either in **the inability** or **the unwillingness** of the obligor to meet its liability.

Country risk comprises of the following risks:

- **Transfer risk** which is the core risk under country risk, arises on account of the possibility of losses due to restrictions on external remittances. Consequently, an obligor may be able to pay in local currency, but may not be able to pay in foreign currency. This type of risk may occur when foreign exchange shortages either close or restrict a country's cross border foreign exchange market.
- **Sovereign risk** is associated with lending to government of a sovereign nation or to taking government guarantees. The risk lies in the fact that sovereign entities may claim immunity from legal process or might not abide by a judgement, and it might prove impossible to secure redress through legal action. Ordinarily, it is assumed that there will be no default by a sovereign. This, however, does not mean that there is no risk involved in sovereign lending, for the risk may manifest itself in terms of rehabilitation of an indebted country in terms of financial solvency and liquidity for which there may be rescheduling of country debt or external debt.
- **Non-sovereign or political risk** arises when political environment or legislative process of a country leads to Government taking over the assets of the financial entity (e.g. nationalisation) and preventing discharge of its liabilities in a manner that had been agreed to. It is also referred to as risk of appropriation and expropriation. Non-sovereign risk includes, in addition to sovereign risk, private claims and direct investments like lending to corporates and project finance lending and includes risks associated with legal frameworks and economic environment.
- **Cross border risk** arises on account of the borrower being a resident of a country other than the country where the cross border asset is booked, and includes exposures to local residents denominated in currencies other than the local currency.



- **Currency risk** is the possibility that exchange rate changes will alter the expected amount of principal and return of the lending or investment. At times, banks may try to cope with this specific risk on the lending side by shifting the risk associated with exchange rate fluctuations to the borrowers. The risk however does not get extinguished, but gets converted to credit risk.
- **Macroeconomic and Structural Fragility Risk** has come into prominence after the East Asian crises of 1990s. In these crises firms could purchase foreign exchange to service foreign debt but collapse of exchange rates and surge in interest rates due to severe government restrictions on firms owning external debt resulted in highly unfavourable exchange rates and very high interest costs on domestic borrowings for these firms. This severely impaired these firms' ability to service foreign debt. The structural fragility risk can also include that associated with poor development of domestic bankruptcy laws and weak courts for their enforcement.

7.2 Broad Contours of Country Risk Management (CRM)

The broad contours of CRM are:

- Risk Categories
- Country Risk Assessments
- Fixing of country limits
- Monitoring of country exposures

7.2.1 Risk Categories

Countries can be broadly classified into six risk categories – insignificant, low, moderate, high, very high and off-credit. **IBA would be assigned the responsibility of developing a mechanism for assigning countries to the six risk categories specified above.** Banks may be allowed to adopt a more conservative categorisation of the countries.

7.2.2 Country Risk (CR) Assessment

To begin with, banks may adopt the sovereign ratings of international credit rating agencies. However, banks should eventually put in place appropriate systems to move over to internal assessment of country risk within a prescribed period, say by 31 March 2005. Banks may adopt the ratings of any of the international credit rating agencies during the transition period. In case there is divergence in the ratings accorded to any country by the international credit rating agencies, banks may adopt the lower/ lowest of the ratings.



Banks should also evolve sound systems for measuring and monitoring country risk. The system should be able to identify the full dimensions of country risk as well as incorporating features that acknowledge the links between credit and market risk. Banks should use a variety of internal and external sources as a means to measure country risk. Banks should not rely solely on rating agencies or other external sources as their only country risk-monitoring tool. Banks should also incorporate information from the relevant country managers of their foreign branches into their country risk assessments. However, the rating accorded by a bank to any country should not be better than the rating of that country by the international rating agency.

The frequency of periodic reviews of country risk ratings should be at least once a year with a provision to review the rating of specific country, based on any major events in that country, where bank exposure is high, even before the next periodical review of the ratings is due.

7.2.4 Fixing of country limits

Bank Boards may set country exposure limits in relation to the bank's regulatory capital (Tier I + Tier II) with sub-limits, if considered necessary for products, branches, maturity etc. The basis for setting the limits for the country/ category shall be left to the discretion of the banks' Boards. The country exposure limits set by the Board should be reviewed periodically.

Exposure limit for any country should not exceed its regulatory capital, except in the case of insignificant risk category. In respect of foreign banks, the regulatory capital would be the capital held in their Indian books.

Banks may also set up regional exposure limits for country groups, at the discretion of their Boards. The Board may decide on the basis for grouping of countries and also lay down the guidelines regarding all aspects of such regional exposure limits.

7.3.5 Monitoring of country exposures

Banks should monitor their country exposures on a weekly basis before switching over to real-time monitoring. However, exposures to high-risk (and above) categories should be monitored on a real-time basis. Banks should switchover to real-time monitoring of country exposures (all categories) by 31st March 2004.

Boards should review the country risk exposures at every meeting. The review should include progress in establishing internal country rating systems, compliance with the regulatory and the internal limits, results



of stress tests and the exit options available to the banks in respect of countries belonging to 'high risk & above' categories.

Management of country risk should incorporate stress testing as one method to monitor actual and potential risks. Stress testing should include an assessment of the impact of alternative outcomes to important underlying assumptions.

Country risk management processes employed by banks would require adequate internal controls that include audits or other appropriate oversight mechanisms to ensure the integrity of the information used by senior officials in overseeing compliance with policies and limits.



Chapter 8 – Loan Review Mechanism/ Credit Audit

Credit Audit examines compliance with extant sanction and post-sanction processes/ procedures laid down by the bank from time to time.

8.1 Objectives of Credit Audit

- Improvement in the quality of credit portfolio
- Review sanction process and compliance status of large loans
- Feedback on regulatory compliance
- Independent review of Credit Risk Assessment
- Pick-up early warning signals and suggest remedial measures
- Recommend corrective action to improve credit quality, credit administration and credit skills of staff, etc.

8.2 Structure of Credit Audit Department

The credit audit / loan review mechanism may be assigned to a specific Department or the Inspection and Audit Department.

8.3 Functions of Credit Audit Department

- To process Credit Audit Reports
- To analyse Credit Audit findings and advise the departments/ functionaries concerned
- To follow up with controlling authorities
- To apprise the Top Management
- To process the responses received and arrange for closure of the relative Credit Audit Reports
- To maintain database of advances subjected to Credit Audit

8.4 Scope and Coverage

The focus of credit audit needs to be broadened from the account level to look at the overall portfolio and the credit process being followed. The important areas are:

8.4.1 Portfolio Review: Examine the quality of Credit & Investment (Quasi Credit) Portfolio and suggest measures for improvement, including



reduction of concentrations in certain sectors to levels indicated in the Loan Policy and Prudential Limits suggested by RBI.

8.4.2 Loan Review: Review of the sanction process and status of post sanction processes/ procedures (not just restricted to large accounts)

- all fresh proposals and proposals for renewal of limits (within 3 - 6 months from date of sanction)
- all existing accounts with sanction limits equal to or above a cut off depending upon the size of activity
- randomly selected (say 5-10%) proposals from the rest of the portfolio
- accounts of sister concerns/group/associate concerns of above accounts, even if limit is less than the cut off

8.4.3 Action Points for Review

- Verify compliance of bank's laid down policies and regulatory compliance with regard to sanction
- Examine adequacy of documentation
- Conduct the credit risk assessment
- Examine the conduct of account and follow up looked at by line functionaries
- Oversee action taken by line functionaries in respect of serious irregularities
- Detect early warning signals and suggest remedial measures thereof

8.4.4 Frequency of Review

The frequency of review should vary depending on the magnitude of risk (say, for the high risk accounts - 3 months, for the average risk accounts- 6 months , for the low risk accounts- 1 year).

- Feedback on general regulatory compliance.
- Examine adequacy of policies, procedures and practices.
- Review the Credit Risk Assessment methodology.
- Examine reporting system and exceptions thereof.



- Recommend corrective action for credit administration and credit skills of staff.
- Forecast likely happenings in the near future.

8.5 Procedure to be followed for Credit Audit

- Credit Audit is conducted on site, i.e. at the branch which has appraised the advance and where the main operative credit limits are made available.
- Report on conduct of accounts of allocated limits are to be called from the corresponding branches.
- Credit auditors are not required to visit borrowers' factory/ office premises.



Chapter 9 – RAROC Pricing/ Economic Profit

9.1 In acquiring assets, banks should use the pricing mechanism in conjunction with product/ geography/ industry/ tenor limits. For example, if a bank believes that construction loans for commercial complexes are unattractive from a portfolio perspective, it can raise the price of these loans to a level that will act as a disincentive to borrowers. This is an instance of *marginal cost pricing* - the notion that the price of an asset should compensate the institution for its marginal cost as measured on a risk-adjusted basis. Marginal cost pricing may not always work. A bank may have idle capacity and capital that has not been deployed. While such an institution clearly would not want to make a loan at a negative spread, it would probably view even a small positive spread as worthwhile as long as the added risk was acceptable.

9.2 Institutions tend to book unattractively priced loans when they are unable to allocate their cost base with clarity or to make fine differentiations of their risks. If a bank cannot allocate its costs, then it will make no distinction between the cost of lending to borrowers that require little analysis and the cost of lending to borrowers that require a considerable amount of review and follow up. Similarly, if the spread is tied to a too coarsely graded risk rating system (one, for example, with just four grades) then it is more difficult to differentiate among risks when pricing than if the risk rating is graduated over a larger scale with, say, 15 grades.

9.3 A *cost-plus-profit pricing strategy* will work in the short run, but in the long run borrowers will balk and start looking for alternatives. Cost-plus-profit pricing will also work when a bank has some flexibility to compete on an array of services rather than exclusively on price. The difficulties with pricing are greater in markets where the lender is a price taker rather than a price leader.



9.4 The pricing is based on the borrower's risk rating, tenor, collateral, guarantees, historic loan loss rates, and covenants. A capital charge is applied based on a hurdle rate and a capital ratio[▲]. Using these assumptions, the rate to be charged for a loan to a customer with a given rating could be calculated.

9.5 This relatively simple approach to credit pricing works well as long as the assumptions are correct - especially those about the borrower's credit quality. This method is used in many banks today. The main drawbacks of this method are:

- Only 'expected losses' are linked to the borrower's credit quality. The capital charge based on the volatility of losses in the credit risk category may also be too small. If the loan were to default, the loss would have to be made up from income from non-defaulting loans.
- It implicitly assumes only two possible states for a loan: default or no default. It does not model the credit risk premium or discount resulting from improvement or decline in the borrower's financial condition, which is meaningful only if the asset may be repriced or sold at par.

9.6 Banks have long struggled to find the best ways of allocating capital in a manner consistent with the risks taken. They have found it difficult to come up with a consistent and credible way of allocating capital for such varying sources of revenue as loan commitments, revolving lines of credit (which have no maturity), and secured versus unsecured lending. The different approaches for allocating capital are as under:

- One approach is to allocate capital to business units based on their asset size. Although it is true that a larger portfolio will have larger losses, this approach also means that the business unit is forced to employ all the capital allocated to it. Moreover, this method treats all risks alike.
- Another approach is to use the regulatory (risk-adjusted) capital as the allocated capital. The problem with this approach is that regulatory capital may or may not reflect the true risk of a

[▲] The hurdle rate is defined as the minimum acceptable return on a business activity.



business. For example, for regulatory purposes, a loan to a AAA rated customer requires the same amount of capital per Rupees lent as one to a small business.

- Yet another approach is to use unexpected losses in a sub-portfolio (standard deviation of the annual losses taken over time) as a proxy for capital to be allocated. The problem with this approach is that it ignores default correlations across sub-portfolios. The volatility of a sub-portfolio may in fact dampen the volatility of the institution's portfolio, so pricing decisions based on the volatility of the sub-portfolio may not be optimal. In practical terms, this means that one line of business within a lending institution may sometimes subsidize another.

Risk Adjusted Return on Capital (RAROC)

9.7 As it became clearer that banks needed to add an appropriate capital charge in the pricing process, the concept of risk adjusting the return or risk adjusting the capital arose. The value-producing capacity of an asset (or a business) is expressed as a ratio that allows comparisons to be made between assets (or businesses) of varying sizes and risk characteristics. The ratio is based either on the size of the asset or the size of the capital allocated to it. When an institution can observe asset prices directly (and/or infer risk from observable asset prices) then it can determine how much capital to hold based on the volatility of the asset. This is the essence of the mark-to-market concept. If the capital to be held is excessive relative to the total return that would be earned from the asset, then the bank will not acquire it. If the asset is already in the bank's portfolio, it will be sold. The availability of a liquid market to buy and sell these assets is a precondition for this approach. When banks talk about asset concentration and correlation, the question of capital allocation is always in the background because it is allocated capital that absorbs the potential consequences (unexpected losses) resulting from such concentration and correlation causes.

9.8 RAROC allocates a capital charge to a transaction or a line of business at an amount equal to the maximum expected loss (at a 99% confidence level) over one year on an after-tax basis. As may be expected,



the higher the volatility of the returns, the more capital is allocated. The higher capital allocation means that the transaction has to generate cash flows large enough to offset the volatility of returns, which results from the credit risk, market risk, and other risks taken. The RAROC process estimates the asset value that may prevail in the worst-case scenario and then equates the capital cushion to be provided for the potential loss.

9.9 RAROC is an improvement over the traditional approach in that it allows one to compare two businesses with different risk (volatility of returns) profiles. A transaction may give a higher return but at a higher risk. Using a hurdle rate (expected rate of return), a lender can also use the RAROC principle to set the target pricing on a relationship or a transaction. Although not all assets have market price distribution, RAROC is a first step toward examining an institution's entire balance sheet on a mark-to-market basis - if only to understand the risk-return trade-offs that have been made.



Chapter 10 – New Capital Accord: Implications for Credit Risk Management

10.1 The Basel Committee on Banking Supervision had released in June 1999 the first Consultative Paper on a *New Capital Adequacy Framework* with the intention of replacing the current broad-brush 1988 Accord. The Basel Committee has released a Second Consultative Document in January 2001, which contains refined proposals for the three pillars of the New Accord – Minimum Capital Requirements, Supervisory Review and Market Discipline.

10.2 The Committee proposes two approaches, viz., Standardised and Internal Rating Based (IRB) for estimating regulatory capital. Under the **standardised approach**, the Committee desires neither to produce a net increase nor a net decrease, on an average, in minimum regulatory capital, even after accounting for operational risk. Under the **IRB approach**, the Committee's ultimate goals are to ensure that the overall level of regulatory capital is sufficient to address the underlying credit risks and also provides capital incentives relative to the standardised approach, i.e., a reduction in the risk weighted assets of 2% to 3% (foundation IRB approach) and 90% of the capital requirement under foundation approach for advanced IRB approach to encourage banks to adopt IRB approach for providing capital.

10.3 The minimum capital adequacy ratio would continue to be 8% of the risk-weighted assets, which cover capital requirements for market (trading book), credit and operational risks. **For credit risk**, the range of options to estimate capital extends to include a **standardised**, a foundation **IRB** and an **advanced IRB** approaches.

10.4.1 Standardised Approach

Under the standardised approach, preferential risk weights in the range of 0%, 20%, 50%, 100% and 150% would be assigned on the basis of ratings given by external credit assessment institutions.



Orientation of the IRB Approach

Banks' internal measures of credit risk are based on assessments of the risk characteristics of both the borrower and the specific type of transaction. The probability of default (PD) of a borrower or group of borrowers is the central measurable concept on which the IRB approach is built. The PD of a borrower does not, however, provide the complete picture of the potential credit loss. Banks should also seek to measure how much they will lose should a borrower default on an obligation. This is contingent upon two elements. First, the magnitude of likely loss on the exposure: this is termed the Loss Given Default (LGD), and is expressed as a percentage of the exposure. Secondly, the loss is contingent upon the amount to which the bank was exposed to the borrower at the time of default, commonly expressed as Exposure at Default (EAD). These three components (PD, LGD, EAD) combine to provide a measure of expected intrinsic, or economic, loss. The IRB approach also takes into account the maturity (M) of exposures. Thus, the derivation of risk weights is dependent on estimates of the PD, LGD and, in some cases, M, that are attached to an exposure. These components (PD, LGD, EAD, M) form the basic inputs to the IRB approach, and consequently the capital requirements derived from it.

10.4.2 IRB Approach

The Committee proposes two approaches – foundation and advanced - as an alternative to standardised approach for assigning preferential risk weights.

Under the *foundation approach*, banks, which comply with certain minimum requirements viz. comprehensive credit rating system with capability to quantify Probability of Default (PD) could assign preferential risk weights, with the data on Loss Given Default (LGD) and Exposure at Default (EAD) provided by the national supervisors. In order to qualify for adopting the foundation approach, the internal credit rating system should have the following parameters/conditions:

- Each borrower within a portfolio must be assigned the rating before a loan is originated.



- Minimum of 6 to 9 borrower grades for performing loans and a minimum of 2 grades for non-performing loans.
- Meaningful distribution of exposure across grades and not more than 30% of the gross exposures in any one borrower grade.
- Each individual rating assignment must be subject to an independent review or approval by the Loan Review Department.
- Rating must be updated at least on annual basis.
- The Board of Directors must approve all material aspects of the rating and PD estimation.
- Internal and External audit must review annually, the banks' rating system including the quantification of internal ratings.
- Banks should have individual credit risk control units that are responsible for the design, implementation and performance of internal rating systems. These units should be functionally independent.
- Members of staff responsible for rating process should be adequately qualified and trained.
- Internal rating must be explicitly linked with the banks' internal assessment of capital adequacy in line with requirements of Pillar 2.
- Banks must have in place sound stress testing process for the assessment of capital adequacy.
- Banks must have a credible track record in the use of internal ratings at least for **the last 3 years**.
- Banks must have robust systems in place to evaluate the accuracy and consistency with regard to the system, processing and the estimation of PDs.
- Banks must disclose in greater detail the rating process, risk factors, validation etc. of the rating system.

Under the ***advanced approach***, banks would be allowed to use their own estimates of PD, LGD and EAD, which could be validated by the supervisors. Under both the approaches, risk weights would be expressed as a single continuous function of the PD, LGD and EAD. The IRB approach, therefore, does not rely on supervisory determined risk buckets as in the case of standardised approach. The Committee has proposed an



IRB approach for retail loan portfolio, having homogenous characteristics distinct from that for the corporate portfolio. The Committee is also working towards developing an appropriate IRB approach relating to project finance.

10.5 The adoption of the New Accord, in the proposed format, requires substantial upgradation of the existing credit risk management systems. The New Accord also provided in-built capital incentives for banks, which are equipped to adopt foundation or advanced IRB approach. Banks may, therefore, upgrade the credit risk management systems for optimising capital.
