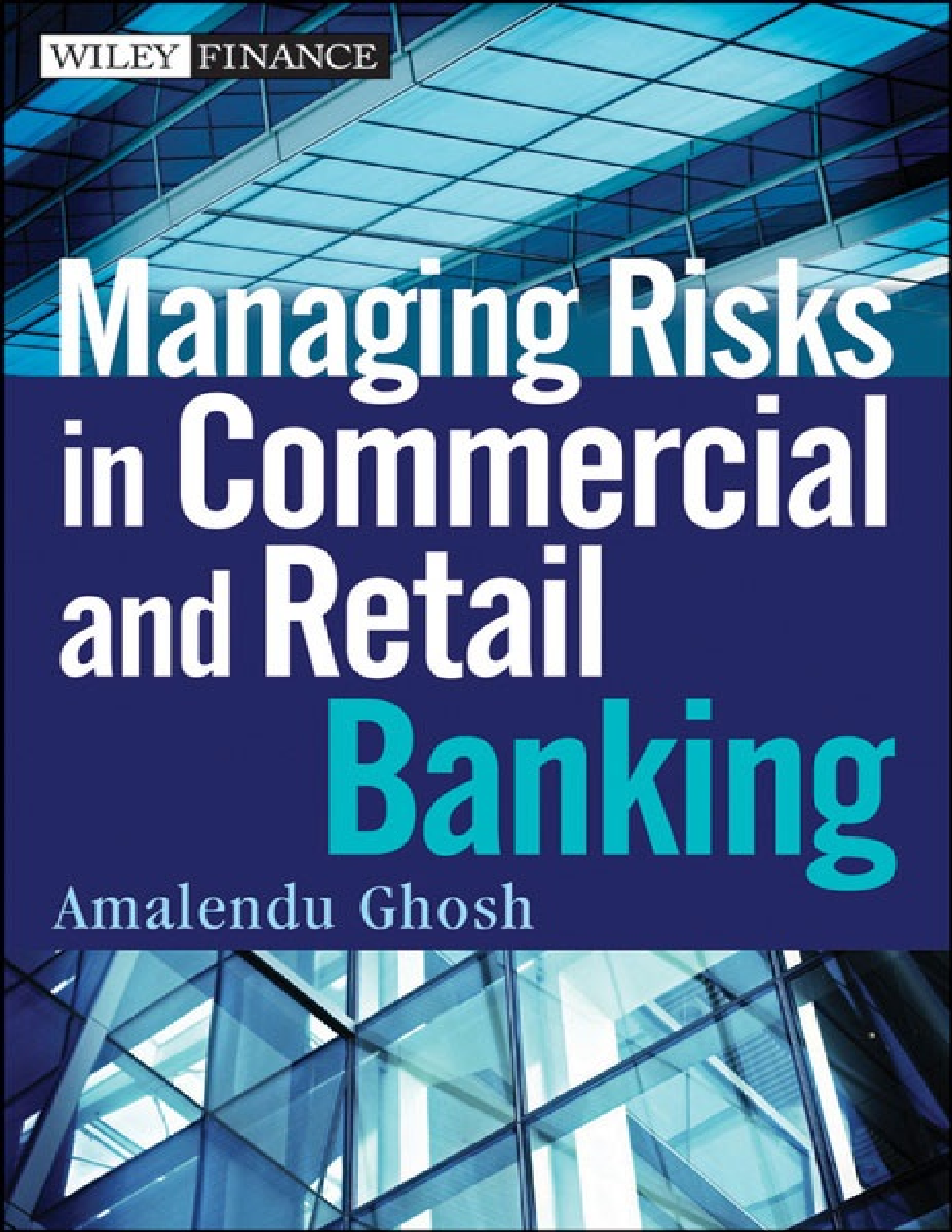
WILEY FINANCE
Managing Risks in Commercial and Retail Banking
Amalendu Ghosh

Contents

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Managing Risks in Commercial and Retail Banking

AMALENDU GHOSH

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Preface

The banking regulatory and supervisory authorities are focusing attention on two key issues: implementation of the new capital adequacy framework in banking institutions and transition to a foolproof risk-based bank supervision system. The New Basel Capital Accord of 2006 is more risk sensitive than the Old Capital Accord of 1988. For the first time, a counterparty rating-based approach has been advocated for regulatory capital assessment. Besides, a new concept of economic capital has been introduced to stick to a capital standard that takes care of unusual losses from severe events.

The New Accord encourages banks to develop internal models for risk rating and risk measurement, strengthen their risk management practices and procedures, and acquire internal capability to assess capital requirements. Concurrently, bank supervisory authorities are taking new initiatives in many countries to focus on a risk-based bank supervision system in order to reduce financial sector vulnerability. The supervisors require banks to undertake self-assessment of their risk profile, identify vulnerabilities in their operations, and improve risk management practices to protect their capital base and ensure long-term solvency. This book takes into account New Capital Accord issues, including those specified in the 2010 Basel Committee response to the global financial crisis, and deals with important aspects of risk management in one place.

Commercial banks, financial institutions, bank auditors, chartered accountant firms, banks' training colleges, and students who pursue financial risk management courses will find this book useful. The book focuses on practical aspects of risk management; covers risk management–related topics and credit, market, and operational risks; and contains modalities for establishing internal models for risk rating of banks' counterparties and rating of branch offices for audit prioritization. It contains a balanced mix of concepts, methodologies, and tools pertaining to risk management. Banks that are in the process of implementing New Capital Accord recommendations and the internal and external auditors who are to evaluate independently the soundness of risk management systems and the capital adequacy calculation process in banks will like this book. The book contains summaries at the end of each chapter.

The book comprises seven parts. The first part deals with conceptual aspects of

risks and fundamental principles of risk management and gives an outline of the risk management architecture that banks should have.

The second part identifies credit risk management issues and describes procedures for identification, measurement, and management of credit risk. It deals with the modalities for establishing internal models for risk rating and risk measurement and the problematic issues that arise in establishing the rating system across the organization. The rating-based loan pricing mechanism and credit portfolio review techniques are explained in this part.

The third part describes the market risk management framework and explains the process to identify, measure, and control all forms of market risk. It identifies the causes that accentuate market risks and discusses possible solutions to respond to them.

The fourth part deals with operational risk management and the sources and causes that give rise to operational risk events, and explains in a logical sequence the procedure to make a scientific assessment of operational risk. It identifies the operational risk events that happen in banking institutions and explains the procedure to evaluate the loss-inflicting capacity of those events and assess operational risk in terms of event frequency and impact severity. It discusses the ways and means to tackle significant operational risk events that cause serious business disruption.

The fifth part deals with the risk-based internal audit procedure and describes the sequential steps involved in switching over from a transaction-based to a risk-based audit system. It explains the methodology to compile risk profiles of branch offices of banks and gives an elaboration of the risk-focused audit process and risk-focused report writing technique. Risk-based auditing can be used as a tool to assess the efficacy of risk control systems in a bank. For this reason, this topic has been included in this book.

The sixth part gives an outline of corporate governance. Protection of depositors' interest is the key element of corporate governance that determines the codes and ethics that banks should follow. Corporate governance in banks will suffer unless the bank management establishes a sound risk management system to protect the interests of depositors, shareholders, and debt holders. In view of this, this topic has been included in this book.

Part seven describes the causes and the impact of the Asian and the U.S. financial crises, the lessons we learned from them, and the possible methods banks can take to contain in future the risks that emerged from the crises.

The book contains references to a few documents of the Basel Committee on Banking Supervision, particularly the document on “International Convergence of Capital Measurement and Capital Standards—A Revised Framework” of June 2006. This document is referred to in this book as the New Basel Capital Accord. I have drawn some points and features from the Basel Committee documents and indicated the source, but I have explained them in my own way. The translation or the exposition is not an official translation of the Bank for International Settlements (BIS). The original texts of documents referred to in this book are available free of charge at the BIS web site (www.bis.org). I am grateful to the Secretariat of the Basel Committee on Banking Supervision for giving me permission in this regard.

AMALENDU GHOSH

PART One

Risk Management Approaches and Systems

CHAPTER 1

Business Risk in Banking

1.1 CONCEPT OF RISK

Risk in banking refers to the potential loss that may occur to a bank due to the happening of some events. Risk arises because of the uncertainty associated with events that have the potential to cause loss; an event may or may not occur, but if it occurs it causes loss. Risk is primarily embedded in financial transactions, though it can occur due to other operational events. It is measured in terms of the likely change in the value of an asset or the price of a security/commodity with regard to its current value or price. When we deal with risks in banking, we are primarily concerned with the possibilities of loss or decline in asset values from events like economic slowdowns, unfavorable fiscal and trade policy changes, adverse movement in interest rates or exchange rates, or falling equity prices. Banking risk has two dimensions: the uncertainty—whether an adverse event will happen or not—and the intensity of the impact—what will be the likely loss if the event happens (that is, if the risk materializes). Risk is essentially a group characteristic; it is not to be perceived as an individual or an isolated event. When a series of transactions are executed, a few of them may cause loss to the bank, though all of them carry the risk element.

1.2 BROAD CATEGORIES OF RISKS

Banks face two broad categories of risks: business risks and control risks. Business risks are inherent in the business and arise due to the occurrence of some expected or unexpected events in the economy or the financial markets, which cause erosion in asset values and, consequently, reduction in the intrinsic value of the bank. The money lent to a customer may not be repaid due to the failure of the business, or the market value of bonds or equities may decline due to the rising interest rate, or a forward contract to purchase foreign currency at a contracted rate may not be settled by the counterparty on the due date as the exchange rate has become unfavorable. These types of business risks are

inherent in the business of banks. Credit risk, market risk, and operational risk, the three major business risks, have several dimensions, and therefore require an elaborate treatment. These risks are dealt with in greater detail later in this book.

Control risk refers to the inadequacy or failure of control that is intended to check the intensity or volume of business risk or prevent the proliferation of operational risk. Inadequacy in control arises due to the lack of understanding of the entire business process, while failure in control arises due to complacency or laxity on the part of the control staff. Let us suppose that the bank has estimated an average loan loss of 5 percent in its credit portfolio as per its internal model. The actual loan loss will be more than 5 percent, if adequate control is not exercised on credit sanction and credit supervision. If the loan sanction standard is compromised or collateral is not obtained in accordance with the prescribed norms, or laxity in control prevails over the supervision of borrowers' business and accounts, the level of credit risk will be higher than that estimated under an internal model. Business risk will be higher if the control system fails to detect the irregularities in time. Banks must have an elaborate control system that spreads over credit, investment, and other operational areas.

The risks can also be classified into two other categories: financial risk and nonfinancial risk. Financial risks inflict loss on a bank directly, while nonfinancial risks affect the financial condition in an indirect manner. Credit, market, and operational risks are financial risks since they have a direct impact on the financial position of a bank. For example, if the market value of a bond purchased by the bank falls below the acquisition price, the bank will incur a loss if it sells the bond in the market. Reputation risk, legal risk, money laundering risk, technology risk, and control risk are nonfinancial risks because they adversely affect the bank in an indirect manner. Business opportunities lost, and consequently income lost, on account of negative publicity against a bank that impairs its reputation, or compensation paid to a customer in response to an unfavorable decree from a court of law against the bank, are examples of nonfinancial risk.

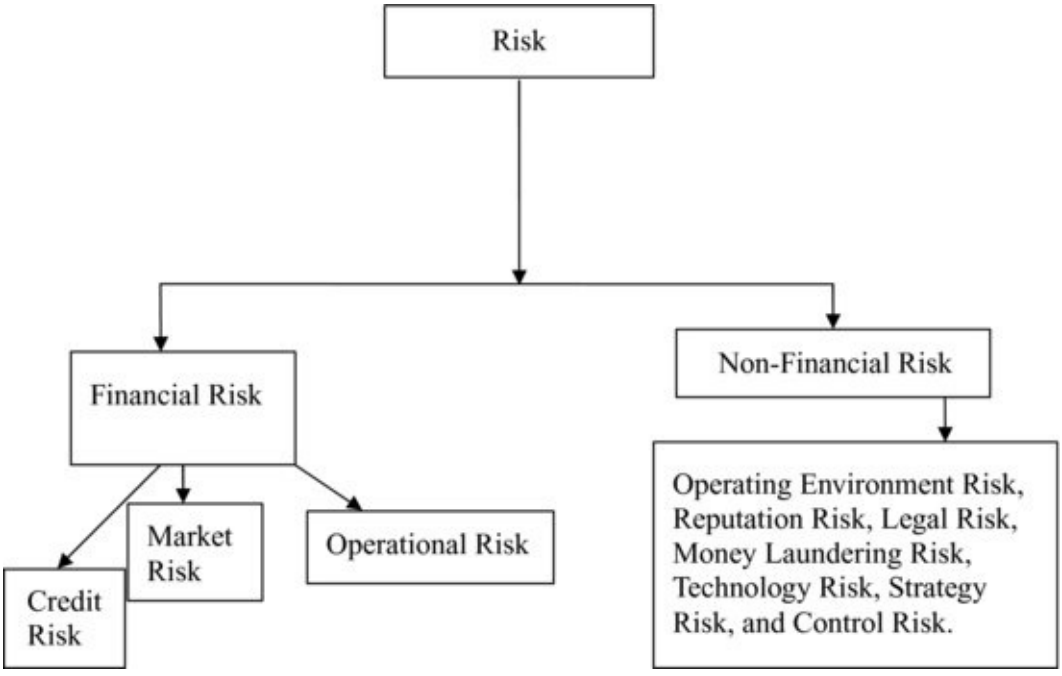
The impact of financial risks can be measured in numerical terms, while that of nonfinancial risks is most often not quantifiable. The impact of nonfinancial risks can be assessed through scenario analysis and indicated in terms of severity such as low, moderate, and high. Business risks comprise both financial and nonfinancial categories of risks, whereas control risk is only a nonfinancial risk as it impacts a bank in an indirect way. Consequently, risk management in banking is concerned with the assessment and control of both financial and

nonfinancial risks. Bank regulators and supervisors caution banks about the dangers of ignoring risks and want them to understand the implications of financial and nonfinancial risks and develop methods to assess and manage those risks.

A typical risk can occur from multiple sources. For example, credit risk occurs from loans and advances, investments, off-balance-sheet items including derivative products, and cross-border exposures. Likewise, market risk occurs from changes in the interest rate that affects banking book and trading book exposures, changes in bond/equity/commodity prices, and change in the foreign exchange rate. The boundaries between different types of risks are sometimes blurred. A loss due to shrinking credit spreads may be either credit risk loss or market risk loss. Credit risk and market risk may sometimes overlap. Capital risk and earning risk are not risks by themselves for a bank. They are the two financial parameters that absorb the ultimate loss from the materialization of risks. The minimization (or optimization) of the impact of business risk and control risk on the capital and earnings of banks is the ultimate goal of risk management.

Different types of financial and nonfinancial risks are shown in Figure 1.1.

FIGURE 1.1 Types of Risks



1.3 CREDIT RISK

What Is Credit Risk?

The Basel Committee on Banking Supervision (BCBS) has defined credit risk as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with the agreed terms.[1] Credit risk, also called default risk, arises from the uncertainty involved in repayment of the bank's dues by the counterparty on time. Credit risk has two dimensions: the possibility of default by the counterparty on the bank's credit exposure and the amount of loss that the bank may suffer when the default occurs. The default usually occurs because of inadequacy of income or failure of business. But often it may be willful, because the counterparty is unwilling to meet its obligations though it has adequate income. Credit risk also signifies a decline in the values of credit assets before default that arises from deterioration in portfolio or individual credit quality.

What Does Credit Risk Denote?

Credit risk denotes the volatility of losses on credit exposures in two forms: the loss in the value of the credit asset and the loss in the earnings from the credit. Let us assume that a bank has lent U.S. $1 million to a customer at 5 percent annual interest repayable in eight quarterly installments beginning one year after the date of the loan. The credit risk on the exposure of U.S. $1 million is denoted by a risk grade, either derived through the bank's internal model or taken from an outside rating agency. The rating assigned to the borrower will reveal the level of risk associated with the exposure, such as high risk, moderate risk, or low risk. The rating will give an idea of whether the counterparty is likely to default on its repayment obligation over the life of the loan or within some specified time horizon. The amount of loss that the bank may suffer on the exposure will have to be assessed separately through the risk measurement model. In the event of default by the counterparty to repay the amount of U.S. $1 million together with the interest on the due dates, either in part or in full, credit risk has actually materialized. It does not matter whether the default is intentional or unintentional. If the counterparty does not pay the installments at the contracted interest rate, the loss suffered by the bank will include both principal and interest. But if he or she agrees to repay the principal and requests the bank to waive the interest amount due on the loan, partly or fully, due to the inadequacy of income, loss of earning on the credit has occurred. Thus, credit risk denotes uncertainty in the recovery of the principal value of the loan and the contracted interest amount, either in part or in full.

What Is Intermediate Credit Risk?

Credit risk occurs in different intensities. The most severe is the risk of default in repayment of the principal and the interest. An intermediate credit risk occurs when the creditworthiness of the counterparty deteriorates causing a decline in the market value of the credit exposure. In such a situation, credit risk appears in the form of a rating downgrade. When the credit quality declines, credit risk may be deemed to have materialized before the occurrence of default. The extent of credit risk can be assessed from the current risk grade assigned to the exposure. In a market, where loans are traded between lending banks, deterioration in credit quality will fetch a lower amount when the asset is put up for sale. The estimated loss in the asset value before default is an intermediate form of credit risk.

What Is Country Risk?

Another element of credit risk, which arises from cross-border lending and investment, is “country risk.” The latter term denotes the possibility that a sovereign country is unable or unwilling to meet its commitments to foreign lenders. The risk is greater in countries where the economy is weak and the financial system is fragile and not well regulated. Country risk arises from exposures both to the sovereign government and the private borrowers who are resident in that country and have borrowed money from banks located in other countries. The default on obligations can arise due to the restrictions imposed by the government for conversion of domestic currency into foreign currency on account of depletion in foreign currency reserves, or it can arise from very adverse movement in the foreign currency exchange rate that increases substantially the amount repayable in domestic currency on foreign currency loans. The default can also occur due to political changes or economic policy changes. Sometimes, the government itself may renege on its liability, or the borrower located in the foreign country may refuse to repay.

1.4 MARKET RISK

What Is Market Risk?

BCBS has defined market risk as:

The risk of losses in on or off-balance-sheet positions arising from movement in market prices. The risks subject to this requirement are:

- *The risk pertaining to interest rate related instruments and equities in the trading book.*
- *Foreign exchange risk and commodities risk throughout the bank.*[2]

Market risk refers to the possibility of decline in the market values of assets or earnings that arise from changes in market variables. Market risk arises from financial transactions undertaken by banks to build up inventories of financial assets or take up positions deliberately in expectation of favorable movements in interest rates, exchange rates, and bond/equity prices to make gains. Banks may build up positions in securities and shares or off-balance-sheet items, like forward contracts in foreign exchange or futures in commodities, and so on.

1.5 OPERATIONAL RISK

What Is Operational Risk?

BCBS has defined operational risk "as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk, but excludes strategic and reputation risk."[3] Operational risk is sometimes perceived as "residual risk" and arises in almost all departments of the bank—credit department, investment and funds department, treasury, information technology department, and so on.

Causes of Operational Risk

The causes of operational risks are many, and it is difficult to prepare a complete list of the causes because sometimes the risk occurs from unknown and unexpected sources. If we are clear about the causes and sources of credit and market risks, we can understand why risks emerging from failed people, processes and systems, and from external events are grouped under operational risk. Risks from people arise on account of incompetency or wrong positioning of personnel and misuse of powers. The bank faces risks if the staff handling certain transactions do not have adequate knowledge or technical skills to handle those transactions, or the staff who are known to have doubtful honesty and integrity are placed in sensitive areas of operations, or the staff misuse their loan

sanction powers. The employees may commit fraud by themselves or in collusion with outsiders, or they can access computers without authorization and manipulate or alter data and information. In all these situations, the bank will incur financial loss from the dishonesty and irregular actions of its employees.

Process-related risks arise from possibilities of errors in information processing, data transmission, data retrieval, or inaccuracy of result or output. Process risks can occur in execution of complex transactions, such as option pricing, currency swapping, or interest rate swapping. Errors can occur in payments and settlements due to faulty processing of data or mutilation of messages and data during the processing and transmission stage that may result in excess payment. Errors can also take place in making decisions on loans and investments due to generation of faulty outputs. For example, in making decisions on large loans or investment in bonds, the risk grade of the counterparty is crucial. The rating grade assigned to a party can be erroneous due to model error or processing error. The model output may not reflect the reality of the situation. The risks arising from these types of process-related errors can be attributed to the “process” component of operational risk.

Banks depend on computer systems for smooth conduct of their operations, and the hardware and software systems that process and store huge volumes of information and data every day are highly vulnerable. Several situations arise in the course of the bank's day-to-day operations that give rise to high levels of risk. The failure of the computer system or the telecommunication system, the breakdown of automated teller machines, the hacking of the computer network by outsiders, and the programming errors are incidents that can take place any time and disrupt the bank's business. These incidents ultimately cause losses to the bank. The risks that arise from these types of incidents can be ascribed to the “systems” component of operational risk. Operational risks from external events like earthquake, flood, riot, burglary, looting, and so forth are obvious and need no elaboration.

Operational risk arises from different events and situations that take place every day in banks. The risks from these incidents, which relate to either the people or the process or the systems, cannot be clearly attributed to credit and market risks based on definitions. One cannot definitively say that these three sources of operational risk are independent of one another, and there is no interrelation among them. The more acceptable proposition is that these three elements are closely linked, and operational risk often arises as a result of their combined effects. When a bank enters into a business relationship with a client,

it is the process (procedure) prescribed in the operation manual that is applied for initiating the transaction, it is the people who do the processing for analyzing the transaction and making the decision, and it is the computer system (technology) that supports the process to deliver the service. All three sources of operational risk are intermingled, and it is sometimes difficult to pinpoint the exact source.

Awareness about Operational Risk

Historically speaking, banks have been quite familiar with operational risk events for decades. This has been evident from their eagerness to identify vulnerable areas of operations and take special measures to plug the loopholes. Banks have made sustained efforts in the past to streamline the procedures for credit and investment decisions, reduce irregularities in transaction handling, and prevent frequent occurrence of fraud. They have devoted specific attention to fraud-prone areas, like reconciliation of books of accounts and security of the computer network system. These preventive measures have been taken in response to internal and external audit findings. But there has been no systematic approach to deal with operational risk in a comprehensive manner. Bank management has not given due treatment to operational risk that they have given to credit risk and market risk. Operational risk differs from other business risks in that it is not taken for an expected return, but it is implicit in the business activities of the bank. It has high potential to inflict large losses, and omitting to recognize the risk in its entirety will distort the actual risk profile of a bank.

1.6 OPERATING ENVIRONMENT RISK

The operating environment includes the economic, political, social, legal, and regulatory environments. Banks scan the environment in which they operate and prepare business plans (annual performance budgets). Severe competition in the financial services sector makes it extremely difficult for banks to prepare realistic business plans that are achievable in the given environment. Different strategies are required for different types of clients, markets, and products. Banks run the risk of business loss due to the incompatibility of business strategy with business potential and business environment, besides technological inadequacy, lack of expertise, and delay in delivery of services.

Banks face operating environment risks that arise from changes in

macroeconomic and microeconomic factors. The business environment changes due to slower economic growth, high inflation, an adverse balance of payments situation, high interest rates, and money market and capital market restrictions. Banks also face constraints due to the sudden introduction of new regulatory and supervisory directions. High fiscal deficits, stringent regulatory restrictions, and the environmental changes that trigger movements in asset prices are some of the important factors that affect business growth and profitability. Also, the government sometimes issues directives to banks for achieving minimum lending targets in chosen sectors of the economy, like residential housing, agriculture, and small-scale industry, or preferred groups of people, like low-and middle-income people. Banks also face constraints due to the customer's preferences, limited range of innovative products, lack of geographical reach, and lack of opportunities for enlargement of market share. The degree and the duration of environment risks that a bank will face depend on its preparation and willingness to adapt to the changing environment. The sudden changes in operating environment often make it difficult for banks to reorient their business plans, and they run the risk of loss of business and earnings. In a competitive environment, the loss of business during a particular period tends to make future years more vulnerable as banks will be under pressure to achieve aggressive targets to make up for the shortfall. Formulation of medium-term business plans based on research that takes into account possible changes in the business environment with a clear focus on target clientele, target products, and target markets is crucial for managing operating environment risks effectively.

1.7 REPUTATION RISK

Reputation risk is the risk of damage to a bank's image and goodwill that occurs due to negative publicity against it or erroneous perceptions about its soundness and operational integrity. Reputation risk triggers loss of confidence in the public and sometimes creates a gigantic liquidity problem for the bank that may precipitate its failure. The bank's failure to honor commitments to the government, regulators, and the public at large impairs its reputation, but reputation risk cannot be perceived as the risk that solely arises from failure to meet liabilities. It can arise from any type of situation relating to mismanagement of the bank's affairs or nonobservance of the codes of conduct under corporate governance. Risks emerging from suppression of facts and manipulation of records and accounts also come under the ambit of reputation

risk. Bad customer service, inappropriate behavior of the staff, and delay in decisions create a bad image of the bank among the public and hamper development of business. Loss of reputation may also arise due to the action of a third party, which may be beyond the control of the bank. The management's failure to be cognizant of the events that damage the bank's reputation and to take remedial actions in time may lead to erosion of its standing in the market.

The occurrence of events that generate negative opinion about the bank or the publicity of some secret transactions or affairs of the bank by the media that questions the management's integrity involves great reputation risk. For instance, the delay or refusal to honor commitments promptly under a financial guarantee issued by the bank to the beneficiary, which has been invoked, creates doubts about the bank's intentions to follow established banking practices. Such events may lead to situations where financial guarantees issued by the bank may not be accepted by others. Customers’ perceptions, shareholders’ perceptions, and regulators’ perceptions about a bank are the bases that help in detecting the flaws that give rise to reputation risk. The gossip in the market about a large fraud that has taken place or a large loan that has become nonperforming too soon after disbursal of funds creates bad impression about the integrity of the management. Banks are highly vulnerable to negative publicity that can cause loss of existing and future business. Loss of reputation may force certain valued customers to discontinue their relationship with the bank. Reputation risk, though nonfinancial in nature, has the potential to cause loss to the bank in an indirect way.

1.8 LEGAL RISK

Legal risk is the risk of financial loss that arises from uncertainty of outcomes of legal suits filed by the bank in a court of law or from legal actions taken against it by third parties. Legal risk arises due to errors in application or interpretation of laws or omissions to perform obligations under the laws. Banking transactions involve contracts between the bank and the customers, which can become unenforceable due to defects in their execution, or which can be challenged in a court of law if one of the parties is ineligible to enter into transactions or negotiations. The agreement can become unenforceable due to deficient documentation or invalid charges on collateral. Even unforeseen circumstances may invalidate a contract. Inappropriate or incomplete documentation or defects in contractual agreements between the bank and the customers and between the

bank and the vendors (on outsourcing arrangements) are the principal reasons that cause legal risk.

Banks also face legal risk as their actions can be challenged in a court of law on the ground that the actions are not in conformity with the banking laws or other laws of the country. They can face legal suits initiated by customers, third parties, and service providers for redress of their grievances or settlement of their disputes arising from nebulous issues. The customers can accuse banks of negligence in handling their business or in taking unilateral action that has been detrimental to the interest of their business. Legal risk also arises in cross-border transactions when the applicable laws of other countries are unknown or unclear, or when jurisdictional ambiguities arise in identification of responsibilities of different national authorities.

1.9 MONEY LAUNDERING RISK

Money laundering risk arises from the bank's failure to comply with domestic and international anti–money laundering laws and regulations, including those of other countries in which the bank has its branch offices or affiliated units. Money laundering is the criminal practice of converting illegal sources of money through a series of transactions that look like genuine transactions into a pool of genuine proceeds, which are utilized for illegal and criminal purposes. Financial sector supervisors face several challenges to ensure that financial service providers are not used as intermediaries for the deposit or transfer of illegal money derived from criminal activities.

Money launderers usually generate funds at their country of residence through tax evasion, drug trafficking, illegal arms dealing, and the like, and then transfer those funds to other dummy accounts at foreign centers or invest them in financial instruments to give a legitimate appearance. They use that money for business at foreign centers to generate more illegal income in disguised names or to carry out criminal and terrorist activities. They utilize many tricks to conceal the transfer of money, like selling property or other assets to dummy entities owned by them against deferred payments which are never settled, or remitting money for payment of goods and services by creating fictitious invoices, or making false claims as deductible expenses for payments made to their dummy entities toward rentals and depreciation on fictitious machinery and equipment, or depositing checks payable to dummy entities for collection by a bank at tax haven. Likewise, money launderers utilize a variety of methods to repatriate

funds at chosen places, such as taking loans from fictitious parties at offshore centers or utilizing deposit receipt of offshore funds as collateral for borrowing money at their place of operation, or utilizing credit and debit cards issued by offshore banks on their accounts.

Reliable estimates of the amount of money laundering are not available, but it is believed to be in trillions of U.S. dollars. Money laundering is posing a significant threat to individual financial institutions and the global financial system, and the threat is more from parties operating at offshore banking centers and tax havens. The bank faces reputation risk because its failure to detect money laundering affects its integrity, the volume of cross-border business, and its international standing.

Compliance with anti–money laundering laws is complicated because the chances of unintentional mistakes in detecting money laundering activities are high. First, no certain definition exists regarding the types of financial transactions that are considered money laundering, because countries are free to determine what constitutes illegal sources of money, and also, banks cannot track the actual sources of money. Second, banks find it difficult to comply with the bank regulators' directives to segregate transactions of individual values above certain specified limits and screen them to detect the suspicious ones, because the unscrupulous customers either break large transaction into multiple transactions of individual values below the specified limit or open and operate multiple accounts in different fictitious names to escape from scrutiny by bank officials. Bank staff find it difficult to trace money laundering transactions as they handle large volumes of transactions during the day, though they may have received training on “Know Your Customer” principles and the controls are in place to monitor operations in accounts. Third, there is a conflict of interest between the bank's obligation to maintain the secrecy of customers’ accounts under the Bank Secrecy Act and its responsibility to report transactions involving suspicious activities under the anti–money laundering laws. Banks face the risk of reporting genuine transactions as suspicious and, in the process, breaching the contract to preserve the secrecy of customers' accounts.

The consequences of banks' failure to detect and report suspicious transactions to the supervisory authorities under the anti–money laundering laws are very severe in certain countries. The individual bank employees are subject to termination of service, criminal conviction in a court of law, and imprisonment, if evidence of money laundering is established. Banks themselves are liable to pay a high monetary penalty imposed by the supervisory authorities, and the

collateral, the personal property, and even the genuine deposit accounts of customers are subject to forfeiture, if they have any linkage with money laundering activities. If bank officials detect money laundering attempts by customers, they should be cautious in sanctioning loans against the security of risk-free assets, like high cash margin or mortgage of properties, if the sources of acquisition of cash or other assets by the customers are unknown.

1.10 OFFSHORE BANKING RISK

Banks face risks from their own clients engaged in offshore banking and from other counterparties operating in offshore banking centers. Most of the offshore banking centers are also tax havens, and financial institutions operating in tax havens are highly protected through bank secrecy laws. Customers may have a genuine need for offshore banking accounts because of better investment opportunities and low taxation, but many customers deal in offshore centers to conceal money earned through illegal sources or to store money for illegal activities. Customers do not disclose their financial dealings and income earned in offshore centers to their home country tax authorities. Many customers prefer tax havens because of the low or negligible level of taxes applicable in those areas, and because sources of funds are not questioned nor operations in their accounts appropriately supervised. Offshore banking centers provide all types of banking services including conversion of local currency into foreign currency, and their operations have become voluminous as multinational corporations set up trusts and subsidiaries in those jurisdictions to hold and manage assets to reduce tax burdens or evade specific taxes. Most authorities apply the following four criteria to identify tax havens:

1. The center offers exemption from taxes or imposes negligible tax.

2. The center offers protection against disclosure of personal information and transactions.

3. The legal and administrative provisions are not transparent.

4. The exchange of information with foreign tax and bank supervisory authorities is either absent or ineffective.

Offshore banking has assumed enormous significance in the international financial system because large amount of assets, believed to be in the region of U.S. $5 trillion, are held in offshore tax havens, but at the same time it has become a source of threat to international financial stability. The regulation and

supervision of financial institutions at many tax havens are very weak, and consequently, the risk from offshore counterparties remains hidden. Customers divert income and evade their tax obligations by opening bank accounts at offshore centers and later withdraw those monies through debit or credit cards. Banks face credit risk, money laundering risk, and reputation risk from their clients because the national authorities could prosecute the clients for tax avoidance or involvement in criminal activities through offshore accounts.

Money launderers usually choose offshore banking centers or tax havens to park their illegal money by establishing trusts, corporations, subsidiaries, investment companies, or insurance companies under fictitious names, because the chances of detection of money laundering activity are very low in those centers due to weak anti–money laundering laws and lax implementation. Bank secrecy provisions vary between locations, and people usually choose those locations that offer maximum protection against disclosure of information.

1.11 IMPACT OF RISK

Different types of risks impact the banks with different intensities. Each broad category of risk, like credit, market, and operational risks, impacts the bank through a number of risk factors, and the impact is ultimately reflected through capital loss, revenue loss, and decline in asset values. The impact of financial and nonfinancial risks is shown in Figures 1.2 and 1.3.

FIGURE 1.2 Impact of Financial Risk

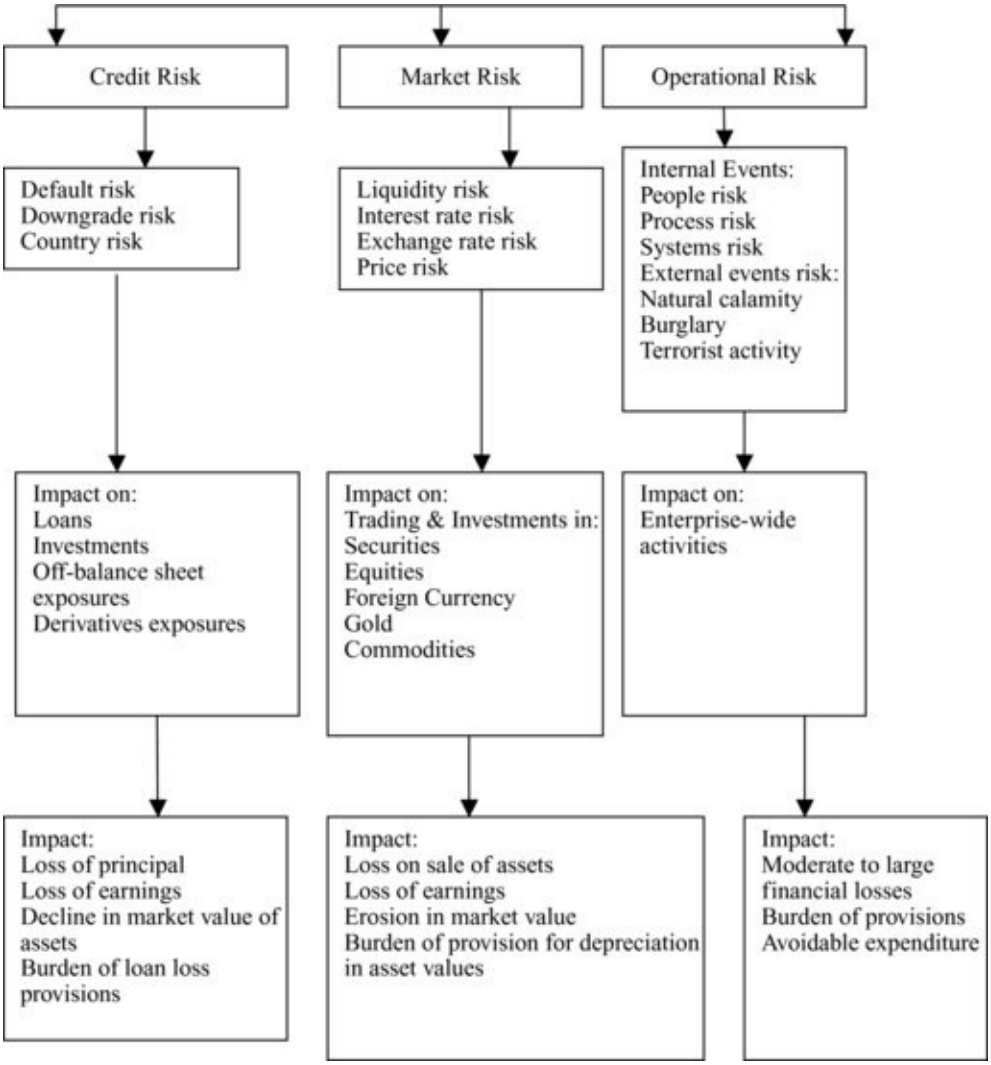
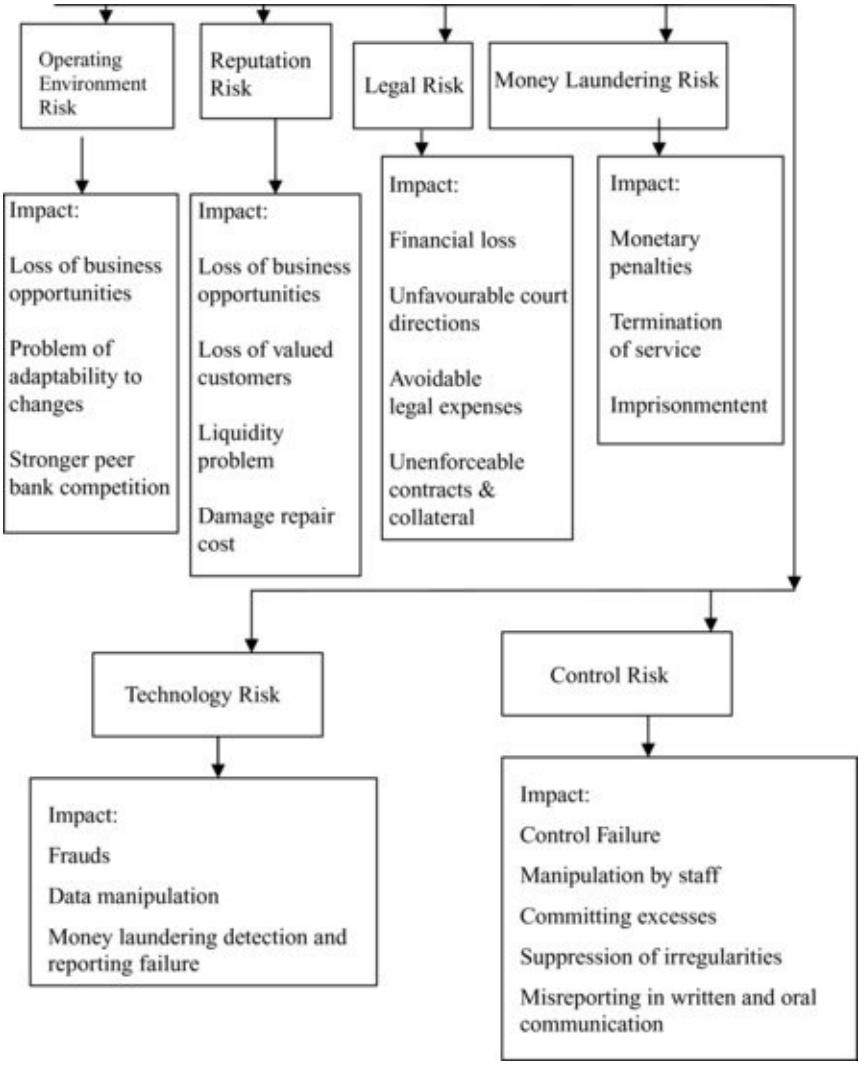


FIGURE 1.3 Impact of Nonfinancial Risk



1.12 SUMMARY

Risk in banking refers to the loss that may occur to a bank on account of some events happening. Risk signifies potential loss and is primarily embedded in financial transactions, though it can arise from other operational events.

Banks face business risk and control risk. Credit, market, and operational risks are the three major business risks and cause erosion in asset values and earnings. Control risk refers to the inadequacy or failure of control to check the intensity of business risk and influences the quantum of loss that arises from business risks.

Risks can be classified into financial and nonfinancial risks. Credit, market, and operational risks are financial risks, while operating environment risk, reputation risk, legal risk, money laundering risk, technology risk, strategy risk,

and control risk are nonfinancial risks. Financial risks inflict loss directly, and nonfinancial risks cause loss of income in an indirect manner, besides avoidable expenditure. The impact of financial risks is measured in numerical terms, while that of nonfinancial risks is indicated in terms of severity, such as low, moderate, high, and extremely high.

Credit risk is the risk of default by the counterparty and the potential loss that can occur from the default. Market risk is the risk of decline in asset values or erosion in earnings that may arise from changes in market variables. Operational risk is the risk of potential loss that may occur from adverse events associated with people, internal processes and systems, and external events. Operational risk is taken, not for an expected return; it is implicit in the ordinary course of corporate activities.

Operating environment risk causes loss of business from changes in the operating environment, and reputation risk leads to flight of deposit money and business due to negative publicity against the bank. Legal risk arises from errors in application or interpretation of laws and regulations and not performing contractual or legal obligations that may involve payment of claims under court decrees. Money laundering risk arises from breach of anti–money laundering laws and rules that may result in criminal conviction and payment of a penalty.

NOTES

1. Principles for the Management of Credit Risk, BCBS, September 2000.
2. Basel Committee on Banking Supervision (BCBS), “International Convergence of Capital Measurement and Capital Standards: A Revised Framework— Comprehensive Version,” June 2006 (New Basel Capital Accord), paragraph 683(i).
3. New Basel Capital Accord, paragraph 644.

CHAPTER 2

Control Risk in Banking

2.1 HOW CONTROL RISK ARISES

Banks are susceptible to control risk because of the inadequacy of their control framework and the possibility of human failure in the application of control. Human failure may occur due to the lack of knowledge about the products and the business process. Control risk arises because of negligence in the application of control or because of complicity and compromise with the business principles and rules. Controls are predesigned checks to prevent occurrence of errors, slippages, and excesses in conducting the bank's business. But risks may emerge from unknown and unanticipated events, for which the control framework may sometimes fall short of the requirements. It is perhaps not possible to visualize every possible way in which risks can occur and then set up an elaborate control framework to respond to any risk event, because certain types of events rarely happen. Control managers must be able sense the dangers and set up a temporary monitoring mechanism as long as fears from such dangers persist. The alertness and the sincerity of individuals who are responsible for the application of control are more important than the elaborateness and the niceties of the control procedures. The impact of control risk is high, and therefore, a bank cannot but have a foolproof control system.

2.2 EXTERNAL CONTROL AND INTERNAL CONTROL RISKS

Banks are subjected to two types of control: external and internal controls. External control is exercised by the financial sector regulators and internal control by the bank's own management. External control seeks to reduce vulnerability and promote soundness and stability of the financial system. The primary responsibility of the bank supervisor is to protect the interest of the depositors and small investors and ensure the financial soundness and solvency

of each bank. To achieve this objective, the supervisor exercises control over banks and other financial institutions through the banking/financial services regulation acts. Broadly, capital adequacy, management quality, operational policies, risk management practices and procedures, asset classification and provisioning, accounting quality, transparency, and disclosure come under the ambit of external control.

Banks are prone to external control risk from two angles: first, from the deficiencies in regulatory and supervisory controls, and second, from their own failure to comply with the regulatory and supervisory directives. The weakness in regulatory and supervisory oversight may generate a sense of complacency in the bank management about the soundness of operations. A lenient regulatory environment and prolonged supervisory deficiency encourage banks to undertake economic activities or financial transactions that are beyond their risk-bearing capacity. Sooner or later, the bank's asset quality deteriorates, defaults multiply, and losses surface, which ultimately leads to its insolvency. The Asian financial crisis of the 1990s and the United States’ financial crisis of 2007 bear testimony to this phenomenon.

In the opposite way, the bank's failure to comply with the supervisory directives may result in the imposition of penalties or initiation of discriminatory action against it. For example, if the bank is not able to achieve the milestone laid down under the supervisor's prompt corrective action framework, it may face discriminatory action like an increase in the capital adequacy ratio, a halt to expansion of branch offices, shredding of uneconomical activities, a ceiling on dividend payouts, reconstitution of the board of directors, and so on. These actions of the bank regulator and supervisor affect the bank's business and growth, albeit slowly. On the other hand, deficiency in internal control produces an impact on the bank faster and with greater intensity. Internal control, which is management driven, is designed to monitor transactions, business activities, and the performance of each individual within the organization. It protects the integrity of operational procedures and checks the justification of actions. Laxity in the application of internal control enhances business risks and results in large financial losses, which are usually borne out of the current year's revenues. Weak control depresses the bank's profits and reduces the market value of equity.

The internal control framework in banks is a part of the overall risk management system and seeks to minimize the impact of credit, market, and operational risks and other residual risks. Honesty in the application of control is essential to keep the risks within limits and prevent financial mishaps. Sound

internal control procedures protect the long-term financial solvency of a bank and, consequently, the seriousness of the management to protect the sanctity of control becomes crucial to manage risks.

2.3 INTERNAL CONTROL OBJECTIVES

Internal control is a process that seeks to achieve operational efficiency, reliability of reporting, and compliance with rules, and to promote the soundness of the bank's operations and financial solvency. It is a continuous process, and it concerns personnel at all levels within the organization. The primary objective of internal control is to ensure compliance by the operating staff with the bank's rules, policies, and procedures and in the process, mitigate and contain risks. The aim is to monitor the level of risk in relation to the risk appetite of the bank and ensure that the business is conducted within specified risk limits and the risk of asset loss or revenue loss is minimized. Consequently, compliance is the most significant element of the control process. The internal control activities are designed to assure the management that the bank complies with the rules and regulations prescribed under the Banking Regulation Act and other applicable laws.

Another objective of internal control is to evaluate the performance efficiency of the operating personnel to achieve business targets, utilize resources efficiently, and economize costs. The objective also includes reporting and review of all business activities and transactions, compatibility of products and services, and working of affiliated units for timely remedial action. Internal controls are established to keep the bank on its defined course toward the achievement of its goals and, in the process, minimize the pitfalls and the surprise outcomes that come along the way. The effectiveness lies in the serious application of the control process as and when transactions are executed or activities are performed. The internal control procedures are vulnerable and, consequently, control risk is a high-risk factor. Several banks in many countries have suffered substantial losses or become insolvent due to the breakdown of internal control or laxity in the application of control.

2.4 INTERNAL CONTROL FRAMEWORK

Customization of the Control Framework

It is difficult to envisage an ideal design of an internal control framework, because different banks carry out different types of financial activities and use different products. Most banks undertake core banking functions, like granting credit, investing in securities, issuing guarantees and letters of credit, and trading in foreign exchange and derivative products, and yet some of them specialize in investment banking and merchant banking or financing residential houses and commercial real estate. Financial conglomerates have a banking arm that provides all kinds of banking services, a securities arm that deals in sovereign securities and corporate bonds and equities, and an insurance arm that provides life insurance and general insurance services. Trading in securities, foreign exchange, gold, and commodities is highly speculative, and dealing in derivative products is relatively more complex. Consequently, there cannot be a preconceived design of the internal control setup, based on a “one design suits all” approach. The design should conform to the specific requirements of a bank and be in alignment with the functions and activities. The control should be activity-specific and transaction-specific. The design of control should encompass all business activities and the entire range of products and services, and it should cover all locations where the bank carries out its operations, either directly or through affiliated units.

In harmony with the objectives of internal control, the design of control framework in a bank should include techniques and procedures to address three primary elements of control: control over performance, control over reporting, and control over compliance. First, the framework should include methodology for evaluation of performance, activity-wise or business line–wise, at different points of time. The framework must establish criteria and specify norms to assess whether the personnel within the organization are working with sincerity and integrity to achieve business targets with operational efficiency. Second, the control framework should include activity-wise and transaction-wise formats to report to the monitoring and review personnel all information and data on the business conducted by the operating personnel within a prescribed time. Besides transaction and customer data, the control mechanism should include provision for periodic reporting by the respective business line heads on the allocated budgets, performance, and other material developments. Third, the control framework should evaluate the quality and the comprehensiveness of compliance, and monitor to make sure that transactions, activities, and products

are processed and delivered in accordance with prescribed rules and procedures. The framework should have a built-in surveillance system to ensure that the business is undertaken in accordance with internal rules, regulatory directives, and applicable laws. Control methods should be such that they promptly identify and report the breach of rules and regulations and other operational irregularities. The framework should include the procedure for fixing accountability.

The size, the activities, the business strategy, the product range and complexity, and the business volume determine the design of the internal control framework. The design also depends on the span and the intensity of control the bank management intends to have in each area of operation. The control must be rigorous in respect to material activities that carry high risk and have potential to inflict large losses. The control framework will be broad if the bank has a large geographical spread of operations and also a few affiliated units that undertake different types of financial services, like real estate finance, securities trading, and an insurance business. The design should specify the functional head who will be responsible for exercise of controls. Besides the internal audit department, business heads and line managers are responsible for monitoring and controlling the activities that take place in their respective areas.

Types of Control

Controls are designed primarily to detect irregularities in transaction bookings, deviations from procedures, transgression of authorized limits, and exceptions made without merit or authorization. Control activities begin with the commencement of relations with a customer and end with the closure of that relationship. Sometimes, control activities continue even after the termination of a customer relationship. For example, banks continue to track the affairs of a customer whose loan account has been written off on grounds of business failure and lack of income, to verify that the representations made by him for waiving the repayment were true and the prospects of further recovery really did not exist.

It is necessary to make an objective assessment of the risks and threats to which the bank is exposed and then put in place various types of control activities. Every control activity must be linked to an objective that it is going to achieve. For example, if the objective is to judge the performance efficiency of a business line head, control is exercised through a review of the business report from the business head that depicts achievement of business targets, describes

emerging risks from the business line, identifies threats, and specifies steps taken to control risks and overcome future challenges. The control framework should include pretransaction, posttransaction, preventive, detective, and corrective controls.

The following section describes various types of control that a bank should have, but it does not deal with the preventive and detective controls relating to electronic banking. For this purpose, banks should introduce laser-printed checks; incorporate safe procedures for the automatic log-in and log-off system for Internet banking; introduce appropriate systems and checks for use of debit, credit, and smart cards and automatic linkage with customer accounts; and establish authorization procedures for mobile phone banking. In addition, they should install the latest equipment to count cash and detect fake currencies and fraudulent alteration in checks. The following section deals with broader forms of control that are designed to take care of prudential requirements, direct the bank's operations toward a safer course, and abide by the corporate governance codes and practices.

Pretransaction Controls

Pretransaction controls refer to the business standards, rules, and procedures that must be prescribed by the bank to ensure that transactions are booked on their merits and in compliance with banking practices and banking regulations. The controls should achieve two objectives. First, an appropriate due diligence process must be followed to ensure the quality of an asset and the justification for taking on a liability. Second, the transaction does not infringe the applicable laws and the bank regulator's directives. A few examples of pretransaction controls are given in Table 2.1.

TABLE 2.1 Pretransaction Control Activity

Type of Control Activity	Objectives
1. To follow the “Know Your Customer” principle before establishing a transaction relationship with the customer. **2.** To keep on record the photograph, address, and other details of the customer.	**1.** To comply with anti–money laundering laws and rules. **2.** To establish that the new customer is fit and proper to deal with the bank and engage in financial transactions. **3.** To establish the identity of the customer.
To undertake a rigorous due diligence process for loan sanctions.	**1.** To ensure that the need for a loan is genuine and the purpose is legal. **2.** To establish that the borrower's business/project is technically feasible and financially viable.
To adhere to specified entry-point risk ratings of counterparties for	To reject credit/investment proposals that do not

granting credit lines or purchasing bonds.	fall within the bank's risk appetite.
To limit the size of the transaction up to a specified amount and the bank's exposure under different circumstances.	To contain risk exposure and avoid large losses if risk materializes.
To put in place a system that ensures that large and significantly large exposures are sanctioned by a committee of senior executives instead of by an individual.	**1.** To maintain neutrality and transparency in large exposure dealings. **2.** To take the benefit of collective wisdom to maintain the quality of large-value exposures.

Posttransaction Controls

Posttransaction controls refer to the rules and procedures that must be set up to ensure appropriate funds utilization; monitor and protect asset quality; verify the merits, genuineness, terms, and conditions of transactions; take corrective actions in time; and contain financial losses if risks ultimately materialize. A few examples of posttransaction controls are given in Table 2.2.

TABLE 2.2 Posttransaction Control Activity

Type of Control Activity	Objectives
To obtain appropriate documents and agreements before disbursement of funds.	To ensure enforceability of the bank's right to recover debts.
To make direct payments to suppliers of goods and services under sanctioned loan limits.	To ensure end-use of funds since diversion of funds for other purposes impairs loan repaying capacity of borrowers.
To conduct periodic visits to borrowers' factory/business premises, particularly in respect to medium and large exposures.	**1.** To verify that the borrowers are continuing with their manufacturing/business activities and the collateral charged to the bank is secure. **2.** To ensure that the prospects of recovery of loans remain unimpaired.
To conduct quarterly scrutiny of the borrower's business activities, financial condition, and status of operations in short-term renewable accounts, particularly medium-and large-value accounts.	**1.** To keep track of the health of loans and advance accounts. **2.** To detect early warning signals for remedial action before the accounts reach the stage of default.
To accept specified collateral and manage it properly as per prescribed policy.	**1.** To accept easily marketable collateral. **2.** To revalue collateral frequently and seek additional cover in case of a shortfall in value. **3.** To physically verify collateral from time to time.
To submit hourly reports to the middle office by the front office/dealers in the treasury department on trading details and trading position of securities and foreign currency transactions.	**1.** To verify that all transactions are carried out at prevailing market rates. **2.** To verify that dealers are adhering to deal size limits and position limits.
To mark to market securities and foreign currencies for valuation on a real-time basis and apply a stop-loss limit to dispose of them in time.	To contain losses to the bank under volatile or unstable market conditions.
To carry out frequent scrutiny of depositors' and borrowers' accounts to detect suspicious transactions.	**1.** To prevent money laundering. **2.** To prevent diversion of funds for unauthorized purposes (e.g., funds meant to meet manufacturing expenses being diverted to the equity market).

Preventive Controls

Preventive controls relate to the rules and procedures that must be established to avoid errors and fraud and to check for skipping of procedures and dereliction of duties and responsibilities. Preventive controls are put in place to check for loss of cash and other valuables; to bar unauthorized access to the bank's computer system, vaults, and storerooms; and to prevent manipulation of account books. Preventive controls also cover activities that are designed to avert thefts, burglaries, and looting and thwart attempts to indulge in malicious acts against the bank that will cause loss.

A few examples of preventive controls are given in Table 2.3.

TABLE 2.3 Preventive Control Activity

Type of Control Activity	Objectives
To document and print procedures/manual of instructions for transaction processing and communicate them to operating staff.	**1.** To follow standardized procedures to safeguard the bank's interests. **2.** To make up for deficiency in knowledge about products and methods to process transactions. **3.** To prevent errors in executing transactions.
To prescribe procedures for authorization of transactions, particularly where excesses have been allowed and exceptions made by dealing officials.	**1.** To adhere to transparent criteria that secure the bank's interest. **2.** To prevent manipulation and motivated dealings for personal gain.
To reject exposures beyond a specific maturity period.	To avoid financing longer term assets with shorter term funds to contain liquidity risk and interest rate risk.
To fix criteria for job rotation, positioning of staff at sensitive points, and segregation of duties and responsibilities between operational staff and control staff.	**1.** To prevent development of vested interests in dealings with customers. **2.** To ensure that sensitive positions are held by persons of high integrity. **3.** To avoid conflicts of interest in allocation of duties. **4.** To eliminate scope for engaging in unauthorized transactions beyond prescribed limits or booking transactions for personal gain. **5.** To facilitate fixing of accountability.
To carry out periodic verification and surprise checks of cash, valuables, blank checkbooks, draft forms, stationery, and dead stock by officials unconnected with the handling of those items.	**1.** To track loss of cash and valuables in time and the extent of shortages, if any. **2.** To keep the handling staff on alert about the safe custody of articles to prevent others from committing thefts and fraud. **3.** To prevent the occurrence of events that may impair the bank's reputation. **4.** To fix accountability in cases of discrepancies and procedure violations.
To segregate accounts reconciliation duties from accounts handling duties.	**1.** To prevent manipulation of accounts to commit fraud. **2.** To ensure that books of accounts reflect the correct position of asset– liability items. **3.** To prevent interpolation of fictitious entries in account books to balance unreconciled positions.
To allow only designated officials to make payments to meet claims against the bank and raise debits in suspense	To prevent misappropriation of the bank's funds through fraudulent means. To establish the authenticity of claims

accounts.	against the bank.
To store at a different and safe place backup of customer accounts–related records.	To restore operations when original records are stolen, destroyed or damaged.
To prepare a blueprint of business continuity plans and undertake mock trials to meet emergency situations.	To resume banking operations in the event of natural calamities, terrorist activities, or breakdown in utility services.

Detective and Corrective Controls

Detective and corrective controls relate to control over reporting, screening, and review of the bank's operations in different areas. These controls are employed primarily to detect unauthorized transactions, errors, irregularities and fraud, omissions of material facts in financial reporting, and the like, which have caused loss to the bank or contain the potential to cause loss in the future. The detective and corrective controls also cover periodic review of different activities, and in particular, the asset–liability position that has the potential to generate different forms of market risk.

A few examples of detective and corrective controls are given in Table 2.4.

TABLE 2.4 Detective and Corrective Control Activity

Type of Control Activity	Objectives
To submit monthly reports to the controlling authority on related party lending.	**1.** To assess the quantity and quality of related party lending. **2.** To detect lack of due diligence in granting related party credit and allowing concessions in terms and conditions.
To submit a statement of loans sanctioned under the discretionary financial powers to the controlling authority at prescribed intervals.	To detect misuse of discretionary powers for personal benefit.
To submit to the competent authority the ratings assigned to borrowers under the internal model.	To detect errors in ratings and assignment of motivated/biased ratings.
To submit to the designated authority the material findings of internal audit, particularly inadequacies in systems and control, breaches of procedural requirements, and irregularities in transaction bookings.	To improve upon systems and procedures to prevent recurrence of irregularities in the future, initiate punitive actions, and introduce new types of controls or enhance existing controls.
To submit reports on the results of back-testing of internal models on counterparty ratings and risk measurement.	To revise and modify models to capture realistic situations.
To submit to the competent authority at monthly intervals the details of expenditure incurred under discretionary powers for the upkeep of office premises.	To verify the authenticity of work done and the reasonableness of expenditures.

2.5 TASKS IN ESTABLISHING A CONTROL FRAMEWORK

Assessing the Work Environment

The work environment in an organization influences the design of the control framework. Every organization has its own work culture and typical ways of functioning, besides the codes of conduct. The work culture and the employees' attitude toward the organization and its management throw up signals that make it possible to judge whether the employees are safety conscious and significantly rule abiding in their dealings, or indifferent about the organization and its future. In many organizations, the employees hold the view that it is exclusively the prerogative of the management to think about the organization's future, and they have no role to play in it. It is this scenario that gives hints about how much rigorous the control framework has to be. The congeniality of the working environment is visible from the management's commitment to uphold the sanctity of control, their seriousness in taking a view on the breach of rules and procedures, and their sincerity in maintaining neutrality and transparency of penal actions for violation of rules. The environment includes the management's philosophy of governance, their style of functioning, and their concern for the employees.

In banks, the boundary and the materiality of delegated financial and administrative powers are important elements of the work environment. The designers of a control framework should be cognizant of the prevailing environment in an organization and recommend a structure that will protect the principles and the purposes of control. Besides containing and mitigating business risks, the framework should include elements that promote high standards of ethics and integrity in the discharge of duties and inculcate in the staff a sense of belonging to the organization. The aim in establishing a network of controls is to develop a strong control culture within the organization and enhance control consciousness among the management and the employees.

Scanning Risk Assessment Tools and Techniques

The design of the control framework should take into account the bank's risk appetite and the risk profile. Control is a response to the risk events that are likely to surface during the course of the bank's business. It is necessary to scan the risk assessment methodology and the tools and techniques adopted by the bank to identify, capture, and measure enterprise-wide risk in order to determine what types of controls are required to ensure that the systems and procedures are foolproof and working efficiently. The risk identification process, which is a part

of the control system, should capture all types of risks faced by a bank. Underassessing risk or omitting to identify risk are fraught with serious financial consequences if the underassessed or unidentified risks suddenly emerge. The control framework should have in-built procedures to detect omissions in recognizing risks from all sources and to assess their materiality and their likely impact. The control process should have a mechanism to capture the level and the amount of risk arising from business deals entered into with the clients and relay them to the risk aggregation desk. If the control system fails to identify and report risks in certain transactions or activities, the loss that may arise from the risks remains hidden. It is therefore necessary that the bank evaluate the internal control process at periodic intervals to find out the gaps.

It is sometimes difficult to identify and capture all the risks for risk aggregation, because there are sometimes multiple risks that emerge from one single transaction. For example, a bank faces at least four types of risks when it invests in corporate bonds in domestic currency. The first is the interest rate risk, which may cause erosion in the market value of the bonds, and the second is the credit risk, which may lead to default in repayment of the principal when the bonds mature for payment. The third element is the earnings risk, which may result from the counterparty's failure to pay periodic interest due on the bonds. And the fourth element is the liquidity risk as the stream of payments due on the bonds during the nondefault state will cease to be received in the event of default and will create a liquidity gap to the extent of the amount receivable. The control process should therefore capture all four elements of risks in this single transaction, so that an appropriate response can be included in the control structure to deal with each of these uncertainties.

The macroeconomic and microeconomic factors in an economy are constantly undergoing changes that affect a bank's operating environment. An ideal control framework should caution the bank in advance about the impending dangers that can arise from external factors. The control procedure should identify the types of risks that might emerge from the likely changes in economy-related factors and assess the resultant impact on the bank. The assessment process should diagnose which risks are controllable and which are relatively difficult to manage. This will facilitate expansion of business in relatively safer areas and reduction or withdrawal of business in areas where risk levels are likely to increase.

Besides risk identification procedures, the control framework should cover the risk measurement process. Critical elements that influence the credit risk

measurement process are the risk rating assigned to the borrowers and the integrity of data used to measure expected and unexpected losses. Likewise, the reliability of data and information used to measure market risk and operational risk are also crucial for assessing capital adequacy and allocating capital. The control framework shall specify the procedures to check the accuracy of data, information, and assumptions as and when these are fed into the computer system.

In designing the control framework it is necessary for banks to do a cost-benefit analysis of the control activity. Submission of returns and statements by branch office managers, regional office heads, and other operational personnel is a part of the control framework. The cost involved in capturing the data and information and in processing and scrutinizing those data and spending time on probable actions is quite high. In banks, it is usual to call for large number of returns and statements from the field offices at different times and scrutinize them as a part of the control responsibility. But many of these returns and statements are superfluous and insignificant. It is therefore beneficial to have an optimal control structure that excludes those elements of control that offer insignificant benefits. The bank has to be cognizant of the cost involved in running different streams of controls and assess their utility.

Determining the Control Application Field

The field for application of control is vast in banking institutions. The control structure must cover at least those areas that are critical from the viewpoint of a sound corporate governance system. Important areas in which controls must exist are:

- Approvals.
- Authorizations.
- Verifications.
- Accounting and reconciliation.
- Security and safe custody of documents, valuables, and assets.
- Business line activities.
- Employee activities.
- Financial reporting.
- Segregation of duties and responsibilities.

Identifying Elements of Control

Control refers to the sequence of actions needed to contain, mitigate, or avoid risks. The control structure comprises three layers of control and three stages of application of control. The first layer of control consists of policies, strategies, and limits, including rules and procedures for conduct of business. These include standards and benchmarks that assist in managing risks associated with transactions and portfolios. The second layer of control consists of reporting formats and returns that monitor compliance and detect in time the assumption of risks that are not in conformity with the risk management philosophy and the risk appetite of the bank. The intention is to alert the field officials and the business line heads when they are about to reach the risk limits or exceed them, and caution them when they attempt to skip over prescribed rules and procedures. And the third layer of control consists of the methodology for processing and scrutinizing data and information reported in the periodic returns or relayed to the higher authorities through the computer network system. The purpose is to identify breaches of prescribed limits and departures from procedures, besides identification of adverse features that are developing in different areas of the bank's operations for initiating preventive actions.

Once the control parameters have been set up, it is necessary to follow an appropriate sequence of actions for control application. The first stage of control application relates to the verification of the process for execution of transactions. The objective is to verify whether the officials have observed the due diligence process and complied with the prescribed limits and procedures. The second stage relates to the examination of reporting details by the operating personnel from the angle of accuracy and comprehensiveness. The intention is to ensure that integrity and honesty are maintained in reporting, and that manipulation of information and deliberate omission of unauthorized transactions do not take place. The third stage is the comprehensive review of procedural irregularities, breach of rules, and unauthorized actions. The purpose is to commence prompt corrective action for protecting business interests and, at the same time, initiate penal actions for committing offences.

A sound verification process is an integral part of the control system since it aims at certifying compliance with the rules and regulations. Banks need to protect the sanctity of the verification process by setting up an impartial and independent internal audit function, besides verification by the external auditor. Another aspect of the internal control structure is the preparation of blueprints for assignment of responsibilities and allotment of duties between individuals to avoid conflicts of interest between the operational function and the reporting and

control function. The sphere of action in this regard is to identify the vulnerable and sensitive areas of operation and split the duties between more than one individual, if it appears that there is scope for manipulation of transactions and data, or concealment of unauthorized actions.

Strengthening the Control Foundation

a. Enhancing Communication Efficiency

Information capture and communication are the basic requirements for efficient functioning of the control system. The bank must set up a two-way communication system that involves transmission of messages to the field staff and receipt of information and suggestions from them. There must be appropriate checks on communication, since incorrect and unauthorized communication may create problems. For establishing a meaningful communication system within the organization, it is necessary to determine: (1) what type of data and information are required in different areas of operations to exercise control, (2) at what interval the data and information are required, and (3) what methods are to be used to effectively communicate them to the personnel within the organization. It is essential that appropriate and relevant data and information are identified, captured, and communicated in a structured format to the personnel responsible for monitoring and control. Employees should receive a clear message from the top management about their control responsibilities and the possible administrative action arising from negligence and dereliction of duties. Likewise, the field and operational personnel should have authorization and means of conveying significant information and adverse developments to the relevant authorities within the organization. Besides internal communication, control on communication with outside parties is equally important. External communication carries more risk, because an unwanted and incorrect communication gets widely circulated in no time. The control foundation will include a mechanism that will ensure appropriateness and accuracy of communication with the external parties—the customers, the shareholders, the government, and the banking regulatory authority.

b. Enhancing the Control Culture

Enhancement of the control culture and control consciousness is essential for strengthening the control foundation of an organization. Various elements of

controls applicable to different functions and activities are interlinked. The exercise of control by a business line head is not confined to the activities that pertain to that business line. There are linkages and overlapping between activities pertaining to different business lines. The control foundation will be weak unless the personnel are familiar with the links between different business lines and the relevant elements of control that cut across business lines.

c. Strengthening the Management Information System

An elaborate and sophisticated management information system (MIS) is the backbone of the control foundation and essential for the effective functioning of the internal control system. The MIS is institution-specific, since activities and products differ between institutions. The MIS should capture all relevant particulars relating to the bank's business, customers, and transactions, including information on external events, economic factors, and market conditions. The MIS should produce data and information in structured formats to facilitate exercise of control. The system should store, process, and deliver information and data to the operating personnel, business line managers, and the top management in the formats specific to their requirements. MIS-generated communication is sent both through electronic and nonelectronic modes. Appropriate checks and balances will have to be put in place at different tiers of the organization to prevent manipulation of data and information and corruption of messages, both during the data-entry and data-transmission phases.

2.6 BUSINESS RISK AND CONTROL RISK RELATIONSHIP

The risk profile of a bank is a combined output of business risk and control risk, and there is no correlation between them; rather, they are independent of each other. If business risks move to a higher scale, the bank may strengthen its internal control to mitigate business risks. In such an eventuality, the control risk will come down, though business risk will remain high. Weak control implies a higher internal control risk, and the higher the control risk, the higher will be the overall risk level, if the business risk level remains unchanged. The actual losses from credit, market, and operational risks will be higher than the potential losses estimated under risk measurement models, if the field personnel are lax in the application of internal control. Other things remaining equal, weak internal

control has the potential to increase the financial loss to the bank.

Opinions differ on the relative significance of business risk and control risk and which one should be given higher weight in calculating the overall risk profile of a bank. To a large extent, this depends on the business profile, and for a bank indulging largely in speculative trading or transactions, control risk is more significant. A bank that undertakes high-risk business will have fewer concerns if it has an effective control system to manage the risk, but for banks that undertake traditional banking business where loans and investments constitute the major assets, business risk is more significant, since they will usually have a standardized control system. In general, it is appropriate to attach more weight to control risk, since the quality of control is more important in mitigating the business risk.

2.7 SUMMARY

Controls are responses to the risk events that surface in a bank's business and consist of a sequence of actions aimed at containing, mitigating, or avoiding risks. Control risk arises because of inadequacy of the control structure and the possibility of human failure in the application of control. Weak internal control increases the level and magnitude of business risk.

Banks are exposed to external control risk because supervisory and regulatory deficiency in the exercise of control may not bring out the vulnerability in their operations and may ultimately lead to insolvency. Likewise, inadequacies in the internal control framework and laxity in the application of control have the potential to cause large losses to banks.

The primary objective of internal control in a bank is to ensure compliance by the operating staff with the approved policies, procedures, and limits and to mitigate and contain the risks. The effectiveness of internal control lies in serious application of the control procedure.

Internal control design varies between banks due to the differences in their business activities and risk profiles. Control over performance, control over reporting, and control over compliance are the three main components of the internal control framework.

Controls seek to detect irregularities in transaction booking, deviations from procedures, and exceptions made without merit or authorization. Control activities begin with the commencement of a relationship with a customer and

continue until the closure of that relationship.

Banks should make an objective assessment of the risks and threats to which they are exposed, analyze the work environment, and identify the spectrum of activities that should come under control before framing the design of the controls. The framework should include pretransaction, posttransaction, preventive, detective, and corrective controls.

The basic foundation of the control structure can be reinforced by putting in place an efficient communication system and a comprehensive management information system, and by instilling the control culture among the staff at all levels.

CHAPTER 3

Technology Risk in Banking

3.1 WHAT IS TECHNOLOGY RISK?

Technology risk arises from the use of computer systems in the day-to-day conduct of the bank's operations, reconciliation of books of accounts, and storage and retrieval of information and reports. The risk can occur due to the choice of faulty or unsuitable technology and adoption of untried or obsolete technology. Major risk arises from breaches of security for access to the computer system, tampering with the system, and unauthorized use of it. Historically, information technology was used as a supporting tool for fast and accurate delivery of financial services. Over the years, the uses of information technology in financial services have substantially widened. Fierce competition among banks induced them to enlarge their network of banking products and services, and compelled them to offer services off-site and allow the customers to access the computers from their end. Banks are facing greater threats from rapid changes occurring in the technological systems applicable to financial services.

3.2 RISKS IN ELECTRONIC BANKING

The introduction of Internet banking service, mobile banking service, automated teller machine (ATM) service, and other utility services has increased the information technology risk manifold. The need for providing multiple electronic banking services has pushed banks to bring changes in products and speed up service delivery. The market competition leaves no time for banks to adjust to new technological requirements. The creation of electronic channels for providing services off-site has added another dimension to their risk profile. Electronic banking service carries a high level of technological risk, because it involves frequent modification of the computer systems and increases dependency on the vendors for system design and maintenance.

Banks need to create two web sites for providing Internet service to their

customers—one site for transmission of information on products and services to the public, and the other site for use by customers for transacting the business from their end. The publicity web site requires periodic upgrading of service-related information, such as introduction of new products and services, ruling interest rates for loans and deposits, foreign exchange rates, equity prices, and information about special schemes and facilities. The operational web site provides customers with facilities for transacting their banking business off-site. This web site allows customers to transfer funds, pay bills, make enquiries about balances in their accounts, make payments to third parties, and trade online in equities and other financial instruments. Banks therefore face high risks from the use of the network system by the customers.

The provision for electronic money transactions through the use of debit cards, smart cards, and credit cards has substantially increased the technology risk. Banks are faced with the risk of maintaining values on an individual card basis and a network basis. This complicated task poses threats to the security and the control of the network system. Besides, the facilities for transfer of funds through the network system and the use of electronic cards are fraught with the risk of money laundering by unscrupulous customers, which the banks will find extremely difficult to detect. By nature, therefore, electronic banking raises two crucial issues—how to put in place a foolproof security system and how to ensure that legal protection is available to the bank under the relevant laws. The vulnerability of the security system and the uncertainty of legal protection have the potential to inflict heavy losses on banks.

3.3 SOURCES OF TECHNOLOGY RISK

Information technology does not trigger new kinds of risks; it brings in new dimensions to other types of risks. The major areas that are susceptible to technology risk are the following:

- Technology-based products, processes, services, and delivery channels.
- Collection, processing, storage, and retrieval of data.
- Computer system maintenance and reliability.

Technology risks also arise from the following:

- Vendors.
- Hardware systems locations.
- Software programming.

- Systems compatibility.
- Systems planning and design.
- Systems handling.

Choice of Vendors

Technology risk arises from the vendors from whom the technological systems are procured. Most of the banks outsource information technology services due to the lack of in-house capabilities and the need for continuous updating of the systems. Technology risk increases substantially when a bank entrusts the entire responsibility of designing and developing the technological systems to an outside agency. Deficiency in the system design, flaws in implementation of the systems, and negligence in equipment maintenance may generate inadequate and faulty information and data. In an era of fast technological developments, procured technology soon becomes obsolete, and the acquisition of new systems poses a lot of risks, besides the cost of acquisition. The limitations of the internal staff to absorb new technologies at frequent intervals add to the risk. Lack of sufficiently timely availability of services from the vendors when the technological system develops problems is a potential source of high risk.

Hardware Systems Location

Large banks require data storage, data processing, and data retrieval facility at different locations for risk management and risk control. The hardware system must be located at a very safe place and be accessible from each place of operation. The choice of location for installation of large-capacity equipment, like the main server, is crucial as locations are often susceptible to unforeseen and almost unmanageable risks. Locations that are prone to natural disasters like hurricanes, earthquakes, and floods or sensitive to frequent riots and law and order disturbances, or where the legal framework governing electronic commerce and electronic banking is unclear, pose greater risks.

Software Programming

The software system installed by banks is susceptible to programming error. Besides, there can be inconsistencies between different programs applicable to different fields of operation. The package of software programs acquired by banks should be mutually consistent. The programs should have built-in

mechanisms that can thwart attempts to corrupt or manipulate the systems. Errors in the application of programs may arise due to the lack of familiarity of the staff with the programs and lack of knowledge about the areas in which these programs can be used. When modification or alteration of the existing software system is undertaken, there is risk of manipulation of the system, which may facilitate perpetration of fraud at a later stage. During the postmodification period, there is the possibility of higher risk of error as the reliability of the system is established after a trial for a minimum period. Due to the occurrence of an unexpected event, either external or internal, interruptions or virus infections can take place, which may cause damage to the computer systems and lead to loss of business, assets, and reputation. The situation will be critical if the interruptions in program application take place where customer interface is imminent and frequent, as in the use of automated teller machines or the Internet banking facility. Program application risk also arises on account of the possibility of accidental or inadvertent disclosure of customer data or the banks' confidential business data to unauthorized persons, which can lead to fraud, legal disputes, and impairment of reputation.

Systems Compatibility

Banks operate in an environment where they interact with the government, the regulator, the customers, peer banks, and the legal fraternity. There is a risk of penal measures from the government and the regulator, if the information technology setup of a bank is not in conformity with the prescribed standards and specifications, and does not meet the legal requirements. Besides, a bank can face technological problems if its systems are incompatible with those of other banks. For example, participation in the payment and settlement system requires compatibility of the operating platforms within the financial sector with built-in error correction and risk protection mechanisms. Loss of business may occur if the system does not meet the customers' expectations and the peer banks' convenience. Legal risks may arise if customers raise disputes regarding the authenticity of certain electronic transactions recorded in the system. Such disputes may result in the loss of money, if the legal protection to the bank is inadequate. The greater the extent of mechanization in a bank, the greater will be the impact from changes in laws and regulations that govern information technology.

Systems Planning and Design

Faults in the planning and design of technological systems may cause frequent operational problems, besides loss of business. A bank engages in various types of financial activities, such as the core banking business, insurance business, securities trading, merchant banking, and consultancy services. It offers different types of products and services. Smooth operation of its business at different centers requires appropriate systems to process transactions and deliver prompt service. Systems support is crucial if planned business growth and business diversification are to be achieved in conformity with the corporate goal. The bank requires an appropriate information technology strategy in alignment with the business strategy. The information technology policies and plans should capitalize on business opportunities, promote faster transaction processing and decision making, and provide competitive advantages against peer banks' offers. The planning and strategy should ensure that the package of technology acquired by the bank is complete in all respects. Piecemeal acquisition of equipment and repetitive alteration in technological systems carry additional risks. The strategy should include standby arrangements, provision for alternatives, options for continuation of business, if interruptions take place on account of technological faults, and the technical support needed to manage business risks and control risks.

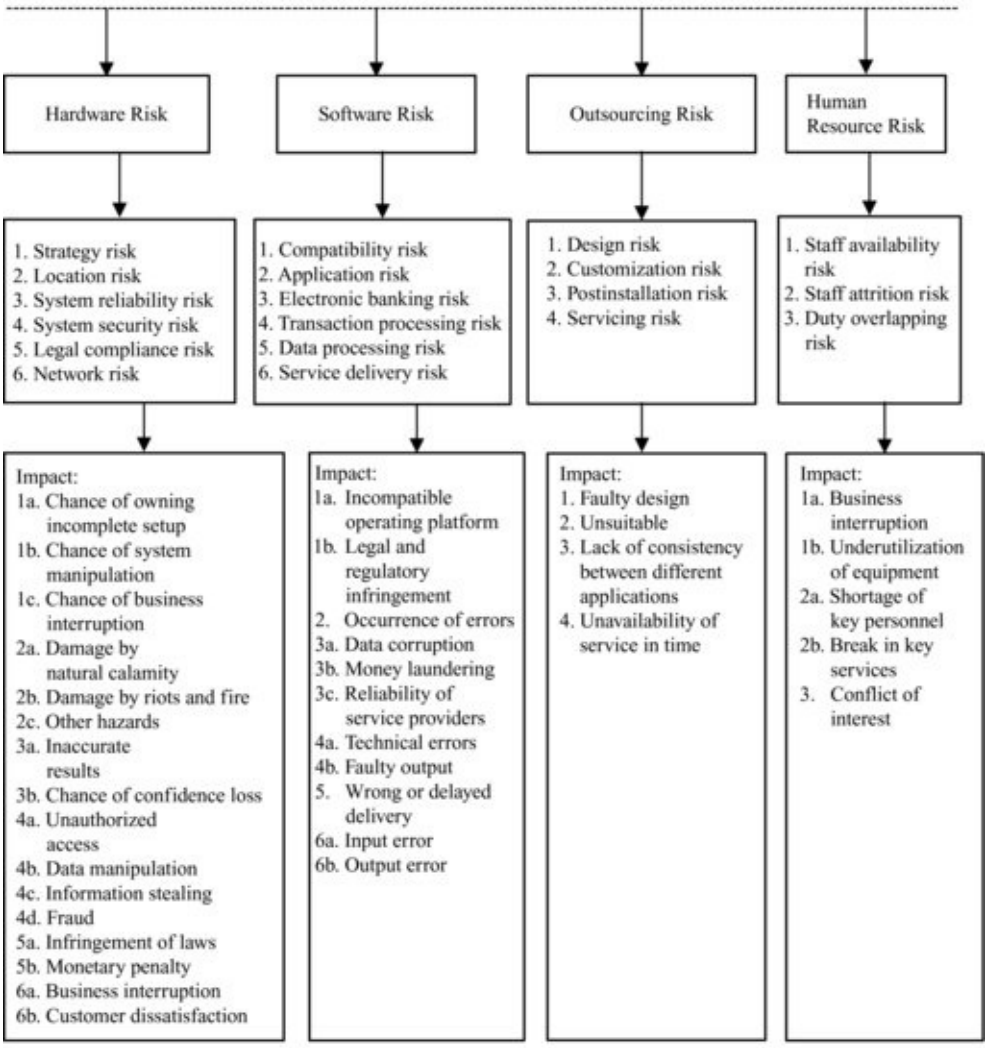
The information technology planning and strategy should take into account the medium-term corporate goal. The system should not only meet present business needs but should have the potential to take care of future business requirements. Banks should avoid developing excess capacity in computer hardware and software systems, since acquisition and maintenance of technological systems are expensive. They should adopt an appropriate business strategy for full utilization of technological potential within the organization for minimization of transaction costs.

Systems Handling

The choice of personnel for placement in the information technology area is fraught with risk, because persons without proper background and exposure may not be able to handle the computer system and protect its integrity. While placing the staff in the information technology area, the bank has to ensure that their skill and exposure match the level of technological sophistication required. This requires placement of technically qualified personnel with appropriate training in

information technology at strategic places. The software programs can be put to multiple uses, and the staff can misuse the systems. Consequently, appropriate checks and balances should be in place to ensure that the system is free from aberration. There should be clear demarcation of duties and responsibilities between the technical staff and the operational staff to avoid conflicts of interest. The same person should not have dual responsibility of business operation and business control. The duty allocation should rule out the possibilities of misuse of the system and the scope for data alteration or manipulation. The staff responsible for development and modification of the hardware and software systems, including periodic maintenance, should be kept distinct from the personnel handling the bank's business. The impact of information technology risk is shown in Figure 3.1.

FIGURE 3.1 Information Technology Risk



3.4 MANAGEMENT OF TECHNOLOGY RISK

Managing risks from the information technology setup of a bank is complicated because the sources from which technology risk may surface cannot be anticipated in advance so that appropriate controls can be put in place. The risk is high if there is significant dependence on an outside agency for supply and maintenance of the system. The bank should be cognizant of the sources from which technology risk can appear (as outlined in section 3.3) and ensure that the acquired system is free from those vulnerabilities. Besides, the bank needs to undertake the following activities to manage technology risks:

- Installation of foolproof security systems to prevent unauthorized access to the computer system.
- Vigilance over the use of the network system by the customers.
- Preparation of a contingency plan in case of system failure or network failure.
- Preparation of a disaster recovery plan.
- Preparation of a business continuity plan.
- Monitoring compliance with rules and regulations governing information technology and electronic banking.

3.5 SUMMARY

Information technology does not trigger new types of risks; it brings in new dimensions to other types of risks. Banks face technology risk from the use of a computer network system for the conduct of business and the creation of electronic channels for providing off-site services to customers. The vulnerability of the security system in preventing unauthorized use of computers is a significant source of technology risk.

The introduction of Internet banking, mobile banking, and other utility services, and the introduction of automated teller machines and electronic money transaction facilities, have significantly increased technology risk over the years. Besides, the risk of money laundering has increased due to the use of electronic cards in the execution of transactions.

Selection of vendors, location of hardware systems, design of software programs, and areas of software applications contain the potential to cause

technology risks. Faulty planning and design of technological systems and placement of personnel without the proper background and exposure in the information technology area are fraught with high technology risk.

CHAPTER 4

Fundamentals of Risk Management

4.1 RISK MANAGEMENT CONCEPT

Risk management essentially involves identification of risks that surface during the course of the bank's business and dealing with them in an effective manner to minimize or eliminate the losses that may occur. It is a process that involves development of tools and techniques to identify and assess risks and establish systems and procedures to manage them. It includes formulation of policies and strategies and establishment of monetary limits and benchmark standards for different types of activities. Risk management is a series of business decisions based on appropriate business policies and strategies that seek to optimize risk-adjusted returns on assets. The aim is not to avoid risks, but to handle them and minimize their impact through the exercise of appropriate options like accepting and managing risks, hedging, or transferring them.

Though development of tools and techniques and application of limits and controls are the core activities of the process, management attitude and employee ethics are important for realizing the full benefits of risk management. The bank management must establish high standards for managing risks and determine the limits and boundaries of acceptable risk levels, and the employees should acquire knowledge about the risks and participate in handling and controlling the risks. Consequently, management must devote enough resources to develop the internal risk management capability.

4.2 RISK MANAGEMENT APPROACH

A holistic approach is essential to treat the risks because banks undertake multiple activities, and it is not possible to manage risks at the individual activity level or in functional silos. The nature and the intensity of different types of risks and the frequencies at which they occur vary. The risk events are interconnected and affect more than one area of operation simultaneously. Credit, market, and operational risks can be assessed with some degree of accuracy, but it is difficult

to assess nonfinancial risks, like business environment risk, reputation risk, legal risk, technology risk, and control risk. The perpetration of a large fraud in a bank generates reputation risk and legal risk in addition to operational risk. It is therefore incorrect to place different types of risks in watertight compartments and deal with them in an isolated manner. An integrated approach to manage risks is essential because each banking activity generates more than one type of risk, and it is necessary to identify all kinds of risks from each activity, each transaction, and each product and deal with them in an integrated manner. Risk management does not aim only at minimization of the impact of risks; it also helps in selection of activities that offer higher returns. An integrated approach to risk management helps in achieving an optimal balance between risk and return at the corporate level and enables the management and the employees to understand the multiplicity of risks, the sources from which they can occur, and the manner in which they can be tackled.

An integrated approach to risk management involves an enterprise-wide assessment of risks. First, the bank has to assess the risks from every operating location including affiliated concerns and second, it has to arrive at the aggregate of risks emerging from all activities and products in order to get an integrated picture of the overall risk profile. Enterprise-wide risk assessment facilitates balanced decision making, reveals the relative significance of different types of risks the bank faces, and determines the kind of modification needed in risk management tools and techniques to match the emerging situation.

Some banks function under the control of a large holding company, which owns and manages several affiliated units operating in different countries. The holding company functions as a universal banker and undertakes banking, securities, and insurance businesses. In such cases, it is necessary to assess risks in respect to the holding company or the conglomerate as a whole. The affiliated units function under the brand name of the parent company, which has the responsibility to rescue them through financial and other support when they are in distress. In a similar way, if a bank has subsidiary units that deal in mutual funds or offer insurance services, it is incumbent on its part to provide financial support to the units if they are unable to meet their liabilities, though it may not be legally binding on it. This is because the subsidiary units were set up under its brand name, and the public kept funds with them, drawing comfort from the image and financial soundness of the bank. The parent bank or the holding company cannot shy away from rescue operations on the ground that the units are separate legal entities, as that will have wider repercussions on their

reputation and business prospects. In the ultimate analysis, the primary aim of risk management is to ensure the solvency and the long-term survival of each individual financial entity as well as the group as whole. It is necessary to adopt an integrated approach to risk management where multiple units function under a common ownership.

4.3 RISK IDENTIFICATION APPROACH

Each category of business and control risks consists of a few broad risk components, which in turn comprise a few risk factors and risk elements, which are different in nature and have separate identities. Several causes produce a particular kind of risk. For example, credit risk can occur from economic slowdown or bad borrower selection or business failure. Each of these risk events is a potential source that generates credit risk. The bank may follow a three-stage identification process to get a clear picture of risks—first, identify the risk components; second, the risk factors; and third, the risk elements. Three-stage identification is advantageous because it helps to identify the finer risk elements that show a relatively high level of risk and to devise control strategies that are just appropriate to contain the risks. If risk identification is done up to the finer element level, it will be relatively easy to form strategies to manage the risks.

4.4 RISK MANAGEMENT ARCHITECTURE

Risk management architecture refers to the design of the overall risk management framework that must be in place to manage risks. The design of the architecture will vary between banks, because the geographical spread, the nature of activities, the business focus, and the strategies differ. Some banks may have large number of foreign offices and voluminous cross-border business.

Risk management architecture should meet the following requirements:

1. It should provide an integrated approach to risk identification.

2. It should capture the whole gamut of risks—activity-wise, function-wise, and enterprise-wide.

3. It should include techniques to segregate the major and material risks the

bank faces.

4. It should contain tools to assess and quantify risks.

5. It should contain mechanisms to monitor and control risks.

6. It should specify transaction-specific and portfolio-specific hedging strategies to mitigate risks.

7. It should include procedures to calculate capital requirements in accordance with the changing risk profile.

8. It should include procedures to allocate capital among credit, market, operational, and residual risks for optimization of risk-adjusted returns.

9. It should automatically update the management information system.

Risk management architecture should have mutually supportive tools and techniques to manage risks of different types and different intensity. The absence of any one of the supporting tools will weaken the structure and make the bank vulnerable. For example, a bank may have excellent statistical models to measure risks for a given volume of business, but if it does not have a scientific process to identify risks enterprise-wide, the total risks faced by it may remain underestimated. The bank's risk profile may be erroneous and the impact can be serious at times.

Risk management architecture consists of several elements that have to be built in stages. The architecture should consist of the following elements at the minimum:

- Risk management policies and strategies.
- Risk identification process.
- Risk measurement tools.
- Model back-testing and validation procedures.
- Risk mitigation tools and techniques.
- Risk monitoring and risk control mechanisms.
- Management information system.
- Capital adequacy assessment process.
- Capital allocation methods.
- Organizational structure for risk management.

4.5 RISK MANAGEMENT ORGANIZATIONAL STRUCTURE

The risk management organizational structure should have provisions for separate administrative units to deal with three major business risks—credit, market, and operational risks. Banks set up separate departments to deal with credit and market risks, but usually they do not have a parallel administrative unit to look after operational risk, since they do not attach much significance to it. Banks must establish a separate administrative unit to deal with operational risk, because its frequency and magnitude have grown significantly over the years. Besides, banks do not often make distinction between risk taking and risk monitoring and control functions and allocate duties and responsibilities between operational staff and risk management staff, disregarding the principle of avoiding conflicts of interest in duty demarcation. Banks should be cognizant of these two issues in deciding the organizational requirement for risk management.

A centralized organizational structure is appropriate to meet the requirements of an integrated approach to risk management, because the information on all types of exposures and the netting and hedging of exposures will be available at one place for assessing the enterprise-wide risk exposure. The advantages of a centralized structure are that it reduces the possibilities of omissions and prevents slippages, because the whole process is overseen by the senior executives. It will facilitate mapping of the risk profile and assessing capital adequacy requirements in accordance with the changing risk profile. A supreme body in the head office of the bank will discharge the risk management responsibilities along with expert committees and top management. The supreme body will look after the entire cycle of risk management activities, from policy formulation to systems review and modification.

In finalizing the design of the organizational structure, the bank should recognize that conflicts of interest exist between the operational function and the risk control function. The reporting responsibilities should be segregated from business management responsibilities, and the independence of the control function should be maintained. For example, in the treasury department, there should be segregation of duties among the trading, reporting, monitoring, and control functions. Banks should clearly demarcate the roles and responsibilities of individuals and create separate units or earmark separate groups of personnel to deal with the operational function and the risk management function to avoid conflicts of interest.

A strong correlation exists between credit and market risks, and these two major risks are usually managed by banks in a parallel two-track approach. When interest rates increase and foreign exchange rates depreciate, the

repayment obligations on foreign currency loans increase substantially, and the emerging situation leads to a spate of defaults by borrowers. Several financial institutions and private entities in Thailand, which had taken foreign currency loans from banks abroad, defaulted on their repayment obligations when the exchange rate depreciated due to a large imbalance in the demand and supply of U.S. dollars, which finally led to the Asian financial crisis. It became evident that credit risk can arise from market risk–related factors. There is, therefore, a need for integration of the credit risk management function with the market risk management function. The organizational structure should ensure close coordination among the personnel managing credit and market risks.

The size and geographical spread, the business activities, and the range of products and services play a role in shaping the design of the organizational structure. Banks that undertake traditional banking business consisting primarily of credit and investment activities may have a simplified structure, but banks that combine credit, investment, securities, and insurance activities should have a larger structure consisting of specialized departments and cells to manage each category of risk. Banks usually have separate credit, market, and operational risk management departments, but if they are engaged in securities trading and insurance business along with their core banking business, they should have separate administrative units to deal with the relevant risks. If the bank's major business is trading in financial instruments, they need to have specialized groups of personnel having exposure to market risk, and if they directly undertake an insurance business or carry out an insurance function through fully owned or partly owned subsidiary units, they should have actuarial experts.

Large credit and investment exposures and related party exposures carry high loss-inflicting potential. Possibilities of risks materializing from these exposures are high, because errors of judgment can arise if decisions are taken by a single individual, or some collusion works behind these types of transactions. A committee approach to decision making on large and related party exposures may be appropriate to avoid conflicts of interest and safeguard the bank's interest. Expert committees consisting of personnel from within and outside the organization should be formed to deal with risks from large and related party exposures.

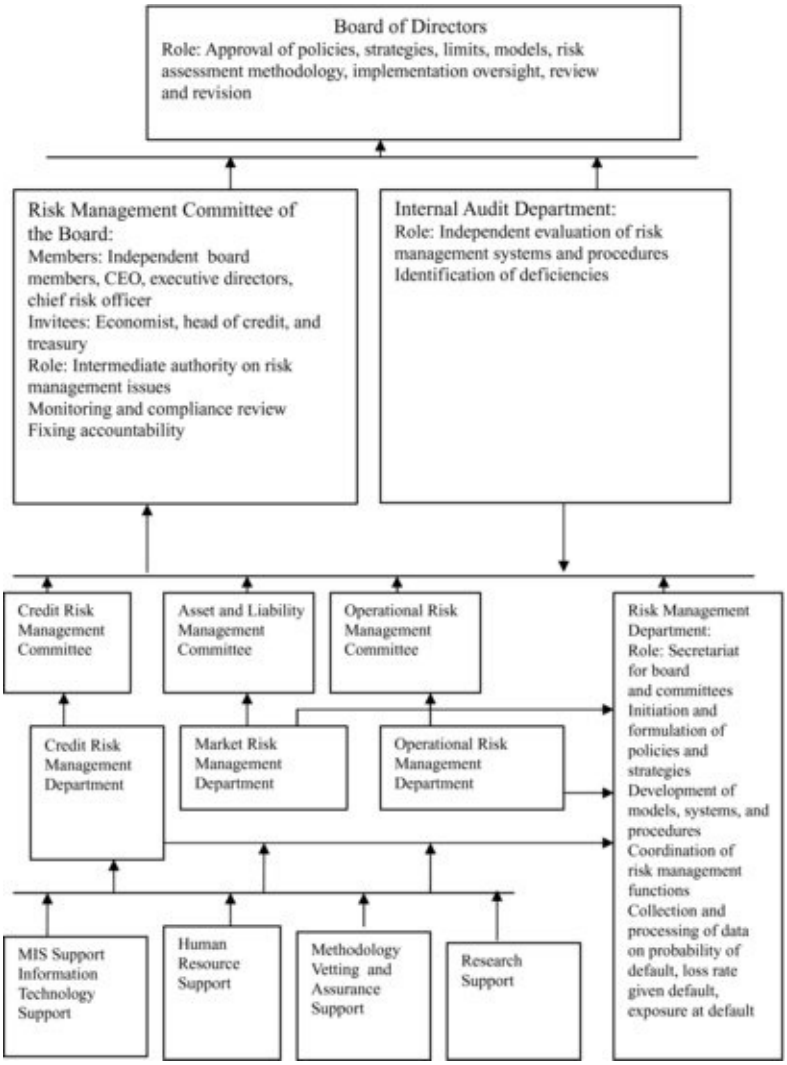
An integrated approach to risk management involves risk assessment on a bank-wide basis. Credit, market, and operational risk departments will assess risks pertaining to their own departments. But it is necessary to set up a separate risk management department that will work as the nodal department and

function independently as a parallel unit, consolidate risks on an enterprise-wide basis, and coordinate all risk management functions. It should have its own credit, market, and operational risk wings to oversee the risk management responsibilities of other departments and provide assistance to the bank's board and the committees.

The board of directors will be at the top of the risk management organizational structure and will have the primary responsibility to understand the nature and materiality of risks the bank faces and put in place appropriate tools and techniques to manage those risks. But it is necessary to ensure that the board members are qualified for their position and are free of influences from people within or outside the organization. Risk management is a very specialized and sensitive function, and it is essential that board members understand their role, recommend sound practices, establish “checks and balances,” and prevent conflicts of interest. The process of selection of board members, whether the bank is owned privately or by the government, has to be transparent.

The organizational structure should include a smaller body of experts who have knowledge of and exposure to risk management. This will be a screening and advisory body with intermediate powers, which will meet more often than the board and make recommendations to the board on all risk management issues. This body will consist of two or three persons who are members of the board and a few top executives, like the chief executive officer and the executive directors, and will be called the risk management committee of the board. This committee will supervise and coordinate the activities of the other lower-level committees. The heads of operational departments, as are relevant, may be co-opted as members of the committee without voting rights. The operational heads, because of their proximity to market information and responsibility for business development, should have freedom to express their views in the formulation of risk management policies and strategies. The combination of experts from inside and outside the organization will help in taking balanced views and avoiding conflicts of interest.

FIGURE 4.1 Organizational Structure for Risk Management



Credit, market, and operational risks arise from different sources and different banking activities. The organizational structure should therefore have provisions for specialized committees, which will work as intermediate bodies and deal with each of these business risks. Each of these committees will consist of the executive directors and the business line heads of the functional departments since links exist between different types of risks. The higher-and the lower-level committees will require the backup of full-fledged departments and other supporting staff and thus, the organizational structure will have both credit, market, and operational risk management committees and departments, besides a separate risk management department that will work as the secretariat of the committees.

The organizational structure should include appropriate machinery for independent evaluation of the risk management function. Formulation of risk management policies and strategies, fixation of risk limits, and approval of risk

assessment techniques and models are top management functions. Implementation of policies, strategies, and techniques is the function of the operating people. It is therefore necessary to ensure that there are no inconsistencies between policy formulation and policy implementation. Besides, the bank management has to assure the bank supervisor that the methodologies and systems followed by it for risk assessment are sound, and the bank's risk profile represents a realistic situation. There is, therefore, the need for an evaluation of the entire risk management process, which should be done by people who are unconnected with the risk management responsibilities. The task can be entrusted to the internal audit department, which will carry out an independent assessment of risks and risk management systems and procedures, and identify the gaps for corrective action. It will assess the realities of the situation and report to the board. Accordingly, the internal audit department should be a part of the risk management organizational structure.

The organizational arrangement should take into account the requirement of risk management specialists and technical personnel to provide support to the risk management committees and departments. Technology support and personnel support are crucial to maintain an effective risk management function. The technical support will be provided by the information technology department, which will be responsible for developing or outsourcing software systems. Besides, the technology department will independently collect, process, and supply information and data as per the specific requirements of the departments handling different types of risks. The personnel support will be provided by the human resources department, which will be responsible for placing appropriate personnel and developing their skills to handle the risk management responsibilities.

An illustrative organizational structure for risk management is given in Figure 4.1.

4.6 SUMMARY

Risk management does not aim for avoidance and elimination of risks. It aims for minimization of the impact of risks and optimization of risk-adjusted return on assets.

A risk management approach cannot be function-specific or activity-specific, as the primary objective is to ensure the solvency of the banking company as a

whole, including the subsidiary units owned and controlled by it. An integrated approach to risk management that ensures an enterprise-wide assessment of risks is indispensable. An integrated approach brings out the relative significance of the different kinds of risks the bank faces and helps in achieving an optimal balance between risk and return at the corporate level.

Each broad category of risk is made up of a few risk factors and a few risk elements. It is necessary to identify first the risk elements that constitute a risk factor and then the risk factors that constitute a broad risk component in order to identify the risks in a scientific manner.

Banks should establish appropriate risk management architecture in harmony with their business activities and business strategies.

The organizational structure for risk management should include separate departments and committees to deal with credit, market, and operational risks, and separate units to look after risks from securities trading and insurance business. Furthermore, the bank should have a separate risk management department to coordinate all risk management functions.

CHAPTER 5

Risk Management Systems and Processes

5.1 RISK MANAGEMENT POLICY

The risk management philosophy of the bank is revealed through the risk management policy statement, which is the formal commitment of the board of directors to administer an efficient risk management system. The risk management policy document describes the course of risk-taking activities to minimize the losses from risks. Between banks, business activities and business focus differ, and more importantly, the risk-bearing capacity differs, and it is therefore difficult to conceive of a model document on risk management policy. Each bank should have its own risk management policies based on its resources, expertise, strengths, and weaknesses. While risk management policies are unique to each bank, certain similarities in characteristics exist as most of the risk management issues are common.

Corporate goals and corporate vision dictate the tone of the risk management policy. The policy document should contain guidelines regarding risk acceptance levels for different types of transactions and activities, disclose the bank's risk appetite, and specify the risk limits that are applicable during the financial (accounting) year. The document should emphasize the management's commitment to promote risk management systems and processes as an obligation under the corporate governance system and convey the management's determination to follow a high standard of risk management practices in the pursuit of business. The policy should explain the rationale for assuming risks within certain specified levels and serve as a reference manual on risk management for all personnel in the bank. It should highlight the links between the risk management strategies and the bank's strategic plans. The purpose of the policy is to clarify to the staff that identification of risk and determination of the risk level associated with every transaction are integral parts of the due diligence process, and all business proposals need to be assessed from the risk angle before acceptance. The risk management policy is a general document on the bank's risk management philosophy and risk appetite, and it does not contain

specific issues pertaining to the management of loans and investments. It is necessary to formulate a separate loan management policy, investment management policy, and other policies relating to the bank's sphere of operations.

In framing the risk management policy the bank has to take care that it does not generate negative feelings and create fear in the minds of the operating staff. The policy should aim at enhancing the confidence of the employees in handling the bank's business, encourage them to take reasonable risks for business growth, and convey an assurance that the bank will not take punitive action if bona fide decisions have gone wrong. The policy should reveal the management's commitment to developing employee skills with a view to instilling confidence in them to handle risks.

The increasing volume of cross-border transactions and the frequent changes in the fiscal and trade policies of governments across the world have made financial markets volatile. The changes in market conditions alter the assumptions that were made at the time the risk management policies were formulated. The policies should therefore be reviewed frequently and aligned with the market developments. The bank management should treat the occasion of issuing the policy statement as an opportunity to highlight the bank's commitment to adhere to the best practices in risk management and assure the financial sector regulator, the external auditor, the shareholders, and the depositors that their interests will be protected.

5.2 RISK APPETITE

Risk appetite is the quantum of risk that the bank intends to accept within its total risk-bearing capacity. The capital level, the liquidity profile, the liability structure, the cost of funds, and the targeted return on funds largely influence the risk tolerance capacity of the bank. The market competition and the employee skills and work culture also influence the risk appetite, because inadequate skills and bad ethics will generate higher risks, other things remaining equal. Banks cannot have an aggressive risk appetite, partly because they do business with public deposits and partly because they are under strict regulatory control and supervisory surveillance. Risk appetite is better understood when it is quantified, but often it is a matter of judgment. The risk appetite will vary between different business lines, like corporate finance, wholesale banking, retail banking, and commercial real estate finance. Likewise, it will vary between credit and

investment activities, and even within the credit activity, it will vary according to the purposes of credit, such as industrial credit, trade credit, agricultural credit, and export credit.

The bank has to take a view on its risk appetite for business development. The declaration of risk appetite sets the platform for fixing business targets, determining the business mix, and selecting risk grades of loans and investments. It is difficult for banks to specify the risk appetite for every kind of transaction, since large numbers of transactions are executed daily. Risk appetite is therefore fixed for the corporation as a whole or for different business lines. A bank can fix its risk appetite as “high,” “moderate,” or “low,” or it may adopt a balanced appetite. A bank with high risk appetite will prefer to do business predominantly in financial instruments, gold and futures trading, and real estate finance. Such a bank must have high capital, sound risk management practices, and efficient control machinery. Banks that have relatively low capital and average risk management and risk control capabilities usually pursue a conservative approach and have a moderate risk appetite. They concentrate on loans and investments that involve lesser risk and diversify the field of activities. But such banks need to guard themselves against underperformance and low returns. The third category of banks is those that take up both speculative and traditional activities with a view to striking a balance between high-risk, high-return and low-risk, low-return business. Usually, high-risk appetite banks pursue more liberal standards for business acceptance.

A bank can specify that 30 percent of its total business will be in the high-risk bracket, 40 percent in moderate, and 30 percent in low-risk brackets. With a view to comparing the distribution of assets between these three major risk grades, it is necessary to determine the level of risk associated with each exposure. Once the norms for determining the risk levels are developed and the numerical values for assignment of risk grades are fixed, the risk-grade-wise distribution of assets can be compiled and mapped with the declared risk appetite.

5.3 RISK LIMITS

Risk limits are the boundaries of potential losses that may arise if the assumed risks materialize, and they are fixed for different operational areas and activities. Banks should specify in the risk management policy document the extent of risk limits within which the line managers will operate. Risk limits determine the

volume of business that can be undertaken in different areas and the quality of assets that can be accepted. The impact of risk, when it materializes, gets reflected through the decline in earnings and ultimately through the reduction in owned funds that comprise capital, free reserves, and general provisions.

The bank can fix the monetary values of risk limits in terms of the potential loss of capital that it can sustain. The overall risk limit can be fixed as a percentage of the total owned funds and then apportioned among credit, market, and operational risks, after earmarking some amount to take care of the residual risks. Let us suppose that the bank's owned funds aggregate U.S. $3 billion, and the bank's board of directors have fixed the aggregate risk limit at 25 percent of owned funds. The overall risk limit for the year will be U.S. $750 million. Of this sum, U.S. $450 million can be allotted to cover credit risk, U.S. $150 million to cover market risk, and U.S. $100 million to cover operational risk, and the balance of U.S. $50 million can be earmarked for residual risks. The risk limits, which represent the respective outer limits, are not allocated between different types of risks on hypothetical bases. Business opportunities, market competition, and the bank's targeted business mix and historical loss experiences in different business lines influence the allocation of limits.

The potential loss from credit risk on direct credit exposures, and investments and derivative transactions that contain an element of credit risk, can be estimated through the credit risk models, and the potential loss from market risk on investments and other trading assets can be estimated through the value-at-risk and other statistical models. The potential loss from operational risk from people, process, technology, and external events can be estimated through advanced measurement approaches or internal measurement models, as recommended in the New Basel Capital Accord. The total quantum of potential losses from credit, market, and operational risks is an indicator of the overall risk limit, which can be subdivided between them in appropriate proportions after allocating some reasonable amount to cover residual risks. The sublimits are the upper limits within which the potential losses from each of these risks are expected to lie.

Within the overall credit risk limit, the bank needs to put in place maximum exposure limits on concentration risk, volatile business risk, and large exposure risk. Concentration risk may arise from credit concentration (credits to a few parties), facility concentration (too many credits against the same type of collateral), geographic concentration (large portion of credits to one or two geographic regions), sector concentration (disproportionately large credits to one

or two economic sectors or industrial subsectors or trade sectors), and business line concentration, and the maximum exposure limit should be prescribed for each type of concentration.

Volatile business risk exists in substantial exposures to capital market, commercial real estate market, and similar types of businesses, where asset values are highly risk-sensitive and fluctuating. The bank should fix limits on exposures to sensitive sectors or volatile sectors. Large exposure concept varies between countries, and between banks according to the size of the balance sheet, and relates to single borrowers and borrower groups. Large exposure risk arises when the bank's exposures are confined to a few individual borrowers or a few borrowing concerns that are owned and controlled by the same management. The bank will have to define large exposure and fix limits on exposures to a single borrower and the borrower group. The loan management policy document, which is a supplement to the risk management policy document, should prescribe details of the maximum exposure limits in respect of single borrower, borrower group, and large exposures. Where necessary, the bank can fix sublimits in different areas. The policy document should also specify the permissible exceptions to the limits and state the procedures for approval and control of these exceptions. The risk limits will vary from year to year and will have to be revised in accordance with the changes in market variables and the pattern of market volatility.

5.4 RISK MANAGEMENT SYSTEMS

Banks need to set up procedures for undertaking different types of activities like credit sanctioning, funds raising and investing, trade financing, merchant banking, investment banking, advisory services, and so on. They need to prepare manuals on the systems and procedures for booking transactions that will include procedures to identify and manage risks associated with the activities and the transactions, besides accounting methods and reporting procedures. The bank needs to subject the systems and procedures to periodic testing to ensure that they accurately capture and assess the risks associated with the transactions. Procedural lacunae will increase the quantum of risk, even though the business activity, the amount of exposure, and the type of transaction may remain the same. Most banks maintain operation manuals for use by the staff for the conduct of business. It is essential that operation manuals be modified at regular intervals in keeping with the changes in risk management policies and

procedures.

Risk management involves the development of systems and procedures to identify, measure, mitigate, monitor, and control risks. The systems will cover at least four major areas:

- Risk identification process.
- Risk measurement tools.
- Risk mitigation techniques.
- Risk monitoring and risk control machinery.

Risk Identification Process

Risk identification involves capturing risks from all activities, transactions, business locations, and affiliated units. The risk identification process is complex, and it is difficult to set up foolproof procedures that guarantee the capture of all risks the bank faces. The identification process is not static; it is dynamic and needs to be modified when the business policies, business strategies, and business focus change, or when a new activity is added or an existing activity is given up. Failure to recognize all risks or partial capture of risks where multiple risks are involved will not reveal the true risk profile. Banks will run the risk of breaching the capital adequacy norm if there is underestimation of risks because of the inaccuracy of the risk identification procedure.

Banks need to consider a few general issues while establishing the risk identification process. The first issue relates to the problem in identifying multiple risks that emerge from a given transaction since a single transaction may give rise to more than one type of risk. For example, the risks associated with loans granted to customers in domestic currency carry at least three types of risks. The loan transaction may give rise to default risk, liquidity risk, and earnings risk. Default risk may arise as the borrower may not be able to repay the loan that will ultimately result in loan loss. Liquidity risk may arise from the defaulted loan, as the stream of repayments due on the loan falling into different time buckets over the life of the loan will not be received. The sum of defaulted loan amounts for a group of customers taken together may create a liquidity mismatch for the bank. If the amounts repayable by the customers are large, it may compel the bank to make alternative arrangements for funds at a higher cost to repay its liabilities on the due dates. Earnings risk will emerge as the prudent accounting standards require the bank not to recognize interest income on defaulted loans on an accrual basis. Likewise, an investment made in the bonds of a domestic corporation entails interest rate risk, which may cause erosion in the market value of the bond, credit risk if the issuer of the bonds fails to return the principal on maturity, earning risk as the periodical coupons on the bonds may cease to be paid, and liquidity risk as there can be a resource gap due to a default by bond issuers to return money to the bank. If the bonds were issued in foreign currency by a company that is situated in another country, the investment transaction might give rise to exchange risk and country risk. The conversion of

principal and interest due on the bonds received in foreign currency may result in loss of value in domestic currency, if in the meantime the exchange rate has appreciated. The investment transaction will also involve country risk, as that country may repudiate its liabilities on all foreign debts, impose restrictions, or ban all foreign exchange–related transactions. Besides, it is sometimes difficult to make an accurate classification of risks as the distinction between different types of risks is often blurred. Sometimes, we cannot say with certainty whether the risks emerging from certain transactions are credit, market, or operational risks.

The second issue relates to the problem in identifying the level of risk from certain types of transactions, which by their very nature give rise to varying levels of risk. For example, term loans or investments in debt instruments carry varying levels of risks owing to the differences in the tenure of loans or the maturity period of debt instruments. Loans and financial instruments, which have longer tenure for return of value, carry more risk than those which have shorter tenure. This is because the longer the time period for the return of money, the greater is the default probability, as the uncertainties increase over a distant period or the possibilities of adverse events occurring become high over a longer term. It is therefore necessary to fix norms for deciding the risk level in keeping with the maturity periods of term loans and dated financial instruments. Besides, while identifying risk on term loans and long-dated financial instruments, the business cycle risk is also to be taken into account. The latter may be of lesser significance for short-term instruments.

The third issue relates to the problem in evaluating the state of the work culture and the robustness of the corporate governance system in the bank. If the corporate culture is not risk sensitive, and the management permits excesses and exceptions without proper checks and balances, incidences of risk events are likely to increase. If the control machinery is weak in the bank, more operational risk events will take place. It will be prudent to be cognizant of the state of the work culture and the style of management functioning, also the seriousness of the staff in the application of controls across the bank, and make some adjustments by increasing the level of risks from those activities and transactions that are vulnerable. The risk identification procedure has to be robust if there is evidence of control failure within the organization in the past.

The fourth issue relates to the lack of an integrated approach for identification of risk from derivative transactions. When the derivatives market started developing and became a popular source of financial instruments for hedging

against risks, derivatives were usually treated on a stand-alone basis. The personnel responsible for different functions, that is, credit risk management, interest rate risk management, equity exposure management, and foreign exchange risk management, dealt with credit derivatives, interest rate derivatives, equity derivatives, and foreign exchange derivatives in an isolated manner. This type of segmented approach fails to capture the total credit risk from different types of derivative products. It is necessary to place the responsibility of the derivatives portfolio under the charge of derivatives experts and identify the risks in an integrated manner.

Risk Measurement Tools

Risk identification and risk measurement are two complementary activities. Once identified, the magnitude of risk will have to be assessed both in terms of the level of risk and the quantum of potential loss that may arise from the assumed risk. Rating models indicate the level of risk and statistical models measure the potential loss. Risk measurement tools will therefore consist of both the rating models and the measurement models.

Risk measurement tools and techniques should achieve three basic objectives. First, the measurement tools should quantify the potential loss that the bank may suffer from its total exposure and other commitments under different economic, market, and environmental scenarios. The potential loss consists of both expected and unexpected losses, and it indicates the amount of economic capital that the bank should maintain against its risk-taking activities. Potential loss is an indicator to judge the strength of regulatory capital to cover losses from risks. If the management desires to maintain regulatory capital at a level higher than the prescribed minimum, the potential loss will be a guiding factor in deciding the targeted level of capital. Sometimes, banks set up a voluntary target of maintaining a higher percentage of regulatory capital, say 11 percent or 12 percent of total risk-weighted assets. The mapping of the estimated potential losses for four to five years derived from the risk measurement models established by the bank may indicate the benchmark for targeting the capital level. This will, in turn, assist the management in developing strategies in advance for mobilization of additional capital funds to support the future business growth. The New Basel Capital Accord requires banks to maintain the total capital ratio at no lower than 8 percent of the total risk-weighted assets, which will increase to 10.5 percent by 2019, including capital conservation buffer as per recommendations of the Basel Committee on Banking Supervision.[1] The bank regulator/supervisor sometimes specifies a capital adequacy ratio higher than the minimum of 8 percent for all banks or some selective banks. The trend of estimated potential losses in a bank will guide the bank regulator to evaluate the bank's capital standard.

The second objective is that the risk measurement tools should be efficient to measure separately borrower-specific, asset-specific, or facility-specific potential losses. The tools that include rating models should also identify the borrowers whose financial strength has deteriorated and who are likely to default in

repaying the bank's dues within an assumed time zone. Besides, the tools should measure the decline in asset values in relation to their book value. The decline in asset values (before default) and the estimated potential loss that may arise if the default occurs indicate the amount of provisions required to meet the prudential accounting standards. For banks that have significant numbers of loan accounts consisting of large and small exposures, loss estimation on both a client basis and facility basis will be too voluminous. These banks will have to follow a combination of individual account–based approaches and group-based approaches where similar types of small accounts are involved. The measurement tools should accordingly contain methodologies to calculate both borrower-specific or facility-specific potential loss in respect of large exposures, and average potential loss in respect of pools of assets having similar characteristics. The amount of potential loss derived through the measurement models will indicate the quantum of borrower-specific and facility-specific provisions as well as the total provisions the bank is required to make against estimated losses in asset values.

The third objective is that the risk measurement tools shall enable the bank to calculate the risk-adjusted return on capital in order to evaluate the performance efficiency of different business lines. Risk measurement tools should produce the quantum of potential loss that can arise from business lines. The estimated loss amounts can be used to calculate the risk-adjusted returns on capital employed in different business lines. The risk adjusted returns will guide the bank to assess the operating efficiency of each business line and choose the optimum volume of business across different business lines without breaching the capital adequacy standard and the risk limits. For example, if the measurement tools reveal that the returns on capital employed in the capital market business segment are low on account of volatility in equity prices, it is prudent to reduce the capital market exposure in phases and expand credit in the manufacturing or trade sectors where the quantum of expected losses is relatively less and the returns on capital are relatively high. Measurement tools and techniques thus help the bank in firming up the risk management practices. Besides, the analysis of potential losses that may arise from different areas of operations will help the bank in shaping risk management policies and formulating risk management guidelines. The quantum of expected and unexpected losses will serve as indicators to decide credit, market, and operational risk limits.

The risk measurement models should be customized to meet the bank's specific requirements. The bank should take into account its size, business mix,

business volume, range of products and services, and skill set of personnel in choosing the models. Banks that are not too large and that are engaged in core banking activities may set up simplified risk quantification models. But even simplified models need to meet two basic requirements: The models should not only quantify the risks but also bring out the qualitative aspect of risks. Banks may set up internal credit risk rating models to assign risk grades to borrowers and utilize the risk grades to decide the entry-point norms for taking an exposure, set up loan pricing formulas, specify collateral packages, fix risk-grade-wise exposure limits, carry out portfolio appraisals, and estimate loan losses based on historical data. International banks with a large volume of business and having significant cross-border exposures will have to set up robust counterparty rating models and sophisticated statistical models for estimation of expected and unexpected losses from different types of assets and off-balance-sheet exposures.

The New Basel Capital Accord requires banks to set up separate risk measurement models for estimation of potential losses from credit, market, and operational risks. The New Accord has provided a few options to the banks to assess the capital requirements to cover these risks. For measurement of credit risk, the New Accord has prescribed two approaches: the Standardized Approach and the Internal Rating Based (IRB) Approach. The latter has two versions, Foundation and Advanced. For measurement of market risk, banks have the option of following either the Standardized Measurement Method or their own internal risk measurement models, subject to fulfillment of a set of conditions. For measurement of operational risk, banks have three options to follow—the Basic Indicator Approach, the Standardized Approach, and the Advanced Measurement Approach.[2] Banks can choose any of the options/approaches prescribed by the bank supervisor and set up risk measurement models in conformity with the chosen approach.

Validation and Back-Testing

After development of credit risk rating and measurement models and a value-at-risk model based on identified risk parameters and certain assumptions, banks should test the rating models at regular intervals in order to verify the validity of assumptions and other parameters. If an investment in AAA-rated bonds becomes bad within a period of one to two years, the model for bond rating has failed in the validity test and should be deemed to be deficient. In such

situations, the bank should examine the risk factors, the risk elements, the scoring norms, the weights, and the assumptions and make necessary amendments. Likewise, borrower-specific loss, facility-specific loss, and enterprise-wide potential loss derived through the risk measurement models should be compared with the actual losses of the recent past to determine whether the outputs of the models reflect the real situation. This process is called back-testing. The actual credit losses that have occurred on a few selected credit exposures both in default and nondefault states may be compared with the model-generated results for certain chosen time zones and the deviations observed. If the model outputs do not reflect the real situation, necessary modifications in the inputs factored in the measurement models will have to be made. Similarly, the value-at-risk model may be subjected to test by comparing the model output with the actual market-derived loss on investment and trading for different blocks of holding periods. The composition of the investment portfolio changes almost daily; the models should take into account the changes occurring in the composition. If the outputs of the value-at-risk models are not in close proximity with the actual losses that prevailed in the market at the relevant time, necessary revisions in the assumptions and parameters will have to be made. Sometimes, the models themselves may have to be modified in conformity with the trend of empirical results. The job of validation and back-testing should be entrusted to a neutral group of people unconnected with the development of risk measurement tools. Alternatively, professional firms may be hired at periodic intervals to carry out the back-testing of internal models and check the validity.

Risk Mitigation Techniques

Risk mitigation strategies and techniques are an integral part of the risk management process. In the banking business, complete elimination of risk is seldom possible, but the impact of risk can be reduced. Mitigation techniques aim at reducing the intensity of risk associated with a particular transaction, a set of transactions, or the banking activities in general. Risk mitigation is activity-specific, transaction-specific, facility-specific, and customer-specific. Mitigation strategies are different for credit activity, investment activity, trading activity, and so on. For example, the bank may insist on higher margin and tangible collateral for sanction of large credit or issue of financial guarantees to reduce credit risk. If the bond market interest rate is highly fluctuating, the bank may restrict its investment in bonds to avoid large losses from a decline in bond values. Likewise, the bank may like to square up the open position in foreign exchange, if the movement in exchange rate is very uncertain.

Risk can be mitigated in three major ways—tightening follow-up procedures and practices, establishing limits and standards, and prescribing rules and methods for hedging. The bank should activate the monitoring and the vigilance machinery to ensure that the follow-up actions after execution of transactions are not slackened. This is basically an internal affair of the bank. The field staff should take preventive steps from the beginning of a financial transaction to the end of the relationship with the customer to ensure that the risks do not increase due to laxity in follow-up. It should be recognized that strengthening internal systems and procedures is no less important than other options available to mitigate risks.

The second option to mitigate risk is to fix limits on the balance sheet size and introduce checks and balances to control the risk. First, the bank may opt to keep its business volume within limits in keeping with the strength of its owned funds. And second, the bank may prescribe rigid standards for acceptance of business and fix safer limits on exposures. The establishment of standards and limits is usually common among banks, though the nature and extent may vary between them.

The third option to mitigate risk is to undertake derivative transactions with third parties to hedge the risks. The access to outside parties for risk mitigation is usually transaction-specific, product-specific, or client-specific. It is somewhat difficult to prepare a list of events and situations under which the bank should

have recourse to third parties for risk mitigation. The bank should form policies and strategies for risk mitigation relevant to different situations and print and circulate them among the operational staff and risk managers.

Risk Monitoring and Risk Control

Risk monitoring precedes risk control and they complement each other. The quantum and intensity of risks go on changing at frequent intervals as the operating environment and market variables change. The bank should have a monitoring group within the organization set up for assessment of risks on a continuing basis. The monitoring group should consist of personnel who are independent of operational responsibilities. The group should analyze and monitor risks reported from different locations and ensure that the emerging risks are within the risk limits approved by the bank's board of directors. The monitoring group will have close coordination with the operational groups so that the business mix can be changed in accordance with the emerging risk profile.

Risk monitoring and control machinery may vary between banks depending on the size and the activities. For small banks undertaking traditional banking business, the reporting and the monitoring mechanism may be relatively simple and may largely center on credit, investment, and treasury operations. For large banks, which offer several products and services and operate in many locations both directly and through the subsidiary units, and which have a significant volume of cross-border business, the reporting formats and the monitoring and control mechanisms will have to be elaborate. Banks should create a separate machinery to independently assess the integrity, adequacy, and efficacy of the monitoring and control systems.

5.5 MANAGEMENT INFORMATION SYSTEM

Utility of the Management Information System

Banks shall establish a customized management information system (MIS) to provide support to the risk management system. The MIS is concerned with collection and processing of transaction details; storage and retrieval of data and information for conducting the bank's business; and production of statements, financial reports, and analytical notes for use by the management. It assists the management in decision making, planning, program implementation, and

activity control and provides support for transaction processing, payments and settlements of the bank's dues, electronic transfer of funds, automatic cash withdrawal, and Internet banking.

Design of the Management Information System

Banks require historical and current data on their own business and also external data relevant to banking and financial services. Risk management practices, procedures, and models vary among banks, and consequently, the design and the depth of the MIS will vary between them. The MIS should provide support to the entire risk management process that includes balance sheet management, business strategy formulation, and risk monitoring and control.

MIS Support for Risk Management

Each business activity of the bank generates one or more than one kind of risks and as the business grows and the balance sheet size increases, risk management in effect becomes balance sheet management. The basic role of the MIS is to provide support for expansion and sustenance of business with a view to optimizing the risk-adjusted return on assets. The MIS should maintain all data and information and provide decision-making and technology support for balance sheet management.

The MIS should provide meaningful and relevant information for taking prompt business decisions. For example, it should provide answers to different business propositions like: What will be the impact on profit if the lending rates are reduced by 25 basis points? What will be the impact on the cost of funds and income spread if interest rates on deposits are raised by 25 to 50 basis points for different maturity periods? It should provide data and information to deal with different scenarios and changing market conditions, and assist the management to tackle emergencies and stress situations.

The MIS should contain risk management tools and statistical models, besides data and information relevant for the conduct of business. It should store credit risk rating and measurement models, value-at-risk models, stress testing models, sensitivity analysis and scenario analysis techniques, and so on. It should provide information relevant for decisions on credit, investment, and other transactions, and indicate how such business decisions will alter the risk profile of the bank. For example, if a new credit line is sanctioned to a counterparty, the MIS should enable the bank to identify the level of risk associated with the transaction, determine how much additional capital is required to take the exposure on the books, and what will be the quantum of potential loss from the exposure if the counterparty commits default. Likewise, if the bank wants to introduce a new activity, the MIS should have in store all the information needed to carry out logistics analysis, competition analysis, risk analysis, and profitability analysis. The goal is to leverage the information technology system installed in the bank and build up a comprehensive MIS to support the business management process.

Formulation of business development strategies with a focus on risk mitigation and risk control requires the support of a strong MIS. Strategies for expansion and sustenance of business usually vary in focus from year to year. Expansion of

business in new locations and introduction of new products and services require the support of appropriate strategies. The MIS should assist in planning the business and selecting strategies to achieve targets included in the business plans. For example, if a bank decides to achieve a 20 percent increase in net profit during a particular year, the MIS should provide all relevant data and information for the formulation of appropriate strategies to achieve the target. The bank may choose a simple strategy that aims at achieving increase in interest income and fee-based income and reduction in operating expenses. Or, it may decide to concentrate on large exposures and wholesale business where net interest income is more, operating expenses are low, maturity periods of loans are short, and probability of default is low. Likewise, if a bank anticipates a liquidity shortfall during a particular time of the year on account of asset-liability mismatches, the MIS should generate reports on the likely scenario of liquidity gaps at different times and help in formulating appropriate strategies to procure funds at the lowest possible cost at the appropriate time in a competitive market.

Some banks intend to develop a core competency in certain types of financial services to create a niche market for themselves. These banks will have to devise a superior quality product and set up efficient delivery channels that will be difficult for the competitors to mimic. In such situations, the MIS has to provide continuous support to enable the bank to retain the competitive advantage and render prompt and hassle-free service. In fact, banks can leverage their MIS to gain competitive advantages in certain business areas.

The monitoring and control function is an integral part of the risk management system. It consists of checks and balances introduced by the bank to mitigate and contain risks within prescribed limits. The task involves periodic review of performance of each business line with a focus on business constraints, business growth and profitability, and the changing risk profile over time. The MIS should provide all relevant information in structured formats to track the progress in each business line and monitor the performance of business managers, risk controllers, and other key personnel. It should capture data and particulars from prescribed control returns, process them, and produce information reports that will enable the bank to monitor the risks arising from each business line in relation to the prescribed risk limits. The MIS should be arranged so that the personnel with risk-monitoring responsibility are able to capture all relevant data, detect warning signals, and alert the concerned people at each level.

Monitoring responsibility is not confined to the corporate office alone; it exists

at the intermediate level (regional office) and the field level (branch office). Consequently, the MIS should be accessible to the regional offices and the branch offices, but appropriate safeguards against unauthorized use will have to be in place. The health of large borrowers' accounts needs to be monitored on a continuous basis at the field level by the operating staff. The monitoring will be meaningful only when the field staff have adequate information on the borrower's present state of affairs, including the latest data on production, sales, profitability, share price movements, and so on. The MIS should provide client-wise information on large exposures. Performance parameters and financial ratios of companies engaged in different types of activities should be stored in the MIS to provide support to the monitoring staff for identifying large exposures that pose material risks to the bank.

The review and evaluation function is an integral part of the corporate governance process. The board of directors and the top management undertake periodic review and evaluation of activities and functions of the bank to meet statutory obligations and supervisory requirements, and to assess the effectiveness of systems and procedures. The review agenda is usually large, and the evaluation is based on the actual performance data and other information on a date near the time of review. The role of the MIS in providing support to the review and evaluation function is therefore very significant.

An illustrative list of data and information that the MIS should build up and store is given here:

- Market competition and market share data analysis.
- Macroeconomic indicators.
- External environment scenario.
- Government fiscal and budgetary policies.
- Industrial, trade, and export-import policies.
- Government borrowing programs.
- Profile of peer banks and other competitors.
- Command-area business opportunities, business constraints, and legal impediments.
- Year-wise business profiles.
- Year-wise business plans, business growth targets, and achievements.
- Asset-liability profiles—customer-wise, maturity-wise, and interest-rate-wise.
- Credit profile.

- Client profile (borrowers' and bond issuers' profiles).
- Institutional and large deposit profile.
- Income–expenses profile.
- Foreign operations profile.
- Activity-wise, volume-wise, and profit-wise breakup of business lines.
- Financial ratio indicators like capital adequacy ratio, cost-income ratio, ratios of interest income and non–interest income to total income, credit spreads, and so on.
- Sector-wise, industry-wise, loan-size-wise, client-wise, purpose-wise, interest-rate-wise, and maturity-wise credit distribution.
- Prudential norms and limits on credit risk and market risk (interest rate risk, foreign exchange risk, equity price risk, commodity price risk).
- Credit risk rating models.
- Credit loss estimation models.
- Value-at-risk models.
- Country ratings.
- Risk-grade-wise distribution of counterparties and exposures.
- Credit concentration—exposure-size-wise, risk-grade-wise, large-exposure-wise, group-borrower-wise.
- Sensitive sector exposure—real estate, capital market, and other volatile sectors.
- Rating migration of borrowers into different risk grades for each business line.
- Incidences of nonperforming loans—purpose-wise/activity-wise, industry-type wise, loan-size-wise, and business line–wise.
- Portfolio analysis scenario and portfolio quality migration.
- Debt rescheduling and debt restructuring details of large and mid-cap exposures.
- Trend of credit loss—historical data on probability of default, loss given default and exposure at default, trend of recovery, loan loss provisions, and loan write-off details.
- Off-balance-sheet exposure profile and liability devolvement trend.
- Composition of banking book and trading book.
- Composition and quality of investment portfolio.
- Maturity-band-wise distribution of assets and liabilities—asset–liability

maturity gap statements.

- Liquidity profile—structural liquidity and dynamic liquidity scenarios.
- Behavioral pattern of premature withdrawal of term deposits.
- Behavioral pattern of funds utilization under revolving and renewable short-term credits.
- Seasonality pattern of funds withdrawals under sanctioned limits.
- Trend of prepayment of loans.
- Trend of devolvement of liabilities under financial guarantees and letters of credit.
- Trend and volatility of interest rate movements.
- Trend and volatility of equity price, gold price, and commodity price movements.
- Trend and volatility of foreign exchange rate and foreign exchange exposure movements.
- Review and evaluation of past strategies.
- History of asset price movements (equity, sovereign paper, debt, real estate, etc.).
- Profile of products and services.
- Portfolio-wise probability of default and loss given default for three to five years.
- Business line–wise probability of default and loss given default for three to five years.
- Business line–wise risk-adjusted return analysis.
- Highlights of internal audit reports (list of major irregularities).
- Critical comment chart of bank regulator/supervisor and external auditors.
- Human resources profile.
- Duty allocation, duty demarcation, and job rotation charts.
- Job descriptions.
- Operation manual and procedures.
- Internal audit, external audit, and supervisory audit reports—summary of adverse features.
- Fraud reports.
- Information technology system security and access codes.
- Records of home country and host country regulatory and supervisory

directives.

- SWOT (strengths, weaknesses, opportunities, and threats) analysis.
- Control return charts and schedules—purpose-wise.
- MIS backup and disaster recovery plan.

5.6 VERIFICATION OF RISK ASSESSMENT

An independent team unconnected with the risk management responsibility should evaluate the systems and procedures established by the bank to identify, measure, monitor, and control risks. It involves reassessment of credit, market, and operational and residual risks. The verification team has to assure the bank management and the bank supervisor that the systems and procedures are adequate to capture enterprise-wide risks, and the bank maintains sufficient economic capital to cover potential losses arising from all risks. The team should verify the integrity of the risk assessment procedures, besides evaluating the soundness of the control system within the organization and certifying that the capital adequacy assessment made by the bank conforms to the regulator's prescriptions. This responsibility can be assigned to the internal audit department and occasionally to the external auditors to enhance the credibility of the bank management in promoting sound corporate governance practices. The Basel Committee on Banking Supervision has stated that it is the responsibility of the internal auditors to review the effectiveness of risk management procedures and risk management methodologies.

5.7 HUMAN RESOURCE DEVELOPMENT

The risk assessment environment undergoes frequent changes and, consequently, the counterparty rating models and the risk measurement models must be modified to respond to emerging situations. Banks should develop their own models instead of acquiring models developed by other agencies, because that will obviate the need to approach them frequently for review and revision. The New Basel Capital Accord encourages banks to develop internal models for risk assessment. Banks will have to develop different types of models to rate different types of counterparties to switch over to IRB approach for measuring

credit risk; adopt standardized methods or develop internal models to measure market risk; and follow standardized approaches or advanced measurement approaches to assess operational risk. The New Accord focuses on acquisition of internal capabilities for risk assessment, which require development of human resources within the organization.

Banks require three categories of specialized personnel to efficiently administer the risk assessment function. The first category of personnel will develop formats, templates, and models for counterparty rating and risk quantification. The second category of people will implement the models and techniques across the organization, and the third category of people will conduct validation and back-testing and suggest modifications. Besides, the bank will need other personnel who have exposure to various risk management functions.

The risk management process is complicated, and specialized skills can be developed over a period of time within the organization to understand that process and handle the emerging risks. Banks need to recognize risk management as a specialized function, address the human resource development issues separately, and make adequate provision for specialized personnel within the organization. Banks should not only keep front-line people with specialized skills to manage risks but also a second line of support. The real danger begins when the banks assume that the risk management function is just like any other operational function and take it for granted that an adequate number of personnel with appropriate skills and exposure are available within the organization to manage risks.

5.8 TOP MANAGEMENT COMMITMENT

The meaningful involvement of the bank's top management and their total commitment to providing resource support for efficient administration of the risk management function are important requirements of the corporate governance codes and ethics. Top management consists of the board of directors and the committees of the board and the top-ranking officials of banks that include managing directors, executive directors, and general managers. The board of directors and the top-ranking officials have different sets of duties and responsibilities pertaining to risk management. The ownership pattern of banks, the composition of the board of directors, and the methods of appointment of members to the board (nomination, sponsorship, or election) are significant factors that determine the level of involvement. The demarcation of roles and

responsibilities between board directors and other top management officials differs between banks. Whatever be their roles, the involvement and commitment of the top management should be clearly visible.

The extent of top management involvement and commitment can be judged from certain facts. First, at least a few members of the board and the senior management should be familiar with the risks that occur in banking and be able to identify the risks their own bank faces. The top management should take an active interest in approving risk management policies and strategies, set up models to assess potential losses, and establish risk tolerance limits in relation to the bank's net worth and the risk-bearing capacity. The bank supervisors in many countries carry out due diligence to authorize appointments of board members and certain key personnel in the bank to ensure an appropriate constitution of the board.

Second, the board members and the top management should be committed to carrying out frequent reviews of the risk management function, identifying the strengths and weaknesses in the system, and taking action for improvement. They should formulate business plans in conformity with the risk management policies and risk limits and oversee the activities of risk managers, risk controllers, and the business heads. And third, the board of directors should create an appropriate organizational structure and devote adequate resources and where needed, hire risk management experts. The senior management should position personnel with appropriate background and experience at key risk areas and ensure that independent auditing of the risk management function is done at regular intervals.

5.9 CAPITAL ADEQUACY ASSESSMENT AND DISCLOSURE REQUIREMENT

The New Basel Capital Accord requires banks to have adequate capital to support all risk-taking activities and has given them a range of options to determine their capital requirements. The Basel Committee on Banking Supervision has enjoined the bank supervisors to ensure that “the supervisory review process recognizes the responsibility of bank management in developing an internal capital assessment process and setting capital targets that are commensurate with the bank's risk profile and control environment. … Supervisors are expected to evaluate how well banks are assessing their capital

needs relative to their risks and to intervene, wherever appropriate."[3]

One of the key principles of supervisory review is that "banks have a process for assessing their overall capital adequacy in relation to their risk profile and a strategy for maintaining their capital levels."[4]

The Basel Committee on Banking Supervision has prescribed a set of disclosures aimed at encouraging market discipline among banks in an environment where banks have more discretion to assess their own capital requirements. The disclosures are aimed at providing key pieces of information to the market participants on matters relevant to risk exposures, risk assessment, and the capital adequacy assessment process so as to achieve "a consistent and understandable disclosure framework that enhances comparability." The Basel Committee has not set specific thresholds for disclosures and "believes that the user test is a useful benchmark for achieving sufficient disclosures." But a "bank should decide which disclosures are relevant for it based on the materiality concept."[5]

Assessment of capital requirements is a technical job, and the disclosures of key areas of a bank's functioning, including risk management practices and procedures, are sensitive. The bank should have dedicated teams independent of risk management and risk control responsibilities to undertake these tasks. The development of internal capabilities to deal with these two critical functions—assessment of capital adequacy and finalization of materials for disclosures—is an integral part of the risk management system.

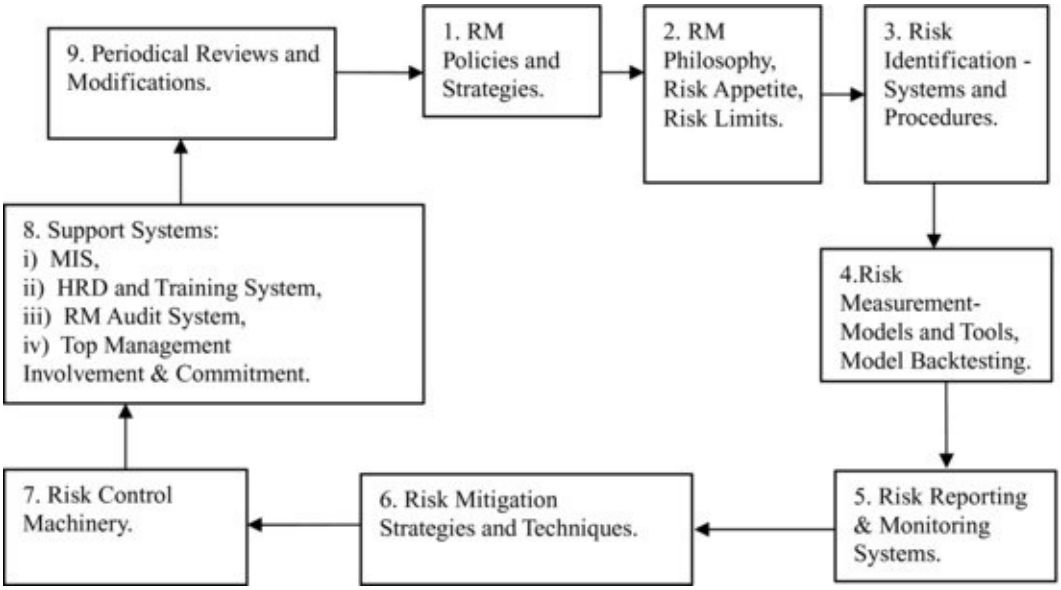
5.10 RISK PRIORITIZATION

The magnitude of credit, market, and operational risks differs between banks on account of differences in activities, business mix, and business volume. It is difficult to pinpoint the type of risk that should be given maximum attention and dealt with more seriously. In deciding the order of prioritization and resource allocation between different risks, the task becomes complicated, as banks face various types of risks, which are often mingled with one another, and which cannot be put in distinct chambers. Fixing of priorities becomes more difficult if the magnitude of losses arising from different types of risks cannot be estimated with some degree of accuracy. The actual losses from risks and the frequency of loss events will differ from year to year, and it is often not possible to decide which should be given more importance in deciding the priority. It is therefore

difficult to suggest a pattern for assigning priorities for resource and capital allocation among three major categories of risks. The better option is to follow the historical loss experiences and the market trend.

The sequential order of the risk management system is shown in Figure 5.1.

FIGURE 5.1 Risk Management (RM) System



5.11 SUMMARY

Banks should formulate a risk management policy, keeping in view their resources, expertise, strengths, and weaknesses. The policy document should reveal the risk management philosophy, risk appetite, and overall risk limit and guide the personnel in conducting the bank's operations in conformity with the risk-taking capability.

Banks should fix risk limits for different operational areas and activities and define the boundary of potential loss within which the line managers should operate. They should frequently revise risk limits in accordance with changing market conditions.

Total risk limit can be fixed as a percentage of the total owned funds and apportioned among credit, market, and operational risks and other residual risks. Within the overall credit risk limit, banks should fix limits on credit concentration, sensitive sector exposure, and large exposures.

The risk identification process should capture risks on an enterprise-wide basis. It should capture multiple risks that arise from a single transaction and

recognize higher risks from term loans and long-dated financial instruments.

Employee work culture, style of management functioning, and efficacy of the control machinery influence the risk identification process. The management permissiveness and weak control machinery increase the incidences and the magnitude of risk. Banks should give due consideration to these factors while assessing risks enterprise-wide.

Risk measurement tools and techniques include both risk rating and risk quantification models. The rating models indicate the level of risks associated with borrowers or facilities, and the measurement models quantify the potential loss that the bank is likely to suffer under different scenarios.

Banks should establish separate credit, market, and operational risk measurement models to estimate potential losses arising from these risks and verify the accuracy of the models through periodic back testing.

Risk measurement models should generate the quantum of expected and unexpected losses on the bank's total exposure, calculate the quantum of borrower-specific and facility-specific potential losses, and enable the bank to calculate risk-adjusted returns on capital employed in different business lines. The model should indicate the benchmark for targeting the capital level to cover potential losses and the quantum of provisions required against loss on asset values.

Risk mitigation is transaction-specific, product-specific, facility-specific, and customer-specific. Mitigation strategies are different for credit activities, investment activities, and trading activities.

Banks should establish rigorous risk monitoring and control machinery to assess risks on a continuous basis since the quantum and the intensity of risks go on changing at quick intervals due to changes in market variables and the operating environment.

Banks should set up a customized management information system to provide support to risk management and balance sheet management activities. They should recognize risk management as a critical function and address human resource issues to build up internal capabilities to develop risk management tools and techniques and assess capital adequacy.

NOTES

1. The Basel Committee's response to the financial crisis: report to the G20, October 2010.
2. New Basel Capital Accord, paragraph 645.
3. New Basel Capital Accord, paragraphs 721, 722.
4. New Basel Capital Accord, paragraph 725.
5. New Basel Capital Accord, paragraphs 810, 817.

PART Two

Credit Risk Management

CHAPTER 6

Credit Problems and Credit Risk

6.1 GENESIS OF CREDIT PROBLEMS

Banks follow standardized procedures for credit management. Yet a good number of credit exposures become nonperforming every year. Important factors that cause credit problems are discussed here.

Lack of Due Diligence in Loan Processing

Under the traditional method of lending, banks carry out due diligence of credit proposals received from new customers to find out whether there are reasonable chances for success of the customer's project/business. Banks collect data and detailed particulars about new customers from published documents and markets, and process and analyze those data to generate three sets of information to screen the customers and select the ones that fall within the loan sanction standards. The first set of information relates to the societal background, the track record, and the market standing of the customer. The analysis enables the bank to form a view about the honesty, integrity, and trustworthiness of the customer. The second set of information relates to the technical feasibility of the project, the infrastructure support, the availability of inputs and personnel, the product quality and marketability, and the past experience and managerial capability of the customer. The analysis reveals whether the customer has reasonable infrastructure support and competency to carry on business in a competitive environment without interruption. The third set of information relates to the financial standing of the customer. Finance-and accounts-related data supplied by the customer are processed to compute standard financial ratios such as a debt-equity ratio, current assets–current liabilities ratio, turnover ratio, profitability ratio, and so on. The analysis of financial ratios and the balance sheet reveals whether the project/business is financially viable. Banks compile cash flow and funds flow statements based on standard assumptions about costs and benefits of the proposed project/business to examine the customer's ability to repay the loan and carry out sensitivity analysis to assess the extent of cushion

available in honoring the repayment obligation, if input costs and output prices change adversely. In this way, banks carry out a detailed due diligence exercise to take an informed and fact-supported decision on sanction of credit.

The genuine due diligence process for credit sanction, if meticulously followed, is likely to reduce the incidences of credit defaults. But in competitive financial markets there are a few factors that interfere with the due diligence process. The first factor is the working environment in which the loan managers operate. It is often seen that the criteria for assessment of the loan manager's performance are not qualitative; the performance efficiency evaluation parameters are usually quantitative. Besides, the corporate policy on rewards and punishments is most often not transparent. Banks fix high targets for lending and grant incentives through rewards and promotions if targets are achieved. The target-oriented approach for achieving accelerated growth of credit dilutes the appraisal process. Besides, intensive market competition that offers customers leverage to dictate terms influences the appraisal standard. The fast-track method of appraisal for securing a share in a loan, where it is syndicated, compels the loan managers to make decisions in haste without thorough assessment of loan proposals.

The second factor that affects the due diligence process is the lack of reliable information on the status and the outlook of the economies in which the bank operates. Many countries do not reveal long-term fiscal, trade, and import-export policies. Besides, the accounting and auditing standards vary between countries, which makes it difficult for the lenders to make a realistic assessment of the balance sheet and financial statements pertaining to the customers. The banks are often compelled to skip the due diligence exercise due to unavailability of certain vital information and make decisions on loans based on their intuitive risk perceptions.

The third factor is the mechanical approach, which banks follow to make decisions on loans relying mainly on credit scoring or credit risk grade. Often, banks attach more importance to risk grade and do not undertake a detailed appraisal of credit proposals. Computation of risk grade may be erroneous if the rating framework is defective. Decisions based solely on risk ratings may lead to larger numbers of defaults. The incidences of defaults will be lower if banks undertake due diligence for credit decisions, besides assignment of risk grade.

The fourth factor that dilutes the due diligence process is the eagerness of banks to increase the nonfund-based commitments in order to enlarge fee-based income, particularly when their profit margins shrink in falling interest rate

scenarios. The focus on nonfund-based facilities may lead to a sudden jump in the issue of financial guarantees, letters of credit, and underwriting commitments. The danger lies not in the increase of nonfund-based business, but in the deficiency of the process for appraisal of proposals. The appraisal and the investigation for grant of nonfund-based facilities to customers are not usually rigorous. The appraisal standard is diluted because it is believed that the liabilities of the bank are of a contingent nature, and if those arise at all, they will occur in the future and also in some of the cases. The strategy for increase in nonfund business is common among banks under a declining interest income scenario, as they earn income without parting with the funds. But the instances of devolvement of liabilities on banks from financial guarantees and letters of credit, due to the customers' failure to honor contracts or fulfill commitments, are rather common. The weakness in the system lies in underestimation of risk associated with nonfund-based commitments and adoption of a softer attitude in performing the due diligence exercise. Banks usually do not assess the impact of devolvement from nonfund-based commitments on the customer's cash flows and fund flows and verify whether the revised cash flows will enable the customer to settle the dues arising from the devolvement of contingent liabilities.

Inaccuracy in Entry-Point Rating

Banks take into account customer rating or facility rating for making decisions on loans and advances. They lay down a set of ground rules for establishing a new credit relationship as well as for continuation of credit to existing customers. A basic requirement of an effective credit risk management system is the prescription of a minimum entry-point risk grade for acceptance of new credit proposals. The risk grade of the borrower is generated either internally through an internal risk rating model or obtained from external rating agencies. The population of customers rated by external rating agencies is low, and where available, the ratings are confined to multinational companies and large corporations. Even otherwise, the ratings by reputed external rating agencies may not be apt, as was evident from the incorrect ratings assigned to mortgage-related securities that were downgraded within a year's time and that created a crisis in the financial market in the United States and contributed to the financial meltdown during 2007 [1]

Banks rely on their internal credit risk rating or credit scoring models for loan sanctions and loan pricing. But if the rating framework is not comprehensive or

periodically tested for validity, the rating will be erroneous. The internal rating is also likely to be inaccurate if some vital inputs are not available. In such circumstances, the risk rating may not reveal the potential weaknesses in the loan proposals. Unless the credit risk rating framework is comprehensive and flexible, and is cognizant of changing risk factors that impact or alter the risk profile of the customer, the risk rating will be erroneous. If the internal risk rating framework does not have mechanisms for automatic factoring of adverse developments that take place in the economy, the financial market, and the capital market, the assigned risk grade will be inaccurate. The assessment of the customer based on that rating will be biased, and the actual risk level associated with that loan will be higher than what is revealed by the risk grade. There is always some time lag before the risk ratings of new and old customers are modified in accordance with the changing risk factors. Credit problems arise because of inaccuracy in assigning entry-point ratings and also because of the time lag involved in modifying the ratings under changing scenarios.

Undue Comfort from Lending against Collateral

Lending against collateral is considered a safe practice, as it is presumed that credit exposures with the backup of collateral are totally recoverable in the event of default by the borrower. But banks have suffered large losses for relying solely on collateral for lending, either due to decline in collateral values or absence of a market for sale of collateral, or because of the long-drawn-out court procedure involved in realizing collateral values. Collateral assets are of two types—financial collateral and nonfinancial collateral. Financial collateral, such as equities and debt instruments, are highly sensitive to changes in market variables. Their prices can change sharply with even small variations in interest rates or foreign exchange rates. Banks sometimes ignore the volatility in the prices of these assets and draw comfort from the marketability of the financial collateral taken as security against a loan. But a rise in the market interest rate can cause substantial erosion in the values of financial instruments held as collateral. The value realized from the sale of collateral may not cover the amount in default. Even the prescription of higher margins on financial collateral to protect loans against the fall in collateral values may fall short of the requirement in times of high market volatility.

Lending against nonfinancial collateral is also a common practice among banks. They grant loans and advances against the mortgage of land, buildings,

plants, and machinery. They also advance money for acquisition of personal assets by customers on which they retain hypothecation rights. In the event of default by the customers, banks often find it difficult to sell the nonfinancial collateral as the sale of second-hand assets is difficult due to the absence of suitable markets. Besides, there can be a significant decline in collateral value due to the passage of time. Most often, it will be a distress sale, and the realized value will be insufficient to cover the loan balance.

Lack of Transparency in Related Party Lending

Related party lending refers to the credit facilities extended to the entities that are owned by the directors, the senior management, or the employees of a bank, or which are controlled by persons related to them. It also includes credit facilities to the concerns in which the directors or the senior management or the employees of the bank have a direct or indirect interest. Sometimes, the persons who manage the concerns, which owe money to the bank, operate under the command of the former sets of people. In such situations, the controlling interest is not clearly visible. The related party concept will thus cover not only the parties who have blood relations with the borrowers, but also those who have vested interests in the concerns that are indebted to the bank. There is no objection in principle to grant credit to related parties if the banking laws and bank regulators permit, but this form of lending is usually not merit based because most often the due diligence exercise is not carried out for making decisions on loans. The related party credit portfolio remains cloudy due to the lack of transparency of the relevant transactions and the absence of laws making public disclosure obligatory. Related party lending usually corrupts the credit portfolio and at times leads to huge financial losses.

Credit problems arise in cases of related parties, because systems and procedures laid down for granting credit are not followed in their entirety, maintaining an arms-length distance. Often, the related party lacks creditworthiness or the amount of credit granted is more than what is admissible under the prevalent norms or beyond the repaying capacity of the party. The terms and conditions of credit are manipulated, and relaxations and exemptions are allowed, which are not justifiable on prudential grounds and also not admissible to other customers. The problem is not confined to the credit granting process alone; it can arise at a later stage due to the leniency shown by the bank officials in supervising and following up the related party credit that impairs the

credit quality.

Related party lending is more common among banks that are privately owned or banks in the cooperative sector, which operate mostly in rural areas and serve low-profile customers. In privately owned banks, directors and other officials who exercise credit granting powers are often placed in those positions by persons who wield money power and enjoy political patronage and who want to get undue benefits from the bank. As a result, the credit granting standards get diluted. The practice is more pervasive among the cooperative banks due to the inherent flaws in the composition of the management committees, which are dominated by members who lack professionalism but enjoy political patronage, and also due to the permissive attitude of the government. In general, credit sanctions and credit rejections are not merit based in cooperative banks. The credit portfolios of cooperative banks are usually contaminated and difficult to evaluate due to the lack of transparency. In certain countries, the problem of related party lending is tackled through banking laws and regulations that prohibit sanction of credit to the relatives of directors or to the concerns in which the directors are interested. But the legislation has proved to be inadequate due to the difficulties in proving the existence of a relationship between the bank directors and their representatives and the owners of borrowing concerns or due to the lack of clear definition of controlling interest.

Prevalence of Credit Concentration

“[Credit] concentrations are probably the single most important cause of major credit problems. Credit concentrations are viewed as any exposure where the potential losses are large relative to the bank's capital, its total assets or, where adequate measures exist, the bank's overall risk level. Relatively large losses may reflect not only large exposures, but also the potential for unusually high percentage losses given default. … A high level of concentration exposes the bank to adverse changes in the area in which the credits are concentrated.”[2]

Credit concentrations are grouped in two broad categories:[3]

- Conventional credit concentration.
- Concentration based on common or co-related risk factors.

Conventional credit concentrations refer to significantly large exposure to a single borrower or borrowers belonging to the same group, industry concentration, sector concentration, or geographic concentration (high volume of finance in one or two preferred locations in a country, significant cross-border

exposures in one or two foreign countries, or exposures in a group of foreign countries whose economies are strongly co-related). For example, credit concentration in the commercial and residential property market in Thailand and Hong Kong contributed to the financial crisis in Southeast Asia during 1997, and in the residential property market in the United States resulted in the U.S. financial crisis during 2007.

Conventional credit concentration also includes:

- Concentration by facility type, such as fixed tenure loans, stand-by commitments, subscription to corporate debentures and bonds, purchase and discount of trade bills and checks.
- Concentration of lending against the same type of collateral, such as mortgage of property, hypothecation of cars, or pledge of shares and bonds.
- Concentration of loans of the same maturity.

The judgment of whether the concentration exists or not should be based on the whole range of activities that involve counterparty risk and not solely on credit exposure alone. Sometimes, banks do not have the option to avoid some level of concentration, either because they do not have access to diversified parties or do not possess skilled staff to deal with all kinds of activities. Small banks are prone to develop portfolio concentration, as they are unable to compete with large market players in certain spheres of activities, and they do not have the cushion to offer concessions on terms and conditions.

Concentration per se is not the sole criterion for rejecting credit proposals of good quality if banks take precautions to mitigate the additional risk from concentration. Some banks often draw comfort from concentration, as they believe that they enjoy core competence over their rivals in certain types of financial activities, and they have the wherewithal to build up a niche market in those areas. Bank regulators and supervisors advise banks to fix outer limits for lending to a single borrower or a borrower-group and also diversify their loan portfolio to reduce the risk of concentration. But it is often difficult for banks to reduce concentration within a specified time, as concentration can be diluted over a period. Sometimes, the benefits of diversification may not be rewarding, if the risk of potential loss from concentration is assessed to be less than that from forced diversification.

The nonconventional type of concentration risk emerges from common risk factors, or from linkages between different risk factors. It may also arise from

large exposure concentration, if there is economic or price shock, or from structured financing or asset securitization. The Asian financial crisis of 1997 to 1998 has shown that there is a strong correlation between credit risk, foreign exchange risk, and liquidity risk. The depreciation in exchange rate increased the risk of foreign banks, which had large foreign currency exposures in some of the emerging markets of Asia. The adverse exchange rate movement increased the repayment obligations of the banks' borrowers in terms of domestic currency. Consequently, credit defaults increased and banks' liquidity positions deteriorated. Nonconventional type of concentration risk also arises in cases of structured financing, or it may surface from securitization of the pools of assets through the leveraged special-purpose vehicles during the downturn of the economy, as it happened from securitization of residential property mortgages in the United States, particularly during 2000 to 2006.

Laxity in Credit Supervision and Credit Monitoring

Laxity in supervision and follow-up of credit leads to faster deterioration in credit quality and increase in potential loan losses in the event of default. Various factors cause downward migration of risk rating of borrowers. Failure or laxity in postdisbursement supervision over credit increases the possibilities of downward movement in ratings. The quantum of loss on inadequately supervised credit will be more than what is shown by an internally developed credit risk model under normal circumstances, because the loss given default and the exposure at default are likely to be more than model averages. If larger incidences of downward migration of ratings are observed in some subportfolios without apparent reasons, the bank need not hasten to find exit routes for existing exposures and restrict further addition, without assessing the opportunities and the prospects of business in the concerned subportfolios. The bank should find out whether laxity in credit supervision has contributed to the downgrading of ratings assigned to the borrowers in the affected portfolios.

Credit supervision includes observance of documentation and funds disbursement procedures, monitoring and follow-up procedures, and keeping track of collateral, borrower's business, and activities. Defective and incomplete documentation, lack of vigilance by the bank over the end-use of funds, diversion of funds for unproductive or speculative purposes, manipulation of accounts through intercorporate transfer of funds by the borrowers, and the bank's laxity in tracking the condition of collateral and establishing effective

communication with the borrowers are the common deficiencies that are observed in credit administration. These types of laxities in supervision cause larger credit losses. Banks often fail to carry out timely inspection of mortgaged properties and stocks and collateral charged to them and keep track of the current condition of collateral and the erosion in value. Slackness in the periodic inspection of collateral encourages unscrupulous borrowers to tamper with the security. Frequent credit problems arise on account of failure to monitor and supervise the activities and the loan accounts of the borrowers.

Absence of Credit Audit Mechanism

Absence of a credit audit mechanism increases the possibilities of poor credits continuing in the books of the bank. Credit audit or credit review refers to an independent assessment of the quality of new credits sanctioned by different functionaries within the organization by a team of expert credit appraisers who are independent of credit origination and credit sanction responsibilities. The scope of credit audit sometimes extends to credit exposures already existing in the books of the bank.

Credit covers all types of exposures that carry default risk, including investment in bonds and debentures that serve as credit substitutes. Credit audit assures in time the quality of credit and catches the early warning signals for remedial action. Banks establish standards for credit sanction based on relevant factors that govern the soundness of credit proposals. The purpose of credit review is to reassess the credit proposals and ensure that credits are granted in accordance with the approved policy and prescribed standard of the bank, and credit decisions are not influenced by extraneous factors or an undisclosed relationship between the borrowers and the sanctioning authority.

An effective credit audit system should recognize the need for an early review of new credit exposures and ongoing reviews of existing exposures. The floor limit of exposures for compulsory credit audit will vary between banks due to differences in sizes and business activities and exposure-size distribution of credits. Audit of new credits should cover at least large value exposures and take place soon after sanction, as late review reduces the options for credit enhancement. Audit of credits that already continue in the books of the bank should cover large exposures on a sample basis or turn basis.

Credit audit achieves two basic objectives of good credit administration. First, a well-established credit audit mechanism promptly identifies the loans and

advances that display early credit weaknesses and allows time for the bank to devise strategies to protect its interests. Second, the credit audit system prevents bad credits being granted by the sanctioning authorities, as they know that their actions are subject to review soon by an expert group of credit appraisers. This reduces the scope of operational risk arising from the “people” component by checking the misuse of loan sanctioning powers.

Absence of Portfolio Evaluation System

Portfolio evaluation aims at assessing individual credit quality and potential credit losses from the portfolios. The bank will not be able to track the quality of credit portfolio if it does not undertake portfolio evaluation at regular intervals. An effective portfolio evaluation system seeks to diagnose the problem sectors and problem industries in advance and helps the bank to chalk out strategies for reduction of affected exposures. The evaluation throws lights on the problems that may develop in certain areas and indicates the manner in which the existing standards for credit acceptance should be enhanced.

Different techniques are in vogue for portfolio evaluation. An impressionistic evaluation of a portfolio can be done based on economic analysis and market reports on the sector or the industry relevant to the portfolio. An impressionistic view often provides clues as to how the credit portfolio should be restructured to avoid large-scale deterioration of credit quality. But more realistic assessment of portfolios can be done through the risk rating migration exercise and credit risk measurement models. The portfolio quality can be evaluated by tracking the migration of borrowers from one risk grade to another within the selected time zones and measuring the variations in potential losses associated with the portfolios over a period of time. The bank should evaluate the trend emerging from the portfolio analysis against its declared credit policy and restructure the portfolios if noticeable deviations are observed. The absence of a portfolio evaluation system hides potential credit problems.

Introduction of New Products without Preparation

Sanctioning credits based on a sound due diligence process has its own merits, though it is relatively time consuming. Adoption of new techniques for

achieving accelerated credit growth without adequate preparation is fraught with greater credit risk. This is particularly true if the new credit assessment method dispenses with the comprehensive appraisal of credit to achieve quicker sanctions. Banks seek to achieve faster credit expansion by widening the range of credit products and by introducing new lending techniques, besides entering into new areas of operation. Certain credit products are complex, and dealings in these products require tailored and tested procedures for decision making. For example, dealings in unfunded and funded credit derivative products are very risky, because credit risk in these products is not always visible and identifiable. The officials who deal in credit derivatives should have special skills to assess the exact nature and the quantum of credit risk arising from each derivative transaction. It is, therefore, highly risky to introduce new credit products without setting up proper handling procedures and developing the competency to handle them.

Another issue is the adoption of new lending techniques based on credit scoring or credit ratings without going through an elaborate credit appraisal process. The new technique may include an abridged credit appraisal procedure. Credit decisions based on mechanical credit rating or credit scoring are likely to display higher probabilities of defaults. On the contrary, loans sanctioned after a genuine due diligence exercise carry lesser default probabilities, because the whole loan sanction process includes an elaborate assessment of the borrower and the project, based on subjective and objective factors, and an evaluation of the prospects of recovery under normal and deteriorating conditions. Banks are likely to suffer greater losses if they choose shorter routes for credit sanctions. The new lending techniques or procedures should be tested before final adoption. The bank can undertake a trial run of the new procedures by granting loans to a sample of borrowers, capture the incidences of default, and compare the default data with the average default probabilities on similar types of loans sanctioned in the past after detailed appraisal. If the incidences of default on new loans are on the high side, the bank should make amendments in the appraisal procedure and incorporate additional factors drawn from the due diligence process in the rating model. The trial run of the new lending techniques may take some time, but it is worthwhile in the long run.

High Leverage to Preferred Borrowers

The capitalization ratio or the debt equity ratio is used as a yardstick to make

credit decisions and determine the size of the exposure that can be granted to the borrowers. In general, commercial banks define debt equity ratio as the ratio of total outside liabilities to equity, and term lending institutions define it as the ratio between funded debt and equity. The prescription of a benchmark debt equity ratio ensures that the borrowers have a reasonable stake in the enterprise, which induces them to run the business on sound lines and repay the bank's dues. Consequently, banks should insist on a minimum capitalization ratio.

The debt equity ratio varies according to the size of the industry and the nature and the capital intensity of the projects, and ranges from 2.5:1 to 4.0:1. The ratios for industrial projects are different from those applicable to other types of business, but most often, the difference is only marginal. Though the debt equity ratio can be made flexible for credit sanction, it will have to be within a safe range so that borrowers do not indulge in “overtrading.” It should be at levels that compare favorably with the averages maintained in the banking industry. Banks usually have a list of preferred categories of borrowers who, they believe, are financially strong and have well-organized, profitable business establishments. They often relax the terms and conditions of loans to retain the preferred borrowers in their books. Taking advantage of the bank's weakness to retain the relationship, some borrowers avail themselves of large amounts of loans from several banks without bringing in matching amounts of equity. This raises the debt equity ratio much above the safe level. Sooner or later, credit problems surface as the borrowers’ stakes in the business get diluted. In the worst case, they become bankrupt or insolvent, and banks incur large losses.

6.2 CAUSES OF CREDIT RISK

Multiple causes lead to credit risk. The more common among them are imprudent credit decisions, deficient credit management, emergence of unexpected events, and the recalcitrant attitude of borrowers. In general, a combination of external and internal factors generates credit risk for banks. External factors relate mainly to weakening macroeconomic fundamentals, deteriorating condition of the economy, and unfavorable developments in external markets. The negative impact of these factors adversely affects the business of the borrowers, which result in reduction of income and impairment of the debt-servicing capacity. External factors like changes in government fiscal and budgetary policies, liberalization of import and export policies, imposition of trade restrictions and sanctions, or adverse movement of financial market

variables affect the quality of banks' credit portfolios. External factors influence the economy in a large way and sometimes trigger an economic downturn. During the downward phase of the business cycle, the economic activities slow down, the volume of production and sales decrease, and the output prices fall due to the slackness in demand for goods and services. The market sentiments also affect the prices of equities and bonds. Larger incidences of credit defaults take place during the economic downturn, and the quality of banks' credit portfolios deteriorate. Conversely, during the boom phase of the business cycle, borrowers' income gets augmented on account of higher production and higher demand for goods and services. The borrowers' repaying capacity improves, and the incidences of credit defaults come down. During the economic downturn, credit risk increases, and during the upturn, credit risk declines. The extent up to which credit risk will decrease or increase on account of variances in economic activities will depend on the intensity of the boom and the depression of the trade cycle, besides the duration of the cycle.

Internal factors associated with the borrowers and their businesses are the major causes of banks' credit risk. Internal factors like business failures, financial mismanagement, lack of corporate governance, and inefficient project management generate larger credit defaults. By and large, credits for manufacturing operations and trading of goods and services constitute the major portion of banks' credit portfolios. Lack of appropriate technical know-how and managerial experience, inefficient production processes, and poor inventory management are some of the common factors that erode production efficiency and product quality. Lack of demand for substandard goods and services and poor sales management acumen aggravate the problem further. These negative factors cause decline in the borrowers' income, impair cash flows, and increase the probability of default. Besides, the borrowers who have obtained foreign currency loans from banks but have not taken cover for exchange risk, or who do not have foreign currency earnings by way of export of goods they produce, cause greater credit risk for banks because of the usual volatility in exchange rate movements. Dishonesty and unethical attitudes of borrowers are also one of the major causes of credit risk. Often, borrowers are reluctant to repay the loans, though they have repaying capacity. They refuse to disclose the actual status of their business to the banks with the intent of seeking favor for waiver of loans.

The internal factors and the external factors, either singly or jointly, increase the incidences of credit defaults. Other things remaining equal, the efficacy of the legal system, the attitude of the society toward the defaulting borrowers, and

the political interference largely influence the credit granting environment and the level of credit risk for the lenders.

6.3 SUMMARY

Intensive competition between banks impairs the due diligence process for loan sanctions and gives leverage to large and financially strong borrowers to dictate their terms. Banks often skip the due diligence process and make credit decisions based on credit rating or credit scoring, which leads to credit problems at a later date.

Credit quality gets diluted if too much reliance is placed on credit rating or credit scoring, disregarding other factors relevant to the loan appraisal.

A combination of factors, which are both external and internal to the bank and the borrower, generate the majority of the credit problems.

Credit problems arise from credit concentration, undue reliance on lending against collateral, and skipping standard procedures for granting credit to related parties.

The related party credit portfolio remains cloudy due to the lack of transparency of related party transactions and the absence of relevant laws for compulsory public disclosure.

Lack of effective credit supervision results in the downward movement of counterparty risk grades and increases the quantum of credit loss. Besides, the absence of a credit audit system increases the possibility of poor credits remaining hidden in the books of the bank without receiving attention. Likewise, the absence of a portfolio evaluation system delays detection of deterioration in the portfolio for corrective action.

A strong correlation exists between credit risk and business cycle, and the extent up to which credit risk will increase or decrease on account of trade cycle effects depends on the intensity of the boom and the depression of the cycle, besides the duration of the cycle.

NOTES

[1] The United States Financial Crisis Inquiry Commission Report, January 2011.

[2] “Principles for the Management of Credit Risk,” BCBS, September 2000. For more details on credit risk–related problems, readers may refer to the original

BCBS document at Bank for International Settlements, www.bis.org.

[3] "Principles for the Management of Credit Risk," BCBS, September 2000.

CHAPTER 7

Identification of Credit Risk

7.1 MARKET RISK AND CREDIT RISK RELATIONSHIP

Volatility in market risk factors, like changes in interest rates and exchange rates, generates credit risk, as was clearly evident during the Asian financial crisis of 1997 to 1998. The debt burden of the banks' clients, who had obtained foreign currency loans, increased substantially in terms of the domestic currency when the exchange rates depreciated appreciably, which led to large-scale credit defaults that resulted in the financial crisis. The credit risk of banks increased substantially due to the increase in interest rates and depreciation in the exchange rate.

Credit risk denotes the probability of default in meeting financial commitments, and market risk denotes the possibility of erosion in the value of assets or earnings. Between credit and market risks, it is not possible to say with certainty which has relatively greater impact on banks. It largely depends on the asset composition, the macroeconomic condition of the economy, the volatility of the financial and capital markets, and the overall operational environment. Where loans and advances constitute a significant portion of the balance sheet, and the operating environment is not conducive to the development of sound business, and the legal system in support of the lender is weak, the intensity of credit risk is likely to be of a larger magnitude.

There are certain distinguishing characteristics between credit and market risks that reveal their true nature. First, credit risk usually lasts longer than market risk because it is difficult for banks to liquidate loan assets at their option, while there are established markets for selling investment assets. The exit route for investments is far easier than that for loans and advances. Credit risk continues till the relationship with the borrower is terminated. This is more so, because credit exposures to customers take place in various forms, and one or the other exposure continues to exist for a long time.

Second, it is more difficult to make a reliable estimate of decline in the values of credit assets since market values of loan assets are not known due to the absence of a secondary market for the sale of loan assets. But decline in the values of trading book assets can be assessed with some degree of accuracy because the market for sale of sovereign securities and bonds and equities is usually active.

Third, banks can avoid credit risk on their investment portfolio to a significant extent since they have options to purchase securities issued by sovereign countries, which are free from credit risk, but they cannot avoid market risk due to the possibility of upward movement in interest rates that will cause decline in the security values. Banks have also greater options in building up their investment portfolio in keeping with the maturity pattern of their liability portfolio, as securities and debt instruments are available for varying maturities and coupons as compared to the options available for development of the loan portfolio, since needs and preferences of customers dictate the terms of loans.

Fourth, market risk can be eliminated through the simultaneous process of borrowing funds and lending the same in the same currency, protecting the desired interest spread, but credit risk cannot be avoided. If the lending rate is made to float and linked to the borrowing rate, the bank will not suffer from reduction in interest spread on account of adverse movements of interest rates. If the loan is given in foreign currency and the funds are also borrowed in the same currency from another source, there will be no net impact on the lending bank on account of movements in exchange rates. But if the counterparty defaults in repaying the loan, there will be problems for the lending bank, as it will have to repay the funds to the creditor on the due date. The credit risk will continue to exist, though interest rate risk and foreign exchange risk can be avoided.

7.2 CREDIT RISK IDENTIFICATION APPROACH

Complications in Credit Risk Identification

Risk managers face several challenges in identifying credit risk because it remains hidden in investments and certain other types of transactions including derivative transactions. Loans and advances are the largest source of credit risk to banks, but it exists in other activities, which do not always involve lending of

funds. Banks face credit risk from acceptances, interbank transactions, foreign exchange transactions, financial guarantees, letters of credit, and derivative transactions in futures, options, and swaps. Credit risk exists in both the banking and trading books. Banking book exposures comprise loans and investments that are intended to be held on a long-term basis, and trading book exposures consist of assets like securities, bonds, debentures, equities and foreign currencies that are intended to be traded in the short term. Credit risk also exists in off-balance sheet exposures, the volumes of which are often very large. Identification of credit risk therefore covers all on-balance-sheet and off-balance-sheet exposures.

Credit risk identification involves a few complications. Banks need to resolve a few issues if they want to establish a comprehensive credit risk identification procedure. The first issue relates to the development of satisfactory methods to identify the magnitude of risk that arises from the complex ownership structure of large companies and the vastness of the geographical spread of their operations. Large companies have several manufacturing and trading establishments, and they conduct their operations through several affiliated units. In such cases, there are high possibilities of underassessment of risks, because each establishment is usually treated by the customer as a separate unit. This type of phenomenon may lead to excess credit being enjoyed by them and may result in credit diversion or lead to overtrading, which poses additional risks. Often, there is lack of transparency and disclosure by the companies of the affairs of their associate concerns or lack of clarity on the ownership and business relations between the establishments. The obligations of a large company to the affiliated units for rescue in times of distress increase the risk of the bank even though the latter has no direct exposure to the affiliated units, since the problems encountered by any affiliated unit may be transmitted to the parent. The real challenge lies in capturing credit risk from all the facilities provided to large corporations on a bank-wide basis across all the geographical locations where the customer and its affiliated concerns have dealings with the bank. Banks often make a mistake in identifying the magnitude of credit risk from the counterparty on a stand-alone basis at each location separately. They ignore the fact that the same counterparty or its affiliated concerns have dealings with them at other locations. Sanction of a facility to the parent company or its affiliated concerns or executing a transaction on behalf of them gives rise to credit risk of different dimensions and magnitude, and alters the risk profile. The segmented approach does not actually capture the level and the magnitude of credit risk faced by a bank from exposures to large corporations or exposures to

the group of firms under the control of the same management. Where an intercorporate relationship exists, the risk identification process must recognize the additional risks emerging from that relationship. The credit risk identification process must recognize the risks from each facility and each transaction on an integrated basis in order to arrive at the total credit risk from the customer-group that enjoys multiple facilities at multiple locations.

The second issue that makes it difficult for banks to identify the actual level and magnitude of risk relates to the problems that arise from the borrowing pattern of large corporations. Multinational companies borrow from multiple sources and require multiple facilities from banks. They seek credit facilities from more than one bank, partly because their requirements are large and partly because they want to broaden their relationship. They choose banks that offer the most competitive terms and conditions. Banks try to reduce the magnitude of risk by limiting the exposure size through loan syndication and loan participation. But the financials and other particulars, which were taken into consideration by the lenders at the time of processing the loan applications, may not reveal the correct picture if multinational companies borrow from multiple sources. The multiplicity of lenders also makes the position of collateral unclear. The lenders' free access to the collateral gets restricted, and the enforceability rights get eroded. The emergence of adverse features in the accounts of the borrower in one bank may alter the risk level of other banks of the same borrower due to the contagion effect. This type of development either remains unknown to other banks or there is a time lag before they come to know about it. Banks need to recognize additional risks from exposures to multinational companies where multiple lenders are involved.

The third issue relates to the lack of satisfactory procedures to capture the total risks emerging from the wide range of facilities that large companies enjoy from the entire banking system. The companies ask for different types of fund-based and non-fund-based facilities from different banks. It is often difficult to precisely assess the total risks from large borrowers who enjoy multiple financial facilities. For example, the issue of financial guarantees on behalf of a customer may increase the level of risk on the overdraft or the loan facility given to the same customer due to the increase in exposure size or fall in the collateral coverage. Sometimes, banks may not be aware of the total facilities enjoyed by the multinational companies from the entire banking system. The challenge lies in establishing a satisfactory procedure to recognize the total risks from the package of facilities enjoyed by large customers from the entire banking system.

The fourth issue relates to the problem in establishing acceptable criteria to define credit “concentration” and the methods to estimate additional risks from it. The bank has to set up norms to identify the areas of concentration in its business and recognize the magnitude of concentration risk in the risk assessment process. Concentration risk can arise from any type of concentration: (1) credit concentration, portfolio concentration, sector concentration, investment concentration, derivatives concentration, (2) geographical concentration, (3) client concentration—single client or group-client concentration. In the normal course, banks usually address the concentration risk through prescription of risk limits. What is important in this context is that, in addressing this issue, the existence of concentration is often ignored or underplayed, and recognition of additional risks is avoided. But it is necessary for the bank to identify the areas of concentration and increase the magnitude of risks emerging from the relevant area. It is difficult to specify methods for estimating additional risk from concentration. One way will be to follow the guidelines of the bank supervisor. Another option is to ascertain the best practices in the industry and adopt similar norms to identify the portfolios where concentration exists, and to increase the quantum of risk in the calculation process by adding a fixed percentage of the total exposure in the relevant area on an ad hoc basis. This will also ensure that additional capital is maintained against concentration risk on the incremental exposure.

The fifth issue relates to the appropriateness of the procedure for risk identification in respect of small exposures. If the bank has a large number of customers who have been sanctioned loans for small amounts, it is difficult to assign a risk grade to each borrower as the task is voluminous. A simple identification procedure based on an asset-pool approach may serve the purpose. The pool approach will have to be based on the homogeneity of borrower characteristics and the similarity of purpose, assets, or collateral. But in cases where the bank's credit portfolio consists predominantly of large exposures, the risk identification has to be on an individual customer basis. Banks that have a mix of large and small customers may adopt a combination of individual customer-based approaches and asset-pool-based approaches.

Credit Risk in Problem Loans

Loans that are not repaid on the due dates are classified as overdue loans. These loans are categorized as nonperforming or nonaccrual for accounting purpose

after a specific period, which usually varies from one month to three months or sometimes six months. Loans that show adverse features, but which are not in a nonperforming state, are usually marked as watch category loans or problem loans. Credit risk is deemed to have materialized in the case of nonperforming or nonaccrual loans, while it is about to materialize in the case of watch category or problem loans. Credit risk focuses on the probability of default, and it is conveyed in terms of the level of risk associated with an exposure before default, such as high, moderate, or low. The level of risk indicates the quantum of loss that may arise in the event of default. Credit risk is a dynamic concept, and over a period of time, the level of credit risk associated with a particular credit exposure will increase, decrease, or remain the same. It is therefore necessary to recognize higher risk from problem loans. An important task in managing credit risk is to identify problem loans before default and initiate measures to improve their health.

7.3 CREDIT RISK IDENTIFICATION PROCESS

Credit Risk from Loans and Advances

Loans and advances usually constitute the largest item of the assets of commercial banks. They grant loans and advances to different types of counterparties, from individuals to sovereign governments, and for several purposes; and to several economic sectors, like the industrial sector, service sector, trade sector, agricultural sector, and export-import sector. Large-value loans are granted for financing infrastructure projects or large-value assets, such as aircraft and ships. Small-value loans are given for a variety of purposes that include personal needs. Again, the loans and advances are given for varying periods—short-term, medium-term, and long-term. Due to these multiple characteristics of loans and advances, credit risk is recognized as the most obvious, most frequently occurring, and most voluminous risk of commercial banks. Consequently, it is necessary for banks to allocate a large amount of resources for credit risk management.

The degree of credit risk is not identical in all types of loans and advances, and at least three factors influence the degree of risk. The frequency and the intensity of credit risk vary in accordance with the constitution of the counterparty, the

purpose of loans and advances, and the maturity period. The bank's customers, who are more strictly regulated by provisions of law than those who are unregulated or unorganized, observe better financial discipline and greater transparency in dealings and are less likely to default on loans and advances. For example, a corporate customer has several obligations to perform under the provisions of the Companies Act. It is legally required to observe corporate governance codes and conduct, adhere to standard accounting practices, maintain the transparency of its dealings, and make substantial disclosure of its business affairs. On the other hand, the provisions of laws governing individuals or sole proprietors, partnership firms, and other forms of constituents, like trusts, are not so strict. Consequently, these types of customers have the tendency to breach the codes of conduct, manipulate accounting standards and block transparency in dealings. Obviously, therefore, credit risk from the noncorporate constituents is greater than that from the public and private limited companies. In some countries, banks are directed through government regulations to make a minimum percentage of loans and advances to target customers, who are usually poor and who pursue small business and agricultural activities. Loans to these categories of people, who are unorganized, illiterate, and inexperienced, usually carry higher credit risk.

The second factor that generates credit risk of varying intensity is the purpose of the loans and advances. In general, the purpose of the loan is more important than the person who takes the loan, that is, “what for” is more significant than “to whom.” Where loans are granted for productive purposes, say, for production of goods and services or purchase of machinery or setting up infrastructure projects like power plants, there is certainty of income generation for repayment of the loan. The degree of credit risk is relatively low because of the self-liquidating character of the loans. But where loans are granted for speculative purposes or unproductive purposes, income generation is uncertain and often inadequate, and it is linked to the occurrence of favorable events. In these types of loans, the degree of credit risk is higher and the chances of default are greater. Thus, loans granted for productive purposes carry a lesser degree of credit risk than those granted for speculative and consumption purposes.

The third factor is the maturity period of loans and advances. The longer the maturity period of a loan, the greater will be the credit risk associated with it. This is because the more distant the future, the greater the amount of uncertainty is. More uncertainty signifies greater risk. The internal and external factors, which cause fluctuations in business volume and income level, are more likely to

manifest themselves in some measure over a longer time horizon. Short-term advances that are granted for working capital purposes and are renewable half-yearly or annually carry lower risks than those associated with medium-term and long-term loans.

It is necessary to be cognizant of these three factors that generate credit risk of varying degrees and intensity in the development of models for credit risk rating.

Credit Risk from Investment

Credit risk in investment refers to the probability of committing default by the counterparties in repaying the amounts due on the financial instruments like securities, bonds, and debentures, and in the event of default, the amount of loss that the bank may incur on the investments. Besides the risk of default in repayment of the principal due on the financial instruments by the counterparty on the redemption date, credit risk in investment also includes the risk of erosion in the value of the investment assets before default on account of issuer-related problems, like deterioration in the financial position of the issuer. This is in contrast to the market risk in financial instruments where the values of the investment assets decline due to the movement of market risk variables like interest rate and exchange rate. The New Basel Capital Accord requires banks to hold additional capital against credit risk in financial instruments.

In our attempt to identify credit risk from investment, we are looking at the investment portfolio of commercial banks that invest funds in fixed income financial instruments for appreciation of capital and earning of interest. Investment activities of commercial banks are mainly confined to funds management and investment management, and credit risk in investments can be identified from the internal or external rating of the issuer or the financial instrument. Banks draw comfort from the quality of the financial instruments from the ratings assigned by the external rating agencies without assessing the reliability and competency of the agencies or cross-checking external ratings with internally generated ratings. They also make investment decisions based on their own risk assessment when ratings are not available. For many banks, investments in corporate bonds and debentures constitute a significant portion of total assets, partly because the clients show preferences for credit substitutes (subscription to bonds and debentures) in lieu of direct credit lines and partly because the banks themselves look for better avenues of earnings as interest margins on loans start shrinking. But banks often fail to take serious note of the

element of credit risk involved in various types of financial instruments. Unrated financial instruments offer high returns, but they carry high credit risk. Where the investment portfolio consists of a large amount of unrated financial instruments, banks are exposed to a high level of credit risk.

Credit Risk from Off-Balance-Sheet Exposure

Credit risk in off-balance-sheet exposures refers to the possibility of loss that a bank may incur on account of default by the counterparty in performing obligations or honoring commitments under agreements or contracts. Off-balance-sheet facilities are provided through different types of financial instruments. The exposures do not involve parting of funds in the beginning, but in the event of failure by the counterparty to perform its duties and obligations or honor its commitments, the bank is forced to meet the liabilities immediately or incur costs to honor its own commitments. Banks assume contingent liabilities under off-balance-sheet transactions. The instruments contain an element of credit risk, as the assumed liabilities may devolve on the bank due to the failure of the counterparty to perform contractual obligations. Common off-balance-sheet items are financial guarantees, letters of credit, acceptances and endorsements, standby commitments and other financial instruments with similar characteristics, and derivative transactions.

Different types of off-balance sheet exposures carry different levels of credit risk. The off-balance sheet items can be broadly classified into four groups:

1. Guarantees, letters of credit, warranties, indemnities, and performance bonds.

2. Irrevocable commitments with certain and uncertain draw-downs.

3. Market-related transactions such as foreign exchange, interest rate, and stock index–related transactions.

4. Customer claims arising from advisory services, management, and underwriting functions.

The relative degrees of credit risk arising from different types of off-balance-sheet instruments differ in their intensity and can be broadly grouped into three categories of credit risk.

In “The Management of Banks’ Off-Balance-Sheet Exposures” (March 1986),[1] the BCBS has suggested the classification of off-balance-sheet activities into three categories of risks:

1. “Full risk”: “where the instrument is a direct credit substitute and the credit

risk is equivalent to that of an on-balance-sheet exposure to the same counterparty."

2. "Medium risk": "where there is a significant credit risk but mitigating circumstances which suggest less than full credit risk."

3. "Low risk": "where there is a small credit risk but not one which can be ignored."

Examples of full risk category instruments are guarantees and acceptances, which act as direct credit substitutes and carry credit risk equivalent to that of a loan. Sale of assets to a third party where the transaction is with recourse and the bank retains the credit risk is a full credit risk category transaction. Financial instruments, which can perform different types of functions, should be bracketed in the respective risk category in accordance with the characteristics of their function. In other words, instruments that work as direct credit substitutes should be treated as equivalent to loans and categorized as having full credit risk. Irrevocable commitments, which are binding on the bank, will involve full credit risk. Where the assets are sold under the "repo" (asset sale and repurchase agreements) arrangement and the asset in question is certain to come back to the selling bank, the latter continues to bear full credit risk on the assets sold. Since there is a possibility of failure by the counterparty to the repo to deliver the asset, an additional credit risk equivalent to the replacement cost of the asset involved in the repo will have to be counted. In respect of outright forward purchase, full credit risk will have to be recognized.

Credit risk from documentary letters of credits should be placed under the medium-risk category because of their short tenure and collateral protection. Indemnities, warranties, and performance bonds, though they are similar in characteristics like guarantees, may be put in the medium-risk bracket because they do not work as direct credit substitutes, and the chance of credit risk materializing is dependent on the ability of the third parties to meet their obligations. Another reason is the lower quantum of loss experienced by banks on these types of instruments. In other words, credit risk from off-balance-sheet exposures where the instruments pose substantial risk, but there are risk-mitigating circumstances suggesting less than full risk, can be placed under the "medium-risk" category. Unconditional standby facilities, note issuance facilities, and revolving underwriting facilities carry moderate degrees of credit risk. In the case of the first type of facility, the bank is compelled to lend at the customer's request, and in the cases of the latter facilities, the bank acts as the "underwriter." These instruments should be placed at least in the medium-risk

category.[1]

There are certain types of transactions where the banking practices are such that they pose medium to small credit risk. For example, in respect of bills of exchange purchased or discounted under a letter of credit, which has been confirmed by another bank, or trade bills that have been endorsed or accepted by another bank, credit risk represents exposure to a bank and can be categorized in accordance with the risk rating of the latter bank. The advisory, agency, and underwriting functions are such that these do not give rise to credit risk, but there are possibilities that the bank may be drawn to payment of claims on account of negligence or breach of obligations. Banks are often complacent in extending off-balance-sheet facilities and do not always carry out due diligence exercises and observe as much caution as they do in the cases of on-balance-sheet exposures, primarily because of the contingent nature of liabilities under off-balance-sheet exposures. But credit risk in off-balance-sheet exposures can at times be substantial and inflict very large financial losses.

Credit Risk from Derivatives

Derivatives Characteristics

Derivatives are complex financial instruments devised by financial engineers and linked to hypothetical assets, events, or other benchmarks. They are unique risk management tools, and banks use them to hedge risk or transfer risk to a third party. They have no independent values; their values are derived from the underlying assets or the benchmark indicators. Derivative products enhance the depth of the market and liquidity of the underlying instruments. Financial derivatives are contracts of contingent nature whose values are derived with reference to the underlying assets like currencies, commodities, bonds, or benchmarks like interest rates, exchange rates, stock prices, and indexes. Derivatives offer scope for high leveraging or gearing, and enable dealers to offer transactions of high volume with small amounts of funds as the backup. Consequently, though derivatives are off-balance-sheet transactions and reflect imaginary events, they have the potential to inflict the same economic consequences that occur under genuine transactions.

Derivatives are of two types—standardized and customized. Standardized derivatives are those that have simple specifications, widest appeal to the market participants, and an easy offset route. Customized derivatives are those that are

designed to meet the specific needs of an end user. Traders and speculators use derivatives to meet their specific purpose. Traders follow the “buy low, sell high” principle to make a profit, but speculators take advantage of volatility in price movements and seek to make windfall gains through the use of derivative products. Banks use derivatives to protect themselves against the loss of, or erosion in, the value of assets. Derivative products are based on expected movements in foreign exchange rates, interest rates, equity prices, and stock indexes. The most commonly used derivatives are forward rate agreements, options, swaps, futures contracts, and hybrid instruments.

Derivative products have highly flexible characteristics and can be designed in accordance with the intended duration of the contract and the desired size of the transaction. Abundant scope of unusual flexibility in the design of derivative products offers a platform to the market players to inject high volatility that can pose greater risk in trading, which may not have arisen under the normal market behavior. Derivatives can be linear and nonlinear in character. It is possible to hedge a risk in two ways. One way is to book a transaction at a fixed price and hold on to it till the maturity. This will enable one to protect the cash flows against fluctuations in market prices. This type of derivative product is called linear derivatives. Forward rate agreements, forward contracts, interest rate swaps, and financial futures are examples of linear derivatives. The other way is to protect the erosion in the value of financial assets against adverse movement in market variables through purchase of a derivative product called an option. The option holder has the discretion to exercise his or her right under the option, if he or she is likely to suffer a financial loss or cash flow is impaired. Options are nonlinear derivatives as the payoffs depend on how the market price moves around the strike price and the agreed time horizon.

Derivatives Risks

Credit risk in derivatives refers to the chances of default by the counterparty to make payments on the obligations implicit under derivative transactions that have taken place between him or her and a bank, and the amount of potential loss that the bank may suffer from the deal. All types of derivatives do not give rise to credit risk; rather, in many cases they carry market risks (foreign exchange risk and interest rate risk). Since under derivative transactions the underlying principal is only notional, there is usually no exchange of principal. But the bank remains vulnerable, as it is exposed to an unintended or unexpected exposure in the event of default by the counterparty.

In the case of forward interest rate agreements, the obligation is to pay only the interest differential on the agreed notional principal and hence, the credit risk for the counterparty is relatively low. In the case of interest rate futures, credit risk is shifted to the Futures Exchange where futures are traded and settled. Credit risk on interest rate swaps is relatively greater, as the commitments of the counterparty involve a series of interest payments that spread over multiple settlement periods. Derivative transactions in options also give rise to an element of credit risk. Under currency options, a bank buying the option has the discretion to exchange (or not to exchange) a specific amount of currency for another currency at a predetermined rate within a specified time period. The bank is exposed to credit risk as the counterparty may fail to perform its side of the contract.

Derivatives are risky products and can cause financial disasters. Financial mishaps have occurred in the past not on account of basic defects in the design of the derivative products, but due to the lack of understanding of the complex nature of the products and unauthorized use of the products by unscrupulous traders or lack of control on use of derivatives beyond prudential limits. The sale of credit default swaps, an “over-the-counter” (OTC) derivative, on an enormous scale by large investment banks, bank holding companies, and insurance companies in the United States to provide protection against default on payments to investors on mortgage-related securities exposed them to an unusually high level of risks without the backup of adequate capital and reserve funds. When the mortgage defaults rose sharply, these large financial institutions incurred massive losses from derivatives exposures and faced a severe liquidity crisis that finally led to financial meltdown in the United States in 2007.

Credit Risk from Interbank Exposure

The ownership pattern, the objectives, and the functions of different kinds of banks within the financial system vary. The laws and regulations governing different types of banks and financial institutions differ in content and rigorousness. The extent of rights to mobilize deposits from the public also varies between different types of banks. Some banks, because of their restricted access to public deposits and restricted banking license, are not subjected to intensive supervision by the central banks or the supervisory authorities. Government-owned commercial banks are directed by the government to perform certain social obligations, like granting credit to the poorer sections of

the society at soft terms. Certain provisions of the banking laws and regulations are not applicable to them. Consequently, exposures to these banks are not risk free despite sovereign ownership. Many of the privately owned commercial banks fall in the high-risk category because of their aggressive business targets, hidden related-party credit portfolio, and expectation of high returns on capital. Cooperative banks, which are quite large in number in some countries, do not often observe merit-based principles of governance. They are also immune to certain regulatory and legal actions that are feasible against commercial banks. Cooperative banks are concurrently governed by both the general banking laws and regulations and the cooperative societies' acts and rules. Their by-laws permit them to conduct business usually with their members. Specialized banks, like export-import banks or agricultural development banks, are not permitted to accept deposits from the public payable on demand, and hence are not subjected to intensive supervision by the supervisory authorities. In view of these varying characteristics, the risk profiles of banks differ, and so also the financial soundness and the degree of solvency. Consequently, the exposures of one bank to other banks are neither risk free nor do they carry same level of risk. It is, therefore, necessary to recognize the risk from interbank exposures.

Banks in the normal course of their business enter into several transactions with other domestic banks as well as overseas banks. They deal in the call money and term money markets, trade-bill finance market, capital market; and foreign exchange, derivatives, and real estate markets. Banks lend large amounts of money to other financial sector participants, place deposits with them for specific periods, and provide financing against trade bills, both domestic and foreign, under the letters of credits issued or confirmed by other banks. They also lend money to third parties against the counter-guarantee of another bank and undertake repo and reverse repo transactions on securities between themselves. They deal in the sale and purchase of securities and foreign exchange as well as act as seller and purchaser of derivative products. One bank owes money to other banks under the payment and settlement systems. All these interbank transactions reflect substantial exposures by one bank to another within and outside the country. Interbank settlements are not free from uncertainties, since one bank may fail to honor its commitments to another bank in time.

The possibility of one bank defaulting on its liabilities to another bank is recognized as an element of credit risk in interbank dealings. The New Basel Capital Accord also reckons banks, financial institutions, and securities firms as

one class of counterparty that carries credit risk. The New Basel Capital Accord even recognizes differences in the financial strength and soundness of different classes of banks and suggests for assignment of risk weights of different values in accordance with their financial standing or rating by the rating agencies. A bank will therefore have to classify its exposures to other banks and financial institutions into different risk grades in accordance with the financial soundness or rating of the counterparty and recognize varying levels of risks from exposures to each category of institution.

Credit Risk from Intercountry Exposure

Internationally active banks have substantial cross-border exposures in the form of direct lending and investment. These exposures carry a country risk element of credit risk as the counterparties are based in other countries. The exposures can be to the sovereign governments themselves, either in the form of investment in their securities or by way of direct lending for specific purposes, or to the entities owned by the government, or private corporate and other parties in the form of project finance, working capital finance, and trade bill finance. These exposures carry an element of country risk due to certain inherent characteristics of cross-border dealings.

Country risk in cross-border exposures arises due to the possibilities of deterioration in the economic conditions of the resident countries of foreign borrowers. If the macroeconomic fundamentals are unstable and the financial system is fragile in those countries, volatilities in interest rates and exchange rates can set in any time. If adverse movements in interest rates and exchange rates take place, the ability of borrowers to service the bank's loans will be affected, and the incidences of default by borrowers located in the relevant countries will substantially increase (for example, the financial crisis of 1997 in Southeast Asian countries). The country risk will be high if the economy of the country is structurally fragile, bankruptcy laws are weak, insolvency procedures are cumbersome, and the enforcement of bank's rights in courts of law is time-consuming. Country risk can also arise due to the political change in a country whereby the new government may refuse to honor certain types of claims, including those of foreign banks. Further, intercountry exposures of banks are subject to sovereign risk, if the sovereign governments are under the rehabilitation program of international agencies in respect to their debts. Sometimes, the sovereign governments themselves may deny their obligations

and claim immunity from settlement of foreign debts.

The other forms of credit risk from cross-border exposures are transfer risk and currency risk. Transfer risk is a core component of country risk, and arises mainly because of restrictions imposed by a government on the use of foreign exchange, either due to the shortage of foreign exchange reserves or the balance of payments problem. The borrower may be able to honor the contractual obligations in local currency, but the lending bank suffers a loss due to the restriction or ban on conversion of domestic currency into foreign currency.

Currency risk refers to the losses suffered by the lending bank in converting the payment received in the domestic currency of the overseas borrower into foreign currency on account of depreciation in the value of the borrower's domestic currency during the tenure of the loan. If the loan is repayable in foreign currency by the overseas borrower, the obligations in terms of domestic currency will increase due to the adverse exchange rate movement, which may induce him or her to default in payment. Thus, the currency risk gets converted into credit risk.

Transaction Settlement Risk

Settlement of financial transactions contains an element of credit risk because one of the parties may fail to complete or settle the transaction in accordance with the agreed terms. If one side of the transaction is settled but the other side fails, one of the parties will incur a loss that may be equal to the principal amount of the transaction. Even if there is delay in settlement, there is an element of loss involved in it, as the delayed process will deprive one of the parties of the investment opportunities that could have been seized if the transaction had been settled on time. This kind of credit risk is a part of the “settlement risk.” What will be the level of credit risk on account of a failed transaction or delayed settlement of the transaction is determined by the specific arrangements for settlement. Factors that govern such arrangements and have a bearing on credit risk include the timing of the exchange of value, payment/settlement finality, and the role of intermediaries and clearinghouses.[2]

7.4 SUMMARY

Credit risk and market risk are closely linked since volatilities in market risk factors generate credit risk. The bank's asset composition indicates which of

these two risks will have greater impact.

Credit risk consists of transaction risk, counterparty risk, and portfolio risk and exists in both the banking and trading books. It is a dynamic concept, and over a period of time, the level of credit risk associated with the same credit exposure usually changes.

Identification of credit risk from exposures to multinational companies is complicated because of the links with the affiliated units they own, the multiplicity of locations at which they operate, and the multiplicity of credit facilities they enjoy from several banks. An integrated approach is essential to capture credit risk from multiple facilities provided to large multinational corporations at multiple locations.

The degree of credit risk is not identical in all types of loans and advances. It varies in accordance with the nature of the counterparty, and the purpose and the maturity period of loans. Exposures to unregulated customers, or for unproductive and speculative purposes and longer maturity periods carry a higher degree of credit risk.

Banks should be seriously cognizant of the credit risk involved in their investment portfolio. Where the investment portfolio consists largely of unrated financial instruments, banks are exposed to a high level of credit risk.

Different types of off-balance-sheet exposures contain different degrees of credit risk, either full, medium, or low. Dilution of due diligence procedures for extension of off-balance-sheet facilities to customers enhances credit risk, even though these do not involve outflow of funds when the transactions take effect.

Credit risk from derivative products is usually low, since under derivative transactions the underlying principal is only notional. But unauthorized use of derivative products by unscrupulous traders or lack of control over the extensive use of derivatives by operational staff can cause significant losses. Risks from the total derivative portfolio should be identified in an integrated manner.

Banks should classify their exposures to other banks and financial institutions into different risk grades in accordance with their financial soundness or their rating, and recognize varying levels of risk from exposures to each category of institutions.

Intercountry exposures carry an element of credit risk, since economic conditions in a country can deteriorate at any time, or a government may deny its liabilities on foreign debts or impose restrictions on conversion of domestic currency into foreign currency. Cross-border exposures give rise to country risk,

transfer risk, and currency risk.

NOTES

1. “The Management of Banks’ Off-Balance-Sheet Exposures,” BCBS, March 1986. The exposition in this paragraph is based on the views and observations made by the committee in this document. For further details, readers may refer to the full text of the document at the BIS web site (www.bis.org/bcbs).
2. “Principles for Management of Credit Risk,” BCBS, September 2000.

CHAPTER 8

Credit Risk Rating Concept and Uses

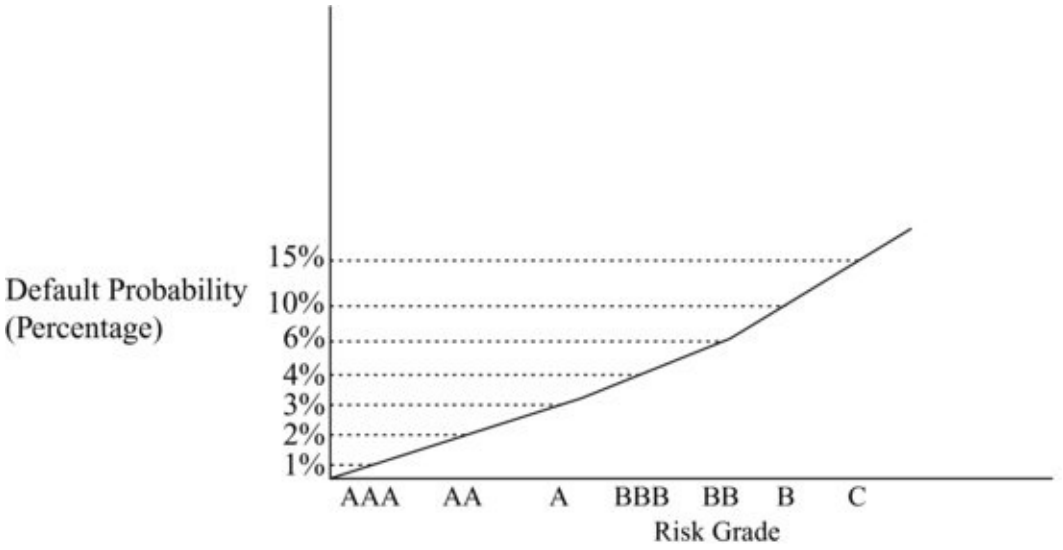
8.1 CREDIT RISK RATING CONCEPT

Credit risk rating (CRR) communicates the relative degree of credit risk associated with a facility or a counterparty. The CRR framework captures the levels of credit risk in a granulated form, and the rating conveys the relative degrees of risk in terms of the probabilities of default for different types of exposures and counterparties, and the potential losses that are likely to arise in the event of default. CRR measures the risk inherent in an individual credit exposure and makes a meaningful differentiation between counterparties in terms of the risk levels they pose to the bank. The rating indicates whether an exposure carries high risk, moderate risk, or low risk and conveys the relative degree of safety inherent in an exposure, such as high safety, adequate safety, or low safety. In a granulated rating framework, the ratings are usually denoted through a combination of alphabets. Many banks have highly calibrated rating frameworks where marginal differences between the rating grades are denoted by adding positive or negative signs after the rating grade, such as AAA+, AAA–, AAA. The principle of rating implies that the higher the rating grade (signifying lower risk or greater safety), the lower is the probability of default. The principle is explained in the diagram in Figure 8.1.

This is an illustrative example. The diagram indicates risk grade default probability as shown below:

Risk Grade	Default Probability (%)
AAA	1
AA	2
A	3
BBB	4
BB	6
B	10
C	15

FIGURE 8.1 Default Probability and Risk Rating Relationship



AAA = highest grade (least risk) C = lowest grade (highest risk)

CRR is the primary indicator of the level of credit risk the bank is going to assume in the event of taking an exposure. The difference between CRR and a credit risk measurement model (CRMM) is that, while CRR indicates the level of risk (high, moderate, low, etc.), CRMM shows the probable amount of loan loss (amounts in dollars) from the credit exposure or the portfolio. These two tools are the two successive stages of the credit risk measurement process. The first stage is the establishment of a credit risk rating framework (CRRF) for assignment of rating, and the second stage is the development of CRMM for quantification of the loss amount. The loss estimated through the CRMM will be realistic if the rating derived under the CRRF is accurate and represents the bank's actual risk perception about the facility or the counterparty.

8.2 CREDIT RISK RATING USES

CRR is the primary tool for credit risk management and guides the bank in making informed and prudent decisions on deployment of funds. The bank's risk management philosophy, risk appetite, credit risk limits, credit risk policy, and business strategies have links with the principle of CRR, since the risk-grade position of total credit exposures must be known for managing credit risk. CRR can be put to a variety of uses to strengthen the credit risk management process. The following section identifies important areas in which CRR can be used as a tool for better credit management.

Selecting Credit

CRR is a handy tool for selection of credits at the entry point. The bank's lending policy should specify the minimum standards for credit selection, which will include the minimum rating of a borrower or a facility that will be acceptable at the entry point. Credits are sanctioned by the bank's personnel at different locations in accordance with the powers delegated to them. Under the traditional method of lending, the appraisal of a borrower, to a certain extent, is dependent on a few subjective factors. In view of these subjective elements in credit appraisal, there is a possibility of adverse selection of borrowers. The assignment of rating at the entry point will, to a great extent, eliminate the possibility of the wrong selection of borrowers and ensure the quality of credit selection at various levels of the organization.

Measuring Incremental Risk

The total credit risk of the bank is not static and goes on changing in line with the developments taking place within and outside the economy that have positive or negative impact on the bank. While it is necessary for the bank to know the overall quality of its total exposure, it is equally important to find out how the risk profile will alter with the addition of new customers or sanction of additional facilities to the existing customers. CRR is such a device that helps in estimating the absolute risk and the incremental risk from additional and new exposures. The admission of new customers alters the credit risk profile of the bank, and the extent of alteration will depend on the credit risk ratings awarded to the new customers at the entry point. The consequential change in the risk-grade-wise distribution of total exposures will indicate the amount of incremental loss that may arise on account of facilities sanctioned to new customers. Likewise, it is possible to measure the incremental risk from additional credit facilities sanctioned to an existing borrower. First, the rating should be revised after taking into account the additional facilities sanctioned to the borrower, and then, the quantum of potential losses should be estimated separately in respect to the existing facilities and the aggregate of credit facilities after sanction of additional facilities. The difference in the potential loss from the exposures before and after sanction of additional facilities will represent the “incremental risk from additional exposure.”

Let us suppose that the bank has total credit exposure of U.S. $100 million to a customer who has been assigned a “Grade A” (low risk) rating. Further suppose

that the average probability of default for “Grade A” rated exposures is 3 percent, loss rate given default is 40 percent, and exposure at default is 90 percent (signifying that low-risk-rated borrowers do not usually draw the sanctioned credit limits to the full).

The potential loss percentage on the exposure to the customer is estimated at:

PD × LGD × EAD = 3% × 40% × 90% = 0.03 × 0.4 × 0.9 = 0.0108 or 1.08% (ignoring the risk component “effective maturity,” as maturity factor is built into the rating model).

The estimated potential loss on the exposure of U.S. $100 million = $100 million × 1.08% = U.S. $1.08 million.

Let us assume that the bank sanctions an additional credit facility of U.S. $20 million to the same customer and the risk rating changes to “Grade BBB” (moderate risk), on account of the larger size of the exposure and changes in objective and subjective risk factors that have gone into the compilation of the risk rating of the customer. Let us further assume that the average probability of default (PD) for “Grade BBB” is 4 percent, the average loss rate given default (LGD) is 50 percent, and the exposure at default (EAD) is 100 percent (signifying that a moderate-risk-rated borrower usually draws credit limits to the full at the time of default).

The potential loss percentage on the total exposure is estimated at:

PD × LGD × EAD* = 4% × 50% × 100% = 0.04 × 0.5 × 1 = 0.02 or 2% (ignoring the risk component “effective maturity”).

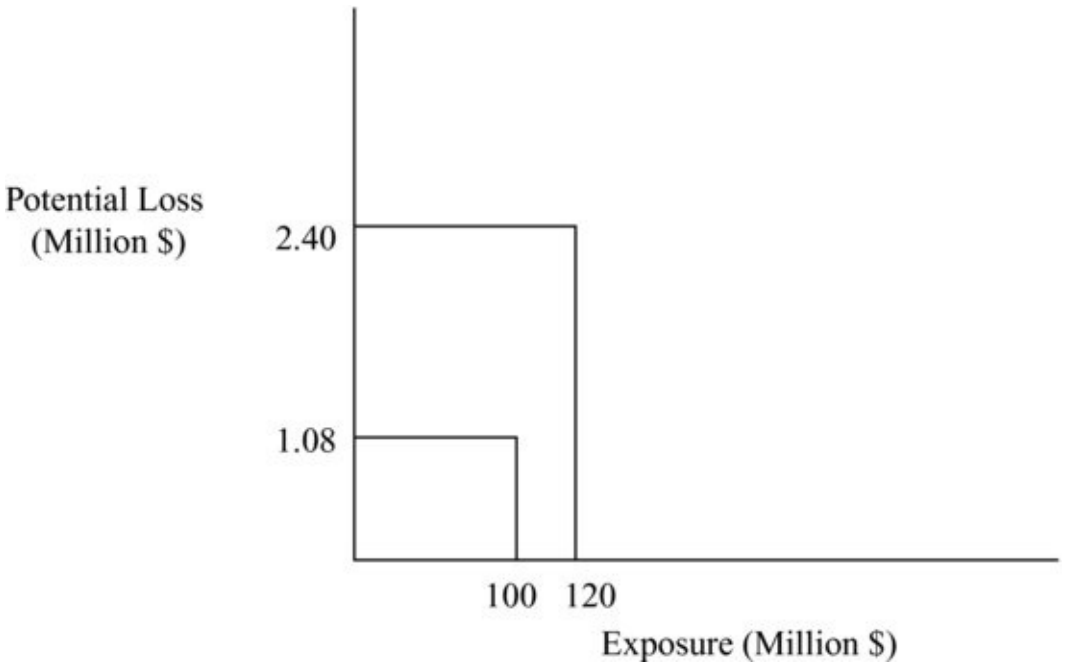
The estimated potential loss on the aggregate exposure of U.S. $120 million = $120 million × 2% or U.S. $2.40 million.

*Using the formula given in the New Basel Capital Accord.

The incremental potential loss on account of the increase in exposure by U.S. $20 million is U.S. $1.32 million ($2.40 –$1.08 million). If the risk rating of the borrower had not changed after sanction of additional facilities, the loss rate would have remained unchanged at 1.08 percent of the exposure and the potential loss would have been U.S. $1.296 million. In the same manner, incremental risk from exposures to new customers can be estimated. We may note that the higher the risk grade (lower risk) assigned to the customer, the lower will be the quantum of potential loss from the exposure.

The position of incremental loss is shown in Figure 8.2.

FIGURE 8.2 Incremental Loss from Additional Exposure



Fixing the Exposure Limit

Banks establish maximum exposure limits both for individual borrowers and the borrower-group, which are usually called “single exposure” and “group exposure” limits. Banks define a borrower-group as the group of entities that are owned by the same promoters or that function under the direct or indirect control of the same management. Bank regulators specify in general the maximum single exposure and group exposure limits in terms of a fixed percentage of the bank's capital funds. In addition to the single exposure and the group exposure limits, bank regulators prescribe a prudential limit on the aggregate of large exposures. Banks are required to define large exposure in relation to their capital funds and keep the aggregate of large exposures within the prescribed ceiling. Usually, banks observe some element of flexibility in fixing the exposure limits within the outer limits specified by the bank regulators. In deciding this flexibility, CRR can be used as a guiding device.

Sound risk management practices require some flexibility in fixing maximum exposure limits. Variation in exposure limits can be made in accordance with the risk rating of the counterparty and the purpose of the loans. There is a strong case for setting up a lower exposure limit for high-risk borrowers and a higher exposure limit for low-risk borrowers. Banks can link exposure norms with the ratings and prescribe risk-grade-wise exposure limits for the single borrower and the borrower-group. A parallel move will be linking the loan sanction powers of

different functionaries with the risk rating of the customers. Loan managers can be delegated variable powers in accordance with the risk rating of the customers, based on the principle of higher powers for low-risk rated customers and vice versa.

Assessing Credit Concentration

Credit concentration in any form can cause significant problems to a financial institution during periods of economic slowdown, volatility in financial markets, or disturbances in macroeconomic fundamentals, and can inflict large losses. But credit concentration to a reasonable extent in certain areas of business may not be threatening under all situations. Banks can create a niche market for themselves and develop concentration in lending to a certain extent in that market, if they have core competence or specialization in the relevant area. For scientific risk assessment of a bank's credit portfolio, it is necessary to have a mechanism to measure the intensity of risk from concentration in any subportfolio. CRR is one such important tool that can be relied upon to evaluate the concentration risk.

The assignment of risk rating to every borrower in the credit subportfolio where concentration exists will indicate the overall quality of that subportfolio. If low-risk and moderate-risk exposures constitute the bulk of the total exposure, the subportfolio can be considered healthy, despite concentration. A scientific evaluation of each subportfolio based on ratings over a period of time will indicate whether there is potentially dangerous concentration in any subportfolio. If there is an urgent need for dilution of concentration, the relative quality of each subportfolio will also point out the possible areas for diversification. Subportfolios consisting of loans granted for acquisition of residential properties against the mortgage of property are considered low risk as compared to volatile real estate subportfolios. Banks often build up concentration in the residential housing sector, because the risk from most of such borrowers is generally low. The repayment of residential housing loans is tied up with stable sources of income from salary or established business, and the prospect of marketability of the collateral is better. The use of CRR for portfolio evaluation and assessment of concentration makes the risk management process less vulnerable.

TABLE 8.1 Eight-Scale CRRF—Implication

Rating Symbol	Risk Level
AAA	Very low risk

AA	Marginal risk
A	Low risk
BBB	Moderate risk
BB	Fair risk
B	High risk
C	Very high risk
D	Default

TABLE 8.2 Counterparty Rating Migration

Customer Identification Number	Rating under CRRF		
	Year 1	Year 2	Year 3
1	AAA	AA	A
2	AA	AAA	BBB
3	B	C	D
4	BB	A	A
5	BBB	C	BB
6	A	BBB	A
7	D	C	C
8	C	C	D

Tracking Risk Migration

Banks need to review the quality of their credit portfolio from time to time. Portfolio review will indicate whether the quality of the exposures in a particular subportfolio is improving or deteriorating over time. The portfolio quality is assessed by tracking the movement of risk ratings assigned to the borrowers that constitute a subportfolio at regular intervals, say, at quarterly or half-yearly intervals. CRR is a tool for tracking the rating migration of borrowers. Risk migration will indicate whether the level of risk from exposures to counterparties has increased, declined, or remained the same during the successive periods. The improvement in ratings, called the rating upgrade, and the deterioration in ratings, called the rating downgrade, signify lower and higher quantum of potential loss in the event of default.

The interpretation of ratings, that is, the level of risk associated with the rating, is shown in Table 8.1, and the rating migration of counterparties is shown in Table 8.2.

Table 8.2 shows that customer 1, who was assigned the AAA rating at the entry point in year 1, was awarded rating AA in year 2 and rating A in year 3. This shows that the quality of credit exposure to customer 1 has gradually

deteriorated in a three-year time zone. The risk level has increased from very low risk to low risk, signifying a higher probability of default, higher quantum of potential loss in the event of default, and higher capital requirement under the New Basel Capital Accord due to an increase in the percentage of risk weight. Customer 4, who was originally assigned rating BB in year 1, has moved to rating A in year 2 and retained the same rating in year 3. The quality of the bank's exposure to customer 4 has improved from the fair risk to low risk category, signifying a lower probability of default, lower quantum of potential loss in the event of default, and lower capital requirement. Likewise, customer 3, who was assigned rating B (high risk) in year 1, slipped into rating D (default) in year 3, implying that he defaulted in his obligations to the bank within two years. The downgrading of the loan to grade D means that the bank is required to classify it as nonperforming, and as a consequence, there is loss of income on the loan and erosion in net profit on account of the loan loss provisioning requirement and the need for higher capital. The exposures to individual counterparties under each portfolio can be rated over a period of selected time zone and rating-wise distribution of exposures compiled for each portfolio. The data can be analyzed to assess how the quality of credit assets under each portfolio has moved over the chosen time period. CRR is thus an important tool for risk migration analysis of borrowers.

Migration analysis indirectly helps in cross-checking the accuracy and integrity of the CRR. The accuracy of CRR implies that there will be gradual migration in the rating assigned to a counterparty over a reasonable period of time under normal circumstances. There will not be abnormal deviations in ratings assigned to the same counterparty over the successive years. Under normal circumstances, the risk-grade distribution of total credit exposures at the corporate level over two or three successive years should not depict accelerated improvement or deterioration in credit quality. Loans can, however, abruptly deteriorate in quality under abnormal circumstances, for example, during a downturn in the economy or high market volatility. If a good number of borrowers, who were originally assigned a low or moderate rating, migrate to the default category over one or two years under normal market conditions, it is apparent that the CRRF is defective. In such a situation it is necessary to undertake a case-by-case analysis of the ratings; recheck the risk factors, the scores, and the weights that are used for computation of ratings; and make necessary modifications in the CRRF. This is, in effect, the back-testing and the validation of CRR. CRR methodology can help the bank in improving the

quality of credit portfolios through identification and gradual liquidation of high- and very high-risk exposures and acquisition of low-risk exposures.

Deciding the Loan Exit Point

Where counterparty exposures are large, banks prefer to apportion the credit limits among themselves either to avoid client concentration or reduce the intensity of risk. Banks take shares in large exposures either through loan participation or loan syndication. The arrangement for loan participation or loan syndication is most often done by a prime lender or a sponsor bank, which is designated as the “lead bank.” The latter generally takes the major share in the exposure and monitors the compliance by the borrowers with the terms and conditions of the loan and the financial discipline. In practice, it is the prime lender or the sponsor bank that undertakes the due diligence of the credit proposal and assigns a risk rating. The other banks usually accept the assessment done by the lead bank. However, sometimes the banks that take a share in the loan exposure also undertake independent appraisal of the credit proposal. The participating banks, if they have internally developed credit risk rating models, can assign a risk grade to the customer and track the health of the exposure through the rating migration technique. The independent assignment of ratings over successive accounting periods will indicate the movements of the borrower's rating and the time frame within which a possible downgrade is likely to take place. A risk-sensitive bank will pick up the warning signals from a rating downgrade, evaluate the quality of the exposure in the light of its risk management philosophy and loan sanction standards, and quit the syndicate in time to avoid large loan losses. CRR is a valuable tool that helps banks to decide not only the exit point of syndicated loans, but also the exit points of loans where the bank is the sole credit provider.

Fixing Loan Prices

The level of credit risk varies in accordance with the type of the counterparty, the purpose, the duration, and the nature and structure of the credit facility. CRRF established by the bank captures these varying characteristics and produces counterparty ratings or facility ratings. The rating indicates the level of risk and the relative safety associated with a credit exposure, and conveys the relative probability of default associated with different risk grades. It is necessary for banks to recoup the losses resulting from defaults committed by borrowers in

repaying the loans and advances to remain solvent and continue in the business. The principle of loan pricing is that the pricing of any risky asset must reflect the return on a risk-free asset plus a risk margin. The risk margin must be adequate to compensate the bank for the loss of money from risks that materialize in part or full. Banks should therefore fix norms for determining the amount of additional money that they should recover from customers on account of the assumed risk. The exposure to one customer may be riskier than that to another. CRR helps in differentiating customers in terms of the relative levels of risk and adjusting the loan prices in accordance with the varying degrees of risk.

Measuring Business Performance

Banks lend funds through direct credit lines and by way of investment in bonds and debentures and stand as surety on behalf of customers. Banks build up different portfolios based on business planning and strategy, business capability, and risk-bearing capacity. For allocation of capital and optimization of return on assets, it is necessary to evaluate the relative performance of different business lines. One of the ways for evaluating the efficiency of different business lines is to compare the risk-adjusted returns on capital employed in those business lines. Risk-adjusted return is the net return from a given business line (net income – (expected and unexpected losses)) expressed as a ratio to the capital employed in that business line. The bank can map different activities and products into different business lines in conformity with the accounting requirements, and evaluate the performance of different business lines in terms of the risk-adjusted returns.

First, ratings should be assigned to all counterparties who have been granted credit facilities under a business line and then the risk-grade-wise total should be taken. This will show the distribution of total exposures in a business line as per the risk rating scale adopted by the bank. Thereafter, the risk-grade-wise potential losses should be calculated through the credit risk measurement models and aggregated to arrive at the potential loss that may arise from each business line. The risk-adjusted net return on capital employed in each business line should be derived, using the potential loss associated with it as an input, and compared to assess the relative profitability. But various types of risks associated with the activities and the products falling within a business line are intertwined and cannot be dealt with in an isolated fashion for measuring efficiency. It is therefore necessary to take into account the potential losses arising from market

and operational risks associated with a business line to judge the relative profitability. However, the returns on capital deployed in different business lines, like corporate finance, trade finance, commercial banking, and retail banking, where credit risk is the major risk, can be computed after adjusting for potential loss arising from credit risk and compared to ascertain the relative profitability, ignoring the potential losses that may arise from market and operational risks. This will be a rough indicator for the evaluation of business lines, as sometimes market or operational risks associated with a business line can be high.

Validating Loan Loss Reserves

Banks create loan loss reserves in accordance with the regulatory guidelines and in conformity with the standard accounting practices. Bank regulators generally prescribe a minimum quantum of loan loss reserves and provisions against the deterioration in asset values. The minimum quantum of loan loss reserve is a product of three variables:

1. The age of the defaulted (nonperforming) loan.

2. The value of collateral.

3. The prospect of recovery expressed as a percentage of outstanding dues.

The regulators require banks to maintain two types of reserves and provisions —general loan loss reserves and loan-specific provisions. The general loan loss reserves serve as a cushion against the possibility of losses on loans that can occur in future. These reserves are not earmarked against known losses in specified assets and are calculated at a fixed percentage of the total loans and advances. The quantum of general loan loss reserves on standard (performing) loans and advances is usually not based on the rating of individual counterparties or exposures. These are treated as free reserves and therefore qualify for inclusion in Tier II capital under the New Basel Capital Accord. On the other hand, specific provisions are created against deterioration in the values of identified assets or a subset of assets. The specific provisions are not freely available to meet general loan losses, which arise in the loan portfolio subsequently, and therefore do not qualify for inclusion in the Tier II capital.

The bank supervisors and the bank auditors, whether external or internal, usually assess the adequacy of loan loss reserves during the course of bank examination. The ratings assigned to credit exposures serve as the benchmark for deciding the adequacy of loan loss reserves. The risk-grade-wise bifurcation of total loans and advances indicates the quantum of exposure in a particular risk

grade. For example, it shows how much of the exposures are held in the AAA rating grade, how much in the A or B or C grade. Prudent accounting practices require that that the general loan loss reserve, which is calculated at a fixed percentage of performing loans, should not be less than the aggregate of expected losses from all standard category loans and advances. CRR is a handy tool for validating the general loan loss reserve. For determining the adequacy of provisions against specific loan assets, like problem loans, watch category loans, or nonperforming loans, an assessment of the diminution in the value of the identified loan assets is needed. Even here, the assignment of rating under an internal rating system will generate the expected loan loss figure from a given exposure and serve as the benchmark for cross checking the adequacy of provisions made after assessing the decline in the value of the assets. CRR methodology thus helps the bank management in setting up a scientific loan loss provisioning system. The bank supervisors and the bank auditors can use CRR as a tool for validating the adequacy of loan loss reserves and provisions.

8.3 CREDIT RISK RATING PRINCIPLES

The internal risk rating models and the methodology for rating vary between banks. Different models exist for rating different counterparties and different types of exposures. The Basel Committee on Banking Supervision has recommended that a bank, to be eligible to adopt the Internal Rating-Based Approach for credit risk assessment, “must demonstrate to the supervisor that it meets certain minimum requirements at the outset and on ongoing basis. Many of these requirements are in the form of objectives that a qualifying bank's risk rating systems must fulfill. The focus is on banks’ abilities to rank order and quantify risk in a consistent, reliable and valid fashion. The overarching principle behind these requirements is that rating and risk estimation systems and processes provide for a meaningful assessment of borrower and transaction characteristics; a meaningful differentiation of risk; and reasonably accurate and consistent quantitative estimates of risk.”[1]

A bank can outsource credit risk rating models or develop its own models. In either case, the models must be based on certain minimum principles so as to meet the bank supervisors’ criteria for acceptability and qualify for capital adequacy assessment under the New Basel Capital Accord. In the long run, it is beneficial for banks to have their own rating models. The broad principles that banking institutions should consider in developing their internal rating models

are described in the following paragraphs.

Differentiation in Risk Perception

The credit risk rating differentiates between borrowers and facilities in terms of the levels of risk they pose to the bank. The rating identifies whether the exposures carry low risk (high safety), moderate risk (moderate safety), or high risk (low safety). The differences in risk grades can be quantified in terms of the probability of default and loss rate given default, or in terms of risk weights to be assigned for assessment of regulatory capital. The differences between two immediately preceding risk grades assigned to borrowers or credit facilities, when compared with another risk grade, get reflected by way of lower probability of default, higher recovery factor in case of default, and lower risk weights for capital requirement. For example, counting A as the base risk grade, the probability of default for risk grade AA should be lower than that for risk grade A and for AAA still lower than that for AA. The position will be reversed in case of two succeeding rating grades. The probability of default for risk grade BBB should be higher than that for risk grade A, and for BB still higher than that for BBB. The risk grades assigned under the rating model should be so granulated that they make meaningful differentiations in risk perception and risk quantum as credit quality declines. If a customer has been assigned the AAA rating by a bank, which signifies very low risk, which is the best rating in its rating framework, the top management and market perception is that the probability of default is extremely low for such a customer under normal market conditions, and if the transaction characteristics have also been factored in the computation of the rating, the loss rate given default will also be low. On the other hand, if a customer has been assigned the C rating in a seven-scale rating framework, which is the worst rating in the nondefault category, the risk perception is that the probability of default is very high for a C-rated customer and in the event of default, the loss to the bank is likely to be large.

Borrower Characteristics and Transaction Characteristics in Rating

The Basel Committee on Banking Supervision in the document on the New Basel Capital Accord has stipulated that “a qualifying IRB rating system must have two separate and distinct dimensions:

i. the risk of borrower default, and

ii. transaction specific factors."[2]

The first dimension of the rating system is that separate exposures to the same borrower should be assigned the same risk grade irrespective of the differences in the nature and characteristics of specific transactions, except under certain specified circumstances. If country transfer risk pertaining to exposures in foreign currencies is involved or guarantee protection to a transaction is available, different risk grades can be assigned to different exposures to the same borrower. But this exception allowed by the Basel Committee does not appear to be a sound proposition. We may take the view that it is sensible to assign the same risk grade to all facilities to a borrower irrespective of facility-wise credit enhancement or risk mitigation characteristics, since a borrower who commits default in respect of one facility is likely to commit default in respect of all facilities sooner or later, and also because the bank has a general lien on all collateral against the total debt of the customer.

The second dimension of the rating system is that the rating should reflect the transaction-specific characteristics, such as quantum and quality of collateral, creditor seniority, or product type. The first dimension of the rating system focuses on the chances of default by a borrower who has been assigned a specific risk grade; the second dimension focuses on the extent of protection available to the bank in the event of a default. But, from the risk management perspective, it is erroneous to assign different risk grades to different facilities extended to the same customer, whether the facilities are granted at the same time or at different times. A rating system that incorporates both the borrower-specific and transaction-specific characteristics is more meaningful. Where a borrower has been sanctioned multiple credit facilities, it is better to assess in an integrated manner the borrower's ability to service all the credit facilities as and when obligations arise during the currency of the facilities, rather than assessing repaying capacity for each facility in an isolated manner. A credit risk rating that conveys the overall risk of total exposure to a customer is safer than the one that measures risk associated with a particular facility. Even where facility rating is in vogue for making a decision on a particular facility, the bank has to take an overall view of the customer.

Transparency of Rating Criteria

The introduction of the "Third Pillar—Market Discipline" in the New Basel

Capital Accord is a unique feature of the revised framework. The third pillar requires banks to make qualitative and quantitative disclosures on risk exposures and risk assessment process. Under the qualitative disclosure on credit risk, banks are required to include a description of the internal rating process separately for five distinct portfolios (relating to each class of asset specified in the New Accord) in their disclosure framework. The description shall include, among others, the definitions, the methods, and the data for estimation and validation of probability of default, loss rate given default, and exposure at default, including assumptions employed in the derivation of these variables.[3] The rating system internally developed by a bank must include specific definitions of each rating, the criteria taken into account for compilation of ratings and assigning a specific rating grade to an exposure, and the process by which the specific risk grade is derived. The definitions and criteria should be documented so that third parties or persons unconnected with the rating process clearly understand the mechanism of the rating assignment and are in a position to evaluate the appropriateness of the ratings.

The criteria for assigning a rating should be consistently applied across the organization to achieve uniformity in ratings for all borrowers and all facilities posing similar risk to the bank. The information and inputs utilized in the rating process should be comprehensive with a view to achieving uniformity in the rating done by different personnel across the organization at different geographical locations. The criteria for ratings should be consistent with the bank's internal lending standards and the policies and procedures that deal with problem loans or recalcitrant borrowers. In brief, the rating system must fulfill at least the following four objectives:

1. Consistency in the application of criteria for rating compilation.
2. Clarity of definition of each rating grade.
3. Comprehensiveness of information and financial data used for the rating.
4. Compatibility of the import of the rating with the internal lending standards.

Integrity of the Rating Process

The rating assigned to a customer is the basis for sanction of credit. Consequently, the integrity of the rating process assumes tremendous significance for the bank's top management as well as the bank supervisors and the auditors. If the ratings are to be accepted as realistic and reliable, the rating process should meet at least two basic requirements. First, an independent

evaluation of the rating process should be in place, and second, the rating grade assigned to a borrower by loan sanctioning officials should be vetted by higher officials and frequently updated. “Credit policies and underwriting procedures must reinforce and foster the independence of the rating process.”[4]

The working of the rating system should include a rating approval and rating endorsement process. Assigned ratings, particularly relating to large exposures, should be reviewed by persons unconnected with credit sanction. The rating assignment and the rating endorsement process should be included in the bank's procedures for lending and reflected in the credit policy. Ratings should be revised or endorsed, preferably biannually or at least annually, and in any case, reviewed at a time when certain developments take place that have an impact on the borrower's business and income. Review of customer rating is essential when material developments, such as changes in the ownership pattern, organizational structure, or decline in volume of business and income and the value of collateral takes place. Annual updating of ratings is more reliable as the data on borrowers’ business and income are available annually. Besides, the annual financial statements are dependable as it is obligatory for the customers to get the results audited by the external auditor at the end of the financial year. If the exposures are large or fall into the high-risk category, more frequent reviews of ratings should be done.

The reference date for review of counterparty ratings may relate to the date on which the borrowers are required to publish financial statements and other particulars in compliance with the stock exchange regulations or other applicable laws. If facility rating is also in vogue, the rating shall be reviewed whenever market conditions change, as volatility in market risk factors affects the value of collateral and the probability of default, loss rate given default, and exposure at default. The validity of the regulatory capital assessment based on the Internal Rating-Based Approach will largely depend on the accuracy and the integrity of the credit risk rating process. Besides, the rating is an indicator of the kind of follow-up actions that a bank needs to take to manage credit exposures. The depth, the intensity, and the frequency of supervision and follow-up of credit are closely linked with the risk grades assigned to borrowers. The worse the rating grade, the more frequent and the more intensive should be the supervision of credit.

Quantitative Estimation of Risk

The Internal Rating-Based Approach for credit risk estimation specifies that the internal risk rating system of banks should fulfill the basic objective of quantifying risks in a consistent manner. The rating system conveys the risk in terms of the level of risk, such as low, moderate, and high risks. This is a generalized form of risk perception; it does not convey the actual quantum of risk in numerical terms associated with low, moderate, and high risks. For example, if a customer is enjoying a credit line of U.S. $1 million from the bank and is assigned risk grade A, it only signifies that the bank is facing low risk. It does not convey the amount of potential loss the bank is likely to suffer on the exposure of U.S. $1 million in the event of default by the customer. The potential loss can be quantified if historical data on the risk components, that is, the probability of default (PD), the loss rate given default (LGD), and the exposure at default (EAD) are available.

For measurement of potential loss from credit exposures, the bank has to build up historical data on PD, LGD, and EAD for each rating grade (AAA, AA, A, etc.) and for each asset class (corporate, sovereign, banks, etc). Once the data have been built up and validated through the back-testing and stress-testing process, each rating grade will indicate the amount of expected loss that can occur on an exposure in the relevant asset class. In this way, it is possible to determine the amount of potential losses, asset-class-wise and risk-grade-wise. But the accuracy of potential loss figure will depend on the comprehensiveness of rating inputs and the consistency in application of rating criteria.

The consistency of the output produced by risk-rating models can be maintained if two requirements are met. First, it is necessary to achieve objectivity in the computation of rating and maintain uniformity in the application of the rating criteria. Second, the rating model should be appropriate to the type of business activity and the purpose of credit. Uniformity in model-generated output is essential as many persons will have the responsibility of credit sanctions within the organization at different geographical locations. The uniformity and accuracy of ratings can be achieved, on the one hand, through standardization of risk factors that go into the compilation of rating grades for different activities, different exposure sizes, and different purposes, and on the other, by systematic development of norms for assigning scores in accordance with the extent and intensity of risks. The standardized risk factors and scoring norms, which will be applicable across the organization, will produce the same rating grade for the same type of borrower or exposure, even though ratings will be compiled by different persons and at different locations. The risk factors will

have to be suitably modified for assigning ratings to counterparties at overseas centers.

8.4 SUMMARY

Credit risk rating measures the risk inherent in credit exposures and makes a meaningful differentiation between counterparties in terms of the risk levels they pose to the bank or the relative degree of safety of the exposure.

The principle of rating implies that the better the rating grade, the lower is the probability of default. A rating is reliable if it does not show abnormal deviations over a reasonable period under normal circumstances.

Banks can decide entry and exit points of loans, measure potential losses from additional and new exposures, and track the rating migration of borrowers over a period of time through the use of CRR. They can assess loan concentration, fix exposure limits, and delegate loan sanction powers in keeping with the risk profiles of counterparties through the application of CRR.

Banks can use CRR to evaluate the performance efficiency of business lines, fix loan prices, and determine the quantum of loan loss reserves and provisions.

Models and methodology for rating may vary between banks due to differences in counterparty and facility characteristics. Counterparty rating is more meaningful than facility rating and consequently, the bank should incorporate both the borrower-specific and transaction-specific characteristics in the rating methodology.

It is erroneous to assign different risk grades to different facilities extended to the same customer. A risk rating that conveys the overall risk of total exposure to a customer is safer than the one that measures risk associated with a particular facility.

Risk grades included in the rating framework should be so granulated that they make meaningful differentiations in risk perception and risk quantum as credit quality declines. The criteria for rating assignment should be transparent and applied consistently across the organization, and the integrity of the rating process protected, if the CRR framework is to be accepted by bank supervisors and external auditors.

The New Basel Capital Accord requires that the risk rating system developed by banks for credit risk estimation should fulfill the basic objective of quantifying risk in a consistent manner. The consistency in assignment of ratings

can be achieved through standardization of risk factors and scoring norms.

NOTES

1. New Basel Capital Accord, paragraphs 388, 389.
2. New Basel Capital Accord, paragraph 396.
3. New Basel Capital Accord, Table 6.
4. New Basel Capital Accord, paragraph 424.

CHAPTER 9

Credit Risk Rating Issues

9.1 RATING PRACTICES IN BANKS

A rating is a summary indicator of the risk inherent in credit exposure and conveys the potential loss the bank may suffer if the borrower commits default in repaying its dues. The quantum of loss is never static because the default probability and the loss intensity vary from time to time on account of changes in the political and economic environment and the market conditions. It is difficult to design a credit risk rating framework (CRRF)[1] that will apply equally to all types of borrowers and all types of banks. Practices vary among banking institutions in framing the design of credit risk rating models. The Models Task Force of the Basel Committee on Banking Supervision carried out a survey of around 30 institutions in G-10 countries in 1999 to gather information about the "best practice" and the "sound practice" in the internal rating systems design. The committee found that "there is no single standard for the design and operation of an internal rating system." There were "both similarities and differences in the structure, methodology and application of internal rating systems at banking institutions." Broadly, the commonality among the banking institutions in the credit risk rating system related to (1) the types of risk factors taken into account for risk compilation, (2) the assignment of ratings based on the assessment of the counterparty, and (3) the use of ratings for different facets of risk management. The major area of dissimilarity was found in the methods followed by banks for compilation of loss characteristics data for each risk grade. The survey revealed that banks generally considered similar types of risk factors in assigning a rating, though there were some variations in the relative importance and mix of the quantitative and qualitative risk factors. Banks made an overall assessment of the counterparty for assignment of rating, irrespective of whether the rating was to be assigned to the borrower or the facility. And ratings were used largely for the same purposes, namely, limit setting, loan pricing, and management reporting.[2]

9.2 DESIGN OF THE RATING FRAMEWORK

In preparing the design of a realistic rating framework, it is necessary to resolve certain issues relevant to the rating process. The first issue is that the CRRF should meet the requirements specified under the Internal Rating-Based (IRB) Approach of the New Basel Capital Accord for assessment of regulatory capital. The New Accord permits banks to make greater use of internally developed models for capital assessment to cover credit risk. The rating derived through the CRRF should reflect the varying levels of risks between different risk grades and enable the bank to map risk weights in accordance with the varying risk characteristics. The ratings assigned to the counterparty and the risk weights assigned to each risk grade will facilitate compilation of risk-weighted assets for the calculation of the capital charge for credit risk. The bank supervisory authority should endorse the validity and the reliability of the CRRF and certify that it generates appropriate ratings for making a realistic assessment of credit risk.

The second issue is that the CRRF should provide a mechanism to identify the loss characteristics associated with each risk grade. The framework should enable the bank to track the rating migration and generate default probability data with respect to rated borrowers within the chosen time span. The risk grades included in the CRRF should be the basis for compiling historical data on risk components (PD, LGD, and EAD), which can be used for calculation of expected losses and unexpected losses for assessment of economic capital.

The third issue is that the CRRF should not work in a negative way and hamper the bank's credit growth process. This can happen if the rating criteria are not realistic or are very negative, and pessimistic views are taken in assessing risk factors that are included in the rating process. The CRRF is not intended to replace the bank's traditional process of loan appraisal. Rather, the rating should be used as an additional tool for decisions on loans.

There is no uniformity in approach between banks in framing the design of rating models, because they differ in their views on the relative importance of risk factors that go into the compilation of a rating and the relative balance between the quantitative and qualitative risk factors. Whatever approach is chosen, the internal rating system established by the bank should broadly meet the requirements of the IRB approach prescribed under the New Basel Capital

Accord.

The key issues that influence the design and operation of an internal credit rating system are:

1. Conceptual issues.

2. Developmental issues.

3. Implementation issues.

Banks need to clearly understand and handle these issues so that the rating process works smoothly across the organization. The methodology should be user friendly and the staff handling credit should understand the import of the rating. The bank has to ensure that there is no divergence in the application of the rating methodology by different staff positioned at different places. There should be no variations in the final output, other things remaining the same. These issues are analyzed briefly in the ensuing paragraphs.

9.3 CONCEPTUAL ISSUES

Choice of Approach for Risk Factor Selection

The first conceptual issue relates to the choice of approach for recognition of risk factors for the computation of the credit risk rating (CRR). There are two approaches for rating: the “through the cycle approach” and the “current condition approach.” The difference between the two approaches lies in the choice of time horizon for the selection of risk factors that go into the CRR computation. The question is: Shall we compute CRR based on the risk factors that currently exist, or shall we consider risk factors that can arise over a much longer time horizon?

The stability of the financial system is highly dependent on the health of the economy, and the system becomes vulnerable when macroeconomic instability sets in. It is difficult to predict the frequencies at which trade cycles are likely to occur in an economy. Banks suffer during the depression or recession phase of the trade cycle, but it is difficult to foresee when the depression phase is likely to begin in an economy or how long the depression phase will last. Apart from the uncertainty in the time of occurrence of trade cycles, the intensity and the spread of the cycle are also determinant factors. When depression sets in, it need not necessarily encompass the whole economy; it may affect one or two sectors in the economy like the real estate sector, the steel sector, or the automobile sector.

There can be some spillover effects between certain sectors on account of correlation. During the period of depression, the manufacturing and the trading units, which have borrowed funds from the banking system, suffer due to decline in sales and profits. The downward trend in their operations generates negative impact on cash inflows and impairs the loan repaying capacity. During the recessionary phase, the default probabilities increase and the collateral values decline. The issue that arises for consideration in this context is how to factor this phenomenon of economic downturn in the risk rating process because of some complications.

The first complication is that the criteria for the selection of risk factors for rating are different under the “through the cycle” approach and the “current condition” approach. The criteria followed by the international credit rating agencies are not transparent, but it is presumed they generally follow the “through the cycle” philosophy under which the borrower's projected condition in a depressed economic scenario is factored into the rating process. The assessment of the financial condition of the borrower is done at the worst point, assuming the “bottom of the cycle scenario,” or under serious stress situations. The risk grade is assigned according to the risk posed at that time. But the ratings assigned by international credit rating agencies pertain mostly to large corporations or multinational companies operating in developed economies and prominent financial and capital markets, and the ratings need not always be appropriate and reliable, as was evident from the incorrect ratings assigned to mortgage-backed securities that were soon downgraded, which contributed to the U.S. financial crisis in 2007. In any case, it is sensible to assume that the “through the cycle approach” is more relevant for large companies that have higher tolerance against economic shocks. This approach may not be appropriate for rating small and medium enterprises, which constitute the largest group of clients of many banks, because their tolerance level is low against economic shocks, and too rigorous criteria for rating may make them ineligible for credit, though their projects and businesses can be financially viable. In these cases the current condition approach seems to be more appropriate. Nonetheless, the external agencies’ ratings are handy and can be accepted if criteria for ratings are transparent and reliability is endorsed through empirical evidence. In respect of overseas counterparties, banks may use their own internal country risk ratings (sovereign ratings) and other published data and modify the external agencies’ ratings, wherever considered necessary.

The second complication is that the downturn in the economy may not take

place in a definite cyclical order. The downturn may be engineered by market-related factors and not by a slump in demand for goods and services. It may be confined to one or two sectors in the economy. The Asian financial crisis has demonstrated that there is a strong correlation between credit and market risks. The financial crisis began with the downturn in the real estate sector, but the economic instability escalated due to the volatility of market variables. The downturn did not occur in tandem with the past trend of business cycles. It is therefore difficult to anticipate the timing of trade cycles, form definite views about the characteristics associated with the cycles, and identify risk factors that can be factored into the rating process.

The surveys conducted by the Models Task Force of the Basel Committee on Banking Supervision in spring 1999 have revealed that, in general, banks evaluate the risk of a borrower or a facility on a point-in-time or “current condition approach” basis. The survey has, however, corroborated that banks consider all relevant factors in the assignment of ratings, including those that are relevant from a long-term perspective. Banks take into account longer term negative prospects even under the “current condition approach” for risk rating, but do not rely heavily on long-term projections that show improvements in the borrower's repaying capacity over time for assigning a favorable rating.

The conclusion is that banks should not place too much emphasis on the time horizon for choosing risk factors for inclusion in the internal credit risk rating models. All data and information that are relevant and available at the time of rating, including contingencies that can arise, should be taken into account. The “current condition approach” is more suitable for the bulk of the customers.

Choice of Rating System Dimension

The risk rating indicates the relative safety of credit exposures. Some banks consider a “facility rating” for sanction of a particular facility, while some others consider a “counterparty rating” for sanction of any type of credit facility. While facility rating methodology has focused mainly on facility characteristics, counterparty rating methodology combines both the borrower characteristics and the facility characteristics. Some banks first compute the counterparty rating without considering facility characteristics, and then they modify the rating by superimposing the facility characteristics such as collateral coverage and guarantee protection. In the absence of empirical evidence on the extent of correlation between credit decisions based on facility-rating and borrower-rating on the one side and the incidence of credit defaults on the other side, it is not appropriate to conclude which is a safer practice.

In banks, extension of credit facilities takes place through different forms and under different nomenclatures. Borrowers enjoy different types of fund-based and non-fund-based credit facilities, either from a single bank or a number of banks. The fund-based facilities are in the form of fixed tenure loans, overdraft or cash credit facilities, trade bills discount and purchase, or in the form of subscription to bonds and debentures of corporations redeemable over a period of time, which are credit substitutes. The non-fund-based facilities are extended usually through financial guarantees, import and export letters of credit, or for underwriting of equities and bonds. It may be possible to base lending decisions on facility rating, if the borrower avails itself of only one type of facility from one bank. But where borrowers seek multiple credit facilities that involve a number of banks, it is not prudent to base the lending decision on a facility rating. The latter practice (bond or debenture rating) is meaningful, where the bank provides facility by way of subscription to the bonds or debentures issued by the counterparty. If the borrower needs a package of credit facilities, it is not practical to rely on facility ratings due to the likelihood that different facilities may receive different rating grades, though they relate to the same customer, who is answerable to the bank for the total debt and not facility-wise debt. Moreover, computation of ratings for different facilities may not show consistency between ratings due to the varying characteristics of facilities. The situation gets further complicated if the borrower approaches more than one bank for sanction of different types of credit facilities. Different banks may have

different rating criteria, different rating scales, and different rating models, which may not be comparable due to the bank-specific idiosyncrasies and preferences. In view of these complications and the possibilities of greater divergence in facility ratings, it is more sensible to undertake borrower rating in preference to facility rating. In fact, borrower rating is more meaningful than facility rating, since the funds lying in various accounts are fungible, and the borrower has the freedom to transfer funds between accounts and between locations, or it can manipulate the accounts to suppress unfavorable developments. The default in a facility does not occur in isolation; default in any one of the facilities usually takes place when the overall financial condition of the borrower deteriorates. Even facility rating is not done in isolation; risk factors taken into account for facility rating also include risk elements that reflect the borrower characteristics.

Adoption of Definition of Default

A credit rating signifies the potential loss that can arise in the event of default. In preparing the design of a CRRF it is therefore necessary to set up a definition of default. When we assign a rating to a credit exposure, say the AA rating, we invariably link it with the probability of default. We try to convey as a credit analyst that the default percentage in the AA category of credit assets is low, and lower than the average rate of default for the bank as a whole. The granulation of rating scale is essentially based on the incidences of defaults in various asset categories. Consequently, the definition of default assumes tremendous significance in framing the design of the CRRF. There is no uniformity in practice among banks, and also between the bank regulators and supervisors, in determining when a credit exposure has reached the stage of default. Even the Basel Committee on Banking Supervision has given some flexibility to the bank supervisors to use their discretion in setting up a definition of loan default, keeping in view the peculiarities of local conditions.

Broadly, there are two definitions of default—the legal definition of default and the bank supervisors' definition of default. The definition of default used in credit risk rating models can be different from that used for legal purposes. In simple terms, default can be defined as the breach of contractual obligations by the debtor to the creditor. Default occurs when the debtor is unable to meet his or her financial obligations to the creditors on a global basis on the agreed dates. In other words, the ambit of default extends to the debtor's financial obligations anywhere in the world. If the debtor voluntarily applies to a court of law for declaring him or the organizations owned by him as insolvent, or if the creditors file suits in a court of law for declaring a debtor or his concerns as bankrupt and the court upholds the applications, the default has occurred. Sometimes, the process gets delayed as bankruptcy laws differ between countries.

The bank supervisors' definition is precise and simple. In their view, the default has occurred when the debtor (borrower) fails to repay his dues to the creditor (lender) in full or in part as per the agreement, within the specified time counting from the date the debt is due to be repaid. But the supervisors' definition is not uniform between countries, mainly due to different prescription of the time period allowed as concession to the debtor to repay his debts. The time period is usually linked to the production and income generation cycles and the trade practices that vary between countries.

The New Basel Capital Accord defines default:

A default is considered to have occurred with regard to a particular borrower when either or both of the two following events have taken place:

i. *The bank considers the borrower is unlikely to pay its credit obligations to the banking group in full, without recourse by the bank to actions such as realizing security (if held).*

ii. *The borrower is past due more than 90 days on any material credit obligation to the banking group. Overdrafts will be considered as being past due once the customer has breached an advised limit or been advised of a limit smaller than current outstanding*[3]

In the case of retail and public sector entity obligations, the period of 90 days can be extended up to 180 days by bank supervisors under their discretion to suit the local conditions.

In addition, the document has prescribed certain events or elements that will help bank management to determine whether a default has occurred in respect to a credit exposure.[4] These events/elements are:

1. When a bank ceases to charge interest on an account in pursuance of prudent accounting policy or standard accounting practices.

2. When a bank makes provision in respect of the account due to decline in credit quality.

3. When a bank sells at a discount the credit exposure or it restructures the debt involving financial sacrifice on its part.

4. When a bank files an insolvency or bankruptcy petition in a court of law or to a competent authority.

5. When the borrower seeks protection under the bankruptcy or insolvency laws to delay or avoid repayment obligations to the creditors.

The definition of default is an important input to the rating process. It is advantageous to accept the bank regulators'/supervisors' definition of default, which is very specific, in framing the design of the CRRF. If a borrower has been rated AAA at the entry point and commits default to the repayment obligations within a year or two, except under exceptional circumstances, it indicates that the internal risk rating model set up by the bank is not realistic.

9.4 DEVELOPMENTAL ISSUES

Selection of Risk Factors

A bank has to develop its own rating models, keeping in view its asset profile. The key inputs are the risk factors that go into the computation of ratings. The bank has to carefully identify the risk factors that will be valid for different types of counterparties and different types of facilities. It is not difficult to identify the risk factors for compiling ratings, because these are more or less the same that the bank officials usually consider when they carry out the due diligence exercise for loan sanction. Under the traditional credit analysis method, the bank makes an overall assessment of the risk based on a set of conclusions emerging from a detailed analysis of the technical feasibility and financial viability of the borrower's project. The focus is on the assessment of the borrower's repaying capacity under normal conditions and stress situations. In doing so, the traditional credit analyst considers all the risks that can arise till the loan is repaid. In the computation of a rating, more or less similar risk factors are considered, but in a more structured way. The difference is that risk factors are assigned numerical values after assessment of the severity of emerging risk, and later, the numerical values are aggregated to derive the rating that indicates the level of risk (low, moderate, high) associated with an exposure. The risk factors used under the traditional credit analysis method and those used under the rating method are by and large common. Usually, conservative banks do not depend solely on ratings for credit decisions. They use risk rating as an additional tool to take a final view of a loan after careful analysis through the traditional credit appraisal method. The risk rating is not a substitute for the due diligence exercise.

Granularity in Rating

We have discussed in Chapter 8 the multiple uses of a granulated rating scale. But what should be the extent of granularity in rating? Risk management strategies and options will fall short of the requirement if we do not go beyond binary classification of loans into good and bad loans. The granulation of risk grades seeks to overcome the limitations of broad loan classifications. The objective of granulation is to set up realistic and scientific credit risk models for credit loss estimation. The most important aspects of granularity in risk grade are that:

1. The user understands the comprehensive meaning of a particular risk grade.

2. Each grade represents a set of conclusions relating to the relevant counterparty.

3. Each grade conveys the incidence of default risk associated with the exposure.

For instance, a banker who uses ratings for decisions on loans should understand without difficulty that a counterparty rated as AAA falls in the lowest risk or the highest safety category. If the counterparty is awarded the AAA rating, it is expected that the rating will endorse the following set of conclusions:

1. The counterparty is financially sound.

2. The counterparty is least susceptible to moderate business setbacks or has a high degree of sustainability in adverse circumstances and volatile markets.

3. The counterparty has a high degree of survival during economic depression.

4. The incidence of default on exposures in the AAA category is the lowest and minimal, say, 0.5 percent to 1 percent of borrowers.

Number of Risk Grades

How many risk grades should a bank have in its internal credit risk rating system? International practices differ in this regard. There has to be a minimum number of risk grades in the rating framework so that the grades reflect the marginal variations in risk perception. In the New Basel Capital Accord, the Basel Committee has recommended that “a bank must have a meaningful distribution of exposures across grades with no excessive concentrations, on both its borrower-rating and facility-rating scales. To meet this objective, a bank must have a minimum of seven borrower grades for non-defaulted borrowers and one for those that have defaulted. … Supervisors may require banks, which lend to borrowers of diverse credit quality, to have a greater number of borrower grades.”[5]

The rating scale shall consist of a sufficient number of risk grades so that it is possible for the bank supervisors and the external auditors to evaluate the relative quality and the health of the bank's credit portfolio. Usually, the bank supervisors do not specify the exact number of grades; they give discretion to banks to decide the number they will include in the rating scale. The supervisors, however, expect that banks will comply with the requirements prescribed under the IRB approach.

Banks must consider that it is not worthwhile to increase the number of rating grades beyond a point, because it may not produce any additional benefit. The greater the number of rating grades, the more expensive and time consuming will be the process to collect the data and information for fine tuning the risk grades and operating the rating system. The number of risk grades that can be included in the rating scale depends on several factors.

For determining the realistic number of risk grades, banks should take into account at least the following factors:

1. Credit risk management policy.

2. Credit risk appetite.

3. Credit profile.

4. Targeted credit spreads (exposures at prime lending rate, below prime lending rate, and at prime lending rate +, ++, and so on).

5. Provisioning policy on impaired loans.

6. Local banking industry practices.

7. International best practices.

The major objectives for including a reasonable number of risk grades in the rating scale are:

1. To assign appropriate risk weights to counterparties to assess capital requirements in alignment with varying risk characteristics.

2. To distinguish one loan from another in terms of credit quality.

3. To build up historical data on risk components (PD, LGD, EAD).

4. To estimate potential losses from exposures with varying credit qualities.

5. To set up a scientific loan pricing formula.

6. To evaluate the overall health of the credit profile.

Another important objective is to identify watch category loans or problem loans. From the credit risk management point of view, a separate grade for "watch category loans" is required for close monitoring to stop the slippage of standard category loans and advances into the nonperforming category. A separate grade for sick category loans is also required for segregating at an early stage the borrowers' industries or businesses that have become sick so that rescheduling or restructuring packages can be worked out at the appropriate time.

The grading system should be flexible so that banks can have a lesser number of grades for relatively small exposures or for personal loans or agricultural loans. For rating of large exposures, banks may have very fine granulation so that even slight changes in the material financial ratios, which are included in the rating process, cause alteration or migration in risk grades. The rating mechanism should be such that even changes in the lending environment can be factored into the rating process. The ultimate test of robustness of the grading system is that it symbolizes without ambiguity the variations in default probabilities associated with different risk grades. The proportion of loans turning bad in each risk grade within a selected time zone as seen from actual cases in the records of the bank must be around the model-generated default probability, if the credibility of the rating grades is to be accepted.

Determination of Rating Scale

The rating scale should capture all possible states of loans in terms of their probability to move to a default state and the extent of recovery in the event of default. What is important is that a bank should document distinct criteria for assigning a particular risk grade. Each grade should convey the degree of default risk associated with the borrowers in that grade and be distinguishable from another grade in terms of the intensity of default probabilities. For example, in a eight-scale borrower rating framework, rating of a borrower in grade 1 (best rating) represents virtually no risk or the least probability of default, whereas rating in grade 7 will mean the highest risk or the highest probability of default. The calibration in the rating grade guides the bank to fix the collateral package and other terms and conditions for sanction of loans in accordance with the varying scales of risks. A bank may devise its own notations to assign risk grades to the borrowers. It can be either alphabetical, such as AAA, AA, A … C, and so on, or numerical notations preceded by the abbreviation of its name. The design of an eight-grade rating scale is suggested in Table 9.1.

TABLE 9.1 Borrower Rating Scale

Rating Scale	Description of Risk	Level of Safety
AAA	Very low risk	Highest safety
AA	Marginal risk	Very high safety
A	Low risk	High safety
BBB	Moderate risk	Moderate safety
BB	Fair risk	Less than average safety
B	High risk	Low safety
C	Very high risk	Very low safety
D	Defaulted or nonperforming loans and advances	Risk has materialized

A bank may modify its rating grade by the addition of “+” or “–” (say AAA+, AAA–). It should set up a complete set of criteria for assigning a rating grade that clearly explains the characteristics of the grade with plus and minus notations. Large banks may set up longer rating scales where rating grades can be assigned “+” or “–” signs to represent minor variations in risk perception.

Interpretation of Rating

Credit ratings convey the current opinion on the creditworthiness and financial soundness of a counterparty in relation to its total financial obligations. Ratings convey the ability and the willingness of the borrower to meet specific financial obligations on loans, overdrafts, bonds, commercial papers, and so on. Different rating grades convey different probabilities of committing defaults on the repayment obligations and differences in the levels of safety (quantum of loss that may arise in the event of default). The interpretation of different rating grades is described in Table 9.2.

TABLE 9.2 Interpretation of Counterparty (Borrower) Rating

Rating Grade	Rating Notation	Description of Risk	Level of Safety	Interpretation
1	AAA	Very low risk	Highest safety	Excellent track record, growth potential, and business prospects; extremely strong fundamentals. Projected cash flows are very strong to service long-term and short-term loans and advances. Least susceptibility to cyclical fluctuation and adverse economic scenario.
2	AA	Marginal risk	Very high safety	Very good track record, growth potential, and business prospects and very strong fundamentals. Projected cash flows are strong to service long-term and short-term loans and advances. Very low susceptibility to cyclical fluctuation and adverse changes in economic scenario.
3	A	Low risk	High safety	Good track record, growth potential, and business prospects and strong fundamentals. Projected cash flows are reasonably good to service all forms of loans and advances. Low susceptibility to cyclical fluctuation. Debt servicing capacity is likely to be moderately affected under adverse economic scenario but will remain adequate.
4	BBB	Moderate risk	Moderate safety	Satisfactory track record, moderate growth potential and business prospects, and satisfactory fundamentals. Projected cash flows are satisfactory but not so good as to guarantee servicing of loans and advances under stress situations. Moderate susceptibility to cyclical fluctuation. The debt servicing capacity will be impaired under adverse circumstances.

Rating Grade	Rating Notation	Description of Risk	Level of Safety	Interpretation
5	BB	Fair risk	Lower safety	Average track record, growth potential and business prospects, and just average fundamentals. Financial parameters are equal to or marginally lower than benchmark ratios. Projected cash flows are just adequate to service all long-term and short-term loans and advances. Fair susceptibility to cyclical fluctuations. Repaying capacity will be inadequate under adverse circumstances.
6	B	High risk	Low safety	New or inexperienced management, low growth potential and business prospects, and weak fundamentals. Financial parameters are lower than benchmarks but acceptable under special circumstances. The debt servicing capacity is adequate under favorable circumstances but highly susceptible to development of adverse circumstances.
7	C	Very high risk	Very low safety	Poor track record of management, very low growth potential and business prospects, below standard fundamentals but acceptable under special circumstances. Likely to service debts if favorable conditions continue. High level of uncertainties in generating adequate income.
8	D	Risk has materialized	Safety linked to collateral	Debt servicing is in default; recovery proceedings are due.

9.5 IMPLEMENTATION ISSUES

Appropriate mechanisms have to be in place to implement credit risk rating

models uniformly across the organization. Large banks, which have a broad network of domestic branch offices and operate at several overseas locations, face several challenges in implementing the rating system. The questions that arise in this connection are:

- Who will collect data on borrowers and initiate the rating process?
- Who will approve the ratings?
- Will loan managers also rate borrowers to whom they sanction loans?
- Do all loans have to be individually rated?
- Will loan managers stationed at branches have the knowledge and experience to understand the rating methodology and carry out the exercise?
- What types of checks and balances exist to prevent assignment of motivated ratings?

Banks have to address a few issues to tackle the typical problems they face in implementing the risk rating models across the organization. The main implementation issues are:

- Deciding the rating coverage.
- Deciding the modalities for initiation and completion of the rating process.
- Ensuring objectivity in rating and achieving uniformity of rating output.
- Setting up procedures to avoid conflicts of interest between rating assignments and loan decisions.
- Fixing responsibility for independent verification of assigned ratings.
- Arranging for storage, retrieval, and online connectivity of data on borrowers accessible to monitoring and controlling staff.

These issues are dealt with in the following section.

Rating Coverage

A bank's credit assets comprise loans and advances of varying sizes to different counterparties and for different purposes and tenures. The principle of credit risk management dictates that all exposures shall be rated irrespective of size, because size-based classification of exposures has its own limitations. Large-size exposures of short tenures can be less risky than medium-size exposures of long tenures. The credit risk management process will be incomplete unless all exposures are rated. Banks, which have significantly large number of small borrowers, may not find it practical to rate all small loans because of the volume and the cost of rating, and they may decide to rate all loans above specified limits. The cutoff limits may vary counterparty-wise, purpose-wise, and tenure-wise, and will depend on the risk management policy of the bank, the average size of exposure, and the number of loans within specified ranges of limit amounts. The small loans below the cutoff limits can be grouped into homogeneous categories and assigned predetermined ratings without subjecting them to individual rating. But the assignment of predetermined risk grades to pools of small loans should meet at least two conditions, if the principle is to be accepted. The first condition is that the assigned rating to the asset-pool should display default probability and loss given default characteristics that are almost the same if individual ratings of these loans had been undertaken. The second condition is that the risk weights that will be assigned to these small loans on a pool basis for calculation of regulatory capital should be in conformity with the prescriptions of the bank supervisory authority and the requirements specified under the New Basel Capital Accord.

Rating Approval Process

The rating approval process has to go through three stages to generate the final output. The first stage is information collection and initiation of the rating process by the front-line staff, the relationship manager, or the manager of the branch office itself, who interacts with the prospective borrower. The compilation of rating requires several pieces of information and data on prospective borrowers, and it will be advantageous if the loan application forms are designed in such a manner that they contain all the information in one place, both for rating as well as for loan processing.

The second stage relates to data processing for derivation of the rating, and the third stage to approval of the rating and modification where needed. The choice of authority for compilation and approval of the rating will depend on the organizational structure and the decentralization of loan sanction powers. Borrower rating can be undertaken at the branch office of the bank without compromising with the principle of separating the operational function from the control function, if certain minimum checks and balances are observed. A bank having a three-tier organizational structure—the branch office, the controlling office, and the head office—can have rating approval responsibility at all tiers of the administration. Each tier may be assigned responsibilities up to specified limits in accordance with the organizational status of the officials. For approval of risk rating, the application of the principle of next higher authority seems more appropriate. If the rating is compiled by the branch office manager, it should be approved/modified by his or her controlling authority, that is, the regional manager. But for a bank of large size, having a few thousand branch offices and large number of borrowers, the task will be enormous if the ratings assigned to all borrowers at the branch offices are to be ratified by the next higher authorities. From both practical and realistic viewpoints, the responsibility for approval of the credit risk rating of borrowers can be entrusted to the officials with loan sanctioning powers at different tiers of the administration up to specified limits, subject to hindsight review by the next higher authority on a sample basis. This type of arrangement will have to be subjected to surprise audit at frequent intervals and supported by a rigorous punishment system for deliberate wrongdoings. For rating very large exposures for different asset classes, though the rating process will be initiated at the branch office, the final approval of rating should rest with a committee of senior

executives.

Rating Review

Ratings assigned to borrowers should be reviewed at periodic intervals to make credit risk monitoring effective and meaningful. Ratings should be reviewed when facilities are renewed or additional facilities are sanctioned to an existing borrower, or whenever changes in fiscal, industrial, export-import, and regulatory policies take place, or when material developments surface in the affairs or accounts of a particular borrower or borrower-group. The officials entrusted with the authority to approve risk rating within the organization are usually responsible for review and revision of the risk grade when conditions relating to the borrower change.

Rating Output Consistency

An important implementation issue is how to maintain uniformity and consistency of rating output, because it is done by different sets of personnel in different locations across the organization. Rating grades assigned by different personnel at different geographical locations may vary even in respect of the same or similar type of borrower, though the data and information base is the same. This is because rating is a combination of subjective and objective assessment. The accuracy in rating can be ensured if subjectivity is reduced and objectivity increased. Uniformity of rating output means that the rating methodology generates the same rating in respect of the same or similar type of borrower, even though it is done by different personnel at different locations. The objectivity in rating and the consistency in assignment of rating grade can be achieved by developing norms for assigning scores to risk factors, documenting the criteria for assigning a rating grade, and familiarizing the field personnel, who undertake the rating, with the rating methodology.

Conflicts of Interest in Rating

In implementing the rating process, the broad principle of segregating the credit sanction function from the risk rating function has to be kept in view to avoid conflicts of interest. But it is difficult to adhere to this principle by banks that have a large network of branch offices and a large number of borrowers. It is practically impossible to observe this principle with respect to small loans, since these are voluminous and spread over a large network of branch offices. This principle should be strictly observed in respect to all large and medium-size exposures where these constitute a significant percentage of the total volume of credit. Rating of very large exposures should be approved by the top management or a committee of two or three credit experts at the bank's head office, while the actual loan sanction should be the responsibility of the board of the bank, the managing director, or a committee of senior management in accordance with the loan approval policy. In respect to loans up to specified limits, the credit staff associated with the loan sanction process can be assigned the responsibility for initiation and approval of ratings, subject to appropriate checks and surprise audit.

Independent Verification of Assigned Ratings

The assignment of risk grades to the borrowers has a few implications. Rating not only influences the decision on the loan, but also the lending rate and the collateral package. Low-risk-graded loans enjoy a lower lending rate and a softer collateral package. Consequently, possibilities exist for manipulation of ratings for personal gain or achieving higher targets through soft ratings. Banks should follow a system of independent verification of ratings by personnel unconnected with the loan sanction and loan administration process, in addition to the rating review and rating modification system. Independent verification of assigned ratings to borrowers can be entrusted to the internal audit team on a regular basis. The internal audit team is a better choice in preference to outside agencies as it ensures continuity and protects the confidentiality of the borrower's accounts; besides, the internal audit team is more accountable to the top management.

Storage and Retrieval of Data

The financial data and other information on prospective borrowers required for rating are handled by bank personnel at different levels. The corruption of data at any stage can cause errors in rating. Besides, the data can be manipulated to produce a better rating grade that has implications for credit quality. It is essential to restrict data accessibility to officials across the organization and protect the integrity of data. The data entered into the computer system at the branch office or the front office should be subjected to selective verification at periodic intervals by personnel unconnected with the risk rating or credit sanction functions. This verification process assumes more significance if the bank intends to adopt the IRB Approach for credit risk assessment prescribed in the New Basel Capital Accord, since risk weights for assessment of regulatory capital are aligned to the various risk grades derived through the internally developed models, and capital relief is available on the value of admissible collateral. The integrity and the accuracy of ratings can be protected through checks on data entry and data accessibility. The particulars of collateral, which are factored into the rating process as risk mitigation inputs and which offer relief from capital requirements, will also have to be verified. The other aspect relates to the storage and online connectivity of data and information on all borrowers. It is necessary to generate risk-grade-wise breakup of total credit exposure of the bank at any point in time to manage credit risk. The retrieval of data on a real-time basis requires provision for daily feeding into the computer system the particulars relating to incoming and outgoing borrowers, and requires online connectivity between branch offices, controlling offices, and the head office. The entire set of data relating to credit ratings and credit sanction shall be made accessible only to the designated staff at various levels of the administration.

9.6 RATING FRAMEWORK OVERVIEW

The issues involved in designing and developing an internal credit risk rating framework (CRRF) are summed up in Table 9.3.

TABLE 9.3 Internal Credit Risk Rating Framework (CRRF) Summary of Issues

Issues	Action Points	Input Requirement	Comments
1. Selection of approach.	To select between "through the cycle" approach and "current condition approach."	Economy-related, industry-related, and counterparty-related data.	Model shall take into account borrower's projected condition under economic downturn or stress situations.
2. Choice of rating system.	To choose between facility rating and obligor rating system.	Supervisor's prescription. Banking industry practices.	Obligor rating is safer.
3. Adoption of definition of default.	To adopt either bank supervisor's definition or New Capital Accord definition.	Bank supervisor's directions. External auditor's requirement.	Bank supervisor's definition is precise and easier to apply.
4. Risk factor identification procedure.	To identify risk components, risk factors, and risk elements for each model.	Information and data on external and internal risk factors. Data on business cycles and market volatility. Information on industry correlation.	Risk components/risk factors/risk elements shall be appropriate to different risk rating models for different asset classes.
5. Choice of rating scale.	To decide the number of rating scales and the risk grades within each scale.	Supervisor's prescription. Bank's credit profile. Risk management philosophy. Credit risk policy. Lending policy. Loan pricing policy. International best practices.	The bank shall have customized rating scales that convey asset value changes corresponding to risk grade changes, and default and loss characteristics of each risk grade.

6. Granulation of rating.	To decide the extent of granulation in ratings.	Elaborate information on risk elements. Risk management philosophy. Credit risk management policy. Loan pricing and loan provisioning policies.	Granulation must bring out minor variations in risk levels between risk grades. Bank can have finer granulation for large borrowers and lesser granulation for small borrowers.
7. Rating coverage	To decide the cutoff limit for different types of loans for individual ratings.	Supervisor's prescription. Exposure-size-wise distribution of loans and advances. Loan sanction power chart. Credit risk management policy. Disclosure policy.	Loans to existing (old) and new borrowers above cutoff limit may be individually rated. Loans below cutoff limits may be clubbed on a homogeneous characteristics basis and assigned predetermined ratings.
8. Rating process	To decide rating methodology and establish modalities.	Identification of risk components, risk factors, and risk elements under each model. Identification of subjective and objective risk factors. Prescription of scoring norms and weights for risk components, risk factors, and risk elements.	Bank may place more reliance on internally developed models as their coverage will be large, and they will produce consistent ratings and will be cost effective in the long run.
9. Range of rating models.	To decide the number of rating models, asset-class-wise and exposure-size-wise.	Supervisor's directions. Asset-class-wise breakup of exposures. Exposure-size-wise distribution of loans and advances.	Bank shall have different rating models corresponding to different asset classes (counterparties), different activities, and different exposure sizes.

Issues	Action Points	Input Requirement	Comments
10. Rating approval process.	To specify authorities at different levels for initiation of rating process and final approval of rating.	Supervisor's directives. List of duties and responsibilities of relevant officials at branch office, controlling office, and head office. Loan sanction power chart.	Rating shall be done by officials at different levels of the organization up to specified limits, subject to checks and balances to avoid conflict of interests, and approved by next higher authorities on a sample basis, except for small loans.
11. Rating review	To make decisions about timing, frequency, and modalities for review and revision of ratings.	Supervisor's directions. Policy for review and renewal of loans and advances. Portfolio review and portfolio analysis policy. Loan pricing and loan provisioning policies.	Effective credit risk monitoring requires periodic updating of ratings. Frequencies for review may differ corresponding to exposure size.
12. Risk quantification.	To develop internal model for risk quantification.	Data on PD, LGD, and EAD with respect to different classes of assets/borrowers for at least 5 to 7 years.	Bank may set up internal model as recommended in New Capital Accord to estimate expected and unexpected losses for assessing regulatory capital and economic capital, and provisions for loan losses.

9.7 SUMMARY

The credit risk rating methodology varies among banking institutions due to

bank-specific idiosyncrasies and preferences, and differences in rating criteria, rating scales, and rating models.

Banks can use internal rating models for assessment of regulatory capital, generation of risk-grade-wise loss characteristics, quantification of risk-grade-wise potential losses, and tracking the rating migration of borrowers.

Banks should treat ratings derived through the internal models as an additional tool for credit decisions and not as a substitute for due diligence. Banks need to resolve certain conceptual, developmental, and implementation issues in preparing the design of the rating framework.

Conceptual issues relate to determination of the time period for selection of risk factors, choice between facility rating and counterparty rating, and adoption of the definition of default. The “current condition approach” is more suitable for rating the bulk of the customers than the “through the cycle approach.”

It is prudent to undertake borrower rating in preference to facility rating because the latter may produce different rating grades for different facilities though they relate to the same borrower. There are possibilities of greater divergences in facility rating.

Developmental issues relate to identification of risk factors and fixation of number of grades in the rating scale. The rating scale should capture all possible states of loans in terms of their probability to move to a default state and represent without ambiguity the variations in default characteristics associated with each risk grade.

Implementation issues relate to rating coverage, rating approval, and rating administration process. From cost and convenience points of view, loans above specified cutoff limits may only be individually rated. Small loans below the cutoff limits can be grouped into homogeneous categories and assigned predetermined ratings on a conservative basis.

The uniformity in assignment of rating grades by different personnel at different locations can be achieved by developing norms and scores applicable to risk elements and establishing transparent criteria for assigning grades.

NOTES

1. CRRF is used in a broad sense. It consists of rating models, rating methodologies, rating processes, risk components, risk factors, risk elements, and scoring norms.
2. “Range of Practice in Banks’ Internal Rating Systems,” discussion paper, BCBS, January 2000. Readers may refer to this document for details.
3. New Basel Capital Accord, paragraph 452
4. New Basel Capital Accord, paragraph 453
5. New Basel Capital Accord, paragraphs 403 and 404.

CHAPTER 10

Credit Risk Rating Models

10.1 INTERNAL RATING SYSTEMS IN BANKS

In 1999, after surveying banks' internal rating systems and processes in about 30 institutions across G-10 countries, the Model Task Force of the Basel Committee on Banking Supervision, brought out the similarities and the differences in the structure, methodology, and application of internal rating systems at the banking institutions.[1] The Task Force found the following common elements in the rating systems:

1. Commonality of risk factors for compilation of ratings, though differences existed in assigning relative importance to these risk factors and in deciding the mix between quantitative and qualitative factors.

2. Prevalence of both one-dimensional and two-dimensional rating systems among banking institutions, though the majority of them assigned ratings based on the assessment of the counterparty.

3. Similarity in purposes for utilizing information from the rating that included management reporting, pricing, and limit setting.

The Model Task Force found three main categories of rating processes in banks.[2] One of these processes was a "statistical-based process," which used both quantitative and qualitative risk factors, and the default probability or other quantitative tools to determine the rating of the counterparty. In developing this type of model, the bank first identified financial variables that provided information about the probability of default, and then by using historical data, the bank estimated the influence of these variables on the incidences of default for a sample of loans. The resultant coefficients were then applied to data on current loans to arrive at a score that was indicative of the probability of default. The score was then converted into a rating grade. A small number of banks relied on this model for rating large corporate exposures and a few banks for rating middle market and small business exposures.

Another rating process was the “constrained expert judgment-based process.” Under this process, banks based their ratings on statistical default/credit scoring models or specified objective financial analysis, but modified these ratings by a limited degree by using judgmental factors. One variant of this process was to modify the rating derived from the application of a scorecard by one or two notches (both upgrading and downgrading) by using judgmental factors. Another variant was assigning the maximum number of points to quantitative and judgmental factors to keep within limits the influence of judgmental factors on ratings. The Model Task Force inferred that the constraints on judgments were more severe when such judgments were applied for rating upgrades rather than for rating downgrades. A few banks used this approach for rating large corporations and a few others for rating middle market customers and smaller corporations.

The third process was the “process based on expert judgment.” Within this process, the weight of judgmental factors in the assignment of ratings was considerable. The manner of application of judgmental factors varied between banks. A few banks considered the rating derived from statistical models as the “baseline” rating, and then modified it by using judgmental considerations. A few other banks did not rely on the use of statistical models at all. Some banks considered that the statistical tools were only one of the determinants for assignment of ratings. In all cases, the rating authority used discretion to significantly deviate from the statistical model–derived output in the assignment of a rating grade.

10.2 NEED FOR DIFFERENT RATING MODELS

A bank should have different models for different types of counterparties, but there are other factors too that call for establishment of separate models. The number of models that a bank can have depends on the nature of its credit portfolio and the characteristics of loans and advances. In deciding the nature of models one has to keep in mind the following three factors:

1. Who is the counterparty?

2. Why does it want to borrow?

3. What amount does it want to borrow?

Accordingly, the models will vary by counterparty, loan purpose, and loan

size.

A bank has exposures to different types of counterparties who have different constitutions and who pose different kinds of risks. Where the counterparty is a bank, the risk assessment is based on the risk factors relating to capital adequacy, asset quality, liquidity profile, and profitability. If the counterparty is an industrial corporation, the focus is on risk factors like extant industrial policies, prospects of the industry, the financials of the peer group of industries, and the financial soundness of the loan proposal. Thus, risk characteristics vary between different types of counterparties. Similarly, banks sanction loans for a variety of purposes, like financing industrial and agricultural activities, trading activities, infrastructure projects, and for acquisition of assets, and so on. The risk characteristics associated with each of these activities vary according to the purposes of loans. For example, in the case of financing of industrial projects, risk factors like growth potential and economic prospects of the industry, demand-supply gap of its products, technological feasibility, and financial viability of the project are considered for risk assessment. But for financing agricultural projects, risk factors like the nature and size of the land, climatic and environmental conditions, quality of support and extension services, level of governmental support, and so on are taken into account for risk assessment. Again, risk assessment will have to be elaborate and rigorous in the case of large exposures and abridged and simple in the case of relatively smaller loans. Banks should therefore develop separate credit risk rating models to take care of variations in risk characteristics among counterparties, loan purposes, and loan sizes.

10.3 NEED FOR NEW AND OLD BORROWER RATING MODELS

Risk rating a borrower is not a one-time affair. A borrower rated in year 1 has to be rerated after six months or a maximum of one year, that is, in year 2 and subsequently, till the accounts are closed and the relationship terminated. Periodic updating of borrower ratings reveals the risk migration that is essential for credit risk assessment. Moreover, mapping of ratings of all borrowers over the selected time zone is necessary to conduct portfolio analysis. Since the rating exercise is an ongoing process, the rating models should be different for preentry (new) and postentry (old) rating of customers, because there are some additional

risk factors that go into the postentry rating process.

The New Basel Capital Accord requires that banks intending to switch over from the Standardized Approach to the Internal Ratings Based (IRB) Approach for credit risk assessment should collect historical data on the probability of default, loss given default, and exposure at default for a period of five to seven years. Consequently, banks have to rate their old borrowers (who already exist in their books) with reference to past years in order to build up default-related data risk-grade-wise on a yearly basis.

At any time, there are many borrowers on the books of the bank who have been dealing with it for a number of years. It is customary among bankers to form a view about the current financial standing and the creditworthiness of borrowers through scrutiny of ledger accounts and assessment of compliance with the financial discipline and the terms of credit sanction. The operations in the accounts and the dealings as evident from the bank's past records serve as a mirror to judge the current financial position of a borrower, besides his or her honesty and integrity. The scrutiny of accounts and the analysis of past dealings bring out the irregularities, the deficiencies, and the problems that have surfaced in the past. This first-hand information about the existing borrowers' dealings and observance of discipline in operating the loans and accounts in the past is vital for assessing risk. The scrutiny essentially brings out the risk elements, such as business stagnancy, overtrading, dishonesty, account manipulation, noncompliance, funds diversion, and so on, associated with the credit facilities granted to the borrower in the past. Consequently, "past dealings risk" is an important risk component that needs to be considered for rating borrowers who have been dealing with the bank for some time. For all types of borrowers, the risks arising from facility characteristics are important and should be included as a risk component in the rating model. This risk component is called facility structure risk. In the case of old and continuing borrowers, additional risk arising from past dealings risk needs to be recognized in addition to facility structure risk. It is therefore appropriate to set up two separate models for the same type of borrower even though the purpose of the loan is identical. One model is for rating new borrowers and the other for rating old (existing) borrowers in the same line of activity. The model for rating new borrowers includes the risk component facility structure risk; the model for rating old and continuing borrowers includes the risk component past dealings risk, besides facility structure risk.

There are two other variables that also influence the pattern of models, that is,

the type and the tenure of credit facilities. Banks grant loans and advances for different purposes and for different maturities. The maturities of loans spread over short, medium, and long periods, and generally match the purposes of the loans and the economic life of the assets acquired with the loans. Long-and medium-term loans are granted for infrastructure development; establishment, expansion, and diversification of industrial projects and activities; purchase of machinery; and acquisition of assets like aircraft and ships. Short-term loans are granted for meeting working capital needs and are renewed from year to year. Long-and medium-term loans granted for financing projects give rise to additional risks from project-related uncertainties and long tenure of loans. Consequently, the risk associated with project financing should be included as an additional risk component in the rating model. This risk component is called project implementation risk. This risk has to be included in the rating model for rating borrowers who obtain infrastructure development loans.

The number of credit risk rating models that a bank should have, is dependent on three main variables—the type of counterparty, the purpose of the loan, and the nature of the facility. But it does not mean that there are different sets of risk components and risk factors for each type of model. Most of the risk components and risk factors are common between models irrespective of the type of counterparty, the purpose of the loan, and the nature of the facility. The risk components that are not common between models relate to project implementation risk and overseas banking risk.

10.4 TYPES OF RATING MODELS

Banks need to take a long-term view about the type and the number of rating models if they intend to move to the IRB Approach for credit risk assessment. Rating of each type of counterparty to which the bank has an exposure should be done through a separate rating model, which should also take into account the risks associated with the purpose of the loan. For example, the model for rating a corporate client should also take into consideration the risks arising from financing of projects, objects, commodities, or real estate, as the case may be. It is not necessary to have an entirely different model for each type of activity or each purpose of a loan. The minor variations in risk characteristics can be accommodated within the broad framework of models if there are similarities between economic activities and the risk components and the risk factors are largely common between models. But if economic activities and risk factors are

heterogeneous, as between agricultural loans, education loans, or housing loans, it is necessary to have separate models on each one of them. The bank needs to classify the credit portfolio clientele-wise and loan purpose–wise, and decide about the types of models it requires to rate the present and future borrowers.

It is necessary to establish two or three subsidiary models within the main model to take care of variation in risk characteristics owing to differences in exposure size, since risk from large exposures is much more than that from small exposures. The principle is that the larger the exposure size, the more rigorous the rating model should be. For rating relatively small exposures, the model can be simplified through deletion of several risk elements, as it will be cost effective. For instance, within the manufacturing sector, the bank can have a simplified model for rating borrowers with loan size up to U.S. $5 million, a more detailed model for rating borrowers with loan size from U.S. $5 million to U.S. $50 million, and a much more elaborate and rigorous model for rating borrowers with loan size exceeding U.S. $50 million. Each bank may decide the cutoff limits for each type of model in accordance with the exposure-size distribution of credit.

10.5 NEW CAPITAL ACCORD OPTIONS

The New Basel Capital Accord provides a few options to banks to determine capital requirements for credit, market, and operational risks and allows bank supervisors to select approaches that are most appropriate to their banking system. The New Accord has prescribed two alternatives for the calculation of capital requirements for credit risk. The first alternative is the Standardized Approach, which seeks to assess credit risk from the counterparty ratings assigned by external credit rating agencies. However, this approach has limitations as ratings from external credit rating agencies are usually available for sovereign governments, large multinational banks and securities firms, and large corporations, or for prime debt instruments, and not for small and medium enterprises, retail, and small businesses, which cover the largest number of borrowers in many banks. There may not be uniformity between different credit institutions across the world in fixing the values of risk weights against each rating grade assigned by different external rating agencies. Moreover, as the methodology, the risk factors, and their relative significance may vary between external rating agencies, comparison of risk grades assigned by these agencies becomes difficult. More importantly, the ratings by external rating agencies may

not be always reliable, as was evident from the inappropriate ratings assigned to mortgage-related securities that contributed to the U.S. financial crisis during 2007 to 2008 (U.S. FCIC Report).

Under the Standardized Approach, banks are required to assign 100 percent risk weight to unrated exposures for calculation of regulatory capital, irrespective of the actual levels of risks emerging from these exposures. Because of this limitation, the Standardized Approach produces at best an approximation of risk-aligned capital. It does not achieve the purpose of holding an appropriate amount of capital based on the varying levels of risks associated with unrated exposures. The true picture of the bank's credit risk profile will not come out, since unrated exposures will be large in number. Risk monitoring and risk control processes will get diluted as stronger actions cannot be directed toward high-risk exposures.

The second alternative for credit risk assessment under the New Accord is the IRB Approach that allows banks to use internally developed rating systems for credit risk measurement. It casts significant responsibilities on the banks, as they will have to make their own estimates of probability of default, loss rate given default, and exposure at default for the calculation of the total capital requirement against credit risk. The limitation of the Standardized Approach is that its main focus is on regulatory capital assessment; it does not guide the bank in effective handling of the credit risk management function. Capital adequacy assessment and credit risk management are two separate functions, though they are interlinked. The focus of the former is on credit risk identification and measurement for determination of the quantum of capital required to cover credit risk; the focus of the latter is on credit administration that includes sanction, disbursement, follow-up, supervision, and recovery of credits. If a bank adopts the Standardized Approach, it will still have to put in place an elaborate procedure for credit risk management. But the IRB Approach provides additional inputs and critical information on risk-related issues that will help banks to conduct the credit risk management function efficiently. In the long run, it is much more beneficial for banks to adopt the IRB Approach both for capital adequacy assessment and credit risk management.

10.6 ASSET CATEGORIZATION

Banks have to establish in the beginning the internal credit risk rating framework if they want to develop their own credit risk measurement model. Banks have

devised several types of credit products with a view to aligning product designs with customer needs. Credit facilities are structured by banks so as to safeguard their own as well as the customers' interests. Each credit exposure has certain specific characteristics that are identifiable from the type of client, the purpose, the size and tenure of the loan, and the collateral coverage and guarantee protection. It is necessary to establish a credit risk rating framework that consists of different rating models, because different types of credit assets exhibit different risk characteristics. Banks have to meet certain benchmark standards under the IRB Approach if the internally developed credit risk rating framework is to be accepted by the bank supervisors.

The IRB Approach requires banks to categorize the banking book exposures into five broad classes of assets: corporate exposure, sovereign exposure, bank exposure, retail exposure, and equity exposure.[3] The Basel Committee on Banking Supervision has given options to banks to adopt their own definition of exposures, but the committee holds the view that the methodology adopted by banks for assigning exposures to different classes of assets must be appropriate and consistent over time.

10.7 IDENTIFICATION OF MODEL INPUTS

Credit risks from borrowers arise from internal and external factors. External factors refers to the macroeconomic policies and the economic and political environment over which neither the borrower nor the bank has any control. The external factors are fiscal and budgetary policies, monetary policy, exchange rate stabilization policy, industrial policy, import-export policy, and cross-border transaction regulations. The changes in the government's fiscal policy, the central bank's monetary policy, the bank supervisor's supervision policy, and the changes in market variables have a significant impact on banks and financial institutions, which alters their risk profile. Consequently, the risk from unfavorable changes in policies that create economic and financial constraints for banks' borrowers will have to be recognized in developing risk rating models.

The external risk factors that are included in the rating models are those that have a negative impact on the borrower's business. The risk is assessed in two stages. First, a view is formed about the possible developments that may take

place in the areas identified as external to the borrower and the bank, and second, the likely impact of those developments on the future prospects of industries, trade and commerce, and the borrower's income to service the loans is evaluated. The objective is that customers whose business is very sensitive to unfavorable changes in external factors and whose debt servicing capacity is likely to be greatly eroded on account of these changes should be rated lower in the rating scale.

Internal factors refer to those that are internal to the borrower. The internal risk factors are partly financial and partly nonfinancial. The financial risk factors are those that are derived from the borrower's financial statements, balance sheets, and business performance data. Examples of financial risk factors are the debt-equity ratio, current ratio, cost-income ratio, profitability ratio, turnover ratio, and so on. The nonfinancial risk factors are descriptive and qualitative in nature, but ultimately affect the borrower's financials. Examples of nonfinancial risk factors are prospects of an industry, competition among manufacturers, quality and marketability of products, availability of infrastructure facilities and skilled labor, and so on.

The risk factors that are included in various types of models are largely common. Where risk elements marginally vary between models due to differences in client type, exposure size, credit purpose, and credit tenure, the rating models can be modified with minor adjustments. We can think of several risk factors that can be included in the rating models, but it will be prudent, for two reasons, to keep ourselves confined to the risk factors that are material and that cover almost the entire gamut of risks. First, it is difficult and time consuming to collect information on certain finer risk elements, which may not be very material and which may have a marginal effect on the risk grade. Second, the cost involved in the collection of large amounts of information may be high and may not offer proportionate benefits.

In framing the design of credit risk rating models, banks have to identify all kinds of risks that arise from different exposure types. Three stages are involved in the risk identification process—identification of risk components that constitute the rating model, identification of risk factors that constitute a risk component, and identification of risk elements that constitute a risk factor.

Identification of Risk Components

The broad risk components that can be included under different types of rating models are given below:

1. Industry/business prospect and stability risk.
2. Managerial risk.
3. Financial viability risk.
4. Facility structure risk.
5. Past dealings risk.
6. Overseas banking risk.
7. Project implementation risk.

Four of these risk components, component 1 to component 4, are common to most of the models, and of the remaining three risk components, component 5 to component 7, the component that is appropriate to the relevant exposure is used. There can be some variations between banking institutions in selecting the risk components for inclusion in a particular model. Such variations will, however, be marginal, as the kinds of risk that arise from a particular type of counterparty are common though the methodology for rating can vary. The risk factors that are taken into account for assessment of risks that come under each broad risk component are explained in the following section.

10.8 ASSESSMENT OF COMPONENT RISK

For derivation of counterparty rating, banks should first assess the risk associated with each component included in the rating model. They should identify and list the risk factors and the risk elements that constitute a risk component relevant to a model and then assess each one of them to determine the level of component risk. The risk factors and risk elements pertaining to each risk components are discussed in the ensuing section; these are not however exhaustive.

Industry/Business Prospect and Stability Risk

Banks have to assess the future prospect of the industry and the scale of business

in financing industrial/manufacturing activities. Exposures pertaining to different types of industries pose different degrees of risks. For example, the degree of risk from an exposure to a steel industry is largely dependent on the performance of other industries that use steel as input, such as ship-building, automobiles, construction, and so on. There is a positive correlation between those industries that use other industries' products as their inputs or which supply their products to others for use as inputs. Banks need to keep in mind this correlation factor while assessing industry prospect risk in connection with the financing of industrial projects and manufacturing activities. The smaller the coefficient of correlation between related industries, the lesser will be the intensity of risk arising from stagnant or sluggish growth in other relevant industries.

Banks have to examine a few risk elements to assess the present status and the future prospect of the relevant industry, like its relative position in the economy, its susceptibility to cyclical fluctuations, and its relative profitability. The average return on capital, the average percentage of profit to sales, and the relative stability of earnings are some of the important financial parameters that depict the trend of financial performance of a particular industry. The future prospects of the industry should be assessed through examination of risk elements like the government's licensing policy, trade policy and import-export policy, the industry's growth potential and future outlook, the demand-supply gap of its products, and the extent of domestic and international competition it is likely to face. The presumption is that the more unfavorable the risk elements are, the more risky it is for the bank to finance a particular type of industry. The risk arising from inadequacy and inferior quality of infrastructure support is another important risk factor. Banks need to carefully examine the extent of infrastructure support the industry will get to carry on production on a long-term basis and achieve stability of operations.

Besides industry prospect risk, banks have to assess the business prospect risk through an evaluation of risk factors like business environment, market competition, and product pricing policy. The present level of capacity utilization in the same type of industry should be examined to ascertain the scale at which the proposed industry is likely to run since this has an important bearing on the cash flow. The scale of manufacturing and selling expenses in relation to those prevailing in similar industrial units should also be examined to assess the operating efficiency. Even the personnel policies that govern industrial relations are relevant. The presumption is that unless the industry achieves reasonable capacity utilization and operates with efficiency, the supply of its products at

competitive prices will get disrupted. The business level will be low and the business prospect risk will be high.

Another risk factor is the market competition and market acceptability of the products the industry will manufacture. Banks should examine the demand supply gap of its products, the range of products, their marketability, the marketing strategy, and the selling arrangement. An industry that is dependent on a single product, that is going to produce goods whose quality and acceptability are yet to be established in the market, and that does not have a network of sale outlets is more risky from a business point of view than an industry that manufactures a wide range of products, whose products have a brand image, and that has a chain of sale outlets. Another risk element is the proposed industry's capability to pursue a flexible pricing policy that allows price manipulation of its products in competitive markets to retain its market share and survive in a scenario of rising input costs and declining sale prices.

Banks should undertake an overall assessment of all these risk factors and risk elements to ascertain the level of industry/business prospect and stability risk for the purpose of rating. Banks usually carry out this type of risk assessment during the course of a traditional due diligence exercise to determine the extent of risk involved in financing a particular industry.

Managerial Risk

Managerial risk is a critical risk component that influences the counterparty rating because poor management of an industry or business leads to failures even though all other requirements are met. Banks attach significant importance to the quality of management in considering a loan proposal. They assess the managerial risk through an analysis of the ownership structure, the professional competency, the past experience, and the track record of the borrowers and the status of corporate governance.

The ownership structure of the borrowing concern is an important risk factor. The risk should be assessed through examination of the form of legal entity and the holding pattern of equity (capital). The corporate form of ownership is less risky than other types of entities, since the corporation is governed and bound by several legal provisions under the Companies Act, which are more extensive and broad based than other relevant laws. A corporation has to comply with several obligations under the company laws and maintain transparencies and disclosure standards. Consequently, dealings with the corporate clients are less risky because of their professional approach to management and greater visibility of actions. Where the rules and the regulations are not comprehensive and the management actions are not transparent, the risks from the clients are greater.

The second risk factor is the past experience and the track record of the borrowers in managing the relevant industry and business, and meeting past financial commitments. The track record is judged from successful completion of projects by the borrowers in the past and the data on achievement of targeted sales and profits. In examining the track record, banks need to take a broad view and consider the borrowers' experience in any type of industry or business. The payment of dues to the market creditors and the payment of taxes and duties to the government on time are proofs of a good track record. Lack of past experience and defaults and delays in payment of dues are symptoms of a bad track record. If there is evidence of such features, the risk is higher. The longer the managerial and technical experience of the borrowers and the better the financial record, the lower is the level of risk. If the borrowers are relatively new in the industry or trade and not much information is available about their past record, the level of risk will be relatively high. A management with tainted reputation, doubtful integrity, and dishonest market dealings is the most risky.

The third risk factor is the status of corporate governance of the prospective

clients. The critical aspects of corporate governance are appropriate organizational structure conducive to sound management, transparency in functioning, accountability of the management, and the succession policy. An appropriate organizational structure with fully committed management that is conscious of changing environmental and functional requirements, that observes objectivity and transparency in allocation of functional responsibilities, and that believes in disclosure of policies is less risky. On the other hand, management that has overlapping roles and responsibilities, that believes in inward-looking governance policies, and that is oblivious of succession policy requirements carries a higher risk. The conclusion is that the higher the managerial risk, the greater are the possibilities of business failure and the chances of default in servicing the bank's dues. The assessment of these risk factors and risk elements shows the level of managerial risk.

Financial Viability Risk

Financial viability risk is the most important among the risk components. Financial viability is examined through an assessment of the adequacy and stability of income generated from the project/business financed by the bank during the currency of the loan. Banks examine past financial parameters and future cash flows from the industry/business to assess the borrower's loan servicing capacity. They assess financial viability risk by working out certain critical financial ratios from the borrower's balance sheet and other financial records, and comparing these ratios with the benchmarks. The important financial parameters that go into the assessment of financial viability risk are:

1. Current liabilities to current assets ratio.

2. Total outside liabilities to tangible net worth ratio.

3. Debt service coverage ratio.

4. Operating profit and net profit.

5. Return on capital employed.

Banks compute these financial parameters, both in respect to past and projected operations, from the borrowers' balance sheets of the recent past and evaluate them to determine the level of financial viability risk.

Under the traditional credit appraisal method, both the financial ratios and the income generated from the industry/business are taken into account to judge the financial soundness of a loan proposal. The cash flow statements are prepared and the internal rate of return of the industry or project is derived and put to a sensitivity test. The internal rate of return indicates the profitability of the investment made by the borrower after repayment of the bank's dues. Besides calculation of internal rate of return, year-wise inflows and outflows of funds during the economic life of the project are calculated to judge the adequacy and the stability of income and the surplus available to service the debt. The financial parameters, which are analyzed for project appraisal under the traditional method, are also treated as risk factors for assessing the financial risk component for risk rating. For example, the analysis of debt service coverage ratio reveals information about the adequacy of income from a project to service a loan. This ratio is an input for computation of the rating. The larger the debt service coverage ratio (meaning a greater cushion in debt servicing capacity), the lesser is the financial risk. Since financial ratios are derived from the financial statements provided by the borrower, the quality of the statements or the balance

sheets is an important risk element. A critical examination of the balance sheet indicates the extent up to which financial ratios can be considered as reliable and consistent. Consequently, financial statements audited by reputed chartered accountant firms are more reliable and are considered less risky in deriving conclusions based on financial parameters.

In assessing the financial risk, it is not prudent to arrive at conclusions based on the current year's financial parameters alone. If the customer has been running an industry or business for some time, it is sensible to consider the trend of financial parameters for the past three to four years. An analysis of the trend reveals the customer's efficiency in achieving reasonable growth in sales and profits over a longer period. The financial ratios and other parameters are likely to be biased if only the current year's figures are taken into account, as these figures may contain an element of unusual swings in the volume of sales and profits due to favorable factors that are unsustainable. If the customer is new and does not have a business at present, the financial parameters of similar industries or businesses should be considered to determine whether the industry or business for which the customer has applied for a loan is likely to be financially sound. Banks take into account both the risk factors relating to the past financial performance and the stability of cash flows (present and future) to assess the financial viability risk component.

Another element of financial risk is the impact of future uncertainties on the cash flow projections. Banks should examine how the customer's financial position and the future cash flows will change if some uncertain but plausible events take place, and assess the risk from two angles. First, what will be the impact on the customer's financial position if he or she has to meet some unforeseen liabilities? Second, what will be the likely impact on the ability to raise fresh funds or further capital from the market if some negative events occur? These eventualities constitute future sources of viability risk. Banks shall assess these events carefully if the loan is repayable over the medium term or long term.

The examination of risks from all the relevant risk elements and the risk factors will show the level of financial viability risk.

Facility Structure Risk

Facility structure risk should be assessed in a broader perspective. It is not merely the risk from the structure of credit facilities and the vulnerability of collateral, but also the risk from other factors like the age of the borrower's relationship with the bank, the number of credit institutions from which the borrower avails him-or herself of the facilities, and the foreign currency component of the facility. It is not correct to assess the facility structure risk in isolation, relying solely on the strength of collateral and disregarding other factors.

The longer the number of years the bank has been dealing with the borrower and the more information it has about his or her past dealings, the lower is the level of risk. It is therefore obvious that the risk from new borrowers is more than that from old borrowers because of the “unknown factor.” Besides, additional risk arises when banks seek to expand the relationship with large-value customers beyond a point relying solely on the honesty of their past dealings. It is wrong to assume that the bank's interest is always safe if the customers’ dealings have been satisfactory, because the financial market is highly competitive and market variables change frequently. Moreover, if large-value customers are aware of the bank's eagerness to retain and enlarge the banking relationship, they assume bargaining power to manipulate the terms of sanction that are often detrimental to the interests of the bank.

Facility structure and banking arrangement are two other elements of risk. The particular mix or package of facilities required by a borrower poses different degrees of risk to the bank. Facilities that provide financial assurance to third parties, such as financial and performance guarantees and letters of credit, carry more risk because the customers are often found wanting in honoring their commitments to the satisfaction of the third parties, which forces the latter to make claims against the bank. Facilities like overdraft against collateral of equity shares carry more risk, because a sudden fall in equity prices may substantially reduce the value of collateral. Similarly, the banking arrangement is also an element of facility structure risk. Where multiple credit institutions are involved in sharing large-value loans among themselves, banks’ risks are mitigated, but banking with multiple institutions is more risky because of the lack of coordination between them. Sometimes, the customers resort to multiple banking arrangements to avoid the financial discipline of a control-conscious bank.

Often, they take loans without the knowledge and the consent of their first banker, which raises questions about their integrity. It is sometimes found that borrowers seek trade bill financing from one bank, and term loan and overdraft facilities from another bank. The borrowers' intention is to keep the latter bank in the dark about the volume and value of sales, which are evident from trade bills that are discounted by the former bank.

The third and the most important aspect of the facility structure risk is the collateral risk. The realizable value of collateral is uncertain, either because it is highly susceptible to price fluctuation or because it lacks marketability. The value and the quality of collateral largely decide the degree of facility structure risk. The more the value of collateral and the easier the route for sale, the lower the risk from the facility and the lower the overall financial risk. The quality and marketability of collateral are more significant than its tangibility in mitigating risk. Land, buildings, plants and machinery, residential and commercial properties are more tangible than certain other types of assets, but their risk-mitigating quality is inferior because of the time-consuming process involved in selling the securities in the event of default by the borrower. In view of the restricted marketability of these types of tangible collateral, only financial collaterals, the values of which are promptly realizable with certainty, are recognized as risk-mitigating security for getting capital relief under the New Basel Capital Accord. The financial collateral provides relief to the bank from allocating capital against the relative exposure to the extent of their realizable values. Consequently, facilities supported by easily realizable collateral carry lower risk than those covered by collateral that has restricted marketability. Unsecured or clean credit facilities carry high risk.

The fourth element of facility structure risk is the exchange risk that arises from the foreign currency component of the credit. Customers take foreign currency loans for import of machinery and raw materials, or for setting up affiliated concerns or joint ventures abroad. These loans are repayable in installments over the medium term in the foreign currency. Customers are usually reluctant to take cover against fluctuations in exchange rates on account of the additional cost involved. When the domestic currency depreciates beyond a tolerance level, the borrowers are unable to meet the additional debt burden due to the adverse exchange rate. Where the customers earn foreign exchange through export of their products or receive remittances from affiliated units or joint ventures abroad, they are in a better position to meet repayment obligations even if the domestic currency is continuously depreciating. Where the customers

do not take forward cover against the exchange risk or do not earn foreign exchange, the risk against the foreign currency component of the loan is greater. The emergence of this type of risk was evident during the Asian financial crisis of 1997 when the banks' credit risk increased on account of the volatility in exchange rates. Banks should examine all these risk elements and risk factors and assess the level of facility structure risk.

Past Dealings Risk

In section 10.3, I have explained the rationale for setting up separate credit risk rating models for new and old (existing) borrowers. It is erroneous to assign a risk grade to a borrower who has been dealing with the bank for a certain period of time without examining the borrower's past dealings. The focus under the past dealings risk is on the satisfactory conduct of accounts and observance of financial discipline by the borrower in the past. The scrutiny of operations in the accounts generally applies to revolving overdraft or renewable cash credit facilities, where credit limits are sanctioned for a fixed period of time, usually one year, and the borrower is free to operate the accounts on an ongoing basis within the sanctioned limits. But often irregularities occur in the accounts, either due to withdrawal of funds beyond the sanctioned limits or return of unpaid checks or unpaid trade bills. If funds are withdrawn in excess of the sanctioned limits frequently or the checks and trade bills are returned unpaid on a few occasions during a year, the borrower's credentials come under a cloud. In such situations, the bank should be cognizant of the warning signals and be cautious in dealing with him or her. Besides, the borrower is required to observe financial discipline and adhere to the terms and conditions of credit facilities. The scrutiny of operations in the ledger accounts reveals the extent and the quality of compliance with the terms and conditions of credit facilities by the borrower, which determine the level of past dealings risk. Where the assessment of the borrower's past dealings reveals breach of loan sanction terms to an unreasonable extent or frequent occurrence of irregularities, past dealings risk is high. If the irregularities are material or the past dealings are unsatisfactory, the rating of past dealings risk should be used as a rider and the risk rating assignable to the borrower should be downgraded though other risk components show a favorable position.

Overseas Banking Risk

No fundamental difference exists in the application of criteria for rating borrowers within the country and those operating outside the country. The risk components—industry/business prospect and stability risk, managerial risk, financial viability risk, facility structure risk, and past dealings risk—which are applicable to domestic borrowers are equally applicable to borrowers at foreign branches of banks. The risk factors and the risk elements are largely the same, but the risk elements should be assessed on the basis of local conditions and the local laws of the relevant country. For example, in assessing the industry/business prospect and stability risk, the risks relating to growth potential of the industry and the government's industrial and trade policies should be assessed with reference to the situation prevailing in the country where the borrower operates. But while assessing managerial risk and financial viability risk, the judgmental factors and the quantitative parameters that are considered are broadly the same. For instance, in assessing the managerial risk pertaining to a borrower operating abroad, the same risk elements, namely, past track record, professional competence, corporate governance practices, and management succession plan, are considered.

Overseas banking risk is an additional risk component that is taken into account for rating borrowers having exposure at foreign branch offices of a bank. The risk is assessed in two stages—first in the foreign branch office and then in the corporate office of the bank. The overseas banking risk component consists of three risk elements—country risk, currency risk, and transfer risk. In some cases, there can be an additional risk if the foreign branch office extends finance to those who are not resident in that country. There can also be the risk of collateral, if the port of shipping and the port of destination of goods exported by a borrower are located outside the country where the foreign branch office is operating. In the latter case, the branch office that has provided export credit backed by documents of title to goods has no independent source to verify the merchandise or the sale-purchase particulars supplied by the borrower, nor is it in a position to take possession of the goods if the bills are not accepted by the importer or payment not made by the importer on the due date.

The country risk, currency risk, and transfer risk are not altogether different in character; they are closely interrelated. In fact, country risk emerges on account of the deteriorating economic condition of a country, which triggers currency

risk and transfer risk. Country risk refers to the risk of default by a country (and also by a resident borrower in the country) in meeting its repayment obligations to international organizations, banks and financial institutions incorporated in other countries. There is a possibility that the country may refuse payment on its liabilities on account of political changes, or be unable to honor commitments in acceptable foreign currencies due to a crisis situation. It is not possible to evaluate the economic condition of a large number of countries and assign a rating due to the lack of accessible and reliable data and information. The acceptable alternative is to take the country rating of international rating agencies and cross-check it in the light of data and information the bank has, and accordingly assign a score to the risk element “country risk.”

Currency risk is the risk of loss that can materialize on account of adverse movement of the exchange rate, which leads to increased risk of default. In assessing the currency risk it is necessary to examine the relative stability of the exchange rate and form a view about the movement of the exchange rate in future. The bank should take into account the fluctuations in exchange rates during the last couple of years, the macroeconomic variables, and the economic stability and the rating of that country, and assess the extent of currency risk.

Transfer risk is the risk of sudden restrictions imposed by the government or the exchange control authority of a country on the conversion of domestic currency into an acceptable foreign currency. The borrower may be able to honor repayment obligations in domestic currency on the due date in respect to foreign currency loans taken from a bank situated in another country, but he becomes a defaulter in the books of the bank if he is not permitted to convert the domestic currency into foreign currency and remit the money. Even if the borrower has taken the loan from a local branch office of a foreign bank and repays the installments in domestic currency, the branch office is unable to remit money to its parent office due to the restrictions imposed on the conversion of local currency into foreign currency. In forming a view on the possibility of transfer risk materializing within a specific time zone, it is necessary to look into the strength of the domestic currency of the borrower, the economic and political stability factors, and the country rating, and assign an appropriate score. The additional risk that may arise from exposures to borrowers who are not resident in the country where the branch office is functioning and the uncertainty about protection from collateral should be assessed on case-by-case basis, keeping in view the track record and the business profile of the borrower and the reputation of the manufacturer or the supplier of goods.

Banks should examine the risks from all these risk elements and risk factors and assess the level of overseas banking risk associated with customers at foreign locations.

Project Implementation Risk

Loans for setting up infrastructure projects in the power, transportation, telecommunication, petroleum, and other sectors are long-term in nature. In assessing the risks from project finance, the risk elements that are considered for financing of industries engaged in manufacturing activities are also taken into account. But project finance has certain different types of characteristics. Consequently, some additional risks that are relevant to projects are also considered. Assessment of project risk involves examination of risk factors relating to project management and the technical and financial feasibility of the project. The financial viability of a project is highly vulnerable to delay in project completion. The cost escalation, the additional interest burden, and the delayed receipt of revenues from the sale of output due to the prolongation of the gestation period severely distort the cash flow projections. Delay in completion of projects also compels bankers to reschedule or restructure the debt in the beginning, which impairs the reputation of the promoters in the banking and market circles. Consequently, the possibility of delay in completion of a project, the probability of cost escalation, and the uncertainty in funding the cost overrun are important risk elements that need to be assessed. Further, as the implementation of a project involves immaculate planning and execution in phases, management track record in handling projects in the past is also an important risk factor. Some other types of risks may arise depending on the nature of the projects. For instance, in the case of commercial real estate projects, the project site is of high significance. The location and the ownership of the site, the constraints in getting possession of the site (if there are occupants and tenants), and the suitability of the site from a technical angle (soil texture, environmental hazards) are additional risk elements. Project risk also includes three financial risk elements—the tenure of the loan, the asset coverage, and the debt-service coverage ratio. Banks should evaluate these three risk elements to judge the financial soundness of a project.

The longer the repayment period of the loan, the higher will be the risk because of greater uncertainties. Due to the high amount of funds involved in a project, the ratio of income generated from the project to the total debt obligations of the borrower and the economic life of the project during which the income is expected to continue are crucial factors. A reasonable surplus of income provides assurance that the project has inherent strength to generate

revenues to service the loan for a 10-year or 15-year period. The lower the debt-service coverage ratio, the higher will be the risk of default. Banks should examine all these risk elements relevant to project implementation and assess the level of project implementation risk.

10.9 SUMMARY

Banks should take a long-term view about the number of rating models they intend to have to move to the Internal Rating-Based Approach recommended in the New Basel Capital Accord for credit risk assessment. Banks should develop as many credit risk rating models as are necessary to take care of variations in risk characteristics between counterparties, loan purposes, and facility types.

Banks should set up different models for rating different types of counterparties and different activities, but it is not necessary to have entirely new models for each type of counterparty or economic activity. If risk components and risk factors are broadly similar between counterparties and economic activities, the variations in risk characteristics can be accommodated within the main models through minor modifications.

Banks should establish separate models for rating new borrowers and old (existing) borrowers, since the track record of past dealings influences the rating. Besides, for maintaining continuity of rating, a separate model for rating borrowers who continue on the books of the bank beyond a year is necessary.

The Basel Committee on Banking Supervision survey conducted in 1999 revealed that the common elements in the banks' rating systems were the counterparty rating in preference to the facility rating, the types of risk factors used in rating, and the similarity of purposes for using ratings.

Each credit risk rating model consists of a few broad risk components, which comprise a few risk factors and the latter a few risk elements.

NOTES

1. “Range of Practice in Banks’ Internal Rating Systems,” discussion paper, BCBS, January 2000. Readers may refer to this document for details.
2. “Range of Practice in Banks’ Internal Rating Systems,” discussion paper, BCBS, January 2000.
3. New Basel Capital Accord, June 2006. For details, readers may refer to section III of Part 2 of the document.

CHAPTER 11

Credit Risk Rating Methodology

11.1 RATING METHODOLOGY DEVELOPMENT PROCESS

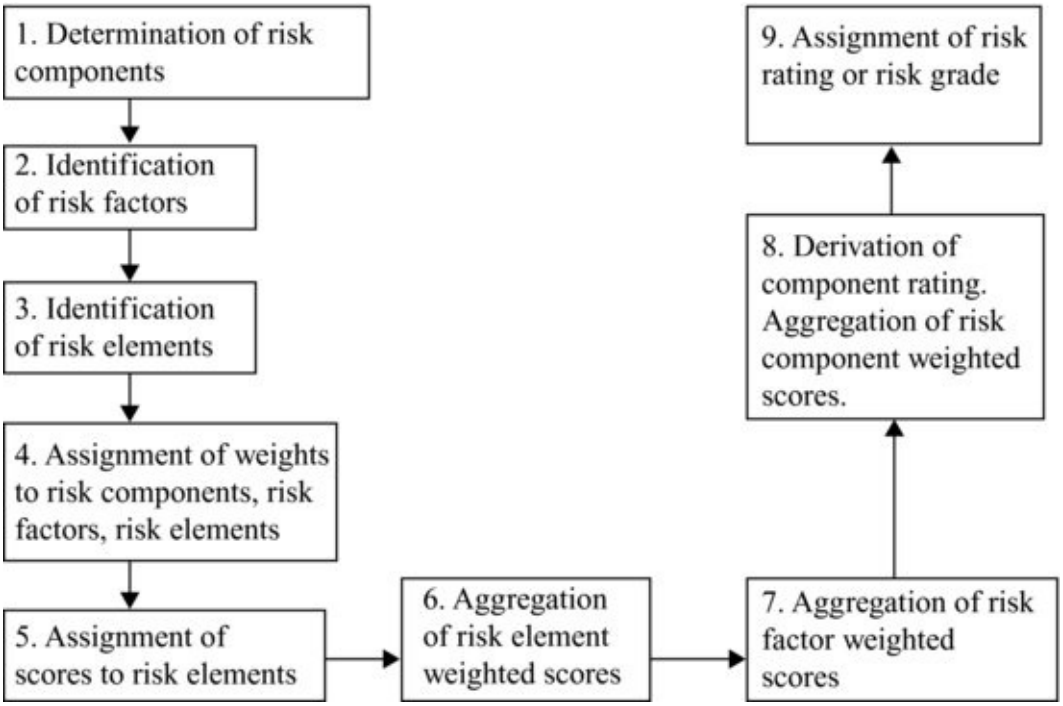
Credit risk rating (CRR) models capture the entire risk profile of the borrower and generate ratings based on the quantitative and qualitative assessment of risk factors. Banks also use discretion to modify model-generated ratings by applying judgmental factors. Several models exist for the derivation of risk ratings, but in this book I have recommended simplified methodologies for the computation of counterparty ratings. The model takes into account all credit facilities sanctioned to a borrower at different geographical locations relating to the borrower's entire operations and produces a rating that reveals the overall risk arising from the borrower's total obligations to the bank. The model recognizes facility characteristics in the derivation of the overall rating, but where appropriate, the facility structure risk can be separately rated and interpolated into the rating model to produce the final rating.

The sequential steps for credit risk rating are:

1. Determination of risk components.
2. Identification of risk factors.
3. Identification of risk elements.
4. Assignment of weights to risk components, risk factors, and risk elements.
5. Assignment of scores to risk elements.
6. Computation of risk component rating.
7. Assignment of overall risk rating or risk grade.

The risk rating process is explained in Figure 11.1.

FIGURE 11.1 Risk Rating Process



Risk Assessment and Weight Assignment

The assessment of risk is done in four stages:

1. Risk element level.
2. Risk factor level.
3. Risk component level.
4. Counterparty level.

Each model consists of a few risk components, which in turn consist of a few risk factors and the latter a few risk elements. But each risk component, risk factor, and risk element is not equally significant and therefore, they cannot be assigned equal weights for the derivation of a risk grade. Even when a loan is appraised under the traditional method, the final decision on the loan is based on assessment of certain crucial factors. The technical feasibility and financial viability of the project have more significance for making a decision on the loan. The same principle holds good for computing the risk rating of the counterparty. For instance, among the risk components that go into the computation of risk rating under different risk models, the risk component “financial viability risk” is critical and highly significant, and is relatively more material than other risk components and therefore is assigned a higher weight. Likewise, in assessing “industry/business prospect and stability risk,” the risk factor “future prospect of the industry” is considered relatively more material than the risk factor

"infrastructure support," and the risk element "growth potential and future outlook" is considered relatively more significant than the risk element "demand supply gap of its products." For computation of ratings, the relative importance of risk components, risk factors, and risk elements has to be kept in view. While each risk component, risk factor, and risk element has its own importance, each of them carries varying significance in different types of rating models. It is necessary to determine the relative significance of the item in a model and attach a weight that matches the risk perception of that item in relation to the other items. The financial viability risk is the most significant and carries the highest weight among all the risk components. The relative importance of other risk components may vary between rating models in keeping with their significance in that model. The weights to be assigned to risk components, risk factors, and risk elements will vary between models due to differences in borrower status (new or old), loan purpose (industrial, agricultural, trading, real estate, etc.), and loan tenure (short, medium, or long tenure).

TABLE 11.1 Credit Risk Rating Model

Applicable to Manufacturing/Trading Units
Weight Assignment to Risk Components

New Borrowers		Old Borrowers	
Risk Component	Weight	Risk Component	Weight
Industry/business prospect and stability risk	25	Industry/business prospect and stability Risk	20*
Managerial risk	20	Managerial risk	15*
Financial viability risk	35	Financial viability risk	30*
Facility structure risk	20	Facility structure risk	15
		Past dealings risk	20
Total	100		100

*In the case of old borrowers, lower risk weights have been assigned to these risk components since the bank has been dealing with the borrower for some time, and it knows the status and performance of the industry/business, sales and profit, and so on. Suitable modification in assignment of weights between manufacturing and trading units should be made in accordance with the risk perception of risk components.

Weight Assignment to Risk Components

Illustrative examples for assignment of weights to risk components under models for rating new and old (existing) borrowers are shown in Tables 11.1 and 11.2.

TABLE 11.2 Credit Risk Rating Model

Applicable to Infrastructure Project
Weight Assignment to Risk Components

New Borrowers		Old Borrowers	
Risk Component	Weight	Risk Component	Weight
Industry/business prospect and stability risk	15	Industry/business prospect and stability risk	10
Managerial risk	20	Managerial risk	15
Financial viability risk	35	Financial viability risk	30
Facility structure risk	15	Facility structure risk	15
Project implementation risk	15	Past dealings risk	20
		Project implementation risk	10
Total	100		100

In the case of existing borrowers (those who are already enjoying credit facilities from the bank), past dealings risk is a significant factor for continuation of the sanctioned limits and relatively more important than facility structure risk and managerial risk. It has therefore been allotted a higher weight. If the operations in the accounts are unsatisfactory or stagnant, or the accounts became irregular on a few occasions in the recent past, it indicates that the borrower is facing problem in running the business, and the possibility of the account becoming nonperforming will soon become a reality. In such a situation, the borrower is assigned a rating that signifies very high risk. The bank should put this type of credit facility in the watch category and monitor it vigorously.

The bank should assign weights to different risk components in keeping with their significance in a model. In some cases, equivalent weights may be assigned to two or three risk components because of their equal significance in the model. The model shown in Table 11.2 relates to loans for setting up an industrial project, say, a power or telecommunications project. Project implementation risk is included in this model and assigned a risk weight in accordance with the significance of the item. For old borrowers, project implementation risk is lower since their track record and managerial competency are already known and hence it has been assigned a relatively lower weight.

In this way, risk components applicable to different types of models (for rating corporations, banks, real estate loans, personal loans, etc.) can be identified and weights assigned in accordance with their relative significance.

Weight Assignment to Risk Factors

The next step in the computation of ratings is to assign weights to risk factors

that constitute a risk component. The weights should be distributed in such a manner that the total of the weights assigned to risk factors is equivalent to the weight assigned to the risk component in the model (refer to Tables 11.1 and 11.2). The weights assigned to risk factors vary between models on account of varying risk characteristics and the relative significance of risk factors.

Illustrative examples for assignment of weights to risk factors are shown in Table 11.3.

TABLE 11.3 Credit Risk Rating Model

Applicable to Manufacturing Unit Weight Assignment to Risk Factors			
New Borrowers		Old Borrowers	
Risk Component—Managerial Risk		Risk Component—Financial Viability Risk	
Risk Factors	Weights	Risk Factors	Weights
Organizational structure and managerial experience	10	Accounting quality and reliability	4
Track record of promoters	5	Financial standing of promoters	3
Quality of corporate governance	5	Financial standing of associate companies	3
		Past financial record	10*
		Future financial risk (projected parameters)†	10
Total	20 (refer to Table 11.1)	Total	30 (refer to Table 11.1)

*In the case of new borrowers, weights on accounting quality and reliability and past financial record should be reduced and weights on financial standing of promoters and future financial risk should be increased.
†Future financial risk is an indicator of the stability of the borrower's income and repaying capacity and has been assigned a higher weight.

Weights are assigned to risk factors in such a manner that the aggregate of weights is equal to the weight assigned to the relevant risk component.

In this way, risk factors under different risk components applicable to different types of models can be identified and weights assigned in accordance with their relative importance.

Weight Assignment to Risk Elements

The next step in the computation of ratings is to identify the risk elements that

constitute risk factors and assign weights in such a manner that the total of the weights assigned to risk elements is equivalent to the weight assigned to the risk factor under a particular risk component in the model (refer to Table 11.3). The weights assigned to the risk elements vary between models on account of varying risk characteristics and the relative significance of risk factors.

Illustrative examples for assignment of weights to risk elements are shown in Tables 11.4 and 11.5.

TABLE 11.4 Assessment of Financial Viability Risk

Weight Assignment to Risk Elements (Applicable to Old Borrowers—Manufacturing Units)	
Risk Factors/Risk Elements	**Weights**
Risk Factor—Accounting standard and reliability	
Risk Elements	
Accounting standard and balance sheet quality	2
Auditor's comments	2
Subtotal	4
Risk Factor—Financial standing of promoters	
Risk Elements	
Net worth of promoters	1
Market liabilities of promoters	1
Overall indebtedness of promoters	1
Subtotal	3
Risk Factor—Financial standing of associate companies†	
Risk Elements	
Track record of associate companies	1
Extent of dependence on parent company	1
Future risk from associate companies	1
Subtotal	3
Risk Factor—Past financial record	
Risk Elements	
Current ratio*	1
Debt-equity ratio*	2
Inventory and receivables to net sales ratio*	1
Operating profit before interest, taxes, and depreciation*	2
Ratio of net profit to sales*	1
Ratio of total outside liabilities to tangible net worth on the last	1
balance sheet date	1
Return on capital employed*	2
Subtotal	10
Risk Factor—Future financial risk (projected parameters)	

Risk Elements	
Net worth	1
Current ratio	1
Debt-equity ratio	2
Operating profit to total income ratio	2
Return on capital employed	1
Debt service coverage ratio	2
Promoters' capability to raise capital in future	1
Subtotal	10
Grand Total	30 (refer to Table 11.3)
*Average of last two to three years. †Risk from associate or affiliated companies is included and assessed as their problems will have an impact on the parent company, that is, the primary borrower.	

TABLE 11.5 Assessment of Managerial Risk

Weight Assignment to Risk Elements	
(Applicable to New Borrowers—Manufacturing Units)	
Risk Factors/Risk Elements	**Weights**
Risk Factor—Organizational structure and managerial experience	
Risk Elements	
Organizational Structure and ownership pattern of the borrowing unit	2
Past experience of promoters	4
Integrity, competence, and commitment of promoters	2
Opinion of other bankers on promoters	2
Subtotal	10
Risk Factor—Track record and competency of promoters	
Risk Elements	
Record of payment to creditors in the past (based on market inquiries)	2
Promoters' competency to prepare viable business plans and achieve projected sales and profit	3
Subtotal	5
Risk Factor—Corporate governance	
Risk Elements	
Management dynamism and initiative	2
Awareness about corporate governance codes and strategy to implement corporate governance practices	3
Subtotal	5
Grand Total	20 (refer to Table 11.3

In this way, risk elements applicable to different risk factors under different risk components in the models shall be identified and weights assigned in accordance with their relative importance.

Risk Assessment and Score Assignment

The overall risk assessment is based on subjective and objective factors, and it involves qualitative and quantitative assessments. The quantitative estimation is done from quantitative parameters derived from the financial records of the borrower (balance sheet, other published documents, and internal records). For instance, the extent of capacity utilization in an industry, growth in sales and profit, current ratio, debt-equity ratio, debt-service coverage ratio, and so on are quantitative risk elements. The quantitative risk is assessed by comparing the financial ratios derived from the financial records of the borrower to the benchmark financial ratios accepted as minimum standards. Technology risk, environmental risk, and integrity, competence, and commitment of the management are qualitative risk elements. The qualitative risk, which includes subjective risk elements, is assessed on a judgmental basis, but the judgmental view is not hypothetical. It is formed on the basis of relevant and reliable information, which is derived from quantitative indicators or which is apparently realistic. Once the judgmental view is formed, a numerical score is assigned to each risk element, whether quantitative or qualitative, based on risk perception, and the rating process is converted into a score-based arithmetical exercise to ensure accuracy in rating.

Scale for Score Assignment

Scores are assigned to risk elements in a predetermined rating scale in accordance with the degree of risk and in keeping with the need for maintaining granularity in risk grading. The score assignment scale is shorter than the risk rating scale and can be determined by keeping in view the depth of risk analysis required for achieving accuracy in rating. The risk analysis should be comprehensive to rate a large counterparty or large exposure because of the variations in risk perception arising from marginal differences in risk characteristics or risk-related features. The bank may have a longer scale for assigning scores to risk elements, if it is rating a significant counterparty like a multinational company or large corporation, or borrowers who take loans for major activities, like the establishment of manufacturing units or the development of infrastructure projects and commercial real estate. It can have a relatively shorter scale for assigning scores to risk elements applicable to small and retail borrowers including those in the agricultural sector. In respect to a significant counterparty, a six-scale score assignment table seems appropriate,

while for small and retail borrowers, a four-scale or even three-scale score assignment table may suffice. A three-scale score assignment table can be adopted in the cases of borrowers who take personal loans like residential housing loans, car loans, or education loans. The bank has to establish appropriate scales keeping in view its credit profile and size-wise distribution of loans and advances. The bank can make a compromise by adopting a shorter score assignment scale to save time and cost, if it is clear that adoption of a longer scale will not make any material difference in the output of ratings in majority of the cases.

Illustrative rating scales for assignment of scores to risk elements are given in Table 11.6.

TABLE 11.6 Credit Risk Rating

Score Assignment to Risk Elements			
Rating of Large Exposure		Rating of Small Exposure	
Six-Scale Score Card		Four-Scale Score Card	
Risk Perception	Score	Risk Perception	Score
Very low risk	5	Low risk	4
Low risk	4	Moderate risk	3
Moderate risk	3	Average risk	2
More than average risk	2	High risk	1
Very high risk	1		
Unacceptable risk	0		

Unacceptable risk is allotted a score of 0 for the computation of ratings; it does not mean that the relevant loan case merits rejection on this ground alone.

Score 5 in Table 11.6 indicates that the risk characteristics are so good that the particular risk element poses very low risk, and score 0 indicates an unacceptable degree of risk in a six-scale score assignment table. For instance, in assessing the managerial risk component, if score 5 is assigned to the risk element "Track record of the management," it conveys that the borrowers have an excellent track record, and their integrity and commitment are of a very high order. On the other hand, score 0 conveys that the borrowers' track record is bad, their integrity is in doubt, and they have a casual attitude to business.

Norms for Score Assignment

One of the guiding principles for judging the efficiency of the risk rating framework is that the rating models should have a built-in mechanism to achieve

consistency in rating assignment within the organization. The risk rating model should generate the same output in respect of the same counterparty, even though the rating may be done by different people at different locations (corporate office, controlling office, or branch office) and both subjective and objective factors are used. The risk assessment based on quantitative and qualitative parameters may vary between different financial institutions as they may have different benchmarks. But within the same organization, variation in assignment of risk grade to the same or similar borrower can arise because of the possibility of differences in risk perception of different personnel. Within the bank the objective should be to achieve uniformity in the assignment of risk grade to the same borrower or borrowers having similar features, even though the exercise may be undertaken by different sets of people. Variations can occur in the quantitative and qualitative assessment of risk by different persons though the data and the set of information pertaining to the borrower may be the same. This type of variation in risk perception can produce different ratings in respect to the same borrower handled by different persons. The possibility of variation in awarding a risk grade to a borrower under similar circumstances by different personnel within the same bank or financial institution can be largely minimized by the development of standardized norms for assignment of scores. The norms indicate the scores to be assigned against a risk element under different sets of criteria. The application of standardized norms will not leave much scope for the use of discretion for altering or maneuvering the rating. The norms for assigning scores will have to be developed in respect to each risk element. Since each risk component usually consists of three to four risk factors and each risk factor four to five risk elements, there will be large numbers of risk elements for which scoring norms will have to be developed. The risk elements are mostly common between models, but they are different when they relate to rating models that are applicable to heterogeneous counterparties, like the borrowers in the commercial real estate sector and the manufacturing sector. The scoring norms relating to risk elements that are common between models are largely the same, but the norms may have to be modified when variations in attributes or features are noticed.

The scoring norms are described by way of attributes or features that are visible from an analysis of the risk element. The scores are allotted in accordance with the features/attributes that emerge from market inquiries and scrutiny of balance sheets, financial statements, and other reliable documents and in keeping with standard banking practices. Each norm is expressed by way

of a few possibilities that are most likely to appear or exist in relation to a point that is relevant for loan appraisal. In assigning scores to risk elements during the course of actual rating, it is not necessary that the description of features/attributes match word by word with the prevailing situation. The features/attributes describe various possibilities, and the scores should be allotted based on the concept of “similarity or nearness.” There seldom will be a situation where the description of attributes will exactly match the actual findings.

The assessment of each risk element is based on the conclusions that emerge from the analysis of features/attributes pertaining to that element. The more favorable the characteristics are from the banker's safety perception, the better is the ranking and the greater is the score allotted to it. The features/attributes are arranged downward in order of increasing risk perception and decreasing scores. The norms describe a set of characteristics, attributes, or features, which decide the relative degree of risks that may arise from the risk element under different circumstances. For example, if the characteristics or attributes of a particular risk element display very good features, it signifies “very low risk” and score 5 is assigned to that risk element in a six-scale score chart. If the characteristics or attributes indicate that the risk is of very high order, the risk element is placed in the “unacceptable risk” category and assigned score 0. Where scores are allotted on a judgmental basis, the judgmental view is based on quantitative indicators as well as information sourced from reliable documents. Banks should follow these principles in assigning scores to risk elements. Illustrative examples of scoring norms relating to different types of risk elements are described in the tables that follow. The scores are assigned in a six-scale rating chart. Part I deals with scoring norms based on a qualitative assessment, and Part II deals with those based on a quantitative assessment.

Part I Scoring Norms Based on a Qualitative Assessment (Six-Scale Rating Chart)

Let us suppose that we want to rate a borrower who has applied to the bank for loans for setting up an industrial unit. One of the risk components in the rating model is “industry/business prospect and stability risk.” The risk component consists of two to three risk factors, and each risk factor consists of a few risk elements. We have seen that one of the risk factors under this component is “future prospect of the industry.” Let us assume that one of the risk elements

under this risk factor is “growth potential and future outlook.” An illustrative example of scoring norms based on a qualitative assessment in respect to this risk element is given in Table 11.7.

TABLE 11.7 Risk Component: Industry/Business Prospect and Stability Risk

Risk Factor: Future Prospect of the Industry		
Applicable to New Borrowers		
Score Assignment Chart		
Risk Element: Growth Potential and Future Outlook		
Attributes	**Ranking**	**Scores**
Growth potential and industry outlook are excellent. Large demand-supply gap exists and is likely to continue.	Very low risk	5
Growth potential is substantial and industry outlook is highly encouraging. Substantial demand-supply gap exists and is likely to continue.	Low risk	4
Growth potential is good and industry outlook is stable and positive. Good demand-supply gap exists and is likely to continue in the medium term.	Moderate risk	3
Growth potential is low and industry outlook is not encouraging. Marginal demand supply gap exists at present.	More than average risk	2
Growth potential is poor. Supply of product proposed to be manufactured is abundant and exceeds current demand. Future is uncertain.	Very high risk	1
No growth potential. Growth rate is negative. Excess capacity exists at present.	Unacceptable risk	0

Bankers attach high importance to the management factor in making decisions on loans, as it is critical in running an industry. One of the risk factors under the “managerial risk” component is “managerial experience and competency of promoters,” and one of the risk elements is “integrity, competence, and commitment of promoters” (refer to Table 11.5).

Illustrative scoring norms for this risk element are given in Table 11.8.

TABLE 11.8 Risk Component: Managerial Risk

Risk Factor: Organizational Structure and Managerial Experience		
Applicable to New Borrowers		
Score Assignment Chart		
Risk Element–Integrity, Competence, and Commitment of Promoters		
Attributes	**Ranking**	**Scores**
Excellent and long-standing track record. Highly competent management. Possesses excellent technical know-how. Demonstrated ability to modernize and diversify. Fully committed.	Very low risk	5
Good track record of 3 to 5 years. Up-to-date technical knowledge. Highly competent to run business on sound lines.	Low risk	4

Shown strong commitment in the past.		
Track record of 1 to 2 years. No adverse feedback from market. Has adequate managerial competency. Conversant with technical know-how. Good commitment.	Moderate risk	3
Recent entry in the market. Average managerial competency. Limited technical know-how. Limited initiatives for improvement. Average commitment.	More than average risk	2
Market standing not ascertainable. No technical knowledge. Competency not visible from past actions. Lacks integrity and commitment.	Very high risk	1
Past defaulter. Not competent to run business. Evidence of dishonesty. Not trustworthy.*	Unacceptable risk	0
*This description is for assignment of scores for the computation of risk grade. In fact, banks usually reject credit proposals from such counterparties irrespective of the risk grade assignable to them.		

Table 11.4 depicts risk factors and risk elements pertaining to financial viability risk. An illustrative example of scoring norms for one of the risk elements under financial viability risk is given in Table 11.9.

TABLE 11.9 Risk Component: Financial Viability Risk

Risk Factor—Accounting Standard and Reliability		
Applicable to Old Borrowers		
Score Assignment Chart		
Risk Element: Auditor's Comments		
Attributes	**Ranking**	**Scores**
No adverse comments on the balance sheet by auditors. No evidence of contingent liabilities on the balance sheet without full provision. No diversion of funds or loans to associates/affiliated concerns.	Very low risk	5
Adverse comments on the balance sheet by auditors are of minor nature. Existence of contingent liabilities on the balance sheet but 75% provisions made. Minor diversion of funds to associate concerns. Loans to associate concerns do not exceed 15% of net worth of the borrowing (parent) unit.	Low risk	4
A few observations by auditors on the balance sheet. Auditors' comments have minor impact on net profit and net worth. Diversions of funds of minor amount. Loans to associate concerns do not exceed 20% of net worth of the borrowing (parent) unit.	Moderate risk	3
A few qualifications by auditors on the balance sheet. Auditors' comments impact net profit and net worth to the extent of 25%. Diversion of funds of good amount. Loans to associate concerns do not exceed 25% of net worth of the borrowing (parent) unit.	More than average risk	2
Several qualifications by auditors that alter the basic structure of the balance sheet. Adjustments result in net loss as against declared profit. Substantial diversion of funds and loans to problematic associates or affiliated concerns.	Very high risk	1

Qualifications and comments by auditors regarding authenticity of balance sheets/financial statements. Large-scale diversion of funds, irrecoverable loans to associates or affiliated concerns.	Unacceptable risk	0

Part II Scoring Norms Based on a Quantitative Assessment (Six-Scale Rating Chart)

The quantitative assessment of a risk element is based on the relative strength of quantitative/financial parameters in relation to the benchmarks set up by the bank in keeping with the safety standards of lending. The assessment is indicated by assigning a score to the risk element. The better the quantitative indicator or the financial parameter, the lower is the degree of risk associated with the particular risk element and the higher is the score.

Let us suppose that a customer has applied for a loan to set up a steel manufacturing industry. Current financials of steel manufacturing industries, which is a risk factor, are relevant for making a decision on the loan. Return on capital employed is a risk element that falls within this risk factor. An illustrative example of norms for assignment of scores (in a six-scale rating chart) to this risk element associated with “industry/business prospect and stability risk” is given in Table 11.10.

TABLE 11.10 Risk Component: Industry/Business Prospect and Stability Risk

(Applicable to Manufacturing Units)		
Applicable to New Borrowers		
Risk Factor: Current Financials of Peer Group Industry		
Score Assignment Chart		
Risk Element: Return on Capital Employed		
(current average of proposed industry)		
Attributes	**Ranking**	**Scores**
Return on capital employed (ROCE) exceeds 20%	Very low risk	5
ROCE between 16% and 19.9%	Low risk	4
ROCE between 12% and 15.9%	Moderate risk	3
ROCE between 8% and 11.9%	More than average risk	2
ROCE between 4% and 7.9%	Very high risk	1
ROCE less than 4%	Unacceptable risk	0

Let us suppose we are rating an existing borrower for renewal of working capital facilities. Business prospect is a risk factor within the risk component “industry/business prospect and stability risk,” and the trend of profit growth is a risk element under the risk factor “business prospect.” An illustrative example of

norms for assignment of scores to this risk element is given in Table 11.11.

Likewise, illustrative examples of scoring norms in respect to two risk elements pertaining to the "financial viability risk" component shown in Table 11.4 are given in Tables 11.12 and 11.13.

TABLE 11.11 Risk Component: Industry/Business Prospect and Stability Risk

Applicable to Old Borrowers		
Risk Factor: Business Prospect		
Score Assignment Chart		
Risk Element: Trend of Profit Growth		
Attributes	**Ranking**	**Scores**
Average increase in net profit during the last 2 to 3 years over 30%	Very low risk	5
Average increase in net profit during the last 2 to 3 years more than 25% and up to 30%	Low risk	4
Average increase in net profit during the last 2 to 3 years more than 15% and up to 25%	Moderate risk	3
Average increase in net profit during the last 2 to 3 years up to 15%	More than average risk	2
Net profit marginal and stagnant during the last 2 to 3 years	Very high risk	1
Net loss during the last 2 to 3 years	Unacceptable risk	0
Scoring norms given in Tables 11.10 and 11.11 relate to the particular industry and not to an individual borrower within that industry category.		

TABLE 11.12 Risk Component: Financial Viability Risk

Applicable to Old Borrowers		
Risk Factor: Past Financial Record		
Score Assignment Chart		
Risk Element: Current Ratio (Ratio of Current Assets to Current Liabilities)		
Attributes	**Ranking**	**Scores**
Current ratio exceeds 2.0	Very low risk	5
Current ratio between 1.50 and 2.0	Low risk	4
Current ratio between 1.33 and 1.49	Moderate risk	3
Current ratio between 1.25 and 1.32	More than average risk	2
Current ratio between 1.00 and 1.24	Very high risk	1
Current ratio less than 1.00	Unacceptable risk	0

TABLE 11.13 Risk Component: Financial Viability Risk

Applicable to Old Borrowers		
Risk Factor: Past Financial Record		
Score Assignment Chart		
Risk Element: Ratio of Total Outside Liabilities to Tangible Net Worth		
Attributes	**Ranking**	**Scores**
Ratio less than or equal to 1.5	Very low risk	5
Ratio greater than 1.5 and less than 2.00	Low risk	4

Ratio greater than 2 and up to 2.5	Moderate risk	3
Ratio greater than 2.5 and up to 3	More than average risk	2
Ratio greater than 3 and up to 4	Very high risk	1
Ratio exceeds 4	Unacceptable risk	0

Scoring Norms Based on Qualitative and Quantitative Assessment for Rating Small Exposures (Four-Scale Rating Norm)

Tables 11.7 to 11.13 indicate norms for assignment of scores in a six-scale rating chart. Many banks sanction small loans to small-scale industrialists, small traders, agriculturists, and personal loans like residential housing loans and education loans. These banks have widely dispersed credit portfolios. Banks intending to set up rating models for small loans should develop scoring norms in an identical manner in a four-scale rating chart.

11.2 DERIVATION OF COMPONENT RATING

The risk rating of the counterparty is done in two stages. First, the risk is assessed component-wise, and then the component risks are aggregated to derive the risk grade assignable to the counterparty. Each risk component is individually rated and assigned a rating, and thereafter the component ratings are converted into a single rating by mapping the weighted average score to a predetermined rating scale.

Suppose that a customer has submitted a loan proposal to a bank for setting up an industry. Further suppose that the industry/business prospect and stability risk (risk component) associated with the loan proposal is rated as moderate (BBB), the managerial risk is rated as low (A), the financial viability risk is rated as marginal (AA), and the facility structure risk is rated as low (A). The overall rating of the borrower is then computed by combining the individual component ratings. Once weights are assigned to risk components, risk factors, and risk elements, and norms are developed for assignment of scores to risk elements, it is possible to assign an appropriate rating to the component through the score assignment process. This is done by taking the total of weighted scores of a risk component and then assigning a risk grade to it in accordance with the

predetermined scale of rating. In Chapter 9.4 (Table 9.1), an illustration is given for adoption of an eight-scale risk rating grade, seven grades to cover borrowers in the standard advance category and one grade to cover borrowers in the default category. The same rating scale can be adopted for the risk component rating and overall risk rating of the counterparty. The rating scale for component rating is indicated in Table 11.14. The table excludes the eighth risk grade, which is applicable to defaulted loans. Once a loan has become nonperforming or nonaccrual, it may be given rating D.

TABLE 11.14 Risk Component Rating

Rating Grade Chart		
Rating Grade	**Description of Risk**	**Weighted Average Score (%)**
AAA	Very low risk	More than 85
AA	Marginal risk	80–85
A	Low risk	75–79
BBB	Moderate risk	65–74
BB	Fair risk (more than average)	55–64
B	High risk	50–54
C	Very high risk	Less than 50

The risk components may be assigned a rating in accordance with the rating scale in Table 11.14. For instance, if the risk components “industry/business prospect and stability risk” and “financial viability risk” under any of the risk rating models get a weighted score of 63 and 76, respectively, it indicates that the former carries “fair” risk and the latter “low” risk in respect to the counterparty. Risk component rating gives an added advantage to the bank from the risk management point of view, as it indicates the specific area on which the bank should focus its attention during the period when the borrower's accounts remain live on its books to prevent deterioration in the health of the accounts and downward migration of the rating. If “industry/business prospect and stability risk” is rated “fair” and the “financial viability risk” is rated “low,” it is clear that the bank will have to monitor the borrower's business matters more closely than his or her financial affairs. An adverse development in business will have an impact on the financial viability risk as well.

Computation of component risk rating involves the following steps:

- Identify risk factors and risk elements falling under a component risk.
- Assign scores to each risk element included in the component risk on the basis of norms.
- Assign weights to each risk element as determined by the bank.

- Multiply scores by weights to arrive at weighted scores against each risk element.
- Take the total of risk weighted scores.
- Work out the percentage of weighted scores to the maximum possible weighted score.
- Assign a rating to the component in accordance with the predetermined rating scale (seven-grade scale shown in Table 11.14

It is possible that some risk elements do not apply to a particular risk component in a rating model. In such a case, score 0 may be assigned to that risk element, and consequently the risk weighted score will be 0. While taking the total of maximum possible weighted scores in respect to a risk component, weights relating to inapplicable risk elements may be deducted from the total weight assigned to that risk component and the maximum weighted score adjusted accordingly. If the weights pertaining to an inapplicable category are reallocated to other risk elements to keep the total of component risk weight intact, it may show inconsistencies in assigning a rating to a risk component. The reallocation of weights will be done by different personnel in the bank at different locations for various types of loans, which may not show a uniform pattern. Besides, reallocation of weights may make a risk element more important though it does not merit that status. Other things remaining unchanged, the reallocation may not achieve uniformity and consistency in the assignment of a rating. To achieve consistency in the assignment of a rating, it is necessary to adhere to a standardized process and ignore the inapplicable weights, rather than adopt a discretion-based process.

Illustrations for the computation of a component risk rating, where a few risk elements are not applicable, are given in Tables 11.15, 11.16, and 11.17.

Another possibility is that all risk elements are applicable but the assessment of one or two risk elements gives a score of 0. In such a scenario it will be incorrect to deduct the total weights allotted against those risk elements and reduce the maximum weighted score. It is necessary to take the maximum weighted score for deriving the percentage of weighted score to assign a rating to the risk component.

TABLE 11.15 Credit Risk Rating Model

Applicable to Old Borrowers
Assessment of Risk Component "Financial Viability Risk"
Derivation of Weighted Score

Risk Factors/Risk Elements	Allotted Score	Weight	Weighted Score
Risk Factor—Accounting standard and reliability			
Risk Elements			
Accounting standard and balance sheet quality	3	2	6
Auditor's comments	4	2	8
Subtotal		4	14
Risk Factor—Financial standing of promoters			
Risk Elements			
Net worth of promoters	4	1	4
Market liabilities of promoters	4	1	4
Overall indebtedness of promoters	4	1	4
Subtotal		3	12
Risk Factor—Financial standing of associate companies*			
Risk Elements			
Track record of associate companies	0	1	0
Extent of dependence on parent company	0	1	0
Future risk from associate companies	0	1	0
Subtotal		3	0
Risk Factor—Past financial record			
Risk Elements			
Current ratio†	5	1	5
Debt—equity ratio†	4	2	8
Net working capital†	3	1	3
Operating profit before interest, taxes, and depreciation†	4	2	8
Ratio of net profit to sales†	3	1	3
Ratio of total outside liabilities to tangible net worth as on the last balance sheet date	4	1	4
Return on capital employed†	3	2	6
Subtotal		10	37
Risk Factor: Future financial risk (projected parameters)			
Risk Elements			
Net worth	4	1	4
Current ratio	4	1	4
Debt-equity ratio	5	2	10
Operating profit to total income ratio	4	2	8
Return on capital employed	4	1	4

Applicable to Old Borrowers
Assessment of Risk Component "Financial Viability Risk"
Derivation of Weighted Score

Risk Factors/Risk Elements	Allotted Score	Weight	Weighted Score
Debt service coverage ratio	4	2	8
Promoters' capability to raise capital in future	5	1	5
Subtotal		10	43
Grand Total		30 (Refer to Table 11.3)	106

*The borrower has no associate company.
†Average of last two to three years.

TABLE 11.16 Assignment of Risk Grade to Risk Component

Assessment of Risk Component "Financial Viability Risk"		
Summary of Assessment		
Derivation of Weighted Score		
Risk Factors	**Weight**	**Weighted Score**
Accounting standard and reliability	4	14
Financial standing of promoters	3	12
Financial standing of associate companies	3	0
Past financial record	10	37
Future financial risk	10	43
Total	**30**	**106**

TABLE 11.17 Assessment of Risk Component "Financial Viability Risk"

Derivation of Component Rating	
Total risk weighted score	106
Maximum possible weighted score	135*
Percentage of risk weighted score to maximum possible weighted score	78.5%
Rating of component "Financial Risk"	A or (Low risk) (refer to Table 11.14)
Maximum possible weighted score of the component = 30 × 5 = 150 (5 is maximum possible score against a risk element). Total of weights allotted to 3 inapplicable risk elements = 3. Maximum possible weighted score for inapplicable risk elements = 3 × 5 = 15. *Maximum possible weighted score excluding inapplicable risk elements = 150 − 15 = 135.	

Examples are given in Tables 11.18, 11.19, and 11.20.

TABLE 11.18 Credit Risk Rating Model

Applicable to New Borrowers
Assessment of Risk Component "Managerial Risk"
Derivation of Weighted Score

Risk Factors/Risk Elements	Allotted Score	Weight	Weighted Score
Risk Factor—Organizational structure and managerial experience			
Organizational structure and ownership pattern of the borrowing unit	5	2	10
Past experience of the promoters	0	4	0
Integrity, competence, and commitment of the promoters	4	2	8
Other bankers' opinion on promoters	0	2	0
Subtotal		10	18
Risk Factor—Track record and competency of promoters			
Record of payment to creditors in the past (based on market inquiries)	4	2	8
Promoters' competency to prepare viable business plans and achieve projected sales and profit	3	3	9
Subtotal		5	17
Risk Factor—Corporate governance			
Management dynamism and initiative	3	2	6
Awareness about corporate governance codes and strategy to implement corporate governance practices	3	3	9
Subtotal		5	15
Grand Total		20 (refer to Table 11.5)	50

TABLE 11.19 Assessment of Risk Component "Managerial Risk"

Summary of Assessment		
Derivation of Weighted Score		
Risk Factors	**Weight**	**Weighted Score**
Organizational structure and managerial experience	10	18
Track record and competency of promoters	5	17
Corporate governance	5	15
Total	20	50

TABLE 11.20 Assessment of Risk Component "Management Risk"

Derivation of Component Rating	
Total risk weighted score	50
Maximum possible weighted score	100 (20 × 5)

Percentage of risk weighted score to maximum possible weighted score	50%
Rating of component "Managerial Risk"	B or (High risk) (refer to Table 11.14)
Note: The promoters did not have past experience and other bankers' opinion on promoters is either not received or not satisfactory. These two risk elements are awarded a score of 0, but the total weighted score is retained at 100 (not reduced by 30, that is, weight 6 × maximum score 5).	

TABLE 11.21 Credit Risk Rating Model

Assessment of Overall Rating Assignment of Risk Grade to Borrower			
Column 1	**Column 2**	**Column 3**	**Column 4 (Column 2 x 3)**
Risk Component	**Risk Component Weighted Score Percentage (Refer to Tables 11.17 and 11.20)**	**Weight in Percentage (Refer to Tables 11.1 and 11.2)**	**Final Weighted Score (%)**
Industry/business prospect and stability risk			
Managerial risk			
Financial viability risk			
Facility structure risk			
Past dealings risk*			
Overseas banking risk†			
Project implementation risk††			
Total			
Assignment of rating grade (refer to Table 11.14)			
Rating Migration			
Current year rating grade (year 0)			
Last year rating grade (year –1)			
Rating grade two years ago (Year –2)			

*Applicable to old (existing) borrowers.
†Applicable to borrowers at foreign branch offices.
††Applicable to project finance.
Note: The percentage of risk component weighted score, which has been separately worked out (Tables 11.17 and 11.20), should be tabulated under column 2 and multiplied by the percentage of weights assigned to risk components under different models (refer to Tables 11.1 and 11.2) to arrive at the final weighted score percentage for each risk component and shown in column 4. The aggregate of the final weighted score percentage in column 4 will indicate the rating to be assigned to the counterparty in the seven-scale rating framework shown in Table 11.14.

In this way, the bank has to compute the rating of all risk components applicable to a model.

11.3 DERIVATION OF COUNTERPARTY RATING

The overall risk grade assignable to a counterparty is computed through aggregation of component risk. The aggregation process involves the following steps:

1. Write down the weighted score percentage of each risk component (column 2, Table 11.21).

2. Write down the percentage of weights allotted to each risk component under the CRR model (column 3).

3. Arrive at the final weighted score percentage (column 4).

4. Take the total of the final weighted score percentage (column 4).

5. Assign the risk grade as per the grading scale (refer to Table 11.14).

The format for computation of a counterparty rating is suggested in Table 11.21.

11.4 SUMMARY

The credit risk rating models suggested in this book involve a two-stage rating process. First, each risk component is individually rated and assigned a rating, and thereafter, the component ratings are aggregated to derive the overall rating of the counterparty. The same rating scale is used for component ratings and counterparty ratings.

Risk components, risk factors, and risk elements carry varying significance in different types of rating models. With a view to achieving accuracy in rating, their relative importance is recognized in the rating models through assignment of varying weights that match the risk perception.

Risk assessment involves qualitative assessment done on a judgmental basis and quantitative assessment done from quantitative parameters. Each risk element is assigned a score after quantitative and qualitative assessment to convert the rating exercise into a score-based process to ensure accuracy in rating. Banks may use discretion to modify ratings derived from established models in appropriate cases on the basis of judgmental factors.

Banks should develop norms for assigning scores to risk elements to minimize the possibility of variations in awarding a risk grade by different personnel to a

counterparty under similar circumstances. The standardized norms should largely achieve uniformity and consistency in ratings and eliminate scope for the use of discretion in altering or maneuvering the rating.

CHAPTER 12

Credit Risk Measurement Model

12.1 RISK RATING AND RISK MEASUREMENT MODELS

The development of credit risk measurement models has two dimensions. The first dimension is the establishment of credit risk rating models, and the second is the development of techniques for measuring potential loss on the bank's total credit exposure. Risk rating itself is a tool such that once a rating is assigned to a counterparty or a credit facility, it indicates the quantum of potential credit loss that can arise if the default occurs. If the quantum of potential loss from a rated counterparty approximately matches the actual loss in the event of default, the accuracy of the rating is validated. For example, if an obligor is assigned the AAA rating, which implies very low credit risk, it is inferred that credit loss from exposures to the counterparty will be small. Consequently, banks prescribe a lower risk weight for the calculation of regulatory capital, a lower interest rate for lending, and a lower loan loss reserve for AAA-rated credit exposures. There is an inverse relationship between the risk rating and the quantum of credit loss; that is, the higher the rating signifying lower risk from the exposure, the lower the expected quantum of potential credit loss. This relationship is likely to hold good only if the rating model is very robust and produces accurate rating grades. The rating model should include multidimensional criteria and recognize both the counterparty-specific and transaction-specific characteristics. Rating criteria should include appropriate factors that influence the level and the stability of the borrower's business and income, like economic slowdowns and macroeconomic imbalances within the country, and adverse developments in other countries that affect import and export business and cross-border transactions. The shortcomings of the rating models are that they do not often capture credit losses during economic recessions, and they assume zero correlation between risk factors and business activities. The recognition of all relevant risk parameters should, to a great extent, do away with some of the shortcomings found in credit risk rating models.

12.2 CREDIT LOSS ESTIMATION—CONCEPTUAL ISSUES

Establishment of credit risk measurement models involves resolution of two major issues. First, when shall we say that credit loss has occurred or is likely to occur, and second, what is the time zone up to which we shall attempt to measure credit loss? The broader the definition of credit loss, the more complex the measurement process will be, and the longer the time zone for measurement, the larger the potential credit loss will be. Credit loss is defined as the difference between the current value of an exposure and its future value at the end of a chosen time period. The precise definition of current and future values emerges from the concept of credit loss that the bank adopts for setting up credit risk measurement models. On the issue of credit loss definition, two practices are in vogue among banks. One is that the loss is deemed to have occurred only when the counterparty commits a default on its repayment obligation. The other is that deterioration in the quality of credit exposure signifies credit loss, even if there is no default. Corresponding to these two definitions of credit loss, there are two paradigms for model selection—the default mode paradigm and the mark-to-market paradigm.

Default Mode Paradigm

The default mode (DM) paradigm is a two-state model—the default state and the nondefault state—and consequently, the definition of "default" for measuring credit loss is very significant. Various concepts of default were given in section 9.3 in Chapter 9, but usually, banks define default as a credit event that conveys that the counterparty has failed to meet loan repayment obligations as per the terms of the contract, and in that event, the bank treats the relevant exposure as "nonperforming or nonaccrual" in accordance with the standard accounting practices. Under the DM paradigm, credit losses are recognized only when the counterparty commits a default in repayment obligation, but if there is no default, there is no credit loss though the credit quality may have declined. The credit loss is measured as the difference between the amount of exposure outstanding in the books of the bank and the present value of future recoveries net of all expenses and costs involved in the recovery process (e.g., legal expenses, insurance costs of collateral, recovery agent's fees, etc.). However, the DM paradigm measures credit losses from credit exposures with one year or less than one year maturity; it does not measure potential credit losses from exposures where defaults occur after the planning horizon of one year. The future value of an exposure is estimated under the DM model in terms of the loss rate given default (LGD), which is a random variable and whose value is uncertain and not known at the beginning of the planning horizon.

The DM paradigm is relatively simple and easier to operate. Under the DM paradigm, the aggregate of potential credit loss is the simple summation of potential credit losses on all the individual assets where defaults have occurred within the planning horizon. If the planning horizon is one year, all defaults taking place after one year are ignored for the estimation of potential credit losses. Some banks try to reconcile the shortcomings by capturing credit losses from financial instruments having maturities beyond the planning horizon by adjusting the rating of the instruments. The longer term instruments are assigned a lower credit rating than shorter term instruments relating to the same customer, signifying higher probability of default and higher loss rate given default. But unless other variables such as correlation factors are also recognized, the method may not produce a realistic assessment of credit loss on exposures having maturities beyond the planning horizon.

Mark-to-Market Paradigm

The mark-to-market (MTM) paradigm is a multistate model. Unlike the DM paradigm, the MTM paradigm recognizes credit losses if there is deterioration in the credit quality, though the counterparties have not defaulted within the time horizon. The downward movements of the ratings of a counterparty or a facility to other risk grades on account of deterioration in the credit quality represent the status of the exposure in nondefault states (all states other than the default state). The MTM model requires data not only on the probability of default but also the probabilities of migration to nondefault states, known as the credit migration matrix. The credit loss under the MTM paradigm is the difference between the value of a credit exposure at the beginning of the planning horizon, that is, the current value, and at the end of the planning horizon, that is, the future value, both in default states and the states short of default. The future value of an exposure in a nondefault state is derived by marking the credit asset to the market or to the model. Since under the MTM model the decline in the economic value of an asset in nondefault states is recognized (which may be derived by marking the asset to market for ascertaining its value), the methodology for valuation of an asset in various nondefault states assumes importance. The future values of loans or facilities that have not been defaulted are calculated using the discounted cash flow methodology. The MTM model thus requires another input, the discount factors, in addition to the credit risk migration matrix. The interest rates (discount factors) used for calculation of present values of the future cash flows will be the risk-free interest rates derived from the yield curve of sovereign security papers plus the credit spreads applicable to the relevant risk grades. The value of a loan can change over time due to the migration of the borrower to other risk grades or the change in the market-determined term structure of credit spreads. The discount factors used at the beginning and the end of the planning horizon can be different due to changes in risk grades and credit spreads during the intervening period. Under the MTM model, one of the risk grades to which a counterparty or a facility can migrate is the default grade. Once the default occurs, the discounting of contractual cash flows becomes meaningless, and the future value is determined by the recovery value of the defaulted loan.

Default Mode and Mark-to-Market Models

Both the DM and MTM models are used for measurement of credit losses. In the

case of the DM model, only the rating transition of an exposure to the default state is taken into account, and the transition to other states is ignored, but in the case of MTM model, the rating transition to all the states—upward, downward, and default states—is relevant. The gains and the losses in the economic value of assets on account of upward and downward migration of credit ratings are taken into account for estimation of potential credit losses under the MTM model. The upward movement in rating enhances the market value of the exposure and reduces the credit loss, while the downward movement reduces the market value and increases the credit loss in the event of default, because of variations in probability of default, loss rate given default, and exposure at default between risk grades. Under both the models, the loans decline in value if defaulted within the planning horizon, and the actual loss is represented by the recovery rate.

The distinguishing features of the DM and MTM models are summarized in Table 12.1.

TABLE 12.1 Estimation of Credit Loss

DM Model versus MTM Model	
Distinguishing Features	
DM Model	**MTM Model**
Two-state notion of credit loss prevails—default or no default.	Multistate notion of credit loss prevails—credit loss also arises due to deterioration in credit quality short of default.
Requires data on probabilities of credit rating migrations to default state within the planning horizon.	Requires data on probabilities of credit rating migrations to nondefault states as well as default state.
No default within selected time horizon signifies no loss on credit, even though the quality of assets may have deteriorated.	Credit loss is recognized for downward movements in rating. Credit loss is estimated by marking the asset to market at the beginning of the planning horizon and by estimating the future value at the end of the planning horizon—the difference in value represents credit loss.
Does not capture changes in the quality of assets over time and their impact on the financial condition of the bank. The model recognizes credit losses from defaults within the selected time horizon and their impact on the financial condition.	Recognizes both credit gains and credit losses arising from changes in asset quality over time and their net impact on the bank's financial position.

Choice of Planning Horizon

The bank may take into account the maturity structure of loans and advances to select the time horizon for building up an internal model for credit loss estimation. Usually, the major portion of loans and advances is for a period of one year, after which the accounts are reviewed and the limits are renewed, subject to satisfactory operation and positive outlook of the customer's business. If adverse features or irregularities are observed in the conduct of the accounts, the limits are terminated and steps initiated for recovery of dues. The quantum of loans up to one year maturity is usually significant in commercial banks, and therefore it makes sense to assume a one-year time horizon for the calculation of potential credit loss. A one-year time horizon is not unrealistic as most of the events associated with credit administration take place within a year. For example, credit reviews for remedial action, risk grade review, and capital planning for credit expansion are usually done annually. While compiling the data on probability of default, if the study is based on a relatively longer time span, say, a consecutive period of five to seven years, the probability of default of longer-term credit instruments is also likely to be captured in the majority of the cases. The selection of a one-year time zone, therefore, may not materially impair the quality of data on the default probabilities of medium and long-term loans.

12.3 QUANTIFICATION OF RISK COMPONENTS

For estimation of credit loss, banks need to have the data (average values) on the following inputs:

- Probability of default.
- Loss rate given default.
- Exposure at default.
- Maturity or tenor of credit instruments.
- Correlation between counterparties and risk factors.

Estimation of Probability of Default

Probability of default (PD) refers to the possibility of a counterparty committing a default on repayment obligations to the bank during the selected time horizon. This definition is valid both for DM and MTM models. The New Basel Capital Accord has stipulated that “banks may use one or more of the three specific techniques—internal default experience, mapping to external data, and statistical default models” for estimation of the average PD for each rating grade in respect to corporate, sovereign, and bank exposures.[1]

A bank should have an internal credit risk rating system to estimate the average PD based on internal default data. The bank may use the borrowers’ ratings derived from the internal rating system to compile the data on PD and estimate PD borrower-wise rather than facility-wise, if the borrower enjoys more than one facility. All credit facilities enjoyed by a borrower should be considered at the same time to determine whether the borrower is in default. If a borrower commits default on any of the credit facilities, all the other facilities enjoyed by him or her may be deemed to have been defaulted concurrently. The New Basel Capital Accord requires banks to estimate PD separately for corporate, sovereign, bank, and retail exposures. The bank can choose the DM paradigm and one-year time horizon to compile time series data on PD based on the internal default experiences of borrowers in each risk grade. It can utilize the internal credit ratings assigned to counterparties over a period of time to compile a credit risk migration matrix, including migration to the default state for application in the MTM model. The bank should generate data on PD for a continuous period of at least five to seven years. For estimation of PD on retail exposures, the bank may assign the exposures to asset pools based on the homogeneity of borrower characteristics or facility characteristics and build up the data on a random sampling basis. For example, loans to small-scale industries, loans to farmers or co-operative societies for agricultural purposes, residential housing loans, personal loans, credit card debits, and so on can be separately grouped under different (homogeneous) pools, and average PD can be derived for each asset pool.

The bank should compile data on PD separately for each asset class to make an estimate of the potential loss on total credit exposure across the organization. PD should be derived for counterparties in each risk grade (AAA, AA, …BB, C, etc.) and for each asset class (corporate, sovereign, retail, etc.) for a period of

five to seven years, and the data suitably organized to generate risk-grade wise distribution. If the bank intends to follow the portfolio approach to estimate credit loss, it should compile PD on a portfolio basis and for each portfolio, like manufacturing sector, trade sector, commercial real estate sector, capital market sector, retail sector. It should identify the portfolio to which the counterparty belongs, place the default data pertaining to different grades in the respective portfolio, and compile risk-grade-wise and portfolio-wise average PD.

The estimation of risk grade-wise PD based on internal default experiences is shown for a given portfolio in Table 12.2 and for all portfolios taken together in Table 12.3.

TABLE 12.2 Manufacturing Sector Portfolio

Portfolio PD Estimation
Percentage of Borrowers Slipping to Default Grade at Year End
Short-Term Credit Limits

Risk Grade	Risk Level	Y_1	Y_2	Y_3	Y_4	Y_5	Average*
AAA	Very low risk	0.61	0.58	0.98	1.10	0.80	0.814
AA	Marginal risk	1.07	0.98	1.25	1.80	1.10	1.24
A	Low risk	1.99	1.25	2.00	2.80	1.60	1.928
BBB	Moderate risk	3.61	2.08	4.50	6.50	4.00	4.138
BB	Fair risk	4.45	2.85	7.00	9.50	4.25	5.61
B	High risk	6.57	4.75	10.60	12.50	7.70	8.424
C	Very high risk	15.50	12.80	16.20	19.00	14.50	15.60

*Simple average of five-year PD.

The estimation in Table 12.2 is for the manufacturing sector portfolio only. Likewise, PD has to be estimated for each portfolio or subportfolio. In this case, PD has been estimated under the DM paradigm using a one-year time horizon. The number of borrowers changes every year, as some existing borrowers quit or close their accounts and some new borrowers establish credit relationships. If a borrower has defaulted in any of the credit facilities as on the last date of the accounting year (bank's balance-sheet year, say December 31 or March 31), it has been treated as a case of default.

Year 1—Average year.

Year 2—Economy was doing good.

Year 3—Economy was sliding down.

Year 4—Economy was under stress.

Year 5—Economy was improving.

Thus, a longer-term average PD is likely to take care of the concerns of

economic downturn and obligor correlation.

TABLE 12.3 Bank-wide—All Portfolios (All Borrowers)

Risk-Grade-Wise PD Estimation
Percentage of Borrowers Slipping to Default Grade at Year End
Short-Term Credit Limits

Risk Grade	Risk Level	Y_1	Y_2	Y_3	Y_4	Y_5	Average*
AAA	Very low risk	0.50	0.75	1.75	1.25	0.60	0.97
AA	Marginal risk	0.80	1.00	3.10	2.60	1.00	1.70
A	Low risk	1.50	1.80	4.75	3.10	1.60	2.55
BBB	Moderate risk	2.50	3.00	6.50	4.25	2.60	3.77
BB	Fair risk	4.25	6.10	8.25	5.75	5.00	5.87
B	High risk	8.30	10.80	12.90	10.30	10.10	10.48
C	Very high risk	13.25	15.25	20.50	17.50	14.00	16.10

*Simple average of five year PD.

Year 1—Normal year.

Year 2—Economy was sliding down.

Year 3—Economic slowdown set in.

Year 4—Economy was recovering from slowdown.

Year 5—Economy was returning to normal year.

The second technique for PD estimation suggested in the New Basel Capital Accord is based on the mapping of internal data to external data. The bank's own internal credit risk grades should be mapped to the grading scales of the external credit rating institutions, and then the default rate observed with respect to the external rating institution's risk grades should be attributed to the bank's rating grades. If banks intend to apply this technique, they will face at least two constraints. First, the criteria used for ratings by a bank and an external credit rating institution should be comparable, but the latter's criteria are usually not transparent and may not be known to the bank. Second, the external credit rating institutions may not have ratings and default rates for all types of clients of a bank, ranging from large corporate to small borrowers. Consequently, the application of this technique may not give a complete picture of PD for many banks. However, banks can cross-check their ratings and default probability rates with the relevant data of external credit rating institutions at least for large exposures, provided their ratings are known to be reliable.

The third technique relates to the application of statistical models to derive data on default probabilities. The New Basel Capital Accord permits banks to use statistical models for PD estimation subject to meeting the following specific

requirements:[2]

- The variables that are used as inputs in the model must form a reasonable set of predictors.
- The bank must have in place a mechanism to assess the accuracy, completeness, and appropriateness of the data used as inputs in the statistical default or loss prediction models.
- The data used in the model must be representative of the population of the bank's actual borrowers or facilities.
- The bank must have a procedure that allows human judgment and human oversight to modify model results where appropriate.
- The bank must have a regular cycle of model validation.

The characteristics of PD are described here in brief:

- PD is the probability of a borrower defaulting on repayment obligations within a given time horizon (usually 12 months).
- PD is the output of credit risk rating models.
- PD estimation is based on the rating migration of the borrower to the default grade over a period of time.
- PD estimate is required for both DM-type and MTM-type models.
- PD shall relate to each asset class and each rating grade.

Estimation of Loss Rate Given Default

Loss rate given default **(**LGD) is the percentage of loss that the bank is likely to suffer on its total exposure to a counterparty in the event of default. The percentage of net recovery to the outstanding dues as on the date of default is the recovery rate, and for a set of counterparties the average rate of recovery can be derived from the recoveries made in the defaulted accounts over a period of time. LGD is 100 percent minus the recovery rate percent, meaning that the higher the recovery rate, the lower the LGD.

Certain constraints arise in making accurate estimation of LGD. Correlations between credit events and borrowers are important inputs for modeling the probability distribution of LGD. But reliable data on correlation between borrowers due to credit events are seldom available. The Basel Committee on Banking Supervision document, *Credit Risk Modelling—Current Practices and Applications* (Basel, April 1999, Part III), has revealed that “most models assume zero correlations between credit events of different types, although such

correlations may in fact be significant.” The document also points out that “models (used by some banks) generally assume zero correlation among LGD of different borrowers.”

The lack of data on correlation between credit events and borrowers is a real handicap in establishing credit loss estimation models. In general, LGD is dependent on client type, product type, collateral backup, seniority class, recovery laws, collateral enforcement procedures, and the time for realization of collateral values. In certain typical situations, the borrower's attitude significantly influences the values of LGD. Collateral is an important factor that influences the recovery rates, and that may be one of the reasons why emphasis is given on the estimation of LGD facility-wise in the New Basel Capital Accord.

The New Accord allows banks to make their own estimates of LGD for each facility. LGD estimates should take into account not only the average economic loss during normal times but also the severity of losses during periods of high credit losses, like losses during cyclical downturns or periods of economic distress. The New Accord has laid down certain conditions for acceptability of the internal estimates of LGD made by banks themselves. As the Accord puts it, “LGD cannot be less than the long-run default-weighted average loss rate given default calculated based on the average economic loss of all observed defaults within the data source for that type of facility. … LGD estimates must be grounded in historical recovery rates and, when applicable, must not solely be based on the collateral's estimated market value. … Estimate of LGD must be based on a minimum data observation period that should ideally cover at least one complete economic cycle but must in any case be no shorter than a period of seven years for at least one source.”[3] The computation of LGD should also take into account the possibility of unexpected losses on defaulted exposures.

A few issues are involved in deciding the methodology for estimation of LGD of loans and advances. The first issue is whether the historical data on LGD of bonds and debentures, which are usually available, can be taken as proxy. The bank cannot possibly do that because the historical data on LGD of bonds may not be representative data for modeling purpose. The characteristics of loans and advances are different from those applicable to bonds, because the loans are usually secured by cash margin, tangible collateral, and third-party guarantees. The major portion of loans and advances is usually in the form of short-tem credits, which have a one-year tenure and which are usually renewed every year unless irregularities occur. But bonds have a fixed and longer tenure, and they

are not usually protected by tangible collateral. Banks have more control over borrowers who have taken loans, as they are subjected to a definite follow-up procedure, than companies that have issued bonds. The supervision over bond-issuing corporations is unstructured, less transparent, and least documented. In fact, banks have virtually no control over companies whose bonds they have purchased. Further, banks have direct access to collateral against loans and advances, and they are in a position to realize collateral values soon after default. In the case of bonds and debentures where the redemption value is in default or the corporation is bankrupt or insolvent, an elaborate liquidation procedure is involved, and the realized money is distributed by seniority class, in which case the banks may not have priority. These distinguishing features between loans and bonds lead us to infer that in a postdefault scenario, on average the loss is likely to be less severe in the case of loans and advances than in the case of bonds. It is therefore not correct to assume that the historical LGD of corporate bonds may serve as a proxy for the estimation of LGD of loans and advances.

The second issue is: Shall we estimate LGD on a borrower basis or facility basis? Large corporations or multinational companies enjoy a package of credit facilities, often from more than one bank or financial institution, and they also raise money through the issue of bonds in tranches that run concurrently. In view of this multiproduct approach of companies in meeting their financial needs, it is incorrect to estimate LGD on an individual credit facility basis. If a borrower commits default in any of the credit facilities with any bank, it gives a signal that the borrower's financial position has deteriorated, and the borrower is likely to commit default in all its accounts soon with all the banks. Bank regulators usually issue directions for classification of loans and advances as nonperforming on a borrower basis rather than on a facility basis, and accounting principles also support the same practice. If a borrower defaults on any of the credit facilities with one bank or financial institution, it should be treated as a defaulter throughout the financial system irrespective of the health of its accounts with other banks and financial institutions in order to prevent the borrower from misusing the financial system by retaining the status of a nondefaulter. It is thus more appropriate to estimate LGD on a borrower basis rather than on a facility basis, because banks have a general lien on collateral, and they can set off the excess value of collateral, after settlement of dues in the loan account with which the collateral is attached, against the dues in other accounts of the same borrower though they may not be able to recover their dues in full. Since banks have the right of general lien, it makes more sense to take the

total dues of the borrower in default and the total recoveries made by all means (through sale of collateral, invocation of guarantee, and recourse to legal suit) and arrive at the total of unpaid dues, which represent the credit loss. However, facility-wise LGD is meaningful in cases where a single type of facility is involved, like residential housing loans, car loans, and personal loans. It is thus useful and realistic to follow a two-dimensional approach for the estimation of LGD: facility-wise LGD where a singular type of facility is involved and borrower-wise LGD where multiple credit facilities are involved. Banks can thus customize the approach for estimation of LGD in tune with the structure and the composition of the credit portfolio.

The third issue is: When shall we draw the line between the amounts recovered in the defaulted accounts and the amount that cannot be recovered any more? LGD estimation is based on the presumption that on the date of consideration the recoveries have been completed and the amount of unrecovered portion in the defaulted accounts is the credit loss. But most often, the recoveries are slow and come in irregular installments, and they are also uncertain due to weak recovery laws, lengthy court procedures, or willful default. Often commercial banks, more particularly government-owned banks, make full provisions against the total loan loss in borrowers' accounts, but they put off the loan write-off decisions in expectation of further recoveries or for continuation of recovery actions for fear of regulatory censure, till it is established beyond doubt that no further recoveries are possible. Even when banks want to compile the loss distribution data from the historical records, the process is hampered due to the lack of clear regulatory guidelines on the timing of the loan write-off. One way to get out of this dilemma is to formulate a clear policy specifying the circumstances and the time frame for deciding the deadline on recovery. A transparent loan write-off policy is beneficial for all—the public, the shareholders, and the bank regulator/supervisor.

The compilation of LGD data based on historical loss experiences is practicable and dependable. The loss data should be compiled, borrower-wise, risk-grade-wise, and portfolio-wise, from actual recoveries made in the defaulted accounts for a period of at least seven years. In the case of small and retail loans, which are pooled together to form an asset class, average LGD should be compiled on a random sampling basis for each class of retail asset like transport loans, housing loans, credit card dues, and so on. The longer the period of observation for compilation of LGD data, the more representative will be the data for modeling. The longer span of time will do away with the common

concerns associated with model development, that is, the exclusion of correlation factors between borrowers/industries and nonrecognition of the severity of losses during cyclical downturns or economic distress. The correlation between borrowers within the same portfolio or between different portfolios and the losses during the periods of economic slowdown will get reflected in the LGD data, if the time period of observation is sufficiently long. The unexpected losses will also be captured as the data will be compiled from actual recoveries made in the defaulted accounts. The simple average of LGD should be derived from the seven-year LGD data, which will serve as the representative LGD for estimation of potential credit loss on the total credit exposure of the bank.

It is possible to work out portfolio-wise and risk-grade-wise estimates of LGD from borrower-wise LGD data. The illustration of risk-grade-wise LGD for a given portfolio is shown in Table 12.4.

Year 1 and 2—Normal years.

Year 3—Economy was performing well.

Year 4—Economy was slowing down.

Year 5—Economic depression set in.

Year 6—Economy was recovering from slowdown.

Year 7—Economy was returning to normal.

TABLE 12.4 Manufacturing Sector Portfolio

Portfolio LGD Estimation
Yearly Average LGD as Percentage of Exposure at Default
Short-Term Credit Limits

Risk Grade	Risk Level	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7	Average*
AAA	Very low risk	15	18	10	25	30	25	20	20.4
AA	Marginal risk	18	20	15	30	37	30	24	24.8
A	Low risk	25	28	22	38	50	40	30	33.3
BBB	Moderate risk	35	37	29	42	58	50	37	41.1
BB	Fair risk	45	50	37	58	72	55	50	52.4
B	High risk	55	58	50	70	80	65	60	62.6
C	Very high risk	65	63	60	75	85	72	65	69.3

*Simple average of seven-year LGD.

Note that when the economy was performing well, the defaulted amounts in individual borrowers' accounts were relatively low and the recoveries were better due to greater options for disposal of collateral, and the LGDs were low. The situation was reversed during economic slowdowns. LGDs are relatively low in risk grades AAA, AA, and A on account of stronger collateral protection

against the credit facilities.

The year-wise LGD shown in Table 12.4 has been computed by deducting the actual recoveries from the outstanding dues in each defaulted borrower's accounts, and the data relate to a period of seven years, including periods of economic slowdown. The average LGD is the simple average of year-wise average LGD of defaulted borrowers in each risk grade.

The correlation between borrowers within the manufacturing sector and those in other related sectors is likely to get reflected and the severity of losses during periods of economic distress captured, as the data relate to a time period of seven years. In a similar way, LGD for other portfolios, such as trade sector, capital market sector, real estate sector, residential housing sector, or retail sector, can be compiled. Banks can compile asset-class-wise and risk-grade-wise distribution of LGD by estimating obligor-wise LGD and then placing the obligors in the respective asset class and the risk grades. For calculation of LGD in respect to retail asset pools, a sampling method may be followed, if necessary.

In brief, the characteristics of LGD are the following:

- LGD is the percentage of outstanding dues lost after the default occurs.
- LGD is collateral driven but can vary between exposure types due to varying recovery expectations. High value and easily realizable collateral triggers lower LGD.
- The risk measurement model requires historical LGD data—time series data on recovery performance—data for one complete economic cycle but not less than seven years.
- LGD data sources are (1) the bank's own historical data, (2) other banks’ data, (3) trade association data, (4) published regulatory reports, and (5) rating agency reports.

Estimation of Exposure at Default

Exposure at default (EAD) quantifies the expected level of the bank's gross exposure to a counterparty in the event of default or at the time the default occurs. The New Basel Capital Accord has specified the procedure for estimation of EAD in paragraphs 82 to 89, 308 to 317, and 474 to 479. Banks can follow this procedure, or else they can adopt somewhat simplified procedures and make their own estimates of EAD taking cues from the guidelines prescribed in the Accord as suggested in the ensuing paragraphs.

The banks' exposures to counterparties that involve credit risk can be categorized into four segments—direct credit segment, credit substitute segment, off-balance sheet segment, and derivatives segment. Besides, banks will have exposures by way of investments in other types of financial instruments that involve counterparty credit risk. The direct credit segment consists of short-, medium-, and long-term credit lines. Short-term credit lines take the form of renewable credit and overdraft limits where the balances in the accounts keep on fluctuating and which are usually valid for a period of up to one year. The customer has the option to withdraw funds up to the limit at any time. Usually, the customer tends to draw more funds available under the sanctioned limits when he or she is under financial pressure and when he or she senses that the rating assigned to him or her is likely to be downgraded. Consequently, it is reasonable to assume that EAD will be 100 percent of short-term renewable credit and overdraft limits at the time of default. Banks can accordingly estimate EAD in respect to short-term credits as the aggregate of debit balances outstanding or the sanctioned limits, whichever is greater, as on the reference date. The other option is to make an estimate of EAD on the basis of the average percentage of limits drawn in defaulted borrowers' running accounts up to the date of default, plus a percentage of undrawn limits that were in force. Banks can derive the average percentage of utilization of limits in the defaulted borrowers' accounts from the historical data for a period of seven years or more. Regarding the percentage of unutilized portion of the limits that can be added to the utilized portion to estimate EAD, banks may use data based on empirical observation, past experience, and judgment. For estimation of potential losses on exposures, banks should build up asset-class-wise, portfolio-wise, and risk-grade-wise EAD of short-term credit facilities.

Another form of direct credit line is medium-and long-term loans with tenures

ranging from more than one year to 15 years or above. The term loans are generally drawn up to the full value and amortized over their tenure. A few of them may be recently sanctioned and partly disbursed or yet to be disbursed. The purposes for which term loans are sanctioned to customers are different, and the maturity periods and the sources of repayment are also different. The point at which the customers are likely to commit default during the long tenure of the loan is difficult to predict. At any time, most of the term loans have been partly repaid, and the exposure will be lower than the amount originally sanctioned and disbursed. Accordingly, banks can estimate EAD in respect to medium-and long-term loans as the aggregate of debit balances outstanding in the accounts where loans have been fully disbursed and the sanctioned limits where loans have been partly disbursed or undisbursed. Banks should compile asset-class-wise, portfolio-wise, and risk-grade-wise data on EAD in respect to medium-and long-term loans.

The second segment relates to exposures by way of subscription by banks to the bonds and debentures issued by companies, which are regarded as credit substitutes. These financial instruments are issued for various maturities, and the principal together with the unpaid interest is payable on the maturity date. It is reasonable to assume that the maturity values of the bonds and debentures will be the EAD. In respect to investments in other types of financial instruments and placements (Treasury bills, securities, equities, commercial papers, money market placements, etc.) that involve counterparty credit risk, EAD can be taken as the higher of the face value or the book value. Banks should make a separate estimate of EAD with respect to the investment portfolio that involves counterparty credit risk.

In respect to the third segment relating to off-balance-sheet credit facilities/commitments, banks should also separately estimate the EAD. The New Basel Capital Accord allows banks to calculate EAD on off-balance-sheet items as the committed but undrawn exposure amount multiplied by credit conversion factors that can be estimated either under the foundation approach or the advanced approach. Under the foundation approach, the types of instruments and the credit conversion factors applied to them will be the same as applicable under the standardized approach, except in respect to commitments, financial guarantees, sale, and repurchase agreements with recourse, for which a credit conversion factor at 75 percent will be applicable irrespective of the maturity, excluding facilities that are unconditionally cancellable (see paragraphs 311 and 312 of the New Accord). Banks can either follow the foundation approach or

make internal estimates of credit conversion factors under the advanced approach, except those where 100 percent credit conversion factors are applicable under the foundation approach, for each facility type like letters of credit, commitments, financial guarantees, sale, and repurchase agreements with recourse, subject to meeting certain minimum requirements specified under the New Accord (see paragraphs 474 to 479). For this purpose banks must establish adequate systems and procedures to calculate EAD in respect to off-balance-sheet items that are acceptable to the bank supervisor and the external auditors.

The fourth segment relates to counterparty risk arising out of derivative exposures. The longer the tenor of the contract for derivative instruments, the greater will be the credit risk. For estimation of EAD on derivative transactions, banks may ignore the derivative contracts that are outstanding with a central counterparty (e.g., a clearing house), excluding those that have been rejected by the latter. The bank can make an estimate of EAD for OTC derivative contracts on the basis of the current exposure method recommended in paragraph 92(i) of Annex 4 of the New Accord. “Under the Current Exposure Method, banks must calculate the current replacement cost by marking contracts to market, thus capturing the current exposure without any need for estimation, and then adding a factor (the “add-on”) to reflect the potential future exposure over the remaining life of the contract.” … “In order to calculate the credit equivalent amount of these instruments under this current exposure method, a bank would sum:

- The total replacement cost (obtained by “marking to market”) of all its contracts with positive value; and
- An amount for potential future credit exposure calculated on the basis of the total notional principal amount of its book, split by residual maturities” as specified in paragraph 92(i) of the New Accord.

Banks should make a separate estimate of EAD in respect to the derivatives portfolio. To summarize:

Banks should build up data on EAD in respect to (1) short-, medium-, and long-term credit facilities, (2) investment segments that involve counterparty credit risk, (3) off-balance-sheet portfolios, and (4) OTC derivatives portfolios.

The characteristics of EAD are the following:

- EAD is the expected level of gross exposure at the time of default.
- EAD varies according to the structure of credit facility, facility characteristics, and covenants governing operation on the facilities.
- EAD tends to increase with the deterioration in the credit quality.

12.4 CREDIT RISK MEASUREMENT MODELS

Credit risk measurement models usually target credit segments and credit products. Though the modeling practices differ between banks, the ultimate objective is to estimate the quantum of potential losses from credit exposures that are realistic and close to the actual losses when defaults occur. Models generate potential credit losses that determine the quantum of economic capital needed to support all credit risk–related activities of the bank. They enable the bank to set up a risk-based loan pricing system and compute the risk-adjusted return on capital (RAROC), which is the basis for evaluation of managerial efficiency and relative performance of business lines. The model output guides the bank in fixing exposure limits, optimizing portfolio concentration, and allocating economic capital for credit risk. The efficacy of measurement models is judged by their ability to capture the uncertainty of future credit losses around an expected figure.

The primary constraints in developing internal credit risk measurement models are the availability of data on default probabilities, recovery rates in the event of default, and the correlation between risk factors. The absence of a secondary market for loans and the lack of supportive data for back-testing and model validation are the other limitation factors. Credit-related instruments are scarcely traded in the market and therefore their present values are not known, and the extent of erosion in their values cannot be precisely determined. The unavailability of a comprehensive record of historical prices of credit instruments over a longer time horizon is another constraint in developing credit risk measurement models.

Definition of credit losses, choice of planning horizon over which the credit losses are to be measured, determinants of loan values, and treatment of credit-related optionality are critical inputs in the development of credit risk measurement models. The easy, but reliable, way to measure credit loss is to assume a one-year planning horizon and the DM paradigm. Potential credit losses are likely to be greater under the DM model most of the time than under the MTM model, because in the latter case the increases in the quantum of losses on exposures that deteriorate in quality and are downgraded are partly offset by the decreases in potential losses on exposures that improve in quality and are upgraded during the planning horizon. In the DM model the current value and

the future value of a nondefaulting loan equal its book value, while in the MTM model the current value of a nondefaulting loan is the present discounted value of the contractual cash flows, and the future value is the present discounted value of its remaining contractual cash flows. The loss in the value of a defaulted loan, both under the DM and MTM models, is estimated on the basis of loss given default rates.

Internal Model—Estimation of Expected Loss (EL)

Banks can establish their own models for the estimation of potential credit loss on the total exposure in accordance with the methodology suggested in the New Basel Capital Accord. The latter deals extensively with the procedures for estimation of losses for different asset classes, both under the Standardized and Internal Rating-Based Approaches in paragraphs 375 to 379 and 471. Taking cues from these guidelines, commercial banks can follow a simplified process to calculate expected and unexpected losses. The expected loss is the aggregate of potential losses on all types of exposures that involve credit risk or counterparty risk and is calculated as the product of PD, LGD, and EAD and expressed in percentage terms. Banks should compile the average values of PD, LGD, and EAD for each portfolio and each risk grade for all nondefaulted exposures and calculate the expected loss for each portfolio on nondefaulted exposures, and sum up the losses to arrive at the aggregate potential loss. They should separately make a conservative estimate of expected loss on defaulted exposures based on the recovery prospects and provide some cushion to take care of unexpected losses. If the risk factors relating to economic slowdown, industry correlation, and maturity of the instruments are included in the credit risk rating models, and if the average values of PD, LGD, and EAD are compiled from the bank's internal loss experiences based on an observation period of seven years or more, it is expected that the values will be representative. Besides, if models are back-tested and regularly validated by comparing the model-generated estimated losses with actual losses, the reliability of the models gets established. The simplified formula for calculating expected loss (EL) is:

$$EL = PD \times LGD \times EAD \text{ (ignoring the risk component "effective maturity")}$$
$$\text{of nondefaulted exposures plus the best estimate of defaulted exposures}$$

The characteristics of EL are described here:

- EL shows the amount of credit loss a bank will expect on all credit risk-related exposures over the chosen time horizon.

- EL is average loss expectation and varies from year to year.
- EL is the first level of loss estimation and additive.
- EL can be calculated for every borrower or every facility in the portfolio and then aggregated to derive the portfolio EL.
- EL shall be separately estimated for nondefaulted and defaulted exposures.
- EL serves as input for determining economic capital, risk-based loan pricing, and provisions against loan losses.

The calculation of expected loss on nondefaulted exposures for a given portfolio is shown in Table 12.5. It is a simplified illustrative example.

TABLE 12.5 DM-Type Model

Manufacturing Sector Portfolio
Portfolio Credit Loss Estimation
Short-Term Credit Limits*

Risk Grade	Risk Level	Exposure Amt. (Million $)	Average PD* (%)	Average LGD* (%)	Average EAD (100%)	EL Amt. (Million $)	EL to Total Exposure (%)
AAA	Very low risk	1,150	0.814	20.4	1.00	1.91	0.04
AA	Marginal risk	900	1.24	24.8	1.00	2.77	0.06
A	Low risk	950	1.928	33.3	1.00	6.10	0.12
BBB	Moderate	700	4.138	41.1	1.00	11.91	0.24
BB	Fair risk	500	5.61	52.4	1.00	14.70	0.29
B	High risk	450	8.424	62.6	1.00	23.73	0.47
C	Very high risk	350	15.60	69.3	1.00	37.84	0.76
Total		5,000				98.96	1.98

*Short-term credit limits refer to working capital limits sanctioned to manufacturing industries in the form of overdraft/cash credit/ revolving credit/trade bills financing limits and so on of maturities up to one year (renewable annually).

In Table 12.5, PD and LGD relate to the portfolios that have been compiled from data pertaining to individual borrowers in the portfolio. For conservative estimates, EAD has been assumed to be 100 percent irrespective of the risk grade. Assuming that the bank has short-term credit exposure aggregating U.S. $5.00 billion in the manufacturing sector, the EL under the DM model is estimated at U.S. $98.96 million or 1.98 percent of the total short-term credit exposure in that sector. Average PD and average LGD for the portfolio have

been calculated on the basis of actual default and actual recovery on short-term credit limits that exist in the books of the bank (refer to Tables 12.2 and 12.4). The estimation of PD based on five-year actual default cases and LGD on seven-year actual loss data takes care of the concerns regarding the possibilities of higher defaults and lower recoveries during the periods of economic stresses. The long-term data take care of the correlation and credit concentration factors also to a great extent. The data on PD and LGD are collected every year, and consequently, the bank will have a more representative set of data when the observation period is 10 years or more.

Internal Model—Estimation of Unexpected Loss

The EL is the average or the mean loss of the bank's credit portfolio over the chosen time horizon. The unexpected loss (UL) is the amount by which the actual loss exceeds the EL. The PD and LGD at some point of time or in respect to certain exposures may substantially exceed the average PD and LGD estimated on a historical data basis, and the losses in respect of those borrowers will be much more than the model-estimated EL based on the average of PD and LGD. For example, let us take the case of a borrower to whom the bank has sanctioned a short-term credit limit of U.S. $100 million. Suppose the latest risk grade assigned to the borrower is BB. Table 12.5 indicates that the bank will have an average EL for a BB-rated borrower at 0.29 percent of the exposure. Thus, the EL anticipated by the bank in respect to the borrower will be U.S. $0.29 million or U.S. $290,000, assuming that the credit limit is fully drawn as on the date of default. Suppose the borrower actually defaults in repaying its dues and the bank is able to recover only U.S. $80 million. The difference between the actual loss of U.S. $20 million and the model-estimated EL of U.S. $0.29 million or U.S. $19.71 million is the UL in the instant case. In this way, the bank can compute figures of UL for a sample of borrowers in each portfolio and compute UL for the portfolio based on standard deviation. The UL on the bank's total credit exposure can be estimated from portfolio-wise UL. UL arises due to the variances in PD and LGD values, and sometimes the UL can be substantially large. The characteristics of UL are described here:

- UL is the amount by which the actual losses exceed the expected losses.
- UL is a measure of volatility around EL.
- UL is mainly impacted by the volatility of PD and LGD values.

The illustrative example given in Table 12.5 shows the methodology for calculation of EL for short-term credit exposure for the manufacturing sector portfolio. Banks should calculate EL and UL separately for medium-term and long-term credit exposures for each portfolio by using counterparty-wise and facility-wise PD and LGD data. They should compile PD, LGD, and EAD data separately for off-balance-sheet portfolios and derivatives portfolios and calculate EL and UL. The total of EL and UL for all types of exposures and all portfolios will generate the bank-wide potential EL and UL.

12.5 BACK-TESTING OF CREDIT RISK MODELS

Validation is more important for the credit risk model than for the market risk model, because inaccuracy in credit risk modeling is likely to affect the financial soundness of a bank. Some credit instruments cannot be marked to market due to the absence of a market for such instruments, and hence significant losses can accumulate in the banking book unnoticed or unaddressed. Validation of the credit risk model is more complex than that of the market risk model, because the size of the banking book of commercial banks, which is the largest source of credit risk, is much bigger than the size of the trading book, and the time horizon for modeling credit risk is much longer. The historical data collection for deriving values of model inputs for credit risk measurement spreads over several years, while one-to two-year volatility data on market variables may suffice for market risk modeling.

The aim of back-testing is to verify whether the ex ante estimation of credit losses is consistent with the ex post actual losses, and the model has worked in the way it was expected to perform. For simplified internally developed models, there are three main areas in which the back-testing process has to be applied: (1) accuracy of risk grade assigned to a borrower; (2) accuracy of risk-grade-wise estimation of PD and LGD; and (3) accuracy of EAD of different exposures. The bank has to verify whether the ex ante assumptions on the financial and nonfinancial risk factors used in borrower ratings remained valid in the ex post period and whether the risk grade assigned was justified, keeping in view the borrower's current financial position, the behavior of the accounts, and the current risk perception. For example, if a borrower was assigned a AAA rating two years ago and it has now defaulted in its commitments to the bank

under normal circumstances, the credit event is not consistent with the attributes of a AAA rating. This inconsistency between risk grade and expected default probability calls for a reexamination of the risk rating methodology. Likewise, if the model-generated expected and unexpected losses are in significant variance with the actual losses, the methodology followed for estimating PD, LGD, and EAD needs to be investigated, and the procedure suitably modified. This type of back-testing is applicable to credit risk measurement models developed internally by banks, based on historically derived average values of PD, LGD, and EAD under the DM paradigm. In respect to sophisticated MTM models, which utilize a combination of inputs like the credit risk transition matrix, correlation factors, economic factors, joint probability distribution of risk factors, credit spreads, volatility in asset values, and default rates, back-testing involves the application of wide-ranging assumptions and data. Sometimes, back-testing of MTM models is not feasible due to the unavailability of reliable data.

12.6 STRESS TESTING OF CREDIT PORTFOLIOS

Stress testing is a technique to assess the potential vulnerability of a bank if some adverse but plausible events occur or significant adverse movements of financial variables take place. Stress testing measures the extent of economic shocks and other stress situations that the bank can tolerate. It enables the bank to assess the impact of significant but plausible events, first on its credit portfolio and then on its profitability and capital. While conducting stress tests, the bank should be concerned with the significant movement of economic and market variables that have potential to occur and not with day-to-day variations in risk parameters. Stress tests are conducted under the assumption of various plausible stress scenarios with different levels of severity, and the results are used in setting risk limits, allocating capital, managing exposures, and designing contingency plans.

In undertaking stress testing of credit risk, the bank has to identify major elements of uncertainties associated with credit risk modeling and then choose the key variables subjected to test. For example, the uncertainties may relate to situations that significantly influence the values of PD, LGD, EAD, or the joint probability distribution of risk factors. Unfavorable developments in the

economy and adverse movements of interest rates and foreign exchange rates produce a significant impact on the repaying capacity of the borrowers that may lead to an unusual increase in the quantum of nonperforming loans. These types of events trigger larger defaults and generate greater values of PD and LGD that are much above the levels assumed in the measurement models. The bank should subject the credit portfolio to stress tests assuming increases in nonperforming loans by reasonable percentages, evaluate the consequential impact on the financial condition, and take appropriate remedial measures. Similarly, the bank should conduct stress tests with reference to variations in credit spreads, corporate bond spreads, swap spreads, deterioration in credit ratings, shifts in default probabilities, and so on. The bank should subject the commercial real estate portfolio to stress testing with reference to a possible decline in the values of collateral and the exposure to the capital market sector with reference to volatility in bond and equity prices, and evaluate the possible scenarios that may emerge from a fall in property and equity prices. It is also necessary to conduct stress tests of credit and investment exposures in other countries through the assumption of country-specific stress factors. Banks should undertake stress testing of relevant financial parameters at frequencies dictated by the business mix and the risk-bearing capacity at least at three levels of ascending severity—minor, medium and major—and decide the remedial action under each scenario.

Sensitivity tests and scenario tests are the two main techniques employed in conducting credit portfolio stress tests. Sensitivity tests are conducted with reference to a series of predefined moves in a particular risk factor in order to assess the impact on the value of a portfolio. Scenario analysis seeks to assess the impact on the value of the portfolio from adverse movements in a number of risk factors simultaneously, if a significant but plausible event occurs. Scenario analysis is based on historical events that have taken place and have the potential for recurrence and also hypothetical events that are thought to be plausible in some foreseeable circumstances for which there are no exact parallels in history.

An example of a scenario is a sudden economic downturn that affects the credit portfolio significantly. A sudden economic downturn generates three shocks: (1) downgrading of borrowers’ ratings, (2) slippage of performing loans and advances into the nonperforming category, and (3) increase in loan loss provisioning. The bank should conduct stress tests with reference to each of these parameters by varying the degrees of severity of the event (e.g., downward migration of risk grade by one notch and two notches across the portfolio, assuming increase in nonperforming loans by 5 percent, 10 percent, and 15

percent, and increase in loan loss provisioning by 10 percent and 15 percent over the preceding year's amount) and evaluating the impact on its earnings and capital. The bank should periodically review the methodology used and the severity levels assumed for stress testing, identify the issues that emerge from stress test results, and consider those issues in formulating credit risk policy and setting credit risk limits.

12.7 SUMMARY

Banks should develop credit risk rating models to signify counterparty risk level and credit risk measurement models to quantify the potential loss. Models should recognize correlation between risk factors and business activities and capture credit losses during economic recession.

Banks should adopt an appropriate definition of credit loss and select the time zone to measure loss. The broader the definition of credit loss, the more complex the measurement process will be, and the longer the time zone chosen for measurement, the larger the potential credit loss will be.

Once the rating is assigned to a counterparty or a credit facility, the risk rating indicates the likely quantum of credit loss that may arise from the credit exposure in the event of default. There is an inverse correlation between risk rating and quantum of credit loss. The better the rating, the lesser is the quantum of potential credit loss.

Two definitions of credit loss are in vogue among banks. One is that credit loss occurs only when the counterparty defaults, and the other is that credit loss occurs when the credit quality deteriorates, even if there is no default within the selected time horizon. Corresponding to these two definitions of credit loss, there are two types of paradigm for model selection: the default mode paradigm and the mark-to-market paradigm.

The default mode paradigm is a two-state model: the default state and the nondefault state. The mark-to-market paradigm is a multistate model that recognizes credit losses before default if credit quality deteriorates. Potential credit losses are greater under the default mode paradigm most of the time than under the mark-to-market model.

Banks can establish simplified credit risk measurement models based on internal estimates of probability of default (PD), loss rate given default (LGD), and exposure at default (EAD).

PD indicates the possibility of a counterparty defaulting on its obligations within a given time horizon. LGD is the percentage of outstanding dues lost in borrowers' accounts after the default occurs, and EAD is the expected level of gross exposure at the time of default. Credit loss estimation models require PD, LGD, and EAD for each asset class, each portfolio, and each rating grade.

The availability of default probability data, reliable recovery data, and obligor and risk factor correlation data is the main constraint in developing internal credit risk measurement models. The absence of a secondary market for loans and the unavailability of market values of credit-related instruments and historical prices of credit instruments over a longer time horizon are the other constraints.

The credit risk model generates expected and unexpected losses that serve as inputs for fixing exposure limits, optimizing portfolio concentration, deciding risk-based loan prices and provisions against loan losses, and determining capital allocation.

Expected loss (EL) is the aggregate of potential losses from all types of exposures that involve counterparty credit risk and is calculated as the product of PD, LGD, and EAD and expressed in percentage terms. Unexpected loss (UL) is the amount by which the actual losses exceed the expected loss and arises due to variances in average values of PD and LGD.

Banks should carry out back-testing of internally developed credit risk measurement models to verify whether the ex ante estimation of credit losses is consistent with the ex post actual losses. Likewise, they should conduct stress testing of credit portfolios at three levels of ascending severity—minor, medium, and major—to assess the potential vulnerability under significant but plausible circumstances and put in place appropriate checks and balances.

NOTES

1. New Basel Capital Accord, BCBS, paragraphs 461 and 462.
2. New Basel Capital Accord, BCBS, paragraph 417.
3. New Basel Capital Accord, BCBS, paragraphs 468, 470, and 472.

CHAPTER 13

Credit Risk Management

13.1 GENERAL ASPECTS

Credit risk exists in the major activities of a bank and hence, its effective management is crucial for long-term solvency. The primary objective of an effective credit risk management system is to maintain the quality of credit assets and prevent slippage of standard advances into the nonperforming category, since the latter affects the bottom line. Nonperforming advances do not earn, but the bank is required to bear the cost of funds to hold them and make substantial provisions against possible loan losses.

Credit risk management is concerned with the quality of credit before default, and the aim is to maintain the quality of credit over time and monitor those exposures that deteriorate in quality by tracking the migration of borrowers down the rating ladder, because each rating downgrade represents a higher quantum of credit loss to the bank. Credit risk management thus essentially focuses attention on good lending practices to minimize the incidences of default, and on initiation of timely action to arrest the deterioration in credit quality much before actual default. Management of credit risk continues to receive the focused attention of bank supervisors under the risk-based approach to bank supervision.

13.2 CREDIT MANAGEMENT AND CREDIT RISK MANAGEMENT

Credit management refers to the whole process of credit administration, beginning with the grant of credit and ending with the recovery of that credit. It involves sanction, disbursal, supervision, follow-up, and recovery of credit. On the other hand, credit risk management is concerned with the risk the bank faces from credit exposure till the relationship with the borrower is terminated. The aim is to keep the risk within limits and in the process, maximize the risk-

adjusted return on credit exposures. The scale of risk the bank is going to assume from exposures should be consonant with the credit risk management policy of the bank.

Credit risk management essentially deals with the risk from exposures before they reach the stage of default, and it is therefore not management of problem loans or loans that remain unpaid on the due dates. The broad objective is to ensure the quality of credit exposure, minimize the chances of default, and keep the prospects of recovery unimpaired till the relationship with the borrower is terminated. When the borrowers commit defaults in repaying their dues to the bank and the loans become bad, credit risk has materialized and the losses on the credit exposures are going to arise sooner or later. The essence of credit risk management is to set up procedures that assist in selecting good exposures and maintaining credit quality. The procedures should automatically throw up signals when the quality of individual credit or the portfolio begins to deteriorate, so that remedial measures can be initiated in time to prevent default, and if default occurs, to minimize the losses.

Credit risk management is a part of the entire credit management process. The latter is much broader in concept, and the former is a tool that helps in controlling the loss on credit. If there is laxity in credit management, it increases the incidence of defaults and the quantum of credit risk. Credit management encompasses all aspects relating to the selection of borrowers, provision for margin money and collateral support, proper utilization of funds, observance of financial discipline, and adherence to the repayment schedule by the borrowers. It includes supervision of the borrowers' activities and accounts by the bank. On the other hand, credit risk management seeks to minimize the incidence of risk materialization and the intensity of credit loss through establishment of standards for credit selection, diversification of credit portfolio, avoidance of credit concentration, prescription of prudent limits on exposure size, development of models for risk quantification, and prescription of strategies for risk mitigation. Credit management focuses on improving the prospects of recovery; credit risk management focuses on reducing the probability of default. Credit risk management tools are more sophisticated and complicated than credit management standards.

13.3 CREDIT RISK MANAGEMENT

APPROACH

The systems and procedures for managing credit risk assume the greatest significance in the entire risk management process. Credit risk occurs through multiple sources as compared to those from which market risk arises. This is because in an organization, many people operating in many locations are delegated powers for grant of credits, while those who undertake treasury and trading functions that give rise to market risk are few in number and operate in selective locations. The sources and the points of occurrence of credit risk are thus much larger. Thus, the approach to credit risk management should recognize the problems emerging from the multiplicity of personnel handling credit and the multiplicity of operating points at which credits are granted. The choice of credit risk management approach largely depends on the bank's range of activities, the business strategy, the sophistication and the range of products for credit delivery, and the competency of personnel in handling credit products. The approach is also influenced by several other factors like the structure and the level of capital, the business focus (wholesale credit or retail credit), the extent of competition from peers, the product preferences of customers (direct credit lines or credit substitutes), single and group exposure limit policy, related party lending policy, availability of trained personnel for credit administration, and the management's confidence in the staff engaged in credit monitoring and control.

Banks undertake the following activities to establish a comprehensive credit risk management process:

- Formulation of credit risk policies and strategies.
- Development of a credit risk rating framework.
- Development of credit risk measurement models.
- Management of portfolio risk.
- Management of credit risk in interbank exposure.
- Management of credit risk in off-balance-sheet exposure.
- Management of country risk in cross-border lending and investment.
- Development of strategies for credit risk mitigation.
- Development of processes for tracking migration of borrower ratings.
- Establishment of loan review or credit audit mechanisms.
- Establishment of methodology for assessment of risk-adjusted return on capital.
- Establishment of methodology for capital allocation for credit risk.

- Formulation of a loan pricing policy.

13.4 CREDIT RISK MANAGEMENT PRINCIPLES

The Basel Committee on Banking Supervision in the document on “Principles for the Management of Credit Risk” has observed that sound practices for credit risk management address the following areas:

1. Establishing an appropriate credit risk environment.

2. Operating under a sound credit granting process.

3. Maintaining an appropriate credit administration, measurement, and monitoring process.

4. Ensuring adequate controls over credit risk.[1]

The banks address the above four principles to make their credit risk management practices comprehensive. These practices are applied in conjunction with the other practices enunciated in the Basel Committee document covering asset quality, loan loss provisions and reserves, and credit risk disclosures. The four principles of credit risk management mentioned in the Basel Committee document are explained in the ensuing paragraphs.

Establishing Credit Risk Environment

The bank should have a document encompassing credit risk management strategy, credit risk policies, and tolerance limits for credit exposures. The board of directors of the bank has the primary responsibility to approve this document, and the senior management is responsible for developing procedures for implementing the policies and strategies. The bank builds up its credit portfolio in pursuance of these policies and strategies and addresses the following operational requirements:

1. What type of credit exposures will the bank accept, and what should be the mix of exposures in keeping with the risk tolerance capacity and the risk-return trade-off policy for optimizing profits? (Exposure types are commercial credit, wholesale credit, retail credit, consumer credit, export credit, and so on.)

2. What should be the economic sector-wise target of dispensing credit, and what should be the limits for exposure to each economic sector (industrial sector, trade sector, capital market sector, real estate sector, agricultural sector, infrastructure sector, etc.)? What should be the geographical distribution of credit within the domestic sector and the overseas sector?

3. What should be the level of credit concentration in specified areas, and what should be the areas of credit diversification? Where are the target markets?

4. What should be the currency-wise and maturity-wise distribution of credit in keeping with the bank's liability profile?

The board of directors should specify the methods for granting credit, conduct an independent review of credit exposures, and assign clear responsibilities for credit administration. The most vulnerable area of credit administration is the implementation of policies and procedures for grant and conduct of credit, since several flaws and aberrations usually occur in that area. The senior management should lay down written procedures for credit sanction and indicate responsibilities for hindsight review, identification of problem credits, and monitoring and controlling of credit risk. This document should describe the process for allowing excesses and making exceptions, and the procedure for reporting.

The implementation framework should address credit risks in all products and activities, also the country risk and transfer risk of cross-border credit exposures. The framework should specify the procedures for identification of credit risk before introduction of new products. It should assign the responsibility for

periodic assessment of the bank's credit granting and credit management functions. The most difficult aspect of implementation is effective communication of credit risk policies and strategies across the organization in a manner that ensures clear understanding of the whole process by the staff with a view to adhering to the documented standards of credit sanction.

Operating Under a Sound Credit Granting Process

Important aspects of credit operation are the customer selection procedure, the fund disbursement method (to ensure end-use of funds), and the supervision, monitoring, and follow-up procedures. The bank formulates entry-point criteria for sanction of credit and establishes standard terms and conditions covering the lending rate, minimum margin, collateral coverage, and tenure. It should have a set of application forms for collecting all relevant data and information about the borrower for undertaking a comprehensive assessment of his or her risk profile. It should develop standard risk profile templates for the computation of borrowers' credit risk rating, which should include all factors that are relevant to credit decision making. But the risk rating only indicates the level of risk associated with the credit exposure, which is not enough for credit decisions. The purpose of the credit and the repaying capacity of the borrower are more important, and the self-liquidating character of credit is crucial to sound credit decisions. It is therefore necessary to assess the creditworthiness of the borrower independent of the rating. A low risk rating is not necessarily a guarantee that the credit will be repaid in full and in time. Credit sanction standards may specify the need for borrowers to provide collateral and guarantees for credit risk mitigation, but still it will be erroneous to base credit decisions solely on the strength of collateral and guarantee.

The "Know Your Customer" principle is equally important for establishing credit relationships. Even if the borrower is known to the bank and commands a reputation in the locality, it is necessary to carry out an independent appraisal of his or her creditworthiness and the genuineness of the purpose for which he or she seeks credit. It is wrong to grant credit to individuals or institutions for illegal activities even though the exposure may be of sound quality and highly remunerative. If the bank decides to participate in a consortium or a syndicate for a grant of loan, it should not draw comfort from the credit analysis done by the lead bank or lead underwriter for taking a share. Rather, it should make an independent appraisal of the loan in the same manner it would have done if it

were the sole banker to the borrower.

For establishing a sound credit operation process, the bank needs to set up maximum exposure limits in relation to its capital funds. In keeping with the regulatory prescription and the risk tolerance capacity, the bank should specify the maximum exposure limits for a single counterparty as well as for groups of connected counterparties, and explain clearly the procedure to identify the connected counterparty and related party. Regulators require banks to define “large exposure” and set up a large-exposure ceiling in relation to their capital funds. The bank should establish procedures for aggregation of exposures to individual counterparties across all business activities and aggregation of exposures to the group of connected counterparties with a view to adhering to the “single-borrower” and “group-borrower” exposure norms.

Credit risk mitigation by way of acceptance of collateral and financial guarantee is a part of the credit operation process. The bank should formulate credit risk mitigation and collateral acceptance and management policies. Tangible securities, such as mortgages of land and buildings, plants and machinery, residential property, and the guarantee of individuals or institutions are the two most common forms of collateral. Undoubtedly, collateral protection against credit exposures reduces credit risk, but it should not act as the main driver for credit sanction. Collateral securities, though they offer protection against credit losses, are subject to value erosion and complex enforcement procedures.

An important principle laid down by the Basel Committee on Banking Supervision is that “banks shall have a clearly established process in place for approving new credits as well as the amendment, renewal and refinancing of existing credits.” Banks should clearly define the functional responsibility for credit origination, credit analysis, and credit approval; put in place a structure of delegated powers for credit sanction; and conduct rigorous scrutiny of loans to related counterparties at par with the loans to unrelated parties. They should also set up procedures for renewal and enhancement of credits at specified frequencies and lay down criteria for allowing relaxations and concessions on an exception basis, and by authorized officials.

Maintaining an Appropriate Credit Administration Process

The bank should establish a credit administration process in keeping with its

size, credit turnover, client composition, and product range and complexity. The credit administration process begins with the identification of the borrower and sanction of credit and ends with the closure of the accounts. In between there are several intermediate procedures to safeguard the quality of credit throughout its life cycle. The sanction or the financial commitment is only the beginning of the credit administration process; the management of subsequent events is crucial to prevent risk materialization.

The core activities under the credit administration process are creation of enforceable documents, completion of legal formalities for establishing charge over collateral, monitoring end-use of credit, watching compliance by the borrower with the terms of sanction and financial discipline, and conducting follow-up and supervision of credit. Often, proper utilization of credit by the borrower is taken for granted, and the procedure connected with credit disbursement is skipped, which is fraught with greater risk of default. A high correlation exists between misuse of credit and probability of default. Misuse negates the purpose for which credit is granted, and it alters the stream of income generation and the cash flows, since activity changes due to diversion of credit. Thus, vigilance over appropriate utilization of funds by the borrower is a crucial aspect of the credit administration process.

Periodic updating of borrower-related records like the loan agreement and other related documents, financial statements and business status, and storing of those data and particulars in the management information system facilitate credit administration. Balanced credit growth, ongoing vigilance over credit portfolio composition, avoidance of credit concentration, and regular analysis of portfolios ensure the soundness of the credit profile of the bank.

Setting Up a Credit Risk Control Mechanism

Establishment of a rigorous control framework to monitor and control credit risk across the bank including the risk emerging from the affiliated units is essential to manage credit risk. The control framework includes an independent evaluation of the credit administration process, internal review and reporting system, authentication procedure for allowing exceptions, and appropriate checks and balances mechanism. The credit risk control function should cover verification of compliance with the approved credit policies and strategies, the loan sanction standards, and the internal prudential limits. Prompt identification of problem credits is an important element of the credit administration process.

The monitoring and control system should include a suitable mechanism to identify problem credits in time to enable the bank to chalk out debt restructuring and rehabilitation plans.

Bank Supervisor's Role

Bank supervisors have a special role in ensuring the soundness of the credit risk management systems of commercial banks and financial institutions. The supervisors should set up standards that banks are expected to achieve and specify the parameters with respect to which their examiners will assess the adequacy of the credit risk management system. The resources that banks usually devote to establishing a sound credit risk management system depend on the importance the bank supervisors attach to it and the seriousness with which they assess its effectiveness. The supervisors prescribe the limits on credit exposures within which they expect banks to operate. These prescriptions should include, at the minimum, prudent limits on sensitive sector exposure, large exposure, single borrower and borrower-group exposures (group of connected counterparties), related party exposure, and credit concentration. The supervisors must evaluate the bank's procedures for identification, measurement, monitoring, and control of credit risk. They should periodically review and identify the weaknesses and gaps in the banks' credit risk management systems and initiate bank-specific measures. The supervisors are responsible for evaluating the banks' internal capital adequacy assessment process to cover credit risk.

13.5 ORGANIZATIONAL STRUCTURE FOR CREDIT RISK MANAGEMENT

The appropriateness of the organizational structure and the recognition of links between departments are crucial for unbiased assessment and effective monitoring and control of credit risk. The structure should meet the requirements of functional segregation to avoid conflicts of interest. Credit administration and credit risk management are two separate functions and therefore should be kept functionally distinct. At the same time, management of credit risk cannot be viewed in isolation. The organizational structure should not only recognize the need to maintain appropriate links between the credit administration and credit risk management functions, it should also achieve coordination among the credit

risk, market risk, and operational risk management functions as a part of the integrated risk management process. A top-down approach is more realistic in establishing an appropriate organizational structure for credit risk management. The top-down approach covers the approval, coordination, implementation, and reporting functions. The board of directors is the approval authority, senior management is the coordinating authority, middle management is the implementing unit, and the operating staffs at the field level are the reporting units.

The framework of the risk management organizational structure was given in section 4.5 of Chapter 4 of this book. The board of directors of the bank constitutes the first tier and the risk management committee of the board the second tier of the organizational structure. The board and its committee have significant responsibilities relating to risk management functions and are responsible for all matters pertaining to credit, market, and operational risk management. Approval of credit risk policies and strategies, establishment of credit risk limits and exposure norms, allocation of capital for credit risk, and periodic evaluation of the efficiency of the credit risk management system are the core responsibilities of the board.

The risk management committee is an extended arm of the board and a committee of experts who have exposure to risk management techniques and are expected to achieve coordination among credit, market, and operational risk management activities. The committee consists of a few board members and the top officials of the bank, and has the responsibility of approving credit risk management systems and procedures and credit risk measurement models, and overseeing the implementation of the credit risk management policies and strategies.

The credit risk management committee is the third tier of the organizational structure and consists exclusively of bank officials—the chief executive officer, the executive directors, and the departmental heads, besides the chief economist, who is responsible for analyzing the macroeconomic environment, political environment, policy initiatives of the government, and external sector developments, and for guiding the bank about the qualitative aspects of credit growth. The credit risk management committee will act as the recommending authority on credit risk policy formulation and policy modification, and the implementing authority for credit risk policies and strategies. The committee will lay down ground rules for acceptance of loans and exercise of loan sanction powers, make recommendations for fixing limits on exposures and formulating

loan pricing and loan provisioning policies, and approve credit control procedures and practices.

The credit risk management function should be centralized and the responsibility entrusted to one department at the corporate office, which should handle the entire credit risk management activities of the bank. The bank needs to set up a separate credit risk management department not because of the vastness of credit activities, but because of the complexity of the credit risk management function. The credit risk management department should consist of specialists in the areas of risk planning, risk analysis, risk assessment, and credit management systems and procedures. The department will not only provide support services to the higher-level committees, but also develop credit risk models suitable to the bank, oversee the implementation of credit risk management systems and practices across the organization, monitor credit quality, and arrange for credit audit.

13.6 CREDIT RISK APPETITE

Credit risk appetite is the extent to which the bank is able and willing to take risks in the normal course of business in respect to credit and credit-related exposures. In quantitative terms it is the extent of maximum loss on credit exposures that the bank is willing to bear without impairing the benchmark capital level. The risk appetite is determined by the capital level the bank has targeted to maintain in the medium term and revealed through credit risk policies and strategies.

A bank with a high risk appetite will have greater capital strength and ability to raise additional capital and will entertain high-risk credit proposals to a larger extent than banks with a moderate or low risk appetite. Once the bank determines the level of credit risk appetite for pursuing its credit business, the check is exercised by setting up consistent risk limits across the organization, which form the basis for capital planning against credit losses. The bank should take into consideration regulatory prescriptions, targeted credit and profit growth, desired portfolio composition, risk-return matrix, targeted markets, regions, and customers, the basket of credit products, credit processing capability, and credit delivery strength to determine the credit risk appetite.

13.7 CREDIT RISK POLICIES AND STRATEGIES

Credit Risk Vision

A declaration of credit risk vision is essential for formulation of the credit risk policy. The vision shall be in conformity with the bank's medium-term goal and specify the type and tenure of credits in which it intends to specialize. The bank may specialize in corporate finance, wholesale finance, real estate finance, import-export finance, or retail finance, or intend to dispense all types of credit and increase its presence in international markets. The range of credit activities and the choice of credit tenures influence the credit risk vision, and an appropriate vision helps the bank to maintain a balanced credit portfolio at all times for optimization of risk and return. A balanced credit portfolio means an ideal mix of credit exposures in terms of economic activities, purposes, tenure structure, client size, business locations, and risk profiles of counterparties. The credit risk vision should be based on certain principles that promote stability of the credit operation and discourage reckless and aggressive credit growth.

The credit risk vision document should contain the basic principles for containing credit risk. The suggested outline of the document is given here.

1. Credit risk management procedures and practices shall be proactive and flexible.

2. Credit growth in each year shall be in line with the growth in resources and excessive dependence on borrowed funds shall be avoided to fund credit. Credit portfolio shall be kept diversified at all times.

3. The proportion of long-term exposures to short-term resources shall be kept at the bare minimum, since acquisition of long-term credit assets through short-term resources is fraught with liquidity risk, funding risk, and interest rate risk.

4. Limits on single-borrower and group-borrower exposures, large-exposure and sensitive sector exposure shall be consistent with the regulatory prescriptions and the bank's risk-bearing capability.

5. Aggregate of exposures to single borrowers or borrower-groups in excess of the prescribed limits shall remain within the substantial exposure limit.

6. Consistent standards for credit origination, credit processing, credit sanction, and credit supervision shall exist across the organization. Standards shall include documentation, collateral management, and risk mitigation procedures.

7. Multiple layers of credit approvers for large-exposure, high-risk exposure, and long-tenure exposure shall be in place to achieve greater transparency on credit decisions.

8. The level of authority to approve credit shall be higher than usual when transaction risk increases and credit ratings worsen.

9. Location-wise, sector-wise, and clientele-wise credit concentration shall be kept to a viable minimum. The concentration shall be justified in terms of competitive advantages and product specialization.

10. An internal credit risk rating system shall be established and a rating assigned to each borrower or each facility above a certain exposure size. Where the number of borrowers is large but the amount of exposure per borrower is small, individual ratings may be dispensed with. Instead, small credits may be clubbed together in accordance with the homogeneity of borrower characteristics or purposes of credit and assigned predetermined ratings on a conservative basis.

11. Credit exposures shall be appropriately distributed between different risk grades in accordance with the risk-bearing capacity and risk-return optimization principle.

12. A flexible risk-based loan pricing policy shall be in place to discriminate borrowers in terms of risk rating. Lending rates shall be fixed in accordance with risk ratings, and exceptions shall be made on a selective basis on business considerations or due to market compulsion.

13. The health of credit assets shall be ensured through regular credit audits. Monitoring of credit, detection of early warning signals, and initiation of prompt corrective action shall be essential aspects of credit administration.

14. Portfolio analysis and rating migration analysis shall be regularly undertaken to detect risk concentration and assess credit quality deterioration.

15. A consistent approach toward identification of problem exposures shall be followed and prompt corrective action initiated to minimize the incidences of loan defaults.

16. A rigorous system of checks and balances shall be established for grant and supervision of credit. The credit risk management function shall be kept segregated from the credit approval function.

17. Updating of the management information system to measure and monitor credit risk inherent in on-balance-sheet and off-balance-sheet activities shall be a continuous process.

18. The management information system shall provide adequate information on large exposures, credit portfolio composition, risk-grade-wise distribution, credit concentration, and incidences of defaults.

19. Biannual and annual industry performance studies, individual borrower reviews, periodic visits to plants and business sites of borrowers, and quarterly management reviews of problem credits shall form part of the credit management schedule.

Credit Risk Policy

The credit risk policy covers the whole gamut of credit risk–related activities, while the loan policy gives an outline of the strategies to be followed for implementing the credit risk policy and specifies the areas of focus for growth of credit during the year. The credit risk policy describes the economic activities, the business lines, the market segments, and the geographical locations in which the bank intends to concentrate during the next few years. The policy indicates the preferences for clients and products, and prescribes entry-point standards, portfolio composition, loan restrictions, exposure limits, and so on.

The credit risk policy should have a long-term perspective and show the appropriate composition of the loan book based on credit risk appetite and capital planning that is beneficial in the long run. Through the policy the bank specifies its strategies for credit growth and alteration in portfolio composition in the light of the emerging scenario. Loan policy deals with the direction of credit in the shorter term, the terms of credit acceptance, the distribution and diversification of credit, and the systems and procedures for credit management. It deals with sector-wise and industry-wise restrictions, entry-exit prescriptions, rescheduling and restructuring standards, and management of nonperforming loans. Loan policy supplements credit risk policy.

The credit risk policy changes every year in accordance with the changes in market conditions and the bank's risk-bearing capacity. The policy guides the field officials in conducting the bank's credit operations and deters them from indulging in imprudent and unjustified lending. The objective of the credit risk policy is not merely to regulate credit within the defined parameters but to maintain the liquidity and the profitability of credit operations, keeping in view the depositors’ interests. The policy prescriptions, when translated and implemented across the bank, ensure that the potential loss from the aggregate credit risk in quantitative terms comprising expected and unexpected losses remains within the allocated capital. The credit risk policy reveals the bank's credit risk appetite and the extent of risk-return trade-off in credit operations.

Corporate governance codes require banks to follow safe and sound practices in conducting operations and to maintain transparency in the decision-making process. The credit risk policy assists the bank in complying with the corporate governance codes. The policy specifies target markets for lending, risk-grade-wise limits for credit acceptance, credit origination and credit administration

procedures, and credit approval powers and responsibilities. The policy also contains procedures for assignment of risk ratings to borrowers and lays down guidelines for portfolio management, impaired credit management, and recovery management. The assignment of responsibilities to designated officials for identification, measurement, monitoring, and control of credit risks in on-balance-sheet and off-balance-sheet items should be specified in the policy.

While formulating credit risk policy, the bank should take into consideration the current outlook of the economy and the likely changes that may take place in fiscal and monetary policies as well as in the economic and business environment. The credit risk policy prescribes the essential requirements to ensure the sanctity of checks and controls, like adoption of a committee approach for sanction of large credit and independence of the internal audit, risk review, and risk assessment functions.

The credit risk policy should include the following inputs at the minimum:

- Objectives of credit risk management.
- Credit risk appetite.
- Credit risk vision.
- Prudent limits, exposure norms, and ceilings.
- Credit approval procedures.
- Country risk tolerance.
- Definition and management of large exposure and substantial exposure.
- Credit risk tolerance standards in investments, off-balance-sheet exposures, and interbank exposures.
- Tolerance criteria for rehabilitation and restructuring of impaired loans.
- Credit risk rating methodology.
- Entry-point rating and risk acceptance standards.
- Portfolio analysis methodology and portfolio management techniques.
- Risk-rating and risk-pricing linkage.
- Loan review mechanism.
- Capital allocation for credit risk.
- Organizational structure for credit risk management.

Credit Risk Limits

Credit risk limits specify the extent up to which credit risk can be assumed on credit and investment transactions and in other financial activities. The limits are established mainly in the form of maximum exposure limits and country exposure limits to contain the size of the exposures and avoid undue credit concentration. The exposure limits relate to economic sectors, industrial sectors, a single borrower, and a group of concerns under the control of the same borrower. The bank should establish different types of credit risk limits to keep a check on the total credit business.

The first type of credit risk limits relates to the economic sector-specific limits that specify the maximum amount of exposures that can be made to different sectors like the manufacturing sector, the trade sector, the agricultural sector, the export-import sector, the real estate sector, and the capital market sector. Government policies, economic outlook, business prospects, and regulators' prescriptions determine the amount of sector-wise limits. Besides, default frequencies and risk-adjusted returns on business in different sectors influence the structure of sector-wise limits. The limits are flexible, vary from year to year, and are even reset within the year, if circumstances so warrant. Sometimes, the central banks or the bank supervisors prescribe a minimum percentage of total loans and advances that banks are expected to lend to certain sectors that are classified as priority sectors or to certain categories of people who are identified as economically weak. These limits are the floor limits that banks are required to achieve, even though the lending to priority sectors or poor people carries higher risk.

The second type of credit risk limits relates to the industry-specific limits, which are usually kept in the range of 10 percent to 15 percent of total credit exposure, but the limits can be higher where the types of industries in a country are very limited. For example, where oil exploration and oil refinement constitute the major industrial setup, industry-specific limits may be substantially higher. For core groups of industries like power, telecommunications, road construction, airports, seaports, oil exploration, and refining, which constitute the infrastructure sector of the economy, higher limits can be fixed as the required quantum of loans is usually large. Consequently, credit risk limits for financing industries in the infrastructure sector are usually higher than those fixed for industries in the manufacturing sector. But banks will

have to be conservative in fixing the limits for the infrastructure sector because of additional risk involved in the tenure of loans, which is usually very long. In deciding the structure of industry-specific limits the bank should take into account the term structure of its liabilities to avoid strains on liquidity arising from duration mismatch of assets and liabilities. Where credit limits required by parties are more than the prescribed limits, syndication of loans or participation by other banks is the solution.

The third type of credit risk limits relates to the sensitive sector-specific limits, which consist mainly of real estate and capital market sectors. In designing the structure of sensitive sector risk limits, the bank should be cognizant of the volatility of asset values and fix the limits based on market conditions and past volatility rates. The limits for financing of activities or assets that are market sensitive or where greater uncertainties exist for income generation should be low. The sensitive sector limit should consist of sublimits in respect to the commercial real estate and capital market sectors, and venture capital and the film and entertainment industry. These limits should be flexible and reset more frequently in response to the signals emerging from credit portfolio analysis.

The fourth type of credit risk limits relates to the counterparty exposure limits, that is, single-borrower and group-borrower limits. Usually, the central banks or the bank regulatory authorities prescribe the maximum counterparty exposure and large exposure limits. The maximum single-borrower and group-borrower exposure limits are usually fixed in terms of specific percentages of the total capital funds of a bank. The off-balance-sheet exposures to a single borrower and group-borrower form part of the specified risk limits. Sometimes, marginal relaxations in single-borrower and group-borrower exposure limits are allowed by the regulatory authorities within the defined boundary of credit concentration. Banks find it practically difficult to administer the group-borrower limit due to the absence of a satisfactory definition of group-borrower. The criteria for defining a group-borrower like minimum percentage of equity holding or preparation of consolidated balance sheet or evidence of control by the same management are often misleading due to the lack of transparency in the corporate relationship. It is possible to exercise control over a group of entities by the same management through the setup of dummy entities. For maintaining the sanctity of the group-borrower limit, it is prudent to treat all entities having links between them by way of equity holdings or intercorporate investment, or entities working under an apparently common management with direct or indirect control, as falling within the concept of group-borrower. The bank's goal

to avoid credit concentration in group-borrowers is best achieved in the long run by disregarding the criteria of majority-holding or minority-holding of equity capital so long as signals are visible that a certain group of entities belong to a group-borrower.

The fifth type of credit risk limits relates to the country-specific risk limits. The New Basel Capital Accord does not recognize all sovereigns as risk-free counterparties for calculation of regulatory capital. The New Accord has prescribed risk weights varying from 20 percent to 150 percent for calculation of regulatory capital on exposures to the sovereigns, excluding those that are assigned AAA to AA– ratings. This requirement to assess sovereign risk is noteworthy in that it recognizes the varying degrees of risk on exposures to the sovereign counterparty depending on the rating. There is some difference between sovereign risk and country risk. The former represents risk from exposures to the government and government-owned companies and the latter, the risks from exposures to all counterparties within the country, which obviously includes private parties. But such differentiation is more academic than real, and from a practical angle, total exposure to all counterparties within a country irrespective of their status should be considered for fixing country-specific limits.

Banks will have to follow a two-way process to fix country risk limits. First, it is necessary to classify the countries into various risk grades (insignificant, low, moderate, high, and very high risk grades), and second, to prescribe maximum country exposure limits either in terms of absolute amounts or a percentage of total capital funds. The country exposure limits will vary due to the differences in risk perception as demonstrated by country ratings. Banks may find it difficult to rate countries through internal models as they will not have access to vital data and information about various countries. They should adopt the ratings of reputed international credit rating agencies and group the countries in accordance with these ratings in separate risk grades. The external ratings may be treated as the benchmark, and banks should use additional data collected from internal and external sources to modify country risk where needed, and reset country risk limits as often as warranted by circumstances.

Limits in respect to off-balance-sheet exposures should also form part of the credit limit structure. Banks should recognize the dangers from high off-balance-sheet exposure, maintain a balance between on-balance-sheet and off-balance-sheet exposures, and fix up a reasonable ceiling on the total off-balance-sheet exposure in relation to the total on-balance-sheet exposure. Fixation of an off-

balance-sheet exposure limit depends on several factors, including the frequency and the severity of devolvement of liabilities from these exposures in the past.

Large Exposure Limit

“Large exposure” is a relative concept in credit administration, and the definition varies between banks and bank regulatory authorities. Large exposure is usually defined in relation to the capital funds, but conservative banks define an exposure as large when the amount of exposure exceeds a specified sum irrespective of the size of the capital funds. Consequently, some banks recognize an exposure exceeding, say, U.S. $10 million as large, and other banks define an exposure exceeding, say, U.S. $50 million as large. The amount has a direct relation to the exposure size distribution of loans and advances and the risk-bearing capacity of the bank. Conservative banks may consider the aggregate exposure to any counterparty as a large exposure if it constitutes 8 percent to 10 percent of the total capital funds and classify an exposure as “very large or significantly large” if the amount exceeds the specified percentage of capital funds. In order to contain credit risk, the regulators usually place a cap on the aggregate of large exposures in terms of a multiple of capital funds. The credit risk limit framework should include a satisfactory definition of large exposure and a ceiling on the total of large exposures.

Adoption of a rigid definition of large exposure based on a fixed percentage of capital funds disregarding other criteria may sometimes land the bank in serious trouble, if the absolute amount is too large. A flexible definition of large exposure based on varying risk perception (owing to variation in risk characteristics) is more meaningful for controlling credit risk. The constitution of counterparties can be recognized as a factor to determine the size of the large exposure. Moderate exposures to individuals or proprietary or partnership concerns can be classified as large exposure, while for the limited liability companies the exposure size can be significant to be counted as large exposure. Similarly, the risk grade assigned to a borrower can be considered as another criterion for defining large exposure. For example, the medium-size exposure to a high-risk borrower can be classified as large exposure. A risk-sensitive bank should treat the single-borrower, group-borrower, and large exposure limits established in response to the regulatory prescriptions as the outer limits and operate within lower limits.

The identification of large exposure serves two basic requirements of good credit risk management. First, large exposures are subjected to rigorous and intensive follow-up by the credit risk monitoring officials of the bank, which

reduces the chances of default, and second, the number and the total amount of large exposures in the total credit portfolio serve as indicators of the severity of credit risk the bank faces. If the credit portfolio consists of a few exposures of very large size, it carries much more risks than the aggregate of risks from a good number of relatively moderate-size exposures. A genuine concern of bank regulatory authorities is the preponderance of large exposures in the credit portfolios of banks. If the structure of the credit portfolio of a bank is such that a substantial portion of total credit exposure is confined to a few large parties, the position is unacceptable to the bank regulator/supervisor, particularly if the bank is systemically significant in the financial architecture of that country.

13.8 EARLY WARNING SIGNAL INDICATORS

Early warning signals refer to the adverse features that develop in borrowers' business and accounts that have the potential to lead to credit default. The warning signals are not visible in the normal course, and a diagnostic procedure has to be followed to detect the weaknesses in the financial condition of the borrowers. Detection of early warning signals for initiation of remedial action before the loan accounts turn bad is an integral part of the credit risk management system. Various practices and procedures exist for detection of early warning signals, but banks depend primarily on the structure of the credit portfolio and the clientele-wise and exposure size–wise distribution of credit to establish appropriate systems. There are at least two sets of early warning signals that matter. One set relates to the signals that emerge from counterparty exposure analysis on a stand-alone basis and the other set to the adverse features that emerge from portfolio analysis.

Warning signals are derived from an analysis of operations in the borrowers' ledger accounts, the balance sheet and other financial parameters, and the business trend including threats to business. The easiest way to identify weaknesses in borrowers' loan accounts is to analyze the history of the accounts with a focus on the unsatisfactory features. Noncompliance with the terms of credit sanction, noncompletion of documentation requirements, nonadherence to the bank's postdisbursement financial discipline, issuing checks to third parties without funds in the accounts, committing defaults in payment of discounted trade bills on the due dates and in settling liabilities that have devolved on the

bank from off-balance-sheet exposures are examples of unsatisfactory features. Poor operations in the overdraft or short-term renewable accounts of the borrowers, which show sticky tendencies, are symptoms of near default conditions. The identification of these impaired loan accounts offers early scope for rehabilitation and revival of the borrowers' business units. But exclusive dependence on the analysis of ledger accounts as a tool for detection of early warning signals is not likely to lead to success in many cases, as defaulting borrowers have tendencies to camouflage their accounts through fictitious entries. It is necessary to consider other financial and nonfinancial factors.

The bank should undertake credit quality assessment from four angles to detect warning signals from weakening credit portfolios or subportfolios:

1. Rating migration analysis of borrowers constituting the portfolio.

2. Examination of accounts turning bad too soon after funds disbursement.

3. Evaluation of incidences of defaults.

4. Assessment of variations in the estimated credit losses over the previous periods.

Significant rating downgrades of borrowers, noticeable increase in the number of loan defaults, and rapid erosion in the market value of collateral are some of the warning signals that call for more detailed analysis at the microlevel for modification of loan entry standards and loan exit policies.

A few credit risk models exist that predict business failure or risk of insolvency or bankruptcy of corporations. The models identify the list of counterparties that are likely to go bankrupt soon or commit default on debt servicing obligations. The preparation of the list of borrowing firms that are likely to default is only the beginning of the warning signal detection exercise. The real work lies in undertaking microanalysis of the borrowers' business affairs and identifying the maladies displayed by the weakened financial ratios and other nonfinancial factors, and initiating remedial action to prevent the slippage of the borrowers' accounts into the default stage.

The bank should apply both financial and nonfinancial criteria to detect warning signals at the early stage. It needs to maintain a minimum set of parameters that should serve as the benchmark for comparison. Not only strong correlation exists between credit risk and economic factors, but it also exists between credit risk and market risk–related factors, as the volatility of market variables (interest rate, stock price, and exchange parity rate) increases credit risk through a decline in asset values. The bank should be cognizant of these

relationships in preparing the list of financial parameters for comparison. It is an understatement to say that only financial parameters impact the credit quality of counterparties, because banks have ample evidence to show cases where defaults in borrowers' accounts occurred due to nonfinancial factors, though financial ratios were found to be sound.

Illustrative examples of financial and nonfinancial parameters that a bank needs to examine for detection of early warning signals is given in Table 13.1.

TABLE 13.1 Early Warning Signal Indicators

Parameter	Attribute	Trigger Point for Remedial Action
Nonfinancial	Contingent liabilities shown in balance sheet.	Lack of clarity. Inadequate disclosure. Inadequate provision.
	Diversion of funds evident from balance sheet.	Misuse of credit limit. Diversion of funds to associate concerns. Diversion for other purposes.
	Auditor's qualification of balance sheet.	Material observation by external auditors. Auditors' qualifications impair basic accounting practices and alter values of balance sheet items.
	Multiple borrowings by the company.	Borrowings from several banks without justification. Lack of transparency in borrowings.
	Managerial ineffectiveness	Lack of cohesion between board members. Dissension among board members/partners. Market gossip about management.
	Change of management in the company.	Technical knowledge and business experience of new management not known. Visible lack of integrity and competency. Commitment of new management below expectations.
	Growth potential of industry financed by the bank.	Growth rate of industry declining. Demand for products falling down. Change in government policy.
Financial	Percentage of inventories and receivables to net sales.	Increasing trend. Percentage currently exceeding 33.
	Ratio of total outside liabilities to tangible net worth.	Increasing trend. Ratio currently exceeds 3.
	Return on capital employed (ROCE).	Declining trend. ROCE currently below industry average.
	Ratio of current assets to current liabilities (current ratio).	Declining trend. Current ratio currently less than 1.33.

	Asset coverage ratio (book value of total assets excluding intangible assets minus total current liabilities and short-term debt obligations) to the total outstanding term debt.	Declining trend. Ratio currently less than 2.
	Average equity price (last 52 weeks' average).	Declining trend. Currently market value significantly less than last 1-year average.
	Debt-service coverage ratio (DSCR).	Under strain. DSCR currently around 1.5.
	Ratio of operating profit before interest, taxes, and depreciation to net sales.	Declining trend. Ratio currently 10% or less.
	Servicing of principal and interest on bank loans.	Trend of delayed settlements in recent past. Delays exceed 2 weeks.
	Invocation of guarantees/ letters of credit.	Incidences of devolvement of liabilities more than expected. Reasons for invocation suggestive of incompetence and bad management. Delays/difficulties in clearing dues after devolvement.
	Earning stability.	Swings in earnings. Low return on assets.

Financial parameters specified in Table 13.1 are based on average benchmarks applicable to loan sanctions. For example, a minimum current ratio of 1.33 and a debt service coverage ratio of more than 1.5 are the minimum standards the bank expects the borrowers to maintain at all times as long as the relationship continues. When the financial ratios fall below the benchmarks, or the borrower's ledger accounts start showing sticky tendencies, or adverse developments start emerging in the borrower's operating environment, the warning signals have begun to surface and the remedial action should commence.

Identification of warning signals is a continuous process and part of the credit quality monitoring exercise. From a cost point of view, there is no need for a separate administrative setup to handle the early warning signal detection function. The function can be performed within the three-tier administrative setup that banks usually have, the branch office, the controlling (regional) office, and the head office. The branch office is primarily responsible for analysis of borrowers' accounts and initiation of the warning signal detection exercise during the biannual and annual review and renewal exercise. The corporate office monitors large exposures or significant exposures, the regional office the medium-size exposures, and the branch offices relatively smaller loans and advances to detect warning signals. Besides application of financial and nonfinancial parameters, banks can use suitable credit risk models developed by outside agencies to identify large borrowing entities that are in distress and are

likely to default on repayment obligations soon.

13.9 CREDIT AUDIT MECHANISM

Objectives and Functions

A credit audit is primarily concerned with the hindsight review of new loan sanctions within a reasonable time from the date of sanction. The main objective of a credit audit is to make an independent review of the quality of new credit assets with reference to the checks and balances put in place by the bank. The review team checks the accuracy of the risk grade assigned to the borrowing entity, examines the quality of the due diligence process, verifies whether the entry point standards have been observed for granting sanctions and documentation formalities completed before disbursement of funds, and whether postdisbursement supervision procedures are being followed by the branch office to protect the bank's interests. The review is carried out with the intent of picking up early warning signals and making recommendations for corrective action. The review should be undertaken within a period of three to six months, and the earlier the review takes place, the more significant is the achievement of the credit audit function. The scope and functions of a credit audit differ between banks due to the differences in the volume and composition of the loan portfolio.

The credit audit generally covers new credit sanctions above cut-off limits that vary from bank to bank due to the difference in the volume of total credit. But the credit audit function can be extended to cover existing accounts on a selective basis, more importantly those revolving credits of large amounts that become due for renewal at prescribed intervals. The focus of a credit audit should be on large new loans, but it can also cover medium and large old exposures chosen at random that are continuing in the books of the bank. The objective is to cover through quick audit at least 20 percent to 25 percent of the total number of medium and large exposures every year.

Organizational Status

The credit audit mechanism should meet at least four basic requirements:

1. It should achieve purposeful scrutiny of large and medium size new credits soon after sanctions.

2. It should have different focuses of audit and thus avoid duplication of the audit function.

3. It should ensure that the credit audit team is unconnected with the processing and sanction of loans selected for audit.

4. It should ensure that the credit audit team consists of personnel who have a credit processing and credit management background.

The status of the credit audit setup within the organization should be in keeping with its critical role. Banks have a credit department, risk management department, inspection or internal audit department, and sometimes a separate credit monitoring department. Monitoring of accounts is the function of the credit department or the credit monitoring department. A separate setup of the credit audit function is often considered redundant, and consequently, the function is given secondary importance, both in terms of staff adequacy and staff capability. But the credit audit is crucial for containing credit risk in large exposures. The requirement should be met by establishing a separate credit audit cell or department and linking it with the risk management department or the credit monitoring department. Credit audit setup cannot be a part of the credit department as that may give rise to conflicts of interest, nor should it be a part of the inspection or audit departments as it will lose its identity and focus. This will affect the quality and the purpose of special review. The function of the credit audit department will include documentation of audit findings, processing of audit reports, and monitoring of corrective actions taken by the relevant departments. Periodical reporting on the credit audit function to the top management and the board of directors is also one of the functions of the credit audit department.

The internal audit department of banks undertakes regular audits of branch offices and management audits of controlling offices and the head office at periodic intervals. Banks usually follow a discriminating cycle for audit of branch offices. The internal audit team scrutinizes all loans and advances during the audit as part of their routine job. The coverage and focus of the credit audit are different from those of the regular internal audit. The former makes a quick

review of new credit sanctions, particularly of large and medium exposures, from the angle of quality of processing, soundness of decision, and appropriateness of the terms of sanction. This way, the overlapping of functions between the credit audit and the regular internal audit is avoided. But the credit audit unit can also function as a separate setup parallel to the regular audit department for limited audit of large exposures, which were sanctioned in the past but are still live, on a sampling or selective basis. The duplication of functions between the credit audit and regular audit, if old (existing) revolving credits are brought within the purview of the credit audit, is tolerable to a limited extent as a part of the checks and balances mechanism. The internal audit team usually focuses its attention on the deficiencies in credit administration and irregularities that occurred between two cycles of audit, while the credit audit team can have a quick review of the quality of revolving and renewable credits. This minor overlapping of roles may enhance the credibility of the checks and balances mechanism.

13.10 CREDIT RISK MITIGATION TECHNIQUES

Credit risk mitigation techniques are part of the whole credit risk management process. The main objective of credit risk mitigation is to eliminate or reduce the magnitude of actual loss in the event of default, besides minimizing the chances of default on credit exposures to the extent possible. There are a few ways through which credit risks are mitigated, but three methods are more common. These methods are:

1. Traditional method.
2. Credit enhancement method.
3. Credit derivatives method.

Traditional Method

The traditional method of credit risk mitigation refers to the tightening of credit administration through vigorous implementation of internal rules and procedures. The credit administration process consists of credit sanction, disbursement, supervision, and recovery. Banks have standardized rules and procedures for each of these credit management activities, which need to be scrupulously followed to ensure that credit exposures remain healthy. If any of these activities is not diligently carried out, credit defaults will increase and larger credit losses will occur when the risk materializes. An analytical study of nonperforming loan accounts and an examination of problem exposures will reveal the weaknesses in the credit administration system and the causes for higher incidences of defaults. The conclusions emerging from the analysis will indicate the kind of remedial action required for risk mitigation. It may be necessary to strengthen the loan appraisal procedure, raise the standards of loan eligibility, tighten the loan disbursement procedure to prevent misuse of funds, track the financials of the borrower and monitor the operation in its loan accounts more intensely, and accelerate the recovery process in case of default. These traditional methods of credit risk mitigation are often not given due importance. The bank management draws comfort from the internal audit mechanism and believes that the shortcomings in the credit administration system are rectified through implementation of the internal audit recommendations. But often the internal audit system is found wanting in this regard, as its focus is on detection of irregularities and not on the deficiencies in the systems and procedures that need to be frequently reviewed and modified. Banks hardly try to find out the gaps in the credit administration process by engaging consultants in order to strengthen the systems and procedures and usually look out for other options to mitigate credit risk. Strengthening the credit administration process is like repairing the holes in the system in time to avoid having recourse to more difficult options that may be expensive in the long run.

Credit Enhancement Method

Credit enhancement takes place in different forms and reduces the credit risk associated with a particular transaction or a set of transactions. A few credit enhancement options are available, but banks should choose the appropriate option keeping in view the kind of response needed under the emerging circumstances. The risk mitigation response can be in relation to a particular customer or a particular type of exposure or a pool of homogeneous assets. Credit enhancement can be achieved through the following means:

1. Loan collateralization.
2. Loan guarantees.
3. Loan syndication or loan participation.
4. Loan insurance.
5. Loan securitization.

In the first place, credit risk can be mitigated through additional collateralization of an existing credit exposure. Credit risk of banks, particularly risks from large and medium exposures that are already supported by collateral, increases when the market values of collateral decline. Consequently, the extent of margin specified at the time of loan sanction decreases, and banks try to contain the increasing risk by revaluing the collateral and increasing the margin money on loans. When market conditions become volatile and values of collateral significantly fluctuate, banks can mitigate risk from the existing exposures through procurement of additional collateral belonging to the borrower, such as mortgage of property or assignment of marketable financial instruments.

Second, credit risk on exposures can be mitigated by obtaining financial guarantees of third parties if there is an apprehension that the credit quality is likely to deteriorate. The financial guarantee can be executed by a corporation, a bank, or a private party. The bank can insist that the directors of a corporation provide financial guarantees in their individual capacity to cover credit facilities sanctioned to the company, or seek the guarantee of the parent company to cover facilities provided to its associate concerns, or a guarantee from the partners of a partnership firm, or even personal guarantees of individual borrowers.

Third, banks can resort to loan syndication or loan participation for credit risk mitigation in a significant way. A group of banks and financial institutions can join together to provide credit facilities to a single borrower or borrower-group.

Where the exposures are very large and for a long duration, like a loan for a big infrastructure project, credit risk can be mitigated through loan participation. In the case of new loans, other banks or credit institutions can be invited by the sponsor institution or the lead bank to take a share through mutual consent. In such situations, the risks from the large exposures are divided between the participating institutions. In respect to large exposures already existing in the books of the bank, other credit institutions can be approached to take a share. The loan syndication or the loan participation method is particularly significant in the case of very large-value exposure, where the quantum of loss, if the default materializes, can be very high in relation to the annual income or the capital of a bank. Loan sharing becomes obligatory if the amount is too large and exceeds the counterparty limit or large exposure limit prescribed by the bank supervisor.

Fourth, credit risk can be mitigated by obtaining insurance on loans from the insurance companies, which will compensate the bank in the event of default by the borrower. This form of risk mitigation is not common, since many countries do not have insurance companies to provide insurance coverage for bank loans. In certain countries where banks are unwilling to make loans to certain sectors like the agricultural sector and small and tiny industries sector because of high risk, a credit insurance corporation or credit guarantee corporation has been set up in the public sector to provide insurance for small loans, though for limited amounts. Nonetheless, the access to a public sector organization providing a credit insurance facility even up to a limited extent is an additional source of credit risk mitigation.

Fifth, credit risk can be mitigated through securitization of a pool of assets. Asset securitization is meaningful only if a bank has a reasonable volume of similar loans that have homogenous characteristics and can be pooled together to form an asset class. For example, car loans, housing loans, real estate loans, credit card receivables, and so on can be clubbed together to form different asset classes for securitization. But all types of securitization do not result in risk mitigation. The asset securitization procedure should be such that the credit risk on the underlying pool of exposures is transferred in whole or in part to a third party, which is usually a special-purpose vehicle or an entity specifically set up for securitization purpose. When credit exposures of the originating bank are legally transferred to the special-purpose vehicle or the specified entity in exchange for cash or securities without future recourse to it, which results in the transfer of credit risk, the risk mitigation objective is achieved.

Another simple form of credit risk mitigation is to ask the borrowers to provide a cash margin or maintain deposit accounts. There should be written agreements between the borrower and the bank for adjustment of deposits held by it against the dues of the former. Usually, banks are given protection through legal enactments for netting of deposits against the outstanding dues of the customers.

Credit Derivatives Method

The third method for credit risk mitigation is to hedge the risk with the help of derivative instruments. A derivative is a financial instrument that has no independent value of its own and derives value from an underlying asset. Derivatives can be devised with reference to any underlying asset to provide protection against the risk of volatility in price or erosion in the value of an asset or against the total loss of value. Financial engineers can design different types of derivative products to hedge the risk associated with different types of transactions. For credit risk mitigation, banks shall have recourse to credit derivatives to transfer the risk on credit exposure to another party. Credit derivatives can take a few forms and can be synthetically designed to transfer or even eliminate the risk on credit exposures, but their basic structure is confined to three broad types.

The first type of credit derivative is the credit default swap, which is designed to protect the lender from the loss of value on the credit exposure due to the occurrence of any type of credit event. A credit default swap is a derivative contract under which one party agrees to make a specific payment if a negative credit event like a downgrade in rating or default in repayment takes place, or if the counterparty seeks bankruptcy protection or negotiates for restructuring of the debt, in exchange for receiving a premium or a stream of payments at periodic intervals for the specified life of the agreement, For example, two banks enter into an agreement under which the first bank agrees to make periodic payments of a fixed sum during the life of the agreement to the other bank, which makes no payment unless a specified credit event occurs. If any credit event occurs, the second bank makes payment of the agreed sum to the first bank, and with that payment, the credit default swap comes to an end. The size of the premium is determined with reference to the probability of occurrence of a negative event and the expected market value of the reference asset if the negative credit event takes place. But banks will have to assess the financial strength of the credit default swap sellers and their corporate governance and risk management practices, because they may fail to meet their liabilities under the contract, as happened to systemically large financial institutions during the U.S. financial crisis.

The other type of credit derivative is credit return swap, which provides protection against the loss of income on account of declining credit spreads. A

credit return swap is beneficial under circumstances when the credit spreads on loans or corporate bonds are becoming thinner or, in general, the interest rate is declining. Suppose a bank wants to hedge its interest income on a credit exposure against an assessment that the interest rates on lending are going to fall. The bank will then enter into a swap deal with another counterparty to pay the ruling market interest rate (which is tied to a benchmark rate like LIBOR) on a notional amount at a six-monthly interval against the receipt of a fixed yield for the life of the loan. If the lending rate falls, the bank will protect its interest income. Likewise, there can be a total return swap under which a bank may swap periodic payments on an underlying asset that includes interest payment usually at a floating rate and appreciation in asset value, if any, to be made to another bank over the life of the agreement in return for a total return on the asset that includes interest payments at the benchmark rate plus credit spread and the loss in the value of the asset, if any. The difference between a credit default swap and a total return swap is that, while the former provides protection against the loss on the occurrence of a credit event, the latter provides protection against the loss of value irrespective of the cause. Besides, in a total return swap the interest rate risk is also transferred.

The third type of credit derivative is the creation of credit-linked notes with the base being an individual asset or a pool of assets. In this type of derivative product, the risk on credit exposure is shifted to the investors on the notes who agree to accept a reduced value of the principal amount due on the notes in exchange for a higher yield, if a negative credit event takes place before the maturity date.

Credit derivatives can be widely used as risk mitigation tools if a vibrant credit derivative market exists and there are many buyers and sellers of credit derivative products. Where there are limited numbers of players, all types of credit derivatives for specified notional amounts and periods may not be available or if available, the terms may be expensive. Besides, banks will have to be cautious in selecting counterparties for buying derivative products to hedge credit risk since the latter may fail to honor commitments on schedule under the contracts.

13.11 SUMMARY

Credit risk management is concerned with treatment of risk from credit exposures before default and not with management of problem loans or unpaid

loans. The focus of credit risk management is on minimization of loan defaults and loan loss to the bank. Laxity in credit management increases credit risk and the incidence of credit defaults.

Credit risk exists in banking and trading books and arises from multiple sources as compared to market risk. A credit risk management approach should recognize problems emerging from a multiplicity of personnel handling credit and a multiplicity of operating points at which credits are granted.

Specification of credit granting procedures, standardization of terms and conditions for credit sanction, independent review of credit exposures, prescription of entry-point criteria, establishment of maximum exposure limits and tenure-wise exposure norms, and appropriate demarcation of credit administration responsibilities form the nucleus of the credit risk management process.

The creditworthiness of borrowers should be independently assessed irrespective of the rating grades assigned to them, since a low-risk rating is not a guarantee for return of credit. Related party lending proposals should be subjected to due diligence as applicable to loan proposals of unrelated parties.

Implementation is the most vulnerable area of credit administration since aberrations take place during implementation. “Know Your Customer” principles should be observed in all cases for establishing credit relationships.

The organizational structure for credit risk management should recognize the distinction between credit administration and credit risk management functions to avoid conflicts of interest, but it should achieve coordination among the credit risk, market risk, and operational risk management functions as a part of the integrated risk management process.

Articulation of the credit risk vision and formulation of the credit risk policy and loan policy are the primary strategies for credit risk management. Credit risk vision and credit risk policy guide the field officials to build up a balanced loan book from a risk mitigation angle.

Banks should establish sector-wise credit limits, counterparty exposure limits, country limits, off-balance-sheet exposure limits, and large-exposure limits to manage credit risks. They should devise an effective warning signal detection mechanism to identify incipient sickness developing in borrowers’ business units and accounts at early stage for remedial action.

Banks should establish the credit audit function to make an independent review of the quality of new credit assets soon after sanction.

Banks should choose appropriate options to mitigate credit risk in accordance with emerging circumstances. They should strengthen credit administration procedures to reduce chances of default, and take recourse to credit enhancement and credit derivatives to mitigate, transfer, or even eliminate credit risk.

NOTE

1. “Principles for the Management of Credit Risk,” BCBS, September 2000. Readers may refer to the original document for details.

CHAPTER 14

Credit Portfolio Review Methodology

14.1 PORTFOLIO CLASSIFICATION

Portfolio management is concerned with both investment and credit portfolios. The investment portfolio consists of a few subportfolios, such as the sovereign security portfolio, corporate bond portfolio, equity investment portfolio, mutual funds portfolio, and so on. Management of the investment portfolio is concerned with the protection of investment values against the volatility of market variables. Credit portfolio management deals with the evaluation of each portfolio at periodic intervals to judge the quality of assets held in the portfolio and protect them from losing values through appropriate corrective action in time. For managing the credit portfolio, banks may divide its total credit assets into different portfolios or subportfolios

Banks may decide the composition of portfolios keeping in view the nature and the distribution of its loans and advances. They may classify total credit exposure into purpose-wise, sector-wise, borrower-type-wise, or even product-wise portfolios. It is, however, advantageous to classify large credits into sector-wise portfolios, like infrastructure sector, manufacturing sector, trade sector, and real estate sector portfolios, and relatively medium-and small-size credits into retail portfolios, like residential housing loan portfolio, auto loan portfolio, personal loan portfolio, education loan portfolio, and credit card portfolio. Retail portfolio management is relatively easier due to the simplicity of the facility structure that consists of one or two loan products, the homogeneity of retail borrowers, who are mostly individuals, and the smallness of the size of loans. Corporate credit portfolio management is more complex due to the complexity of facility structure and the lack of size-wise, purpose-wise, and tenure-wise similarity of loans granted to them. It is difficult to group corporate loans into convenient lots for portfolio analysis based on the homogeneity of characteristics, and therefore, the bank has to admit heterogeneity of borrower characteristics and facility characteristics in managing corporate loan portfolios.

14.2 PORTFOLIO MANAGEMENT OBJECTIVES

The primary objective of credit portfolio management is to detect in time the deterioration in portfolio quality and avoid undue concentration of exposures in the portfolio that may contain hidden and large credit risk. The objective is to build up a broad-based credit portfolio through rational distribution of credits among a large spectrum of customers. Credit portfolio analysis enables banks to develop balanced portfolios and contain overall credit risk by redirecting credit to relatively less risky and more gainful business lines. The conclusions emerging from portfolio analysis help the bank to determine the future strategies for credit growth. Through regular portfolio analysis the bank can identify credit subportfolios that are likely to worsen in quality.

Portfolio review objectives and portfolio analysis implications are narrated in Table 14.1.

TABLE 14.1 Portfolio Review Analysis

Objectives and Implications	
Portfolio Review Objectives	**Portfolio Analysis Implications**
Track migration of credit assets down the ladder in the chosen portfolio.	Migration analysis shows whether the risk grades assigned to borrowers in a particular portfolio are deteriorating at an unusual rate. Conclusions help the bank to modify loan sanction standards and loan exit norms.
Optimize benefits from diversification of loan portfolio.	Evaluation of portfolios shows which are the most adversely affected and which are the most gainful business lines. Conclusions enable the bank to diversify its business and optimize returns.
Reduce potential adverse impact of loan concentration.	Analysis shows which portfolio is having concentration that is likely to be adversely affected soon. It helps the bank to reduce concentration in that portfolio in time.
Adopt appropriate strategies for future build-up of credit portfolio.	The conclusions enable the bank to choose strategies for development of incremental business, keeping in view the emerging concerns.
Adopt flexibility in risk management policies.	Analysis helps the bank to identify the risk factors including market risk factors (capital market, money market, interest rate and exchange rate volatilities) that are generating greater incidences of loan defaults. This helps the bank to modify its risk management policies and strategies.
Achieve appropriate risk-grade-wise distribution of exposures in the portfolio to contain the magnitude and the quantum of credit risk.	Evaluation of each portfolio in terms of risk-grade-wise distribution of borrowers indicates the overall quality of the portfolio. If portfolio analysis reveals preponderance of high and very high-risk borrowers, the bank can modify the portfolio composition in phases to bring down the overall credit risk.
Measure performance of portfolios in terms of risk-adjusted returns.	Evaluating the portfolios from risk-return angle reveals the performance and efficiency of each portfolio. Conclusions help the bank to choose better options for incremental business without pressure on additional capital.

14.3 PORTFOLIO MANAGEMENT ISSUES

The bank should examine the portfolios from two angles. First, the bank should evaluate the change in portfolio quality through rating migration analysis, and second, assess the change in the portfolio health through study of variations in potential losses over a period of time. The bank may address the following issues to set up an effective portfolio management mechanism:

1. What shall be the criteria for deciding the composition of portfolios if it has a wide variety of loans and advances, clientele-wise, purpose-wise, and tenure-wise?

2. How should the necessary data on counterparty rating, probability of default, loss rate given default, and exposure at default be generated, if there are large numbers of borrowers and large numbers of small loans for a variety of purposes?

3. What methodology should be adopted to achieve greater objectivity in portfolio evaluation since the data on counterparty correlation and volatility of asset prices are usually not available? These data are most often not reliable also.

4. What should be the norms for measurement of concentration in portfolios?

The first issue relates to the selection of criteria for deciding the portfolio composition. The commercial banks' loans and advances are widely distributed among numerous clients, and their credit portfolio consists of a large number of revolving credits and term loans. Besides, within the broad manufacturing sector portfolio, there are subportfolios like steel sector, cement sector, chemicals sector, power sector, and petroleum sector portfolios. The bank has to consider whether it should evaluate the manufacturing sector portfolio as a whole or evaluate subportfolios. The first option is better because of similarities in borrower and facility characteristics between different subsectors and the evaluation parameters that will be applied may not materially vary between them. But the small and medium enterprises sector consists of thousands of credit exposures of heterogeneous nature; agricultural and allied agricultural sectors consist of huge numbers of loans for diverse purposes; and the personal loan sector comprises loans for residential housing, purchase of cars and consumer durables, equity share acquisition, higher education, and so on. In such situations, it is inappropriate to form broad portfolios by clubbing together a few subportfolios because of the lack of homogeneity in borrower characteristics and facility characteristics. It is better to form subportfolios like housing loan

portfolio, car loan portfolio, consumer durables loan portfolio, agricultural loan portfolio, small industries portfolio, and evaluate them separately. But certain constraints arise in applying portfolio analysis techniques to these subportfolios, because the individual ratings of all borrowers in subportfolios will not be available to study the rating migration nor the risk-grade-wise data on probability of default, loss rate given default, and exposure at default to estimate potential losses and calculate risk-adjusted returns on subportfolios. It is difficult for the bank to compile these data on an individual borrower basis, because of the multiplicity of borrowers and huge number of small loans involved in the process. The bank can compile data on ratings and risk components (probability of default, PD; loss given default, LGD; and exposure at default, EAD) on an average basis for each subportfolio on a random sampling basis.

Eventually, the bank may classify credit portfolios into two categories—broad portfolios like infrastructure sector portfolio, manufacturing sector portfolio, trade sector portfolio, export sector portfolio, and relatively smaller portfolios in the retail sector. In respect to broad credit portfolios, the bank should build up borrower-wise rating data and risk-grade-wise data on probability of default, loss rate given default, and exposure at default, and study risk migration and variations in the quantum of potential losses associated with the portfolios over a period of time to assess the change in the portfolio quality. In evaluating the retail sector portfolios, the bank may compile the risk rating of a good number of individual borrowers in each group on a random sample basis to assess the overall quality of the subportfolio and the changes in quality over a period of time. The bank can construct the risk-grade-wise distribution of retail sector subportfolios based on risk rating and risk component (PD, LGD, and EAD) data pertaining to samples of borrowers comprising the portfolio and estimate the potential losses on the basis of average values. The average of the risk component data should be applied for evaluation of a particular subportfolio representing a homogeneous borrower-group, like borrowers in the residential housing sector.

The second issue relates to the selection of the method for estimating counterparty correlation and volatility of asset prices. Correlation between two counterparties refers to the degree of impact on one counterparty when adverse conditions affect the other. Eventually, both of them may default on their obligations to the bank simultaneously. Let us assume that there are two large corporations, one in the steel sector and the other in the automobile and automobile ancillary sectors, promoted by two separate industrial groups.

Suppose there is a huge fall in the demand for automobile products due to substantial increase in oil prices. This will simultaneously reduce the demand for steel products and consequently, the production and income generation in both these industries will decline, and both the counterparties are likely to default on their loan obligations. The increase in oil prices has adversely affected both the two corporations simultaneously due to the correlation between the two industries, though they are owned by separate and unrelated industrial groups. The resultant effect is the concurrent deterioration in the quality of the steel sector and the automobile sector credit portfolios owing to the increase in oil prices. Despite diversification of the loan portfolio to avoid concentration, the correlation between the two segments of the manufacturing sector affects the performance level and the portfolio quality simultaneously. High correlation between the borrowers impairs the portfolio quality faster.

Reliable data on counterparty correlation and portfolio correlation are usually not available. If there are specialized institutions or government agencies that publish data on correlation between industrial sectors and portfolios, banks can use such data for portfolio evaluation. There is no simple methodology for estimating credit correlation. Efforts have been made to estimate correlation between defaults and bond market spreads in the developed financial markets and utilize the results for establishing correlation between counterparties in a given portfolio. This approach may not be feasible in most of the cases, since reliable data on bond ratings and corporate bond market spreads are available to a very limited extent. The bank can, however, internally estimate credit correlation data through assessment of the impact on the counterparties from adverse changes in macroeconomic factors. The stress tests of the debt-servicing capacity of individual borrowers belonging to different portfolios can be conducted under different macroeconomic scenarios and the resultant impact mapped to estimate correlation between counterparties and portfolios.

The third issue is about the standardization of norms for measurement of portfolio concentration. Some banks have developed special expertise over a period of time and designed special products to provide loans in selected business lines. They want to leverage this expertise and create a niche market for their products, and build up a large portfolio in a particular business line. If the expected default frequency of a portfolio is small and the risk-adjusted return is relatively high, even a large portfolio cannot be considered unsafe from the credit concentration angle. Nevertheless, such a large portfolio is subject to risk that may arise from changes in economic factors such as economic slowdown or

unfavorable changes in government economic policies. Conservative banks whose risk appetite is moderate may set up lower limits for defining loan concentration. If the aggregate of exposures in a particular portfolio exceeds 15 percent of total credit, they may classify that portfolio in the category of moderate concentration. Banks with high risk appetite and having expertise in providing special types of loans at competitive terms may prescribe a higher ratio for classifying credit concentration. Banks should set up an acceptable definition of loan concentration, taking into account their strengths and weaknesses, and after assessing the opportunities and the threats. The total exposure ceiling of a portfolio need not be too low, as working at a level below the optimum may result in customer loss, business loss, and profit loss. At the same time, too much leveraging of expertise to build up concentration in the chosen business line is fraught with high risk.

14.4 PORTFOLIO ANALYSIS TECHNIQUE

The methodology for undertaking portfolio analysis is suggested in the following section.

Mapping Rating Migration

The first step for portfolio analysis is to assess the impact of rating migration of the borrowers on the portfolio. The bank may choose a particular portfolio, assign a risk grade to each borrower in the portfolio using its internal risk rating model, and work out the percentages of exposures in each risk grade to the total credit outstanding in the portfolio for three or four successive quarters or half-years. The percentages of credit exposures in each risk grade (AAA, AA, … BBB, BB, C, etc.) over the review period are tabulated and compared to determine the extent of deterioration in credit quality in that portfolio. The comparison will reveal the shift in the portfolio quality in terms of borrower rating migration (say, 3 percent of borrowers migrating to risk grade BBB from risk grade AA) and change in risk-grade-wise exposure (say, the quantum of exposures held in risk grade AAA falling from 15 percent to 13 percent). The change in risk-grade-wise exposure will indicate whether the portfolio quality has improved or deteriorated over the review period. If there is a decline in percentage of exposures, particularly in low-risk grades, the bank has to identify borrowers' accounts that have slipped to higher risk grades and critically

examine the reasons for migration (decline in quality). Whether the portfolio reviews should be undertaken quarterly or half-yearly will depend on the portfolio size and the change in the quality of exposures as revealed from previous analyses.

Illustration of rating migration of borrowers in a portfolio is given in Table 14.2.

TABLE 14.2 Manufacturing Sector Portfolio

Portfolio Review Analysis
Risk-Grade-Wise Break-up of Credit Portfolio
(Including new sanctions over the review period)
Rating Migration of Borrowers in the Portfolio
Amount (Amt) in Millions of U.S. $

End of Quarter 1			End of Quarter 2			End of Quarter 3		
Risk Grade	Amt	%	Risk Grade	Amt	%	Risk Grade	Amt	%
AAA	1,000	20	AAA	1,100	18.4	AAA	1,050	13.1
AA	1,500	30	AA	1,650	27.5	AA	2,000	25.0
A	1,000	20	A	1,250	20.8	A	1,600	20.0
BBB	750	15	BBB	1,000	16.7	BBB	2,000	25.0
BB	400	8	BB	450	7.5	BB	550	6.9
B	200	4	B	350	5.8	B	400	5.0
C	100	2	C	130	2.2	C	250	3.1
D (default)	50	1	D	70	1.1	D	150	1.9
Total	5,000	100	Total	6,000	100	Total	8,000	100

(The amount of exposure in a risk grade represents the total of exposures to each individual borrower, rated and placed in that risk grade.)

Note that loans and advances in risk grades AAA (very low risk) and AA (marginal risk) within the portfolio have come down from a total of 50 percent to 38.1 percent of total exposure from the end of quarter 1 to the end of quarter 3, and those in risk grade A (low risk) have remained around 20 percent over the review period. The borrower-wise scrutiny of the portfolio will reveal that some of the borrowers rated in risk grades AAA at the end of quarter 1 have migrated to higher risk grades to AA, A, BB, … C (downgraded) at the end of quarter 3, and some other borrowers have migrated from higher to lower risk grades, from A to AA, AA to AAA (upgraded). There will be movement in the borrower ratings in both directions, from lower to higher risk grades and vice versa. Table 14.2 reveals that the overall credit quality of the portfolio has deteriorated over a period of six months (from the end of the first quarter to the end of the third quarter). This deterioration in the health of loan accounts implies that the bank needs to hold more amounts of capital on account of increase in risk weights due

to downgrading of risk ratings and make more provisions against increase in potential loan losses. For better comparison of risk migration of borrowers, the new sanctions that have taken place from the beginning of the first quarter to the end of the last quarter may be ignored and data pertaining to old (continuing) borrowers separately tabulated risk-grade-wise to judge the rating migration and movement of portfolio quality.

Ignoring the new sanctions over the three quarters, which aggregate U.S. $3 billion, the rating migration of borrowers comprising the portfolio is shown in Table 14.3.

TABLE 14.3 Manufacturing Sector Portfolio

Risk-Grade-Wise Break-Up of Credit Portfolio
(Ignoring new sanctions over the review period)
Rating Migration of Borrowers in the Portfolio
Amount (Amt) in Millions of U.S. $

End of Quarter 1			End of Quarter 2			End of Quarter 3		
Risk Grade	Amt	%	Risk Grade	Amt	%	Risk Grade	Amt	%
AAA	1,000	20	AAA	900	18	AAA	950	19
AA	1,500	30	AA	1,400	28	AA	1,200	24
A	1,000	20	A	1,050	21	A	1,150	23
BBB	750	15	BBB	800	16	BBB	750	15
BB	400	8	BB	350	7	BB	400	8
B	200	4	B	250	5	B	250	5
C	100	2	C	180	3.6	C	150	3
D (default)	50	1	D	70	1.4	D	150	3
Total	5,000	100	Total	5,000	100	Total	5,000	100

An analysis of the portfolio reveals that the amount of low-risk category exposures (aggregate of exposures in grades AAA, AA, A), which constituted 70 percent of the total exposure in the portfolio, has come down to 66 percent during the six-month period, and the percentage of default category loans has increased from 1 percent to 3 percent. Overall, the portfolio has weakened during the six-month period, though not significantly, and the bank will have to study the cases of individual borrowers at random and identify the factors that are affecting credit quality. An analysis of the factors that have pushed the ratings downward will indicate the kind of remedial measures that the bank will have to take in individual cases, particularly large-exposure cases. But the focus of portfolio analysis is to evaluate the change in portfolio quality over a period of time and make decisions on the future direction of loans falling within the portfolio. The bank will have to assess the relative strength of the portfolio in a

risk-return perspective and decide whether it will continue to add further loans to the portfolio or reduce the exposures over a period of time.

Mapping Default Frequency

The second step for portfolio analysis is to make a frequency assessment of loan defaults by borrowers in a portfolio. The bank should compile risk-grade-wise data on defaults by borrowers in each portfolio over the chosen time period, and map and analyze the data. If the incidences of defaults in a particular portfolio are relatively higher in relation to other portfolios or much above the average default rates of loans (historical average based on three to four years' data) in the bank and there are no extraneous reasons of a temporary nature justifying the increase in the default rates, the bank should take measures for restructuring the portfolio over a period of time. The bank should at the same time raise entry-point standards, including enhancement in down payment and collateral support, for sanction of new loans in the relevant portfolio.

Mapping Loss Severity

The third step for portfolio analysis is to make a severity assessment of estimated potential losses of portfolios over the review period. The bank may derive the amounts of expected losses from the total exposure held in each portfolio using the credit risk measurement model and then study the variations in estimated potential losses associated with the portfolios over the chosen review period and identify the portfolio where the severity of potential loss is greater. If the bank uses an internal model for estimation of potential loss on the credit exposures, the probability of default and the loss rate given default parameters used for loss estimation should be, at least, averages of five-to seven-year default-related data applicable to the portfolio as recommended in the New Basel Capital Accord. Shift of credit exposures to worsening risk grades, in which the probability of default and loss rate given default are relatively higher, implies that the quantum of potential losses in the relevant portfolios has increased, and the portfolio requires additional capital support.

Evaluating Correlation Effect

The fourth step for portfolio analysis is to make an assessment of the impact on a portfolio on account of correlation between borrowers or even portfolios. If the

bank has exposures to different types of industries, it will have to assess the impact on the value of an industrial subportfolio on account of its correlation with another industrial subportfolio. The bank will apply the risk-grade-wise borrower rating and risk component data (PD, LGD, and EAD) to the exposures in all subportfolios, study the rating migration and variation in potential losses over a period of three to four quarters or half-years, and identify the subportfolios that are deteriorating in quality and whether those have correlation with other subportfolios. The loans and advances in an industrial subsector where the credit exposures are standard and performing will also decline in value due to the emergence of adverse developments in another subsector that has correlation with the former industry. For example, if there is a slowdown in the construction industry on account of falling property prices and the quality of exposures in the construction sector is deteriorating, the bank has to assess the values of exposures in the iron and steel industries, cement industry, paints industry, and so on, since there is correlation between these industries, find out the severity of impact, and initiate a package of remedial measures to prevent further deterioration in the quality of the subportfolio.

Estimating Exchange Risk Impact

The fifth step for portfolio analysis is to make an impact assessment of foreign exchange risk on the foreign currency portfolio, because the depreciation in foreign exchange rate impairs the repaying capacity of borrowers who have taken foreign currency loans or have other types of foreign currency exposures. The foreign currency loans are repayable either in foreign currency or the domestic currency equivalent of the amount due in foreign currency at the exchange rate prevailing on the due date. On account of significant increases in the volume of cross-border transactions and the increase in the volatilities of financial market variables in many countries, exchange rate risk has increased significantly. If the domestic currency depreciates, the repayment obligations of borrowers who have foreign currency exposures, but who do not have earnings in foreign currency or have not taken cover against exchange risk, increase substantially in terms of domestic currency, and many of them are likely to commit defaults. The bank should therefore evaluate the effect of depreciation in exchange rate on the foreign currency credit portfolio under different scenarios. The bank may separately group the borrowers who have taken foreign currency loans into a subportfolio and assess the impact from the angle of borrower rating

migration and the consequential change in risk-grade-wise composition of the portfolio, and make an estimate of the increase in potential loan losses.

Undertaking Stress Tests

Credit portfolio management involves accomplishment of three tasks—to undertake rapid portfolio reviews, conduct stress tests and scenario analysis of each portfolio, and assess the volatility of asset values under different sets of assumptions. The bank should make reasonable assumptions like general slowdown in the economy, unfavorable changes in fiscal and monetary policies, adverse movements in interest rates and foreign exchange rates, and conduct stress tests of different portfolios under different sets of assumptions. The bank should work out the potential erosion in asset values under different stress situations and restructure the portfolios to minimize the impact from plausible adverse scenarios.

Strengthening the Management Information System

Portfolio reviews require borrower-wise rating data, risk-grade-wise potential loss data, and other supplementary information to evaluate the current quality of the credit portfolio and the future scenario that may emerge. The bank should identify the gaps in information for conducting effective portfolio reviews and continuously upgrade the management information system.

14.5 PORTFOLIO RISK MITIGATION TECHNIQUES

Choosing Risk Mitigation Options

Portfolio risk mitigation techniques are not basically different from general credit risk mitigation techniques. The bank takes stock of the options available for risk mitigation and chooses the best option to respond to the exact concerns emerging from portfolio analysis. To a certain extent, regulatory directions to banks to establish sensible counterparty limits, sector-wise limits, sensitive sector limits, and credit concentration limits, besides insistence on compulsory diversification of credit portfolios prevent the development of large, vulnerable portfolios.

Portfolio risk can be mitigated through portfolio-specific action, borrower-specific action, and an asset securitization program. First, if evaluation of a particular portfolio reveals that it is likely to weaken over a period of time due to the emergence of certain economic factors or external factors on which the bank has no control, it may tighten the entry norms for new loans to discourage the potential borrowers and liberalize the loan exit norms to facilitate earlier liquidation of dues by borrowers or transfer risk to other institutions through an asset sale. Second, the bank may direct the mitigation action toward the individual borrowers within the portfolio that is deteriorating in quality, either by asking them to provide additional collateral support, or intensifying monitoring and follow-up action on loans, or inviting other financial institutions to share the loan, or obtaining guarantees and insurance on loans. Third, the bank may undertake asset securitization of certain types of loans, like car loans, residential housing loans, consumer durable loans, and so on, to achieve reduction in the volume and value of the portfolio. The asset securitization should be done with appropriate legal protection so that it results in effective transfer of risks to the special-purpose vehicles.

Enhancing Collateral Management Practices

Formulating a Collateral Management Policy

Collateral management has immense significance for mitigation of credit risk, because collateral is of no use if its value is not realizable within a given time frame. Banks accept collateral in a routine manner without being aware of the complications involved in enforcing the collateral. The collateral disposal procedure is so time consuming and complicated that eventually the risk mitigation element of the collateral is lost. One constraint is the prohibition from the court on distressed sale of collateral, which delays the disposal as buyers willing to offer a fair price are scarcely available, and the other constraint is the indecision on the part of the loan officers to enforce the collateral due to the lack of transparency of internal policies on collateral disposal. Often, the loan officers delay the enforcement on one pretext or another, sometimes in collusion with the borrower. The New Basel Capital Accord allows a wide range of credit risk mitigants for capital relief, which include collateralization of transactions, netting of deposits against loans, and protection of unconditional guarantees and credit derivatives. It is therefore necessary for the bank to formulate policies on

credit risk mitigation and collateral management.

In order to seek collateral support from the borrowers as a risk mitigation strategy, the bank has to frame policies regarding acceptance and management of collateral. The policy document should dwell on the various aspects of collateral management and provide first-hand knowledge to the operating staff regarding handling of the collateral. The bank's declared policy on collateral requirement and collateral acceptability infuses transparency in the terms and conditions of loan sanctions. The collateral management policy shall include, at least, the requirements discussed in the following paragraphs.

Defining Collateralized Transactions

Usually a collateralized transaction is defined as a loan transaction that is hedged in whole or in part by collateral offered by the counterparty or a third party on behalf of the counterparty. The policy should include an appropriate definition of collateralized transaction, clarity on the bank's specific lien on the collateral, and the legal position of its right to enforce the collateral and apply the value to settle outstanding dues under on-balance-sheet and off-balance-sheet facilities, if the borrower defaults.

Prescribing Collateral Acceptability Norms

The policy should specify the types of collateral and the kind of charge that the bank will have in relation to the particular collateral. The collateral is a security or protection against the outstanding dues of the borrower, and it can be primary, secondary, or supplementary. Primary collateral is the asset created out of the credit facilities extended by the bank, which the borrower is obliged to offer to it as security by way of pledge, hypothecation, or mortgage, and is usually in the form of mortgage of residential property or factory land and buildings, pledge of goods and merchandise, hypothecation of machinery, consumer durables, and cars, and so on. The secondary or supplementary collateral is generally in the form of savings instruments, equities and bonds, life insurance policies, personal guarantees, and so on, and is taken by banks in addition to primary collateral where dues are large or risk is greater, or as a protection against loans if there is no primary collateral.

Many banks do not frame separate collateral management policies though the practice of insisting on collateral for grant of credit is widely prevalent. Consequently, the acceptance of collateral often becomes a formality to comply

with the lending standards and is not viewed as an effective instrument for credit risk mitigation. Banks should formulate a collateral management policy and specify the collateral that may be accepted and those that may not be accepted. Normally, tangible and easily disposable collateral is given preference over other types of collateral, and least priority is attached to collateral whose value is highly volatile or which belongs to third parties.

Establishing a Collateral Management Procedure

The bank should prescribe methods to value financial and nonfinancial collateral, and clearly state its policy regarding insurance and inspection of collateral. It should prescribe the quantum of margin that borrowers should maintain at all times and ensure that they restore the specified margin in the event of shortfall. Under the New Basel Capital Accord, banks are required to enhance the value of exposure to the counterparty as well as reduce the value of collateral by way of haircuts to take care of possible future fluctuations in exposure amount and collateral value. The document on collateral management should specify the percentage and methodology for application of haircuts.

The bank should specify the documents required to establish its charge on the collateral, because often its right to enforce collateral is challenged in the court of law due to defective or inadequate documentation. Contractual agreement in the prescribed format, security delivery letter, title deeds and mortgage deeds, declaration from the parent and the guardian in case of a minor holding interest in the collateral, confirmation letter from the company or competent authority about the genuineness of financial instruments if these are offered as collateral, assignment letter from the insurance company in case of assignment of life insurance policies, and the like are examples of documents usually taken by banks. Appropriate documentation shall be done in accordance with the provisions of law governing the type of collateral in question.

The bank should lay down proper procedures for safe custody of collateral and regular monitoring of its status. It should have a system of memorizing the maturity dates of financial collateral so that their values are realized on the due dates. Enforcement of collateral is often complicated, since there are various types of laws that govern enforcement of different types of collateral. The bank should therefore lay down the enforcement procedure to avoid allegations by customers about the distressed sale of collateral or application of coercive means or adoption of dubious methods to realize collateral values that may impair its

reputation or draw it into courts of law.

14.6 SUMMARY

The primary objective of credit portfolio review is to detect in time the deterioration in portfolio quality, avoid undue portfolio concentration that may contain hidden and significant credit risk, and mitigate overall credit risk by redirecting credit to relatively less risky and more gainful business lines.

Banks should establish criteria for deciding portfolio composition and norms for identifying portfolio concentration in order to establish appropriate portfolio evaluation mechanisms.

Banks should compile portfolio-wise data on counterparty rating, probability of default, loss rate given default, and exposure at default to estimate potential losses from portfolios. High correlation between borrowers within the same portfolio or between different portfolios erodes portfolio quality faster. Consequently, data on counterparty correlation and portfolio correlation are essential for portfolio evaluation.

Portfolio evaluation involves examination of portfolios from two angles—tracking changes in portfolio quality through borrower rating migration analysis and estimating variations in the quantum of potential losses from the portfolio over the review period. Portfolio reviews involve mapping of rating migration data, default data, and potential loss data at successive quarterly or half-yearly intervals in order to assess how the portfolio quality is changing over the review period.

The effect of correlation between counterparties and portfolios and the impact of adverse exchange rate movements on the portfolios should be assessed as part of the portfolio evaluation process.

Portfolio risk mitigation techniques are not basically different from general credit risk mitigation techniques. Banks should take stock of risk mitigation options available and choose the option to respond to the exact concerns emerging from portfolio analysis.

CHAPTER 15

Risk-Based Loan Pricing

15.1 LOAN PRICING CONCEPT

The risk-based loan price reflects the return on a risk-free asset, plus a risk margin, which should be adequate to compensate the bank for the entire gamut of risks assumed by it. Risk-based loan prices take into account different elements of risks, including default risk, rating migration risk, credit correlation risk, credit concentration risk, collateral risk, and recovery risk. The most dominant factors that influence the loan price are the probability of default and the loss rate given default that reflect the probable loss from credit risk.

The key factor that determines the risk-based loan price is the quantum of potential loss that can arise from the exposures to a counterparty. The default characteristics of loans and the varying scales of recovery when default occurs set the platform for discriminating between counterparties in fixing the lending rates. Prior to default, it is not possible to say with certainty which borrowers will default, but we can make an inference about the possibility of a borrower committing default by looking at its current risk rating and fix the lending rate accordingly.

15.2 LOAN PRICING PRINCIPLES

The general principles that can be followed in determining the risk-based loan prices are explained here:

1. Rating grades assigned to borrowers should be the basis for fixing lending rates on loans and advances. The bank may rely on its own internal risk rating framework for fixing the risk-based price of loans to medium enterprises and small borrowers and use ratings of reliable external rating agencies, where available, for large and significant borrowers.

2. The interest rate on loans should be so fixed that loans rated as the least risky generally carry the lowest rate and those rated as the most risky carry the highest rate. The lending rates, which lie between the two extremes, should be

calibrated within a predetermined range. The difference in lending rates between the most risky and the least risky loans, that is, the range of risk margin, should be in alignment with banking industry practices.

3. The potential loss on credit exposure is the prime factor that determines the risk-based loan price. The internal ratings of borrowers, the default probability rate, and the loss rate given default are the critical inputs in determining the risk margins. The economic capital required to support credit risk–related activities and the expected (risk-adjusted) return on capital are the other two important factors that influence the loan price.

4. The tenure of loans and the repricing interval of funds that support a pool of term loans influence the lending rate. The uncertainties in sourcing funds involve additional costs. Consequently, the cost of funds, which may have to be occasionally outsourced to correct asset-liability mismatches, will have to be taken into account in fixing the lending rate.

5. While fixing risk-based loan prices, the bank has to make distinction between the qualities of loans placed in different risk grades, because the incidence of default and the quantum of loss vary between risk grades. AAA-rated loans are likely to cause the least amount of loss to the bank and in very few cases. Likewise, A-rated loans may generate low amounts of loss and in only a few cases, while BB, B, and C category loans may generate greater losses and in several cases.

6. The risk-based loan price should carry a penalty clause that may be made applicable in the cases of prepayment of loans and low utilization of sanctioned credit limits.

15.3 LOAN PRICING ISSUES

Banks should examine and resolve the following issues in order to establish appropriate procedures for fixing risk-based loan prices:

1. The first issue is about the availability of reliable data to calculate the quantum of expected loan loss, which is an input for determining credit spreads for fixing the loan price. Various models exist to calculate expected loss, but if banks want to measure credit losses through internal models in line with the New Basel Capital Accord recommendations, they will have to build up data on the probability of default, loss rate given default, and exposure at default for each asset class and each risk grade for a period of five to seven years.

2. The second issue is about the methods for calculation of unexpected loss from credit exposures and its inclusion in loan price computations. Banks usually ignore the unexpected loss component in fixing loan prices, because it is difficult to make a fair estimate of unexpected loss. Studies have shown that the idiosyncratic default risk or the risk of unexpected loss is real and does exist. Banks shall therefore derive the unexpected loss through the credit risk measurement model and include it in loan pricing. Usually, there is a built-in cushion in risk-based loan prices that takes care of unexpected losses, since banks use credit spreads slightly higher than market-related credit spreads in fixing the loan prices.

3. The third issue is whether the risk-based loan prices should be strictly followed for all kinds of loans and advances. There are a few types of loans where the lending rates are fixed on an ad hoc basis because of market competition. This principle is usually followed in the case of retail loans having similar facility characteristics or loans against easily realizable collateral or for specified purposes. Banks can fix lending rates for these types of loans purpose-wise, exposure-size-wise, and tenure-wise, taking the risk-based loan prices as the benchmark. Banks may charge higher rates on medium-size exposures and on loans for speculative purposes and for longer tenures, and lower rates on relatively small exposures and on loans for productive purposes and for shorter tenures. But the risk-based price for each category of loans should be kept in mind while fixing the final rate so as to make a minimum profit from lending.

4. The fourth issue is about the obligation to lend at rates lower than the risk-based rates for selected customers due to market compulsion. Banks can work out the minimum lending rates on the basis of “no profit, no loss” criteria for loans falling into different risk grades and add minimum spreads to the indicative “no profit, no loss” rates to fix the chargeable rate for selected customers. From the angle of interest rate risk management, it is prudent for banks to avoid lending at rates below the “no profit, no loss” cut-off rates except to the extent that they have to lend to low-income people under the bank supervisors’ directions. Banks will have to ensure that the lending rates are at least higher than the “no profit, no loss” rates by some margin even for selected customers. Sometimes, for public sector enterprises and other corporations which are financially very sound and which are rated in the AAA, AA, or A categories, banks can fix lending rates that are at least equal to “no profit, no loss” rates on a case-by-case basis because of business compulsion, particularly

if there is potential for getting large non-fund-based business from those customers to compensate for the loss of interest income.

5. The fifth issue relates to the extent up to which funds can be lent at “no profit, no loss” rates or at rates marginally higher than those, but lower than risk-based loan prices, if banks are compelled to do so for a variety of reasons. Banks may fix a ceiling up to which they will lend funds at such rates, and in fixing the ceiling, they should take into account the low-cost funds available with them, since the cost of funds is the major element in risk-based loan pricing. The ceiling can be a portion of the corpus comprising the current account deposits where no interest is payable, the core (semipermanent) portion of savings account deposits where low interest is payable, the lower-tenure low-cost time deposits, the core amount of interest-free float funds, and the procured funds at economic rates. The average of these funds over a 12-month period can be taken as the maximum amount of funds that is available for lending at relatively lower rates; a portion of the corpus may be lent at rates equal to or marginally higher than “no profit, no loss” rates to minimize the loss on interest income.

6. The sixth issue refers to the extent up to which banks should calibrate the risk-based loan rates to match the risk rating scale. Is it necessary to fix a risk-based loan price for each risk grade, if there is minor variation in risk perception between two risk grades, particularly the adjacent risk grades? It is not pragmatic to follow a rigid risk-based loan pricing formula under the eight-scale or seven-scale credit risk rating framework. From a practical angle, it is convenient to classify the borrowers into broad risk categories and place the risk-based loan rates into three or four slabs. Risk grades showing marginal or minor differences in risk scores and risk perception can be conveniently grouped into broad risk categories. For example, seven risk grades adopted under a seven-scale rating framework can be grouped into four risk categories —low risk, moderate risk, fair risk and high risk, and the risk-based loan rates placed in four slabs. There can be provision for minor adjustment in the rates on an ad hoc basis in respect to fair risk and high risk category borrowers. The fixation of loan price on a broad risk category basis is operationally more convenient. The minor variations in lending rates may also reduce the feeling of discrimination among the customers, enhance their loyalty, and increase the market share of business. An illustrative example of grouping of the risk grades into broad risk categories for fixation of risk based loan price is given in Table 15.1.

7. The seventh issue relates to the extent of variations that can be made in risk-based loan pricing on account of the loan maturity factor, other things remaining unchanged. Is it necessary to fix separate risk-based loan rates for short, medium, and long-term loans? In fixing the lending rates, banks need to be cognizant of the higher risk involved in longer term loans. To a certain extent, higher risk associated with the loans of longer maturity is included in the risk grade, since facility characteristics that include the tenure of loans are factored into the counterparty rating process. But the better option is to downgrade the risk rating of borrowers who take medium-and long-term loans by one notch because of the additional risk involved in the loans of longer maturity. For fixing lending rates on medium-and long-term loans, banks may take into account the additional cost of long-term funds and load some additional risk premium linked to the tenure of the loan.

TABLE 15.1 Computation of Risk-Based Loan Price

Grouping of Risk Grades	
Broad Risk Category	**Risk Grade**
Low risk	AAA and AA
Moderate risk	A and BBB
Fair risk	BB and unrated
High risk	B and C

15.4 LOAN PRICE COMPUTATION

Risk-based loan pricing implies that the lending rates increase with the increase in risk from credit exposures. The risk rating of borrowers, which reflects varying degrees of risks between risk grades, is the basis for determination of the rate applicable to each risk grade. Though risk-based loan price computation is basically an arithmetical process, bank-specific, facility-specific, and risk mitigation–specific factors influence the final lending rate. The size of the bank and its market position, sources of funds, loans to deposits ratio, historical cost-income ratio, targeted return on assets, and the extent of credit portfolio diversification are bank-specific factors. Facility structure, purpose of the loan, quantum and quality of collateral, tenure of loan, prepayment penalty provision, and right of loan recall are facility-specific factors. The scope of loan syndication or loan participation by other banks, availability of insurance or guarantee, and availability of derivative products for interest rate risk hedging are risk mitigation–specific factors. All these factors influence the lending rates.

The risk-based loan price consists of the following components:

1. Fund cost.
2. Service cost (operating cost).
3. Capital cost (opportunity cost).
4. Risk premium (cost of expected and unexpected losses).
5. Income spread (tax burden, provisioning requirement, and profit margin).

Illustrations of risk-based loan price computation are given in Tables 15.2 through 15.7. The figures of assets and liabilities given in the tables are hypothetical.

TABLE 15.2 Risk-Based Loan Pricing

Computation of Fund Cost	
Average cost of funds = [Interest expended (Interest paid on deposits + interest paid on borrowings + interest paid on bonds and debentures + accrued interest) ÷ Interest bearing liabilities] × 100	**U.S. $ (Million)**
Interest on deposits	1,300
Interest on borrowings (call and money market borrowings, refinance from central bank, export-import bank, and other refinancing agencies)	300
Interest on bonds and debentures	215
Total interest expended	1,815
Interest bearing liabilities[†]	40,000
Average cost of funds	4.54%
[*]Interest bearing liabilities represent all liabilities, including deposits, borrowings, refinance and bond proceeds, and any other item on which interest is payable. [†]Simple average of month-end balance sheet figures for 12 months included in the accounting year.	

The risk-based loan price shown in Table 15.7 relates to fund-based credit facilities; the bank can work out the rates for non-fund-based credit products, taking into account service cost, regulatory capital cost based on credit conversion factor, risk premium (expected and unexpected losses), and some profit margin. The risk-based loan price shown in column 9 of Table 15.7 does not include an unexpected loss component. The income spread of 3%, which is slightly higher than the market-related credit spread, includes an element of unexpected loss. The quantum of unexpected loss can be separately determined based on the targeted confidence level. The risk-based loan price shown in Table 15.7 has been computed risk-grade-wise under the default mode model taking into account the entire credit exposure of the bank. The bank can work out a portfolio-wise risk-based loan price for each sector (manufacturing sector, infrastructure sector, trade sector, commercial real estate sector, export sector, agricultural sector, capital market sector, and retail sector).

TABLE 15.3 Risk-Based Loan Pricing

Computation of Service Cost	
Service cost = (Total operating expenses ÷ Lendable resources as on account closing date) × 100	**U.S. $ (Million)**
Operating expenses	510
Lendable resources (deposits, bond proceeds, and borrowings, excluding refinance, minus statutory obligations like minimum cash reserve to be maintained with the central bank and minimum investment in sovereign papers toward liquidity requirements)	35,000
Service cost	1.46%

TABLE 15.4 Risk-Based Loan Pricing

Computation of Capital Cost	
Opportunity cost of regulatory capital with CRAR target at 10% (CRAR = capital to risk-weighted assets ratio)	**As on Balance Sheet Date**
Tier I capital	70%
Tier II capital (subordinated debt instruments)	30%
Cost of Tier II capital at annual coupon rate	7.00%
Tax rate	30.00%
Posttax cost of Tier II capital [Cost of Tier II capital × (1-tax rate)]	4.9%
a. Risk-free return (yield on 5-year sovereign security)	6.00%
b. Cost of Tier I capital based on expected return on allocated capital invested in selected band of equities in the capital market, rated bonds, mutual funds, *etc.* (assumed at 15.00%)	15.00%
Weighted average cost of regulatory capital (70% of cost of Tier I capital + 30% of posttax cost of Tier II capital)	11.97 %
Opportunity cost of regulatory capital (cost of regulatory capital minus yield on 5-year sovereign security), i.e., 11.97% minus 6.00%, assuming that allocated capital can be invested in risk-free sovereign security at 6%	11.97% – 6.00% = 5.97 %
Opportunity cost of regulatory capital with targeted CRAR of 10% = 10% of 5.97%	0.60% (rounded off)

TABLE 15.5 Risk-Based Loan Pricing

Risk-Grade-Wise Estimation of Expected Loss
Default Mode Type Model

Risk Grade	Risk Level	Average PD (%)*	Average LGD (%)*	Average EAD (100%)	Average EL (%)*
AAA	Very low risk	0.97	18	1.00	0.17
AA	Marginal risk	1.70	21	1.00	0.36
A	Low risk	2.55	30	1.00	0.77
BBB	Moderate	3.77	41	1.00	1.55
BB	Fair risk	6.37	55	1.00	3.50
B	High risk	10.76	60	1.00	6.46
C	Very high risk	19.70	69	1.00	13.59

*Average of 5-year data.

TABLE 15.6 Risk-Based Loan Pricing

Computation of Basic Cost in Lending		
Average fund cost	Table 15.2	4.54%
Service cost	Table 15.3	1.46%
Basic cost		6.00%

TABLE 15.7 Risk-Based Loan Pricing

Computation of Risk-Grade-Wise Loan Price

Risk Grade	Risk Wt. (Suggestive)	Basic Lending Cost (%)	Regulatory Capital Cost (%)	EL (%)	Total (Col. 3 + 4 + 5) (%)	Targeted Income Spread (%)	Total (%)	Lending Rate Rounded Off (%)
1	2	3	4	5	6	7	8	9
AAA	20%	6.00	0.12	0.17	6.29	3.00	9.29	9.30
AA	20%	6.00	0.12	0.36	6.48	3.00	9.48	9.50
A	50%	6.00	0.30	0.77	7.07	3.00	10.07	10.10
BBB	75%	6.00	0.45	1.55	8.00	3.00	11.00	11.00
BB	100%	6.00	0.60	3.50	10.10	3.00	13.10	13.10
B	150%	6.00	0.90	6.46	13.36	3.00	16.36	16.40
C	150%	6.00	0.90	13.59	20.49	3.00	23.49	23.50

Column 9 of Table 15.7 shows the risk-based lending rates based on expected loss for each risk grade. Banks usually fix a prime lending rate, which serves as the minimum lending rate, that is, the risk-based loan rate applicable to AAA

rated borrowers, and build up the lending rate structure around that rate. In fixing the risk-based lending rate, banks take into account the number of risk grades in the risk rating scale and determine accordingly the interest rate band to cover all borrowers from the lowest risk to the highest risk categories. The prime lending rate will be applicable to the lowest risk category borrower and the prime lending rate plus the maximum of the interest rate band to the highest risk-rated borrowers. But the lower end and the higher end of the interest rate range can be at variance with the risk-based lending rates due to the influence of other factors like the central bank policy, the interest rate outlook, the market trend, the liquidity condition, and competition from peers. A risk-based loan price cannot be applied mechanically to high and very high-risk–rated borrowers as the applicable rates will be unreasonably high due to the high percentage of potential loan losses in these two categories. It is necessary to fix the maximum lending rates for high-risk category borrowers at a level that may be lower than the risk-based rate.

15.5 SUMMARY

The risk-based loan price reflects the return on risk-free assets plus the risk margin. The most dominant factor that influences the risk-based loan price is the quantum of potential loss that can arise from the credit exposure. Default probabilities of loans and varying scales of recovery when default occurs set the platform for discriminating between borrowers in fixing risk-based lending rates.

Rating of borrowers is the basis for varying the lending rates. The maximum interest rate band between the least risky and the most risky credit exposure should be in alignment with banking industry practices and the regulatory prescriptions. The additional cost in procuring funds to support long-tenure loans should be included in the lending rate.

The risk-based loan price should be granulated in accordance with the risk grade included in the rating scale. However, for operational convenience, lending rates can be linked to broad risk categories instead of each risk grade of the rating scale. Exceptions can be made in fixing the risk-based loan price due to market compulsion and longer maturity of the loans.

Risk-based loan pricing implies that the lending rates increase with the increase in credit risk, but risk grade alone is not the sole basis for deciding the final rate. Size of the bank, risk appetite, targeted return on assets, historical

cost-income ratio, and extent of credit portfolio diversification determine the final rate. Furthermore, collateral coverage and risk-mitigation opportunities also influence the lending rate.

PART Three

Market Risk Management

CHAPTER 16

Market Risk Framework

16.1 MARKET RISK CONCEPT

Market risk is the risk of losses that arise from movements in market risk variables. Its impact is on the bank's earnings and capital. The erosion in the value of assets and the earnings occurs from adverse changes in interest rates, foreign exchange rates, security prices, equity prices, and commodity prices. Like credit risk, market risk exists in both individual transactions and portfolios. Banks have to deal with market risks in daily transactions like the sale and purchase of sovereign securities, corporate equities, foreign currencies, options, futures, and the like, and in portfolios of investments in government securities, Treasury bills, corporate bonds and equities, besides the derivatives portfolios like the swaps portfolio, options portfolio, and futures portfolio. Market risk exists mainly in the trading book, because banks undertake the sale and purchase of financial instruments and derivative products in the short term to make a profit, but it also exists in the banking book since they hold investments in their books for long periods to earn interest and make gains from redemption values on maturity dates. Market risk arises due to the volatility in the movement of market risk variables; the larger the volatility, the greater is the amount of potential loss or gain.

16.2 MARKET RISK TYPES

Market risk emerges in five forms:

1. Liquidity risk.
2. Interest rate risk.
3. Foreign exchange risk.
4. Equity price risk.
5. Commodity risk.

The first four types of risks are common among banks, but the commodity risk does not arise in those countries where there is a legal or regulatory prohibition

against banks dealing in commodities and commodity futures, with the exception of gold. The bank's investment and trading portfolios are exposed to market risk, which materializes through erosion in the value of assets and earnings when a market risk variable changes. Suppose a bank is holding sovereign securities of the face value of U.S. $1 million of five-year maturity issued at an interest rate of 3.75 percent payable annually. Further suppose the interest rate increases to 4.00 percent per annum in the financial market, and the market value of the security held by the bank falls to U.S. $995,000 against the face value of U.S. $1 million. This erosion in the value of the security by U.S. $5,000 is attributable to market risk. There is an inverse relationship between the market value of a security and the rate of interest payable on it, which implies that the market values decline under normal circumstances when the interest rate rises. Likewise, suppose the bank has subscribed to the bonds of a corporation of the face value of U.S. $1 million of five-year maturity at a floating interest rate of 3 percent per annum plus a three-month London Interbank Offered Rate (LIBOR), which is refixed every three months. Suppose the three-month LIBOR was 0.50 percent (50 basis points) on the transaction date, which means the effective interest rate was 3.50 percent per annum. If the three-month LIBOR falls to 0.40 percent (40 basis points) on the interest rate reset date, the interest on the bonds gets refixed at a lower rate of 3.40 percent per annum. This erosion in earnings on account of a fall in the interest rate is attributable to market risk.

The trading book of a bank usually consists of positions in financial instruments and gold held with the intent of trading or hedging risk. It includes investments in sovereign securities, corporate equities, bonds and debentures, mutual funds, gold, and so on, positions in spot and forward contracts in foreign exchange, and derivative contracts in swaps, options, futures, and so on. Market risk is the potential loss that may occur on the entire investment and trading portfolio on account of movements in the interest rates, exchange rates, or equity prices in the market. The likely erosion in the values of investment and trading portfolios can be estimated through application of value-at-risk models.

Adverse changes in financial market variables cause fluctuations in the bottom lines of banks. In a market where interest rates and foreign exchange rates are extremely volatile and volumes of transactions are large, market risk can severely erode banks’ profits. On their own, banks often indulge in aggressive speculative trading in securities and foreign exchange to make windfall gains, assuming that market variables will move in a calculated path. In the process, banks expose themselves to a higher magnitude of market risk. Thus, market risk

affects banks mainly in three ways:

1. It causes erosion in the financial value of assets.

2. It reduces earnings on account of falling interest rates, particularly where floating rates are applicable to financial instruments.

3. It impairs liquidity on account of decline in the inflow of funds.

16.3 MARKET RISK MANAGEMENT FRAMEWORK

The market risk management framework is made up of two components:

1. Organizational setup.

2. Policies and strategies for managing liquidity risk, interest rate risk, foreign currency exposure risk, equity exposure risk, commodity exposure risk, and risk from derivative transactions.

Banks have to undertake the following important activities to manage market risk:

1. Developing procedures for market risk identification and techniques for measurement.

2. Developing procedures for aggregation of exposures.

3. Establishing a methodology for valuing positions.

4. Fixing limits and triggers.

5. Setting up risk monitoring, risk control, and risk reporting frameworks.

First, banks define their market risk appetite and set up limits and triggers commensurate with their risk-bearing capacity to cover both individual transactions and portfolios. They establish procedures for identifying all components of market risk separately for all products and activities, develop financial models to value positions and measure market risk, and establish criteria for assessing the qualitative aspects of risk. The measurement models should be subjected to validation tests to examine the appropriateness of the algorithm employed and the accuracy of the output.

Second, banks establish an elaborate risk-monitoring mechanism to verify compliance with procedures for executing transactions and compliance with prescribed limits, and adherence to guidelines for trigger-driven actions. As a part of the monitoring system, they check the reasonableness of assumptions made in the models to value positions and measure value-at-risk, and conduct

stress tests for trading and accrual portfolios at regular intervals.

Third, banks establish a robust and foolproof control system, and ensure that the conflicts of interest are avoided in the allotment of duties between operational staff and monitoring and reporting staff. The control procedure must ensure that adequate checks exist to detect in time unauthorized transactions and wrong use of discretionary powers by officials, and make it difficult for dealing personnel to hide unsustainable positions. Banks shall assign validation, back-testing and stress-testing activities to people unconnected with the investment operations, model development, and software development programs.

Fourth, the market risk management framework should include the methodology for assessing and monitoring regulatory and economic capital to cover market risk at the end of each day in accordance with the New Basel Capital Accord requirements.

16.4 ORGANIZATIONAL SETUP

The organizational setup for market risk management should meet at least five essential requirements:

1. Authority to approve.
2. Authority to recommend.
3. Authority to handle assets and liabilities on a daily or weekly basis.
4. Authority to manage market risk.
5. Support group.

In addition to the board of directors and the risk management committee of the board, the organizational setup for market risk management should consist of the following bodies:

1. Asset-liability management (ALM) committee.
2. ALM support group.
3. Market risk management committee.
4. Market risk management department.
5. Front office, middle office, and back office.

The board of directors is responsible for formulating market risk policies, strategies, and vision; defining market risk appetite; fixing prudent market risk limits; and specifying trigger points for risk mitigation actions. The board should periodically review the efficacy of the ALM system and modify policies and strategies to respond to a changing market environment. The board should be

assisted by a risk management committee (RMC), which will oversee the entire market risk management activities and recommend for approval the systems and procedures to manage market risk and also the market risk measurement models and tools. The committee should make strategic decisions in response to changing market risk scenarios to reduce the vulnerability of the investment and trading position and arrest a downslide in asset values or erosion in earnings. It should take stock of various ALM techniques, monitor the effectiveness of the ALM function, review the results of back-testing and stress testing of models, and make recommendations to the board for appropriate modifications.

Banks should have an asset-liability management committee **(**ALCO) of top executives to look after the balance sheet management. The composition and the size of ALCO should be flexible and bank-specific. ALCO is the most strategic organizational wing within the bank to manage market risk, and it has a multifarious role to perform. Besides, banks should have an ALM support group of middle-level officials to provide information and data support to ALCO and conduct risk analysis and scenario analysis. The group should not be entrusted with a line function to avoid conflicts of interest. It should draw inputs from the relevant departments, make forecasts on possible movements of market risk variables, analyze the asset-liability mix, measure the impact on the balance sheet under emerging market conditions, and suggest options for risk mitigation.

Besides ALCO, banks should have a market risk management committee of top executives and departmental heads, which will act as an intermediate authority between the former and the risk management department. They should also have a separate market risk management department to work as the secretariat of all committees and the board. The department should have an expert market risk support group who will have the responsibility to develop market risk management tools and techniques that are appropriate to the investment and trading profile of the bank. The group should assess the impact of market risk on the bank's exposure under different circumstances through simulation exercises and scenario analyses and prepare technical reports. The market risk management department should provide support to different wings within the organization that deal with market risk.

In addition to the committees and the department, banks should have a front office (treasury department), a middle office and a back office. The front office will work as the clearinghouse to match, manage, and control transactions that carry market risks, and provide funding and liquidity support through asset-liability deals and investment support through the sale and purchase of securities.

The dealers stationed at the front office should undertake transactions in domestic and foreign currencies and derivative contracts in accordance with the set of authorizations granted to them.

The middle office should make an independent assessment of exposure to market risk and provide regular feedback to ALCO. It should track and monitor on a real-time basis the aggregate of market risk on the investment portfolio, foreign currency portfolio, and derivatives portfolio; monitor compliance by the treasury with approved limits and risk parameters; and submit to ALCO status reports on market risk exposure at regular intervals.

The back office should monitor and supervise the functioning of the front office and middle office, maintain an arm’s-length distance with the dealing room, and ensure that there is a clear segregation of duties between the operational and the reporting units. The back office should exercise key controls over market risk activities, including dealing room activities; verify details of transactions executed by the dealing room; and crosscheck rates, prices, and brokerage from independent and reliable sources. It should monitor the value of individual deals vis-à-vis the prescribed risk limits and exercise control over payments and settlements.

16.5 MARKET RISK POLICY

The market risk policy has two dimensions: investment management policy and asset-liability management policy. The policy should include a definition of market risk, describe the activities and products that give rise to market risk, and deal with all aspects relating to investment and trading operations. The policy should clearly define the bank's market risk appetite, specify the capital level it wants to maintain against market risks, and assign responsibilities for the smooth conduct of investment and trading operations. It should analyze investment opportunities and risks involved in various types of investment operations, indicate the strategies to achieve investment objectives, and specify the limits and triggers for effective management of the investment portfolio. The policy should describe the methods for identification, measurement, monitoring, and control of liquidity risk, interest rate risk, foreign currency exposure risk, and equity and commodity exposure risks. It should indicate the quantum of capital the bank intends to hold to cover market risk and lay down guidelines for qualitative and quantitative disclosure of market risk in pursuance of the New Basel Capital Accord requirements.

16.6 MARKET RISK VISION

Banks shall have a clear vision about market risk–related activities they want to undertake in the short and medium terms, and prepare a market risk vision document containing the principles for the conduct of investment and trading operations. The vision document is an offshoot of the market risk policy. Banks should formulate their investment strategies at the beginning of each accounting year, keeping in view regulatory directives, policy guidelines, investment opportunities, and net gains they expect from investment business. It is beneficial to take a medium-term view of the investment environment within and outside the country and follow a predetermined path. The investment policies and strategies should be consistent and compatible with the business environment, and should be based on principles contained in the market risk vision document. The strategies should help banks to choose investment alternatives that are relatively free from high market volatilities. The market risk vision should be flexible and adaptable to changes in market developments. A bank should observe, at the minimum, the following principles in conducting its trading and investment operations:

1. It shall not confine its investment function to corporate bond and equity markets. It shall undertake retailing of government securities and portfolio management on behalf of the clients, play the role of a market maker, and work as a depository participant.

2. It shall endeavor to optimize income from investments by assuming risks in harmony with the targeted market risk profile.

3. It shall pay adequate attention to liquidity aspects while deploying funds in the investment business. Investment operations shall not lead to a situation where it will have to resort to extraordinary measures to raise funds to meet liabilities and other commitments on time.

4. The investment portfolio shall be flexible and shall consist of readily salable assets to a reasonable extent. The bank shall be in a position to dispose of assets promptly to meet liquidity requirements in the event of premature withdrawal of large deposits and unusual drawdowns by customers in overdraft and revolving credit accounts.

5. The bank shall keep its investment portfolio well diversified and avoid concentration in any form, and hold different types of financial instruments

with varied coupon rates and varying maturities in the investment portfolio.

6. The maturity structure of the investment portfolio shall be in agreement with the structure of stable and long-term funds to avoid significant asset-liability mismatches.

7. Arbitrage opportunities emerging in the market shall be explored from time to time to make trading profits without exposing the bank to undue and unsustainable risks.

8. In undertaking investment transactions, the bank shall take an integrated view of the total risk emerging from the counterparty both in respect of credit and investment exposures.

9. The ratio of deployment of funds between investment and credit operations shall be governed by regulatory prescriptions, liquidity considerations, market trends, and risk-return perspectives.

10. Decisions on sale and purchase of securities shall be governed by current yield, yield curve, interest rate outlook, liquidity characteristics, redemption loss, maturity basket, and modified duration.

11. The modified duration of portfolios shall be flexible and fixed in harmony with the forecast for financial instruments rate changes.

12. The maturity mix of investments shall be in conformity with prudent norms governing maximum individual gaps and cumulative gaps between assets and liabilities in different time bands.

13. The bank shall keep credit risk from investments in corporate bonds and equities within limits and observe prudent standards relating to entry point rating and risk-grade-wise holding of bonds and equities.

14. It shall make investment in commercial papers and interbank deposits in accordance with transparent and documented guidelines. These investments shall be within the overall counterparty exposure limits.

15. It shall clearly define exposure to capital markets and keep the exposure within prudent limits.

16. It shall undertake investments in preference shares, mutual funds, venture capital funds, instruments of securitization, and interbank participation certificates within specified limits in accordance with the principle of diversification.

17. It shall use appropriate derivative products to hedge counterparty-specific, transaction-specific, and portfolio-specific market risks.

16.7 SUMMARY

Market risk arises due to the uncertainties in the movement of market risk variables, such as interest rates, exchange rates, equity prices, and commodity prices. It exists both in the trading and banking books and causes erosion in the values of the bank's assets and earnings. Market risk can severely erode banks' profits if interest rates and foreign exchange rates are extremely volatile and trading and investment operations are large.

Banks should develop systems and procedures to identify and measure market risk, establish operational limits, specify triggers for specific actions, and set up monitoring and control systems to manage market risk.

Banks should establish separate committees, functional units, and support groups within the organization to manage market risk. The organizational arrangement should recognize the need for having separate units to deal with operational, developmental, recommendatory, and approval functions.

Banks should formulate a market risk policy and prepare a market risk vision document containing principles for conducting investment and trading operations. The market risk policy should deal with both investment management and asset-liability management, define market risk appetite, and prescribe limits and triggers commensurate with the risk-bearing capability. The market risk vision should be flexible and adaptable to changes in market developments.

In framing the market risk policy, banks should take a medium-term view of investment environment within and outside the country and choose operating strategies that are relatively free from high market volatilities.

Banks should maintain an appropriate ratio between investment and credit in deploying funds. The ratio should be governed by regulatory prescriptions, liquidity considerations, market trends, and risk-return perspectives.

While executing investment transactions, banks should take an integrated view of credit risk (credit exposure) and market risk (investment exposure) associated with the same counterparty.

CHAPTER 17

Liquidity Risk Management

17.1 LIQUIDITY RISK CAUSES

Liquidity refers to the ready availability of cash and cash-like liquid assets with the bank to meet payment obligations and fund assets. Liquidity risk is the risk of the bank's inability to garner liquid funds to meet liabilities and other commitments as and when they arise. The demand for liquid funds arises on account of the following obligations:

1. To make payments on deposits, borrowings, and other liabilities.

2. To fund loans and advances.

3. To settle claims against the bank.

4. To honor contingent liabilities that devolve on the bank out of contractual obligations.

Provision for adequate liquidity in a bank is crucial because a liquidity shortfall in meeting commitments to other banks and financial institutions can have serious repercussions in the money market and endanger the stability of the financial system. Failure to meet customer payments in time in one location may have a chain reaction across other places of operation of the bank, and in a worse situation, may cause a run and threaten its solvency. This type of incident, even if temporary, damages the bank's reputation and erodes customer confidence.

Liquidity is a continually changing variable, and the volume of liquid assets needed to maintain operational flexibility goes on changing daily. The level of optimum liquidity that a bank needs to maintain is dependent on a number of factors. Adequate liquidity does not mean maintenance of excess liquid funds and sacrifice of potential income from other options. Consequently, in judging the adequacy of liquidity one should not only take into account the liquid funds available within the bank, but also assess its ability to procure funds at reasonable cost in the given circumstances.

There are a few factors that give rise to liquidity risk. One such factor is the idiosyncratic behavior of the corporate and institutional depositors, which may suddenly withdraw funds from the bank without notice under the options

available to them. The sudden and unanticipated withdrawal of deposits by large customers, which are not due for payment, causes severe strains on the bank's liquidity. This type of situation arises because banks allow premature withdrawal of term deposits as a matter of general banking practice, though contractually they are not obliged to do so. This assurance of liquidity wins the confidence of term deposit account holders and dissuades them from exercising other options.

Another factor that generates liquidity risk is the uncertainty in exercising options by term depositors on maturity dates who can either renew matured deposits for another term or withdraw them. Usually, many customers renew their deposits at maturity for another term, and banks generally assess their liquid fund requirements based on this assumption. Over a period of time, banks observe a historical trend in the renewal pattern of matured term deposits. But in the event the renewal of matured term deposits by several customers does not match the historical trend of renewal pattern, the bank may face liquidity strains. This type of event gives rise to funding risk.

Liquidity risk also arises from sudden interruptions in the anticipated inflow of funds due to stoppage of repayment installments by borrowers on their loan obligations or the failure of counterparties to honor contractual commitments on settlement dates. The time gap between receipt of expected funds and the demand for funds to honor standing commitments causes liquidity problems. Besides, the sudden requirement of funds to make payments to third parties when contingent liabilities devolve on the bank due to customers’ failure to honor commitments under financial guarantees, letters of credit, or derivative contracts that were not anticipated, generates liquidity risk. This type of risk is termed the call risk element of liquidity.

In general, liquidity risk originates from mismatches in the maturity pattern of assets and liabilities of a bank. It becomes pronounced if long-term assets are funded by short-term liabilities to a significant extent because of the uncertainties involved in successful rollover of funds during the currency of funded assets or procuring funds from alternative sources at economical rates.

17.2 LIQUIDITY RISK MANAGEMENT ACTIVITIES

A bank needs to undertake several activities to establish an effective and stable liquidity management function. A suggested list of these activities is given here.

Liquidity Risk Management—List of Broad Activities

1. Formulation of Policies and Strategies:

- To adopt a liquidity management policy and formulate funding strategies.
- To prescribe prudent limits and tolerance levels of liquidity mismatches in different asset-liability time buckets.
- To set up a mechanism to collect, process, and monitor asset-liability data on a daily basis.
- To prescribe norms and specify circumstances to decide when to enter the market for purchase of funds and when to commence temporary placement of funds with other institutions.
- To set up guidelines for maintenance of foreign currency liquidity.

2. Fixation of Prudent Norms:

- To fix a cap on call money borrowings and prescribe liquidity-related ratios (e.g., cash reserve ratio, liquidity reserve ratio, and loan deposit ratio).
- To prescribe the maturity structure of liabilities and financial instruments to be held in the investment portfolio.
- To specify the volume, the composition, the holding period, and the defeasance period of securities to be held in the "trading book."
- To prescribe cut-loss limits.
- To prescribe prudent limit on the total of off-balance-sheet exposures.

3. Undertaking Historical Studies and Estimating Seasonal Liquidity Requirements:

- To undertake trend analysis of surplus and deficit of funds.
- To study seasonal patterns of deposit accrual and withdrawal.
- To study seasonal patterns of demand for loans and advances.
- To estimate liquidity requirements on a fortnightly basis to meet commitments on sanctioned loans and unused credit limits.
- To study the trend of renewal of matured time deposits.
- To study the pattern of premature withdrawal of time deposits.
- To study the trend of premature repayment of loans.
- To study the volatility in the movement of large and institutional deposits.
- To strengthen the management information system for daily feeding

and processing of liquidity-related data from all offices.

4. Undertaking Liquidity Planning and Preparing Contingency Plans:

- To prescribe benchmark liquidity levels under a normal scenario, a bank-specific crisis scenario (worst case benchmark), and a market crisis scenario.
- To undertake liquidity planning under alternate scenarios.
- To prepare contingency plans to meet liquidity in crisis situations.

17.3 LIQUIDITY RISK MANAGEMENT POLICIES AND STRATEGIES

Liquidity management policies may vary between banks due to differences in the composition and the maturity structure of assets and liabilities. The policy should lay down guidelines for initiating action by the top management to meet liquidity problems under different market conditions. A bank should have documented liquidity management policies and strategies for implementation by fund managers that provide operational flexibility and facilitate selection of options for sourcing funds in times of need. Liquidity management becomes more complicated if a bank has several branch offices and financial subsidiaries (affiliated units) in other countries, which have different time zones of operation. Liquidity managers need to be cognizant of the liquidity scenario across the globe where the bank and its affiliated units operate. The policy document should deal with the procedure and the methodology for liquidity management for the conglomerate as a whole, and specify options relevant to different situations and the level of authorities for initiating actions under emergency circumstances. The bank should have a system to cross-check fund managers' decisions on sourcing and utilization of funds.

The liquidity management policy should address at least the following requirements:

1. Prescription of norms for the classification of on-balance-sheet and off-balance-sheet items into different time buckets.

2. Establishment of procedures for measuring liquidity.

3. Fixation of tolerance limits of the asset-liability gap in each time bucket—individual gap and cumulative gap limits.

4. Prescription of a desirable mix of investment portfolios and maturity

distribution of financial instruments.

5. Establishment of procedures for review of the maturity structure of liabilities and assets.

6. Prescription of a credit-deposit ratio.

7. Fixation of a cap on call money borrowings.

8. Preparation of an options list for sourcing funds in order of priority and cost.

9. Development of a management information system for generating statements on the daily liquidity position.

10. Assignment of authority and fixation of norms for accessing funds from alternative sources in emergency situations.

11. Prescription of a format for reporting compliance.

The bank should formulate strategies to manage liquidity in conformity with the policy guidelines. “A bank's liquidity strategy should enunciate specific policies on particular aspects of liquidity management, such as the composition of assets and liabilities, the approach to manage liquidity in different currencies and from one country to another, the relative reliance on the use of certain financial instruments and the liquidity and marketability of assets. There should be an agreed strategy for dealing with the potential for both temporary and long-term liquidity disruptions.”[1]

17.4 LIQUIDITY RISK IDENTIFICATION

Liquidity management is not searching for funds when a crisis situation develops. It is a function that requires daily attention and involves meticulous planning to meet fund requirements on a real-time basis. Liquidity managers often have to operate under volatile market conditions, or deal with the erratic behavior of counterparties. Consequently, an effective liquidity management system requires the backup of a comprehensive management information system and a sound analytical process to assess liquidity requirements on a continuing basis.

Liquidity-conscious banks, and for that matter all banks, must have an appropriate mechanism to identify liquidity problems that may surface in a day or two or arise soon. The identification procedure should sort out potential liquidity problems that may occur within (1) a very short period of time (0 to 7 days); (2) a fortnight (8 days to 15 days); and (3) a slightly longer time span (16 days to 1 month and 1 month to 3 months).

Liquidity risk and its intensity can be identified from a scrutiny of the bank's assets and liabilities on a given date with reference to four parameters:

1. The ratios between certain selected items of assets and liabilities.

2. The extent of volatile sources of funds.

3. The visibility of liquidity risk warning indicators.

4. The quantum of liquidity gaps.

One way to assess liquidity risk is to evaluate the liquidity ratios. The basic structure of a bank's balance sheet is the primary indicator of potential and hidden liquidity risk, which can be discerned from a first-hand reading of certain key ratios between certain specified items of assets and liabilities. The analysis of these ratios will indicate whether there are significant mismatches in the basic structure of assets and liabilities that make a bank vulnerable to liquidity risk. Ratio analysis is the starting point for liquidity assessment, and it reveals a picture of the liquidity scenario. These ratios are discussed later in this chapter.

Another way to identify liquidity risk is to assess the proportion of volatile funds in the overall liability structure of a bank. The larger the ratio of volatile funds to total assets or the ratio of volatile deposits to total deposits, the greater is the liquidity risk. Call money market funds, government funds, institutional funds, corporate funds, and funds raised through certificates of deposit are large volatile funds. For that matter, all single deposits above a cutoff limit, say U.S. $10 million, are potently volatile in character.

The third way to identify liquidity risk is to look for liquidity risk indicators or drivers. A liquidity problem by itself is a sign of the financial instability of a bank. The offer of higher interest rates on deposits or higher coupons on issue of bonds than those offered by other market players is a summary indicator of financial weakness. Market gossip about the financial soundness of a bank, downward movement of performance indicators, and declining customer loyalty are signs of increasing risk of liquidity. The downgrading of a bank's rating, the unwillingness of domestic banks or correspondent banks abroad to continue their relationship on normal terms, or their insistence on collateral and other banks’ guarantees for usual dealings are warning signs of potential liquidity problems. The bank's inability to meet increased demand for funds from existing borrowers, its request to counterparties for extension of time to make payment on maturing liabilities, or its reluctance to allow premature withdrawal of deposits by customers against the normal banking practice are suggestive of undisclosed liquidity problems. Fast asset growth without the backup of stable

funds or an increase in the quantum of nonperforming loans that impair cash inflows are also drivers of potential liquidity risk.

The fourth way to identify liquidity risk is to evaluate the liquidity gaps existing in different time buckets. Liquidity gap is identified as the difference between cash outflows and cash inflows in a time bucket based on residual and behavioral maturity of assets and liabilities. If the quantum of assets in a particular time band, say 0 to 7 days, is more than that of liabilities, it is called a positive liquidity or maturity gap, and if the quantum of liabilities is more than that of assets, it is called a negative liquidity or maturity gap, which implies that cash outflows are more than cash inflows in that time band. The larger the negative gaps in the short end of the time buckets (0–7 days, 8–14 days, 15–28 days), the greater the potential liquidity risk is. Regulatory prescriptions in most countries require banks to disclose, as part of the disclosure obligation in the balance sheet, the maturity-wise distribution of assets and liabilities. It is possible to identify from the maturity gaps (asset-liability maturity mismatches) disclosed in the balance sheet whether a bank's asset-liability maturity structure is prone to high liquidity risk.

17.5 LIQUIDITY RISK MEASUREMENT

Liquidity risk is measured through tracking of maturity mismatches and cash flow mismatches. The liquidity measurement procedure should meet two objectives:

1. Reveal the liquidity position on an ongoing basis.

2. Examine how the liquidity position evolves under different scenarios and assumptions.

Banks have to establish an appropriate liquidity measurement process to find out the extent of mismatches in assets and liabilities of the same maturity, assess the liquidity position, and track the liquidity gaps. They first set up norms for classification of assets and liabilities into different time buckets, then construct the maturity ladder of assets and liabilities in the chosen time buckets, and finally determine the deficit or surplus of funds in each individual time bucket based on residual maturity or effective maturity, as well as the cumulative deficit or surplus of funds that exists within a specified time period, say, up to one year.

Time-Bucket Classification of Assets and Liabilities

The time buckets for classification of assets and liabilities are generally prescribed by the bank regulatory/supervisory authorities, and they are more or less the same in most countries. The norms for fixation of time buckets are based on standard practices and are almost similar between banks, but minor variations may exist because of differences in the asset-liability structure and bank-specific preferences. The assets and liabilities are placed in the time buckets in accordance with the expected timing of cash flows to find out the cash flow mismatches within each time bucket.

Liquidity measurement essentially focuses on the cash flow mismatches in the shorter time bands, that is, 0 to 7 days, 8 to 14 days, and 14 to 28 days. The assets and liabilities having fixed maturities like time deposits and term loans are placed in the respective buckets in accordance with their residual maturities, but the problem arises in deciding the time buckets of those items of assets and liabilities that do not have fixed maturities, like current and savings deposits, which are payable on demand, or overdrafts and revolving credits where customers have the freedom to draw funds at any time. Even residual maturities of time deposits and term loans are subject to uncertainties because of the possibilities of withdrawal of deposits and repayment of loans by customers before the due dates, and it is somewhat complex to precisely identify the time buckets in which these items can be placed. Quite a good amount of time deposits is rolled over by the depositors on the maturity dates involving no cash outflows. For example, the effective maturity of a six-month time deposit will be two years if it is rolled over thrice on maturity dates. In the reverse way, a few time deposits may be withdrawn by depositors before the maturity dates involving unanticipated cash outflows. The effective maturity of a two-year time deposit will be five months if it is withdrawn one year and seven months earlier than the maturity date. Likewise, some customers may repay term loans before the repayment date, resulting in unanticipated inflows of cash. These types of variances in cash inflows and outflows occur in each bank, but their actual intensity is difficult to assess. To a certain extent, the variances can be assessed by undertaking an analysis of historical data and observing the trend.

The amounts of assets and liabilities that do not have fixed maturities or whose effective maturities are different from contractual or residual maturities need to be apportioned between time buckets in accordance with realistic norms. The objective is that the measurement technique must generate a liquidity position that is close to actual. The shortfall in liquidity threatens disruption of a bank's operations, and the excess of liquid assets results in loss of income.

Consequently, the determination of norms for classification of assets and liabilities into appropriate time buckets assumes tremendous significance. It is necessary for banks to undertake empirical studies of the historical behavior of relevant items of assets and liabilities over a period of three to five years and determine the norms on the basis of the observed trend. Banks should undertake studies every six months, as customer behavior goes on changing within short periods due to changes in market conditions, and ensure that norms used and assumptions made for bifurcation of assets and liabilities into time buckets are in alignment with the prevailing scenarios.

An illustrative chart of some items of assets and liabilities that are subjects of historical studies is given in Table 17.1.

TABLE 17.1 Asset-Liability Behavior Pattern Study

Items for Historical Study	
Items of Liabilities/Assets	**Objective of Study**
Demand deposits (savings accounts)	To find out the core portion that remains with the bank all the time and the volatile portion that fluctuates from time to time.
Time deposits	To establish the average percentage of renewal as well as premature withdrawal of matured time deposits.
Contingent liabilities	To assess the average percentage of funds outflow due to invocation of guarantees or obligations to pay under letters of credit or derivative contracts.
Overdrafts, revolving credits	To find out seasonality in demand for funds. To work out the core and volatile portions of sanctioned credit limits. To find out the utilization pattern of the undrawn portion of sanctioned credit limits.
Term loans	To assess the average percentage of prepayment of fixed-tenure loans before maturity.

Banks should identify the items of assets and liabilities that are known to have a core portion and a volatile portion, undertake periodic studies of those items to ascertain the behavior pattern, and classify them into appropriate time buckets based on behavioral maturities instead of contractual maturities. The volatile portion should be placed in the first and second time buckets and the core portion in later time buckets depending on the nature of the item, and the rest of the items in the respective maturity buckets.

Liquidity Gap Analysis

The most common method to measure liquidity is to analyze the liquidity gap, which is the difference between cash inflows and outflows, in different time buckets. Banks should construct the maturity ladder for placement of different items of assets and liabilities in respective time buckets in accordance with the anticipated timing of cash flows, find out the liquidity gaps, and study the liquidity position in each time bucket. Banks should assess liquidity gaps in two platforms—a structural liquidity gap and a dynamic liquidity gap. The bank regulators/supervisors usually prescribe structural liquidity and dynamic liquidity maturity ladders.

Structural liquidity gap analysis reveals the maturity mismatches of assets and liabilities on a particular date. The structural liquidity statement is constructed by (1) placing cash inflows and outflows in different time buckets in accordance with actual residual maturities of those items of assets and liabilities that have fixed contractual maturities and which are not influenced by customers' options, and (2) placing the estimated future fund flows in different time buckets in accordance with the behavioral maturity pattern of other items of assets and liabilities that have core and volatile portions and whose effective maturities differ from contractual or residual maturities.

The dynamic liquidity statement of assets and liabilities shows the short-term liquidity position on a dynamic basis and is prepared to assess the net funding requirements over a chosen period, usually up to a time period of 90 days. The dynamic liquidity position is assessed on the basis of projected business growth and standing commitments to provide funds over the next three months and matched with the expected increase in resources (deposits, borrowings, refinance, etc.) to meet the demand for funds. The gaps between the inflows and outflows of funds during the next three-month period based on current and projected data will show the excess or shortfall of funds that can arise at different points of time.

An illustrative example of a structural liquidity statement is given in Table 17.2.

TABLE 17.2 Statement of Structural Liquidity

Maturity-Wise Break-up of Assets and Liabilities
Amounts in Millions of U.S. $
Residual/Behavioral Maturity

LIABILITIES	0–7 days	8–14 days	15–28 days	29 days–3 m	> 3 m < 6 m	> 6 m < 1 yr	> 1 yr– <3 yrs	> 3 yrs– < 5 yrs
Capital	00	00	00	00	00	00	00	00
Reserves and surplus	00	00	00	00	00	00	00	00
Deposits	2,100	1,250	1,450	1,700	2,700	1,700	2,500	500
Borrowings including subordinated debt	500	100	150	300	200	300	00	500
Other liabilities and provisions	200	100	150	200	150	100	200	200
Contingent liabilities	00	00	00	00	50	75	00	00
Committed credit lines	200	150	00	100	150	200	00	00
Unutilized overdraft/revolving credit limits	50	75	150	100	50	400	00	00
Derivative contracts	150	400	150	550	100	150	00	00
Interest payable	25	15	70	75	80	100	150	70
A. TOTAL LIABILITIES	3,225	2,090	2,120	3,025	3,480	3,025	2,850	1,270
ASSETS								
Cash	150	00	00	00	00	00	00	00
Excess cash balance with the central bank (over minimum statutory balance)	100	00	00	00	00	00	00	00
Balances with other banks	150	80	150	00	00	100	00	00

Maturity-Wise Break-up of Assets and Liabilities
Amounts in Millions of U.S. $
Residual/Behavioral Maturity

ASSETS	0–7 days	8–14 days	15–28 days	29 days–3 m	> 3 m < 6 m	> 6 m < 1 yr	> 1 yr– <3 yrs	> 3 yrs– < 5 yrs
Investments	800	1,400	700	1,800	1,080	1,300	1,200	600
Advances (performing)	1,300	800	600	1,200	1,350	1,800	1,300	400
Nonperforming assets	00	00	00	150	250	200	275	50
Fixed assets	00	00	00	00	00	00	00	100
Other assets	250	200	150	300	270	210	400	50
B. TOTAL ASSETS	2,750	2,480	1,600	3,450	2,950	3,610	3,175	1,200
C. MISMATCH (B–A)	(475)	390	(520)	425	(530)	585	325	(70)
D. CUMULATIVE MISMATCH		(85)	(605)	(180)	(710)	(125)	200	130
E. C as % of A	14.7	18.7	24.5	14.0	15.2	19.3	11.4	5.5

LIABILITIES	> 5 yrs– < 7 yrs	> 7 yrs– < 10 yrs	> 10 yrs– < 15 yrs	> 15 yrs	Total
Capital	00	00	00	1,050	1,050
Reserves and surplus	00	00	00	3,200	3,200
Deposits	50	00	00		13,950
Borrowings	100	00	00		2,150
Other liabilities and provisions	100	00	00	00	1,400
Contingent liabilities	00	00	00	00	125
Committed credit lines	00	00	00	00	800

Unutilized overdraft/revolving credit limits	00	00	00	00	825
Derivative contracts	00	00	00	00	1,500
Interest payable	25	00	00	00	610
A. TOTAL LIABILITIES	275	00	00	4,250	25,610
ASSETS					
Cash	00	00	00	00	150
Balance with central bank	00	00	00	00	100
Balances with other banks	00	00	00	00	480
Investments	150	00	100	00	9,130
Advances (performing)	50	00	50	00	8,850
Nonperforming assets	15	00	00	00	940
Fixed assets	100	300	00	3,150	3,650
Other assets	30	50		400	2,310
B. TOTAL ASSETS	345	350	150	3,550	25,610
C. MISMATCH (B–A)	70	350	150	(700)	
D. CUMULATIVE MISMATCH	200	550	700	00	
E. C as % of A	25.4			16.5	

The assets and liabilities placed in different time buckets indicate future cash inflows and outflows, and the difference shows the liquidity gap in each time bucket. Maturing liabilities indicate cash outflows and maturing assets cash inflows. Table 17.2 shows the liquidity gap in each time bucket, and the intensity

of the gap is expressed as a percentage of cash outflows in that time bucket. In the first time bucket of 0 to 7 days, there is a negative liquidity gap to the extent of U.S. $475 million, which is 14.7 percent of cash outflows in that time bucket. For assessing liquidity risk and its intensity, the mismatches in the lower end of the time buckets assume more significance, since the time and the options for taking remedial action in distressed liquidity scenarios are limited. The cumulative liquidity position up to a period of one year indicates whether a bank has a structural imbalance in the shorter maturity profile of assets and liabilities. A significant structural imbalance between assets and liabilities makes a bank highly vulnerable to liquidity risk.

In the same manner, banks have to construct dynamic liquidity statements in a maturity ladder consisting of the first four time buckets based on projections of sources and uses of funds during the ensuing quarter. The statement will show the fund outflows on account of increases in investments, loans and advances, and interbank commitments, and outflows on account of off-balance-sheet transactions and other planned expenditures/commitments, and the fund inflows on account of increases in cash holdings, deposits, borrowings, issue of bonds, and cash inflows from off-balance-sheet transactions including derivative contracts. The dynamic liquidity analysis should also be conducted with reference to institution-specific and market-specific liquidity risk events that can occur during the next quarter. The dynamic liquidity analysis is complementary to the structural liquidity analysis, and compilation and analysis of both structural and dynamic liquidity statements at regular intervals will show a bank's current liquidity position as well as how the liquidity scenario is going to evolve in the next few months.

17.6 LIQUIDITY MANAGEMENT STRUCTURE AND APPROACHES

Liquidity management involves an assessment of funds required at different periods of time and identification of sources from where the funds will be procured to meet not only the known sources of liabilities but also unanticipated demands for funds that arise on occasions during the course of business. Reliability of the sources and the cost of funds are critical to the liquidity planning process, and the success in procuring funds at reasonable cost depends on a bank's current financial standing and the prevalent market conditions. The

market perception about the status of a bank and the rating assigned to it by credit rating agencies reveal its financial standing. Deterioration in market standing or rating will adversely affect its ability to garner liquid funds in time at reasonable cost.

Liquidity Management Structure

A bank should maintain adequate liquidity at every place of operation, including the locations where the associate concerns owned or controlled by it operate. It is safer to follow a centralized liquidity management system under which the bank's central treasury or the funds management department in the head office will look after the liquidity management function, because it is not an isolated risk management function as there is a close link between liquidity risk and other types of risks, such as credit, market, operational, and reputation risks. For example, an increase in the quantum of nonperforming loans, volatile movements in interest and foreign exchange rates, a breakdown in operating systems, and negative publicity against the bank are different types of risk events that may have a significant impact on liquidity. It is difficult for individual business units or associate concerns to factor all probable adverse events in their own liquidity management systems. Liquidity management requires strong management information system support that captures relevant data from all locations and calculates the liquidity position on a real-time basis in all currencies in which the bank operates. A centralized liquidity management system is less vulnerable because the central treasury, in close coordination with all business heads and affiliated concerns, can make a realistic assessment of the demand for and supply of funds at different times.

Liquidity Management Approaches

There are two approaches to tackle the liquidity risk—the stock approach and the cash flow approach. Under the stock approach, built-in safeguards are put in place to ensure that adequate stocks of liquidity exist in different forms within a bank to meet financial commitments at all times. This objective is achieved by adhering to a few standardized ratios between different components of assets and liabilities that determine the basic structure of liquidity in a bank. The second approach is the cash flow approach under which the net shortfall in liquidity in different time buckets is assessed by deducting cash inflows from cash outflows, and plans and strategies are formed to meet shortfalls in funds that are likely to arise at different periods. Besides, the funds position in material business locations is also assessed, surplus pockets are identified, and plans drawn up to transfer funds from surplus to deficit pockets in advance to save the cost on borrowings.

The critical task in ensuring the accuracy of cash flow estimates is to correctly assess the movements of on-balance-sheet and off-balance-sheet items of assets and liabilities in the near future. Demand for new loans, requests for credit limit increase, drawdown under sanctioned limits and standing commitments, premature withdrawal of time deposits, prepayment of term loans, and use of put and call options by counterparties are critical factors that influence the cash flow projection. It is therefore essential to conduct empirical studies of the behavior pattern of certain chosen items of assets and liabilities from time to time and use the data on behavioral maturity patterns to make realistic estimates of cash inflows and outflows.

The ratios between some components of assets and liabilities that are of significance under the stock approach are described in the following paragraphs.

Ratio of Loans to Total Assets

The higher the ratio of loans to total assets, the greater is the element of illiquidity in the bank's operation due to the illiquid character of loan assets. Investments are more liquid and easily marketable assets as compared to loans. There is no ideal loan-asset ratio, which varies between banks. A loan-asset ratio higher than the historical banking industry average is acceptable, if there is an easily accessible secondary market for disposal of loans. The maintenance of a prudent ratio between the investment assets and the loan assets at all times is a

sound banking practice. The scope of trade-off between liquidity of assets and return on assets is limited, since a bank cannot sacrifice liquidity to any significant extent to generate higher returns on assets, as the failure to meet liabilities on time may lead to insolvency. The bank should carry a reasonable quantum of marketable liquid assets to meet anticipated and unanticipated liabilities under any situation. Business opportunities, comparative liquidity of options to deploy funds, comparative returns on investments and loans, and the default probabilities influence the loan asset ratio.

Prime Assets to Total Assets Ratio

The higher the ratio of prime assets to total assets, the greater is the liquidity in the bank's operations. Prime assets consist of items that are either cash or easily convertible into cash, that is, the bank's own cash balance, credit balances with other banks, investment in Treasury bills and dated government securities, equities and bonds that are quoted and readily marketable, and short-term money market placements. Too high a prime asset ratio may reduce the bank's earnings as there is a trade-off between liquidity and the risk-adjusted returns on financial instruments to a certain extent.

Ratio of Liquid Assets to Short-Term Liabilities

The higher the ratio of liquid assets to short-term liabilities, the lesser is the liquidity risk. Liquid assets consist of prime assets excluding the securities, which fall in the “held to maturity” category, and short-term liabilities are liabilities to customers, banks, and other counterparties that are due for payment, usually within a period of 30 days. In deciding the reasonability of this ratio, the marketability aspect of liquid assets should be kept in view.

Ratio of Short-Term Liabilities to Total Assets

The higher the ratio of short-term liabilities to total assets, the greater is the potential liquidity risk because of the preponderance of short-term liabilities in funding medium-and long-term loans. If the duration of the assets is more than that of the short-term liabilities, the bank has to look for funds from alternative sources to pay back the short-term liabilities on due dates. Liquidity risk arises if the short-term liabilities, especially short-term deposits and borrowings, are not rolled over by depositors and fund suppliers. The alternative sources of funds

may be uncertain and expensive.

Ratio of Core Deposits to Loans and Advances

The lower the ratio of core deposits to loans and advances, the greater is the liquidity risk. The intensity of liquidity problem in a bank varies in accordance with the structure of loans and advances. If the credit portfolio consists predominantly of fixed-tenure loans, the bank can minimize the liquidity risk by booking liabilities of similar duration, a back-to-back funding arrangement. This type of ideal situation practically does not prevail because banks usually carry a large advances portfolio, which consists primarily of working capital limits, a sort of revolving credits renewable annually, which are essentially long-term in nature. These types of loans and advances require the backup of long-term funds. The credit portfolio is generally illiquid as there is hardly any secondary market for the sale of loans at a fair price in case of need. The shortage of institutional suppliers of stable funds that can match a bank's fund requirements of desired maturity and cost makes the situation more complex. Consequently, medium-term and long-term loans and advances should be funded largely by core deposits, which generally stay with the bank, and other long-term liabilities. For operational convenience, core deposits can be taken as the sum of the semipermanent component of current and savings deposits (empirically derived portion that remains with the bank until the customer relationship is terminated), a reasonable amount of outstanding term deposits based on the rollover pattern, new term deposits based on the past accrual rate, and an estimated proportion of floating funds.

Ratio of Volatile Liabilities to Total Assets

The higher the ratio of volatile liabilities to total assets, the greater is the liquidity risk. Volatile liabilities include large institutional and corporate deposits and short-term market borrowings. Large wholesale deposits are much less stable, and the holders of these deposits generally look for higher return and greater safety. These deposits are volatile in nature and are often withdrawn without notice. This ratio should be low and based on the historical experiences of a bank.

Ratio of Investments to Purchased Funds

The higher the ratio of investments to purchased funds is, the greater the liquidity risk will be. The purchased funds comprising call money and term money market borrowings and the certificates of deposit, issued often at rates higher than card rates, are of a short-term nature. The major portion of investment is usually in the form of sovereign securities and bonds, and the market for their disposal is generally unidirectional (sellers many, buyers few), and it is often difficult to dispose of these investments at a fair price and within time. The liquidity risk will be higher if the purchased funds are utilized to build up an investment portfolio of longer maturity.

Foreign Currency Component

Banks accept short-term and medium-term foreign currency deposits from general customers, financial institutions, and large corporations and also take foreign currency loans from other banks, financial institutions, and international financial agencies. They provide term loans, revolving credits, and off-balance-sheet facilities in foreign currencies to the domestic as well as overseas customers. Besides, they reimburse funds in foreign currencies to their correspondent banks for honoring commitments on their behalf. It is therefore essential for banks to maintain adequate liquidity in foreign currencies to meet their commitments on time.

The liquidity management framework should include a mechanism that ensures adequate provision of liquidity in foreign currencies in which a bank deals. Where foreign currency deposits and borrowings are converted into domestic currency and utilized in domestic business, inflows and outflows of funds in domestic currency should be placed in appropriate time buckets to calculate the net funding position. When foreign currency liabilities mature, domestic currency is converted into foreign currencies for making payments. Both the above types of transactions involve currency risk. If the liabilities in a particular currency are more than the assets in that currency, the consequential currency mismatch or the maturity mismatch may result in loss or gain depending on the movement of exchange rates on the settlement dates. The mismatches involve liquidity risk if the bank is unable to get adequate foreign currencies without incurring heavy losses due to the adverse exchange rate. This trend was in evidence during the Asian financial crisis of the 1990s. It is therefore prudent to minimize currency mismatch through hedging operations to avoid potential liquidity risk. If a bank deals in multiple foreign currencies, it is not necessary to maintain funds in all currencies; it may keep funds in four or five major currencies which are predominant in its business operations and relatively stable.

17.7 LIQUIDITY MANAGEMENT UNDER ALTERNATE SCENARIOS

Market conditions influence the liquidity profile of banks daily. The behavioral

pattern of assets and liabilities established through empirical studies to estimate cash inflows and outflows in different time buckets may hold good under normal market conditions. But banks' liquidity profiles change abruptly under volatile market conditions, and consequently, they should have proactive liquidity management policies and strategies aligned with the conditions of certainties as well as uncertainties. Under normal market conditions, liquidity assessment is undertaken on both a static and dynamic basis through the analysis of structural liquidity and dynamic liquidity statements. The assumptions made for estimation of cash flows under different time buckets are based on both behavioral and residual maturities of assets and liabilities and remain valid during the normal market conditions, but these assumptions need to be modified when a bank faces abnormal conditions. A comprehensive liquidity management framework should therefore include assessment of liquidity gaps under alternative scenarios and planning of possible options to bridge the gaps. "Under each scenario, a bank shall try to account for any significant positive or negative liquidity swings that could occur. These scenarios shall take into account factors that are both internal (bank specific) and external (market related)."[2]

The scenario analysis is based on the premise that the behavior of cash flows is different under different scenarios, and the timing and the size of cash flows will change in tune with the scenario-specific assumptions. Banks should establish a liquidity management framework that takes care of liquidity assessment under the following scenarios:

1. Normal scenario.
2. Bank-specific crisis scenario.
3. Market crisis scenario.

Normal Scenario

Liquidity management under a normal scenario involves paying greater attention to volatile items of liabilities and matching asset maturity with liability maturity. Banks should reduce dependence on volatile liabilities to fund assets and observe the following basic safeguards to reduce liquidity risk:

- Deploy wholesale deposits to fund assets that are of equal maturity.
- Regulate the percentage of medium-term and long-term loans consistent with the volume of core deposits and borrowed funds of similar maturity.
- Invest part of the funds in Treasury bills and short-term commercial papers that can be sold quickly to meet unexpected withdrawals of deposits and drawdowns in overdraft and renewable short-term accounts.
- Maintain close liaison with customers who enjoy large credit facilities, ascertain the schedule of funds withdrawal from them, and make adequate provisions to meet their fund requirements at the required time.
- Devise strategies to borrow funds from alternative sources, like the central bank, other banks and financial institutions, and call money and term money markets, and set up clear priorities.

Bank-Specific Crisis Scenario

Liquidity management under a bank-specific crisis scenario involves anticipation of liquidity stress events and formulation of strategies to deal with the emerging scenario. The liquidity crisis occurs when adverse events take place within the bank that cause interruptions to cash inflows. The crisis can arise due to sudden withdrawal of wholesale deposits by customers, a run on deposits due to negative publicity, unexpected termination of rollover arrangement of time deposits of large value on maturity, failure of counterparties to repay large loans and downgrading of the bank's rating, and so on. A liquidity crisis can also occur if there is a high concentration of assets in a portfolio that deteriorates in quality in a short time resulting in multiple defaults. To assess the impact on liquidity in bank-specific crisis situation, banks should reconstruct cash flows under varying assumptions, such as the occurrence of a single liquidity stress event or two or

more events simultaneously, or a combination of events that represent the worst-case scenario. They should adopt preventive measures once the warning signals indicate that a shortfall in liquidity is likely to arise soon, in order to reduce volatility in the outflow of funds and simultaneously evolve contingency plans to overcome the situation.

The bank should take the following measures to deal with the crisis situation:

- Reduce its reliance on wholesale and volatile deposits.
- Restrict short-term borrowings to fund long-duration assets.
- Freeze loan sanctions in the pipeline.
- Restructure existing credit facilities enjoyed by customers, wherever possible.
- Frame contingency plans to augment its resources under different crisis situations.
- List the options for mobilizing funds, like liquidation of investments, sale of loans, securitization of assets, purchase of funds, and so on, and match the options with the volume of required funds and the time period within which funds must be available to tide over the crisis situation.

Market Crisis Scenario

Liquidity management under a market crisis scenario is more complex because banks have no control over the events that disturb the functioning of the financial market. A market crisis scenario may arise due to the tightening of monetary policy and liquidity adjustment facility by the central bank, withdrawal of refinance facilities by an export-import bank and other refinancing institutions, failure of one or more major players in the financial market to settle liabilities in time and the resultant contagion effect, and development of an economic and financial crisis leading to loss of investors' confidence in the financial system. During the market crisis, cash outflows on account of off-balance-sheet commitments like drawdown under standby commitments may increase substantially, and at the same time, the pool of surplus funds in the market gets diminished, limiting the bank's options to access the market. It is difficult to forecast the nature and the timing of events that cause a market crisis and establish appropriate preventive mechanisms. In a market crisis scenario, the cost of liquid funds becomes secondary, as honoring the commitments during the crisis situation is essential to retain customer confidence. The bank should prepare blueprints of plans relating to each of the possible market crisis events, which should include feasible options for augmentation of funds and assignment of responsibility to authorized officials within the organization to select the options to respond to the situation without loss of time.

17.8 LIQUIDITY CONTINGENCY PLANNING

Banks should prepare a contingency plan to respond to a liquidity crisis if liquidity stress events suddenly emerge. The plan should include the following aspects to deal with liquidity problems during the stressful situations:

1. Policies.
2. Strategies.
3. Authorities.
4. Responsibilities.

The contingency plan should include an analysis of the impact of different liquidity stress events on the bank's operations in terms of the probability of

occurrence and the severity of events, and the corresponding impact on cash outflows and inflows. Banks should draw up plans to respond to situations emerging from liquidity stress events and indicate the sources of contingency funding and sequence of use of those sources. The plan should be in alignment with the strategies contemplated to deal with bank-specific and market-specific liquidity crisis scenarios. The most important requirement for initiation of action under the contingency plan is the availability of accurate information and internal data on the cash flow position and external data on the liquidity position in other banks and the financial market in time with a view to assessing that an emergency situation has arisen in the liquidity front. Comprehensive and strong management information support is crucial for identification of a liquidity crisis and formulation of realistic contingency plans.

A contingency plan has two dimensions: the asset resolution and the liability control. The bank should have blueprints of asset disposal that specify the assets for sale in order of priority after becoming cognizant of the possibilities of distressed sale. The plan should include guidelines on the restructuring of composition and maturity of assets, which may involve loss of principal and erosion in earnings. For example, the bank may have to sell government papers and corporate bonds of long maturity at market prices that may be less than the acquisition prices, and purchase government Treasury bills of equivalent amount of much shorter maturity on which coupons are low. At the same time, the bank needs to formulate strategies to control swings in cash outflows that result from the unanticipated behavior of large depositors and other fund suppliers. It should have frequent dialogues with them to reassure them of the safety of their funds and dissuade them from exercising options to quit in times of crisis.

The bank should assess expected liquidity support from alternative sources and the reciprocal arrangements for credit support from other banks and financial institutions and lay down the priorities for funds procurement in the contingency plan. The options to access the central bank window for replenishment of funds through the liquidity adjustment facility, borrowings against collateral, and assistance under the lender of the last resort provision are not usually recognized by central banks as alternative sources of funding under the contingency plan.

17.9 STRESS TESTING OF LIQUIDITY FUNDING RISK

Banks should carry out stress tests of liquidity funding risk at regular intervals. The frequency of stress tests should be in keeping with the bank's own perception of liquidity risk, the asset-liability structure, the multiplicity of business locations, and its rating and market standing. Liquidity assessment under bank-specific and market-specific crisis scenarios deals with abnormal situations, while stress tests evaluate the risk proneness of the bank's asset-liability structure in terms of liquidity characteristics and severity of impact on profit and capital under varying assumptions of cash outflow events. Stress tests are tools to identify unsustainable asset and liability components like concentration of volatile deposits, high quantum of illiquid assets, and high level of maturity mismatches, and to assess the impact of swings in cash outflows on the bank's operations. The liquidity assessment under alternative scenarios, the liquidity contingency plan, and the stress testing of liquidity funding risk are multiple tools and techniques to manage liquidity risk; these are complementary to one another.

Banks should carry out two types of stress tests: a sensitivity test and a scenario test. The sensitivity test is done with reference to the variation in one risk element at a time. For example, if sudden and premature withdrawal of large time deposits is assumed as a risk element, the sensitivity test assesses the impact on the bank if withdrawals of such deposits take place to the extent of 50 percent, 40 percent, or 30 percent of the amounts held. The scenario test measures the impact from the application of two or three risk elements simultaneously. For example, if we assume that 30 percent of retail deposits are suddenly withdrawn by customers, 20 percent of liquid assets are sold at a 10 percent discount to meet the liquidity shortfall, and 30 percent of matured time deposits are rolled over at an interest rate that is higher by 100 basis points than the previous rate, then the scenario test reveals the impact on the bank from the application of these three risk elements simultaneously. The stress testing is carried out through backward shifting of one or two items of assets and liabilities to the first and second time buckets (0 to 7 days, and 8 to 14 days) from the later time buckets, which are affected by the assumptions made for stress testing.

Let us suppose that the bank holds a wholesale deposit of U.S. $100 million, which is classified under the 3 to 6 months time bucket. Now, if a request for the sudden withdrawal of 50 percent of the wholesale deposit is received from the customer, there will be a fund outflow of U.S. $50 million, which is shifted to the 0 to 7 days time bucket. Let us further suppose that the bank wants to sell Treasury bills of an equivalent amount to meet the shortfall in cash outflow. In

that case, the investment in Treasury bills of U.S. $50 million, which is also held under the 3 to 6 months time bucket, is shifted to the 0 to 7 days time bucket. If there are few purchasers of Treasury bills in the market on the event date, the sale may realize U.S. $45 million, resulting in a loss of U.S. $5 million. If at the same time a time deposit of U.S. $5 million has matured for payment, the bank may persuade the depositor to roll it for 3 months to meet the shortfall of U.S. $5 million, for which it agrees to pay an additional interest of 1 percent per annum, that is, an additional amount of U.S. $12,500 for 3 months. Thus, the stress testing of the liquidity funding requirement based on simultaneous application of three assumptions has revealed that the bank has incurred a loss of U.S. $5,012,500, which will have an impact on the bank's profit.

The procedure to conduct stress tests involves four steps. First, the structural liquidity statement of assets and liabilities should be constructed with reference to a particular date based on the residual and effective maturities. Second, the relevant amounts of liabilities should be shifted to the first, second, and third time buckets (0 to 7, 8 to 14 and 15 to 28 days, assuming a time zone of 4 weeks) in accordance with the assumptions made for stress testing. Third, the amount of liquidity shortfall should be calculated up to the selected time zone, and fourth, the amounts of assets that need to be sold to meet the liquidity shortfall should be shifted from the respective time buckets to the first, second, and third time buckets as per the assumptions made. If the bank decides to roll over one or two liability items, the relevant amounts should be shown under the appropriate time buckets. Thereafter, the net impact on the bank's profit should be calculated to quantify the liquidity funding risk.

The stress test should be done with reference to different time zones (up to 14 days, 28 days, 3 months, etc.) by tabulating the corresponding asset and liability figures under the relevant time buckets. Usually, the selected time zone corresponds to the expected time period up to which the stress situation is likely to continue. The impact of stress testing of liquidity funding under varying assumptions should be measured to determine the quantum of additional economic capital needed under Pillar II of the New Basel Capital Accord.

The bank should identify the risk factors with respect to which stress testing of liquidity funding risk should be carried out. The risk factors are usually those that cause liquidity risk, for example, erratic behavior of large time depositors and institutional fund suppliers, deterioration in the bank's financial position, downgrading of its rating that erodes depositors’ confidence, rumors and negative publicity against the bank resulting in flight of deposits, supervisory

action against the bank under a prompt corrective action framework, and so on.

An illustrative example of liquidity position under a normal scenario and stress-testing scenario based on assumption of flight of deposits due to rumor and negative publicity against the bank is given in Tables 17.3 and 17.4.

TABLE 17.3 Statement of Structural Liquidity (Normal Scenario)

Abridged Statement of Assets and Liabilities
Residual/Effective Maturity-Wise Break-up
Amounts in Millions of U.S. $
Residual/Effective Maturity

LIABILITIES	0–7 days	8–14 days	15–28 days	29 days–3 m	> 3 m < 6 m	> 6 m < 1 yr	> 1 yr < 3 yrs	> 3 yrs < 5 yrs
Retail deposits	1,600	1,150	1,350	1,400	1,700	1,400	2,500	500
Wholesale deposits	500	100	100	300	1,000	300	00	00
Total deposit liabilities	2,100	1,250	1,450	1,700	2,700	1,700	2,500	500
Other liabilities	1,125	840	670	1,325	780	1,325	350	770
A. TOTAL LIABILITIES	3,225	2,090	2,120	3,025	3,480	3,025	2,850	1,270

ASSETS	0–7 days	8–14 days	15–28 days	29 days–3 m	> 3 m < 6 m	> 6 m < 1 yr	> 1 yr < 3 yrs	> 3 yrs < 5 yrs
Investments	800	1,400	700	1,800	1,080	1,300	1,200	600
Other assets	1,950	1,080	900	1,650	1,870	2,310	1,975	600
B. TOTAL ASSETS	2,750	2,480	1,600	3,450	2,950	3,610	3,175	1,200
C. Liquidity Gap (B–A)	(475)	390	(520)	425	(530)	585	325	(70)

LIABILITIES	> 5 yrs < 7 yrs	>7 yrs < 10 yrs	> 10 yrs < 15 yrs	> 15 yrs	Total
Retail deposits	50	00	00	00	11,650
Wholesale deposits	00	00	00	00	2,300
Other liabilities	225	00	00	4,250	11,660
TOTAL LIABILITIES	275	00	00	4,250	25,610

TABLE 17.4 Statement of Structural Liquidity (Stress Testing)

Abridged Statement of Assets and Liabilities
Residual/Effective Maturity-Wise Break-up
Amounts in Millions of U.S. $
Residual/Effective Maturity

ASSETS	> 5 yrs < 7 yrs	>7 yrs < 10 yrs	> 10 yrs < 15 yrs	> 15 yrs	Total
Investments	150	00	100	00	9,130
Other assets	195	350	50	3,550	16,480
B. TOTAL ASSETS	**345**	**350**	**150**	**3,550**	**25,610**
C. Liquidity Gap (B–A)	70	350	150	(700)	

Abridged Statement of Assets and Liabilities
Residual/Effective Maturity-Wise Break-up
Amounts in Millions of U.S. $
Residual/Effective Maturity

LIABILITIES	0–7 days	8–14 days	15–28 days	29 days–3 months	> 3 m < 6 m	> 6 m < 1 year	> 1 year < 3 yrs	> 3yrs < 5 yrs
Retail deposits	2,605	1,035	1,215	1,260	1,530	1,260	2,250	450
Wholesale deposits	700	400	100	300	500	300	00	00
Total deposit liabilities	3,305	1,435	1,315	1,560	2,030	1,560	2,250	450
Other liabilities	1,125	840	670	1,325	780	1,325	350	770
A. TOTAL LIABILITIES	**4,430**	**2,275**	**1,985**	**2,885**	**2,810**	**2,885**	**2,600**	**1,220**
ASSETS	**0–7 days**	**8–14 days**	**15–28 days**	**29 days–3 months**	**> 3 m < 6 m**	**> 6 m < 1 year**	**> 1 year < 3 yrs**	**> 3yrs < 5 yrs**
Investments	800	1,400	700	1,800	1,080	1,300	1,200	600
Other assets	1,950	1,080	900	1,650	1,870	2,310	1,975	600
B. TOTAL ASSETS	**2,750**	**2,480**	**1,600**	**3,450**	**2,950**	**3,610**	**3,175**	**1,200**
C. MISMATCH (B–A)	(1,680)	205	(385)	565	145	725	575	(20)

Abridged Statement of Assets and Liabilities
Residual/Effective Maturity-Wise Break-up
Amounts in Millions of U.S. $
Residual/Effective Maturity

LIABILITIES	> 5 yrs < 7 yrs	> 7 yrs < 10 yrs	> 10 yrs < 15 yrs	> 15 yrs	Total
Retail deposits	45	00	00	00	11,650
Wholesale deposits	00	00	00	00	2,300
Total deposit liabilities	45	00	00	00	13,950
Other liabilities	225	00	00	4,250	11,660
A. TOTAL LIABILITIES	**270**	**00**	**00**	**4,250**	**25,610**
ASSETS					
Investments	150	00	100	00	9,130
Other assets	195	350	50	3,550	16,480
B. TOTAL ASSETS	**345**	**350**	**150**	**3,550**	**25,610**
C. MISMATCH (B–A)	75	350	150	(700)	

Stress Testing Procedure

Assumptions:

10 percent of retail deposits held in the 2nd to 11th bucket are withdrawn within 7 days.

20 percent of wholesale deposits held in the time bucket of 3 to 6 months are to be paid within two days and 30 percent within 10 days.

Assets maturing after 3 months are sold to the extent of the liquidity gap at a discount of 5 percent.

Let us assume that the stress situation is likely to last three months. There is a net liquidity shortfall of U.S. $1,295 million (–1680 + 205 – 385 + 565) up to the time zone of three months. The bank decides to sell assets maturing after three months to meet the liquidity shortfall arising within three months.

The impact of liquidity funding risk is calculated as follows:

Assuming that the assets maturing after 3 months are sold at a discount of 5 percent to meet the liquidity shortfall, the bank will have to sell assets of the value of U.S. $1,363.16 million to realize U.S. $1,295 million. The impact of liquidity funding risk will be:

5 percent discount on sale of assets of U.S. $1,363.16 million = U.S. $68.16 million.

The illustration shows that if a stress situation arises for the bank (not for the banking system as whole) due to the rumors and negative publicity against it that results in partial withdrawal of retail and wholesale deposits by customers and forced sale of assets at a discount to meet the demand for funds, it suffers a loss of U.S. $68.16 million. The loss has to be borne out of current revenues that reduce the net profit or may result in net loss. In the same manner, the bank can carry out the sensitivity test of liquidity funding risk based on a few assumptions to be applied one at a time or the scenario test based on a set of assumptions to be applied simultaneously. In bank-specific stress events, the severity of cash outflows will depend upon the composition of the deposit base, the extent of the guarantee from the deposit insurance corporation, customer loyalty, the bank officials' rapport with customers, the size and composition of the balance sheet, and the track record of management.

17.10 LIQUIDITY RISK MONITORING AND CONTROL

Though ALCO is the overall authority to monitor market risks including liquidity risk, the middle office has independent responsibility to monitor day-to-day management of liquidity by operational departments including compliance with liquidity risk management policies, strategies, and limits. The usual method to monitor liquidity risk is to prepare structural liquidity statements, weekly or fortnightly, and critically analyze the liquidity scenario in the light of liquidity gaps emerging in various time buckets. The liquidity risk should be monitored with reference to at least five parameters:

- Emergence of liquidity risk indicators.
- Appropriateness of tolerance limits.
- Occurrence of significant events.
- Validity of assumptions.
- Position of foreign currency liquidity.

Emergence of Liquidity Risk Indicators

Banks should prescribe prudent ratios between key items of assets and liabilities that will serve as benchmarks for identifying the structural mismatch of assets and liabilities that contain the potential for high liquidity risk. An exposition of these ratios was given in section 17.6.

The basic philosophy behind the prescription of these ratios between selected components of assets and liabilities is that:

1. Long-duration assets are not funded by short-duration liabilities beyond a reasonable limit.

2. The extent of customer deposits sets the boundary of asset expansion.

3. The maturity basket of assets largely corresponds to the maturity basket of deposits.

4. No compromise is done in maintaining a readily marketable stock of liquid assets to cover short-term liabilities.

5. Purchased funds do not become a regular source of potential liquidity risk and earning risk.

6. Aggressive expansion of loans without the backup of stable customer deposits is a bad business strategy.

Banks should compile prudent ratios from monthly and quarterly balance sheets and analyze them to identify liquidity risk indicators. The ALCO support group should monitor them to identify whether the prudent limits are crossing the boundaries and suggest the package of corrective actions required to revert to the prescribed ratios, if these are found to be unsustainable.

Appropriateness of Tolerance Limits

Banks should set up tolerance limits for liquidity gaps in various time buckets in accordance with the supervisory directions and in keeping with their business profile and risk management philosophy. The tolerance limits prescribed by the supervisory authority should be treated as the outer limits. The tolerance limit, that is, the percentage of negative liquidity gap in a particular time band to the aggregate of cash outflows in that time band, is more significant at the lower end of time buckets due to the limited time available to handle a high level of mismatch. The tolerance limits within the first three time buckets (0–7 days, 8–14 days, and 15–28 days) are usually in the range of 10 percent to 15 percent. In respect to the upper end of the time buckets, banks should prescribe a cumulative tolerance limit so that balance is maintained in the maturity pattern of assets and liabilities.

The officials responsible for monitoring and controlling the liquidity position should measure the liquidity gap in each time bucket daily as well as the cumulative gap in time buckets up to three years and analyze the significance of the gaps in the light of alternative sources available for liquidity replenishment. The liquidity gap analysis should highlight pronounced mismatches, identify reasons, and suggest measures to correct the situation within a definite time frame. Changes should be brought about in the composition and maturity profile of assets and liabilities to reduce liquidity gaps. To meet a temporary liquidity shortfall, banks can use a number of options, such as swapping of foreign currency balances held abroad into domestic currency, borrowing from call money and term money markets, issuing certificates of deposits, bargaining with customers for bulk deposits, and so on. An essential aspect of liquidity management is to avoid concentration of funding sources.

In the light of the scenarios that are likely to emerge under bank-specific or market-specific crisis situations, banks should review the appropriateness of tolerance limits from time to time and modify them within the outer limits prescribed by the supervisory authority. The structure of tolerance limits in a bank must be in alignment with its liquidity profile, trend of market volatilities, its size and geographical spread of operations, and the types of products and services it offers. If the financial market is fragile and volatile, and participants in the market are unidirectional, where most of them tend to borrow or lend at the same time to make quick gains either through arbitrage operations or

temporary placement of funds, lower tolerance limits will be safer. If the wholesale deposits and short-term money market borrowings are prominent items on the liability side and the overdraft limits and renewable credits are the major items on the asset side, liquidity risk from the liabilities held at the lower end of the time buckets will be greater. In such situations, prescription of low tolerance limits will be prudent.

Occurrence of Significant Events

Whenever unexpected events take place or an unanticipated drawdown in standing commitments materializes, banks may face a sudden shortfall in liquidity, which can be large on occasion. Some illustrations of significant events are:

1. Perpetration of large frauds.

2. Premature withdrawal of large corporate or institutional time deposits.

3. Default by a financial market participant to return call money or term money on the due date.

4. Defaults in repayment of a series of large loans by borrowers due to market volatility.

5. Devolvement of large amounts of unanticipated liabilities on the bank from off-balance-sheet transactions or other contracts/commitments.

The liquidity monitoring team should make periodic reviews of significant events that happened in the bank in the past and evaluate whether the events were extraordinary and unusual events, or are likely to recur. The team must assess the frequency and severity of the past significant events and the quantum of funds that were required on each occasion to meet the liquidity shortfall. It should also evaluate the cost-benefit aspect of the bank's response to the events in terms of the funds replenishment cost, the income foregone, and the business opportunities lost. If there is an event that changes the public perception about a bank, the fallout must be critically assessed from the angle of possible flight of deposits and the prolongation of the negative image, and appropriate remedial steps taken.

Validity of Assumptions

Assumptions are made to find out the core and volatile portions of a few items of assets and liabilities and the behavioral pattern of some other items for placement into different time buckets. These assumptions are based on conclusions derived from the analysis of historical data on selected items of assets and liabilities of the bank. For example, if empirical study reveals that average withdrawals in savings deposit accounts remain within 15 percent of credit balances and those in current deposit accounts within 20 percent, these variable portions are classified as volatile components and placed partly in the 0 to 7 days and partly in the 8 to 14 days time buckets. The remaining 85 percent of savings deposit balances and 80 percent of current deposit balances stay with the bank for a longer time and are classified as core components and placed in “over 6 months to one year” and “over 1 year to 3 years” time buckets in appropriate proportions. Likewise, if 50 percent of retail time deposits of different maturities are rolled over on maturity dates by customers, the relevant amounts of time deposits are placed in respective time buckets in accordance with behavioral maturity instead of residual maturity. Core and volatile portions of unutilized overdrafts and revolving credits (renewable short-term credits), where outstanding balances fluctuate within sanctioned limits, are determined on the basis of historical studies about the seasonal pattern of drawdown of funds. The volatile portions are placed in shorter-term maturity buckets and the core portions in relatively longer-term maturity buckets. The conclusions regarding the behavioral maturity pattern of certain items of assets and liabilities emerging from historical data analysis must be reliable, as these are crucial in ensuring the accuracy of liquidity gap estimation under various time buckets. The liquidity monitoring team must cross-check the validity of these conclusions and assumptions with reference to the actual behavior of relevant items of assets and liabilities at least biannually and suggest appropriate modifications.

Foreign Currency Liquidity

Banks must separately monitor the liquidity position of their foreign currency assets and liabilities, including commitments to other affiliated units working abroad. The monitoring team must study the maturity pattern of a bank's foreign currency liabilities under different time periods, say, up to 15 days, 1 month, and 6 months, and verify the arrangements in place to meet those commitments. Foreign currency mismatch is a source of currency risk and liquidity risk, and mismatched currency position is also subject to country risk and settlement risk. Banks should compile structural liquidity statements separately for foreign currency assets and liabilities, identify liquidity gaps, and make appropriate plans to meet foreign currency liabilities on time. Besides, the foreign currency assets and liabilities shall be converted into domestic currency and interpolated into the structural liquidity statement to reveal the overall liquidity position of the bank as a whole.

17.11 SUMMARY

Liquidity is crucial to a bank's stability of operations since its inability to make payments and settlements on time may create panic among customers and other financial sector participants and throw signals about its financial instability.

Liquidity management becomes more complicated if a bank has operational units in other countries that have different time zones of operation as liquidity has to be maintained on a global basis.

Idiosyncratic behavior of large depositors, uncertainty in exercise of options by term depositors on maturity dates, unanticipated drawdown in sanctioned credit limits, and sudden requirement of funds to make payments on contingent liabilities are the main liquidity risk factors. Besides, pronounced mismatches in maturity pattern of assets and liabilities cause severe liquidity problems.

The basic structure of a bank's balance sheet is the primary indicator of potential and hidden liquidity risk. A high ratio of volatile funds to total assets and emergence of liquidity risk events like rating downgrades and negative publicity cause sudden liquidity problems.

Liquidity risk is traced through maturity mismatches and cash flow mismatches. Liquidity measurement essentially involves matching of asset-liability maturities and calculation of maturity gaps to identify negative cash

flows in different time buckets.

Liquidity risk is assessed in two platforms—structural liquidity and dynamic liquidity. Structural liquidity analysis indicates the structural imbalance in the maturity pattern of assets and liabilities that contains high potential for liquidity risk, and dynamic liquidity analysis shows the net funding requirements during the succeeding months and helps to identify liquidity shortfalls in advance.

Banks should adopt both the stock approach and cash flow approach to manage liquidity. The stock approach requires banks to adhere to prudent ratios between certain critical components of assets and liabilities to ensure that adequate stocks of liquidity exist within the organization in different forms, while the cash flow approach requires them to calculate the net shortfall in liquidity in different time buckets and devise strategies to meet liquidity shortages.

The liquidity management framework should include procedures for assessment of the liquidity position under a normal scenario, bank-specific crisis scenario, and market crisis scenario and prescription of options to bridge the liquidity gaps.

Stress testing of liquidity funding risk should be carried out at regular intervals with reference to risk factors identified from the bank's own liquidity profile.

The liquidity monitoring team should identify liquidity risk indicators and suggest remedial steps to prevent the emergence of structural imbalance in the asset-liability maturity pattern.

NOTES

1. “Sound Practices for Managing Liquidity in Banking Organisations,” BCBS, February 2000.
2. “Sound Practices for Managing Liquidity in Banking Organisations,” BCBS, February 2000.

CHAPTER 18

Interest Rate Risk Management

18.1 INTEREST RATE RISK IN TRADING AND BANKING BOOKS

Interest rate risk refers to the risk of loss of a bank's current and future revenues due from trading and banking book assets and the risk of erosion in the value of those assets on account of movement in the rates. It indicates the extent of sensitivity of a bank to interest rate movements with reference to its current asset-liability position. Interest rate risk causes decline in interest revenues or increase in interest expenses or both simultaneously as well as decline in asset values. Risk encountered from expected changes in interest rates is not really a risk as known risk can be hedged in advance or products can be appropriately priced through inclusion of the risk element. Nonetheless, expected movements of interest rates also generate an element of interest rate risk due to the imperfect competition that usually prevails in the financial market or the asymmetry in interest rate variations on different financial instruments that exists across domestic and international financial markets. Changes in interest rates affect a bank's earnings by changing its net interest income as well as the underlying value of its assets, liabilities, and off-balance-sheet instruments. The short-term impact of changes in interest rates is on earnings, and the long-term impact is on the market value of equity or net worth. Interest rate risk is not a stand-alone risk and is linked to the business cycle and other risks.

Interest rate risk exists in both the trading book and the banking book. The trading book comprises those assets that are held by a bank for booking profits through purchase and sale by taking advantage of short-term movements in prices or yields, and the banking book comprises those items of assets that originate out of contractual relationships with clients and are held till maturity for generating steady income. Usually, assets like securities, equities, commodities, foreign currencies, and derivatives are held in the trading book and are subject to mark-to-market valuation. If the values of assets depreciate, banks are required to make provisions out of their current revenues, which reduce

profit. Banks have freedom to decide the composition of trading and banking books, but they cannot do so whimsically and arbitrarily. Most bank supervisors insist that the bank management prescribe norms and standards for inclusion of assets in the trading book and adhere to the norms during the accounting year. The supervisory direction on advance declaration of norms is intended to ensure compliance with standard accounting practices and defend the assurance that the bank's balance sheet represents a true statement of affairs.

The Basel Committee on Banking Supervision has indicated that “a trading book consists of positions in financial instruments and commodities held either with the trading intent or in order to hedge other elements of the trading book. … The financial instruments must either be free of any restrictive covenants on their tradability or able to be hedged completely. … Financial instruments include both primary financial instruments (or cash instruments) and derivative financial instruments. … Positions held with trading intent are those held intentionally for short-term resale and/or with the intent of benefiting from actual or expected short-term price movements or to lock in arbitrage profits, and may include for example proprietary positions, positions arising from client servicing (e.g., matched principal broking) and market making.”[1]

18.2 INTEREST RATE RISK CAUSES

Interest rate risk arises principally due to the gap or mismatch in assets, liabilities, and off-balance-sheet items that involve different principal amounts, different maturity dates, and different repricing dates. The factors that generate interest rate risk are:

1. Mismatch risk.
2. Yield curve risk.
3. Basis risk.
4. Embedded option risk.
5. Reinvestment risk.
6. Net interest position risk.

Brief descriptions of these interest rate risk elements are given in the following section.

Mismatch Risk

Mismatch risk refers to the risk that arises from maturity mismatches of a bank's assets, liabilities, and off-balance-sheet position and the consequential differences in the timing of repricing of these items. Mismatch risk exists if the principal amount of an asset and a liability is not equal in a one-to-one transaction or the tenures of the asset and the liability do not match. If every asset can be funded by a liability of equal tenure, the bank can maintain the desired interest spread and avoid interest rate risk. But in the day-to-day business of a bank, which is a financial intermediary between lenders (depositors) and borrowers (loan receivers) of funds, it is impossible to match the tenure of each asset with that of a liability. Consequently, mismatches of assets and liabilities invariably appear and generate interest rate risk through the repricing risk. The risk arises due to the bank's inability to reprice the assets or the liabilities on maturity in a manner that protects the interest spread, since the interest rate is largely influenced by the market trend. If a three-year fixed-rate loan is funded by a time deposit of six months maturity, the interest spread will shrink if the bank has to renew the time deposit every six months at higher rates in keeping with the market trend. Even if the bank finds an alternative source of funds after the initial six-month period, the carrying cost may not match. The decline in interest income arises because cash inflows from the loan are fixed over the three-year maturity period (assuming a fixed-rate term loan), but cash outflows on interest expended on the six-month time deposit will vary. Likewise, if a bank funds a one-year loan with a three-year fixed-rate time deposit, the bank may not be able to maintain the interest spread if the lending rate falls after one year, since the new loan in the second year has to be given at a lower rate. In this case, cash outflows on the liability are fixed for three years but cash inflows from the asset will vary. The repricing of assets and liabilities takes place at different points in time, which generates interest rate risk.

An interest rate management strategy based on flexible rates on both deposits and lending does not necessarily protect a bank from mismatch risk. When inflation rate rises in an economy or domestic currency depreciates rapidly against foreign currencies, the central bank intervenes through revision of the monetary policy, which may include tightening of liquidity in the financial system. When banks suffer from liquidity constraints, they increase interest rates on time deposits to secure fresh deposits and prevent the flight of maturing

deposits, which raises the average cost of funds. They cannot unilaterally revise their lending rates upward for existing customers until the loans are due for renewal or the cause of action arises under the covenant. Where the lending rate is linked to the prime lending rate and the loan documents confer the right on the bank to revise lending rates following revision of the prime lending rate, it may not be possible to increase the lending rate at the required point in time, disregarding market sentiments and peer banks' lending rate structure. Also, where loan documents permit banks to change the lending rate to an existing client at its discretion, banks refrain from doing so due to the fear of losing a valuable client until a convincing cause of action has arisen. Thus, differences in the timing of repricing of liabilities and assets generate interest rate risk even under a flexible interest rate regime, and cause net interest income to decline at least in the intervening period before revisions can take effect. Mismatch risk is thus unavoidable in banking.

Yield Curve Risk

Yield curve risk arises from the unanticipated shift in the shape and the slope of the yield curve, which affects the economic value of financial instruments. The yield curve rarely moves in a parallel fashion. The unequal changes in yields on comparable types of financial instruments of different maturities generate yield curve risk. An adverse shift in the yield curve impairs the value of assets, particularly the value of fixed-income instruments. When the yield curve shifts, the price of a financial instrument acquired by a bank at a cost, which was based on the yield prevailing on the date of acquisition, changes. The extent of impact is dependent on the movement in the shape of the yield curve. If the yield curve steepens, the yield spreads between short-term and long-term interest rates increase and consequently, the values of long-term financial instruments decline faster than the values of short-term instruments. If the yield curve flattens, yield spreads between short-term and long-term interest rates get thinner, and consequently the changes in the values of instruments are lesser.

Basis Risk

Basis risk refers to the risk of loss from adverse change in the earnings spread due to the unequal degree of change in the reference rates that are used as the base to price assets and liabilities. Interest rates on various financial instruments do not change by the same degree during a given period of time; they change in different magnitudes. The basis risk will exist even if maturity periods of assets and liabilities are same and they reprice after the same interval. A bank will face basis risk if the interest rate on a loan was fixed with reference to the London Interbank Offered Rate (LIBOR) and the interest rate on the debt to fund the loan was fixed with reference to the U.S. government Treasury note rate of the same maturity, if at the time of repricing the magnitude of change in LIBOR and the U.S. Treasury note rate was different. The bank's interest margin will increase if LIBOR increases and the U.S. Treasury note rate remains unchanged or declines at the point of repricing (ignoring the currency risk), and it will gain on account of a favorable basis risk. In the reverse scenario, the interest margin will contract and the bank will be subject to an unfavorable basis risk.

Embedded Option Risk

Embedded option risk is the risk of loss of interest earnings on account of options exercised by customers, fund suppliers, or option holders of swaps. The exercise of an option by an option holder alters the cash flows on the financial instrument or the financial contract. A bank's customers have options to withdraw funds at any time from deposit accounts, which do not have fixed maturity or withdraw time deposits before maturity, or prepay fixed-rate loans before the due dates, if lending rates in the market come down. Likewise, the issuer of bonds held by a bank may exercise an option to buy back if the coupon rate on bonds of similar rating and maturity declines in the financial market. In either of the cases, the bank's income declines due to the exercise of options by counterparties. The options are either explicitly mentioned in the instruments or the agreements or implicitly embedded in asset-liability transactions. In a volatile interest rate scenario, embedded option risks increase substantially due to the possibility of greater uses of options to the disadvantage of a bank. Premature withdrawals of time deposits increase when interest rates increase and prepayments of loans increase when interest rates decline. The range and the complexity of financial instruments and derivative products have increased so much in recent times that interest rate risk from embedded options has become a reality, and can be significant at times.

Reinvestment Risk

Reinvestment risk is an offshoot of mismatch and repricing risks. Due to the lack of investment opportunities, banks are often unable to reinvest maturing cash flows at the existing rate or at desirable spreads. If reinvestment of cash inflows from a matured asset takes place at a rate lower than that at which the investment was made initially, the bank's net interest income will decline, assuming that the cost of funds has remained unchanged. The loss of income arising from the declining interest spread on reinvestment options is the reinvestment risk.

Net Interest Position Risk

In the course of day-to-day business, banks hold a large amount of interest-free funds, which are called float funds and represent noninterest-paying liabilities. The examples of noninterest-paying funds are: (1) funds received from customers for issue of drafts or electronic transfer, which are held till the actual payment is made at another center, (2) down payment or cash margin received from customers as collateral against loans or for issue of financial guarantees or letters of credit till the transactions are closed, (3) funds received on behalf of the government toward collection of taxes and duties as agents till the funds are credited to government accounts, (4) funds received on behalf of corporate issuing equities or bonds till funds are returned to unsuccessful bidders, (5) funds held in member banks' accounts for settlement of interbank transactions in the clearing house, and so on. The size and average holding period of these float funds vary from bank to bank, but in general these are quite substantial. In view of the continuous inflows and outflows of funds at every working hour, there is on an average a large amount of core float funds that always stays in the bank's business. A bank's net interest position is positive if it has more earning assets than paying liabilities. In such a case, the bank's net interest income decreases when the market interest rate falls and increases when the interest rate rises, and it is reversed if a bank's net interest position is negative. If a bank has a large amount of core noninterest-paying float funds, it is less sensitive to interest rate changes.

18.3 INTEREST RATE RISK MEASUREMENT

Interest rate risk measurement techniques seek to assess the sensitivity of a bank's balance sheet to the changes in interest rates. The objective is to measure the quantum of interest rate risk inherent in the balance sheet. The economic activities and the business mix, and the composition of assets and liabilities vary between banks, sometimes quite significantly, and consequently the impact will also vary. Changes in the interest rate have an impact on the trading book almost instantly and on the banking book after some time. If the market interest rate changes, it takes some time for a bank to reset interest rates on deposits and

loans, but the impact on investments in the trading book is on the same day. A bank with a heavy investment portfolio funded by a few large and wholesale deposits or borrowings is more sensitive to interest rate changes than a bank with a dominant loan portfolio funded largely by retail deposits. Consequently, the choice of interest rate risk measurement approach and methodology will depend on the activities, the business mix, and the asset-liability composition of a bank.

The interest rate measurement models address the potential risks from all sources that generate interest rate risk, but it is difficult to set up models that take into account all individual sources simultaneously, because there is no reliable and empirically established data on correlation among the mismatch risk, basis risk, yield curve risk, and embedded option risk. It becomes necessary to make separate assumptions with respect to each of the interest rate risk sources and assess the impact on the balance sheet separately. However, the measurement system should identify and capture all material sources of interest rate risk from the existing and future activities of a bank and assess its vulnerability under stressful and volatile situations.

Interest Rate Risk Measurement Perspective

Banks should measure interest rate risk from two perspectives—the earnings perspective and the economic value of equity perspective. They should establish a methodology to calculate the impact of interest rate changes on the earnings in the short term, because reduction in earnings impairs profitability and slows down the process of accrual of retained earnings that contribute to capital growth. The technique to measure erosion in earnings due to interest rate changes assumes special significance because earnings analysis is an important parameter to judge the viability of a bank. Banks should simultaneously establish procedures to measure interest rate sensitivity from the economic value angle and evaluate the impact of interest rate movement on the balance sheet and the net worth. The economic value is calculated by discounting the net cash flows on all assets, liabilities, and off-balance-sheet positions by a discount factor that represents the market-driven interest rate. The economic value approach is more comprehensive than the earnings approach since it takes into account the present value of all future cash flows, but both the approaches are useful. While the earnings approach measures the impact of interest rate movement on the bank's profit in the short term, the economic value approach evaluates the impact on its net worth and the stability of its operations in the long run. Banks should use both the measures in tandem to take a view on the course of their earnings and the emergence of any destabilizing factor that may impair financial soundness.

There are four commonly used techniques to measure interest rate risk. These are:

- Maturity gap analysis.
- Duration gap analysis.
- Simulation analysis.
- Value-at-risk method.

For measuring interest rate risk sensitivity, it is necessary to bifurcate the balance sheet into the trading book and banking book. The trading book focuses on the price risk and the banking book on the earnings and the economic value risk. Each of the measurement techniques assesses the interest rate risk from different perspectives. Banks generally employ all four techniques, individually and in combination, to evaluate the overall impact of interest rate risk on the financial condition.

18.4 MATURITY GAP ANALYSIS

Maturity gap analysis is the simplest analytical technique to measure interest rate sensitivity of a bank's assets and liabilities and the impact on its earnings from the repricing mismatches. Banks first identify all interest rate–sensitive assets, liabilities, and off-balance-sheet items in the banking book and then place them into predetermined time buckets according to their remaining maturity or repricing period, whichever is earlier. This process generates a statement of interest rate-sensitive assets and liabilities and shows the repricing gaps arising from the maturity mismatches. Some items of assets and liabilities have definite repricing intervals and some do not. For example, fixed-rate assets and liabilities have definite repricing intervals after the expiry of the contractual maturity period, but floating rate assets and liabilities do not have definite repricing intervals. Consequently, banks need to conduct historical studies of behavioral maturity/repricing profiles as well as use their judgment and experience in assigning time buckets to the items of assets and liabilities that do not have definite repricing intervals, like the interest-bearing portion of demand deposits and certain other items like time deposits, loans, revolving retail credits, embedded options with put/call riders, and so on, where actual/behavioral maturities vary from contractual maturities. The difference between the quantum of rate-sensitive assets and liabilities shows the gap in each time bucket and the cumulative gap up to the selected time zone, say, the gap up to the one-year time period. The size of the gap in a particular time bucket is an indication of the intensity of interest rate sensitivity of assets and liabilities in that bucket. The larger the cumulative gap, the more sensitive is the bank to the interest rate changes. If the interest rate sensitivity statement on a given date reveals that the bank's liabilities are repricing faster than the assets, the bank is in a liability-sensitive position (like fixed-rate long-term loans backed by shorter-term deposits, which reprice faster). If, on the other hand, the statement reveals that the bank's assets are repricing faster than its liabilities, it is in an asset-sensitive position (like floating-rate loans backed by fixed-rate time deposits for one year and more). In the first case, if the interest rate rises the outflows will increase since the deposits will be repriced (at a higher rate) earlier than the loans, and in the latter case, the inflows will increase since the assets will be repriced (at a higher rate) earlier than the deposits. The period of time over which the impact of change in interest rates is computed determines which assets and liabilities are repriced. The impact of interest rate movement is much less in the long run than

in the short run, because new assets and liabilities can be booked at new rates.

To summarize, banks need to undertake the following activities for adoption of the maturity gap analysis method to measure interest rate risk sensitivity in the banking book:

1. To bifurcate the balance sheet into the trading book and banking book and specify the items to be included in each category.

2. To define and identify rate-sensitive assets, liabilities, and off-balance-sheet items and classify them into appropriate time buckets.

3. To assign time buckets to those items of assets and liabilities that do not fall under definite repricing intervals.

4. To assign time buckets to those items of assets and liabilities where actual/behavioral maturities vary from contractual maturities.

5. To specify norms for classification of retail demand deposits into interest-paying and noninterest-paying portions.

6. To develop an earnings at risk model to estimate the potential loss in the banking book arising from possible future movements in the interest rate.

Limitations of Maturity Gap Analysis

The maturity gap analysis method is more suitable for small-and medium-size banks with traditional products and portfolios. Large banks with a large volume of business and varieties of complex products require more sophisticated methodology. The maturity gap analysis technique is a static measure, because it takes into account the current volumes of assets and liabilities and assumes that they will not change. When using the maturity gap analysis technique, banks should check whether a static measure is really appropriate to evaluate the interest rate sensitivity, and if not, they should construct short-term dynamic interest rate sensitivity statements, taking into account the expected changes in the volume of assets and liabilities.

The maturity gap analysis method suffers from certain limitations. It assumes that all assets and liabilities mature at the same time within a time bucket and reprice at the same time. Besides, it assumes a parallel shift in the yield curve, which rarely happens, and again, it does not take into account the basis risk, though the prices of assets and liabilities are usually linked to different indexes. The asset price may be linked to the U.S. Treasury bill rate and the liability price may be based on LIBOR. In addition, maturity gap analysis ignores the embedded options risk, though in practice customers exercise options to withdraw time deposits prematurely and prepay term loans when interest rate changes are favorable to them. Last, it does not measure the change in the bank's market value of equity resulting from interest rate changes. Nevertheless, maturity gap analysis is a useful tool even for large banks to form an impressionistic view of the interest rate sensitivity of the balance sheet and initiate timely remedial action to mitigate risk.

18.5 DURATION GAP ANALYSIS

Duration gap analysis is another technique to measure a bank's sensitivity to interest rate risk. Duration measures the percentage change in the economic value of a position corresponding to the percentage change in interest rate. It indicates the quantum of change in the value of a bond corresponding to a change in the market interest rate, given the coupon payable on the bond, the current market yield, and the maturity period of the bond. Duration analysis is used to estimate the price sensitivity of financial instruments to changes in

interest rate. Duration shows the time taken by an investment made in a security to be repaid by its internal cash flows. The key elements that affect the duration of a financial instrument are the coupon rate and its current yield. Duration is lower for instruments with higher coupons, because of the coupon payments received before maturity, and vice versa. Consequently, duration is equal to maturity for zero-coupon financial instruments and lower than maturity where payments in installments are received before maturity. The greater the duration of a financial instrument, the greater is the price volatility of the instrument to interest rate changes. The methodology finally leads us to estimate the change in the economic value of equity arising from the changes in the interest rates.

Macaulay's Duration and Modified Duration

To shield the bank's balance sheet from adverse interest rate changes, it is necessary to know the interest rate sensitivity of individual assets and liabilities from their respective durations, ascertain the extent of change in the value of an item that will take place corresponding to a given change in interest rate, and examine the sensitivity of the market value of equity. Banks should undertake duration analysis based on the concept of Modified duration and Macaulay's duration which are explained in the ensuing section.

Macaulay's Duration

Frederick Macaulay first developed the concept of duration in 1938 and hence, the duration in its simple form is called Macaulay's duration and expressed in number of years. The duration gets modified when the current interest rate or yield to maturity on the instrument changes.

Macaulay's duration represents the number of years required to recover the cost of a financial instrument, taking into account the present values of the coupons and the principal received till maturity. It is computed first by multiplying the present value of each cash flow due on the financial instrument by the time it is received and then summing the present values of the cash flows and dividing the total present value by the current price of the instrument. Macaulay's duration measures the volatility of the instrument's price with reference to the changes in interest rate. The formula for calculation of Macaulay's duration is:

$$\sum_{t=1}^{n} [CF_t \times (t)/(1+i)^t]/\text{current price of the instrument}$$

where CF_t is cash flow at time t, t is the time period in which coupon and principal is received, n is the number of periods to maturity during which payment is received, and i is the yield to maturity.

Table 18.1 shows the calculation of Macaulay's duration for a bond of the face value of U.S. $500,000 with maturity of five years that pays 6 percent coupon annually. The bond was purchased at par to yield 6 percent coupon.

TABLE 18.1 Calculation of Macaulay's Duration

Period (T)	Cash Flow (CF) at Each Year	Discount Factor at 6% Annual Coupon	Present Value (PV) of Cash Flow	Period (T) x PV of CF
1	$30,000	.943396	28,302	28,302
2	$30,000	.889996	26,700	53,400
3	$30,000	.839619	25,189	75,567
4	$30,000	.789735	23,692	94,768
5	$530,000	.746925	395,870	1,979,350
Total				2,231,387

Macaulay's duration = $2,231,387 ÷ $500,000 = 4.46 years, assuming that the current market price of the bond is equal to its face value. If the market price of the bond is lower than its face value, the duration will be higher.

Modified Duration

Modified duration is derived from Macaulay's duration of an instrument and calculated as follows:

$$\text{Modified duration} = \text{Macaulay's duration} \div (1 + ytm \div n)$$

where *ytm* is yield to maturity and *n* is number of coupon periods per year (2 if the coupon is paid half-yearly). If the current yield is also 6 percent per annum and the coupon is paid annually, the modified duration of the bond will be:

$$4.46 \text{ years} \div (1 + 0.06 \div 1) = 4.21 \text{ years}$$

Modified duration is used to measure the interest rate sensitivity of an instrument. It indicates the percentage change in the price of a financial instrument resulting from a change in the interest rate, that is, by how much the duration changes for every percentage change in the yield.

The formula for calculating the price change of the instrument is:

$$\text{Percentage change in asset price} = -1 \times \text{modified duration} \times \text{change in yield } (\Delta i)$$

Let us suppose that the yield to maturity increases from 6 percent to 7 percent. The percentage change in bond price is calculated as:

$$\%\text{ change in bond price} = -1 \times 4.21 \times (0.07 - 0.06)$$

$$= -4.21 \times 0.01 = -4.21\%$$

$$\text{Change in bond price} = -\text{U.S. } \$500,000 \times 4.21\% = -\text{U.S. } \$21,050$$

If the yield to maturity increases from 6 percent to 7 percent, the bond price decreases by U.S. $21,050. The market value of the bond will be U.S. $478,950. Note that there is an inverse relationship between the change in the interest rate and the price of the bond.

Change in Equity Value

The duration method can be applied to estimate the interest rate sensitivity of a bank's economic value of equity. The bank has to first calculate the duration of each item of assets, liabilities, and off-balance-sheet positions including derivative instruments and then derive the weighted average duration of assets and liabilities including off-balance-sheet items. The difference between the weighted average duration of assets and liabilities multiplied by the ratio of rate-sensitive liabilities to rate-sensitive assets represents the duration gap.

$$\text{Duration gap} = DA - DL \times (RSL \div RSA)$$

where

DA = Weighted average duration of assets.

DL = Weighted average duration of liabilities.

RSL = Rate-sensitive liabilities

RSA = Rate-sensitive assets.

Suppose the bank's weighted average duration of assets is 3.50 years, weighted average duration of liabilities is 3.10 years, and the ratio of rate-sensitive liabilities to rate-sensitive assets is 0.90.

The duration gap is:

$$3.50 - (3.10 \times 0.90) = 3.50 - 2.79 = 0.71 \text{ years}$$

This implies that the average duration of the bank's assets is greater than the average duration of the bank's liabilities, and the values of assets are more sensitive to interest rate changes than the values of liabilities.

The duration gap is used to calculate the amount by which the bank's equity will change on account of changes in the interest rate. Once the duration gap has been computed, the change in market value of equity can be calculated by using the following formula:

$$\text{Change in market value of equity} = -\text{Duration gap} \times [\Delta i \div (1 + i)] \times \text{market value of assets},$$

where i is the interest rate.

Implication of the Duration Gap

The duration gap method measures the percentage change in the market value of a bank's equity in response to change in the interest rate. A financial instrument whose duration is longer is more risky than an instrument whose duration is shorter, and the larger the duration gap, the more sensitive is the bank's net worth to changes in interest rates. If the weighted average duration of assets exceeds the weighted average duration of liabilities, then the market value of equity of a bank declines when the interest rate rises and increases when the interest rate falls. In the reverse case, if the weighted average duration of liabilities exceeds the weighted average duration of assets, then the market value of equity increases when the interest rate rises and decreases when the interest rate falls. The market value of equity will remain unchanged if the duration gap is zero. The greater the duration gap, whether positive or negative, the more sensitive the market value of equity is in relation to the changes in interest rates.

Management of the Duration Gap

The solvency of a financial institution is judged by the institution's ability to pay up its present and future liabilities in full if and when the claims accrue, and its soundness is assessed on the basis of “going concern concept.” The financial institution has to ensure that the market value of its assets exceeds the market value of its liabilities at all times. Duration matching is a powerful tool to minimize the impact of changing interest rates on the financial position of a bank. The net worth of a bank is equal to the market value of its assets less the market value of its liabilities. A bank is more sensitive to interest rate risk, if there is an imbalance between the duration of assets and liabilities. By equating the weighted average duration of assets with the weighted average duration of liabilities, the bank can immunize its net worth against changes in interest rates. However, such an ideal situation is not achievable due to market imperfections. The goal is to make the weighted average duration gap as close to zero as possible.

If the weighted average duration gap is to be brought to zero, the bank will have to adjust the duration of assets and liabilities accordingly.

We have seen that:

$$\text{Duration gap} = \text{DA} - [\text{DL} \times (\text{RSL} \div \text{RSA})]$$

If we want to make the duration gap equal to zero, we shall have to adjust the duration of assets and liabilities to achieve the following equation:

$$\text{DA} - [\text{DL} \times (\text{RSL} \div \text{RSA})] = 0$$

$$\text{or, DA} = \text{DL} \times (\text{RSL} \div \text{RSA}), \text{ or, DL} = \text{DA} \times (\text{RSA} \div \text{RSL})$$

If the average duration of assets is more, the bank should bring it down in phases to reduce the duration gap as far as possible or increase the duration of liabilities to reach closer to the duration of assets. In real life situation it is impossible to match the duration of assets and liabilities due to limited options and imperfect market condition. A bank has a lesser control over the duration of liabilities than on assets inasmuch as the depositors and fund suppliers dictate their terms in keeping funds with the bank, but the latter can decide the maturity mix of its assets to a large extent.

When the duration gap is zero, the changes in the market values of assets and liabilities will offset each other if the interest rate changes and the net worth will remain unchanged. Since it is almost impossible to achieve a structure of assets and liabilities that produces a duration gap equivalent to zero, the interest rate

risk has to be minimized by reducing the positive or negative duration gap by altering the maturities of assets and liabilities over a period of time or by increasing the proportion of floating (adjustable) rate assets and liabilities. The risk can also be hedged by having recourse to derivative products, such as forward rate agreements, interest rate swaps, options, and futures.

In a changing interest rate scenario or where the interest rate is unstable but remains within tolerable limits, it is better to target a shorter duration of both assets and liabilities. The bank should undertake a sensitivity analysis of its market value of equity under different interest rate scenarios. It should find out the extent of change in the duration of assets and liabilities if the interest rate changes by 100 or 200 basis points and the consequential impact on the economic value of equity. The bank should analyze the current interest rate scenario and anticipate the future direction and the level of interest rates, and alter the structure and the maturity profile of assets and liabilities in phases. The bank should aim at achieving a shorter duration gap with a view to minimizing the impact of adverse interest rate movements on the market value of equity.

The duration of financial instruments changes over time and consequently, the durations of assets and liabilities need to be reset occasionally to effectively hedge against interest rate shocks. Banks should also take into account the convexity factor (the curvature of the price-yield relationship) to immunize their net worth against large variations in interest rates.

18.6 SIMULATION ANALYSIS

Simulation analysis is an effective tool to evaluate the sensitivity of a bank's balance sheet under different interest rate scenarios and measure the impact on the bank's net income and the market value of equity. A simulation exercise is undertaken with regard to variations in the future path of interest rates, shape of yield curves, changes in business strategy or funding strategy, product pricing and hedging strategies, and so on. Simulation analysis is much more complicated than maturity gap and duration gap analysis, as it is highly technical and high skill oriented. The reliability of findings of the simulation exercise is largely dependent on the validity of assumptions and the dependability of data, and if either of these two parameters is biased, the findings will be misleading. The simulation method is, however, flexible as the output of simulation can be aligned to the user's needs.

For evaluation of interest rate sensitivity of the bank's balance sheet, it is necessary to carry out two types of simulation analysis in harmony with the two basic objectives of measuring the impact on earnings and economic value of equity. The first type is the income simulation analysis, which reveals the changes in interest income or net income with reference to changes in interest rates. The income simulation exercise is a more realistic method of estimating the impact of interest rate risk than the maturity gap analysis and the duration gap analysis methods, provided the data and assumptions used in the model are representative and realistic. The two key inputs for the income simulation analysis are the “base case” scenario and the time horizon for measuring the impact of interest rate changes. The base case scenario with reference to which the comparison is made of the simulation outputs under alternative scenarios can be either the current balance sheet position on an “as is, where is” basis or the reconstructed position, after taking into account the expected changes in the composition of assets and liabilities and/or business activities over the selected time zone. It is customary to carry out simulation analysis based on a one-year time horizon for measuring variations in income, but the time horizon should be longer if a bank has a large volume of long-term assets funded by short-term liabilities because of greater maturity mismatch risk.

The second type of simulation analysis seeks to measure the changes in the market value of equity under different interest rate scenarios, and the analysis requires reliable data on the market values of traded instruments. The cash flows of assets, liabilities, and off-balance-sheet items should be discounted by using different projected interest rates as discount factors and the changes in the net worth or the market value of equity assessed, and then the outcome of the analysis should be compared with the base case scenario to draw conclusions. The result will be reliable only if the assumptions are realistic and tested for their validity. The simulation analysis is more significant for large financial institutions that have substantial interest rate exposures.

18.7 VALUE-AT-RISK

Value-at-risk (VaR) is a tool commonly used by banks to measure the loss that can arise from the investment portfolio, the foreign exchange portfolio, and the commodity portfolio, including gold, under usual volatility in market risk factors. It is necessary for banks to calculate the VaRs on different portfolios at frequent intervals to assess the erosion of asset values, the adequacy of capital

held to cover the market risk, and the impact on the market value of equity. The concept and the methodology to calculate VaR are discussed in the following section.

Concept of Value-at-Risk

VaR is the potential loss that can occur on an asset, a portfolio, or a position due to the adverse movement in selected market risk variables, and is measured with respect to predetermined time zones and specified levels of confidence. VaR as a risk assessment tool can be utilized to estimate the loss that can occur on a single financial instrument, a portfolio of assets, a trading position, or an investment project. The potential loss estimated through the application of VaR methodology can be different from the actual loss that can finally occur. In fact, the actual loss on the financial instruments or the trading position that has occurred in the past is compared with the estimated VaR to judge the validity of the model and the reliability of data used in the model. The inputs for calculation of VaR are the volatility in asset values, the time period over which the risk is to be assessed, and the assumed level of confidence. The time period with reference to which the VaR is estimated can be a day, a week, a fortnight, a month, or even a year. The New Basel Capital Accord has prescribed a minimum holding period of 10 trading days for calculation of VaR. The latter will change even on an identical package of financial instruments or trading position if either the time period (“the holding period”) of the portfolio or the assumed level of certainty (probability of occurrence) or the level of confidence changes. With the help of the VaR model, we can say with varying degrees of certainty that the potential loss on a portfolio or a position will not exceed a specified amount under normal market conditions.

Implication of VaR

VaR indicates the maximum loss in N business days that can occur under an assumed level of confidence and is expressed through a statement as follows:

> "We are *X* percent certain that we will not lose more than *R* millions of value in the next *N* days," where *R* is the *N*-day VaR for an *X* percent confidence level (*N*, *R*, and *X* are positive integral numbers). For calculating the VaR of an asset or trading position, it is necessary to work out the volatility of the values of the relevant variable, choose the confidence level, and select the time horizon.

Finding the Volatility of Asset Values

Volatility is a statistical concept that shows the past dispersion of values of an asset from its average over a specified time period; it is the crucial input for computation of VaR. Volatility reveals how rapid were the movements in the prices of securities, stocks, options, and so on, or how much were the variations in the returns on investments in bonds, or the fluctuations in capital market or commodity market indexes within the chosen time period. It is calculated as the standard deviation of the percentage changes in an asset price from its average over a specified time period. It measures the change with reference to original value and shows the rate at which the values of the chosen variable have moved up and down in the past. A security that is subject to high volatility is prone to undergo large changes in value over a short period of time. A lower volatility means that the future fluctuation in the value of the security is expected to be relatively moderate. The time series data on values of variables, like stock price, gold price, interest rate, exchange rate, and so on, help us to calculate the standard deviation or historical volatility. From the annual volatility figure, we can compute 1-day, 10-day, or monthly volatility, and so on, through the square root rule. For example, daily volatility is annual volatility divided by $\sqrt{250}$, assuming one year consists of 250 trading days.

Choosing the Confidence Level

In managing market risk, it is necessary to know the potential loss that can arise from assets that constitute the investment portfolio or from the trading position. We need to know not merely whether the values of assets or position will fall, but the extent to which these can fall, or with what level of confidence we can say that the values will not fall below a certain amount. We have to follow the link between the standard deviation of the fluctuations in an asset value and the confidence level in order to calculate the amounts of potential losses that can occur on financial instruments or trading positions under different levels of confidence for different holding periods. The standardized relationship among the standard deviation, the probability of occurrence, and the confidence level is given in Table 18.2.

TABLE 18.2 Standard Deviation–Probability Distribution–Confidence Level Relationship

Standard Deviation (rounded)	Probability of Occurrence (%)	Level of Confidence (%)
1	68.3	84
1.65	90	95
2	95.5	97.5
3	99.7	99.9

Selecting the Time Horizon

VaR is estimated with reference to the chosen holding periods, such as 1 day, 10 days, 1 month, or 1 year. The choice of the holding period will vary in accordance with the type of exposure or the nature of the transaction. VaR on the open foreign exchange position is usually calculated at the end of each day, that is, a holding period of one day, while VaR on investment in sovereign securities or equities is generally calculated with reference to a holding period of 10 days, a fortnight, or 1 month. The regulatory prescription, the standard accounting practices, and the bank's risk appetite decide the length of the holding period.

The amount of potential loss derived through the application of VaR methodology will vary according to the chosen level of confidence. The higher the level of confidence desired to be achieved, the larger will be the VaR or the amount of potential loss, and the larger will be the capital requirement to cover the market risk. What confidence level a bank will adopt as the benchmark will depend upon its risk management philosophy and the risk-bearing capacity. A bank that seeks to adopt a liberal approach may calculate VaR based on a moderate level of confidence, that is, 95 percent, but a bank that likes to follow a very conservative approach may estimate VaR based on a high level of confidence, that is, 99.9 percent. The practice varies between banks within the range of 95 percent to 99.9 percent, that is, 1.65 to 3 times of the standard deviation. Again, VaR will vary in accordance with the chosen holding period. The longer the holding period, the larger the VaR will be, signifying a higher quantum of potential loss.

VaR is calculated separately for different types of financial instruments and different kinds of exposures. For example, it is separately calculated for:

1. Fixed income securities.

2. Equity position.

3. Foreign exchange position.

Various methods for computation of VaR, such as the variance-covariance method, historical simulation method, and Monte Carlo simulation method, are in vogue. Banks can, however, compute VaR on an individual financial instrument or a trading position in a simplified way by using the current price and the percentage of volatility in instrument prices or position values observed during the last couple of years. A risk-sensitive bank should calculate VaR with respect to different holding periods (1-day, 10-day, 1-month, 1-year) and

different confidence levels (1.65 times standard deviation corresponding to the 95 percent confidence level, three times the standard deviation corresponding to the 99.9 percent confidence level) on different types of financial instruments and positions, and establish appropriate norms to manage market risk.

Utility of the VaR Model

VaR is a useful tool to manage market risk. It indicates the maximum amount the bank can lose under normal circumstances for a given volatility percentage, holding period, confidence level, and current value of the asset. Banks calculate VaR on an individual instrument, the investment portfolio, and the trading position on both on-balance-sheet and off-balance-sheet items and assess the possible impact of market risk. They derive balance sheet values with reference to different market risk factors through application of the VaR methodology and use the simulated balance sheet values to assess the fall in equity value on account of unfavorable movement in market risk factors. The decline in equity value must be compared with the existing equity and an appropriate amount of equity maintained to avoid breach of capital adequacy ratio. For management of interest rate risk, banks establish an overall VaR limit, that is, the maximum amount of equity value at risk, and take remedial action when VaR crosses that limit under reasonable assumptions.

VaR must be back-tested by comparing the derived potential loss data with the actual loss data pertaining to the relevant period, and if significant deviations between derived losses and actual losses are observed, the methodology and the assumptions should be suitably modified. The objective is that the output of the VaR model must be close to the real situations prevailing from time to time. VaR is a sophisticated risk measurement tool that helps to manage market risk in the trading portfolio and determine the appropriate business mix, but it is not a substitute for other checks and controls that need to be observed to manage market risk.

Limitations of the VaR Approach

The VaR approach has certain limitations and drawbacks. It makes certain assumptions and uses historical data or simulated data, which may not be realistic or may have limited validity. The assumption of normal distribution of data, like price or yield fluctuation data, for the computation of the standard deviation may not hold good in real situations, or the volatilities and correlations derived from the past data may not be a good approximation for estimating the future behavior of market variables. Besides, VaR estimates are based on the end-of-day positions and do not generally take into account the intraday trading risk, and the VaR approach focuses on the estimation of losses for specified time horizons, which are usually very short, 1-day, 10-day, or 1-month, and where the time horizon is long, the estimates are likely to be biased. Nevertheless, the VaR methodology is a handy tool for assessment of market risk in the day-to-day business of a bank and widely used by financial institutions.

18.8 EARNINGS AT RISK

Earnings arise from various sources, but here we confine ourselves to the loss of earnings from adverse movement of interest rate. Earnings at risk (EaR) refers to the possible erosion in the net interest income of a bank on account of changes in the interest rate. EaR is computed with reference to a selected time zone, which may be a quarter or a half-year or one year. Banks find out the gaps between the rate-sensitive assets and liabilities in different time buckets and then multiply the positive or negative gaps by the assumed changes in the interest rate to calculate EaR. They select a time zone for calculation of EaR that is appropriate to its balance sheet size and the maturity-wise distribution of its assets and liabilities. If a bank has large amounts of short-term assets and liabilities, it may have to measure EaR at shorter intervals (weekly or fortnightly), but if it has relatively longer term assets and liabilities it may calculate EaR at longer intervals (monthly, quarterly, or half-yearly). It is sufficient to select a one-year time zone for calculation of EaR, because the accounting period usually stretches up to one year, and it is difficult to predict the interest rate scenario beyond one year, and also the change in earnings taking place within the accounting year is more meaningful. If a bank intends to find out the impact on its net interest income during the next quarter on account of a change in interest rate in relation to the

current quarter, it should take into account the receipts and payments (calculated at the revised rate) arising from the amounts of assets and liabilities that reprice during the next quarter. For evaluation of the interest rate sensitivity of interest income during a particular time period, the bank should take into account the assets and liabilities that reprice during that time period. The difference between the rate-sensitive assets and liabilities up to the selected time zone will be the maturity gap, the mismatch gap, or the repricing gap, on which the change in net interest income should be calculated. The effect on the net interest income (NII) due to a change in the interest rate for any specified time zone can be measured in the following way:

$$\begin{aligned}\text{Change in NII} &= \text{cumulative gap} \times \text{change in interest rate} \\ &= (\text{rate-sensitive assets} - \text{rate-sensitive liabilities} \\ &\quad \text{up to the specified time zone}) \times \text{change in interest rate}\end{aligned}$$

The interest rate sensitive asset-liability gap statement can be utilized to calculate the effects on the profit and the equity of the bank for a specific reporting period.

The steps for computation of EaR are narrated here:

Step 1:

Choose the repricing period to measure the interest rate sensitivity of assets and liabilities.

(Note: A one-year time gap is usually selected as the time zone to measure EaR. The rate-sensitive assets and liabilities that will be repriced within one year are taken into account.)

Step 2:

Distribute the rate-sensitive assets and liabilities into different time buckets as per their repricing periods.

(Note that rate-sensitive assets and liabilities reprice over different time horizons. For example, a 10-year housing loan at a fixed rate of interest does not reprice over the remaining period of the loan, while a one-year time deposit will reprice after one year.)

Step 3:

Find out the volume of rate-sensitive assets and liabilities that reprice within the selected time zone.

(Note: This includes both on-balance-sheet and off-balance-sheet items including derivative products.)

Step 4:

Arrive at the rate-sensitive net exposure (rate-sensitive asset exposure – rate-sensitive liability exposure) within the selected time zone.

(Note: If the liability exposure is more than the asset exposure, there is a negative gap, which means that the volume of liabilities that reprices exceeds the volume of assets that reprices within the same time zone.)

Step 5:

Multiply the gap with the assumed percentage change in interest rate.

A simplified example of compilation of an interest rate sensitive asset-liability statement and calculation of EaR is given in Tables 18.3 and 18.4.

TABLE 18.3 Interest Rate Sensitive Asset-Liability Statement

Computation of Earnings at Risk
Assumption: Increase in Interest Rate
Amounts in Millions of U.S. $

	0 to 7 days	8 to 14 days	15 to 28 days	29 days to 3 months	> 3 months < 6 months	> 6 months < 1 year
Total rate-sensitive assets	910	720	1,175	2,460	5,950	8,830
Total rate-sensitive liabilities	1,230	960	900	1,980	6,860	7,390
Periodic repricing gap	(320)	(240)	275	480	(910)	1,440
Impact period in months (counting from midpoint of time buckets)	11.87	11.63	11.30	10.5	7.5	3
1% increase in interest rate	0.01	0.01	0.01	0.01	0.01	0.01
Impact on NII	−3.17	−2.33	+2.59	+4.20	−5.69	+3.6
Total Impact						−0.8

The following assumptions have been made:

The selected time zone is one year.

The interest rate changes by 1 percent.

The change of interest rate takes place at the midpoint of the time bucket and the impact period is up to the remaining period of one year.

The repricing dates of assets and liabilities commence at the same time.

The change in interest rate is uniform across the maturity buckets up to one year (yield curve shift is parallel).

Subject to the assumptions made in the computation of impact on net interest, the illustration given in Table 18.3 shows that, if the interest rate increases by 1

percent, the net interest income decreases by U.S. $3.17 million on account of asset-liability mismatch in 0 to 7 days time bucket, U.S. $2.33 million in 8 to 14 days time bucket, but it increases by U.S. $2.59 million in 15 to 28 days time bucket and so on. In the first time bucket, the amount of liabilities to the extent of U.S. $320 million reprices more than the quantum of assets. Other things remaining equal, both the interest expenses on liabilities and interest income on assets held in the first time bucket increase when the interest rate rises, but the cash outflows are larger than the cash inflows since the quantum of liabilities is more than that of assets and the net interest income declines. Table 18.3 shows that the bank's interest income falls by U.S. $0.8 million within the selected time zone of one year if the interest rate increases by 1 percent. The reverse will be true if the interest rate falls by 1 percent; the net interest income will rise by an equivalent amount (Table 18.4). When the interest rate rises, net interest income will decline if the asset-liability repricing gap is negative and will increase if it is positive.

TABLE 18.4 Computation of Earnings at Risk

Interest Rate Sensitive Asset-Liability Statement
Assumption: Decrease in Interest Rate
Amounts in Millions of U.S. $

Periodic repricing gap	(320)	(240)	275	480	(910)	1440
Impact period in months (counting from midpoint of time buckets)	11.87	11.63	11.30	10.5	7.5	3
1% decrease in interest rate	−0.01	−0.01	−0.01	−0.01	−0.01	−0.01
Impact on NII	+3.17	+2.33	−2.59	−4.20	+5.69	−3.6
Total Impact						0.8

Estimation of Earnings at Risk

The important factors that influence interest rate are the liquidity condition in the financial market, general price movements, fiscal policy of the government, monetary policy of the central bank, exchange rate movements, developments in domestic and international financial markets, and the asset-holding preferences of households. It is difficult to predict whether interest rates will remain steady, move upward or downward in the near future, and if it changes, by what percentage point. It is the job of the bank's economists to critically analyze the economic and banking scenario and draw a road map of interest rate movements that can take place in the short and medium terms. Taking a view on interest rate movement is not guesswork, because the direction of interest rate movement and the likely change in the level can be anticipated with some amount of confidence, except when it is apprehended that economic slowdown is likely to set in or market volatility is going to accentuate. The direction and the scale of interest rate movements in the past in combination with the other economic factors that influence interest rates guide us to form an opinion about the future interest rate scenario. The standard deviation of interest rate movements in the past indicates the possible range of variation in interest rates.

Banks should collect historical data on interest rate changes in the recent past, calculate the standard deviation of interest rate movements, and estimate the likely change in the rate that can occur during the next few months or a year on the basis of the current interest rate scenario and the standard deviation. They can modify the estimated rate on a judgmental basis, if there is reasonable ground for it. Once the bank forms a view about the direction of interest rate movement and estimate the likely percentage change in the rate, it can calculate the amount of earnings at risk from the interest rate sensitive asset-liability statements shown in Tables 18.3 and 18.4 on the basis of relevant assumptions.

18.9 INTEREST RATE RISK MANAGEMENT

The Basel Committee on Banking Supervision laid down the principles for management of interest rate risk in its revised document released in July 2004. As enunciated by the Basel Committee, “sound interest rate risk management

involves the application of four basic elements in the management of assets, liabilities and off-balance sheet instruments:

a. Appropriate board and senior management oversight;

b. Adequate risk management policies and procedures;

c. Appropriate risk measurement, monitoring and control functions; and

d. Comprehensive internal controls and independent audits."[2]

In harmony with these principles, banks shall put in place adequate policies and procedures for managing interest rate risk, both on day-to-day and long-term bases, and maintain clear lines of authority and responsibility for managing and controlling the risk. A bank should have at the minimum the following arrangements for managing interest rate risk:

a. "Appropriate limits on risk taking;

b. Adequate systems and standards for measuring risk;

c. Standards for valuing positions and measuring performance;

d. Comprehensive interest rate risk reporting and interest rate risk management review process; and

e. Effective internal controls."[3]

In essence, a bank has to focus its attention on four critical sources of interest rate risk:

- Funding risk.
- Maturity mismatch/repricing risk.
- Term structure risk.
- Embedded option risk.

The strategies for managing interest rate risk must address the issues relating to the present structure of the balance sheet and the contemplated changes in the future structure, the product pricing policy, the limits within which the bank must operate, the off-balance-sheet activities, and the capital allocation to cover interest rate risk. Banks should put in place the tolerance limits for interest rate risk both in relation to the maximum loss of earnings and the minimum market value of equity under various interest rate scenarios. With a view to minimizing the adverse effects of interest rate movements on earnings, banks should calculate earnings at risk at frequent intervals under realistic assumptions on the near future behavior of interest rates and take proactive measures in advance.

Banks should maintain an appropriate management information system to compile interest rate risk sensitive asset-liability statements at quarterly intervals or even at shorter intervals, if the interest rate is volatile. They should calculate

earnings at risk on a quarterly basis with respect to the anticipated interest rate movements and initiate appropriate remedial measures. If a bank is liability sensitive, it should rearrange its asset portfolio over a period of time by acquiring assets of appropriate maturity with flexible interest rates. For example, it should gradually reduce fixed-rate medium-and long-term loans and acquire more floating-rate short-term loans, and enter into forward rate agreements to hedge risk from adverse movements in interest rates or enter into interest rate swaps where credit spreads are getting thinner.

Banks should focus attention on the structure of yield on securities of different maturities, assess the likely direction and the possible change in yield, and restructure their investment portfolio in keeping with the emerging scenario. There is an inverse relationship between the value of a security and the yield to maturity, and the volatility in investment values, that is, the appreciation or depreciation, is governed by the movements in the yield-to-maturity. Volatility is a function of the maturity period and the coupon rate, and consequently, the longer the period to maturity or the lower the coupon rate, the greater is the risk of erosion in investment values. Consequently, the bank should maintain a balanced investment portfolio comprising a healthy mix of securities of varying coupon rates and varying maturities. Even in the case where the bank does not have direct credit exposure to a counterparty but has a large investment exposure by way of subscriptions to bonds, debentures, and equities, it has to regularly keep track of the financial health of the counterparty and the interest rate movements in the market and off-load the investment before the counterparty's financial health deteriorates or the market interest rate hardens.

A bank should compute both the volatility of earnings (earnings at risk) based on the maturity gap analysis method and the volatility of equity value based on the duration gap analysis method under various interest rate scenarios. The bank must operate within the risk limits approved by its board and take appropriate remedial actions when the exposures exceed the risk limits. It should adopt both the maturity gap and the duration gap analysis and cover all items of assets, liabilities, and off-balance-sheet items for interest rate risk management. The focus should be on matching the duration of assets and liabilities, because duration matching is more effective than matching the maturities or repricing intervals to protect the economic values of assets and liabilities from interest rate risk.

A bank should undertake simulation or scenario analysis with reference to different scenarios, like changes in interest rates, failure of funding source, use

of embedded options by customers, and assess the impact under each scenario and refix the interest rates to protect earnings and alter the structure and volume of assets and liabilities to preserve the equity value. The bank should calculate VaR on trading positions to assess the maximum potential loss that can arise within a selected time horizon at specified confidence levels and manage its business within the specified VaR limits.

18.10 INTEREST INCOME STRESS TESTING

A bank should undertake stress testing of net interest income and economic value of equity from time to time based on different factors like change in market rates of interest, change in prices of products and services, and change in balance sheet mix. It should take into account the likely changes in balance sheet position owing to the sale or securitization of assets, prepayment of loans by clients and consequent reinvestment, and consider various historical and hypothetical scenarios for conducting stress tests. It should carry out stress tests assuming simultaneous changes in more than one source of interest rate risks, such as the yield curve risk, basis risk, term structure risks, embedded options risk, and so on.

VaR and stress tests are complementary tools for managing interest rate risk. VaR shows the maximum potential loss associated with the market risk events under normal conditions, while stress tests disclose the likely impact of market risk associated with probable events under stress situations. The bank should regularly review stress test scenarios to respond to the changes in market risk events and take into account estimated losses emerging from the stress tests to fix the limits on investments, trading position, and off-balance-sheet transactions, and use both the stress test results and VaR to determine the allocation of economic capital.

18.11 INTEREST RATE RISK CONTROL

Banks should use a combination of policies, strategies, and limits to monitor and control interest rate risk. They should establish norms for bifurcation of investments into held for trading, available for sale, and held to maturity categories and follow the system of mark-to-market valuation of investment and

trading portfolios. In order to avoid shocks from sudden and significant interest rate movements, banks should keep the investment portfolio well diversified and not confine their investment operations to the corporate bond market. They should fix modified duration of instruments in alignment with the forecast for interest rate changes and shuffle instruments in the portfolio frequently in response to the emerging interest rate scenario. Banks should set up separate limits on investments in various types of financial instruments, like government securities, public sector unit bonds, private corporate bonds, equities, mutual funds, in keeping with the interest rate sensitivity of the instruments.

In order to control interest rate risk in the trading and banking books, banks should take at least the following actions:

1. Prescribe the maturity mix of investments, maximum maturities of assets and liabilities, and maximum modified duration of assets and liabilities.

2. Set up the intraday short selling limit.

3. Fix holding periods for different types of instruments.

4. Prescribe a defeasance period, stop-loss limits, and VaR limits.

5. Specify limits on notional principal values for individual forward rate agreements and interest rate swap transactions.

6. Specify the financial powers of officials for investment and money market operations.

18.12 SUMMARY

Interest rate risk generates loss of current and future revenues and loss in asset values. It arises principally due to the maturity gaps or mismatches in assets, liabilities, and off-balance-sheet positions, which involve different principal amounts and different repricing dates. Interest rate risk has links with other types of risks and exists both in trading and banking books.

Maturity mismatch risk, yield curve risk, basis risk, embedded option risk, reinvestment risk, and net interest position risk are principal factors that generate interest rate risk.

Banks should assess the interest rate sensitivity of assets and liabilities from an earnings perspective and economic value (of equity) perspective. The earnings approach measures the impact of interest rate movement on a bank's profit in the short term and the economic value approach reveals the impact on the net worth.

Maturity gap analysis, duration gap analysis, simulation analysis, and the

value-at-risk method are the four methods to measure interest rate risk.

Banks should identify the gaps between the quantum of rate-sensitive assets and liabilities in various time buckets to measure interest rate risk sensitivity. The larger the gap, the more sensitive is the bank to interest rate movements.

Maturity gaps show whether the bank is in a liability-sensitive or asset-sensitive position. If interest rates rise, the net earning of a liability-sensitive bank declines and that of an asset-sensitive bank increases.

Duration gap analysis measures a bank's interest rate sensitivity through matching of asset-liability duration. The larger the duration gap, the more sensitive is a bank's net worth to interest rate changes, and consequently, banks should endeavor to maintain a shorter duration gap where the interest rate is relatively unstable in order to reduce the impact of interest rate movements on net worth.

Simulation analysis is a method to evaluate a bank's interest rate sensitivity under different interest rate and balance sheet scenarios. The simulation exercise is undertaken with reference to variations in the possible interest rate risk events.

Banks can measure the potential loss on an asset, a portfolio, or a trading position due to the adverse movement in market risk variables by employing the value-at-risk (VaR) methodology. VaR on an asset varies according to the chosen time horizon and the level of confidence. The longer the holding period or the higher the level of confidence, the larger will be the VaR.

Banks can assess erosion in net interest income owing to interest rate changes by calculating earnings at risk on the rate-sensitive net exposure up to a selected time zone. If earnings at risk are significant for minor interest rate variations, banks should restructure their assets and liabilities to reduce the maturity gaps and shield the balance sheet from interest rate shocks.

Banks should regularly undertake stress tests of net interest income and economic values of assets and liabilities to assess the impact on earnings and net worth under different stress scenarios, and use stress test results, together with VaR, to fix the limits on investments, trading position, and off-balance-sheet transactions and determine the economic capital allocation against interest rate risk.

NOTES

1. New Basel Capital Accord, paragraphs 685 to 687.
2. “Principles for the Management and Supervision of Interest Rate Risk,” BCBS, July 2004.
3. “Principles for the Management and Supervision of Interest Rate Risk,” BCBS, July 2004.

CHAPTER 19

Foreign Exchange Risk Management

19.1 EXCHANGE RISK IMPLICATION

Foreign exchange risk is the risk of loss from foreign currency exposures of banks, which occurs due to the unfavorable change in the exchange ratio between domestic currency and foreign currencies. The risk sensitivity of banks has significantly changed due to the volatility in exchange rate movements. The larger the volume of foreign currency exposure and the more the fluctuations in the exchange rate, the greater is the risk of loss. The disparities in growth rate and inflation rate, and interest rate differentials on financial instruments between countries are important factors that cause volatility in exchange rates. Besides, the level of foreign currency reserves and current account deficits, the differences in fiscal and monetary policy stances of governments and central banks, and the relative disparities in the purchasing power of domestic currencies are significant factors that influence exchange rate movements.

Banks raise foreign currency resources through various sources like acceptance of deposits, issue of bonds, borrowings in foreign financial markets, and securing credit lines or term loans from foreign banks and multilateral financial institutions. They hold foreign currency assets in different forms like cash balances with foreign central banks, investments in foreign securities, foreign currency loans to domestic and overseas clients, and placement of funds with other institutions in foreign financial markets. The assets, liabilities, and off-balance-sheet positions are held in multiple foreign currencies and when exchange rates between different currencies change, banks either incur a loss or make gains. At any time, the foreign currency assets and liabilities and the positions can be converted into domestic currency at the ruling exchange rate and the notional gain or loss derived. Where a consolidated balance sheet is prepared, the assets and liabilities of foreign branch offices are translated into domestic currency at the exchange rate prevailing on the account closing day and included in the balance sheet. The resultant gain or loss arising from a change in the exchange rate between the transaction booking date and the balance sheet

date is usually included in the profit and loss account.

19.2 EXCHANGE RISK TYPES

Banks face the following types of foreign exchange risk:

- Position risk.
- Gap risk.
- Default risk.
- Legal risk.
- Control risk.

Position Risk

Banks are exposed to position risk in respect to their foreign currency portfolio to a significant extent. Position risk refers to the risk of potential loss that can arise from the net position of a bank's foreign exchange exposure. In the normal course of business, banks carry out foreign currency cash transactions, sell foreign currency financial instruments, undertake the sale and purchase of foreign currencies on account of the import-export business of clients, purchase and discount foreign currency trade bills, and engage in foreign currency trading for making windfall profits. They grant foreign currency loans, settle interbank foreign currency transactions, carry out overseas operations, and enter into transactions with foreign central banks. Banks buy and sell foreign currencies during the day through their treasury department. At the end of the day, the bank may reach a position where the purchases can be more than the sale or vice versa. If excess purchases or excess sales are not squared up through an opposite transaction (selling the excess to or buying the shortfall from another counterparty) before the close of business on the day, an open position in foreign currency is created. This open position in foreign currency is subject to exchange risk, as the exchange rate can move either way when the foreign exchange market opens the next day. The sale and purchase of foreign currencies can be either spot or forward, that is, after the expiry of a specific period. An open position in foreign currency exposure includes both spot and forward sales and purchases. Banks reach an open position either on account of merchant transactions or cover operations or both. They often build up open positions for speculative purposes and engage in trading in foreign currencies either in a proprietary capacity or on behalf of clients. When foreign currency assets

including outstanding purchase contracts exceed foreign currency liabilities including outstanding sale contracts, it is called a long position. Likewise, when foreign currency liabilities including outstanding sale contracts exceed foreign currency assets including outstanding purchase contracts, it is called a short position. The long and short positions cause favorable or unfavorable changes in asset values when the exchange rate moves.

Gap Risk

The gap risk refers to the risk of potential loss that can arise from gaps or mismatches in the maturity pattern of foreign currency assets and liabilities. Banks buy and sell foreign currencies, spot and forward. Often, the sale and purchase of foreign currencies for a particular forward value date may not match, creating a gap. The maturity spread of a bank's foreign currency assets and liabilities may be such that the inflows of currencies at a particular point of time may fall short or be in excess of the expected outflows. This imbalance may require the bank to buy or sell foreign currencies to match its requirements at different points of time, which involves exchange risk. The forward sale and purchase of currencies are mainly dependent on customer needs and the bank's own business requirements. The quantum of forward sales and purchases and the periods for which these are undertaken may not often match, and consequently, gaps in the maturity pattern of assets and liabilities emerge. Banks also knowingly create a gap as a trading strategy to make gains based on their perception of exchange rate movements.

Interest rate differential determines the percentage of forward premium or discount of one currency in relation to the other, assuming that there is no exchange control restriction and there is free mobility of capital between the two economies. The interest rate differential between two currencies also influences the forward demand and supply of the currencies. The movements in interest rates influence the forward premium or discount in the local foreign currency market, which in turn affects cash flows from open gaps and mismatches. The other factor that influences exchange rate movement is the purchasing power parity relationship. The differences in the inflation rates between the countries alter the purchasing power parities, which usually get reflected in exchange rate adjustments. The mismatches or maturity gaps in foreign currency assets and liabilities will result in loss if exchange rates move adversely on the forward value dates.

Default Risk

Banks are subject to default risk associated with foreign currency transactions, because the counterparty may fail to settle its obligations in the specified currency under a contract. Default risk arises generally in the cases of forward purchase or forward sale contracts. For example, suppose Bank A has entered into a forward contract with Bank B for purchase of U.S. $10 million for delivery after six months at an agreed rate. Bank B fails to deliver the contracted amount to Bank A on the due date for some reason and consequently, Bank A will have to purchase U.S. $10 million from some other source at the ruling rate on that day to meet its commitments, which may be more expensive than the rate contracted with Bank B. This additional cost to the Bank A is the replacement cost of the failed transaction. Thus, the failure by Bank B to deliver the contracted amount on the settlement date has driven Bank A to incur a loss on account of the purchase of foreign currency at more expensive rate, which is the default risk element of foreign exchange transactions. The default can also occur during the life of the transaction.

There is another kind of default risk associated with foreign currency transactions, which arises due to the time zone differences. Bank A deposits local currency with Bank B for purchase of U.S. dollars to be delivered at a particular center when the banks open there for business. But in the meanwhile, Bank B fails and is directed by the home country regulator to stop banking business forthwith. Bank B defaults in making delivery of U.S. dollars to Bank A at the specified center though it has received payment for delivery. This kind of default risk is referred to as the settlement risk and known as Herstatt risk. The Bankhaus Herstatt in West Germany failed in 1974 and defaulted in its commitments to deliver U.S. dollars to other banks when they opened in New York, despite having received an equivalent amount of money in deutsche marks on the previous day. The bank failed after it received money from other banks in West Germany.

Another form of default risk is the country risk element of foreign exchange transactions. Counterparties in a foreign country, which have foreign currency exposures, may default in their contractual obligation to make payments to the lender bank in the denominated foreign currency due to the imposition of restrictions on the conversion of domestic currency into foreign currencies. Besides, the default can also be intentional when foreign customers come to know that the lender bank will not be able to take recovery action as the

sovereign government is likely to freeze legal actions against domestic parties on their foreign currency obligations. In such situations, the default risk or the credit risk element of lending in foreign currency to foreign entities has materialized.

Legal Risk

Banks are subject to the legal risk involved in foreign currency transactions due to the complicated legal structure or inadequate assessment of legal process prevalent in other countries. Laws, including financial laws, differ from country to country, and a great amount of uncertainty prevails in the enforceability of international contracts. The documentation of international transaction is complex and often voluminous, and it is therefore subject to high legal risk. Banks as well as their clients who undertake foreign exchange transactions should be familiar with the legal process obtaining in countries with which they have frequent dealings. The documents must conform to internationally accepted Master Agreements between the parties.

Control Risk

Banks are likely to incur large losses from foreign currency transactions or business operations in foreign locations on account of control failure. The dealing desk in the treasury department is the most sensitive area of the bank's operations. Banks set up limits on foreign currency transactions and foreign business to keep losses within the tolerance level in the event of adverse movement in exchange rates. They establish control procedures to monitor adherence to the limits by the operating staff, but if there is failure of control over foreign exchange transactions and activities in overseas locations, it can cause a financial disaster. The classic case of control failure was the collapse of Barings PLC, Britain's oldest merchant bank. The bank incurred massive losses due to unauthorized and concealed trading activities at its Singapore office. The activities related to the creation of unsustainable open positions in foreign currency exposures without authority, trading beyond intraday limits, buildup of unauthorized speculative positions in futures, and unauthorized trading in options. There was a failure of the control system in the bank's head office due to which the unauthorized activities remained undetected and the resultant losses led to its failure. There was an inherent defect in the control system inasmuch as the control responsibilities were not kept segregated from operational duties.

19.3 FOREIGN CURRENCY EXPOSURE MEASUREMENT

Banks deal in multiple foreign currencies, but they maintain positions in a few major currencies. It is therefore necessary to set up a mechanism to arrive at the aggregate of foreign currency exposures that include all on-balance-sheet and off-balance-sheet foreign currency assets and liabilities. Measuring foreign currency exposure is the first step for managing exchange risk, since banks must know how large their exposure is and what will be the impact, if the values of foreign currency items change in the domestic currency when the exchange rate changes.

Foreign currency exposure takes place in three ways—transaction exposure, translation exposure, and economic exposure. First, the exposure occurs when a foreign currency transaction is undertaken, like the sale and purchase of currencies, the sale and purchase of securities and shares denominated in foreign currencies, discounting foreign trade bills, giving a foreign currency loan, and issuing a deferred payment guarantee in foreign currency. The exposure remains live from the date the transaction is booked till the date the transaction is closed by actual completion of obligation under the transaction. During the life of the transaction, banks are exposed to erosion in asset values on account of adverse movements in exchange rates.

The second form of exposure is by way of holding of equity, assets, and liabilities in foreign currencies by banks and receipt of income from these items from abroad. The exposure takes place when the domestic currency is converted into foreign currency and remitted abroad to meet business and capital requirements of foreign branch offices and affiliated concerns. The exchange risk arises when assets and liabilities of the bank's foreign branches and affiliated concerns are translated into domestic currency at the ruling rate for incorporation in the consolidated balance sheet. This type of exposure is called translation exposure. The bank will have to book a loss from the translation of foreign currency assets and liabilities into domestic currency if on the date of translation the ruling exchange rate was unfavorable in relation to the rates prevailing on the dates when the relevant transactions were booked.

The third type of exposure is called economic exposure, which has an impact on the future earning power and cash flows of a bank as a result of revision of the exchange rate parity. The exchange rate adjustment may affect a bank's

competitive position in the financial markets and the volume of its business, and may impair its profitability indirectly.

With a view to quantifying the total exposure that is subject to exchange risk, banks have to devise a method that indicates the value of the exposure in a single currency and the value of the aggregate exposure of long and short positions in all foreign currencies. The New Basel Capital Accord has prescribed a minimum capital standard to cover the risk of holding or taking positions in foreign currencies, including gold. The Accord has recommended two processes to calculate the capital cover for exchange risk. "The first is to measure the exposure in a single currency position. The second is to measure the risk inherent in a bank's mix of long and short positions in different currencies."[1]

For measuring exposure in a single currency, banks calculate the net position in each currency. The net position in a single currency consists of the net spot position and the net forward position (taking into account all relevant asset-liability and off-balance-sheet items), guarantees that are certain to be called and likely to be irrecoverable, and a few other items. For measuring foreign exchange risk in a portfolio of foreign currency positions and gold, banks have a choice of two alternative measures, subject to the discretion of the national regulator/supervisor. The first is a shorthand method, which makes no differentiation between currencies, and the second is the use of internal models, which recognize the actual degree of risk involved in the foreign currency portfolio. For measurement of exposure under the shorthand method, the nominal amount of the net position in each currency and in gold is converted into the reporting currency at spot rates, and the overall net position is then measured as:

> the sum of the net short positions or the sum of the net long positions, whichever is greater; plus the net position (short or long) in gold, regardless of sign.[2]

An example for measuring exposure in multiple foreign currencies and gold (which has been treated as foreign currency) is given in Table 19.1.

TABLE 19.1 Measuring Foreign Currency Exposure

Shorthand Method		
Currency	**Position**	**Domestic Currency Equivalent (million)**
USD	short	250
EURO	long	300
GBP	short	150
Japanese yen	short	250

Singapore $	long	100
GOLD	long	50
Shorthand method: Foreign currency exposure		650
Gold		50

Table 19.1 shows that the aggregate of the short position is 650 million and that of the long position is 450 million in domestic currency. The foreign currency exposure is the sum of the net short positions (650 million), which is the greater of the two.

It is convenient for banks to follow the shorthand method for measurement of foreign currency exposure. The latter must be measured on a consolidated basis and should include exposures of the foreign branch offices of banks as well as those of the affiliated concerns working abroad. Many banks have large domestic operations, but a small number of foreign branch offices, or one or two small affiliated concerns in foreign countries. If a bank has a relatively small volume of operations in foreign locations and it becomes technically difficult to identify and quantify all foreign currency exposures, it can follow a simplified method. The bank can take the internal limits on each currency as the proxy and add the limits, without regard to the sign, to the net open position in each currency (refer to footnote of paragraph 718(xLi) of the New Basel Capital Accord).

19.4 EXCHANGE RISK QUANTIFICATION

Banks can use the VaR method to measure the loss on foreign exchange exposures that can arise from adverse changes in exchange rates. The potential loss can be estimated under normal market conditions over a given holding period (1-day, 1-week, 10-day, 1-month, etc.) and at specified levels of confidence (84 percent, 95 percent, or 97.5 percent confidence levels, etc.). VaR does not indicate the worst possible loss; it calculates the maximum possible loss that can occur on foreign exchange exposures or portfolios under normal market conditions, having regard to the past behavior of exchange rate movements.

VaR of the foreign exchange portfolio is the aggregate of:

1. VaR on overnight open positions.

2. VaR on forward foreign exchange gaps for periods beyond spot.

For calculation of VaR, the following inputs are required:

1. Standard deviation or volatility of the exchange rate during the past one to two years.

2. Holding period specification.

3. Confidence level specification.

Banks can calculate VaR on the basis of historical data on exchange rate movements. They may collect the data on the fluctuations in exchange rate between two currencies for the last trading year or approximately 250 trading days and calculate the standard deviation from the derived values. For simplicity, banks may assume that the distribution of values is normal.

Annual volatility can be converted into volatility for the chosen holding period, say, 1-day or 10-day, as shown here:

1-day volatility = Annual volatility divided by $\sqrt{250}$, assuming 250 trading days a year

10-day volatility = Annual volatility divided by $\sqrt{25}$, assuming 25 10-day trading cycles a year

Let us work out VaR on an open position of U.S. $100 million for a 10-day holding period at a 95 percent confidence level (90 percent probability), if the annual volatility of the foreign exchange rate between Singapore dollars (SD) and U.S. dollars is 5 percent and if the SD–U.S. dollar exchange rate is:

SD 1.25 = U.S. $1

Annual volatility = 5%

10-day volatility = $5\% \div \sqrt{25}$ = or 1%

VaR for 10-day with 95% confidence level (1.65 times standard deviation; refer to Table 18.2 in chapter 18):

$1.65 \times 1\% = 1.65 \times .01 = .0165$

Value of the exposure in SD = U.S. $100 million × 1.25 = SD 125 million

VaR on the exposure in U.S. $ = 100 million × .0165 = U.S. $1.65 million

VaR on the exposure in SD = U.S. $100 million × 1.25 − U.S. $100 million × [1.25 − 1.25(.0165)] = SD 125 − SD 122.94 million = SD 2.06 million

The example given above shows that if the SD–U.S. $ exchange rate volatility based on one-year historical data on the movement of exchange rates is 5 percent, and the bank has an aggregate foreign exchange exposure of U.S. $100 million, the 10-day VaR is SD 2.06 million at 90 percent probability or a 95 percent confidence level.

This way, we can calculate VaR for different holding periods and different confidence levels assuming 5 percent annual volatility and the exchange rate at SD 1.25 = U.S. $1.

Other things remaining the same, if the confidence level is increased to 97.5

percent, VaR is calculated as shown here:

VaR at 95.5 percent probability or 97.5 percent confidence level (two times standard deviation), 5 percent annual volatility, and 10-day holding period will be:

$$\text{VaR on the exposure in U.S. \$} = 100 \text{ million} \times 2 \times .01 = \text{U.S. \$2 million}$$

$$\text{VaR on the exposure in SD} = \text{U.S. \$100 million} \times 1.25 - \text{U.S. \$100 million} \times [1.25 - 1.25(2 \times .01)] = \text{SD } 125 - \text{SD } 122.5 \text{ million} = \text{SD } 2.5 \text{ million}$$

Note that VaR increases by U.S. $0.35 million (U.S. $2.00 million − U.S. $1.65 million) or SD0.44 million (SD 2.5 million − SD 2.06 million) for the same 10-day holding period if the confidence level is increased from 95 percent to 97.5 percent.

Let us calculate VaR for a 1-day holding period at 90 percent probability or a 95 percent confidence level (1.65 times standard deviation).

$$\text{1-day volatility} = 5\% \div \sqrt{250} = 0.3162\%$$

$$\text{VaR in U.S. \$} = \text{U.S. \$100 million} \times 1.65 \times .003162 = \text{U.S. \$0.52 million.}$$

$$\text{VaR in SD} = \text{U.S. \$100 million} \times 1.25 - \text{U.S. \$100 million} \times [1.25 - 1.25 \times (1.65 \times .0.003162)] = \text{SD } 125 \text{ million} - \text{SD } 124.35 \text{ million} = \text{SD } 0.65 \text{ million}$$

Note that the shorter the holding period or the lower the confidence level, the lower is the amount of VaR.

19.5 EXCHANGE RISK MANAGEMENT

The primary task in managing foreign exchange exposure is to understand the functioning of major financial markets across the globe, assess the outlook for interest rate movements in those markets, and track the daily movement of exchange rates of major currencies. Banks should analyze the behavior of foreign currency movements in the recent past and identify the reasons for variations. Besides, they should document and analyze the intraday fluctuation of exchange rates between major currencies and the currencies in which they hold overnight positions, showing the day's high and low positions and the forward rate movements in major currencies. If the foreign currencies in which a bank holds open positions have appreciated or depreciated in relation to the domestic currency, it should identify the reasons and establish the likely trend for the immediate future. If the supply and demand of important currencies have either increased or decreased beyond normal expectations and the demand-

supply equation has influenced the exchange rate, banks should find out the reasons and estimate the period for which the instability is likely to continue. The conclusions derived from the economic analysis and exchange rate movement analysis and an assessment of the trend that is likely to persist in the foreign exchange market are critical factors that guide treasury officials to make gains from the foreign exchange operations.

Foreign exchange management involves simultaneous implementation of two complementary activities—fixing of appropriate exchange risk–related limits and hedging of risks for risk mitigation. The exchange risk arises either due to the open position in spot and forward transactions, a maturity mismatch of foreign currency assets and liabilities, or a principal amount mismatch within the same maturity bucket. The principal risks are spot position risk and forward position risk. Spot position risk arises from the open positions in spot foreign currency transactions due to the fluctuation in exchange rates during different times of the day, and forward position risk arises due to the possible adverse movement in the interest and exchange rates during the period in which the bank has an open position in forward foreign exchange transactions. Banks control these risks by setting up appropriate limits. These limits are discussed in the following paragraphs.

Position Limits

Banks should establish two types of position limits—intraday and overnight position limits. They should set up currency-wise intraday open position limits, that is, the daylight limits, and an overall daylight limit on intraday exposures in all foreign currencies taken together, and ensure that the total exposure remains within the specified limit. Likewise, they should set up overnight open position limits for an individual currency and for all currencies taken together. Maintenance of the overnight position is a speculative activity, and aggressive dealers in the bank's treasury often maintain large overnight positions with a view to making quick and large gains. If on the next day the exchange rate is unfavorable (worse than that at which the transactions were booked on the previous day), the bank will incur a substantial loss. With a view to putting a check on speculative position-building in foreign currency exposures, bank regulators/supervisors often prescribe spot open position and overnight open position limits in terms of a percentage of Tier I regulatory capital. There is no fixed ratio between the daylight limit and the overnight limit, but in general the

daylight limit is kept higher than the overnight limit. The rationale for fixing a higher daylight limit is based on two considerations. First, the remedial action can be taken immediately as long as the market is open, if unexpected fluctuations in the exchange rate are noticed. Second, a larger daylight limit enables the bank to accommodate client requests for large transactions during the day, sometimes even beyond the prescribed limit, as an opposite transaction can be booked to square up the open position before the market closes. An overnight open position is more risky as possible developments in different financial markets that can trigger volatility in exchange rates overnight cannot be precisely assessed.

Deal Size Limit

Banks should prescribe individual deal size limits to keep foreign exchange transaction sizes within prudent limits. The deal size limit will be applicable to all types of exposures including transactions in derivative instruments like currency swaps, currency options, and currency futures and placement of foreign currency funds with domestic or foreign counterparties on an overnight basis or on a term basis.

Gap Limit

Banks should fix individual gap limits currency-wise and maturity bucket–wise, both spot and forward, and for all maturity buckets taken together separately for individual and all foreign currencies. They should also prescribe the overall aggregate gap limit for all currencies and all maturity buckets taken together, which is the sum of individual currency-wise aggregate gap limits for all maturity buckets. The gap reveals the cash flow mismatches between assets and liabilities at specific points in time. The gap analysis helps in identifying specific cash flow mismatches that need to be corrected to reduce exchange rate and interest rate sensitivity. While fixing the maturity-wise limits, banks should take into consideration the intensity of fluctuations in interest rates and exchange rates noticed in the recent past. If the market situation is fairly stable, higher limits can be fixed for longer maturities. For better management of exchange risk, banks should regularly shuffle assets and liabilities between maturities in response to the changing market outlook.

The maturity gaps in foreign currency assets and liabilities are exposed to three kinds of risk:

- Liquidity risk.
- Exchange risk.
- Interest rate risk.

The maturity gaps expose the bank to liquidity risk, if the quantum of maturing liabilities exceeds the quantum of maturing assets in a particular time bucket and also foreign exchange risk because on the date of redemption of assets and liabilities, the open position needs to be covered at the ruling market rate, which may be adverse. Likewise, gaps cause interest rate risk due to the time difference in the repricing dates of assets and liabilities. The maturing liabilities may have to be renewed or freshly procured at a higher cost or the maturing assets may have to be reinvested at a lower interest rate. Banks should therefore keep the gaps within reasonable limits to avoid undue risks.

Foreign exchange management involves frequent reviews of maturity gaps and an assessment of the impact of possible movements in spot and forward exchange rates on a bank's profit and capital. This is analogous to conducting an exchange rate sensitivity analysis. For identifying gaps, banks should construct a consolidated statement of maturity gaps of foreign currency assets and liabilities including off-balance-sheet items across all time buckets that have open positions. If residual gaps, that is, the differences between the total of on-balance-sheet and off-balance-sheet foreign currency assets and liabilities are negative, the bank is in a liability-sensitive position in the respective time buckets, which implies that the quantum of liabilities falling due for redemption or repricing in the respective time buckets is more than the quantum of assets. If the residual gaps are positive, the bank is in an asset-sensitive position in the respective time buckets. An adverse movement in exchange rates and interest rates on foreign currency liabilities and assets will affect the bank's revenues. Banks should therefore undertake an open position gap analysis under different exchange rate scenarios and assess the impact on revenues. They can conduct the gap analysis on the basis of the following simplified assumptions:

1. Changes in the exchange rate are uniform for all repricing assets and liabilities.

2. The midpoint of each bucket is taken as the repricing period.

3. Repriced assets and liabilities continue to remain in the balance sheet.

4. Income on repriced assets and expenses on repriced liabilities at revised rates for the relevant residual periods are taken into account for impact analysis.

Stop-Loss Limit

Banks shall fix a stop-loss limit on the trading position in foreign exchange. A stop-loss limit refers to the loss that occurs if the trading position is marked to market for valuation. It seeks to contain the loss at a particular point in time that may arise from the trading position in a currency owing to an adverse movement in exchange rate. Once the prescribed stop-loss limit is reached, the bank's dealer is required to close or square up the trading position so as to limit the loss to a particular amount. The stop-loss limits are generally based on the marketable lot of the position and fixed in terms of the maximum loss denoted in domestic currency or the period of time for which a designated asset can be held when its value is declining.

VaR Limit

Banks prescribe a VaR limit applicable to the foreign exchange portfolio for managing foreign exchange–related exposures. VaR measures the maximum potential loss that can arise from the foreign exchange portfolio due to adverse changes in exchange rates under normal market conditions. VaR is calculated both on overnight open positions and forward gaps in foreign exchange related–exposures. The amount of capital allocated to cover risk from foreign exchange–related exposures sets the boundary for prescription of the VaR limit. Banks should also prescribe a holding period and confidence level for calculation of VaR on foreign exchange–related exposures. When VaR is near the prescribed limit, banks need to reassess the position and the gaps, and also scan the entire portfolio for corrective action to mitigate the risk.

Tolerance Limit

Internal control rigor requires treasury personnel to book foreign exchange transactions at ruling market rates. Due to market imperfections, market shallowness, or a unidirectional trend among market players, it is often not possible for dealers to carry out transactions for the required amount or the desired period at market-related rates. For smooth operations of the bank's business, it is necessary to give some discretion to the dealers to complete foreign exchange deals at rates that may be marginally lower or higher than the ruling market rate. Banks may allow dealers to make deviations from the market rates by small margins for booking foreign exchange–related transactions. They

should prescribe tolerance limits for making exceptions by dealers and set up clear and transparent guidelines to prevent misuse of discretionary powers.

19.6 EXCHANGE RISK HEDGING

Different tools are available for hedging different kinds of foreign exchange risk. Forward contracts, currency swaps, currency options, and currency futures are various types of derivative instruments available for hedging. The forward contract, which is common among banks to hedge exchange risk, is fraught with the risk of default by the counterparty that may involve a high replacement cost. Sometimes, the number of players in the forward exchange contract market is limited, and it becomes difficult for banks to access the market and book the transaction at the intended rate with strong counterparties. Where forward contracts are not available, currency futures can be an alternative. Futures are exchange-traded, which minimizes or eliminates default risk. But futures are available in standardized forms, which may not exactly match the bank's requirements, amount-wise or tenure-wise. Nevertheless, banks have greater flexibility with currency futures since they can exit their obligations before the settlement date of the contract.

A currency option is another instrument for hedging foreign exchange risk. A currency option is a contract for future delivery of a currency in exchange for another currency at the contracted price. Option buyers pay a premium to the option sellers for buying the required amount of currency at an agreed price, called the strike price, at a future date. The buyer is not automatically obliged to buy the currency, but the seller is obliged to deliver the currency at the agreed price, if the buyer exercises its option to buy. Since future exchange rate movements cannot be predicted with some amount of certainty, options may prove handy in some cases. But options are very complex instruments and difficult to price. By contrast, futures and forwards are relatively simpler instruments and most common among banks for risk hedging.

Another method to hedge risk against future commitments in foreign currency is to borrow in the money market in domestic currency and place the borrowed amount in the foreign currency deposit, or invest in interest-bearing foreign currency instruments or assets, taking advantage of interest rate differentials between the two currencies. This method is a substitute for the forward contract and is beneficial only if the interest earned on the foreign currency asset is more than the interest paid on domestic currency borrowing, after accounting for loss

of value that may occur due to the exchange rate movement in the intervening period. Banks should keep in mind that investment in foreign currency instrument is fraught with default risk and forward contracts carry replacement risk. They should weigh the pros and cons of each type of hedging mechanism and decide the mix of hedging instruments to minimize cost and other associated risks.

19.7 SUMMARY

Foreign exchange risk is the risk of probable loss that can occur from adverse movement in the exchange rate on exposures held in foreign currencies. The larger the volume of foreign currency exposure or the more volatile the exchange rate is, the greater is the risk of potential loss from foreign exchange business.

Banks are exposed to position risk, gap risk, default risk, and country risk on foreign currency exposures, and control risk from operations in foreign locations. They are also subject to legal risk due to the complexity of rules and regulations governing foreign currency transactions.

Foreign currency exposures take place through transaction exposure, translation exposure, and economic exposure. Banks should establish appropriate methods to measure exposure in a single currency and the aggregate of exposures of long and short positions in all foreign currencies.

Exchange risk on the foreign exchange portfolio can be quantified through the application of value-at-risk methodology based on the historical volatility of exchange rates and for specified confidence levels. Value-at-risk shows the maximum probable loss that can occur on the foreign exchange portfolio from adverse movement in the exchange rate under normal market conditions.

Exchange risk management involves establishment of appropriate exchange risk-related limits and adoption of hedging strategies for risk mitigation. The structure of limits consists of daylight limits, overnight open position limits, individual deal size limits, gap limits, stop-loss limits, and value-at-risk limits.

Banks can choose various types of derivative instruments like forward contracts, currency swaps, currency options, and currency futures for hedging exchange risk. They should put in place transparent guidelines to enable dealing officials to decide the package of appropriate hedging instruments under different scenarios.

NOTES

1. New Basel Capital Accord, paragraphs 718(xxx) to 718(xLi).
2. New Basel Capital Accord, paragraph 718 (xLi).

CHAPTER 20

Equity Exposure Risk Management

20.1 EQUITY EXPOSURE IDENTIFICATION

A bank's exposure to equities is a high-risk portfolio due to the daily fluctuation in equity prices that can generate substantial loss within a short period of time. Because of the high-return feature of equity exposure, banks often invest large amount in equities to make a quick profit, ignoring the high risk involved in it. To prevent excessive speculation or loss of significant capital under volatile circumstances, bank regulators sometimes put a cap on the total equity exposure of commercial banks and also prohibit them from short selling of equities. They expect banks to be cautious in taking exposure in the capital market, since their role is not to destabilize the market through excessive speculative trading in equities with the help of public funds.

An appropriate definition of equity exposure is essential for measuring all forms of direct and indirect risks. Usually, equity exposure relates to direct investment in corporate equities, but it should include all equity-related instruments to prevent banks from engaging in speculative trading with the public money through indirect routes. Besides, declining equity prices increase the incidence of defaults by clients who deal in equities or have taken loans for acquiring equities and enhance the banks’ credit risk from those clients. Since equity exposure contains a high potential to inflict large losses, it should include all forms of lending and financial commitments of banks to all types of clients where the disbursed funds ultimately reach the capital market, directly or indirectly. But it should not include loans and overdrafts given to clients against collateral of corporate equities, unless the funds are utilized for the purchase of shares or capital market instruments.

Equity exposure should include the bank's own investment made in a proprietary capacity and also funds given to the clients for investment in equity-related instruments. The latter category of investment is not usually counted in assessing the sensitivity of the bank's exposure to capital markets, but it is

necessary to recognize the destabilizing potential of a large quantum of bank funds routed to capital markets through clients. It is the responsibility of bank regulators/supervisors to prevent commercial banks from endangering the stability of the capital market through aggressive speculative trading. Banks should protect the interests of medium-and long-term investors, particularly small investors, in order to assist the regulators to promote the stability of the financial system. Accordingly, banks' exposure to equity should include at the minimum the following items:

1. Banks' own investment in equities, convertible debentures, and units of equity-oriented mutual funds.

2. Loans to the public for participating in initial public offerings of equities by corporations.

3. Loans to clients for purchase of equities.

4. Loans to corporations to meet promoters' contribution in equity issues.

5. Loans to share brokers and market makers.

6. Issue of guarantees on behalf of share brokers.

20.2 EQUITY EXPOSURE MANAGEMENT FRAMEWORK

Banks should observe certain fundamental principles in taking equity exposures and put in place a comprehensive framework to manage the exposure. The framework should include:

1. An appropriate definition of equity exposure.

2. Policies and strategies to manage high risk from equity exposures.

3. A transparent policy for investment in equities.

4. Assignment of authority for investment decision in equities.

5. Prescription of a voluntary ceiling on total capital market (equity) exposure.

6. Prescription of limits to avoid concentration of equity investment in a single corporation and corporate group, including exposures in other forms.

7. Prescription of monetary limits on exposures to individuals (for purchase of equities), share brokers, and market makers.

8. A mechanism to avoid conflicts of interest in conducting the investment portfolio.

9. Vigilance on insider trading.

10. Analytical support to the investment management team through equity research.

11. Establishment of methods for measurement of equity exposure risk.

12. Administrative oversight to prevent excesses and exceptions.

13. An independent monitoring and control mechanism.

20.3 EQUITY EXPOSURE RISK MEASUREMENT

For measuring risk from equity exposures, banks should set up appropriate techniques, keeping in view the exposure size and the composition of the equity portfolio. They should capture movements in daily equity prices and undertake mark-to-market valuation of the portfolio to assess the erosion in value. If the bank's equity exposure is relatively significant, it should undertake risk analysis, sector-wise and industry-wise. Industry analysis will throw up warning signals relating to slowdowns, stagnancy, or sluggish growth in specific industries. The conclusions emerging from the analysis can be leveraged for taking a timely exit from equities whose prices are likely to decline.

The quantum of potential loss that can arise from the equity portfolio can be estimated through the application of the VaR method as shown in the example given here.

Let us suppose that a bank holds 1 million shares of a corporation purchased at U.S. $10 per share. Suppose the volatility or the annualized standard deviation of the share price fluctuation is 20 percent. What will be the VaR on the exposure in equity for a holding period of one month at a 95 percent confidence level (1.65 times the standard deviation)?

VaR is calculated as under:

$$\text{Monthly volatility} = 20\% \div \sqrt{12} = 5.77\%$$

We ignore the situation where the share price increases, since in risk management we are concerned with potential loss and not with gain. We are concerned with the likely fall in share price based on the volatility rate at the given confidence level.

The fall in share price can be calculated as shown below:

$$\text{Fall in value per share} = \text{U.S. } \$10 \times 1.65 \times .0577 = \text{U.S. } \$0.952.$$

$$\text{VaR on 1 million shares (of value U.S. } \$10 \text{ million)} = \text{U.S. } \$952{,}000.$$

It can be calculated in another way.

The value of each share after the likely fall in price

= U.S. $10 – U.S. $10[(1.65 × .0577)] = U.S. $10 – $10(.0952)

= U.S. $10.00 – U.S. $0.952 = U.S. $9.048

Value of exposure = 1 million shares × U.S. $10 per share

= U.S. $10 million

Value of position after the likely fall in price = 1 million × 9.048

= U.S. $9.048 million

VaR on 1 million shares (on equity exposure of U.S. $10 million)

= U.S. $10 million – U.S. $9.048 million = U.S. $0.952 million

= U.S. $952,000

Banks' equity portfolios consist of equities of different companies and consequently, the calculation of VaR on the entire equity portfolio requires data on the volatility of each equity. They should therefore maintain an appropriate management information system that captures daily equity price data and shows the fluctuations of share prices quoted in domestic and overseas capital markets. They should calculate VaR on each equity exposure and take the aggregate to find out the total VaR of the equity portfolio. If the number of equities is very large and price volatilities of several shares are not available, banks can assess the risk in terms of the movement in representative share price indexes. If share prices are not quoted in the stock exchange, they should evaluate the financial position of the issuer companies and assess the realizable values. They should fix the VaR limit on the total exposure to keep the risks within reasonable limits, assess the potential loss from equity and equity-related instruments through the application of the VaR method at regular intervals, and take appropriate action when the limit is exceeded.

20.4 SUMMARY

Banks' exposure to equity is highly risk sensitive because of daily fluctuations in equity prices that contain high potential to inflict large financial loss. Volatility in equity prices triggers defaults by clients who deal in equities or have taken loans to acquire equities, and enhances credit risk.

A comprehensive definition of equity exposure is essential for assessing direct and indirect risks from equity-related instruments. The definition of equity

exposure should be broad as it is not desirable for banks to engage in speculative trading with public money, either directly or indirectly. Equity exposure should include the bank's own investment made in its proprietary capacity as well as funds lent to clients for investment in equity and equity-related instruments.

Banks should apply the value-at-risk method to estimate the quantum of potential loss on their equity portfolio, fix up the value-at-risk limit, and put in place adequate checks and controls to avoid speculative trading in equities and loss of significant capital under volatile conditions in the capital market.

CHAPTER 21

Asset Liability Management Review Process

21.1 ASSET-LIABILITY REVIEW

Maturity mismatch and duration mismatch of assets and liabilities expose banks to various forms of market risk. They should therefore carry out frequent reviews of asset-liability items through an asset liability management (ALM) system to effectively monitor and control the emerging risks. The Asset Liability Management Committee (ALCO) is the authority that reviews the changing composition of market risk–related asset-liability items, assesses the severity of emerging risk factors, and initiates corrective actions.

The ALM review process begins with the scrutiny and the risk analysis of the asset-liability maturity gaps under different maturity buckets that arise during the course of a bank's business. Maturity gaps are identified from the structural liquidity statements compiled on a weekly basis and short-term dynamic liquidity statements compiled on a monthly basis. The structural liquidity statements show the current gaps between the bank's assets and liabilities in the prescribed maturity buckets, and the analysis of the gaps reveals the extent of its sensitivity to liquidity risk, interest rate risk, and foreign exchange risk. The conclusions guide the bank to identify the dangers that may arise from changing market risk factors and form strategies to make appropriate responses to the emerging scenarios.

The effectiveness of the ALM review process is dependent on two factors. First, maturity gap statements must be accurate and cover all items of on-balance-sheet and off-balance-sheet asset-liability items. Second, the scrutiny of maturity gap statements must be comprehensive and meaningful so that emerging concerns that threaten a bank's operations are precisely diagnosed. Besides gap analysis, the ALM review process should bring out the extant position of significant items of assets and liabilities and the ratios between them in relation to the prescribed norms. The ALM review process will be effective and meaningful if the ALM support group presents analytical reports in a structured format after scrutiny of the asset-liability statements.

An illustrative format for presenting the ALM review report is suggested here. The review report should bring out the position of compliance with the prescribed norms and limits pertaining to market risks, identify the concerns emerging from changes in market risk factors, and examine various options available to respond to changing market risk scenarios.

21.2 LIQUIDITY RISK REVIEW

The liquidity risk review report should be in two parts, the first part dealing with the quantitative parameters that reveal the liquidity position on the review date and the second part, the situation emerging from asset-liability maturity mismatches and duration mismatches. The report should include descriptions of various options available for remedial action.

First Part of the Reporting Format

TABLE 21.1 Asset-Liability Review

Maturity Mismatch (Gap) Position			
Time Bucket	Prescribed Tolerance Level (% of Negative Gap to Outflows) (Illustrative Ratios)	Mismatch on Review Date (+/–) %	Recommendations for Remedial Action
0 to 7 days	10		
8 to 14 days	15		
15 to 28 days	15		
29 days to 3 months	20		
Over 3 months to 6 months	25		
Over 6 months to 1 year	25		
Over 1 year to 3 years	30		
Over 3 years	No fixed tolerance level		

TABLE 21.2 Asset-Liability Review

Position of Key Ratios			
Particulars	Prescribed Ratios*	Actual Position on Review Date	Recommendations for Remedial Action
Ratio of liquid assets to short-term liabilities			
Ratio of short-term liabilities to long-term assets			
Ratio of short-term liabilities to total assets			
Ratio of volatile liabilities to total assets			
Ratio of prime assets to total assets			
Ratio of investments to purchased funds			
Ratio of borrowings from call money and term money markets to total resources and total capital funds†			
Ratio of credits to deposits			
Ratio of core deposits to total loans and advances			
Amount and percentage of short-term bulk deposits to total deposits			
Ratio of institutional and corporate deposits (volatile deposits) to liquid assets			
Withdrawal of large deposits before maturity during the previous fortnight			
Ratio of loans to total assets			
Ratio of cumulative outflows to cumulative inflows up to one-year time buckets			

*The bank should prescribe prudent ratios keeping in view the regulatory directives, its own credit rating, asset-liability profile, business activities, money market conditions, and other relevant factors.
†Bank regulators sometimes prescribe the benchmark.

Second Part of the Reporting Format

The ALM support group should analyze the significance of maturity mismatches in different time buckets (mismatches between inflows and outflows of funds), review the position of key ratios between different asset liability items as indicated in Table 21.2, and comment on the liquidity position. The report should

identify liquidity pressure that the bank may face under different situations, discuss the liquidity scenario in the financial market, and suggest strategies and options that are available to tackle any adverse situation. The analytical part of the report should contain observations and suggestions on the following issues:

1. What is the extent of liquidity mismatch under the first three time buckets against prescribed limits, and is there a case for special action? If gaps are negative and unsustainable, are they likely to cause liquidity problems? What action shall be taken to reduce the gaps, and what options are available to address any emergency situation?

2. What methodology is being used by liquidity managers to track cash flow mismatches under sensitive time buckets (0–7, 8–14, and 15–28 days), and what are the possible strategies to meet urgent shortfalls? What is the track record of fund suppliers?

3. Is there any structural imbalance in the maturity profile of assets and liabilities? Is there a need to reduce the maturity mismatch in any particular time bucket and/or across certain time buckets? If maturity mismatches are unreasonable and vulnerable, what are possible options for risk mitigation? If a liquidity stress event takes place, what are the possible sources of funds to meet the liquidity shortfall?

4. Should the liabilities of the bank be restructured to reduce maturity mismatches, and if so, what are the options and the cost implications (options include (a) issuing certificates of deposit at rates higher than card rates, (b) raising wholesale deposits at higher rates, (c) floating incentive schemes for deposit mobilization, (d) issuing bonds at rates higher than prevailing market rates, and (e) borrowing long-term funds from other financial institutions)? Is it feasible to alter the tenure of assets to reduce mismatches?

5. What was the impact on liquidity during the last fortnight on account of sudden withdrawal of large funds before maturity, nonrenewal of several matured term deposits by customers on maturity dates that was not in conformity with the historical trend, and default by counterparties on their contractual obligations due to unanticipated events?

6. Is there a change in the behavior pattern of customers during the last three months in relation to (a) withdrawal of large funds before maturity, (b) rollover of matured time deposits, (c) drawdown of unutilized overdraft credit limits, (d) seasonality in withdrawal of funds, and (e) prepayment of term loans? How does the actual behavior pattern compare with the trend that emerged from the historical data analysis for the last two to three years? (Note: The situation

should be assessed after taking into account structural liquidity and short-term dynamic liquidity statements and the periodic reports received from field offices.)

7. What is the amount of maturing term deposits, the estimated amount of drawdown in unutilized credit limits, and the amount of possible claims from contingent items during the next three months? What are the bank's other commitments (repayment of interbank borrowings and bonds issued, sanction of new loans, etc.), and how will the liquidity requirements be met?

8. What type of liquidity situation is likely to evolve under plausible scenarios during the next three months? How will an adverse scenario affect the bank, and what are possible strategies to deal with emerging situations?

9. What are the commitments in regard to maturing foreign exchange contracts? What is the magnitude of swapped foreign currency deposits (into domestic currency) maturing for payment in the shorter end of time buckets? What are other short-term foreign currency liabilities? How will funds be organized to meet maturing foreign currency obligations?

10. Is there any likelihood of remitting funds to the bank's affiliated concerns working within and outside the country during the next three to six months? What is the expected amount, and how will the demand for funds be met?

21.3 INTEREST RATE RISK REVIEW

1. What is the market perception about the interest rate scenario, and what is the likely direction of future interest rate movements?

2. Is the current interest rate structure of the bank in conformity with the emerging interest rate scenario and the goal to achieve the targeted credit spreads? What modifications in term deposit interest rates, prime lending rates, and sector-specific lending rates will be required? What should be the ratio between the growth of fixed-rate and floating-rate assets and liabilities in the future to mitigate the adverse impact of interest rate risk?

3. Is there a need to alter the composition of assets in the trading book and the banking book in the light of the prevailing interest rate scenario? Will the alteration be in conformity with regulatory prescriptions and standard accounting practices? What will be the provisions for shifting the required quantum of investments from the “held for trading category” to the “available for sale” and “held to maturity” categories?

4. How do the gaps between interest rate–sensitive assets and liabilities in each time bucket compare with the prescribed limits? How severe is the interest rate sensitivity of assets and liabilities under different interest rate scenarios?

5. What is the magnitude of earnings at risk under possible interest rate movements? What will be the impact if interest rates rise/fall by .5 percent and 1 percent? How do the earnings at risk compare with the targeted limit on variation in income? If the earnings at risk are relatively large, what restructuring of the maturity profile of assets and liabilities is required to minimize the negative impact? What principles and strategies should be followed to achieve the desired maturities of incremental assets and liabilities?

6. What is the weighted average modified duration of assets and liabilities, including off-balance-sheet items? What steps are required to minimize the duration gap? What will be the impact on the bank's net worth on account of possible movements in the interest rates?

21.4 FOREIGN EXCHANGE RISK REVIEW

1. What were the foreign exchange rate movements in major currencies during the last week? Was there any significant fluctuation in the exchange rate of any major currency, and if so, what was the impact on the bank's foreign currency exposure?

2. What was the trend of overnight open positions, and how does it compare with the limits fixed by the bank?

3. What is the extent of the gap or mismatch in the maturity pattern of foreign currency assets and liabilities and the magnitude of potential loss that can arise from the mismatch? Is there any pronounced mismatch in foreign currency assets and liabilities in any time bucket, and how will the position be rectified?

4. Are the daylight limit, overnight limit, and gap limit in conformity with the bank's business requirements? If not, what modifications are required?

5. What is the extent of foreign currency exposure of the bank's customers? If there is an adverse movement in exchange rates, how will it affect the customers who have not taken cover against exchange risk? Are the relevant customers’ loans and advances likely to become problem accounts?

6. What are the country-wise exposures and the total overseas exposure of the

bank? What is the breakup of aggregate exposures into low-risk, medium-risk, and high-risk countries? Are there significant exchange rate fluctuations in any country that can affect the quality of exposure?

7. Is there any pronounced mismatch in outstanding transactions in any major currency? What strategies are being adopted by the treasury to handle currency mismatches?

8. Is there any concentration of the bank's foreign exchange exposure in any particular currency? How are currency concentrations handled by the treasury to mitigate exchange risk, country risk, and settlement risk?

9. What was the range of values-at-risk on the total foreign currency exposures during the last fortnight? How does it compare with the approved limits?

21.5 EQUITY PRICE RISK REVIEW

1. What is the market trend of equity prices during the last week? Was there any volatility in equity prices in any industrial sector or any corporate group?

2. What is the corporate-wise significant holding of equities by the bank? Is there any concentration in equity holdings? What is the bank's total exposure to corporate groups (entities controlled by the same management), taking into account equity exposure, bond exposure, and credit exposure? What will be the impact on the bank in a stress scenario?

3. What is the market value of the basket of equities held by the bank vis-à-vis the acquisition prices? What is the value-at-risk on the bank's total equity exposure?

4. What is the ratio of investment in equities to the total investment of the bank? Is it in line with the bank's risk management policy?

5. Is there a need for restructuring of equity holdings on account of volatility in prices of some of the equities held by the bank?

21.6 VALUE-AT-RISK REVIEW

What is the magnitude of aggregate value-at-risk to which the bank is exposed? This should be worked out by adding together the following components:

1. Value-at-risk on sovereign securities.

2. Value-at-risk on bonds and debentures.

3. Value-at-risk on equities and mutual funds.

4. Value-at-risk on foreign exchange exposure.
5. Value-at-risk on gold and other commodities.

21.7 SUMMARY

Banks should compile structural liquidity statements at weekly intervals and dynamic liquidity statements at monthly intervals to identify structural mismatches in asset-liability maturity patterns and the intensity of different types of market risks to initiate corrective action.

Banks should put in place an effective asset-liability management review process to effectively monitor market risks on a continuous basis and identify emerging risks from maturity mismatches and duration mismatches of assets and liabilities, including foreign currency assets and liabilities, and initiate action for risk mitigation. They should adopt structured formats for meaningful review of the asset-liability position.

PART Four

Operational Risk Management

CHAPTER 22

Operational Risk Management Framework

22.1 OPERATIONAL RISK CONCEPT

It is difficult to precisely define operational risk (OR) because it has less visibility and often remains hidden in transactions and activities. In contrast, credit and market risks have more visibility and are more easily identifiable and predictable. Operational risk arises from possible failures of the business operation process and the control system of a bank. The Basel Committee on Banking Supervision has defined operational risk "as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk, but excludes strategic and reputational risk."[1] The Basel Committee definition is based on the happening of certain events that cause loss to the bank but cannot be clearly assigned to default risk (credit risk) or value erosion risk (market risk). For example, misappropriation of cash by dealing staff, unauthorized transactions by front office staff, forging of bank officials' signatures for false claims against the bank, accounting errors resulting in loss of revenues, and the like are incidents that give rise to operational risk. Significant differences exist between credit risk and market risk on the one hand and operational risk on the other, if we take into account the multiplicity of sources from which risks occur, the number of events that cause loss, and the magnitude of loss that arises if risks materialize.

Sometimes, it is difficult to attribute an event to the risk category to which it actually belongs. A few examples are cited in Table 22.1.

TABLE 22.1 Risk Events Classification Dilemma

Type of Events	Type of Risk
Unauthorized trading of securities or trading in foreign exchange.	Market risk or operational risk?
Building up undesirable position in securities/equities and open position in foreign exchange.	Market risk or operational risk?
Defaults in loan accounts due to skipping of or dilution of loan sanction procedure.	Credit risk or operational risk?
Mismanagement of collateral.	Credit risk or operational risk?

The Basel Committee definition of operational risk seeks to analyze the

reasons behind the occurrence of loss to a bank and attribute the loss to people-related, process-related, or systems-related failures, or to the happening of an external event. This is a broad definition, but banks can set up a more precise definition with illustrative examples from their own experiences to facilitate understanding by staff at all levels. Banks should clearly and unambiguously define operational risk to identify bank-wide operational risk on a consistent basis, increase risk awareness among the staff, and enhance the control culture. They should adopt a definition that is consistent with that of other banks in order to achieve uniformity in the classification of operational risk events. The consistency and uniformity in the definition of operational risk will facilitate collection and exchange of risk events and loss data between banks. The growing volume and severity of operational risk losses over the years are changing the risk perception of bank management, since the failure to identify operational risk or diffuse it in time can result in huge losses. The Barings Bank of the United Kingdom collapsed due to the failure to detect operational risk in time. Unlike credit and market risks, the impact of operational risk can be catastrophic. Bank management needs to recognize operational risk as a major risk management function because of the multiplicity of operational risk events and the complexity involved in managing it. The management should allocate adequate resources to manage operational risk and provide sufficient economic capital to cover unexpected losses. Operational risk management should be recognized as a significant element of the corporate governance process.

22.2 OPERATIONAL RISK SOURCES

Credit risk and market risk are business specific but operational risk is all-pervading. The latter can occur in any business area and percolate to the business process. The numbers of operational risk incidents are significant in areas like system security, system failure, system viability and system validity, utility services, and outsourcing of services. Keeping in view the definition of the Basel Committee on Banking Supervision, the potential sources of operational risk are explained in the ensuing paragraphs with illustrative examples.

Operational Risk from People

The risk from personnel posted at sensitive areas of the bank's operations is becoming increasingly important. People-related risk arises due to the

inadequacy of knowledge, lack of familiarity with procedures, positioning of dubious personnel at sensitive operational areas, lack of business ethics and honesty, inadequacy of compensation for intellectual honesty, lenient attitude of the management toward corruption, laxity in supervision by higher authorities, and looseness in administration. Banks often lag behind in upgrading the skill of personnel who deal with the complex financial products.

Examples of people-related operational risk events are:

- Committing fraud.
- Booking unauthorized transactions.
- Undertaking unauthorized trading in securities, foreign exchange, and derivatives.
- Engaging in insider trading and dealings.
- Sanctioning loans without due diligence.
- Exceeding delegated financial powers.
- Compromising with recruitment and training standards.
- Claiming unjust compensation and benefits.
- Raising unjust trade union issues.

Operational Risk from Processes

Banks have innovated varieties of financial products to increase their customer base due to the growing pressure on profit margin, and introduced automated technology to increase the business volume, reduce transaction costs, and speed up service delivery. They have set up multiple processing centers to manage the volume of growing domestic and cross-border business and meet customer expectations in time. Besides meeting their own business and risk management requirements, banks have to supply data online to the supervisors in connection with the latter's off-site supervision program. Consequently, they require the backup of a strong management information system that captures and processes all operational data on a continuous basis. They have therefore to undertake concurrently processing of voluminous data and information relating to their own and affiliated units’ activities. For cost optimization, banks are installing computer systems that process business transactions and simultaneously capture and store all transaction-related data. The clubbing of the transaction processing function for delivery of customer service and the data classification and storage function for updating the management information system has increased the possibilities of errors occurring during the processing stage and generating

inaccurate information and messages that may cause significant loss to banks.

Examples of process-related operational risk events are:

- Wrong pricing of products and services.
- Incorrect valuation of client assets.
- Accounting errors.
- Errors in transaction processing, execution, and settlement.
- Errors in stock lending.
- Breach of procedures.

Operational Risk from Systems

Systems development for managing business has become an obsession with banks, since they want to acquire not merely the latest technology to survive in a competitive market, but also to meet the convenience of their clients. As the information technology system is changing fast, banks have to upgrade their computer systems and modify software packages frequently, and handle several issues relating to the procurement and maintenance of the operating systems. Their computer systems are under severe pressure and contain high potential to generate operational risks.

Examples of systems-related operational risk events are:

- Failure of hardware and software systems.
- Deficiencies in hardware and software systems.
- Incompatibility of the systems arising from mergers and acquisitions.
- Reliability of the systems under stress conditions.
- Unauthorized access to the computer system.
- Hacking or virus injection to the system.
- Corrupting messages in transit.
- Connectivity failure.
- Corrupting data processing.

Operational Risk from External Events

External events may inflict huge monetary losses besides causing prolonged disruption of business operations. Banks have virtually no control over external events since they cannot predict the timing of the events and assess the intensity of impact in advance. The planning and the design of protective mechanisms that

can be put in place to minimize the risk from external events are likely to be elaborate and expensive, but the protective mechanisms may not be of much use when events actually happen. Nonetheless, the external events do occur, and banks have to recognize the risk.

Examples of external factor–related operational risk events are:

- Natural disasters—floods, fire, and earthquake.
- Acts of terrorists and criminals.
- Theft, robbery, and burglary.
- Failure of outsourced activities.

22.3 OPERATIONAL RISK CAUSES

Major changes have occurred in the structure and functioning of the financial systems in many countries on account of mergers and acquisitions of banks, diversification of financial activities, automation of business processes, and outsourcing of financial services. First, high economic growth, particularly in developing economies, has increased the demand for financial services and opportunities for cross-border banking business that have led to rapid growth of financial institutions, which in turn have increased the vulnerability of the banking system. The new financial institutions are prone to greater risk within the financial system as their focus is on business growth and they lag behind in establishing a sound risk management and control system. Besides, during the last two decades several mergers between banks and acquisition of other financial institutions by them have taken place. When the merger and acquisition takes place, it becomes difficult to integrate the diverse operating systems of two financial institutions and create a congenial working environment with people of different work cultures and value systems. Rapid growth of financial institutions and the mergers and acquisitions that create new operating environments have significantly increased the potential to trigger more operational risk events.

Second, the expansion and diversification of the banking business have significantly enlarged the scope for emergence of operational risk. Banks have diversified their financial activities by undertaking, in addition to their core banking activities, insurance business, securities business, specialized lending, and structured lending, either directly or through subsidiary institutions. They have also assumed varieties of other functions like providing utility services to customers and undertaking payment and collection services on their behalf. The

significant increase in the volume and diversity of the financial services business has added another dimension to operational risk.

Third, banks have tremendously increased the capacity and scope of application of computer systems and raised the automation level for delivery of banking services. Cash dispensation through automated teller machines, electronic transfer of funds, e-commerce, and Internet banking facilities are examples of financial services that work on an automatic basis. The spate of automation has raised several questions about systems failure, systems security, hacking, entry of fraudulent transactions, and so on. The high level of automation is a major cause of operational risk in banks.

Fourth, banks are increasingly resorting to outsourcing of financial and nonfinancial services. Cost-benefit considerations have driven them to have recourse to outsourcing of services on a larger scale, and over the years, the range of outsourcing has significantly widened. Banks outsource the services of experienced firms for providing security to the premises and valuables, maintaining automated teller machines, remitting cash and valuables from one center to another, maintaining computer systems, and so on. Some banks even outsource the services of competent firms as agents for mobilizing financial resources and processing loan applications. The failure of service providers to keep commitments on time, nonavailability of outsourced services in stress and emergency situations, deficiency in delivery of services, and service providers' chances of accessing the bank's secret and confidential information are some of the dangers associated with the outsourcing process. Banks face a high degree of operational risk from these types of eventualities.

Operational risk arises from the execution of transactions, the systems that process the transactions, and the control that monitors and manages the risk associated with the transactions. Operational risk commences before transactions are executed, continues during delivery of transactions, and even remains after completion of transactions. At the transaction negotiation stage, there is the possibility of identifying the wrong client or an error can occur due to the lack of expertise in understanding the client's need and selecting the appropriate product package. The bank officials may structure the facilities in a way that may not suit the needs of the client. During the transaction processing stage, programming error, systems error, or systems failure may occur. At the product delivery stage, there is the risk of misuse of financial powers, risk of fraud, risk of money laundering through misuse of funds, risk of documentation and collateral valuation, and model risk to measure the quantum of loss that can arise from the

transaction. Thus, operational risk occurs from the beginning of a transaction and stays until the transaction is closed and the customer relationship terminated.

Banks usually ignore or overlook a few plausible causes that give rise to operational risk. A few examples are given here.

Risk from Inadequate Communication

Inadequate and deficient communication creates doubts in the minds of staff and erodes confidence in handling the business. Unclear communication affects the efficiency of staff across the organization that drives them to commit errors. Effective communication within the organization means a host of things. It is not merely the clarity of circulars and directives issued to the staff to explain the procedures; it is the efficacy of the methods and devices used to effectively communicate the message. The objective is that each employee shall have means to know the instructions and the procedures, understand them, and apply them in day-to-day activities. The absence of job description cards or manuals containing operating procedures for the conduct of business is an example of incomplete communication. Likewise, listing of “do's and don’ts” is an essential part of effective communication. The shortcomings in the communication system give rise to more incidences of operational risk.

Risk from Absence of Control Culture

Control culture is the habit of doing the right things in accordance with the prescribed procedure at all times. It is a work ethic that guides an individual to be alert and abstain from wrongdoing. The efficacy of the corporate governance system is judged by the depth of the control culture. In an organization with a high control culture, the employees are aware of the risks associated with the activities they are doing, the control responsibility is built into their frame of mind, and they exercise precautions to safeguard organizational interests. Control culture does not evolve automatically and does not grow in isolation. It will develop if there is a transparent system of rewarding intellectual honesty and application of mind, and awarding punishment for negligence and dereliction of duties. The employees will be control conscious if they know that there is an unbiased system of identifying accountability for wrongdoing. A weak control culture gives rise to frequent operational risk events.

Risk from Control System Failure

The structure and the efficiency of the control system are crucial to the long-term survival of financial institutions. The breakdown of control, particularly in critical operational areas, may lead to large financial losses. For example, segregation of duties between operational staff and risk monitoring staff is an essential ingredient of the control system. Unless the firewall between the two categories of staff is inviolable, the control system will get diluted, and erosion in control may result in huge losses. The collapse of the Barings Bank is a unique example of the catastrophe that can happen to a financial institution due to the failure of the key control system. On the one hand, the principle of segregation of duties between the trading (in equities, futures, options) and the arbitraging functions and the risk monitoring and control functions was not observed, and the operational duties and risk control function were concentrated in a single individual. On the other hand, the bank's parent office in London skipped over the application of control. There was a breakdown of the control system as the accumulation of large staggering losses remained unnoticed till the Barings Bank reached the stage of bankruptcy.

Banks prescribe prudent risk limits in respect to credit, investment, trading, and off-balance-sheet activities, and establish simultaneously a rigorous control mechanism to contain enterprise-wide risks within the limits. If there is dilution or failure of control, the risk level will go beyond the specified boundary. The additional risk arising from inadequacy of control is not a business risk, but a control risk that should be attributed to operational risk.

Risk from New Activities and New Products

When a new activity or new product is introduced, banks study its viability, taking into account the potential losses that can arise from credit and market risks associated with the activity or product, but they do not properly evaluate the operational risk dimension of the new activity or product. For example, if a bank wants to undertake a new activity like the insurance business, it requires trained personnel with actuarial and other relevant experiences. Or, if it wants to introduce new products, like buying and selling of options and futures, it requires the backup of skilled and experienced personnel. Banks often fail to realize that the introduction of new activities and products may create certain situations that contain the potential to generate operational risk. First, the bank may not be fully equipped to undertake a new activity or introduce a new

product because it involves new technology and requires the services of trained personnel. Second, the existing risk monitoring and control structure may not capture the kind of risk that will emerge from the new activity or the product. Third, the format that is currently in use for reporting on the qualitative and quantitative aspects of risks may not be sufficient to deal with the new activity or product. Consequently, the control framework will require modification to handle risks emerging from the new activity and the product. Banks carry out SWOT (strengths, weaknesses, opportunities, and threats) analysis before introducing a new activity or a product. The analysis must include an assessment of new operational risk events that can surface and the manner in which they will monitor and control the risks.

Risk from Unrevised Profile

The risk management activities of a bank are aligned with its risk profile, which is a self-compiled document and which analyzes the type, the quantum, and the intensity of risks to which it is exposed. In particular, the risk profile document reveals the qualitative and quantitative aspects of credit, market, and operational risks that a bank faces. Economic, political, and environmental changes have an impact on the risk profiles, and the regulatory changes or supervisory policy initiatives also alter the profile. Consequently, banks have to undertake a review and revision of the risk profile at regular intervals and assess the adequacy of the risk management architecture in place. They have to modify the processes and systems to deal with the new situation emerging from the revised risk profile. The failure to update the risk profile may catch a bank unprepared to meet certain eventualities that may generate new types of operational risk events.

Risk from Ineffective Auditing

An internal audit independently evaluates the effectiveness of the risk management system in a bank. The audit team is required to assess whether the business heads are identifying operational risk in their respective business areas and owning and managing it, and bring out in the audit reports the departures from procedures, the excesses allowed and the exceptions made by the operating personnel, the laxity in supervision and control, and other irregularities. The audit function is a key element of the checks and balances mechanism. If the audit is ineffective, fails to detect frauds and irregularities, or compromises with the violation of rules by the field staff, a situation will prevail where the staff

may become complacent or lax and develop a casual approach toward the work. This type of development will increase the number and the severity of operational risk events.

22.4 OPERATIONAL RISK POLICY OBJECTIVES

The basic objectives of operational risk management are to:

1. Recognize the loss-inflicting capacity of operational risk events.

2. Develop an awareness and control culture across the organization.

3. Develop techniques to assess the impact of operational risk events.

4. Devise methods to allocate capital to cover potential losses from operational risk.

Banks have to formulate a separate operational risk management policy because the characteristics of operational risk are different from those of credit and market risks. The purpose of a separate policy is to recognize the high significance of operational risk in the overall risk profile and integrate it with the entire risk management process. Banks should establish a process to assist all staff to clearly understand the meaning and the ambit of operational risk, develop a control culture, and operate within limits with integrity and honesty. They should put in place a comprehensive framework to identify operational risk, develop tools and technology to measure risks under different scenarios, and monitor and control them in an effective manner to ensure long-term solvency. They should create a work environment where business is performed with due diligence and personal care, a high standard of conduct is maintained, conflicts of interests are avoided or minimized, and transparency and disclosure become an integral part of business management. They should fix operational risk tolerance limits and explain the rationale.

22.5 OPERATIONAL RISK POLICY CONTENTS

The content of operational risk policy may vary between banks, but the variations will be marginal. Several factors like the organizational structure, size of the bank, variety of business activities, range and complexity of products,

business ethics, skill set of people, and the work and control culture influence the policy content. The policy document should describe the methods and the strategies to manage operational risk on a bank-wide basis, explain the bank's views on operational risk tolerance, and lay down limits within which the staff should operate. It should deal with a comprehensive definition of operational risk, the methodology for risk identification and risk measurement, and strategies for monitoring, controlling, and mitigating the risks. It should narrate the bank's exposure to various forms of operational risk in relation to the current activities, the quantitative and qualitative analysis of the exposure, and the manner in which responses will be made to handle the risks. The policy should describe the loss events that usually occur and the impact the events can have on the bank. It should highlight critical issues in the bank's functioning, outstanding issues that contain danger, and indicate the manner in which these issues are being addressed. The document should highlight the management's expectations of the staff in promoting the control culture and maintaining an efficient reporting and review system. It should convey management's commitments to maintain transparency in all matters and emphasize its determination to fix accountability for irregular actions. It should describe the administrative process to deal with deviations from procedures, unauthorized excesses and exceptions in dealings, and the negligence and carelessness of officials in discharging assigned responsibilities.

An outline of different elements that should be included in the OR policy document is indicated here:

1. Definition of OR.
2. OR philosophy and tolerance.
3. OR limits.
4. Sources of OR.
5. Methodology for categorization of OR.
6. Key processes to manage OR.
7. Mapping of activities into business lines.
8. OR identification methodology.
9. OR assessment and measurement methodology.
10. OR monitoring.
11. OR control and mitigation.
12. Capital allocation for OR.
13. Treatment of excesses, exceptions, and rule violations.

14. Outsourcing policies and procedures.
15. Business continuity planning policy.
16. Evaluation of OR management function.
17. Organizational structure to manage OR.

22.6 OPERATIONAL RISK MANAGEMENT FRAMEWORK

Unlike credit and market risks, which are business-specific, operational risk emerges in a variety of ways and is present in all business processes. The frequency of operational risk events has been increasing over the years and the complexity of their character is changing. It has been prominent in certain areas, such as system failure, system security, system validity and viability, utility service, and outsourcing. As such, the focus of operational risk is on managing the risk rather than measuring it. Banks should treat operational risk management as an independent risk management function that involves identification, assessment, monitoring, control, and mitigation of the risk. The design of the operational risk management framework should be oriented toward the bank's own requirements in keeping with the size and complexity of business, risk appetite, working environment, and targeted level of capital. At the minimum, banks should undertake the following activities to manage operational risk:

1. Banks should prepare a document on operational risk management policies, processes, and procedures and communicate the material contents to the staff that are exposed to operational risks in day-to-day activities. The document should include strategies for successful implementation of operational risk policies and define risk tolerance limits with breakdown into appropriate sublimits and prescribe reporting levels for breach of limits.

2. Banks should set up a process for identification and assessment of operational risk, taking into account historical as well as potential risk events. They should track actual and potential operational risk loss data, classify operational risk loss events into different risk categories based on their frequency and severity, and map them for prioritization of remedial action.

3. Banks should establish an effective monitoring process for prompt detection of deficiencies in operational risk management systems and procedures and initiation of remedial action. Besides monitoring of operational risk loss events,

they should identify early warning indicators that contain the possibilities of increased risk of future losses.

4. Banks should develop specific policies for mapping products and activities into appropriate business lines for managing operational risk.

5. Banks should put in place appropriate policies, processes, and procedures to control and mitigate material operational risks. They should periodically review the effectiveness of risk mitigation and control strategies and revise the operational risk profile.

6. Banks should establish policies for managing risks associated with the outsourcing activities. Also, they should have in place contingency plans and business continuity plans for operation in the event of serious business disruption. They should periodically review the disaster recovery and business continuity plans.

Banks should prepare an appropriate operational risk management framework based on the policy document, which will contain the blueprint of the operational risk management process. Besides containing a precise definition of operational risk, the framework should include the design of an effective communication system that will promote understanding of operational risk by the staff and enhance risk awareness and the control culture across the organization. The framework should describe key processes to manage operational risk, specify the role of different functionaries, and lay down guidelines for assignment of responsibilities and fixation of accountability. It should include a mechanism that explains and evaluates risks emerging from new products, new activities, and new systems and is cognizant of risks arising from external circumstances and other environmental factors.

Banks should create an appropriate organizational structure within the enterprise-wide risk management structure for effective management of operational risk and observe the principle of segregation of conflicting duties in allocation of responsibilities. They should promote human resource policies that encourage honesty and integrity in dealings and discourage tendencies to deviate from the prescribed procedures. They should uphold the importance of the monitoring and control function, and subject the operational risk management function to a comprehensive internal audit for independent evaluation and assessment. An illustrative operational risk management framework is summarized in Table 22.2.

TABLE 22.2 Operational Risk (OR) Management Framework

Policy Input	Policy Objective	Task	Functional Responsibility
1. OR Definition	To familiarize staff with OR events.	Define OR and explain to staff with examples.	Operational Risk Management Department (ORMD).
2. OR Philosophy and Appetite	To describe OR philosophy and tolerance level.	Explain OR philosophy and appetite. Align activities and products with risk appetite. Fix boundary wall. Prepare statement for disclosure in balance sheet.	Board of directors, Risk Management Committee of board (RMC), Senior management, ORMD.
3. OR Limits	To disclose business unit-wise OR limits.	Fix OR limit (maximum potential loss) based on historical loss events data, scenario analysis, and stress tests. Estimate economic capital requirement.	Board, RMC, Senior management, ORMD.
4. OR Sources	To explain potential sources of OR to staff. To promote risk awareness.	Identify possible sources of OR. Prepare and circulate list of OR sources relating to each business area.	ORMD.
5. OR Categorization	To classify OR loss events into appropriate categories for OR management.	Set up guidelines for loss event classification into loss event–type categories. Prepare illustrative list of loss events and show their category-wise classification.	ORMD.
6. OR Management Process	To familiarize staff with key OR management processes.	Describe approaches and methods of OR management with illustrative examples. Identify loss events. Map loss events into business lines.	Business line heads, Functional heads, ORMD.

		Assess potential loss. Allocate capital. List risk control and risk mitigation duties.	
7. Activity Mapping	To map each activity into a prespecified business line for OR capital assessment. To facilitate switchover to Advanced Measurement approach.	Collect information on banking industry practices for mapping. Set up principles and norms for mapping activities into eight business lines (as per New Basel Capital Accord)	ORMD.
8. OR Identification	To explain procedure for OR identification. To entrust to business heads responsibility to identify OR in their business lines.	Identify and prepare list of operational risk events from all activities, business lines, and products. Collect OR events from peer banks and other external sources. Familiarize staff with OR identification procedure.	Business line heads, Functional heads, ORM specialists, OR managers, ORMD.
9. OR Measurement	To establish methodology for OR assessment and measurement. To assess capital requirements.	Prepare lists of historical and potential OR events. Design formats and collect historical data on actual losses, potential losses. Identify high loss-inflicting events. Design key risk indicators (KRI) and collect data on KRI. Collect loss event data from external sources. Appoint in-house group to assess vulnerabilities and make scenario-based assessment.	Business line heads, Functional heads, OR specialists, OR managers, ORMD.

Policy Input	Policy Objective	Task	Functional Responsibility
		Develop norms for event classification in terms of frequency and severity. Design matrix to categorize losses, event type-wise and business line-wise. Undertake activity-wise and business unit-wise OR assessment. Arrive at enterprise-wide OR through business unit-wise self-assessment, loss event data-based assessment, key risk indicator-based assessment, and scenario-based assessment.	
10. OR Monitoring	To adhere to prescribed policies, procedures, and limits. To detect deficiencies in OR management process.	Prepare checklist of OR vulnerabilities and circulate among staff. Devise methods to detect early warning signals of occurrence of significant OR events. Identify vulnerable areas for prioritization of remedial action. Devise mechanism to track and record frequency and severity of loss events. Set up mechanism to identify excesses and exceptions for punitive action. Set up periodic reporting framework by business and functional heads on (a) OR events, (b) early warning indicators, and (c) extent of actual and potential losses.	Business line heads, Functional heads, ORMD.

11. OR Control and Mitigation	To minimize impact of OR.	Identify severe loss events and most susceptible business lines. Set up risk mitigation tools and techniques. Identify areas of conflicts of interest and prepare chart showing segregation of duties and responsibilities. Formulate human resource policies to incentivize compliance and honest reporting and punish noncompliance and irregular actions. Devise strategies for promotion of strong internal control culture.	Human Resources Department, ORMD.
12. OR Capital Allocation	To comply with capital adequacy requirement.	Decide capital adequacy assessment approach. Establish method to calculate regulatory and economic capital against OR. Draw up road map for transition from basic approach to advanced approaches.	ORMD.
13. Excesses and Exceptions.	To set up transparent system to deal with limit and rule violations. To define excesses and exceptions. To establish criteria to determine severity scale of rule violations.	Convey management's policy to treat limit and rule violations. Prepare chart of excesses, exceptions, and violations committed by staff in the past for circulation. Map violations in severity scale for staff information. Prescribe benchmark for punishment in keeping with gravity of offences.	Human Resource/Personnel departments, ORMD.

Policy Input	Policy Objective	Task	Functional Responsibility
14. Outsourcing Policies and Procedures	To establish structured policies and procedures to deal with risks from outsourcing of services, and other residual risks like reputation risk, service failure risk.	Prepare list of activities to be outsourced. Formulate policies and procedures for outsourcing and vendor selection. Carry out due diligence exercise and cost-benefit analysis for vendor selection. Prepare draft of legal agreement to be executed between bank and service providers/vendors. Prepare strategies to respond to service failure and draw up contingency plans. Prepare list of alternate service providers for calling in emergency.	ORMD, Customer Services Department, Planning Department, Information Technology Department.
15. Business Continuity Plans.	To formulate plans for business restoration in the event of serious disruptions and systems failure.	Assess impact on business operations from service dislocation due to calamity, terrorist activity, systems failure, and breakdown in electrical/ communication services. Identify and prioritize critical business activities, identify logistics, and prepare business continuity plans to resume at least critical operations.	ORMD, Funds Department, Planning Department, Information Technology Department.

16. OR Management Evaluation	To assess effectiveness of OR management system. To provide to top management an assurance of compliance with policies and procedures.	Establish mechanism for independent evaluation of OR management function and enterprise-wide control environment by outside agency. Finalize modalities for due diligence of OR management function by internal audit department. Prepare review reports on OR management effectiveness.	ORMD. Internal Audit/ Internal Inspection Department.
17. Organizational Structure	To establish an organizational structure in alignment with OR management activities.	Prepare recommendation for creation of appropriate OR management organizational structure within enterprise-wide risk management structure. Prepare roles and responsibilities chart. Decide modalities to align human resource policies with OR objectives.	Board. Senior management. Human Resource/ Personnel Department. ORMD.

22.7 SUMMARY

Operational risk results from people-related, systems-related, and process-related inadequacies or failures, and from external events. It has lesser visibility and predictability than credit and market risks and remains hidden in transactions and activities.

Operational risk is more significant than credit and market risks, because it is not business specific, and it occurs from multiple sources, manifests through varieties of events, and inflicts substantial loss when the risk materializes. It occurs from the beginning of a transaction and stays until the transaction is closed and the customer relationship is terminated.

The rapid growth of financial institutions and the merger and acquisition of banks, the diversification of financial activities, the automation of business processes and the outsourcing of financial services have significantly increased the possibilities of operational risk to emerge in one form or another.

Ineffective and incomplete communication, lack of an unbiased system for fixing accountability, and absence of transparent criteria for awarding rewards and punishments increase operational risk incidences. Besides, lack of seriousness in evaluating the operational risk dimension of new activities and products and inefficiency of the audit function increase the number and severity of operational risk events.

The basic objective of operational risk management is to recognize the loss-inflicting capacity of operational risk events and deal with them effectively. Banks should have a separate operational risk management policy because the significance and characteristics of operational risk events are different from those pertaining to credit and market risk events.

Banks should prepare an operational risk policy that includes an outsourcing policy and a business continuity planning policy. Outsourcing of services contains high potential to inflict operational loss due to the failure or deficiency of services rendered by vendors and third parties. Internal events like systems failure and external events like natural calamities and terrorist activities interrupt business continuity and generate financial loss.

Banks should establish an appropriate operational risk management framework in conformity with their size, business activities, risk appetite, operating environment, and targeted level of capital. The framework should include the blueprint of the operational risk management process and conducive human resource development policies that are in alignment with the objectives of

operational risk management.

The operational risk management function must be subjected to a comprehensive internal audit for independent evaluation and assessment.

NOTE

1. New Basel Capital Accord, paragraph 644.

CHAPTER 23

Operational Risk Identification, Measurement, and Control

23.1 OPERATIONAL RISK IDENTIFICATION APPROACH

The operational risk identification procedure should capture operational risk from all types of business activities, products, and services rendered by banks. In the past, operational risk was managed by banks, usually through a control mechanism that was supported by an internal audit function. No systematic approach was followed to identify operational risk in a comprehensive manner. Two documents released by the Basel Committee on Banking Supervision, "Sound Practices for Management and Supervision of Operational Risk, December 2001" and "International Convergence of Capital Measurement and Capital Standards: A Revised Framework— Comprehensive Version, June 2006" have underlined the need for comprehensive treatment of operational risk.

The identification procedure should be comprehensive and cover enterprise-wide operational risk from business activities, products, and other sources as indicated here.

Business Activities

Business activities are granting credit, accepting deposits, borrowing funds, purchasing securities, issuing credit cards, transferring funds, providing custodial services, and providing agency services.

Products

Products are service delivery instruments through which activities are carried out, and are of different types like deposit and credit products, bill purchase and discount products, financial guarantee and commitment products, and credit card and derivative products.

Processes

Processes refer to transaction processing, client instruction processing, funds transfer processing, data and message transmission, payment and settlement systems–related processing, and books of accounts reconciliation.

Systems

Systems include the computer system, software system, core banking solution system, automated teller regulated cash payment system, net working system, Internet banking system, and records and accounts maintenance system.

External Events

External events relate to service breakdown, natural calamities, burglaries, and terrorist activities.

Outsourcing of Services

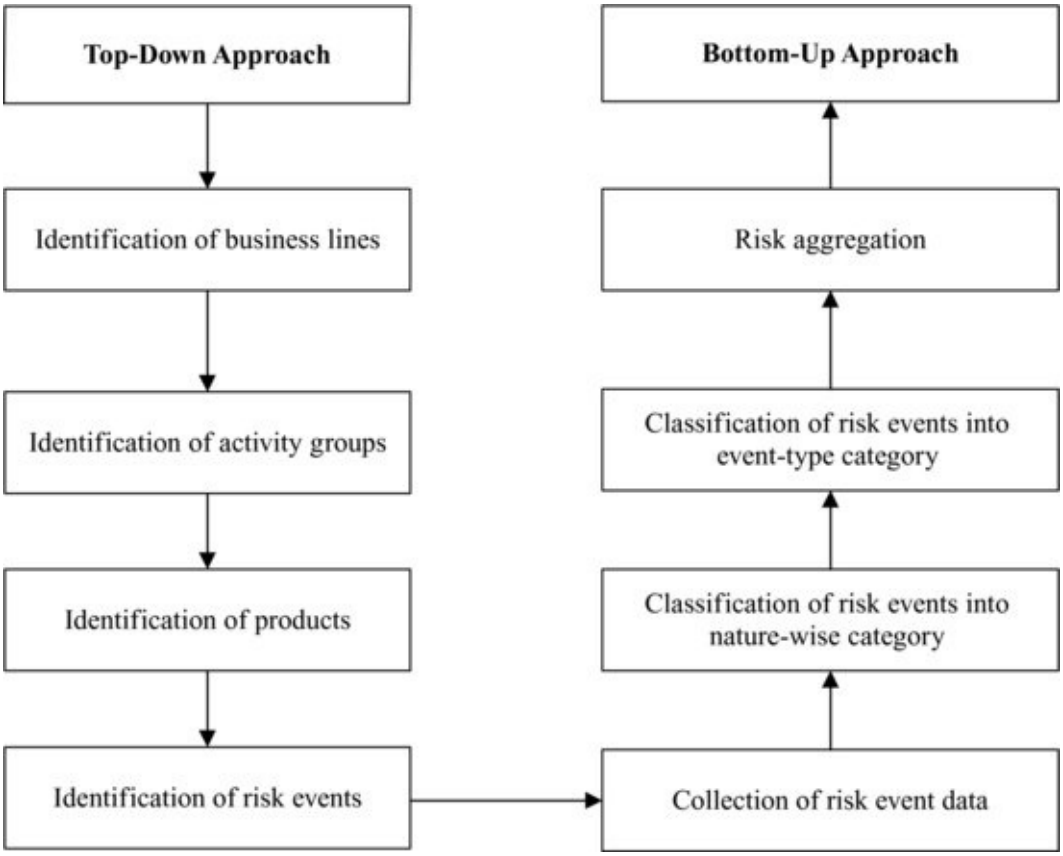
Outsourcing of services covers computer maintenance contracts, automated teller machine operation and maintenance contracts, service contracts to physically transfer cash and valuables, and surveillance and security contracts to guard premises and miscellaneous assets.

Identification of operational risk in a comprehensive manner is vital for establishment of an effective monitoring and control system. Banks should therefore prepare checklists to identify operational risk in a chronological way from each of the areas indicated above, and from new activities, products, and systems and processes.

23.2 OPERATIONAL RISK IDENTIFICATION PROCESS

Banks can follow a top-down approach for identification of operational risk events and a bottom-up approach for risk mapping, classification, categorization, and aggregation. Under the top-down approach, the bank's activities are broken into business lines, and activity groups associated with each business line are identified. Thereafter, the products used in each business line are segregated, and risk events associated with each product are identified. Under the bottom-up approach, data on individual risk events are collected and classified into broad event-type categories within each business line, and risks under event-type categories are aggregated to get a comprehensive picture of the operational risk the bank faces. The sequential steps for operational risk identification are indicated in Figure 23.1.

FIGURE 23.1 Operational Risk Identification Process



23.3 BUSINESS LINE IDENTIFICATION

Certain business lines are major and certain are minor for banks, and some activities are not part of their regular business. The Basel Committee on Banking Supervision has recommended adoption of eight business lines for calculation of operational risk capital charges under the Standardized Approach.[1]

The business lines are:

1. Corporate Finance
2. Trading and Sales
3. Retail Banking
4. Commercial Banking
5. Payment and Settlement
6. Agency Services
7. Asset Management
8. Retail Brokerage

Banks may adopt these business lines for operational convenience and

assessment of capital adequacy to cover operational risk. Each business line consists of one or more than one broad activity, and each broad activity is assigned to a few activity groups that offer different products and deliver different types of services. For example, under the business line “Retail Banking,” the broad activities are “retail banking, private banking, and card services” and the activity groups are “private lending and deposits, banking services, trust and estates, investment advice, merchant/commercial/corporate cards, private labels, and retail.” In the New Basel Capital Accord, business lines have been assigned Level 1 category and broad activities Level 2 category.[2]

The task of operational risk identification begins with the classification of the bank's entire activities into appropriate business lines. Some banks may not undertake all kinds of activities, and therefore some business lines may not be relevant to them. For example, some banks may not provide agency services or undertake asset management or retail brokerage. The identification of risk events from each product used by activity groups associated with each business line constitutes the core of the identification process. Banks should therefore prepare activity-group lists of operational risk events that have occurred in the past and circulate them among the business heads. The process will familiarize the business line managers with risk events that may occur in a particular business line and eliminate the possibility of omission.

Principles for Identification of Business Lines

Banks should develop specific policies for mapping a product or an activity to an appropriate business line. The Basel Committee on Banking Supervision has laid down the principles for business line mapping in Annex 8 of the New Basel Capital Accord.[3] It is convenient to map products/activities to business lines in alignment with the principles described in the New Accord. The mapping of activities to business lines for calculation of operational risk capital requirements should be consistent with the definition of business lines used for calculation of regulatory capital for credit and market risks. Banks should map the activities to the business lines in a mutually exclusive and jointly exhaustive manner and allocate the ancillary function of an activity to the business line it supports. They may assign the activities that belong to more than one business line to the most prominent or more suitable business line, break the compound activities into components, allot the components to the most suitable business line, and so on. Keeping these principles in view, banks should make a list of all activities and

assign them to one of the prescribed business lines. If a bank does not undertake an activity that falls under a specific business line, it may ignore that activity.

Identification of Activity Groups and Products

After identification of business lines, banks may identify product teams or activity groups and products used by them for delivery of services falling under that business line. The product teams may carry out functions of general banking, transaction banking, merchant banking, sale-purchase of securities and currencies, debit and credit card services, cash management, wealth management services, and so on. Each product team uses a variety of products for delivery of service. For example, the general banking activity group may use different types of deposit products for individuals, corporations, and institutions, and different types of credit and credit-related products like term loans, overdrafts, letters of credit, purchase and discount of trade bills, and issue of guarantees for different types of clients. But there may be common types of products that fall under more than one business line. For example, retail deposits and wholesale deposits of both individuals and corporations, and overdrafts and term loans may come under both retail banking and commercial banking. The linking of products with activity groups and alignment of products with business lines are mainly for the purpose of deriving the gross income under each business line for adoption of the Standardized Approach for calculation of operational risk capital charges. The Basel Committee on Banking Supervision has stated that “within each business line, gross income is a broad indicator that serves as proxy for the scale of business operations and thus the likely scale of operational risk exposure within each of these business lines.”[4]

Identification of Risk Events

The next step for identification of operational risk is to identify the risk events associated with the products. An operational risk event is an incident or an experience that has caused or has the potential to cause material loss to a bank, either directly or indirectly with other incidents. Examples of risk events are misappropriation of funds, fraudulent encashment of drafts, robbery, computer hacking, computer failure, money laundering, and so on.

Risk events are associated with people, processes, and technology used in the delivery of products, and can be listed from adverse or unfavorable incidents that have taken place in the past either in branch offices, controlling offices, or the head office of a bank. We can even think of an incident that can occur and cause loss of money, assets, or reputation to a bank as a potential risk event. Banks may prepare lists of risk events from regulatory guidelines, their own experiences, and the incidents that have taken place in other banks and financial institutions.

An illustrative list of operational risk events is given in Table 23.1.

TABLE 23.1 Illustrative List of Operational Risk Events

Operational Risk Events
Misappropriation of cash.
Unauthorized transactions and loan sanctions.
Intentional misreporting.
Breach or omission of prescribed procedures.
Misuse of financial powers.
Account manipulation or error.
Lack of knowledge for handling transaction resulting in error.
Disclosure of customer information to unauthorized persons.
Theft and fraud by employees or outsiders.
Encashment of forged instruments.
Writing-off from books interbranch transactions without authorization.
Unauthorized use of automated teller machine, debit and credit cards.
Forging of customers’ signatures for unauthorized withdrawals.
Forging of bank officials’ signatures for false claim/monetary gain.
Check kiting.
Customers’ valuables missing from bank's lockers.
Missing assets, collateral, valuables, payment vouchers.
Removal of checks in transit relating to clearinghouse transactions.
Interruption in business due to failure in computer system.

Error in transaction due to inaccurate computer processing.
Stealing of computer access code and unauthorized use of computer.
Unauthorized entries in computer-maintained accounts.
Suffering damage due to computer hacking.
Unauthorized use of e-banking facility.
Theft of confidential information by third parties.
Looting, burglary, and damage from external events.
Money laundering.
Insider trading.
Fiduciary breaches.
Breach of privacy.
Default or deficiency in outsourced services.
Extortion threats.
Vendor disputes.

The operational risk identification process is presented in Table 23.2.

Step 1: Identify the business line.

Step 2: Identify the product team in each business line.

Step 3: Identify products used by the product team in each business line.

Step 4: List operational risk events associated with the products.

Operational risk events arise from people, process, and systems failures and from external events. It is possible to relate each risk event to either of these causes. For this purpose, banks can maintain records in the form shown in Table 23.3. They should prepare separate lists of risk events relating to external events as those will be very few.

TABLE 23.2 Operational Risk Identification Format

Business Line	Product Team	Products	Operational Risk Events
Business Line 1	Product Team 1	Product 1	Event 1
		Product 2	Event 2
	Product Team 2	Product 3	Event 3
		Product 4	Event 4
	Product Team 3	Product 5	Event 5
		Product 6	Event 6
Business Line 2			
Business Line 3			
Business Line 4			
Business Line 5			
Business Line 6			
Business Line 7			
Business Line 8			

TABLE 23.3 Operational Risk Identification Process

List of Risk Events
Record-Keeping Format

Business Line							
Business Line 1	Business Line 2	Business Line 3	Business Line 4	Business Line 5	Business Line 6	Business Line 7	Business Line 8
Product	Product	Product	Product	Product	Product	Product	Product
1, 2, 3,..	1, 2, 3,..	1, 2, 3,..	1, 2, 3,..	1, 2, 3,..	1, 2, 3,..	1, 2, 3,..	1, 2, 3,..
Risk Events	Risk Events	Risk Events	Risk Events	Risk Events	Risk Events	Risk Events	Risk Events
1, 2, 3,..	1, 2, 3,..	1, 2, 3,..	1, 2, 3,..	1, 2, 3,..	1, 2, 3,..	1, 2, 3,..	1, 2, 3,..
Attributable to:	Attributable to:	Attributable to:	Attributable to:	Attributable to:	Attributable to:	Attributable to:	Attributable to:
Risk Event 1:	Risk Event 1:	Risk Event 1:	Risk Event 1:	Risk Event 1:	Risk Event 1:	Risk Event 1:	Risk Event 1:
a) People	a) People	a) People	a) People	a) People	a) People	a) People	a) People
b) Process	b) Process	b) Process	b) Process	b) Process	b) Process	b) Process	b) Process
c) Systems	c) Systems	c) Systems	c) Systems	c) Systems	c) Systems	c) Systems	c) Systems
Risk Event 2:	Risk Event 2:	Risk Event 2:	Risk Event 2:	Risk Event 2:	Risk Event 2:	Risk Event 2:	Risk Event 2:

23.4 OPERATIONAL RISK ASSESSMENT METHODS

Banks should develop their own operational risk assessment techniques, keeping in view the entire range of activities, the business profile, and the data availability. Unlike credit risk where the focus is on quantification of potential credit loss and market risk where the focus is on quantification of likely erosion in investment values, both in numerical terms, under operational risk the focus shifts to assessment of loss in relative terms like small, moderate, large, and substantial.

Operational risk is more a management issue than a measurement issue, and consequently, banks should make an assessment of enterprise-wide operational risk exposure, identify areas where the potential loss is high, and take remedial action in time to contain risk.

Banks may assess operational risk through application of three methods:

1. Control and risk self-assessment method.

2. Key risk indicator method.

3. Risk mapping method.

Control and Risk Self-Assessment Method

Under the self-assessment technique, potential risk from a bank's products and activities is assessed in terms of business processes and limits, skill requirement, and possible threats and slippages. It is an in-house process to evaluate the strengths and weaknesses of the operational risk environment within the bank. It requires the teamwork of experts within the organization to review key business risks the bank faces and the efficacy of controls in place to contain and mitigate those risks, and to examine whether the existing environment can achieve the corporate objectives and corporate business perspective.

Let us suppose that the corporate objective is to become a dominant retail banker in the financial sector. An in-house team of experienced staff drawn from several departments of the bank who have exposure to various facets of retail banking is formed who will undertake the “Control and Risk Self-Assessment” exercise. The team prepares a list of vulnerabilities observed in the retail banking portfolio that are specific to the bank, makes a formal self-assessment of business processes and control systems that exist, and identifies the deficiencies,

hassles, and management issues that the bank may face in realizing the corporate goal to become a dominant retail banker. The team analyzes the threats in terms of possible operational risk events that can occur, the existing controls in place, and the severity of the impact if an event occurs. It evaluates the control system from the user's point of view and makes recommendations for modification of the control procedure to reduce the vulnerabilities that threaten the realization of the corporate goal.

Banks can assign scores after assessing the inherent risk, the controls in place to mitigate the risk, and the severity of final impact, and indicate the ranking of different types of operational risk scenarios. Banks should design standardized risk assessment templates and set up risk assessment criteria and standardized scorecards to facilitate control and risk self-assessment. This method will help them to identify the vulnerabilities in their systems and procedures and evaluate the effectiveness of existing controls that provide clues for enhancing the control system.

Key Risk Indicator Method

Key risk indicators (KRIs) are statistics or metrics designed to identify critical areas where operational risk can materialize and activities and risk factors that have the potential to inflict losses. KRIs provide early warning signals on people, processes, and systems. KRIs originate from a combination of three parameters:

1. Business volume (examples: deposit or loan transactions per day in a branch office, volume of cash handled, number of new accounts opened in a day or week after completion of Know Your Customer formalities).

2. Logistic support environment (examples: number of staff in relation to work load, number of computers processing business transactions, spread of local area network, adequacy of standby facilities).

3. Discretionary power schedules (examples: spread and varieties of operations for use of discretionary powers, average number of loans sanctioned beyond discretionary powers, average number of excesses allowed, and exceptions made in transactions).

KRIs usually lie in those operational areas where the bank auditors find most of the irregularities or the bank management visualizes operational constraints and deficiencies in control. A rapid increase in business volume or transaction levels, out-of-proportion errors, losses in unexpected areas, arrears in reconciliation of books of accounts, significant interbranch communications on payment and settlements, or a sudden increase in the number of irregularities in branch operations are the symptoms that guide a bank to look for KRIs.

KRIs exist in different activities, products, and business lines, and though they may owe their origin to the same source, they exist in all business lines. For example, people-related KRIs may exist in the treasury department, credit department, or funds department. The business line heads are more familiar with the flaws and vulnerabilities of operations in their respective business areas, and therefore they have to own the responsibility of identifying KRIs in their business lines. Each KRI should be linked to the underlying cause for tracking adverse developments and periodically checked for relevance and accuracy.

Banks should set up thresholds or limits of risk tolerance beyond which the designated officials will look for KRIs. The limits are intended to alert the risk managers about the potential problems that may surface in certain areas of operation. The selection of KRIs is a continuous process and the inventory of

critical KRIs changes over time. Some KRIs arise from the past statistics of loss event data. A few examples are the number of frauds in check encashment, delivery of faulty outputs due to systems problems, number of occasions when employees misused their own accounts in the branch office, and so on. Some new KRIs arise from changes in business volume, business profile, and introduction of complex products. It is necessary to take cues from these changes and design KRIs that are forward looking.

An illustrative list of KRIs is given in Table 23.4.

TABLE 23.4 Illustrative Key Risk Indicators

Operational Risk Source	**Key Risk Indicators**
People Related	Significant number of excesses and exceptions.
	Significant number of limit and financial power violations.
	Staff absenteeism and sickness rate.
	Adverse age profile of executives.
	Disproportionate number of staff disciplinary cases.
	Clubbing of conflicting responsibilities.
Operations Related	Unreasonable transaction–staff ratio.
	Significant number of unpaid clearing checks.
	Unreasonable number of debits to suspense accounts.
	Frequent entries in staff deposit accounts.
	Rapid increase in number of loan accounts.
	Significant number of large exposures.
	Frequent revisions in credit rating of borrowers.
	Large number of dematerialized accounts.
	Significant arrears in renewal of revolving credit accounts.
	Increasing incidence of nonperforming loans and advances.
	Frequent devolvement of off-balance-sheet liabilities.
	High number of speculative transactions in treasury department.
Process Related	High proportion of incomplete and expired loan documents and agreements.
	Disproportionate number of unreconciled entries in books of accounts.
	Significant variation in internal credit rating and external agency rating of same borrowers.
	Frequent defaults or omissions in capturing and entering data in the management information system.
	Disproportionate number of unsettled suit filed cases.
	Disproportionate number of written-off cases.
	Screening system not capturing suspicious transactions or money laundering attempts.
Systems Related	Unusual duration of systems downtime.
	Frequent violation of security codes in accessing computer systems.
	Number of outages in network functioning.

	Number of virus-related incidents.
External Events Related	Number of occasions burglaries took place or attempts made.
	Number of occasions when vendors/service providers failed to honor agreements/commitments.
	Number of times utility services broke down.

Banks should lay down benchmarks in each relevant area to determine whether the ratios and numbers of events/incidents/transactions are disproportionate or significant so that risk managers will look for KRIs when the actual data exceed the benchmarks. They should gather data on KRIs periodically, rate them on a grading scale, assess their importance in terms of frequency and intensity, and prepare a list of critical KRIs to pay more attention to them. It is necessary to collect actual operational risk loss data for the last five to seven years in respect to identified KRIs in order to make an estimate of potential loss that can arise from operational areas to which KRIs pertain. An estimate of potential loss can be made on the basis of frequency, severity, and historical loss data of KRI-related incidents. The KRI-based assessment of potential loss from each operational area is more useful for identification of critical and vulnerable areas and for focusing attention on those areas for risk mitigation.

Risk Mapping Method

The basic objective of risk mapping is to identify areas of weaknesses for prioritization of remedial action. Banks should select their own parameters for risk mapping, collect the operational risk loss data associated with various business units, and classify them according to event types in accordance with the loss event type classification indicated in Annex 9 of the New Basel Capital Accord. They should map loss data separately in respect to each business line, and rank the event-type and business line operational risk scenarios to identify the most vulnerable areas for appropriate remedial action.

23.5 OPERATIONAL RISK MEASUREMENT METHODOLOGY

The objectives of measurement are:

1. To know the size of potential losses in relation to business volume and income.

2. To judge the adequacy of capital against expected and unexpected operational risk losses.

3. To evaluate the relative performance of business lines in terms of the ratio of loss (operational risk loss) to income (business line income).

The Basel Committee on Banking Supervision has recommended three methods for calculating operational risk capital charges in the document on the New Basel Capital Accord: the Basic Indicator Approach, the Standardized Approach, and the Advanced Measurement Approach. The first two approaches seek to calculate capital charge from the income estimation side; the third approach calculates capital charge from the loss estimation side. Only the Advanced Measurement Approach lays down the methodology for estimation of potential operational risk loss.

It is advantageous to set up an operational risk measurement methodology that conforms to the requirements of the Advanced Measurement Approach for calculation of operational risk regulatory capital and is capable of generating two outputs—the expected loss and the unexpected loss from operational risk exposures. The New Basel Capital Accord specifies that “a bank's internal measurement system must reasonably estimate unexpected losses based on the

combined use of:

a. Internal and relevant external loss data.

b. Scenario analysis.

c. Bank-specific business environment and internal control factors.

The bank's measurement system must be capable of supporting an allocation of economic capital for operational risk across business lines in a manner that creates incentives to improve business line operational risk management." The Accord requires that "a bank's risk measurement system must be sufficiently 'granular' to capture the major drivers of operational risk affecting the shape of the tail of the loss estimates."[5]

Banks should establish risk measurement techniques in conformity with their business profiles, product range, and complexity. The measurement process must estimate the quantum of potential loss based on a combined application of four components: internal loss data, external loss data, scenario analysis and bank-specific business environment, and internal control factors.

Internal Loss DataBased Measurement

The key component of the operational risk measurement process is to estimate the potential loss based on the bank's own internal loss experiences. Banks should track internal loss event data for tying their own risk estimates to the actual loss experiences. The internal loss data should relate to the current business activities and should be mapped to the business lines and the event types described in Annexes 8 and 9 of the New Basel Capital Accord. The data should be comprehensive and cover all material activities and exposures from all geographical locations and the entire systems and processes. The data should capture all material losses consistent with the definition of operational risk including operational risk losses linked to credit risk-and market risk-related activities.

Banks should collect operational risk loss data from their branch offices and consolidate them to have an overall picture of business line and enterprise-wide operational risk loss. They should set up distinct criteria for assignment of loss data arising from loss events into different business lines and design structured formats for reporting of operational risk loss event and loss data by branch offices and regional offices in order to maintain consistency and uniformity in reporting by offices from different locations. If the bank is large and has a large number of branch offices at different locations, it is not worthwhile to collect operational risk loss data involving very small amounts; it is sufficient to collect data above cutoff amounts. The latter may vary between banks, and within a bank, between business lines and event types. The structured formats should include the following particulars:

- Date of loss event.
- Type of event.
- Amount of loss, amount recovered, and amount outstanding.
- Drivers or causes of loss events.
- Modus operandi.

The data should pertain not only to actual events and actual losses but also near-miss events and potential losses that could have occurred. The term near-miss operational risk loss event means the loss that could have arisen but did not occur by chance, or the loss that was averted through vigilance and alertness on the part of the staff (examples: a customer trying to withdraw money with a forged signature but detected in time; an amount altered in a check/bank draft

presented for encashment; attempts at check kiting; failed burglary; a fire in the premises extinguished in time; an attempt to steal cash packed in remittance boxes; the attempted removal of documents or valuables from bank premises).

Banks should consolidate operational risk loss event information on actual losses and near-miss losses collected from branch offices to get a picture of enterprise-wide operational risk loss that has actually occurred and the likely loss that could have occurred but was avoided. The consolidated picture will enable them to make realistic estimates of potential operational risk losses that can arise during the current year and the next year. Banks should compile loss data business line–wise in order to rank the business lines in order of their vulnerability to operational risk and compute the risk-adjusted return on capital to assess the performance of individual business lines by using the quantum of operational risk loss (in combination with the quantum of credit and market risk losses).

External Loss DataBased Measurement

External data on operational risk loss events supplement the measurement system by capturing those situations that internal data often cannot map. External data are available from industry sources, peer banks, and other public documents. The external data are more meaningful for mapping of infrequent but potential high-severity losses. Banks should collect external data on loss events and evaluate the data for applicability to their own situations in the context of their size and the business activities, the areas where the incidents occurred, and the causes and the circumstances leading to the loss events. The relevance of external data is important from two angles: (1) whether the loss event is a unique event, and (2) whether the severity of the impact is significantly large, though the loss event is common and routine. Banks should have a systematic process to determine the situations in which external data will be used and the methods by which the data will be incorporated in the measurement process.

Scenario-Based Measurement

Scenario analysis is another tool for assessment of operational risk loss, used in combination with the external loss data to assess, particularly, a bank's exposure to high-severity events. Scenarios are future events that have the potential to cause large losses, and the analysis guides the banks to allocate economic capital against large potential losses from operational risk events. For conducting scenario analysis, banks may generate plausible operational risk scenarios, assess the scenarios about their relevance, and estimate potential losses that can occur under different scenarios. They may generate probable operational risk scenarios in relation to each business line and build up the database of scenario-based events through reasoned assessment of plausible severe losses by experienced business managers and risk management experts.

The Basel Committee on Banking Supervision in the New Basel Capital Accord has recommended that a bank using the Advanced Measurement Approach for calculation of operational risk capital must demonstrate that its approach captures potentially severe “tail” loss events. The Committee is of the view “that there may be cases where estimates of 99.9th percentile confidence interval based primarily on internal and external loss event data would be unreliable for business lines with heavy tailed loss distribution and a small number of observed losses. In such cases, scenario analysis, and business

environment and control factors, may play a more dominant role in the risk measurement system. Conversely, operational loss event data may play a more dominant role in the risk measurement system for business lines where estimates of the 99.9th percentile confidence interval based primarily on such data are deemed reliable."[6]

The major challenge in carrying out scenario analysis is to build up the database of scenario-based events. Loss events may occur any time when one or more incidents happen that evade controls. The magnitude of loss depends on the timing of detection of a loss event and the effectiveness of controls in place, because early detection of events will result in a lesser quantum of loss as event-specific monitoring and control can be strengthened. The first task is to identify the cause that may lead to an event (e.g., unauthorized access to a computer in a branch office of a bank for altering customer-related data), and the second task is to assess the proactive controls in place to prevent the occurrence of that event, that is, the controls that are already existing (e.g., the prescription of secret codes to operate the computer). The third task is to assess the possible impact of the event (the estimated amount of money that the customer can fraudulently withdraw from his accounts) after the introduction of new event-specific controls or enhancement of general controls; and the last task is to estimate the potential loss that can finally occur despite enhancement of controls soon after the event was detected. This way banks can estimate the potential losses from different types of events and use the database for scenario-based loss assessment.

23.6 OPERATIONAL RISK MEASUREMENT PROCESS

Historical loss experiences provide a sound basis for assessment of potential loss from operational risk. The collection of data on actual operational risk losses from different types of events that occurred in the past is the beginning of the measurement process. Banks should collect internal loss data relating to all business activities and business locations, derive the average loss values pertaining to different events, and apply the derived values to calculate the potential loss that may occur during the current year, next year, and so on. They should make estimates of business-line and event-type losses based on the average loss values and then arrive at the aggregate to derive enterprise-wide potential loss. The data must be representative and reflect the true frequency of

risk events and the intensity of impact, and therefore relate to successive financial years and at least five observation periods initially, as recommended in paragraph 672 of the New Basel Capital Accord.

The internal loss data reveal the frequency of occurrence of each loss event during each year, the quantum of loss that occurred on each occasion, and the causes of each loss event. Banks have to process the data and derive the loss-event frequency and severity. This process will enable them to assign a rank to the loss events in ascending order of frequency and severity, and identify the loss events that usually have severe impacts and the business lines that are most susceptible to operational risk. With a view to assessing the potential loss that can occur in future, banks may classify the loss events in a three-scale measuring frame—low, medium, and high—in accordance with the frequency of risk events and the amount of loss associated with each event. The norms and the scale for classification of loss events in terms of frequency and severity may vary between banks due to the differences in size, business activities, business volume, risk appetite, and risk-bearing capacity. Banks can adopt a finer measuring scale if their volume of business is large and the number of events is quite significant.

Indicative benchmarks for the classification of the frequency and severity of loss events are suggested in Tables 23.5 and 23.6. Banks need to identify major loss events and apply the norms given in Tables 23.5 and 23.6 to estimate event-wise frequency and severity and assess the potential loss.

TABLE 23.5 Operational Risk Loss Events

Type of Loss Events—Frequency Ranking	
Loss Event Frequency	
No. of Times a Loss Event Has Occurred During a Year	**Frequency Ranking**
1 to 3	Low
4 to 10	Medium
>10	High

TABLE 23.6 Operational Risk Loss Events

Type of Loss Events—Severity Ranking	
Loss Event Severity	
Average Amount of Loss Net of Recoveries from Each Loss Event (in U.S. $)	**Severity Ranking**
Up to 1 million	Low
>1 to 5 million	Medium
>5 million	High

The norms for ranking frequency and severity may vary, and banks may

establish their own norms after careful evaluation of historical internal loss data, the standards of peer banks, the industry average, and the international best practices relevant to their size and operations. Once the loss event data are classified according to frequency and severity, banks should map the events in a matrix as shown in Table 23.7.

TABLE 23.7 Operational Risk Loss Event Matrix

FREQUENCY			
High	Quadrant C Risk Event 2 Medium Impact	Quadrant F Risk Event 6 High Impact	Quadrant I Risk Event 4 Very High Impact
Medium	Quadrant B Risk Event 5 Low Impact	Quadrant E Risk Event 9 Medium Impact	Quadrant H Risk Event 7 High Impact
Low	Quadrant A Risk Event 8 Low Impact	Quadrant D Risk Event 1 Low Impact	Quadrant G Risk Event 3 Medium Impact
	Low	Medium	High
		SEVERITY	

Risk event 8 falls in Quadrant A, indicating that its frequency and severity are low, and consequently, the overall loss from the event will be low. Likewise, risk event 6 falls in Quadrant F, indicating that its frequency is high and the severity is medium, and the overall loss from the event will be high (though the severity is medium, overall loss is estimated to be high because of high frequency). Banks can include a "very high" ranking scale in their scale of measurement, and in that case, the overall loss from the risk event falling in Quadrant I should be ranked in the very high category. The matrix approach has an added advantage in that it identifies the risk events that have caused substantial losses in the past. Banks should review these high-loss risk events, assess the effectiveness of controls, and capture the emerging picture adequately in the risk measurement process. The analysis of loss events in terms of frequency and severity will enable them to set up an effective operational risk management system and identify the areas where they need to strengthen the controls to mitigate risks.

The potential operational risk loss is the aggregate of expected loss and unexpected loss, and banks have to assess the potential loss from three sources:

1. Internal loss event data.
2. External loss event data relevant to their situation.

3. Scenario-based plausible events.

For calculation of future potential loss from past internal loss data, banks need to make a reasonable assessment of the types of events that can happen, their frequency, and the amount of loss that can occur. Once these parameters have been determined, they can make an estimate of expected losses that may arise from each event type category (e.g., internal fraud, external fraud, damage to physical assets) under each business line (e.g., commercial banking, retail banking) and then take the aggregate of business line estimated loss to arrive at the enterprise-wide total expected loss. In making this estimate, banks can use the norms given in Tables 23.5 and 23.6 or establish their own norms. This is a simplified method, but it is worthwhile if a bank's goal is to arrive at an approximate estimate.

In addition to estimation of potential loss through the internal loss data–based measurement process, banks need to make an estimate of expected loss that can occur from risk events drawn from external data sources and scenario analysis. For calculation of loss that can occur in future from the latter two sources, banks need to assess the probability of occurrence of the relevant risk events and their severity. Accordingly, banks have to establish norms for the determination of probability and the assessment of severity of external data–based and scenario-based loss events.

An illustrative example of norms to decide whether a loss event will occur or not this year, next year, and a couple of years later is given in Table 23.8.

TABLE 23.8 Occurrence of Loss Events

Norms for Estimate of Possibility	
Less than 5% chance	Remote possibility
>5% to 10% chance	Low possibility
>10% to 20% chance	Moderate possibility
>20% chance	High possibility

The possibility of occurrence of loss events may vary between business lines, and the same event may occur in more than one business line.

Likewise, banks should establish severity norms for assessment of potential losses in respect of each loss event. Illustrative norms for assessment of severity are given in Table 23.9.

TABLE 23.9 Loss Events

Norms for Estimate of Severity	**Amount in U.S. $**
Insignificant loss	Up to 1 million

Small loss	>1 million to 3 million
Moderate loss	>3 million to 5 million
High loss	>5 million to 10 million
Significant loss	>10 million

Banks should estimate potential losses that can arise from the loss events identified from external data and scenario analyses through combined application of the possibility of occurrence of an event (Table 23.8) and the severity of its impact (Table 23.9).

Estimation of potential loss from internal loss event–based data may not always capture losses from "low-frequency, high-severity" events, which represent unexpected loss. Internal experiences also may not capture certain events and their severity that have occurred in other financial institutions. Banks should therefore evaluate the external data and the operational risk scenarios to identify low-frequency, high-severity events that are relevant to them, estimate the potential losses from these events for each business line, and take the aggregate to derive enterprise-wide potential unexpected losses. Thereafter, banks should add the unexpected loss to the expected loss to arrive at the enterprise-wide potential loss that can arise from the total operational risk exposure. Ideally, it is necessary to induct the correlation factor between business lines and risk events in the calculation process, but in the absence of reliable data it may be necessary to go by business line individual events.

The operational risk exposures and the nature, the frequency and the severity of risk events are not static; they change over time for various reasons. While it is necessary to review the changing scenario and modify the parameters used in the calculation of potential losses, it is equally important to compare the model output with the actual operational risk loss through a regular back-testing process and carry out modifications if unreasonable deviations are observed. Independent evaluation and validation by a committee of operational risk experts not connected with the assessment process as well as by the internal audit/external audit teams should form part of the operational risk measurement review process.

23.7 OPERATIONAL RISK MONITORING

The main objectives of operational risk monitoring are to contain the frequency and the severity of loss events and to verify that the designated officials are honestly discharging their assigned responsibilities to mitigate the risks. The

monitoring team should keep track of operational risk loss events, KRIs, loss events from external sources, and probable operational risk scenarios that are emerging. The team should detect early warning indicators that signify increased risk of future losses and take preventive action.

Banks should subject the monitoring function to occasional hindsight review by designated officials to check its effectiveness. Reports received from different functionaries and departments constitute the base of the monitoring activity. Banks should analyze these reports to identify the areas that should be monitored more frequently and intensely. Monitoring will be effective only if the reports from business units, activity groups, the operational risk department, and the internal audit department are meaningful and contain details of operational risk exposures. Banks should therefore ensure that the reports are comprehensive and include information on new events and new scenarios that have emerged in the banking industry. They should upgrade the monitoring system in the light of the changing operational risk profile that emerges from these reports.

The heads of business lines and the departmental heads should assume the ownership of operational risk that may arise in their respective business lines and departments (e.g., corporate banking head, retail banking head, the personnel department, the information technology department, the audit department, etc.). They should monitor the emergence of operational risk events in their areas and develop strategies for risk mitigation. Banks should conduct independent reviews of the performance of business/departmental heads at regular intervals to evaluate their sincerity and honesty in performing their monitoring role.

23.8 OPERATIONAL RISK CONTROL AND MITIGATION

Banks should establish an effective internal control mechanism supported by risk mitigation tools and techniques to minimize the impact of operational risk. They should evaluate the appropriateness and the efficacy of proactive and reactive controls because these influence the frequency of occurrence of operational risk events and the severity of their impact. The more vulnerable the control framework is, the greater will be the frequency and the severity of loss events. Risk mitigation tools are not substitutes for operational risk control; rather, the tools are complementary to the risk control process. For example, obtaining insurance for cash handled by the teller at the bank's counter or insurance for

cash in transit is a mitigation strategy against operational risk arising from theft, burglary, or looting. But the bank cannot draw comfort from the insurance and soften its control on the observance of procedures by the officials for handling cash at various locations, as the insurance company may repudiate a claim due to negligence in observing the laid-down procedures. The availability of insurance is a risk mitigation tool that is complementary to the overall risk control process. Banks should select mitigation tools to respond to identified operational risk exposures on a case-by-case basis.

Banks have to take a series of actions for operational risk mitigation. A list of actions is suggested here:

- Obtaining insurance for cash, valuables, and other assets.
- Establishing backup facilities for the computer systems.
- Organizing systems audits.
- Establishing physical checking in sensitive areas of operation and at sensitive places.
- Ensuring compliance with policies and limits.
- Setting up transparent procedures to endorse approvals and authorizations.
- Continually updating and reconciling the bank's accounts and other records.
- Enhancing internal audit coverage and procedures.
- Establishing systems to identify and segregate conflicting duties and responsibilities.
- Strengthening the management information system.

Monitoring and control become easier if a strong control culture prevails within the organization and banks pursue proactive human resource policies. On the one hand, banks should provide incentives for compliance and honest performance, and on the other, they should impose punishment for noncompliance and irregular actions. They should resolve the issues that undermine the efficiency of the control framework and create difficulties in applying the control procedures (for example, the internal audit team may hesitate to report on irregularities observed in the sanction of a loan to a related party).

Banks should review the operational risk causes and take appropriate remedial action, like amending personnel policies to address concerns arising from the people factor, upgrading technological systems and enhancing systems security,

classifying sensitive data and information for storage in the computer system to prevent leakage and unauthorized use, and assessing legal and vigilance issues for plugging the loopholes that caused loss. In addition, they should assess the performance of business line heads in identifying and monitoring low-probability, high-severity operational risk events, addressing the risk from outsourcing of services in their respective areas, and developing strategies to handle them. As part of the monitoring activity, banks should ensure that the internal audit department is looking into the control environment and control culture in the branch office at the time of on-site inspection and bringing the deficiencies to the notice of the management.

23.9 HIGH-INTENSITY OPERATIONAL RISK EVENTS—BUSINESS CONTINUITY PLANNING

Business Continuity Planning Concept

Banks need to prepare a business continuity plan to meet emergencies that can arise from operational risk events of high intensity. A business continuity plan is a document that contains procedures for restoration of near-normal banking services in the event of business disruption or business failure owing to the sudden appearance of major operational risk events. The plan is intended to prevent complete disruption of services on account of systems failure or external disturbances that can be highly significant at times. Banks use sophisticated technology and leverage it for enlarging their customer base in a highly competitive market. The growing sophistication of technology has significantly increased the possibility of systems corruption or systems failure that can lead to business disruption. Likewise, external events like natural calamities, terrorist activities, and fire within the bank premises can cause serious damage to the bank's properties, and a breakdown in communication systems and the power supply can suddenly disrupt banking services. Banks generally have alternate arrangements to meet minor emergencies like a cash shortage at a branch office to make payments to customers, the sudden absence of branch officials, a sudden power failure or computer systems failure, and so on. But the business continuity plan seeks to meet emergencies that are on a much larger scale and that arise from events that are not expected in the normal course. Banks should therefore have a comprehensive business continuity plan to restore normal services within a reasonable time frame.

Selection of Core Activities

The business continuity plan aims at restoration of core activities on a priority basis. Banks should prepare a list of core activities, select those in order of priorities, and specify the series of actions that may be required to restore operations. The business continuity plan is a blueprint of those actions. Payment and settlement, the treasury function, liquidity management, cash dispensation, and customer interaction are the core activities of a bank.

Payment and Settlement

A bank has to make payments to customers, honor commitments in accordance with the agreements, and participate in the clearinghouse daily as its absence may cause disruption to the payment and settlement system. Its failure to meet payments and settlements on time will have a contagion effect in the financial market and will undermine the financial system.

Treasury Function

The treasury department plays a vital role in day-to-day operations as it maintains the bank's fund position and undertakes trading and risk hedging operations. In the event of systems failure or disruption of the treasury function due to external events, treasury operations can come to a standstill. Banks should have standby arrangements to restore the treasury function without loss of time. They should maintain mirror accounts of daily treasury transactions at nonvulnerable places, which will serve as backup in case of emergency.

Liquidity Management

In the event of business disruption, the demand for liquid funds may be much beyond the normal requirements. There will be pressure on the bank's liquidity, because, during a crisis, there will be higher demand for cash withdrawal by customers. Banks should review the sources for procuring liquid funds during the crisis period and keep the options ready to meet exigencies.

Cash Dispensation

Banks have to keep the automated teller machine service functional at all times. In case of disruption of services on account of mechanical failure, the bank has to promptly restore network connectivity and replenish cash. If the kiosks are destroyed, alternate arrangements will have to be made to deal with the situation.

Customer Interaction

Interaction with the customers is an integral part of the financial services business. In the aftermath of business disruption or business failure on account of natural or man-made disaster, there will be an increased flow of customer inquiries, and banks need to set up call centers at identified locations to provide comfort to the customers. Sometimes, there can be false propaganda or publicity against the bank that affects its reputation. The call center should provide assurance to the customers about the safety of their funds and assets, and respond to their queries about restoration of normal business operations.

23.10 BUSINESS CONTINUITY PLAN SUPPORT REQUIREMENTS

For restoration of services in the postdisruption period, banks should have the following arrangements.

Computer System Support

The ledger extracts of customer accounts are essential for maintaining continuity of customer transactions. Banks should create the backup of computer systems, maintain mirror accounts of customers at an alternate and safe place, and update the mirror accounts on a daily basis.

Outsourced Services Support

Banks should review the materiality of outsourced services and keep contingency plans ready to meet emergencies arising from service providers' failure. If the outsourced activities are critical, like the maintenance of automated teller machines or the supply of armed guards at branch offices and other sensitive areas where cash and valuables are stored, banks should insist that the service providers draw up their own business continuity plans and keep them ready for operation at short notice.

Administrative Support

Urgent and appropriate decisions are essential to restore normal business in the wake of business disruptions caused by major untoward incidents. Administrative decisions that are required during the crisis period may fall outside the authorized powers of the concerned bank officials. Relaxation of prescribed rules and regulations may be required to take urgent action. Banks should therefore formulate clear guidelines about the relaxation of rules and exercise of authority for making urgent decisions during the crisis period. Big banks with a large number of branch offices within and outside the country should have a separate committee of executives to deal with business continuity plan issues.

23.11 BUSINESS CONTINUITY PLANNING METHODOLOGY

Impact Analysis

The objective of the business continuity plan is to minimize the adverse impact on a bank's services from major operational risk events. Before finalizing the plan, banks should undertake an impact analysis under different scenarios and assess what impact these will have on different areas of operations if normal banking services are dislocated due to extraordinary circumstances. They should carry out the impact analysis with respect to events that cause business disruption, like strikes and sabotage, utility failure, equipment failure, damage to the backup facility, programming error, natural calamity, and terrorist activities. The impact analysis will indicate the extent of backup facilities required to restore normal operations within the shortest possible time in the postdisaster period.

Preparation of an Activity Chart

Banks need to undertake the following activities for the preparation of a business continuity plan:

1. Identification of critical business activities.
2. Prioritization of activities.
3. Determination of recovery time.
4. Identification of recovery centers.
5. Identification of support services required for each activity.
6. Finalization of share-out arrangement of systems and equipment with other institutions.
7. Evaluation of service providers' competency for restoration of essential customer service.

Two vital inputs for preparation of the business continuity plan are determination of recovery time and identification of recovery centers. Recovery time refers to the time period within which critical operations should be restored and standing commitments to clients and other counterparties should be met. Recovery time can be different for different types of services. In fixing the recovery time for a prioritized activity, banks should keep in view the nature and the severity of impact from the event and the type of logistics required to restore minimum operation. The primary aim is to protect the reputation of the bank and contain other risks.

Recovery center relates to the alternate sites where the backup facilities are maintained and parallel data stored for retrieval of lost data without loss of time for continuing the bank's operations. The alternate sites must be at a distance from the disaster-prone and vulnerable locations. The business continuity plan should include the map of alternate locations for conduct of critical business functions when the existing business locations are not accessible. Banks should formulate detailed action plans based on the business continuity plan and set up operating procedures for disaster management.

Formulation of Business Continuity Plan

The business continuity plan should indicate the list of critical business activities that the bank considers absolutely necessary to be restored on an emergency basis. The plan should include the time chart within which the bank intends to restore its prioritized activities and indicate the support necessary to implement the plan during the period of crisis. Banks should formulate separate business continuity plans for the head office, regional offices, and branch offices. The plans in respect to the branch offices are critical since retail banking services and core business activities are carried out through them.

An illustrative list of critical activities for preparing the blueprint of the business continuity plan is indicated here:

- Cash dispensation at disaster-affected location.
- Cash dispensation through ATMs.
- Participation in the payment and settlement system.
- Restoration of ledger accounts of customers.
- Restoration of Internet banking.
- Payment of claims against the bank.
- Establishment of customer inquiry and call center.

Banks should identify critical and essential banking services, keeping in view the customer and business profiles and the regulatory directives, and formulate business restoration plans for each activity. The business continuity plan should include the following inputs:

- Description of critical activity.
- Prescription of recovery time.
- Prescription of recovery center.
- Supportive items required to deliver the service.
- Blueprints of plan (miscellaneous arrangements).
- List of actions required.

Testing of Business Continuity Plan

Banks shall subject the business continuity plan to testing at periodic intervals to ensure its workability during the time of disaster, and in particular, cross-check the efficiency of the arrangements contemplated and the extent to which services are available for restoration of normalcy. They should conduct disaster recovery mock drills occasionally and take appropriate remedial steps to keep the plan viable and workable at all times.

23.12 OPERATIONAL RISK MANAGEMENT ORGANIZATIONAL STRUCTURE

Banks should have a separate administrative unit within the risk management organizational structure to deal with the operational risk management function. Small banks carrying on a traditional banking business may have an operational risk management cell within the risk management department, but large banks, which are engaged in multiple business activities, should have a separate operational risk management department, whose activities will be overseen by an operational risk management committee because of the growing complexity of the function and increasing operational risk losses. Banks should address the issue of conflicts of interest in allocating responsibilities between operational functions, risk monitoring and risk control functions, and other support functions.

Operational risk management is a specialized function, and consequently banks should have operational risk specialists or experts to lend support in at least four critical areas:

1. Undertaking control and risk self-assessment.

2. Identification of KRIs.

3. Identification and analysis of operational risk scenarios.

4. Collection and analysis of loss event data

Operational risk must be tackled at the point at which it emerges, and consequently, the business line heads should own and manage the operational risk arising in their areas. They should be responsible for the identification of

loss events and KRIs relating to their business lines; collect, process, and analyze data; undertake self-assessment of operational risk; and finalize risk mitigation packages.

23.13 SUMMARY

Operational risk identification involves identification of risk events, which are incidents or experiences that have caused or have the potential to cause material loss to a bank either directly or indirectly with other incidents. Risk events arise from people, process, and technology failures in handling the business.

Banks should formulate specific policies for mapping products and activities into appropriate business lines for identification of operational risk. They may first identify the business lines and then the activity groups and the products used by groups for delivery of services falling under that business line.

Banks should classify individual risk events into broad event-type categories within each business line and arrive at the aggregate of risks under event-type categories to get a comprehensive picture of the operational risk they face.

Banks should assess operational risk through the control and risk self-assessment method, key risk indicator method, and risk mapping method.

Banks should estimate the potential operational risk loss from historical internal loss event data and compare the estimated losses to the actual loss experiences. Besides, they should estimate potential losses from external data on operational risk loss events that are relevant to them and identify scenario-based events to capture those situations that internal data cannot map. For this purpose, they should establish norms to assess the probability of occurrence of the relevant risk events and their severity.

The potential operational risk loss is the aggregate of expected loss and unexpected loss. Banks should identify low-frequency, high-severity events and assess the quantum of unexpected losses from those events.

The main objective of operational risk monitoring is to contain the frequency and the severity of loss events to mitigate risks. The monitoring team should track operational risk loss events, identify key risk indicators, collect information on loss events from external sources, and identify probable operational risk scenarios.

The business line heads and the departmental heads should take the ownership of operational risks that may arise in their respective areas, identify the risk

events, and devise strategies to address them.

Banks should prepare a business continuity plan for restoration of near-normal banking services in the event of business disruption caused by highly significant operational risk events. The business continuity plan seeks to meet emergencies that are of larger scale and that arise from events that are not expected in the normal course.

Banks should carry out impact analyses of major operational risk events that cause severe business disruption before giving practical shape to the business continuity plan. The plan should include the map of alternate locations for conduct of critical business functions, the list of critical business activities that are absolutely necessary, the time chart for restoration of essential banking services, and the logistics and the administrative support necessary to implement the plan during the crisis period.

Banks should view operational risk management as an independent risk management function and establish a separate administrative setup that will include operational risk specialists and experts.

NOTES

1. New Basel Capital Accord, Annex 8.
2. New Basel Capital Accord, Annex 8.
3. New Basel Capital Accord, Annex 8. The principles indicated in section 23.3 are based on guidelines contained in Annex 8 of the New Basel Capital Accord. Readers may refer to the document for details.
4. New Basel Capital Accord, paragraph 653.
5. New Basel Capital Accord, paragraphs 665 and 669.
6. New Basel Capital Accord, paragraph 669 (f).

PART Five

Risk-Based Internal Audit

CHAPTER 24

Risk-Based Internal Audit—Scope, Rationale, and Function

24.1 INTERNAL AUDIT SCOPE AND RATIONALE

The internal audit function of a bank is an integral part of its internal control system. In June 1999 the board of directors of the Institute of Internal Auditors approved the following definition of internal audit:

> *Internal audit is an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control and governance process.*

The scope of internal audit is vast, but according to the definition of the Institute of Internal Auditors, the focus is on risk management and corporate governance practices and procedures. In general, internal audit is concerned with the scrutiny of transactions, examination of business practices and procedures, verification of compliance with the rules and regulations, and evaluation of the internal control system.

The internal auditor is usually concerned with the following aspects of a bank's operation:

1. Whether business activities in different locations are conducted in accordance with prescribed procedures.

2. Whether all transactions are correctly executed and recorded.

3. Whether duties and responsibilities of officials are clearly demarcated and managerial and operational staff are working within their defined powers.

4. Whether operating officials are adhering to the prescribed risk limits on a continuous basis.

5. Whether business reports submitted by dealing officials to the controlling

authorities are accurate and comprehensive.

6. Whether accounting of transactions is done in accordance with standard accounting practices, and books of accounts support the accuracy of the balance sheet.

The scope of internal audit varies between banks due to the differences in business activities and business profiles, and business practices and procedures.

Internal Audit and Internal Control Relationship

The efficacy of the internal control system can be judged from the findings of the internal audit, because an audit is expected to highlight the deficiencies in control. An effective internal audit function evaluates the soundness of the bank's operating procedures, endorses the appropriateness of the operating systems, and ensures adherence to the prescribed rules and regulations. The internal audit department of a bank independently evaluates the integrity and the efficiency of the control system within the organization, brings out the shortcomings in the control framework, and recommends introduction of new controls or enhancement of existing controls. Through internal audit, inconsistencies in controls are detected and overlapping of functions that dilute the control process is identified. Internal auditors provide the bank management with vital information about the weaknesses in the bank's functioning and thus assist the management in improving the control system. It is thus imperative that banks honor the independence of the internal audit function.

Internal Audit's Changing Role

The current internal audit system in many banks is largely based on the transaction audit; it does not focus on the risk management function and comment on the efficacy and the appropriateness of the risk management systems and procedures. The scope of internal audit, which is a part of the internal control process, must be upgraded to enhance its utility. Banks should switch over from the transaction-based audit to the risk-based internal audit system and assign independent responsibility to the audit department to assess the effectiveness of the risk management systems and the corporate governance process. The risk-based audit reports should give more focus to the deficiencies in the risk management practices and procedures.

The New Basel Capital Accord requires banks to adopt stronger risk management practices, align capital cover more closely with the underlying

risks, and maintain regulatory and economic capital against credit, market, operational, and other residual risks. The Accord encourages greater use of internal systems for risk assessment and capital calculation, and emphasizes the need for setting up a mechanism that independently evaluates the risk management systems and procedures and provides assurance about the accuracy of the bank's risk profile and the adequacy of internally assessed capital. The auditor's role has changed from scrutiny of individual transactions to verification of systems and procedures for identification, quantification, and control of risk. The bank supervisors and the external auditors can use the findings of the risk-based internal audit without carrying out independent scrutiny for assessment of the soundness of a bank's operations, provided the audit reports are reliable and unbiased. Banks should assign to the internal audit or inspection department the responsibility of independent evaluation of the risk management function.

Transaction-Based and Risk-Based Audit Differences

Banks have their own internal audit policies, which usually deal with audit coverage of branch offices within the budget year, the frequency of audit, which is linked to a rating system, and the time frame for completion of the audit. Under the transaction-based audit system, the internal audit team assesses the branch office performance in terms of a few qualitative and quantitative parameters and assigns ratings like excellent, good, average, below average, and unsatisfactory in five-grade or six-grade rating scales. The transaction-based audit focuses attention on the scrutiny of each item of assets and liabilities, verification of transactions and accounting records, examination of compliance with the rules and regulations, and the accuracy and timeliness of control reports sent to the controlling authorities. The audit reports highlight the procedural irregularities, the excesses allowed by the branch officials beyond their financial powers, and the exceptions made without authorization. Banks usually have an audit committee to oversee the functioning of the transaction-based internal audit system.

In contrast, the risk-based internal audit is a proactive and dynamic system of audit that focuses attention on the practices and procedures followed by banks to identify, quantify, and manage risks associated with the transactions. The risk-based audit is also concerned with the scrutiny of individual transactions, but to a limited extent and on a selective basis to examine compliance with the prescribed rules and procedures. It gives more focus on the adequacy and the

appropriateness of the internal control system and detection of control deficiencies to alert the bank management about the high risks.

Risk-based audit reports contain recommendations for improvements in operating procedures and adoption of risk mitigation strategies, and thus contribute to the organization's soundness through value addition. The risk-based audit does not focus attention on listing the irregularities that are noticed during the course of audit; rather, it identifies the causes that lead to the irregularities through selective transaction testing and offers suggestions for amendment of the procedures to prevent the recurrence of those irregularities. A risk-based audit detects the problem areas of the bank's operation, and the audit reports alert the bank management about the impending dangers. The unique feature of a risk-based audit is that it identifies the risks that escape the attention of business heads and risk managers and brings to the notice of the management in advance the deficiencies and shortcomings in the control system that may cause loss to the bank. In the ultimate analysis, an effective risk-based internal audit system protects the solvency of the bank and provides comfort to the bank management about the stability of the operations.

The content and coverage of transaction-based and risk-based audits are broadly the same, but certain differences exist in the approaches between the two audit systems. Table 24.1 highlights the differences.

TABLE 24.1 Transaction-Based and Risk-Based Internal Audit Differences

Transaction-Based Internal Audit	Risk-Based Internal Audit
a. Scrutiny of all transactions between last audit and current audit to detect irregularities.	a. Scrutiny of selective transactions to evaluate systems and procedures for conducting business from the risk angle. (Note that sanction of loans or issue of financial guarantees is regarded as a transaction.)
b. Scrutiny of appraisal, sanction, follow-up, and supervision of loans and advances since last audit.	b. Assessment of loan sanction function from credit risk angle and examination of compliance with risk limits, exposure limits, and other prescribed limits.
c. Scrutiny of each item of assets and liabilities and accuracy of the trial balance.	c. Scrutiny of selective items of assets and liabilities on sample basis.
d. Examination and reconciliation of the books of accounts.	d. Sample checking of books of accounts with provision for detailed checking in case of doubt.
e. Examination of currency, validity, and enforceability of all documents and agreements.	e. Sample checking of documents and agreements with provision for detailed checking in case of doubt.
f. Verification of collateral and valuables, bank's own assets, scrutiny of vouchers and postings in ledger books, scrutiny of control returns and management information reports.	f. Sample verification of physical assets, valuables, collateral, vouchers, books of accounts, control returns, and financial reports.
g. Routine check of compliance with rules and regulations including observance of Know Your Customer principles and anti–money laundering	g. Sample checking of compliance and critical examination of observance of Know Your Customer principles, anti–money laundering rules and regulations, and procedure for identification

laws.	and reporting of suspicious transactions.
	Additional items: Detection of deficiencies in operating procedures and control system. Identification of problem areas. Identification of causes for repeated occurrence of irregularities in branch offices, particularly common irregularities. Formulation of recommendations on risk mitigation techniques and credit enhancement possibilities. Assessment of adequacy of management response to emerging risks from various products, activities, and locations. Verification of risk profile of the branch office under audit. Evaluation of risk management systems and procedures during head office audit. Suggestions for improvement in systems and procedures.

Transition to a Risk-Based Internal Audit System

The bank supervisors have granted greater autonomy to commercial banks over the years and relaxed their control to a great extent on their operations. Consequently, the supervisors need to exercise greater surveillance to prevent banks from misusing their autonomy and indulging in unsafe and unsound banking policies and practices. Banks are now exposed to more incidences and a greater magnitude of risks due to the diversification of their operations and the use of a wide range of products and services. While the bank supervisors are switching over to the risk-based bank supervision system to put in place more stringent methods of bank supervision, it has become imperative for commercial banks to switch over to the risk-focused audit system from the transaction-based audit system.

Risk-based internal audit is an integral part of the risk management architecture, and should therefore be organized as an independent function within the bank. The transition to risk-based internal audit involves a change in the focus from transaction verification to systems verification for risk management and compliance checking through selective transaction testing. Under the risk-based internal audit system, risky areas of operations are identified and prioritized for preferential audit, and audit resources are allocated in accordance with the priority.

The transition to risk-based audit involves significant changes in the style of functioning of the internal audit department, since the latter will have to perform the technical and arduous task of evaluating the risk management practices and procedures and the internal control system. The risk-based internal audit should achieve at least three objectives. First, the audit should certify that business

activities are carried on in accordance with the risk management philosophy and risk-bearing capacity of the bank. Second, it should provide reasonable assurance to the management about the safety and the soundness of the bank's operations; and third, it should render high-quality counsel to the management for improving the corporate governance process.

Risk-Based Internal Audit Functions

The primary function of risk-based internal audit is to evaluate the systems and procedures followed by a bank to manage risks and make an independent assessment of the total risks faced by it. The other important function is to endorse the appropriateness and integrity of the internal control system, and in the process, identify the vulnerability of the operating and control procedures that are fraught with high risks. Banks should therefore establish procedures to assess different types of risks faced by the branch office, controlling office, and the corporate office and the risk control mechanism in place. Their internal audit department should discharge this role and devise its own methodology for risk assessment, keeping in view the volume and the complexity of operations and the significance of each business activity.

Risk assessment by the internal audit department has more than one dimension. First, the audit department should evaluate the risk assessment practices and procedures followed by the risk management department, examine the methods used by the latter to calculate capital requirements against all forms of risk-taking activities, certify that the procedure adequately addresses the regulatory and economic capital calculation issues. The audit department should examine tools and techniques used in identifying and measuring credit, market, and operational risks, and other residual risks across the bank on a solo basis as well as on a consolidated basis. Second, the audit department should carry out an independent assessment of risks faced by individual branch offices for prioritization of the audit and determination of the scope and focus of the audit, which may vary between branch offices due to differences in the business mix and risk profile. Third, in addition to an audit of field offices, the internal audit department should conduct an audit of each business line and each portfolio. In order to perform this task, the department should conduct risk assessment of different portfolios with a focus on relatively high-risk portfolios, such as the credit card portfolio, capital market portfolio, commercial real estate portfolio, and other credit portfolios that exhibit higher incidences of defaults. The

department should undertake a risk-based audit of all offices, all business activities, and portfolios including outsourced activities and subsidiary units of the bank, such as the insurance subsidiary and securities trading subsidiary.

24.2 RISK-BASED INTERNAL AUDIT POLICY

Risk-based internal audit seeks to protect the long-term viability of banks as it significantly reduces the possibilities of large losses occurring from sudden shocks and unexpected sources. Banks should frame a separate risk-based auditing policy to underline its importance; grant special status to the internal audit department in relation to other departments; highlight its role, responsibilities, and powers; and support its independent authority. The audit policy should describe the methodology for compilation of risk profiles of branch offices, portfolios, and business lines, and the assignment of risk ratings before the audit and performance ratings after the audit. The policy should specify the norms for deciding the frequency of audit, the allocation of audit resources between different audit activities, and general instructions regarding the extent of transaction testing and the time frame for completion of the audit. It should specify the procedures for identification of priority areas for preferential audits and deal with operational coverage and depth of the audit, which will differ between branch offices due to differences in risk profiles.

The policy should lay down the modalities and the time frame for compliance with audit observations, and the procedures for administering censures and imposing punishments for committing grave irregularities and failure to comply with audit observations. The audit function will be more beneficial if the offer of incentives to staff is linked with audit ratings and the performance of business heads is evaluated after taking into account the audit findings.

In brief, the risk-based internal audit policy should deal with the following items, at the minimum:

1. Methodology for risk assessment of branch offices, portfolios, and business lines.

2. Norms for rating of branch office, controlling office, head office department, portfolio, and business lines.

3. Methodology for management audit of head office departments and controlling offices.

4. Norms for prioritization of audit activities, offices, portfolios, and business locations for preferential audit.

5. Selection of areas for a compulsory audit irrespective of risk rating.

6. Timing and cycle of audit.

7. Maximum tolerable time gap between two audits in respect to low-risk offices and activities.

8. Extent of transaction testing in different areas of operation.

9. Procedure to deal with serious irregularities and large frauds above a cutoff limit.

10. Time frame for compliance with audit findings and punishment for delayed compliance and noncompliance.

11. Norms for reward and punishment in keeping with the audit ratings and the comments of auditors.

24.3 INTERNAL AUDIT DEPARTMENT STRUCTURE

Risk-based auditing is a complicated function and its scope is much larger than that of transaction-based auditing. Consequently, the structure of the internal audit department should meet the special requirements of a risk-based audit. While deciding the structure of the internal audit department, banks should keep in view the following administrative issues:

1. The corporate culture and the mode of administration.

2. The need for independence of the audit department.

3. The skill requirements of the audit staff.

4. The nature of the relationship between the parent office and the subsidiary units.

The transition from transaction-based audit to risk-focused audit involves certain change management issues. The audit department is usually given a secondary status because it is not a revenue-earning department, and the audit personnel are not given an appropriate standing in the hierarchical setup. It is often perceived as a superfluous unit that creates hindrances in the functioning of the operating staff. If this type of attitude prevails within the organization, it defeats the very purpose of the audit. The internal audit personnel are required to carry out a management audit of the bank's head office departments and the

regional offices, and in the process, they are expected to scrutinize the decisions of the full-time directors and other senior management of the bank to assess their performances and include their findings in the management audit reports. The independence and the neutrality of the audit staff will be diluted if the findings of the management audit are required to be routed through the higher authorities in accordance with the hierarchical order. The formality to route the audit findings through the management executives, who are involved in the decisions that have been audited, may force the audit team to adopt a conciliatory approach and compromise with the business standards of the bank. It is therefore essential to give a high standing to the internal audit department so that its findings are respected. The high status given to the audit department will generate a sense of accountability among the staff at all levels and deter them from indulging in wrongdoing. It is more appropriate if the internal audit head directly reports to the audit committee of the board or the chairman of the board of directors, who is not a full-time official of the bank.

The work of a risk-focused internal audit is qualitatively different from that of a routine audit, because the primary task of a risk-based audit is to examine the risk management activities of the bank in their entirety and scrutinize each item of assets and liabilities from the risk angle. Consequently, the skill of the staff posted in the audit department must match the complexity of the job. Usually, banks do not attach much importance in placing appropriate personnel in this department. The management needs to change their stance if the risk-based audit is to be made purposeful.

Banks have established banking and nonbanking subsidiaries in different countries, which have separate legal status and are responsible for their own internal audit. But the internal audit department at the parent office should have unlimited access to the activities of the wholly owned or majority-owned subsidiaries, because the parent office has the ultimate responsibility to rescue the subsidiaries in times of distress. The parent office may have a centralized internal audit department with the responsibility of audit over branch offices and subsidiary units located abroad, unless the host country bank regulators require a different setup for auditing of offices located in their country.

Banks should have a permanent internal audit department appropriate to their size, complexity, and volume of operations. An official who has other responsibilities or who is connected with risk management activities should not head the audit department, and the latter should not get involved in risk management and risk control activities to avoid conflicts of interest. Banks

should create a firewall between the risk management department and the internal audit department and grant freedom to the latter to report excesses, exceptions, and sensitive findings. They should assess the efficacy of the internal audit function from the angle of objectivity and impartiality in the conduct of the audit and reporting on the findings. The internal auditors are expected to work as in-house consultants for achieving improvement in systems and procedures. The top management's attitude toward the audit influences the devotion and the motivation of the audit staff in performing their assigned role. Their morale will be high if the top management places high reliance on audit findings.

24.4 SUMMARY

The complexity of the internal audit function has changed over the years since the audit is required to focus on risk management and corporate governance issues. Banks should switch over to the risk-based internal audit system from the transaction-based audit as it is focused on protection of earnings and asset values that promote financial stability.

The transaction-based audit is concerned with detailed verification of transactions and accounts, compliance with rules and procedures, and detection of irregularities, while the risk-based audit is concerned with the evaluation of risk management systems and control procedures and selective transaction testing for checking compliance. The risk-based audit system picks up warning signals about high risk and inadequate control that exist in certain exposures and activities and alerts the bank management in advance.

Transition to a risk-based audit system involves significant changes in the functioning of the internal audit department, because the latter will have to devise its own methodology for risk assessment and risk rating of field offices, business activities, and portfolios, and establish procedures to conduct a risk-focused audit.

Banks should formulate a risk-based internal audit policy to underline its importance and promote long-term viability. They should grant special status to the internal audit department in relation to other departments and adopt a transparent policy to evaluate the performances of staff and offer incentives, keeping in view the audit findings.

CHAPTER 25

Risk-Based Internal Audit Methodology and Procedure

25.1 RISK-BASED INTERNAL AUDIT METHODOLOGY

The risk-based internal audit methodology is broadly similar to risk-based bank supervision techniques. In both the cases, extensive on-site examination has been significantly reduced and the focus has shifted to scrutiny of more risky areas of operation and control and testing of sample transactions instead of all transactions. The introduction of risk-based bank supervision and risk-based internal audit has resulted in reduction of examination time and optimization of audit resources. The examination reports highlight the deficiencies in risk management and control procedures, and the examination findings are evaluated to make improvements in systems and procedures.

The risk-based bank supervision process commences with the risk profiling of banks and risk analysis of their operations and control. Likewise, the risk-based internal audit process begins with the risk profiling of a bank's field offices, operational departments, portfolios, and other functional units and analysis of those profiles for deciding priorities and bestowing attention. The audit resources are focused on the material areas and activities of the bank and the risk profiles are used to prioritize activities and locations for audit and formulate an audit plan. Banks have to assess the business and control risks of each branch office and map the magnitude of risks in a risk matrix to classify them into low, moderate, high, and exceptionally high-risk categories in order to decide the frequency, the scope, and the depth of audit. They have to undertake the following steps for transition to the risk-based internal audit system:

1. Formulation of a risk-based audit policy.

2. Compilation of risk profiles of branch offices, controlling offices, and head office departments, business lines, and portfolios.

3. Analysis of risk profiles and preparation of audit plans.
4. Determination of the scope of audit.
5. Conduct of the audit by internal auditors.
6. Preparation of audit reports.
7. Initiation of corrective action.
8. Evaluation of audit findings to strengthen systems and procedures.

Compilation of Branch Office Risk Profile

The bank's internal audit department should independently undertake the risk assessment of all functional units, portfolios, and business lines and compile and analyze the risk profiles in advance of the actual audit. The audit team should verify the risk profile document compiled by the internal audit department during the course of the audit and endorse or revise the risk profile. The department should carry out the risk profiling exercise in a systematic and structured manner, and the risk profile document should contain all relevant data and information on the working of the branch office, including critical comments on the areas of concern. Banks have to maintain objectivity in rating and uniformity in the application of the procedure for rating branch offices through the development of templates for risk profiling and norms for assigning scores to risk elements.

Banks have different types of branch offices; some of them transact all kinds of business and some only restricted types. Accordingly, they should classify the branch offices into different categories in keeping with the kinds of services rendered in those branches, like full function and restricted function branch offices, industrial and agricultural finance branch offices, overseas branch office, and so on. The functions of these branch offices differ, and so the risks faced by them will also differ in kind and degree. For example, credit risk is the major risk in an industrial finance branch, while foreign exchange risk, country risk, and transfer risk are more important in an overseas banking branch. Banks should therefore design different templates for risk profiling of different types of branch offices, because risk factors vary between branch offices due to functional differences. Thereafter, they shall finalize the chart for assignment of weights to risk factors and risk elements in keeping with their relative significance to achieve objectivity and accuracy in the rating of branch offices.

Branch offices face different types of business risk and control and compliance risk as compared to those risks faced by controlling offices and operational

departments. A bank's branch office may be situated in a difficult location where several branch offices of other banks function and where high competition exists for achieving a larger share of business. If the business ethics and attitudes of customers in the command area of the branch office are unfavorable, the business environment is not conducive to achieve business targets. On the other hand, it is relatively easier for the branch offices to achieve business growth if a better business atmosphere prevails and the clients observe business ethics. Thus, the business environment in which a branch office functions is an important risk factor that banks should recognize for risk profiling.

Branch offices face varying degrees of credit risk (more incidences of loan defaults and larger intensity of credit loss), liquidity risk (difficulties in procuring funds locally to meet sudden and unexpected commitments), earnings risk (loss of or swings in earnings due to extraneous factors), and operational risk and varying degrees of control and compliance risk (perpetration of fraud, unauthorized access to computers, breach of security, irregularities in transaction bookings, and human error in accounting entries, compliance with anti-money laundering laws, and so on). Consequently, in designing templates for risk profiling, banks should identify various kinds of risks that different types of branch offices face, determine their relative importance, and accordingly assign weights to risk factors and risk elements, and calculate weighted scores and award ratings in a predetermined rating scale.

The sequential steps for compilation of branch office ratings are given here:

1. Identify risk factors that constitute business risk and control and compliance risk components applicable to a branch office (usually, these are mostly common among similar type of branch offices).

2. Identify risk elements that constitute each business risk and control and compliance risk factor.

3. Develop norms for assignment of scores to each risk element.

4. Determine weights to be assigned to risk factors and risk elements.

5. Adopt an appropriate rating scale.

6. Calculate weighted scores for each business risk and control and compliance risk factor, and assign a rating to each risk factor in accordance with the rating scale.

7. Derive overall ratings of business risk and control and compliance risk components by combining individual risk factor ratings.

8. Tabulate ratings assigned to business risk and control and compliance risk

components in a composite risk rating matrix.

9. Derive the overall rating applicable to the branch office.

Identification of Risk Factors and Risk Elements

The models for risk rating of branch offices consist of two broad risk components, business risk and control and compliance risk. For limited purposes of branch office rating, operational risk can be included within business risk, since in most of the branch offices operational risk factors are limited as control and compliance risk is included in the rating model as a separate risk component that takes into account many of the operational risk events. The business risk component of a full-function branch office will consist of a few risk factors like business environment risk, business strategy risk, credit risk, liquidity risk, earnings risk, and operational risk. In the case of a foreign branch office or an overseas branch office, foreign exchange risk and country risk will also arise. Likewise, the control and compliance risk component will consist of a few risk factors. The control and compliance risk in the branch offices will exist in allocation of duties and responsibilities, exercise of loan sanction powers, supervision of credit, access to vaults and computers, handling of ledgers and other records, reporting of transactions, submission of periodic returns/business reports, monitoring of fraud-prone areas, complying with anti–money laundering regulations, and so on .Thus, each business risk and control and compliance risk component will consist of a few risk factors, which in turn will consist of a few risk elements. For example, credit risk is a business risk factor, and the risk elements that constitute credit risk are rate of credit growth, quality of credit appraisal and follow-up, volume of large exposure, volume of capital market exposure and commercial real estate exposure, extent of credit concentration, trend of nonperforming accounts, fresh incidences of nonperforming loans during the current year, recovery performance in nonperforming loans, and so on. Banks have to accordingly identify risk factors and risk elements applicable to each type of branch office for compilation of ratings.

Development of Norms for Assigning Scores to Risk Elements

For derivation of business risk and control and compliance risk ratings, banks have to assign numerical scores to risk elements in accordance with the level of

risk they carry. The risk level should be assessed with reference to the prevailing circumstances that apply to the risk elements. The higher the level of risk, the lower will be the risk score. Banks have to establish three-scale or four-scale scoring norm charts and develop norms for assignment of scores to risk elements. Examples of four-scale scoring norms (low, moderate, high, and very high) are given in Tables 25.1 and 25.2.

TABLE 25.1 Scoring Norm

Business Risk: Risk Factor—Credit Risk		
Risk Element: Credit Growth*		
Features/Attributes	**Risk Level**	**Score (four-scale rating norm)**
Credit growth up to 20%	Low	4
Credit growth > 20% to < 25%	Moderate	3
Credit growth > 25% to < 35%	High	2
Credit growth > 35%	Very High	1
*During the accounting year.		

TABLE 25.2 Scoring Norm

Business Risk: Risk Factor—Credit Risk		
Risk Element: Fresh Incidence of Nonperforming Loans*		
Features/Attributes	**Risk Level**	**Score (four-scale rating norm)**
Fresh incidences are < 2%	Low	4
Fresh incidences are > 2% but < 5%	Moderate	3
Fresh incidences > 5% but < 8%	High	2
Fresh incidences > 8%	Very High	1
*Fresh incidence of nonperforming loans and advances during a year as a percentage of amount outstanding in standard loans and advance accounts at the branch office.		

When the credit growth is reasonable and growth percentage is in conformity with the budgeted figure, it is presumed that proper due diligence has been exercised in sanctioning credits and hence, the risk is low. The higher the percentage of credit growth during a year, the higher is the risk level, because there are possibilities of dilution of loan sanction standards, skipping of procedures, preponderance of large credit, development of credit concentration, and so forth.

The norms given above are illustrative. Banks should establish their own norms keeping in view the business standard, peer banks' practices, international best practices, and the regulator's guidelines.

An example of scoring norms applicable to the risk element in the control and compliance risk area is given in Table 25.3.

TABLE 25.3 Scoring Norm

Control and Compliance Risk: Risk Factor—Control over Fraud-Prone Areas		
Risk Element: Observance of Know Your Customer (KYC) Procedures		
Features/Attributes	**Risk Level**	**Score (four-scale rating norm)**
KYC procedures fully complied with	Low	4
Minor gaps in observance of KYC procedures	Moderate	3
Full compliance with KYC procedures pending in some cases	High	2
Laxity and negligence in observance of KYC procedures, lack of familiarity of the branch office staff with KYC procedures	Very High	1

TABLE 25.4 Risk Assessment of Branch Office

Risk Component: Business Risk	
Weight Assignment to Risk Factors	
Business Risk Component—Risk Factors	**Weight (%)**
Credit Risk	45
Operational Risk	20
Liquidity Risk	15
Earnings Risk	10
Business Environment and Strategy Risk	10
Total	100

Assignment of Weights to Risk Factors

Business risk factors may vary between branch offices due to differences in activities and functions, but control and compliance risk factors will largely be the same. Banks have to identify the risk factors that constitute the business risk of different types of branch offices and decide their relative importance. Let us suppose that the business risk of a branch office consists of five broad risk factors: (1) credit risk, (2) liquidity risk, (3) earnings risk, (4) business environment and strategy risk, and (5) operational risk. Market risk is excluded as a risk factor as it is usually not applicable to a branch office, since the business activities that are subject to market risk are generally centralized in the head office or the corporate office. Each of the risk factors that constitutes business risk does not have equal importance in assessing the risk level. For example, credit risk and operational risk are more important than liquidity risk and earnings risk at the branch offices and therefore are given more weight. Banks have to assign risk weights to different risk factors that constitute business risk and control and compliance risk components pertaining to the branch offices for computation of business risk and control and compliance risk component

ratings.

The suggestive distribution of the total weight of 100 between five risk factors that constitute the business risk component is shown in Table 25.4.

In the same manner, banks have to identify risk factors that constitute control and compliance risk component and assign weights to each risk factor. The control and compliance risk factors will usually be common among the branch offices. Like business risk component, control and compliance risk component is assigned a total risk weight of 100, which is distributed among different risk factors in accordance with their relative importance.

The suggestive distribution of the total weight of 100 among risk factors that constitute control and compliance risk component is shown in Table 25.5.

TABLE 25.5 Risk Assessment of Branch Office

Risk Component: Control and Compliance Risk	
Weight Assignment to Risk Factors	
Control and Compliance Risk Component—Risk Factors	**Weight**
Control over credit risk	30
Control over operational risk	20
Control over books of accounts	10
Control over fraud prone areas	10
Compliance with anti–money laundering laws and rules	10
Compliance with internal rules and regulations	10
Compliance with regulatory prescriptions and other statutory laws	10
Total	100

Assignment of Weights to Risk Elements

Each business risk and control and compliance risk factor will consist of a few risk elements, which do not have equal importance in assessing the level of risk associated with that risk factor. Some risk elements are critical and more important and therefore carry more weight than other risk elements of lesser significance. For example, quality of credit appraisal, intensity of credit supervision and follow-up, volume of large exposures, volume of sensitive-sector exposures, extent of credit concentration, and incidences of nonperforming loans are significant risk elements of the credit risk factor that should be given higher weights as compared to the risk elements like credit growth, quantum of off-balance-sheet exposure, and so on,. so that the assessed level of credit risk pertaining to the branch office reflects the correct situation.

TABLE 25.6 Risk Category: Business Risk

Risk Factor: Liquidity Risk
Assignment of Weights to Risk Elements

Liquidity Risk—Risk Elements	Score*	Weight	Weighted Score (Col. 2 × Col. 3)
1. Structure of liabilities (deposits, borrowings, other miscellaneous liabilities—the relative proportions will indicate whether liability structure is stable or volatile).	Score. The more volatile the mix of liabilities, the greater will be the risk and the lower will be the score.	2	
2. Percentage of large institutional deposits to total deposits (will indicate the extent of volatility of funds).	Score. The larger the percentage of large institutional deposits, the lower will be the score, since the impact of risk will be high if the deposit is prematurely withdrawn.	2	
3. Trend of movement of wholesale deposits during the last three years (will show the relative stability of large deposits).	Score. Large swings in wholesale deposits from time to time indicate greater risk and will carry a low score.	2	
4. Trend of withdrawal of term deposits before maturity during the last three years (will indicate the extent of volatility of term deposits).	Score. High percentage and swings in premature withdrawal of term deposits indicate higher risk and will carry a low score.	3	

Risk Factor: Liquidity Risk
Assignment of Weights to Risk Elements

Liquidity Risk—Risk Elements	Score*	Weight	Weighted Score (Col. 2 × Col. 3)
5. Trend of unutilized portion of sanctioned credit limits (will indicate the extent of sudden demand for funds from borrowers).	Score. High percentage of undrawn limits, absence of definite pattern in withdrawal of funds, and erratic behavior of borrowers indicate high risk and will carry a low score.	3	
6. Trend of devolvement of off-balance-sheet liabilities (will indicate the extent of unanticipated demand for funds to meet financial obligations).	Score. More than expected average devolvement of contingent liabilities will carry higher risk and a low score.	1†	
7. Reliability of options for replenishment of funds at very short notice (will indicate comfort level for timely receipt of funds in emergencies).	Score. The more the uncertainty about the capability of funds suppliers to supply funds at short notice, the greater will be the risk and the lower will be the score.	2	
Total Rating Grade		15	

*The bank has to decide and assign a score to each risk element in the four-scale rating framework (4, 3, 2, 1) (see Tables 25.1 through 25.3).
†Assigned low weight as the branch office gets time to arrange for funds.

Suppose we want to assess the liquidity risk that exists in a branch office. In the model for compilation of ratings of the business risk component shown in Table 25.4, the risk factor "liquidity risk" has been assigned a weight of 15 out of 100. We shall have to assign weights to the different risk elements that constitute liquidity risk for a realistic assessment of liquidity risk at the branch office (liquidity risk at the micro-level, not at the macro-level for the bank as a whole). Suppose the liquidity risk factor consists of seven risk elements. The suggested distribution of the total weight of 15 among seven risk elements is given in Table 25.6.

In this way, banks may establish norms for distribution of weights among different risk elements that constitute each business risk and control and

compliance risk factor. For example, risk weight 45 (Table 25.4) is to be distributed between different risk elements that constitute the credit risk factor.

Adoption of a Scale for Risk Factor Rating

Banks have to establish norms for assignment of ratings to different risk factors that constitute business risk and control and compliance risk components in relation to a branch office. The suggested rating scale for rating business and control and compliance risk factors is given in Table 25.7.

TABLE 25.7 Business Risk and Control and Compliance Risk Factor Rating

Suggested Rating Scale	
Risk Factor Rating	
Four-Scale Rating Framework	
Weighted Score Percentage	**Risk Rating**
< 50%	Very high
> 50% and < 60%	High
> 60 % and < 75%	Moderate
> 75%	Low

The rating framework indicates that the higher the percentage of score assigned to a risk factor, the lower the risk level is pertaining to that factor at the branch office. Better performance shown by the branch office in a particular operational area is reflected through assignment of a higher score that signifies lower risk. For example, if credit risk factor in a branch office gets a weighted score of above 75 percent, credit risk is low, and if operational risk factor gets a weighted score below 50 percent, then it is very high.

Risk Factor Rating

For assignment of a rating to a risk factor, banks may derive the total of weighted scores allotted to the risk elements that constitute the risk factor and map the score against the rating scale (Table 25.7) to arrive at the rating of that risk factor. If the bank wants to assign a rating to the risk factor "credit risk" of a branch office, it may take the following steps:

- Assign a score, based on risk assessment, to each risk element that constitutes credit risk in accordance with the scoring norm chart (Tables 25.1 through 25.3).
- Assign weights to risk elements as per the approved weight distribution pattern (like the liquidity risk factor weight distribution shown in Table 25.6).
- Multiply the scores by the weights to compute the risk-weighted scores received by each risk element.
- Arrive at the aggregate of weighted scores.
- Derive the percentage to the maximum possible weighted score.
- Assign a rating to the credit risk factor based on the percentage of risk-weighted score.

The maximum possible weighted score is the risk weight allotted to the risk factor in the model (Table 25.4) multiplied by the maximum possible score for each risk element, that is, 4 in a four-scale scoring norm chart (Tables 25.1 through 25.3). For example, the maximum possible weighted score relating to credit risk factor is 180 (weight 45 × maximum score 4).

TABLE 25.8 Risk Assessment of Branch Office

Risk Factor Rating Credit Risk Factor			
Risk Elements	**Score**	**Weight**	**Weighted Score**
Credit growth during the accounting year (%)	2	2	4
Quality of credit appraisal	3	5	15
Large exposure (%)*	2	5	10
Commercial real estate exposure (%)*	3	5	15
Capital market exposure (%)*	3	5	15
Nonperforming loans pending for recovery (%)*	3	5	15
Fresh nonperforming loans during the accounting year (%)†	3	6	18
Recovery percentage of nonperforming loans and advances	2	5	10
Quantum and quality of off-balance sheet exposure	3	2	6
Quality of supervision and follow-up of credit	2	5	10
Total		45 (Table 25.4)	118

*Percentage of the total amount of loans and advances at the branch office on the date that its risk profile is compiled and the audit is conducted.
†Percentage of standard category loans and advances at the branch office.

TABLE 25.9 Risk Assessment of Branch Office

Assignment of Rating to Risk Factor	
Credit Risk Factor	
Total risk-weighted score received by the risk factor	118
Maximum possible weighted score relating to the factor	180 (45 × 4)
Percentage of risk-weighted score to maximum possible weighted score	65.55
Rating of the risk factor (Table 25.7)	Moderate risk

The formats for rating a risk factor are given in Tables 25.8 and 25.9. For illustration, rating of the credit risk factor is shown here. The risk elements are not exhaustive.

In the same way, banks may calculate the percentage of scores received by each business risk and control and compliance risk factor, based on the allotted weights and scores, and assign a rating to each risk factor in the four-scale rating framework in accordance with the percentage of score. After assignment of ratings to each risk factor, banks may compute the overall risk rating of the branch in the manner shown in the next section.

Branch Office Overall Rating

Banks may first derive the ratings of each individual business risk and control and compliance risk factor in the same way as shown in Tables 25.8 and 25.9, then compute the overall rating of business risk and control and compliance risk components, and then combine these two ratings to derive the rating of the branch office. The format for computation of the business risk component rating is shown in Table 25.10.

TABLE 25.10 Branch Office Risk Rating Model

Assessment of Component Rating Assignment of Risk Grade to Business Risk Component			
Column 1	Column 2	Column 3	Column 4 (Column 2 x 3)
Risk Component—Business Risk	Risk Factor Weighted Score Percentage (Refer to Table 25.9)	Weight in Percentage (Refer to Table 25.4)	Final Weighted Score (%)
Risk Factors			
Credit Risk		45	
Operational Risk		20	
Liquidity Risk		15	
Earnings Risk		10	
Business Environment and Strategy Risk		10	
Total		100	
Assignment of Rating Grade	(refer to Table 25.7)		

In the same manner banks may derive the overall rating of the control and compliance risk component in the format shown in Table 25.11.

TABLE 25.11 Branch Office Risk Rating Model

Assessment of Component Rating Assignment of Risk Grade to Control and Compliance Risk Component			
Column 1	Column 2	Column 3	Column 4 (Column 2 × 3)
Risk Component— Control and Compliance Risk	Risk Factor Weighted Score Percentage	Weight in Percentage (Refer to Table 25.5)	Final Weighted Score (%)
Risk Factors			
Control over credit risk		30	
Control over operational risk		20	
Control over books of accounts		10	
Control over fraud-prone areas		10	
Compliance with anti–money laundering laws and rules		10	
Compliance with internal rules and regulations		10	
Compliance with regulatory prescriptions and other statutory laws		10	
Total		100	
Assignment of Rating Grade	(refer to Table 25.7)		

If the business risk component pertaining to a branch office gets a weighted score of more than 60 percent and less than 75 percent, it will be rated as "moderate risk" (Table 25.7). In the same way, the rating of the control and compliance risk component is derived. If the business risk component gets a weighted score of 62 percent and the control and compliance risk component 55 percent, the business risk is moderate and the control and compliance risk is high (Table 25.7). By combining these two ratings banks may derive the composite risk rating of the branch office. In this case, the overall risk (composite) rating of the branch office is high, because even though business risk is moderate, high control and compliance risk will push the overall rating to the next higher grade.

For assignment of a composite rating to branch offices, banks have to set up a risk rating matrix. An illustrative example of the matrix is given in Table 25.12.

TABLE 25.12 Branch Office Risk Assessment

Computation of Overall (Composite) Risk Rating
Risk Rating Matrix

	Rating Scale		Overall Rating		
Business Risk Component	Very High	High	High	Significantly High	Extremely High
	High	Moderate	High	Very High	Significantly High
	Moderate	Low	Moderate	High	Very High
	Low	Low	Low	Moderate	High
	Rating Scale	Low	Moderate	High	Very High
	Control and Compliance Risk Component				

It is reasonable to assume that control and compliance risk is more significant than business risk for assigning a rating to a branch office, because the laxity in control and failure to comply with the rules and regulations have the potential to cause substantial losses. The intensity of loss from high business risk can be reduced if there are very strong controls and high level of compliance, that is, if the control and compliance risk is very low. Table 25.12 indicates that if the business risk is very high and the control and compliance risk is high, the composite rating of the branch office is significantly high, and it is extremely high if the control and compliance risk is also very high. On the other hand, if the business risk is high but the control and compliance risk is low, the composite rating is moderate.

The classification of branch offices into low, moderate, high, very high, significantly high, and extremely high-risk categories is one dimension of the risk assessment. The second dimension relates to the risk categorization of branch offices and business activities in accordance with the potential frequency of risk events and the potential magnitude of risk. Banks have to evaluate these two parameters to identify risk-prone and risk-severe branch offices and activities. Certain risk events occur frequently and produce a high impact. For example, if the dealing officials in a bank's treasury frequently exceed the deal limits or keep high overnight open positions in foreign currency, the treasury branch will fall in the high-frequency, high-risk category. On the contrary, there are risk events that occur frequently, but their impact is not significant. For example, granting loans to borrowers by the branch office loan officers of amounts exceeding their financial powers is a high-frequency, low-impact event, because it happens on several occasions at almost every branch office of a bank, but the overall magnitude of the risk is low as the loan amounts are moderate. There can be a few combinations of risk frequency and risk impact, like low

frequency, high impact; high frequency, low impact; and moderate frequency, moderate impact. The internal audit department should classify the branch offices and other operational areas in terms of risk event frequency and risk severity. This type of risk assessment should cover business activities like the treasury and foreign exchange business, derivatives business, credit card business, merchant banking business, commercial real estate finance, capital market finance, and so on. Banks should take into account the categorization of branches in terms of frequency of risk events and the severity of impact for prioritization of audit and fixation of audit cycles.

Risk Profiling Inputs

The internal audit department should compile the risk profiles of branch offices and operational departments in advance of the commencement of the actual audit. Since the audit department has independent risk profiling responsibility, it should have access to all information concerning the business of the bank and the functioning of the branch offices. The department can source the inputs for risk profiling from the following documents:

1. Branch office performance vis-à-vis the budget.

2. Business volume of branch office and materiality of its activities.

3. Control returns and management information reports submitted by branch office to the controlling authorities.

4. Status of the last two internal audit reports including compliance with audit observations.

5. Senior executive's visit reports on branch offices.

6. Bank supervisor's examination report.

7. External auditor's report.

8. Branch functioning review reports.

9. Audit committee's observations.

10. Management information data.

11. Bank's business strategies.

12. Changes in the branch office activities.

13. Changes in placement of key personnel at branch office.

14. Special reports of the vigilance department on frauds and misappropriation of assets or valuables pertaining to branch office.

15. Vigilance officer's branch-specific reports.

16. Off-site surveillance returns submitted by the bank to the bank supervisor.

17. Historical branch office data on risk event frequency and risk severity.

25.2 RISK-BASED AUDIT PLANNING AND SCOPE

It is necessary for the internal audit department to prepare an appropriate audit plan in keeping with the available resources, and to decide the order in which the

offices and activities will be audited. The department should complete the risk profiling of branch offices, portfolios, and business lines based on the available inputs before the beginning of the audit year, rank the offices and activities in terms of risk categorization and materiality of the business, and analyze the profiles to decide the focus and coverage of audit. Banks have to draw up an audit plan that can be executed within the audit year (accounting year) and standardize the scope of audit in relation to the functions of a branch office, its risk category, and its risk proneness. This section deals with the issues relating to the planning and scope of risk-based audits.

Risk-Based Audit Planning

The information and conclusions that emerge from branch office risk profile analysis form the basis for giving shape to the internal audit plan relevant to the audit year. Risk profile analysis brings out the unsatisfactory features in the functioning of the branch offices that require urgent and closer attention. Banks should compile risk profiles of all their branch offices, derive their risk category distribution to prioritize audit activities, and identify high-risk transactions and risk-prone business activities. The risk profiles should contain both quantitative and qualitative information on the functioning of the branch office and its performance since the date of the last audit. The quantitative part should cover general data on business growth, asset-liability composition, cost-income trend, nonperforming loans, and also information on risk-sensitive areas, like large credit exposures, credit concentration, risk-grade distribution of credit, fraud and misappropriation of assets and valuables, and so on. The qualitative part should highlight procedural irregularities, deterioration in asset quality, deficiencies in branch office administration, overlapping in duty demarcation, and laxity in control and compliance. The information contained in the quantitative and qualitative parts of the risk profile of a branch office will be the basis for deciding the cycle of audit, the depth of scrutiny, the extent of transaction testing, and the time frame for completion of the audit.

While drawing up the audit plan, banks should keep in view the classification of branch offices into various risk categories and the materiality factor in according priority for audit. The risk-based audit philosophy is that the audit resources should be directed to those areas of operation that depict high risks and those locations where the volume of business is significant and which require priority attention. In formulating the audit plan, banks should give priority to

branch offices that are highly risky and associated with high-frequency, high-magnitude risk events, besides high-risk activities and vulnerable areas of operation. They should classify the branch offices and the business activities in accordance with the ascending order of risk category (low, moderate, high, very high, significantly high, and extremely high), frequency of risk events, and magnitude of risk, and place them in an appropriate sequence for audit by turn.

The audit plan should cover the schedule and the sequence of branch office audit, the rationale for assigning audit priorities, and a time budget for completion of audit, besides special audits and specific scrutiny, wherever needed. Branch offices falling in the high, very high, significantly high, and extremely high-risk categories should be audited at shorter intervals, and those falling in the moderate and low-risk categories at longer intervals. Banks should not be complacent about low-risk branch offices and fix a very long audit cycle for their audit. They must recognize the possibility of significant risks lying hidden or undetected at low-risk branch offices or those offices that have a moderate volume of business. The plan must provide for audit of a minimum number of low-risk and low-transaction branch offices every year so that all branch offices are audited at least once in a cycle of three years. Banks should protect the sanctity and the integrity of the audit plan drawn up by the internal audit department and provide the department with skilled and adequate staff to discharge the audit function as envisaged in their risk management and risk-based internal audit policies.

Risk-Based Audit Scope

The internal audit department should determine the scope of internal audit based on risk profiles that may vary in focus and coverage between the branch offices. If the data used at the time of risk profile compilation were not correct or some vital information was missing, the risk profile will not depict an accurate picture, and the risk-based audit may not achieve the purpose. The audit team should verify during the course of audit the risk profile compiled by the audit department in the light of data and information available at the branch office and modify it, if needed. The scope of internal audit should therefore include a reassessment of both the business risk and the control and compliance risk of at least significant and large-size branch offices by the audit team. The outcome of reassessment will reveal the extent to which the risk profiles can be relied upon to carry out the program of risk-focused internal audit.

In summing up the issues for special examination during the course of audit, the audit department should focus on the current status of major irregularities observed during the last internal audit, adverse features mentioned in the latest external audit report and the supervisory authority's examination report, and branch office failures to adhere to the prescribed systems and procedures. It should highlight for special investigation during the audit the issues relating to acceptance of defective and incomplete documentation, laxity in monitoring end-use of funds by borrowers, inadequacy in supervision and follow-up of loans and advances, slippages in standard advances, laxity in control over fraud-prone areas, breaches of anti–money laundering rules and regulations, and negligence in monitoring access to the computer systems and the bank's valuables.

Banks should standardize the scope and coverage of internal audit in accordance with the risk categorization of branch offices to reduce the divergences in audit coverage. Standardization of scope and coverage in keeping with the risk categories of branch offices will ensure objectivity and transparency of audit, besides comprehensiveness. The bank should prescribe in the audit policy the scope and coverage of audit pertaining to branch offices, business lines, and portfolios, and the criteria for special investigation and intensive scrutiny, and prepare standardized lists of issues and concerns that should be looked into during the course of the audit, which will be fairly common.

At the minimum, the branch office audit should cover:

1. Assessment of business performance.
2. Examination of quality of loans and advances and other transactions.
3. Examination of documents and other records.
4. Verification of bank's assets and collateral.
5. Reconciliation of books of accounts.
6. Security and control environment in various areas.
7. Frauds and other irregularities.
8. Compliance with prescribed rules and procedures.
9. Branch administration including duty demarcation for fixing accountability.

The scope of audit should include a critical assessment of the application of internal control procedures at the branch office and its methods of operation to address the issues relating to conflicts of interests among the operating staff, the reporting staff, and the controlling staff. This function of internal audit represents an independent evaluation of control and compliance risk prevailing

at branch offices. The scope will include an examination of compliance with legal and regulatory provisions, policies and procedures, strategies and limits, anti–money laundering rules and regulations, and the previous audit findings.

The audit team should make an assessment of the content and the quality of branch office performance and financial reports sent to higher authorities, the procedure followed to feed data and other information into the computer network system for compilation of borrower rating and management information reports, and the security of the electronic information system prevailing at the branch office. The scope of audit of the head office departments and the controlling offices will include a critical review of their style of functioning and an assessment of their performance in managing risks. The internal audit department should identify deficiencies in managing business and control and compliance risks as revealed in the audit reports of various offices and suggest corrective measures to be taken by the operational departments, and subsequently evaluate the effectiveness of actions taken by them to mitigate risks.

25.3 RISK-BASED AUDIT PROCESS

Methods and Focus of Scrutiny

Certain differences exist in the procedures for conducting risk-based and transaction-based internal audits, particularly in the methods and focus of scrutiny. In the case of a transaction-based audit, the focus of scrutiny is on procedural irregularities in executing the transactions. All transactions and decisions between two successive cycles of audit are examined and a list of irregularities prepared, and postaudit rectification of adverse findings is monitored and the audit report closed when the rectification is complete. The audit of branch offices is taken up by turn with some priorities for large and problem branch offices. The audit cycle is nearly uniform for all types of branch offices, and one round of audit is completed usually within 18 to 24 months.

Under the risk-based audit, the focus of scrutiny is on those transactions and operational areas that depict higher level of risks and the manner in which the branch offices handle those risks. The transactions between two successive audits are examined on a selective basis, and the percentage of transactions chosen for scrutiny depends on the materiality of activity, the type of transactions, the level of risk, and the severity of impact associated with those transactions. For example, transaction coverage may be 30 to 40 percent of small loans and advances sanctioned between two auditing dates, but it can be 50 to 60 percent of medium exposures and 100 percent of large exposures. Likewise, in the treasury division, the range of scrutiny may be around 50 percent of small to moderate transactions and 100 percent of large deals and derivative transactions.

The risk-based audit focus is not on identification of irregularities, but on detection of shortcomings in the current procedures that are giving rise to the irregularities, most of which are common among the branch offices. The objective is to modify the procedures and tighten the controls to mitigate the risks. In the case of a risk-based audit, the branch offices are taken up for audit in order of the volume of business, the materiality of their activities, and the level of risks to which they are exposed. The audit cycle is different for branch offices having different risk profiles and falling in different risk categories. High, very high, and extremely high-risk branch offices may be audited at an interval of 6 to 9 months and low-risk branch offices at longer intervals. High-risk-prone business areas like trading in securities, foreign currencies, and derivative products may be audited quarterly or half-yearly. In addition to the rectification of irregularities pointed out in the audit reports, the audit findings should be

utilized to improve the systems and procedures.

Banks' internal auditors should bestow their attention on the following issues during the course of the risk-based audit:

1. What are the material activities of the unit under audit (e.g., credit, investments, and treasury operations are material activities)?

2. How are transaction decisions taken?

3. Are the decisions backed by an appropriate due diligence process as laid down in the operations manual?

4. Does the operating staff adhere to the risk limits?

5. Are there exceptions to and deviations from established rules and procedures and if so, are the exceptions allowed in accordance with prescribed norms?

6. Are periodic checks exercised in the prescribed operational areas at random?

7. Are risks monitored on a continuous basis and prompt remedial action taken to contain/control the risks?

8. Is the application of control honest, adequate, and exercised without exception?

The audit team must be familiar with the corporate philosophy of risk management, the activity-wise risk limits, and the prescribed systems and procedures to manage risks since the focus will be on high-risk areas. As in the case of the transaction-based audit, the team should scrutinize every activity of the branch office under the risk-based internal audit, but spend more time on examination of sensitive and high-risk transactions and activities. It should verify compliance with the rules and procedures laid down in the operations manual, examine a reasonable number of transactions on a selective basis to assess the extent and the quality of compliance, and carry out sample checks of the quality of assets, the condition of valuables, and the accuracy of books of accounts. If the audit team has material doubts after initial assessment about the ways in which the transactions are handled in a particular area of operation (say, loan sanction), it should not place significant reliance on the system of selective transaction testing and, instead, examine a larger number of transactions to assess the compliance with the risk-taking guidelines, and ensure that the bank's exposure to risks from a given transaction or an activity is accurately captured and kept within specified limits. The internal auditor should subject an activity that is considered high risk to 100 percent transaction testing.

Under the transaction-based audit system, the coverage, the focus, and the methods of scrutiny are almost the same for all types of branch offices, and the

internal audit department awards performance ratings to them based on an evaluation of quantitative and qualitative parameters in a four-or five-scale rating chart after the audit is completed. But under the risk-based audit system, though the coverage does not significantly vary, the focus and the methods of scrutiny vary between the branch offices due to the differences in functions and risk profiles. The audit department may continue to base the performance ratings of branch offices under the risk-based audit system on the evaluation of the same quantitative and qualitative parameters, but modify the performance ratings through superimposition of a risk management efficiency rating, which will be based on an evaluation of risk awareness, risk identification, risk handling, and risk mitigation capabilities of the branch officials. It should give more weight to their ability to strike an appropriate balance between business expansion and risk exposure. For this purpose, banks should design standardized formats for evaluation of performance and assignment of postaudit ratings.

During the period of transition from a transaction-based to risk-based audit system, the audit department may face some difficulties in assigning appropriate ratings to the branch offices. It must keep in mind that there is no correlation between the performance ratings awarded to branch offices under the transaction-based audit system and the risk ratings awarded under the risk-based audit system. An excellent rated branch office may fall in any of the risk categories. For example, a branch office may be categorized as a high-risk branch for the risk-based audit, but it was so well run in the past that it used to get an excellent performance rating under the transaction-based audit system. If a branch office is categorized as a high-risk branch, the risk-based internal audit implies that it will be inspected at more frequent intervals and the focus of the audit will be on material areas that involve high business risk (such as a high volume of credit, concentration of large credit exposures, high quantum of real estate loans, high incidence of nonperforming loans and advances, high volume of treasury operations, etc.) and high control and compliance risk (such as poor credit monitoring and follow-up, frequent transgression of financial powers, keeping a high open position in foreign exchange exposure, too much arbitraging between securities and foreign exchange markets, weak supervision of fraud-prone transactions, delayed submission of management information reports and control returns, unregulated access to computer systems, etc.). An increase in the frequency of audit or, rather, a decrease in the audit cycle for audit of high-risk branch offices does not imply that its rating is “below average” or “unsatisfactory.” Since under the risk-based audit system the branch offices will

be awarded ratings based on a combination of performance rating and risk management efficiency rating, a high-risk branch office may also get an excellent rating.

Risk-Based Audit Reporting

The internal audit department should prepare structured formats for recording risk-based audit reports by auditors to ensure objectivity in report coverage and inclusion of material aspects. The structure of reporting formats applicable to different types of branch offices will vary due to functional differences; a full-function branch office format will be more exhaustive than that pertaining to restrictive-function branch offices, like industrial finance, agricultural finance, clearing service, and overseas banking branch offices. The format will include annexes that will contain instances of individual transactions and customer accounts at the branch office to support the critical observations recorded in the main report. The suggested content of the audit report is given in the ensuing section.

Overall Assessment of Branch Office Functioning

The audit report will be in two parts, the first part dealing with a brief assessment of branch office functioning and the second part a detailed write-up on each function. It should contain a summary of all vital data and information that conveys at a glance the function and size of the branch office, staffing patterns, asset-liability structure, asset quality, contribution to profit, and working of the computer system and network connectivity. The report should begin with an assessment of the environment in which the branch office is functioning and the strategy adopted by it to overcome competition from other banks and achieve business targets without comprising with business standards. It should comment on the quality of customer service, because good customer service is a platform for business growth and image building, though many banks consider customer service a nonpriority area and do not give it much importance. The audit staff should meet a cross section of customers, ascertain their views on how the bank meets their expectations, and comment upon the branch office ability to meet their needs. Customers are the best publicity for a bank and their satisfaction will guarantee future growth of business and largely reduce the impact of negative publicity against the bank that damages its reputation.

The report should comment on the business processes followed in the branch office, the deviations from procedures, and the likely impact of such deviations. The risk-based audit is oriented toward the verification of systems and procedures for conducting the bank's business from the risk management angle. The report should cover how the branch office is monitoring and controlling credit risk, liquidity risk, earnings risk, and operational risk. The auditors should examine the practices followed in the branch office vis-à-vis the prescribed systems and procedures laid down in the operations manual through selective transaction testing and draw their conclusions.

Credit Management by Branch Offices

The auditor should examine the loan administration function from the risk mitigation angle and include in the report a critical assessment of the loans and advances portfolio of the branch offices. The team should examine in depth the compliance with the prescribed procedures for sanction, supervision, and follow-up of loans and advances, since credit risk is the major risk at the branch offices. It should comment on the reasonableness of credit growth, composition of credit portfolio in a risk-return perspective, risk-grade distribution of credit, and undesirable credit concentration, either clientele-wise, purpose-wise, or activity-wise. The team should assess the intensity of credit supervision, the status of nonperforming loans and advances, and the effectiveness of recovery efforts. They should scrutinize cases of loan sanctions since the date of last audit and comment on the quality of loan appraisals and exercise of due diligence.

The examination procedure will include verification of entry point risk rating assigned to the customers, the viability of credit proposals, and the appropriateness of terms and conditions of loans in light of the assigned ratings. If most of the loans and advances fall in the high-risk category or the branch office is having an overwhelming percentage of high-risk and very high-risk customers in its portfolio, the audit staff should identify the reasons and suggest ways and means to mitigate risks. If there is any undesirable concentration of credit posing higher risk to the bank, they should make suggestions for better distribution of credit during the next two to three years. But the auditor should not take an isolated view of credit concentration at the branch office, disregarding the overall position prevailing at the corporate level. If the aggregate position of loans and advances at the corporate level reveals substantial credit concentration, the matter needs careful examination to find out ways and means to diversify the credit portfolio for the bank as a whole. Before drawing conclusions on the prevalence of credit concentration at the branch office, the auditor should make an assessment about the types of business opportunities that are possible and viable within its command area. For example, if the branch office is located at a place where customers want real estate and personal loans, it will have to build up its credit portfolio in those lines to achieve the target, even though that may result in loan concentration.

Besides loan sanctions, the audit staff should scrutinize loan documents, study the loan disbursement procedure, and comment on the vigilance exercised by the

branch office to thwart attempts by borrowers to divert funds for other purposes. The team should assess the regularity and the intensity of credit supervision and follow-up and state whether the practices and procedures followed at the branch office are enough to contain risk to the expected level. For example, if the branch office is not monitoring the end-use of funds by borrowers or it is lax in supervision and follow-up of credit, credit risk will increase and in the event of default, credit loss will be more than the loss estimated under the credit risk measurement model.

The auditors should pay special attention to the volume of off-balance-sheet exposures and carefully scrutinize the due diligence process followed for issue of financial guarantees and other commitments, and issue and confirmation of letters of credit, and comment on their justification and quality. They should investigate the cases of devolvement of liabilities on the bank from off-balance-sheet exposures and specify whether the causes are attributable to deficiencies in the observance of due diligence procedures or lack of follow-up, or the devolvement took place due to circumstances beyond the control of the branch office.

One of the most critical areas of the branch office audit is to assess the circumstances leading to the slippage in the quality of loans and advances, which includes both migration of existing borrowers to risk grades depicting higher risks and deterioration of standard advances into the nonperforming category. The auditor should analyze the reasons for high slippages and indicate whether the contributory factors were external (poor infrastructure, lack of demand for products, schemes inherently not viable, misuse of funds by borrowers, etc.) or internal (poor appraisal for sanction, disbursement of funds despite incomplete documentation or noncompliance with sanction terms, weak supervision and follow-up, etc.). The analysis will help the bank to devise appropriate strategies for risk mitigation. The audit team should study the systems and procedures followed at the branch office in tracking problem accounts, detecting early warning signals, generating exception reports, and initiating remedial action in time, and comment upon their effectiveness in the report.

The yearly or half-yearly review and renewal of overdraft accounts and revolving credits is an essential aspect of credit monitoring, because the review reveals the weaknesses developing in some of the exposures that are likely to deteriorate in quality. The auditor should examine the alertness of branch officials in tracking the problem exposures and taking corrective action in time in order to prevent an increase in the magnitude of credit risk. The audit report

should contain critical remarks on the quality and timeliness of review and renewal of borrowers' accounts, particularly large-value accounts, and the appropriateness of the actions taken to respond to the concerns that emerge from the review exercise. The team should study the loan cases that have slipped into the nonperforming category, assess the prospects of recovery in those cases, and indicate whether some of the exposures are likely to result in large credit losses to the bank. The report should also include comments on the procedures followed at the branch office to identify loans and advances that have become "sticky" (not showing healthy operations) and initiate remedial actions in time for rehabilitation or recovery of dues.

Liquidity Management by Branch Offices

Liquidity management is a corporate-level function, but it has significance at the branch office level also. An event that displays the branch office's inability to meet its liabilities on time, even though temporary, is indicative of the potential liquidity problem in the bank, because such events send the wrong signal to the public. At the branch office, liquidity problems can arise mainly from five uncertain factors: unexpected demand from fund suppliers for return of funds, unfavorable clearinghouse balance from payments and settlements, premature withdrawal of large time deposits or institutional deposits, sudden drawdown on unutilized portion of sanctioned credit limits and standby commitments, and devolvement of liabilities from off-balance-sheet exposures (contingent items). Lack of a firm arrangement for borrowing funds locally in emergencies or lack of facilities for physical movement of currency between branch offices at short notice may create liquidity problems.

It is necessary for the branch officials to do homework daily to meet fund requirements on time. The audit report should comment on the initiative taken by the branch office to have frequent dialogues with the large and wholesale depositors and fund suppliers, and the borrowers about the timing of their fund requirements, and prepare plans in advance to meet unusual demands for funds. The branch officials should study the trend of behavioral (not contractual) maturity pattern of time deposits, the past volatility of institutional deposits, and the soundness of fund suppliers and make an assessment of the sudden demand for funds that can arise under different scenarios. The branch office should keep track of the seasonality pattern of drawdowns under the sanctioned credit limits and formulate realistic plans to meet sudden and exceptional demands for liquid funds. The audit team should study the procedure followed by the branch officials to assess the liquidity requirements at different points in time, finalize options to procure funds at short notice, and comment upon their effectiveness. The auditors should keep in view the cost of alternative sources of funds and loss of income from excess holding of liquid funds.

Revenue Management by Branch Offices

A bank expects that each of its branch offices will make a profit and be financially viable on its own. But the bank may have several branch offices that make meager profits or even sometimes incur losses, and attribute the losses to operational constraints and lack of business opportunities, though in fact sincere efforts are lacking on their part to improve profitability. The audit report should comment on the initiatives taken by the branch office to augment its income and control operational and establishment costs. The team should examine the trend of growth in interest income and noninterest income in the light of business opportunities that exist in the area and critically comment on the adequacy of steps taken by the branch office to augment business and income.

Revenue leakage is one of the shortcomings in branch office administration. The leakage occurs due to the short-charging of interest on loans and advances and nonrecovery of fees and other charges for services rendered to the customers. The audit team should make a sample check of the accuracy of lending rates fixed in relation to rating, purpose, and tenure of loans; actual interest recovered on loans and advances; recovery of fees and other charges due to the bank; and actual interest paid on deposits and borrowings; and comment on its findings.

Cash management is another area that affects the branch office profit since there can be loss of income due to the holding of idle cash. The cash holding limit must conform to the average daily requirement as evident from the trend of average receipts and payments at the branch office. The total of excess cash holdings at several branch offices of a bank can be a significant amount, and it can lose considerable income from investment of idle cash in risk-free sovereign securities that are readily marketable. Similarly, if the branch office has the responsibility to make payments on behalf of the government, other banks, and institutions as agents, it should promptly seek reimbursement of payments made without receiving funds in advance. The delay will deprive the bank of the income that could have been earned on the funds. The audit team should scrutinize these items and make appropriate comments.

The auditor should examine the funds composition at the branch office and comment on its strategy to mobilize low-cost deposits and funds to bring down the average cost. Besides, the audit team should critically examine the steps taken by the branch office to reduce transaction costs through operational

efficiency and higher productivity, and efforts made to contain expenditures.

Operational Risk Management by Branch Offices

There are three major factors, other than failure of internal control, that are potential sources of high operational risk, (1) lack of familiarity of the staff with the systems and procedures for handling transactions, (2) misuse of delegated powers, and (3) lack of adequate security of the computer systems and other valuables. The audit team should look into the duty demarcation between branch officials and discreetly ascertain their familiarity with the rules, systems, and procedures, and comment on transaction-handling capability and functional overlapping. The audit staff should study the origination, processing, and execution procedure of transactions including documentation and indicate whether the duty demarcation is clear for fixing accountability, when needed. Besides, the audit team should look into the cases of continuation of staff at the same desk in the branch office for an unduly long time since they may develop a vested interest, and periodical rotation of duties is crucial to contain operational risk. The team should make a critical study to identify whether transaction errors and violation of rules and regulations are occurring due to inadequate exposure and lack of training of the staff and make suitable suggestions.

The audit staff should examine a few cases of loans sanctioned by branch officials under the delegated powers and indicate whether the discretionary powers are being used judiciously to protect the bank's interests. The objective of scrutiny is to detect the deliberate misuse of financial powers for personal gains that can result in large losses at a future date. The team should also examine the genuineness of the cases where powers were used beyond permissible limits and whether these were reported to the higher authorities with necessary details for confirmation.

The auditors should study the procedures and practices followed at the branch office to prevent unauthorized access to computers, restrict access to the computer server room, maintain secrecy of passwords, and preserve users’ records and backup of the computer systems, and highlight in the report the negligence and laxity in observing prescribed procedures. Besides, the audit team should study the computer-related fraud to identify the modus operandi and examine the appropriateness and the timeliness of actions taken to prevent recurrence of fraud.

Internal Control Application by Branch Offices

The audit team should carry out an extensive check of the application of prescribed controls at the branch office since laxity in control significantly increases the risk and may result in large losses. In order to assess the internal control environment prevailing at the branch office, the team shall examine (1) the timeliness of submission of control returns and management information reports, including excess and exception reports, to the prescribed authorities and their accuracy, (2) control over the borrowers' accounts, (3) assignment of appropriate ratings to borrowers, (4) control over fraud-prone and vulnerable areas of operation, (5) control over books of accounts, records, and valuables, and (6) control over potential operational risk events.

Submission of control returns and financial reports by the branch offices to the controlling offices is an important element of the monitoring and control framework in the bank. But many banks treat submission of control returns by the operating staff to the designated authorities as a routine affair and seldom utilize them as a tool to oversee and monitor the branch functioning. The audit staff should scrutinize the accuracy and the coverage of periodic returns submitted to the controlling authorities, including returns on loans and advances sanctioned under the discretionary powers of branch officials, examine the quality of scrutiny by the controlling authority, and comment on the appropriateness of actions taken on the deficiencies to protect the bank's interests.

The audit team should make a critical assessment of the branch office control over the borrowers' accounts, because credit risk will increase if there is negligence in supervision over these accounts. It should assess, through selective examination of a few cases, the effectiveness of monitoring of the borrowers' business affairs and accounts and their compliance with the terms of sanction. The audit report should highlight the deficiencies in the supervision and follow-up of credit and indicate whether the deficiencies are likely to lead to an increase in the incidences of loan defaults and the quantum of loan loss in the event of default.

A sensitive area of scrutiny is the assignment of a credit risk rating to the borrowers by the branch officials under the internal credit risk rating model, since the decision on loan applications and the terms and conditions of loans are linked to the risk rating assigned to them. The more inferior the rating, the higher will be the interest rate, and the larger will be the percentage of margin money

and the quantum of collateral. The possibilities of assigning better ratings to the prospective borrowers for sanction of loans by the officials under their delegated financial powers cannot be ruled out. The audit team should scrutinize the procedure for assignment of risk ratings to the new and old borrowers and selectively test the accuracy of data fed into the computer system for generation of ratings. It should examine the promptness in reviewing and modifying credit risk ratings of existing borrowers at regular intervals, check the system followed to track rating migration of borrowers, and initiate corrective action in cases where ratings have moved downward. The team should conduct deeper investigation if there is unexpected deterioration in the quality of unreasonable numbers of credit exposures. It should also comment on the effectiveness of large exposure monitoring and early warning signal detection procedures and the adequacy of remedial actions taken in the relevant borrowers' accounts.

The audit team should critically assess the branch office control over the fraud-prone areas, including reconciliation of books of accounts. It should verify whether the books of accounts are regularly reconciled by persons unconnected with their operation and maintenance. It should make a sample check of reconciled entries to rule out the possibility of manipulation of accounts, critically study the reasons for backlog in the balancing of books of accounts, and make suitable suggestions for improvement in the procedure. Banks that have large numbers of branch offices usually carry over arrears in reconciliation of interoffice accounts, which contain high possibilities of hiding fraudulent transactions. The audit team should carry out scrutiny of unadjusted entries in interbranch and interbank accounts and examine long-outstanding entries under nominal heads of accounts. They should focus attention on high-value entries, particularly where no response is forthcoming from the counterparty or the concerned branch offices on transaction details, and identify suspicious transactions that may later turn out to be fraudulent.

The audit staff should assess the branch office control over sensitive and vulnerable areas, like handling of cash and valuables; safe custody of daily vouchers; custody of safe deposit lockers, account books, and blank draft forms; and access to customer-related data and information. In case fraud has taken place during the period covered by the audit, they should comment on the laxity and negligence in the exercise of control that led to the perpetration of fraud. They should make an assessment of the overall security environment in the branch office and comment on the vulnerabilities. They should scrutinize the procedure followed at the branch office for feeding data and information into the

computer system for transmission to the corporate office that is used to build up the management information system for the bank and comment on the safety of the procedure and the accuracy and integrity of the data.

Compliance with Rules and Procedures by Branch Offices

The audit team should examine the compliance by the branch office with the banking and other applicable laws, the bank's internal rules and regulations, and the prescribed risk limits. It should examine the quality of rectification of irregularities pointed out in the previous internal audit reports, the bank supervisor's report, and the external auditor's report. The audit staff should examine, at the minimum, the compliance with the income recognition and asset classification norms and accounting standards, and compliance with the anti–money laundering rules and regulations. They should verify whether branch officials are scrupulously observing “Know Your Customer” (KYC) principles while opening new accounts and regularly monitoring large cash transactions and transfers of funds between accounts. They should study the system of screening large-value transactions and identifying and reporting suspicious transactions and highlight the deficiencies in the audit report.

Systems Improvement

The risk-focused audit is expected to contribute to the improvement in the systems and procedures for conduct of the bank's business. During the course of the audit, the audit team comes across several procedural deficiencies and irregularities in handling the bank's business by the branch officials as also some lacunae in the control procedures, which are usually common between the branch offices. The audit team should identify the reasons for which the irregularities occur at the branch offices and formulate recommendations for systems improvement. For example, the team may find that the branch officials exceed their financial powers frequently on different grounds, or they adduce different reasons for postponing legal actions against defaulting borrowers that may harm the bank's interest in future. They may observe that borrowers whose accounts are classified as problem accounts are recalcitrant in renewing the loan documents that are due to expire, and the bank has no time to examine other options, like restructuring of the debt or takeover of the unit by another firm, and is forced to file suits for recovery of dues before expiry of the documents. The audit team should suggest how standardized guidelines can be formulated to overcome these types of problems within the existing laws. It should also make recommendations to modify the bank's systems and procedures and strengthen the control mechanism that will prevent recurrence of irregularities at the branch offices.

Review of the Internal Audit Function

An independent review of the internal audit function is extremely important in view of the special status it enjoys and the significant role it performs. Banks should subject the audit function to periodic reviews by a committee of experts or senior and skilled staff unconnected with the risk management and the risk control activities. The review should cover the structure of the audit department, the methodology adopted by it to compile risk profiles, the coverage and appropriateness of the audit plan, and the content and quality of audit reports. The review team should make an assessment of the role performed by the audit department in identifying hidden risks and offering suggestions for risk mitigation, and in overseeing the compliance by the branch offices and other operational units with the prescribed rules and procedures. The assessment should also cover the audit department's contribution toward strengthening the

systems and procedures as well as the checks and balances system within the bank. Banks should occasionally engage outside experts to evaluate the neutrality and effectiveness of the audit function.

Transition Process

The transition to the risk-based internal audit system will be meaningful only if appropriate risk management architecture exists within the bank. The switchover has to be a gradual process since banks will have to design templates for compilation of risk profiles of different types of branch offices, develop norms for assignment of scores to risk factors, design formats for recording risk-focused audit reports, and train the audit staff in risk management and risk control techniques, including new methods of auditing. Formulation of appropriate strategies, development of tools and techniques, and preparation of a transition map assume significance for an orderly transition.

25.4 SUMMARY

Risk-based bank supervision techniques and risk-based internal audit methodology are broadly similar. The former is driven by risk profiles of banks, the latter by risk profiles of branch offices, portfolios, and other functional units. The risk-based audit focuses attention on risky and sensitive areas of operation and control, and achieves improvement in systems and procedures over time.

The bank's internal audit department should undertake an independent risk assessment of field offices and portfolios for focusing audit resources under the risk-based audit system. It should design different templates for risk profiling of different types of field offices and develop norms and criteria for assignment of ratings.

The audit department should classify branch offices into risk categories like low, moderate, high, very high, and extremely high, keeping in view the risk profiles, the frequency of risk events, and the possible impact of those events.

The audit department should standardize the scope and coverage of the risk-based audit to avoid anomalies in audit coverage between branch offices, and prepare lists of general issues and concerns in keeping with the risk category of branch offices that will be examined during the audit.

The audit cycles and transaction coverage are different between transaction-based and risk-based internal audit systems. Under the latter system, the audit cycle is shorter for high-risk branch offices and transaction coverage is low and selective with a focus on identification of shortcomings in systems and procedures that trigger irregularities and increase risk.

The risk-based audit gives priority to high-risk branch offices, high-risk activities, high-frequency and high-magnitude risk events, and other vulnerable areas.

Under the risk-based audit system, postaudit performance ratings are awarded to branch offices based on a combination of business performance rating and risk management efficiency rating.

The switchover to the risk-based internal audit system should take place in a gradual manner to avoid dilution of audit coverage and frequency of audits during the transition phase.

PART Six

Corporate Governance

CHAPTER 26

Corporate Governance

26.1 CORPORATE GOVERNANCE CONCEPT

Corporate governance refers to the rules, practices, and procedures that are established in pursuance of legal and regulatory requirements to run a business on sound lines to protect the interests of shareholders and other stakeholders. It refers to a governing system in which the board of directors and the senior management are expected to scrupulously follow established rules and procedures and run the organization efficiently without breaching laws and regulations. The senior executives are required to play a proactive role in managing the organization. The rules and regulations are part of the legal system, and the practices and procedures are internal processes established by the management to ensure compliance with the laws.

The corporate governance process is based on good principles, ethics, and values, and therefore its emphasis is on the sincerity of the management in establishing sound business practices and procedures and adhering to them to achieve the corporate goals. Transparency of business deals and administration, application of staff administration rules without discrimination, and compliance with good governance codes are the crucial factors that are evaluated to judge the quality of corporate governance practices. Corporate governance implies a minimum standard of governance. Bad corporate governance essentially means bad management practices, which are devoid of ethics and principles and which threaten the long-term solvency of the organization.

Banks should encourage integrity, honesty, and transparency; highly discourage greed, corruption, and nepotism; and establish a congenial working environment to promote good governance. Usually, the senior executives in banks intend to follow neutral and merit-based business practices and business administration, but interference from promoters and outside directors impairs the neutrality of administration and vitiates the working environment. The top management in an organization faces two opposing forces daily, and when the

negative forces defeat the good principles of governance, corporate disaster sets in.

An appropriate operating environment must prevail if banks are to follow sound corporate governance practices. When we talk about corporate governance in banks, we have in mind three partners that are responsible to create a platform in which banks can operate on sound lines. The federal or the central government, the state government, and the bank regulator are the three partners that influence the environment in which the banks conduct their business. The federal government is responsible for maintaining macroeconomic stability, the state government for maintaining law and order and providing utility services, and the bank regulator for promoting the stability of the financial system. Corporate governance is a cooperative process, and therefore appropriate collaboration must exist between these authorities and the banking institutions. The transparency of actions of the authorities, the alertness of the media and the shareholders in evaluating the management actions, and the effectiveness of the legal system to redress the grievances of individuals are important factors that strengthen the corporate governance system. The governance will improve if all the four agencies—the federal government, the state government, the bank regulator, and the banks themselves—view their respective roles in the proper perspective and create an environment in which the interests of depositors, bond holders, shareholders, employees, and the government are protected.

The government wants economic growth with social justice and expects banks to be an active partner in it. Banks must share that responsibility, but within justifiable limits. Financial sector resources cannot be a substitute for government budgetary resources that support economic growth. A good corporate governance system will prevail if there is apt sharing of responsibilities between the government and the banks and appropriate legal environment exists with strong enforcement machinery that is cognizant of willful violation of contracts, agreements, and other laws and regulations, and assures prompt remedial and punitive action.

26.2 CORPORATE GOVERNANCE OBJECTIVES

The primary objective of corporate governance is to promote shareholders' interests and achieve an increase in the market value of equity and an

improvement in the net worth of the company year after year. But banks are financial intermediaries and their functions materially differ from those of other companies. Protection of shareholder interest cannot be the sole focus of corporate governance in banks, which are bound by laws to protect the interests of depositors, debt holders, and other fund suppliers. Banks are the key players in the financial system, and the bank management is expected to take all prudent actions to ensure the solvency of the institution and promote the soundness of the financial system. Corporate governance objectives for banks will therefore include protection of other stakeholders, besides the shareholders. One can argue that as long as the equity value is positive and the shareholders get a part of the net profit as dividend on capital, banks remain solvent. In such a situation, the market value of assets is more than the market value of liabilities, and therefore, the bank is in a position to pay to its present depositors and other creditors. But this positive gap in market values of assets and liabilities prevailing on a date is not a guarantee for long-term solvency of the bank, and more so, if the risk management and accounting standards are below par or the accounts are manipulated. Unanticipated impact of credit, market, and operational risks in a year or two may cause significant erosion in the value of assets and income, and push the bank into the red, which may affect the bank's ability to pay the present depositors and debt holders in full. This apart, the long-term viability of a bank is judged not only in terms of its capacity to pay to its present depositors in full, but also in terms of the soundness of its methods of operation and the governing procedures that ensure its capacity to meet all future liabilities as and when they arise.

To pursue sound corporate governance practices, banks should establish a sound risk management system to protect the value of equity. It is not the return on assets that measures the financial soundness of a bank; it is the risk-adjusted return on capital that is more significant to judge a bank's long-term viability. The existence of sound risk management practices and procedures will help banks to protect asset quality and prevent unexpected decline in asset values. The objective of corporate governance will not be met adequately unless banks establish a robust risk management system to deal with credit, market, operational, and other residual risks.

As part of the corporate governance practices, banks must establish appropriate business processes and procedures and a clean administration. Banks should clearly demarcate duties and responsibilities among the staff to fix accountability and ensure that the administrative system is efficient and

equitable and promotes the morale of the employees. The main objective of corporate governance is to assure the shareholders, depositors and debt holders that the bank is cleanly and efficiently administered and their interests are safeguarded. Another objective is to build up market reputation and win the long-term confidence of the public to gain easy access to the capital market to raise future equity.

TABLE 26.1 Corporate Governance Foundation—Basic Principles

Principles	Suggested Actions
Protect investor interest.	1. Endeavor to increase risk-adjusted return on capital and improve the net worth of the institution. 2. Operate within risk-taking capability. 3. Ensure liquidity and profitability of operations. 4. Ensure solvency of the institution.
Discourage excesses.	1. Set up business-related limits and monitor adherence to limits. 2. Set up norms for allowing exceptions on merit. 3. View unauthorized excesses and exceptions seriously. 4. Establish transparent criteria for evaluation of excesses and initiation of punitive actions.
Document all business rules.	1. Document all policies, strategies, rules, regulations, standards, and limits for business operations. 2. Make decisions based on printed instructions. 3. Avoid informality in decision making.
Reconcile business interest with public interest.	1. Avoid excessive trade-off between high-profit and high-risk business. 2. Maintain balanced business mix. 3. Ensure asset quality. 4. Protect depositors' interests.

TABLE 26.2 Corporate Governance Foundation—Ethics

Ethics	Suggested Actions
Desist from wrongdoing.	1. Improve employee attitude and work culture to abide by rules. 2. Establish strong control and vigilance mechanism. 3. Closely monitor and detect wrongdoing.
View seriously breach of standards, limits, and rules.	1. Do not tolerate serious breach of rules and regulations. 2. Contain tendency to breach rules through monetary disincentives and administrative actions. 3. Take demonstrative action in serious cases to send appropriate signals.
Prevent corruption and nepotism.	1. Establish transparent rules for recruitment and promotion of staff. 2. Build up manual of instructions for conduct of business. 3. Strengthen preventive vigilance. 4. Introduce appropriate checks and balances.

TABLE 26.3 Corporate Governance Foundation—Values

Values	Suggested Actions
Respect knowledge and skills.	1. Encourage employees who display intellectual honesty. 2. Position staff at workplaces that match skill set. 3. Devise means to acknowledge skills. 4. Encourage competent employees to participate in management meetings irrespective of rank.

Reward honesty and integrity.	1. Publicize management's policy on rewarding honest employees. 2. Establish transparent norms for evaluating performance. 3. Establish reward and incentive packages compatible with banking laws. 4. Avoid undue delay in announcing rewards to deserving employees.
Punish wrongdoing.	1. Set up transparent punishment framework in conformity with the principles of natural justice. 2. Maintain balance between gravity of offence and degree of punishment. 3. Follow open and transparent procedures to display neutrality in disciplinary procedures. 4. Avoid knee-jerk and whimsical actions that create fear and weaken employee morale.

To summarize, the objectives of corporate governance in banks are:

- To achieve long-term solvency.
- To protect shareholders' interests.
- To safeguard depositors' and debt holders' interests.
- To promote the morale of the employees.
- To build up reputation and win public confidence.
- To secure easy access to the capital market.

26.3 CORPORATE GOVERNANCE FOUNDATION

The corporate governance foundation in banks must be based on certain principles, ethics, and values that are of special significance to institutions that deal with public money. Tables 26.1 through 26.3 explain these principles, ethics, and values and suggest actions that banks must take to strengthen the corporate governance practices.

26.4 CORPORATE GOVERNANCE ELEMENTS

Banks should establish appropriate policies and procedures relating to the following elements to promote an effective corporate governance system:

1. Transparency and accountability.
2. Shareholder responsibility.
3. Internal control efficacy.
4. Independence of audit system.
5. Disclosure standard.
6. Checks and balances mechanism.

Transparency and Accountability

In banking institutions, transparency should exist in at least two areas: transparency of powers of the board directors and senior management, and transparency in decision making. Banking laws and the bank regulator's directives define the roles and responsibilities of the board directors and the senior management in banks. The boards of banks in some countries work in an advisory capacity and deal with the policies, strategies, and other organizational issues like global expansion, mergers, and acquisitions, but do not hold operational responsibility or take part in commercial decisions. The boards of banks in some other countries exercise powers in operational matters like the sanctioning of loans, investment of funds, promotion and recruitment of employees. Banks must clearly demarcate the powers of board members and senior executives in conformity with the banking laws and rules. If the board members acquire excessive powers and take part in operational matters, which normally are handled by the senior executives or line management, the corporate governance process will suffer. The greater the objectivity in demarcation of powers between the board directors and the senior management, the more effective will be the corporate governance system. In any case, the decisions, either by the board or by the senior management, must be based on an efficient due diligence process. Where the due diligence procedure is waived, the governance process suffers.

Banks should maintain transparency in decision making to meet the requirements of corporate governance and ensure that the officials make decisions in accordance with documented policies and printed rules. Even the deviations from established norms, which are treated as exceptions, must be made within defined parameters. Lack of transparency of decisions by higher authorities may create doubt about the merits of transactions and become a matter of gossip among the employees that may damage the reputation of the institution. It may also adversely affect the working environment in the organization. Bank executives should therefore avoid making commercial decisions on an informal instruction basis, as informal decisions are not in conformity with corporate governance codes, are usually not based on merits, and are more risky.

Banks should uphold the principle of accountability to promote transparency in business decisions and administration. They should put in place appropriate

criteria to fix accountability for actions taken without adequate consideration or justification, and impose censure or punishment. Many banks view the phenomenon of accountability as an administrative option to be exercised only in cases of wrong decisions or motivated decisions that result in financial loss, and overlook accountability where actions do not result in financial losses or other damages, even though the actions are unauthorized. But the corporate governance system requires that cognizance should be taken of actions that are not based on prescribed rules or norms for fixing accountability, irrespective of the result of the action. This should be so, as the tendencies to engage in unauthorized transactions, though temporarily justifiable, are not beneficial in the long run as it vitiates the governance system.

Shareholder Responsibility

Banks have both individual and institutional shareholders who have a vital role to play to promote the corporate governance system. Usually, individual shareholders are indifferent to the affairs of a bank and do not take an interest in conveying their views to the management that may put the latter on guard. The institutional shareholders who hold substantial numbers of shares are often indifferent to the business affairs, and if they involve themselves, the intervention may not be in the long-term interest of the bank. The views of the shareholders on critical matters, such as director's remuneration, auditor's appointment, geographical expansion, unremunerative business activity, or serious employee offences are important, as those may provide checks on the decisions that are not based on merits. But if the shareholders remain passive, the objectives of corporate governance will not be achieved. To broadbase the corporate governance process, banks should create a mechanism for interaction between the board of directors and the shareholders at regular intervals to incorporate the latter's sensible suggestions in the formulation of policies and strategies. The individual and institutional shareholders are also accountable to the depositors if they remain indifferent or are ignorant about the affairs of the bank.

Internal Control Efficacy

The internal control system is a crucial element of the governing process in banks. The enhancement in the value of equity, which is the primary objective of corporate governance, cannot be achieved unless the control mechanism is efficient to detect and check damaging incidents in time that may cause substantial losses to a bank. It is not the variety and the pervasiveness of controls that are important; more significant is the sensitivity of the monitoring and control personnel to protect the integrity of the control system at any cost. It is of course essential that an appropriate control framework be in place, but at the same time the working of controls must be visible to judge the effectiveness of the control system that supports the corporate governance process. Visibility in this context means effective application of controls in time to prevent financial mishaps, which can be determined through an assessment of the damage, financial or nonfinancial, that would have resulted if wrongdoing were not detected in time and controlled.

The bank should address the following issues to prove that its control machinery is comprehensive and effective:

- Segregation of duties and responsibilities to avoid conflicts of interest.
- Segregation of reporting responsibility from operational responsibility.
- Undertaking due diligence before decision making.
- Rigorous monitoring of effective application of controls.
- Enhancement of technological support with proper security system.
- Evaluation and mitigation of risks from outsourced activities.
- Adoption of risk-focused internal audit.
- Prevention of financial crime.

Independence of the Audit System

The existence of an environment in which the auditors can perform their role in an independent manner is essential to maintain the integrity of the corporate governance practices. The bank management should allow complete freedom to the internal auditors and distance themselves from the subjects of audit, and desist from deciding the methods and the depth of scrutiny. In banking organizations there are two tiers of audit; the first tier relates to audit of branch offices, portfolios, and business lines by the internal audit teams, and the second tier to audit of annual accounts by the external auditors who are qualified chartered accountants. Internal audit focuses attention on compliance with internal rules and regulations, while external audit certifies that the accounts reflect the true financial position of the bank and the management reports reveal the true affairs. Often, the internal auditors' independence gets eroded for various reasons despite the existence of a separate audit committee of the board in banks that consists of independent members, which oversee the internal audit function and protect the quality of audit. Likewise, the quality of external audit gets diluted if there is nexus between the management and the auditors. Where the management interferes with the duties and the freedom of internal or external auditors, or compromises with the standard of external audit, the corporate governance suffers.

External auditors work as the agents of the shareholders, the bank regulators and supervisors, and the depositors and therefore, their focus cannot be solely on the accuracy of accounts and compliance with the accounting standards. Bank audit is a sacred job and bank auditors have a special role to protect the depositors' interest. Consequently, the external auditor shall not only comment on the present state of affairs of the bank, but shall also throw light on the soundness of management policies and strategies and the corporate governance practices. External auditors should evaluate the policies, procedures, and practices and examine the methods of operation, and indicate whether these are appropriate to ensure the safety of the depositors' funds, both in the short and long terms. Promotion of corporate governance in banks calls for auditors' freedom to pursue professional standards.

An area of concern is the possible emergence of conflicts of interest between the auditing responsibility and consultancy assignment. Large audit firms have multidisciplinary and competent professionals, and undertake consultancy work

in addition to auditing. External audit firms often accept a consultancy assignment in banks in which they conduct the audit for evaluation of systems and procedures like the risk management system, internal control system, management information system, systems audit, credit rating system. The bank management can influence the external auditors through promise of a consultancy assignment in the postaudit period and in return, the auditors may soften their remarks on the audit findings. This type of practice has significant pitfalls and is contrary to corporate governance codes.

Disclosure Standard

In banking institutions, disclosure is a very effective weapon to protect the integrity of the corporate governance system and the financial system of a country. One of the important reasons that contributed to the systemic crisis in the United States was the failure by corporate management to observe corporate governance codes of conduct. The inadequate corporate governance practices prevailing in the institutions exposed the banks to high risks from interbank dealings as there was lack of transparency and disclosure about the extent of their involvement in subprime mortgages and risky credit default swap derivatives. In most countries, the Companies Act has made it compulsory for the board of directors to disclose in the annual report and the statement of accounts, the status of compliance with the corporate governance codes and explain the reasons for exceptions and deviations; the company laws include provisions for imposition of censures and penalties for not complying with the codes of good practices. These penal provisions, to a great extent, have compelled the companies to adopt the corporate governance codes and observe the minimum standards of governance. The lesser the protection from concealment of essential information on grounds of materiality and confidentiality and the larger the spread of disclosure, the more difficult it is for the directors to indulge in wrong practices.

The New Basel Capital Accord has prescribed a disclosure framework that requires banks to disclose certain minimum information on risk exposure, risk management systems, and capital adequacy assessment. The disclosure standard prescribed under the Third Pillar of the New Accord is comprehensive and has curtailed the tendency of banks to withhold vital information. Banks will now have to define the material and nonmaterial disclosures, and observe certain minimum qualitative and quantitative disclosure standards. The prescription of minimum disclosure requirements in the New Accord has brightened the possibility of improving the corporate governance practices in banks.

Banks are custodians of public money and are therefore required to make extensive disclosures, some of which are regulation driven and sensitive in nature. The disclosures cover sensitive items like capital cover against credit, market and operational risks, status of related party lending, exposure to capital market and real estate sectors, and the quantum and movement of nonperforming loans and advances and provisions against identified loan losses. The disclosures

aim at preventing excessive exposures to high risk and vulnerable areas to protect the long-term solvency of the financial institutions. The disclosure requirements seek to strengthen the corporate governance process in a significant way.

Appropriate Business Environment

Banks operate in a sociopolitical environment, and it is therefore erroneous to judge the effectiveness of their governance in isolation without taking into account the business constraints they face. They suffer due to the fragile legal system and the absence of enforcement machinery to assist them to pursue criminal cases or recover decreed debts. In the case of banking companies, business environment is a key factor that influences the corporate governance process. The business environment has three dimensions—the laws and the regulations, the international best practices, and the judicial system.

In the first place, the country should have laws and regulations relevant to the banking industry that are in conformity with the international standards, and comprehensive and effective to promote corporate governance. The laws, and the rules framed under the laws, should have provisions to prevent misuse of powers on the one hand and guarantee transparency and accountability on the other. In countries where self-regulation in the banking industry is primary, the regulation has been found to be inadequate and ineffective. The directors and the senior management may engage in unsound and unfair banking practices taking advantage of soft regulatory standards, as it was evident during the 2007 financial crisis in the United States. Because of this apprehension, it is essential for the bank supervisor to prescribe a standard set of regulations, controls, and disclosures that banks should follow to protect the interests of the depositors, shareholders, and other stakeholders.

In the second place, there is an information gap about the best regulatory and accounting practices that are followed in banks across many countries. The central bank or the bank regulatory/supervisory authority of the country has the responsibility to frame regulations in conformity with the international best practices. They should put in place strong regulations and standard accounting practices and bring to the notice of banks the pitfalls in the governance system and the shortcomings in the risk management systems that the examiners have detected during the course of bank inspection. But supervisory authorities should not interfere in operational issues, which should be handled by the bankers' association, the auditors, or the expert committees or banks' boards.

In the third place, the legal system is inadequate in many countries to protect the interest of the financial institutions. The corporate governance process will suffer unless the legal system is strong and generates automatic respect for laws

and fear of punishment for breach of laws. The legal system must be efficient and the court decisions must come promptly. Unless the judgment by the courts for redress of grievances is quick, the tendencies to breach rules and regulations will persist and the atmosphere will vitiate the governance system. The efficiency of the judicial system and the alertness of the enforcement authorities to promptly detect irregularities and take punitive action are crucial. Vigilant enforcement machinery prevents dereliction of duties and perpetration of crimes. The corporate governance system in banks will not be effective unless the government, the central bank, the supervisory authority, the securities regulator, the stock exchange, the insurance regulator, the judiciary, and the enforcement machinery play their respective supportive roles.

26.5 CORPORATE GOVERNANCE IN BANKS

The appropriate constitution of the board, the clarity of its role, and the visibility of the board members' actions are crucial for establishing an effective corporate governance process in any corporation, but they are of special significance in banking institutions. The involvement of the board in the affairs of the bank is extensive and the functioning of the board requires far more cohesiveness. Any action by board members has risk implication because it concerns the safety of public money. The bank directors have to perform certain special responsibilities and observe certain codes of conduct to protect the integrity of the corporate governance process. Besides, there is a need for clear demarcation of roles and responsibilities among the board members and the senior management. This section deals with these aspects.

Special Requirements for Banks

The corporate governance model for banks should have special features because, unlike other corporate institutions, they deal in public money. They enjoy certain privileges as they can raise large amounts of public money through deposits and debt instruments, even though their equity base may be small. There is no prescribed debt-equity ratio for banks, except the obligation to maintain minimum regulatory capital against risky assets and economic capital to cover severe losses from risks. Mismanaged banks adversely affect the depositors' confidence, increase systemic vulnerability, and impair the payment and the settlement systems. Poor corporate governance precipitates bank failures, and the stakes of the government and the central bank are quite high to restore public confidence in the financial system. Corporate governance culture must percolate to the lower levels of the bank administration, as it is a collective process.

Corporate governance in banks has more focus on risk management activities, which involve formulation of sound risk management policies and strategies by the board of directors and their implementation and monitoring by the senior management. But often, bank management develops complacency and compromises with the risk management standards. They presume that the depositors' interests are largely protected by the deposit insurance corporation and finally by the government, which does not want a bank to fail and destabilize the financial system. To a certain extent, the bank management derives comfort from supervision by the supervisory authority since they presume that the responsibility of detecting deficiencies in managerial practices and ensuring solvency of the organization is that of the statutory supervisor. But there are a few crucial issues concerning the board of directors and the senior management that influence the quality of corporate governance in banks, which are discussed here.

Constitution of the Board of Directors

A broadbased board of directors with representations from different academic disciplines and diverse economic fields is more suitable for improving the quality of corporate governance. The Banking Regulation Act usually prescribes the manner in which the boards of banks should be constituted in order to achieve diversity of expertise and stipulates that the members of the board must have an appropriate academic background and be familiar with the industrial,

commercial, and trade policies and practices that are of relevance to banks. A cross section of people with varied backgrounds, such as economists, financial experts, engineers, chartered accountants, industrialists, agriculturists, and information technology experts make a more professionally sound board. It is an advantage if some of the board members are familiar with the international accounting and risk management standards and the banking regulations prevailing in other countries.

The boards of banks consist of official (full-time) directors like the managing director and the executive directors and nonofficial (outside) directors who only attend board and committee meetings. Besides broad representation from different fields of experience in the composition of the board, a balance must exist between the number of full-time in-house directors and outside directors in order to achieve impartiality in decision making and avoid conflicts of interest. A working environment in which the majority of the board members are appointed or elected on merit and do not have connections with the owners of the bank is more conducive for merit-based governance. An appropriate balance between the in-house directors and the independent professional directors may achieve the twin objectives of promoting shareholders' interests and protecting depositors' money. But the quality of governance will suffer if the independent or outside members of the board remain passive during the deliberations in board and committee meetings. Banks should hold training workshops for outside board members to improve their familiarity with the banking practices and procedures, including risk management systems. This type of workshop is likely to enhance their interest in the functioning of the bank, instill confidence in them, and induce them to take an active part in the deliberations of the board and committee meetings.

Relationship between Board Members and Senior Management

The relationship between the board members and the senior management is a critical issue that influences the corporate governance practices in banks. Clear demarcation of roles and responsibilities between the board members and the senior executives, and development of mutual trust and respect for each other are essential for good governance. The transgression of powers of senior management by the board members vitiates the corporate governance process. Ideally, the board members should work as the policy-making and overseeing

authority and the senior management as the implementing authority.

Problem of Multiple Directorships

The directors on the boards of banks hold directorships in other companies, and are often appointed as members of the in-house directors' committees, like the recruitment committee, remuneration committee, audit committee, and so on. If bank directors have simultaneous responsibilities in several companies and in-house committees, the quality of governance will suffer because they cannot bestow adequate attention to the problems of the bank. Banks should put appropriate limits on the total number of companies in which a director can hold a directorship and the number of committees on which he or she can be a member to avoid overlapping of duties and conflicts of interest.

Responsibility and Accountability of Board of Directors

Under the Companies Act, the directors of companies are required to take adequate care to safeguard the interests of the shareholders and perform fiduciary duties—the duty of care and the duty of loyalty. Usually nonbank company directors take care to protect the interests of the shareholders, but banking company directors have more complex and sensitive responsibilities and are expected to take more than normal care to protect the interests of depositors and bond holders, in addition to the shareholders. The official and nonofficial directors of banks have joint responsibility to ensure that the operations are safe and sound, and there is no threat to solvency. The board is required to put in place appropriate checks and balances to guard against the forces that seek to establish unwarranted control over the bank.

The Basel Committee on Banking Supervision in the document on "Enhancing Corporate Governance for Banking Organisations" has given detailed guidelines on "sound corporate governance principles."[1] The Committee has recommended certain principles to be followed by banks for enhancing the quality of the governance process. Based on these recommendations, the responsibility and the accountability of the board of directors are narrated in brief here (readers should refer to the original document available at the BIS web site for details):

1. The board should set and enforce clear lines of responsibility and accountability for themselves and the senior management across the organization. There should be no unspecified or confusing and multiple

accountability and lines of responsibility.

2. The board should set up well-articulated corporate policies and strategies against which the success of the overall enterprise and the contribution of individuals can be measured.

3. The board should understand their oversight role and ensure appropriate oversight by the senior management.

4. The board should recommend sound practices, provide dispassionate advice, and avoid conflicts of interests in their activities/commitments to other organizations.

5. The board should have regular meetings with senior management, approve policies, and monitor progress. It should not, however, participate in day-to-day management of the bank.

6. The board should evolve corporate values, codes of conduct, and other standards and ensure compliance with them.

Role of Board of Directors and Senior Executives in Risk Management

In banking organizations, risk management is the most crucial activity, because an efficient risk management system minimizes the losses that arise from risks assumed by the bank, which in turn enhances the equity value and protects the depositors' interests. The board of directors has the ultimate responsibility to decide risk appetite and risk limits, formulate appropriate risk management policies and strategies, and approve tools and techniques to identify, measure, monitor, and control risk. The New Basel Capital Accord has emphasized the board's role in establishing an appropriate risk management framework. The latter has to adopt a balanced approach between risk and return and focus attention on the risk-adjusted return on capital. The corporate governance process requires the boards of banks to consider several critical issues in balance sheet management for protection of shareholder and stakeholder interests. The board should recognize that a close link exists between balance sheet management and risk management, and balance sheet expansion will require additional capital to match the risk profile of incremental assets. To meet the corporate governance challenges, the board of directors and the senior management will have to fully involve themselves in the risk management process. Their respective role is described in brief in the following section.

Role of the Board

- To explain the bank's risk management philosophy and risk appetite.
- To approve policies and strategies for managing and taking risks.
- To undertake activities that conform to the strength of the bank.
- To set up prudent limits on credit risk, market risk, and operational risk on a bank-wide and global basis, and review compliance.
- To receive and review reports that explain the size and the significance of risks faced by the bank.
- To approve the capital adequacy assessment process.
- To allocate capital between credit, market, operational, and other residual risks.
- To approve internal models for credit risk rating of counterparties.
- To approve risk measurement models and tools.
- To understand the bank's counterparty rating system and management reports on rating system operation.
- To review and modify risk exposure limits from time to time.
- To ensure that risk limits are in conformity with market conditions and business strategies.
- To be cognizant of additional risks from new products/activities.
- To set up a comprehensive and rigorous reporting system.
- To ensure that the reporting system covers details of risk exposure at all locations (including risks from subsidiaries) and for all types of operations.

Role of Senior Executives

- To set up business strategies in conformity with specified risk limits.
- To lay down guidelines, systems, and procedures for conduct of the bank's business.
- To track changes occurring in the operating environment and introduce measures for risk mitigation.
- To ensure that operating staff has sufficient knowledge to understand and operate within risk limits.
- To ensure that risk identification and risk control techniques are in place when new activities and products are introduced.
- To position appropriate personnel to manage risks.
- To see that employees observe intellectual honesty and integrity.
- To monitor day-to-day activities of risk managers, risk control officers, and business line heads.
- To understand the counterparty rating system design and operation, and ensure that the rating system is operating properly.
- To undertake a periodical review of the rating process and take care of identified deficiencies.
- To bring to the notice of the board the material changes in the risk rating system.
- To ensure that rating system operation forms an essential part of the reporting system to the board.
- To report to the board all material aspects of credit, market, and operational risks.
- To establish criteria for fixing accountability within the organization.

26.6 TOWARD BETTER CORPORATE GOVERNANCE IN BANKS

Certain unresolved issues stand in the way of pursuing a strong corporate governance system in banks. The resolution of these issues, discussed here in brief, will enhance the corporate governance process.

Formulation of Long-Term Corporate Goals

Banks pay more attention to short-term goals and concentrate on growth of annual business and profit, and do not usually think about long-term corporate goals. Annual plans give an outline of the business focus and business strategy to be adopted during the year, and usually contain targets on resource mobilization, funds deployment, and profit growth, and also proposals for the establishment of new offices during the year. Banks do not clearly visualize their medium-term and long-term goals and conceptualize the kind of business activities in which they want to specialize, and do not orient the annual plans toward the achievement of longer term goals. For example, if a bank's long-term goal is to specialize in wholesale banking, its business focus and business strategies disclosed through the annual plans must support that objective. Banks should therefore clearly establish their long-term goals and devise short-term, medium-term, and long-term strategies in alignment with those goals. They should draw up a road map of business expansion, activity expansion, and geographical expansion in keeping with their long-term goals and disclose the plans to the shareholders and the bank regulator/supervisor.

Selection of Directors on Bank's Board

Banks should select directors on their boards through an appropriate due diligence process. The Banking Regulation Act must have exclusive provisions to compel banks to appoint fit and proper persons on the board. In government-owned banks, the due diligence exercise for selection is routine and not merit based, and political considerations influence the selection process. The government should formulate a transparent and conscientious policy for nomination of appropriate persons in banks that it fully owns. Where institutions and the public hold equity in banks where the government is the majority shareholder, a proportionate number of independent directors should be elected by the private shareholders on the board in place of government-nominated directors. If a major portion of private equity is held not by individuals but by corporations and institutions, care has to be taken to ensure that the persons who are nominated by them on the board satisfy the fit and proper criterion. In banks that are exclusively owned by private shareholders, the bank supervisor's intervention may be required to ensure that academic and social background and professionalism are given due consideration in the election/nomination of directors on their boards.

Improvement in Judicial Process

There is an urgent need to improve the judicial process for quick resolution of cases that involve recovery of banks' dues on defaulted loans and embezzled of funds. Usually, borrowers adopt dilatory tactics, taking advantage of the shortcomings in legal provisions that prolong court proceedings and delay delivery of judgment by the courts. Besides, even after receipt of a court decree, banks find it difficult to execute the decree due to the absence of an efficient enforcement machinery that significantly affects the prospects of recovery. Special courts do not exist in all locations for quick resolution of insolvency and bankruptcy cases.

The hearings in courts are often prolonged because judges may not have exposure to banking practices and procedures and the modi operandi of fraud, though they are legal experts. The government and banks can jointly organize familiarization workshops for judges on banking procedures and practices that may be useful for quick resolution of bank cases. Workshops for judges that involve an exchange of experiences on dilatory tactics adopted by recalcitrant borrowers and the modi operandi adopted by criminals involved in money laundering, perpetration of fraud, and misappropriation of assets and valuables will create a platform for expediting the court proceedings. Prompt recovery of bank dues facilitates recycling of funds for productive use in the economy and also safeguards the interests of depositors and shareholders, which are the objectives of corporate governance. An efficient judicial system backed by effective enforcement machinery for execution of decrees is essential for good governance.

Existence of Grievances Redress Machinery

In assessing the quality of corporate governance, one has to look into the remedies available to the bank's shareholders and customers against genuine grievances. Shareholders have several grievances against banks, and the most common among them are failure to register names on purchase of shares from the market, send notice on time for attending the annual general meeting, dispatch annual reports and other information on company resolutions, and pay declared dividends in time. Likewise, customers have several grievances, like poor counter service, delay in issue of duplicates against lost drafts, money stolen from accounts, confidential information made known to other parties, and so on. The quality of customer service in banks is an important corporate governance issue.

The protection of individual shareholders who hold small numbers of shares and customers who hold small amounts of deposits is the concern of the government, the bank regulator, and the bank itself. Banks are also expected to protect the interests of the general public who avail themselves of their services. Corporate governance cannot be deemed to be effective if the grievances of individual shareholders and customers are not addressed and solved in time. It is therefore essential that banks set up efficient machinery for redress of shareholder and customer grievances.

Establishment of Preventive Vigilance System

Misuse of financial powers has high potential to inflict large losses on banks that may significantly impair their financial position. It is essential that they establish a vigilance system that prevents misuse of powers and connivance of staff with third parties to perpetrate fraud. Banks should establish an administrative unit that will work as a vigilance body to track misuse of financial powers and deviations from prescribed systems and procedures, identify suspicious transactions from audit reports and other control returns, and assess the seriousness of the offences for initiating disciplinary proceedings. Sometimes, the vigilance unit should conduct on-the-spot scrutiny of doubtful transactions, which are brought to its notice through written anonymous complaints or by anonymous callers. In the absence of vigilance machinery to promptly detect irregularities and institute disciplinary proceedings and punishment, the governance process will get corrupted. Banks should establish a separate vigilance cell or department and specify the manner of functioning of the vigilance machinery to ensure that it does not generate ill feeling among the staff that affects their morale and causes obstruction to the growth of business. The vigilance unit should provide assurance to the staff that its motto is to promote and uphold honesty and integrity in transacting the bank's business.

Positive Anti-Money Laundering Stance

Banks are used as conduits for transfer of illegal money for financing terrorist and other criminal activities. Every country has stringent legislation on anti-money laundering, which requires banks to follow the “Know Your Customer” procedure for establishing relationships with new customers. Compliance with anti-money laundering rules and regulations is an obligation that banks are required to discharge faithfully in the interest of the nation and in their own interest. Detection and reporting of suspicious transactions to the prescribed authority are important requirements under the anti-money laundering laws. But often banks do not act seriously in complying with the anti-money laundering rules, either due to the lack of familiarity with the procedures or the lack of expertise to detect suspicious transactions. Greater awareness about the menace of money laundering and better understanding of anti-money laundering rules and dealing procedures are essential to detect suspicious transactions. Display of a positive anti-money laundering stance through appropriate action is a proof of

an alert corporate governance system.

Prevention of Misuse of Autonomy

Noninterference in the administration of corporations by the external authorities is essential to maintain a neutral governing process. Banks prefer autonomy in their administration and operations and dislike interference in their internal affairs. But it is expected that noninterference by the government and the bank regulator should not lead to a situation in which the bank's operations become vulnerable, and nepotism and inefficiency grow within the organization. Merit- and value-based administration and strict compliance with rules and regulations are essential where banks enjoy the status of autonomous institutions. While excessive regulation and control by the government and the bank regulatory authority create obstacles for banks, total autonomy granted to them without putting in place effective supervision, vigilance, and reporting systems may cause serious problems for the financial system. Before the United States' financial crisis set in, regulatory requirements were softened to grant greater freedom of operations to commercial and investment banks to support the housing mortgage finance market, but supervisory control and oversight were not tightened to monitor the risk profiles of systemically large financial institutions that finally led to the systemic crisis. Misuse of autonomous powers is a serious breach of the corporate governance codes.

26.7 SUMMARY

Corporate governance in banks refers to the principles, ethics, and values established in pursuance of laws and regulations to run the business on sound lines to protect the interests of depositors, shareholders, and other stakeholders. Corporate governance culture must percolate to the lower levels of the bank administration as it is a collective process.

The government and the bank regulator should create an appropriate environment to enable banks to follow sound corporate governance practices.

Protection of shareholder interests cannot be the sole focus of corporate governance in financial institutions. Banks are financial intermediaries and their functions differ materially from those of other companies. They are bound by laws to protect the interests of depositors, debt holders, and other fund suppliers, besides the interests of the shareholders and the government.

Banks should invariably have transparency in decision making and should

establish accountability for wrongdoing, promote an independent audit system and efficient control framework, and establish grievance redress machinery to look into customer and shareholder complaints to demonstrate their seriousness in upholding corporate governance codes, ethics, and values.

Banks should arrange for regular interaction between the board and the shareholders since the latter's views provide checks and balances in the governance system.

Banks should make comprehensive disclosures about their financial position and other affairs in the annual report and the statement of accounts, the status of compliance with the corporate governance codes, and the reasons for exceptions and deviations. The more comprehensive the disclosure standard is, the more difficult it is for the management to indulge in wrong practices and dilute the corporate governance process.

The corporate governance model for banks should have special features, since they conduct business with public money, in terms of the constitution of the board of directors, special responsibility of each director, and the standards of business and administrative parameters. Banks should have an efficient risk management system to protect depositors’ interests and the value of the equity through minimization of losses from risks.

NOTE

1. “Enhancing Corporate Governance for Banking Organisations,” Basel Committee on Banking Supervision, February 2006.

PART Seven

Lessons from the Asian and the United States' Financial Crises

CHAPTER 27

The Causes and Impact of the Asian and the United States' Financial Crises

Risk assessment tools and techniques and the laws on financial activities regulation that were in place proved to be inadequate after the financial crises that occurred in the Southeast Asian countries during 1997 and the United States during 2006 to 2008. The financial crises revealed that the parameters of risk assessment that banks usually follow were not enough as systemic and contagion risks, and risks from certain plausible events were not adequately mapped within the measurement framework. The crises brought new dimension to the risk assessment practices and procedures as it became evident that severe risk could arise due to the close linkage between economies and financial markets across the world. Consequently, the bank's risk assessment process must recognize the contagion and domino effects of risk events that can take place both in developing and developed countries.

The financial crises revealed the failure of banks to appropriately assess and measure the risk that can arise from undue acceleration of credit to achieve higher economic growth through large inflow of short-term foreign funds and use of innovative financial and derivative instruments to fuel the credit boom. The crises brought to light the gaps that exist in the financial activities regulatory framework and the supervisory coverage of financial institutions.

27.1 THE ASIAN FINANCIAL CRISIS CAUSES AND IMPACT

An investment boom took place in Southeast Asian countries during the first half of the 1990s to accelerate economic growth in certain selective sectors. It was largely funded by short-term foreign funds, predominantly U.S. dollars, that exposed the local financial institutions and private entities to high exchange risk. The investment was primarily directed toward residential and commercial

property development in Thailand and Hong Kong and toward selected industries in Malaysia, Korea, and Indonesia. The credit boom exposed the financial institutions to greater risk because the asset price in the real estate sector is usually volatile and the output price in export-oriented industries is largely dependent on sustained demand for exports. The financial sector systemic risk increased as the financial institutions and private business entities got free access to borrow directly from banks abroad to support the investments. The investment boom created excess capacities that led to a slump in property and industrial output prices that significantly eroded borrowers' income and capacity to repay institutional debts.

The Asian financial crisis originated in Thailand in the first quarter of 1997, first, because of the failure of property developers to repay loans to the financial institutions due to plummeting property prices and second, because of the subsequent depreciation in the value of the Thai currency. The change to the floating exchange rate system in Thailand in July 1997 led to a substantial fall in the value of Thai baht against the U.S. dollar, resulting in a substantial increase in debt burden of borrowers in local currency. The fall in property prices and the depreciation of baht created liquidity problems for the Thai financial institutions and other business houses to repay their debts to the creditors, particularly the dollar-denominated debts. The sudden increase in demand for the U.S. dollar to repay foreign currency loans, coupled with speculative trading in it in anticipation of devaluation of the domestic currency exerted tremendous pressure on the exchange rate. The significant depreciation in the value of domestic currency in relation to the U.S. dollar proportionately increased the repayment obligations of borrowers, which led to large-scale defaults. The devaluation of the Thai baht had domino effects on the local currencies in other countries of the region. In the first phase, the Malaysian ringgit, Philippine peso, and Indonesian rupiah depreciated appreciably, and in the second, the South Korean won, Singaporean dollar, and Hong Kong dollar experienced downward pressure in their currency values. The foreign currency crises in these countries led to the financial and economic crisis. The countries experienced sharp reduction in currency values, substantial fall in stock and other asset prices, economic slowdown, and fall in gross domestic product.

The risk proliferation sequence of the Asian financial crisis is shown in Figure 27.1.

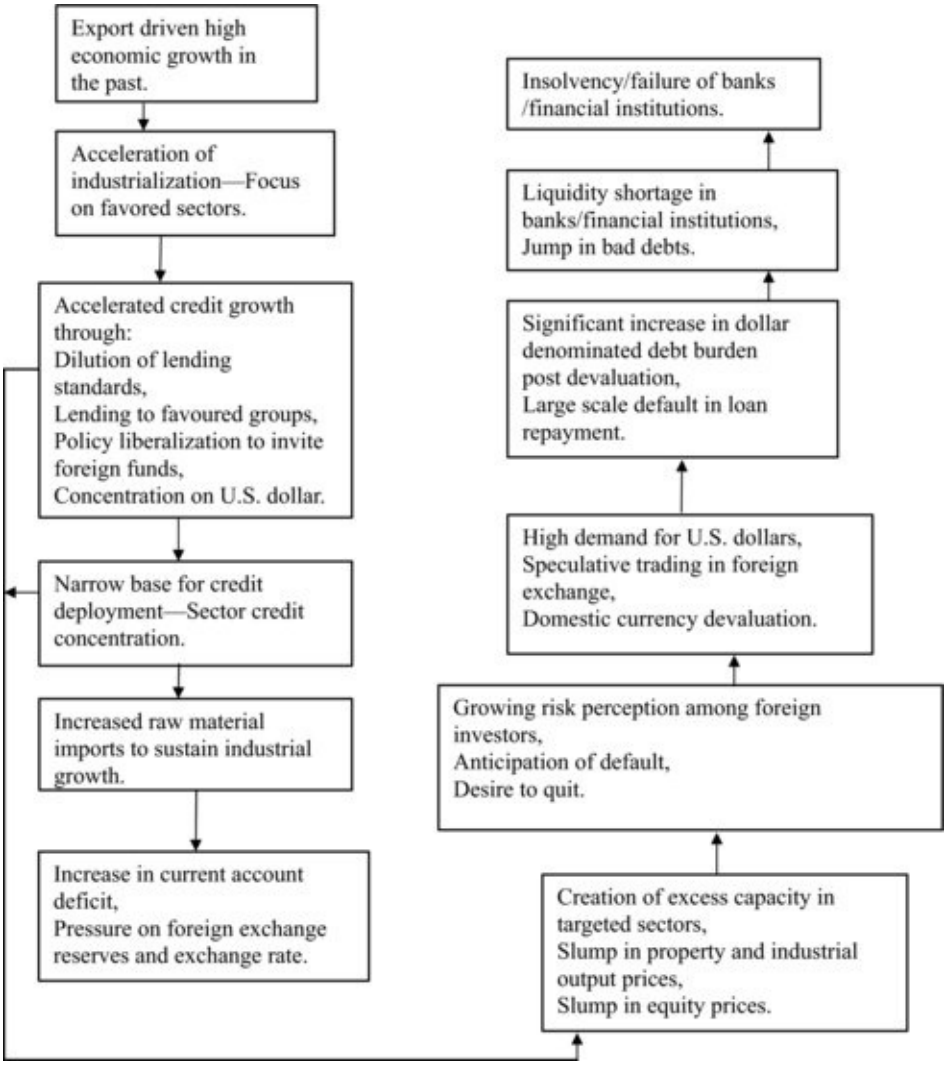
27.2 RISKS EMERGING FROM THE ASIAN FINANCIAL CRISIS

The Asian financial crisis revealed that large foreign currency inflows to finance economic growth create additional risks for financial institutions due to the linkage between the regional and global financial markets. Banks and other lending institutions faced the following additional risks.

Contagion Risk

The financial crisis revealed that the shortage of foreign exchange in one financial market affects the exchange values of foreign currencies in other financial markets in the region, which in turn compels the countries to depreciate their currencies, which significantly impairs the repaying capacity of borrowers and induces them to default on their debt obligations to foreign investors and institutional lenders. In assessing the risks, banks therefore have to identify the significant foreign lenders and investors in their countries and in the region, and the nature of exposures in terms of direct credit, investment in financial instruments, and operations of financial subsidiaries. The exposure of the U.S. banks at the end of 1996 to the eight Asian countries was U.S. $57.9 billion, which constituted about 34.9 percent of all U.S. international lending including exposure in offshore banking centers; the corresponding exposure and percentage of UK banks were U.S. $66.7 billion (50.8 percent); German banks, U.S. $98.3 billion (33.6 percent); and Japanese banks, U.S. $242.6 billion (62.3 percent). In particular, the exposure of Japanese banks was estimated to be about U.S. $146.3 billion in the offshore centers of Hong Kong and Singapore and about U.S. $83.8 billion in Thailand, Indonesia, and South Korea.[1] The aggregate exposure of foreign financial institutions in these Southeast Asian countries was significantly large, and the local banking and financial institutions were exposed to high exchange risk.

FIGURE 27.1 Asian Financial Crisis—Risk Proliferation Sequence



The currency depreciation in Thailand in 1997 had a domino effect on the values of other currencies in the region, resulting in substantial depreciation of these currencies. The currency depreciation in turn substantially raised the repayment obligation of local borrowers, which led to large-scale defaults and the consequential accumulation of nonperforming assets with the credit institutions that drove some of them to insolvency and liquidation. In assessing the risk, banks have to evaluate the economic condition and the fragility and vulnerability of the financial system of the countries that are relevant to their operating environment and recognize the contagion effect of adverse developments that can occur and the consequential risk that can emerge. If the country is dependent on the U.S. markets for exports, the exchange rate is aligned to the U.S. dollar or basket of currencies dominated by the dollar, and the financial exposures are largely in dollars, banks need to carefully evaluate the financial and trade links with the United States, assess the impact of adverse

developments in the United States on the local financial sector, and recognize the additional risk that may surface.

Credit Concentration Risk

The accelerated investment that took place in Southeast Asian nations during the 1990s was largely confined to the commercial and residential property markets in Thailand and Hong Kong, and some selected sectors in Malaysia, South Korea, and Indonesia. Huge borrowings from banks and financial institutions that included foreign funds financed the investments. Apparently, banks did not make realistic projections of demand for the properties and the industrial output, and soon excess capacity emerged in the relevant sectors that led to significant decline in property and output prices, which in turn affected the stock prices. Credit concentration in selective sector/industries coupled with the dilution of lending standards increased the credit risk of banks and other financial institutions and ultimately ended up in larger defaults and huge bad debts. Banks should be cognizant of the additional credit risk that might emerge from concentration of credit irrespective of the factors that lead to such concentration.

Market Risk–Driven Credit Risk

The Asian financial crisis evolved due to the shortage of foreign exchange from early 1997 to repay foreign currency loans taken by local banks, financial institutions, and private entities. Individual borrowers in the private sector, obtained foreign currency loans directly from banks and financial institutions abroad to finance their projects since foreign currency borrowing was relatively cheaper, but appropriate checks on the total inflow of foreign funds at the macro level were apparently not in place. This created an imbalance between the total foreign currency loan repayment obligation and the quantum of available foreign exchange. The unprecedented demand for foreign exchange against insufficient supply exerted downward pressure on the exchange value of local currency that led to currency devaluation in the affected countries and proportionately increased the repayment obligation of the borrowers, which they could not meet. For example, a borrower in Thailand who obtained a loan of U.S. $5 million for one year was required to pay 125 million Thai baht besides servicing of interest when the exchange rate was pegged at U.S. $1 = 25 baht. He or she would have to pay 200 million Thai baht if the exchange rate depreciated to U.S. $1 = 40 baht, which amounts to a 60 percent jump in repayment obligation corresponding to 60 percent decline in the value of the currency. The currency depreciation affected the capital market sentiments and the stock prices fell

sharply. The substantial increase in repayable amounts and the weakening of the capital market induced many borrowers to default, resulting in the accumulation of bad debts with the financial institutions that led to the closure of many of them. It was thus evident that a close link exists between credit and market risks, and the credit risk of banks will increase if the exchange rate depreciates and stock prices decline. Banks have to factor this phenomenon into their risk assessment framework.

Maturity Mismatch Risk

The banks and financial institutions in the affected countries highly exposed themselves to interest rate risk and liquidity risk as they funded long-term projects with short-term borrowings. Real estate development and industrial projects have gestation periods of more than a year to produce benefits and generate cash flows that enable the borrowers to service the debt, and consequently the projects require the backup of longer term loans. The available data show that the six Asian countries relied largely on loans and funds of less than one-year maturity to meet the demand for credit. “At the end of 1996, the proportion of loans with maturity of one year and less was 62 percent for Indonesia, 68 percent for South Korea, 50 percent for the Philippines, 65 percent for Thailand, and 84 percent for Taiwan.”[2] Short-term foreign currency debts to finance medium-term projects generate extra pressure on the exchange rate and the borrowing cost due to the possibility of procuring fresh funds at a higher interest rate. Banks therefore have to recognize an enhanced quantum of liquidity and interest rate risks from asset-liability maturity mismatches in their risk measurement framework, if they fund medium-term projects with short-term foreign funds.

Lesson

The fallout from the Asian financial crisis underlines the need for a coordinated approach between policy liberalization for promotion of free trade and liberal capital inflows and outflows, and enhancement of financial sector regulation and supervision. The authorities must assess the potential risks arising from reduction of controls on private sector direct access to foreign funds and disproportionate inflow of short-term foreign funds and put in place adequate checks and balances to prevent the occurrence of systemic crises in the financial sector.

27.3 THE IMPACT OF THE U.S. FINANCIAL CRISIS

The United States' financial crisis originated from a slump in the prices of residential properties beginning in October 2006, which were funded by commercial and investment banks, insurance companies, securities firms, and other mortgage companies. The residential property sector received the initial shock, but the negative effect soon spread to other sectors of the economy. The economic growth rate worsened and unemployment increased, and many of the home loan receivers started defaulting on repayment obligations, which led to accumulation of bad debts and acute liquidity shortages with institutional lenders and financial firms that became insolvent, merged with stronger institutions, or were bailed out by the government.

The financial crisis impacted the U.S. economy in two ways: the loss of individual and household wealth, and the loss of institutional wealth. The loss of individual and household wealth exceeded U.S. $11 trillion[3] through losses of home equity, household assets, savings, investment, and pension assets, much of the loss originating from speculative buying of residential properties and equities with borrowed money. The loss to the U.S. financial institutions was gigantic due to the defaults in repayment of home loans or return of investments in financial instruments that originated from securitization of home loans. Of the five largest U.S. investment banks, which had a combined debt of U.S. $4 trillion, Lehman Brothers went bankrupt, Bear Stearns and Merrill Lynch were taken over by other companies, Goldman Sachs and Morgan Stanley were bailed

out and converted to commercial banks.

The financial crisis that began in the United States in 2006 impacted the other financial centers and economies in Europe, Asia, and other emerging markets and swelled into a global economic and financial crisis. Many countries experienced a slowdown in economic growth, slump in exports, historic decline in commodity and stock prices, and fall in the values of domestic currencies. Banks and financial firms across the globe, notably in Europe, suffered as they had made large investments in the U.S. property and stock markets through borrowed funds. The fall in stock and property prices largely eroded household wealth, which had a substantial negative effect on consumption, and the crisis that started in the financial sector percolated to the real sectors of the economy. The investors started withdrawing their capital from the affected countries on account of shaken confidence, and the financial markets across the world started to shrink, choking the credit flows that are vital to sustain production and consumption. Several national governments announced relief packages to revive the economy and bail out the financial institutions burdened with bad debts.

27.4 THE U.S. FINANCIAL CRISIS CAUSES AND THE CONCOMITANT RISKS

The U.S. financial crisis, which spread to other countries and ballooned into a global crisis, did not occur solely from the financial system's exposure to subprime housing mortgages, nor did it happen in a quick period of time due to the sudden occurrence of uncontrollable factors. The crisis resulted from a combination of macro-level factors that emerged from the financial system and micro-level factors that arose from the wrong behavior of individual financial institutions and scant regulation of specific market segments. In the aftermath of the crisis it is not difficult to identify the causes; rather, it is beneficial to learn the lessons and leverage the causes to improve the risk identification and risk assessment methodology. The causes that led to the crisis and the concomitant risks are discussed in the ensuing section. In assessing the risk, banks have to evaluate the risk environment and recognize additional risks that originate from the environment.

Development of Credit Boom—Increased Volume of Credit Risk

One of the important causes of the crisis was multiple creation of credit in the economy through (1) a cheap interest rate policy over a long period of time, inducing people to borrow more, (2) increased flow of foreign funds, partly to finance current account deficits, (3) introduction of mortgage-related financial instruments that had potential for further credit creation, and (4) encouragement of a “shadow banking” system that acted as a parallel credit supplier along with the traditional commercial banking system. First, the easy availability of credit at unsustainably low rates of interest following the U.S. Federal Reserve monetary policy to keep the federal funds rate (the rate at which banks lend to each other overnight) low to counter the effect of the late 2000s recession and the rising property prices during 2000 to 2005 prompted people to borrow more and save less. The household debt swelled from U.S. $7.4 trillion at year end 2000 to U.S. $14.5 trillion in mid-year 2008. Second, beginning from the late 1990s significant amounts of foreign money flowed into the United States from fast-growing economies in Asia and oil-producing countries, which added to the money supply pool. The oil-producing nations and the emerging economies with trade surpluses invested large amounts of money in the United States (and Europe) that added to the lendable resources and made the borrowing inexpensive. Third, the creation of mortgage-backed securities or collateralized debt obligations out of the residential property mortgages held by the mortgage originators further stimulated the credit supply. Mortgage-backed securities transformed relatively illiquid individual financial assets into liquid and tradable capital market instruments and enabled the mortgage originators to replenish their funds and again generate credit through repetition of the process. Fourth, and perhaps the most significant, was the phenomenal growth of a shadow banking system that included investment banks, hedge funds, securities firms, and other financial institutions that could freely operate in the financial market, but were not subjected to regulatory controls like commercial banks, which enabled them to enormously leverage their capital resources. Besides, the traditional commercial banks also grew substantially in size by combining banking, insurance, and securities activities following the enactment of the Gramm-Leach-Bliley Act in 1999 that repealed part of the Glass-Steagall Act of 1933 that prohibited bank holding companies from owning other types of financial companies. In effect, two parallel large financial systems emerged that

enormously increased the credit supply capacity, which in turn lowered the cost of credit and made access to credit much easier. Easy credit condition backed by huge lendable resources is inherently risky in that it generates unfair competition between credit suppliers that impairs the due diligence process, and encourages people to borrow funds beyond their sustainable means and invest in riskier assets that contain greater potential for defaults.

Direction of Credit Deployment—Credit Concentration Risk

Credit concentration and unproductive use of credit have greater potential to generate higher probabilities of defaults, because excess capacity in created assets triggers a larger fall in asset values and absence of additional income from credit used for consumption impairs the debt-servicing capacity. The enormous amount of credit that was generated in the U.S. economy during 2000 to 2006 was primarily directed toward financing residential housing and consumption. The savings rate, which was around 8 percent of disposable income in 1990, declined to 2 percent during 2000 and further to almost zero percent in 2005, and concurrently, the household debt, which included mortgage debt and consumer credit, increased from 90 percent of disposable income in 2000 to 127 percent by 2008 (Federal Reserve: U.S. Bureau of Economic Analysis). The mortgage debt, which was less than U.S. $7 trillion in 2003, increased to U.S. $10.5 trillion at the end of 2008. Besides, a substantial portion of cash generated by the people through home sales when the market values of homes were rising, and the home equity that was obtained through refinancing of houses, were utilized to buy new homes. As a result, the borrowers were overstretched on their mortgage debts and did not have a cushion to service the debts even for a temporary period in the event of job loss or other stress situations. This type of situation would create enormous problem for the mortgage lenders and might precipitate a systemic crisis because of the preponderance of mortgage loans in the balance sheet of the financial sector participants. Banks have to take into account the additional risk that arises from credit concentration, particularly in the sensitive real estate sector where asset prices are volatile, analyze the income, savings, and debt profile of the people, and utilize the debt-income pattern in formulating business strategies and making decisions on loans.

Interest Rate Risk—Loss in Asset Value and Earnings

The U.S. financial crisis has shown that banks and financial companies face three types of interest rate–related risks. First, banks face reduction in earnings from the thinning interest spread between borrowing and lending as borrowing becomes expensive during the crisis period on account of liquidity shortages in the financial system. Second, they experience volatility in earnings due to frequent interest rate resetting as short-term borrowings are used to fund long-term mortgages, and third, they lose asset values from larger defaults on adjustable-rate mortgages in a rising interest rate scenario. Beginning in June 2003 the U.S. Federal Reserve followed a cheap money policy. The federal funds rate (the rate at which depository institutions lend money to each other overnight) was as low as 1.00 percent on June 25, 2003, and ranged between 1.25 percent and 2.25 percent during 2004, 2.50 percent and 4.25 percent during 2005, and 4.50 percent and 5.25 percent during 2006 and 2007 (Board of Governors of the Federal Reserve System). The interest spread on 30-year fixed-rate mortgages, which traditionally moved in tandem with the federal funds rate and was more than 4 percent in 2003, narrowed down to 1 percent to 1.5 percent when the federal funds rate started rising from 2006. The cost of interbank lending, which was negligible during 2005 and 2006, became dearer by more than 3 percent during the fall of 2008, indicating higher default risk perceptions in interbank settlements after the financial crisis began in 2007 and lower profit margins on mortgage loans. The mortgages, particularly the subprime mortgages, were largely funded through short-term and repo borrowings, exposing the banks to swings in interest earnings. When the crisis began in 2007, short-term borrowings became expensive for low-rated banks and financial firms, which compelled them to increase the rate on adjustable-rate mortgages to protect the interest spread and correspondingly, the repayment installments rose sharply, which pushed up the default rate and resulted in significant loss of earnings and principal on mortgage loans. It thus became clear that banks should assess the interest rate–related risks after careful analysis of the economic environment and current interest rate scenario and the direction in which it is likely to move on account of anticipated changes in government fiscal policy and central bank monetary policy.

Enhanced Credit Risk from Lax Lending Standards

The loan appraisal standard is the most critical factor to protect asset quality and minimize the incidence of credit defaults. Within the parameters of a sound

appraisal procedure, quantum of down payment and collateral, adequacy of repaying capacity, and appropriate documentation to protect the bank's right in the event of default are the three critical risk elements that influence the level of credit risk. During the credit boom period from the late 1990s to the mid-2000s, the mortgage loan appraisal standard deteriorated significantly. The golden principle of credit sanction, that is, “ability to repay,” was not observed, down payment on mortgage loans was significantly reduced or not insisted upon, and loan documentation was either defective or incomplete or even absent. The quality of loan appraisal suffered primarily for three reasons. First, the number of mortgage lenders was quite large. Besides the traditional commercial banks, some of which grew significantly large after the enactment of the Gramm-Leach-Bliley Act in 1999, large investment banks (Lehman Brothers, Bear Stearns, Merrill Lynch, Goldman Sachs and Morgan Stanley), the U.S. government–sponsored financial institutions (Fannie Mae and Freddie Mac), and a significant number of private mortgage companies and financial firms were participating and competing in the mortgage finance market. In their eagerness to enlarge the market share, the institutions relaxed their business rule standards and overlooked the hidden dangers.

Second, the lending institutions would have possibly assessed the risk exposure from mortgage finance as transitory as they did not want to hold on to their assets in the balance sheet; rather, they intended to sell them through the securitization process. The huge demand for mortgage-backed securities from global investors provided an easy route for the lenders to offer mortgage loans to individuals without observing appropriate loan sanction standards to make a quick profit. Most often, the borrowers were exempted from submitting proof of their stable source of income to service a long-term mortgage loan and the lenders sanctioned loans based on credit scores if only borrowers could prove that they had some balance in a bank account. Many lenders took the shortcut method to speed up the loan approval process and reduce the handling cost to clinch a deal by relying on automated underwriting software that processed loan applications very fast, weeded out the riskiest applicants, and selected the rest, many of whom would not qualify for loans under normal appraisal standards. The financial market environment also facilitated, to a certain extent, reckless lending as banks and other mortgage financiers could access short-term funds in the money market at ease and acquire large numbers of mortgage loans without screening the quality of those loans with the intent to get rid of them through the securitization process.

Third, in a booming home mortgage market, the mortgage brokers sought to leverage the earning prospect in selecting the borrowers against the quality of loans. The U.S. Financial Crisis Inquiry Commission (FCIC) Report revealed that from 2000 to 2003 the number of brokerage firms increased from 30,000 to 50,000, and the brokers originated 55 percent of mortgage loans in 2000, which increased to 68 percent in 2003. The brokers' incentive package consisted of brokerage fees and a yield spread premium. And as the FCIC Report puts it, "mortgage brokers had every incentive to seek the highest combination of fees and mortgage interest rates the market will bear."

Erosion in lending standards is likely to occur during a period of credit boom and inexpensive borrowing, and skipping of lending standards is fraught with the consequence of insolvency or bankruptcy. Banks need to upgrade their loan appraisal standards and undertake rigorous due diligence for loan sanction during periods of aggressive credit growth and strong market competition.

Increased Default Risk from Unfair Lending Practices

Before the U.S. financial crisis began, the mortgage originators, predominantly the brokers, adopted questionable lending practices to entice people to accept loans to buy homes. The U.S. FCIC Report brought out that lenders often booked high-risk mortgage loans knowing that the borrowers did not have the means or intention to repay. Many mortgage brokers did not disclose to the borrowers the sequence of installments they would have to repay over time if they held on to the mortgage. The brokers induced them to choose expensive loans in exchange for higher fees and yield spread premium from mortgage lenders even though many of them would qualify for cheaper prime loans. Most often the borrowers did not understand the loan structure that would escalate future repayment installments due to the higher interest cost ruling on interest reset dates. Besides, the mortgage brokers often pressured the asset value appraisers to inflate the values of homes or even overlook the defects or damages existing in homes.

Mortgage lenders created innovative credit products where higher future costs were hidden to lure people to buy homes, and people found sense in taking mortgage loans when the home values were rising and borrowing was inexpensive, since they were confident they could refinance the loans at a future date and extract home equity out of it. Lenders designed mortgage loans where repayment installments would be low in the initial years. Most popular among

the innovative credit products was the adjustable-rate mortgage (ARM) that offered two options—"pay interest only" during the initial years and "pay as you like" where the monthly payment could be lower than the interest amount due, and the unpaid interest is added to the principal, leaving the borrowers to owe more than the original loan amount. According to available data and survey reports, 23 percent of mortgage loans taken in 2005 were interest-only ARMs, and one-third of ARMs taken out between 2004 and 2006 began with "teaser rates" below 4 percent. The FCIC Report mentioned that "a study by two Federal Reserve economists estimated at least 38 percent of borrowers with adjustable rate mortgages did not understand how much their interest rates could reset at one time, and more than half underestimated how high their rates could reach over the years." The Inquiry Commission observed that "the starting point for many mortgages was a mortgage broker. These independent brokers, with access to a variety of lenders, worked with borrowers to complete the application process." The unfair lending practices adopted by lenders ultimately led to a spate of defaults in loan repayments and accentuated the financial crisis.

Banks should keep in mind that if potential borrowers assess their repaying capacity and use their own judgment to accept a loan, it will indirectly help to reduce the incidence of defaults, provided they maintain transparency in dealings. In minimizing the incidence of credit defaults, banks must clearly explain the credit product they offer and the terms of sanction to enable the loan seekers to assess their loan servicing capacity and exercise restraint.

Increased Volume of Hidden Credit Risk from Subprime Lending

Subprime loans are loans to borrowers who have a poor credit record that includes delinquency in payment of past debt and whose credit ratings convey a higher level of risk. Subprime loans have a higher risk of defaults than prime loans, and consequently they carry a relatively higher interest rate. It is, however, not correct to assume that subprime loans originate from abusive lending practices, though there can be exceptions. The objective of promoting subprime loans within the U.S. financial system was to enhance the credit accessibility of borrowers who belonged to the low-and middle-income category and who needed loans to buy their homes.

Substantial increases in monthly repayment installments on account of rising interest rates and the decline in value of homes beginning in 2006, which made it

difficult for homeowners to refinance their mortgages to extract home equity, triggered large-scale defaults in repayment of mortgage loans, particularly subprime loans. The unfair practices adopted by mortgage financiers often made these loans more default prone. Most subprime loans taken were at adjustable rates and were reset after two to three years at rates higher than the initial rates, and often, these loans had an interest-only payment option and included a prepayment penalty provision to prevent borrowers from seeking refinancing from other institutions at less expensive rates.

The accumulation of nonperforming mortgage loans, particularly subprime loans, in the balance sheets of large financial institutions caused a severe liquidity crisis within the U.S. financial system that precipitated the financial crisis. The phenomenal growth in subprime loans occurred during 2004 to 2006 when home prices were escalating as the lenders with foreclosure rights were comfortable with customers whose poor credit histories had prevented them from buying houses in the past. Large commercial and investment banks, thrift organizations, and independent mortgage lenders substantially increased their involvement in the origination and securitization of subprime mortgage loans. These institutions enlarged their mortgage finance activities through creation of new establishments or acquisition of other mortgage lending companies or providing larger credit lines to other mortgage originators. Many of them increased their scale of operations through involvement in the entire chain of mortgage finance—mortgage origination, mortgage financing, collecting and securitizing subprime loans, and selling securities to investors, including global investors. Press reports revealed that the subprime mortgage loan proliferated during 2004 to 2006 and stood at U.S. $1.3 trillion as of March 2007, and about 25 percent of subprime mortgages, mostly ARMs, were delinquent by April 2008.

Banks are partners of economic growth and they cannot distance themselves from financing the poor and the needy due to societal obligations. Subprime loans, or for that matter, loans to the poor sections of society deteriorate in quality faster during the economic recession because of decline in income. Banks can minimize the impact of loans to the poor sections of the society through appropriate due diligence for borrower selection and diversification of credit portfolio to avoid loan losses arising concurrently from all sectors during an economic recession. Additionally, they have to intensify monitoring and control over nonprime loans for early remedial action and create larger loan loss provisions through lower payouts on dividend on equity.

Underestimation of OTC Derivatives Risk

The phenomenal growth of the securitization market during the 1990s and up to early 2006 in which the investment banks joined the commercial banks and thrift institutions provided a boost to the mortgage finance market. These institutions became more aggressive as it provided opportunities to do larger business with lesser capital requirements and lesser reliance on deposits since securities could be converted into cash soon. Securitization backed by the use of "over-the-counter" (OTC) derivatives significantly increased the flow of investor resources into the mortgage finance market and enlarged the kitty by relaying those resources from one participant to another operating in the market. Financial instruments such as mortgage-backed securities (MBSs) and collateralized debt obligations (CDOs) were created out of residential mortgages that grew day by day when home prices were rising and sold to investors who relied on credit default swaps (CDS), an OTC derivative, that worked as credit insurance and protected the investors' interest against defaults.

Financial institutions acquired mortgage loans from numerous mortgage finance providers, created securities backed by these mortgages, got them rated by credit rating agencies, grouped these loans into different tranches as per assigned risk grades, and sold these securities/bonds to investors who got protection from CDS writers, credit insurers, and underwriters. MBSs that were rated low in the rating scale depicting high risk were separately packaged and converted into CDOs, which were again rated and sold to investors, and this process was repeated by repackaging low-rated and high-risk tranches of CDOs. There was no dearth of investors for high-risk bonds as these carried higher yields and protection against default.

The use of MBSs and CDOs increased enormously during the years before the crisis, but the commercial and investment banks failed to assess correctly the potential risk from these securities and faced tremendous problems when the crisis began to unfold. Securitization acquires investor confidence if payments due on MBSs and CDOs are regularly serviced, but in the event of defaults by borrowers on monthly mortgage payments, banks face severe liquidity problems if they build up the mortgage credit portfolio through short-term market borrowings. Market reports revealed that CDOs aggregating U.S. $450 billion were issued from late-2005 to mid-2007 out of which about U.S. $350 billion were in default in early 2009 and the average recovery rate for senior-tranche

CDOs were 32 percent and for mezzanine CDOs 5 percent.

The mortgage finance process in the United States created risks and uncertainties for banks and other financial institutions at three separate layers—risk from the quality of mortgage loans, risk from the quality of ratings and reliability of credit rating agencies, and risk from the financial capacity of CDS writers, credit insurers, and underwriters. Banks followed two types of models: originate-to-hold and originate-to-distribute (U.S. FCIC Report). They were more careful in providing mortgage finance under the originate-to-hold model where the loans remained in their books till maturity because they would incur credit loss in the event of default, but they were carefree in picking up loans under the originate-to-distribute model where they securitized the loans and sold to investors. And, even in the latter situation though it might not involve direct credit loss, it carried reputation risk if many of the securitized loans eventually turned bad. In fact, mortgages financed under the originate-to-distribute model contained a large quantum of subprime loans that contributed to the U.S. financial crisis because of subsequent defaults in mortgage payments. Banks faced significant credit risk because the quality of loans they purchased from mortgage originators was poor. It is thus clear that in cases where banks acquire loans and receivables from other financial institutions for securitization or make investments in securities issued by special-purpose vehicles established by other institutions, they will have to set up a mechanism to exercise a sample check of the quality of underlying assets to protect themselves from undue credit risk. Likewise, they should ensure the quality of loans they sell to other special-purpose vehicles to avoid reputation risk.

The second layer of risks originated from the credit rating agencies, which apparently did not exercise appropriate due diligence in assigning ratings to MBSs and CDOs created by financial institutions. The published reports revealed that the rating agencies largely depended on the information provided by the bond-issuing firms, often helped clients on how to structure the securities in order to get higher ratings, relented to the pressure from financial firms that paid hefty fees for the ratings, and lacked resources to undertake the ratings at the scale they did. The financial meltdown began when the ratings were downgraded within a short period of time and defaults started surfacing (“U.S. Congressional Research Service Report on Global Financial Crisis: Analysis and Policy Implications,” October 2009 and the U.S. FCIC Report, January 2011). In a market where credit volumes are large in number and by amount, and rating agencies compete among themselves for a larger market share, it is necessary for

banks to cross-check the ratings through their internal risk rating model and also check whether the rating output would hold good in crisis conditions.

The third layer of risk came from OTC derivatives, particularly CDSs that fueled the securitization pipeline and exposed the large financial institutions to an enormously high level of risks without the backup of adequate capital and reserve funds. OTC derivatives are riskier than exchange-traded derivatives like futures and options, because the OTC market is neither transparent nor adequately regulated. The introduction of CDSs in the U.S. mortgage finance market accentuated enormously the leveraging capacity of derivative traders that included large commercial banks and investment banks and insurance companies. These institutions substantially increased their leveraging ratios and engaged themselves in a high volume of derivative trading business with thin capital, taking advantage of two favorable developments. First, OTC derivatives were deregulated and exempted from supervisory oversight in the United States beginning from the year 2000, and second, the Market Risk Amendment to the Basel I Capital Accord enabled banks to hold lesser capital against market or credit risk if the risks were hedged through the use of derivative products. The OTC market expanded enormously due to the higher leveraging capacity of derivative traders in a softened regulatory environment; the global outstanding of OTC derivatives increased from U.S. $95.2 trillion to U.S. $672.6 trillion between year-end 2000 and mid-2008 (FCIC Report).

A CDS is an unregulated OTC derivative, and the purchasers of CDSs transfer the risks to the sellers of CDSs and get protection against the financial loss that may arise on the debt (mortgage) in exchange for periodic payments made to the sellers during the life of the swap, but the sellers of CDSs would face huge losses if a credit event occurs that binds them to pay. CDSs supported and accelerated the mortgage loan securitization process and contributed significantly to the financial crisis. The holders of CDOs purchased CDSs to take protection against the default risk of outstanding mortgage loans, particularly subprime loans. During the housing boom, commercial banks, investment banks, and insurance companies sold CDSs of enormous amounts to earn profits without the backup of adequate capital and reserves. The values of underlying assets covered by CDSs outstanding globally increased to U.S. $58.2 trillion at the end of 2007 from U.S. $6.4 trillion as of the end of 2004. When the house bubble burst and mortgage defaults rose sharply, the derivatives market almost collapsed, and large investment banks, bank holding companies, and insurance companies incurred massive losses from derivatives exposures and

faced a severe liquidity crisis that precipitated the financial crisis.

In managing risks against derivatives exposures banks will have to take two precautions. First, banks will have to sense the quality of underlying assets when selling credit default swaps through evaluation of corporate governance practices of counterparties including transparencies and disclosures. Likewise, while purchasing credit derivative contracts for risk mitigation, banks will have to assess the market reputation and track record of counterparties, the volume of their derivative exposures vis-à-vis capital and reserves, and their overall financial health. Banks should establish derivative-type limits to prevent occurrence of financial shocks in crisis scenarios. Second, banks should avoid building up risk concentration from a particular type of derivative contract and assess the risk from all types of derivative exposures in an integrated manner instead of dealing with each type of derivative on a stand-alone basis.

Regulatory and Corporate Governance Risk

The U.S. financial sector grew very rapidly during the 1980s and 1990s and several individual financial units became systemically very large by acquiring other financial firms. Besides, a phenomenal growth of the shadow banking system has taken place since 1990 that includes investment banks and other parallel financial units that worked like banks but were not regulated as per standards applicable to depository institutions. Again, the bank holding companies enlarged their activities from traditional commercial banking to investment banking, insurance, and securities trading activities after the enactment of the Gramm-Leach-Bliley Act in 1999. In the process, two parallel banking systems of enormous scale emerged, but regulatory control and supervisory oversight were not tightened to monitor the composition of risk profiles and volume of risks of systemically large financial institutions. Instead, regulatory requirements were softened to grant greater freedom of operations in order to support the housing mortgage finance market.

The regulatory environment moved from regulator-dictated control toward self-styled regulation that gave high leeway to investment banks, first to significantly increase their leverage ratio (ratio of debt or asset to equity), and second to focus on securitization and derivatives trading that involved high risk but were not backed by adequate capital. The investment banks were allowed to work out their own capital requirements based on their internal models, which were lower than the capital level applicable to commercial and retail banks. Besides, the relaxation granted in 2004 in the net capital rule requirement to broker-dealers (to hold a minimum quantum of liquid assets to meet all their obligations to customers in an orderly manner) enabled the investment banks to further increase their leverage ratio. Because of the regulatory relaxation, the five largest investment banks, the largest insurance company (American International Group), and two large government-sponsored entities, Fannie Mae and Freddie Mac (which were also granted permission to maintain low capital against large business), incurred a high level of debt against too little capital, particularly short-term debt, and provided long-term mortgage finance that included large amounts of subprime lending and thus, exposed themselves to high liquidity risk in addition to interest rate risk. Besides, these institutions sold enormous amount of CDSs without the backup of collateral or setting aside additional capital to bear losses from high-risk activity or without hedging their

risks. When the home values started declining and borrowers defaulted on their mortgage payments, and claims arose against CDSs, a liquidity crisis set in and the institutions failed to repay their short-term debts, which had a cascading effect across the financial sector because of interconnection between counterparties.

The systemic crisis that developed in the United States was primarily due to inadequate regulation, deficiency in the financial institutions' risk management system, and failure by the corporate management to observe corporate governance codes of conduct. First, the financial services regulation did not cover all segments of the financial sector and financial markets, or where it covered, the standard was not rigorous in relation to the enormity of the size of the institution and the complexity and the riskiness of the credit products they used. The regulatory authorities were apparently not cognizant of the systemic risk that could arise from the solvency and liquidity crisis occurring in one institution and quickly spreading across the financial sector on account of significant interconnection between counterparties.

Second, the banks and other financial institutions did not take into account the high level of maturity mismatch between assets and liabilities and depended too heavily on repo and the short-term money market to fund assets and meet day-to-day liquidity. They ignored the concentration of risk in the housing finance sector that contained potential for high losses in the event of a fall in asset prices. They also did not take adequate precautions against unrestricted risk exposure, undue leveraging, and exclusive reliance on short-term borrowing to meet liquidity.

Third, inadequate corporate governance practices prevailing in the institutions exposed the financial sector participants to high risks from interbank dealings as there was lack of transparency and disclosure about the extent of their involvement in subprime mortgages and risky credit default swap derivatives. Banks and financial institutions adopted the wrong business strategy to achieve high business growth with short-term borrowed funds and assumed huge risks from derivatives trading without the backup of adequate capital and reserves, particularly when the derivatives trading was unregulated, and in the process failed to safeguard the interests of depositors, debt holders, shareholders, and the regulators.

Lesson

The U.S. financial crisis has underpinned the need for reform in financial sector regulation and supervision across the world, which must address concerns both at the national and the international levels. The U.S. experience has shown that there is a systemic risk in exempting from regulation or inadequately regulating nonbank financial institutions that raise public funds through different means to conduct their business, since a close connection exists between regulated commercial banks and unregulated or underregulated financial entities. At the national level, the initiative would include the establishment of a mechanism to identify early the unsustainable financial risk brewing up in any wing of the financial sector and initiate corrective action in time to prevent the transfer of hidden risk to other financial sector participants. The regulation and supervision must cover all financial entities that comprise the financial architecture of a country and all financial markets that include the derivatives trading market, and achieve a minimum level of comparability in regulatory standards. On the one hand, the exemption of nonbank financial entities from stricter bank-applicable capital standards and business rules and limits will offer greater scope to them to engage in highly risky behavior, and on the other, the relaxation of standards for government-sponsored entities will create a moral hazard.

The financial crisis in the United States spread from individual institutions to other financial sector participants, and to other economies and global financial centers, particularly in Europe and Asia. The spread of the crisis calls for attention to two major issues which have been highlighted in the U.S. Congressional Research Service Report on “The Global Financial Crisis: Analysis and Policy Implications,” (October 2009). First, the report has underlined the need for broad compatibility of the regulatory framework and supervisory arrangements between the United States, Europe, and other large financial centers. But, in general, it is necessary to achieve some degree of uniformity in regulatory standards and supervisory practices among the countries to restrict financial operators to concentrate in business in centers with lenient standards, since risks have a contagion effect. Second, the report speaks about the need for a systemic or a single regulator with oversight responsibility over each line of financial service: banking, insurance, securities, and futures. Indeed, there is a case for a single regulator for the financial system as a whole who will have centralized information on all financial sector entities and financial market

segments and can act in an integrated manner to minimize the systemic risk.

The U.S. financial crisis has revealed that potential for systemic risk is greater if inequitable regulatory standards exist between commercial banks, investment banks, and other nonbank financial entities, all of which had rights to raise funds from public and market, provide finance, securitize assets, and sell derivatives. The crisis has brought out the following shortcomings in risk management and corporate governance practices:

- Lack of transparency in underwriting standards.
- Lack of transparency of criteria adopted by rating agencies.
- Lack of adequate disclosure on mortgage originators and quality of underlying assets that were securitized.
- Lack of information on the quality of securities that were protected through credit default swaps.
- Lack of protection of borrowers who were victims of unfair lending practices.

Responses

The U.S. authorities passed a comprehensive law, called the Dodd-Frank Wall Street Reform and Consumer Protection Act, in July 2010 to promote financial stability, address all regulatory and supervisory issues and concerns that arose during the financial crisis, protect consumers from unfair lending practices, and abolish the system of bailing out sick and failing financial institutions. The government brought in sweeping changes in financial regulations, created new agencies, and amended roles and powers of existing regulatory and supervisory agencies in order to assign specific responsibility to different aspects of financial regulation and intensify supervision over systemically big financial institutions. Important dimensions of the new financial regulation and supervision regime are:

1. Creation of a new agency to evaluate systemic risk and respond to emerging threats.

2. Creation of uniform standards for risk management by systemically significant financial institutions and enhancement of the role of the Federal Reserve Board to supervise risk management standards.

3. Improvement in regulation of bank holding companies and depository institutions.

4. Significant enhancement in regulation of the shadow banking system including hedge funds and investment intermediaries.

5. Improvement in transparency of OTC derivatives and routing credit derivative transactions including credit default swaps through exchanges or clearinghouses.

6. Establishment of specific procedures for orderly liquidation of sick and unviable financial institutions.

7. Improvement in accountability and transparency of credit rating agencies through stricter regulation and better oversight.

8. Removal of unfair mortgage finance practices through establishment of national underwriting standards and standardization of fees/compensation for residential mortgage originators.

9. Providing consumer protection through screening of consumer financial products and services, attending to consumer complaints, and promoting financial literacy among consumers.

10. Strengthening corporate governance practices.

27.5 BASEL COMMITTEE ON BANKING SUPERVISION RESPONSE (BASEL III)

The Basel Committee reform package seeks to address the lessons emerging from the financial crisis, in particular the inadequacy and quality of capital to absorb losses during periods of financial stress and economic slowdown, the vulnerability of the risk management framework, and the insufficiency of disclosures under the corporate governance system. The Committee has addressed the main issues relating to the excessive leveraging of capital by the banking system, the absence of liquidity buffers, and the underestimation of risks from trading, securitization, and derivatives activities that contributed to the U.S. financial crisis. It has recommended "stronger capital and liquidity standards"[4] to enhance the resilience of the banking system, particularly systemically significant large financial institutions, during periods of economic and financial stresses. The reform package seeks to strengthen the micro-prudential regulations governing individual financial institutions and also focuses on macro-prudential issues to reduce the systemwide shocks and "the risk of spill over from the financial sector to real economy." The macro-prudential measures are designed to address "the risk of systemically important global banks arising from their interconnectedness, the challenges around domestic and global resolution, and the moral hazard associated with the perception of too-big-to-fail."

The Basel Committee has underlined the need to redefine regulatory capital that should have a minimum common equity component of 7 percent of risk-weighted assets by 2019, including a capital conservation buffer of 2.5 percent with the objective of improving the loss-absorbing characteristic of capital. The total capital including the conservation buffer should increase in phases from 2016 to reach 10.5 percent of risk-weighted assets by January, 1, 2019, and the Tier I component to 6 percent by 2015. Besides, the capital enrichment framework includes a proposal to create a countercyclical buffer ranging from 0 to 2.5 percent in the form of common equity in tune with the national circumstances to protect the banking system from systemwide buildup of risks during periods of excessive credit growth.

The Basel III recommendations require banks to maintain higher capital to cover greater risks inherent in securitization and resecuritization exposures, exposures to off-balance-sheet vehicles, and interfinancial sector exposures. The

Committee has advocated that banks should strengthen their counterparty credit risk assessment framework and recognize higher risks from greater possibilities of counterparty rating downgrades and decline in credit quality during periods of financial stress and economic slowdown. They should adopt a stronger value-at-risk model to quantify risks from trading activities and structured credit products held in the trading book that amplify during stress situations and "conduct more rigorous credit analyses of externally rated securitization exposures."

The Committee has recommended that banks should enhance their liquidity standards through introduction of a liquidity coverage ratio that requires them to hold high-quality liquid assets to meet liquidity requirements during stressed situations and maintain a net stable funding ratio in the longer term that prevents development of structural mismatches between assets and liabilities. It has emphasized the need for greater disclosure on securitization exposures, sponsorship of special-purpose vehicles for securitization, and remuneration practices as part of the obligation under the corporate governance codes. "The Committee continues to work on a range of initiatives important to bank resilience," but banks in the meanwhile should review the composition of the trading book to align it with the varying risk sensitivity of different types of exposures and strengthen the risk assessment methodology of trading book exposures with a focus on securitization activities and derivatives exposures, and develop internal capabilities for counterparty ratings for investment in the securitization market. Banks should put in place a reasonable leverage ratio against on-and off-balance-sheet exposures, redefine large exposures, and fix product-wise business limits to avoid risk concentrations.

27.6 SUMMARY

The Asian and the United States' financial crises have shown that severe risks can arise from incidents happening in other countries due to the close linkage between financial markets across the world. Consequently, in their risk measurement framework, banks must recognize the contagion and domino effects of risk events that can take place in other countries.

The investment boom in Southeast Asian economies was concentrated in a few sectors and largely funded by foreign debts that contained high potential for credit risk and exchange risk. The investment concentration in selective industries created excess capacities that led to a slump in prices. The subsequent depreciation in exchange rate significantly increased the borrowers' obligation to

repay foreign debts and led to a spate of defaults that precipitated the crisis.

Banks should evaluate the fragility and vulnerability of the financial markets in countries that are most relevant to their operation, and recognize the contagion risk that can occur. They should take into account the additional risk from credit concentration irrespective of the sector/the industry since concentration leads to larger defaults through sudden fall in asset prices.

Close link exists between credit and market risks, and credit risk of banks will increase if exchange rate depreciates and stock prices decline. Likewise, liquidity and interest rate risks will increase from asset-liability maturity mismatches where banks fund medium-term projects with short-term foreign currency funds. Banks should be cognizant of these risk factors in their risk assessment framework.

The U.S. financial crisis has shown that easy credit conditions backed by huge lendable resources is inherently risky in that it generates unfair competition between credit suppliers, which impairs the due diligence process and increases the incidence of defaults. Besides, credit concentration in a sensitive housing sector where asset prices are volatile contains greater potential to cause systemic instability.

Banks and financial institutions face three types of interest rate related risks: reduction in earnings from thinning interest spread when regulator driven interest rates rise, increase in cost of borrowed funds when liquidity shortages occur during periods of financial stress and interest rates are reset frequently, and loss in asset values due to rising interest rate.

Relaxation of lending standard and adoption of unfair lending practices are fraught with high risk of loan defaults and eventual insolvency or bankruptcy. Banks need to strengthen due diligence for loan sanctioning during periods of aggressive credit growth and explain the implicit terms of credit to the borrowers.

Subprime loans carry a higher risk of default than prime loans, and a relatively higher interest rate. The unfair practices adopted by lenders make subprime loans more default-prone. The accumulation of subprime loans in the balance sheets of large financial institutions and subsequent defaults in repayment caused severe liquidity crisis within the U.S. financial system that precipitated the financial crisis.

Banks should assess the risk from the quality of mortgage loans they acquire for securitization, risk from the quality of ratings assigned by external rating

agencies, and risk from the credit default swap writers and credit insurers and underwriters. They should exercise a sample check of the quality of underlying assets they collect for securitization to protect themselves from undue credit risk and ensure the quality of assets they sell to others to avoid reputation risk.

OTC derivatives are riskier than exchange traded derivatives because they are not adequately regulated. The sellers of credit default swaps will face huge losses if a credit event occurs that binds them to pay. Banks will have to sense the quality of underlying assets when selling credit default swaps and assess the track record of counterparties while purchasing credit derivative products for risk mitigation.

Banks should establish derivative-type wise limits to prevent the occurrence of financial shocks in crisis scenarios. They should avoid risk concentration from a particular type of derivative contract and assess the risk from all types of derivative exposures in an integrated manner instead of dealing with each type of derivative on a stand-alone basis.

The U. S. systemic crisis occurred primarily due to the deficiency in the financial institutions' risk management systems and the failure by the corporate management to observe the corporate governance codes of conduct.

The Basel Committee on Banking Supervision in its report of October 2010 (Basel III) has underlined the need to increase the level of capital in phases and improve its quality to enhance the resilience of the banking system. The Committee requires banks to recognize higher risks from trading book exposures and decline in credit quality during stressed situations, and to adopt higher disclosure standards on securitization and derivatives exposures and remuneration practices.

NOTES

1. “The U.S. CRS Report: The 1997–98 Asian Financial Crisis,” February 1998.
2. “The U.S. CRS Report: The 1997–98 Asian Financial Crisis,” February 1998.
3. “The U.S. Financial Crisis Inquiry Commission Report,” January 2011.
4. Quotes in this section are taken from the Basel Committee's response to the financial crisis: “Report to the G-20,” October 2010. Readers may refer to the full text available at the BIS web site (www.bis.org), free of cost.

About the Author

The author had significant exposure in banking regulation and supervision in the Reserve Bank of India. He was the former chief of the Reserve Bank of India's department of banking operations and development, which deals with banking policies and regulations, including those that relate to commercial banks' risk management systems. Later, the author worked as the head of a project implementation group of the Reserve Bank of India to introduce the risk-based bank supervision system. He subsequently worked as a risk management consultant to two commercial banks in India for four years. The author was a member of the faculty of the Reserve Bank of India training college for about a decade. He is a professional speaker on risk management in commercial banking.

The author had a brief association with the International Monetary Fund, where he rendered his services as a technical expert on bank supervision. During his service in the Reserve Bank of India the author visited several countries in Europe and Asia, besides the United States, and had interactions on bank regulation, supervision, and risk management practices with the regulatory and supervisory authorities.

This book is an outcome of the author's experiences in the Reserve Bank of India as the overseeing authority on implementation of risk management practices and procedures by the banking system and his experiences in commercial banks as a risk management consultant that included practical work in the field.

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