V MANAGING CAPITAL AND RISK

5.1 Banking institutions are exposed to a diverse set of market and non-market risks. Banking, by its very nature, is an attempt to manage multiple and seemingly opposing needs, and that makes banks 'special'. Banks stand ready to provide liquidity on demand to depositors through chequeing accounts and extend credit as well as liquidity to their borrowers through lines of credit (Kashyap, Rajan and Stein, 1999). In the process, banks face several risks for which they need to take protective measures to ensure that they remain solvent and liquid. Thus, robust risk management and strong capital position are critical in ensuring that individual banking organisations operate in a safe and sound manner, which, in turn, is crucial for maintaining the stability of the financial system and fostering economic growth.

5.2 The major goals of financial sector policies are to maintain financial stability and also enhance access to financial services. These two goals are mostly mutually reinforcing. Through the financial stability goal, policymakers aim at protecting savers, investors and other economic agents from economic disruptions, which help in ensuring access to financial services, including unprivileged sections of society. Ensuring financial stability calls for greater soundness of the system and more effective risk management practices. Understanding the risks in the system and managing them, and earmarking sufficient amounts of capital, increases the stability of the system. More generally, strong capital helps banks absorb unexpected shocks and reduces the moral hazard associated with deposit insurance.

5.3 Traditionally, banks held capital as a buffer against insolvency, and liquid assets – cash and securities – to guard against unexpected withdrawals by depositors or drawdowns by borrowers (Saidenberg and Strahan, 1999). Risk is the potential of both expected and unexpected events having an adverse impact on banks' capital or earnings. Capital adequacy ratios are intended to ensure that banks maintain a minimum amount of own funds in relation to the risks they face so that banks are able to absorb unexpected losses. Thus, the expected losses are covered by a combination of product pricing, business revenue and loss provisions, and the unexpected losses by capital funds of the bank. Capital ensures that unanticipated market situation or deterioration in borrower credit quality does not present any serious challenge to bank's solvency. Capital does not, however, seek to ensure that banks would be immune from failure[1].

5.4 Theories suggest that banks' choices of portfolio risk and capital are interrelated. A sound risk management process is the basis for an effective assessment of the adequacy of a bank's capital. For depository institutions, it is, therefore, necessary that the economic substance of risk exposures is fully recognised and incorporated into the system. The estimates of risk must translate into robust capital assessments.

5.5 Capital and risk management are of interest not only to supervisors, but also to all stakeholders, including bank owners, employees as well as depositors and lenders. The owners are inherently interested in the continued existence of the bank as they expect a reasonable return on their investments and wish to avoid capital losses. Furthermore, the bank's employees, depositors and lenders also have a stake in its survival. This is because, in case of bank failure, the bank is unable to repay all of its depositors and lenders in full and on time and there is a possibility that these parties may have to bear losses. Similarly, the credibility of bank employees is questioned in case of bank failure. The individual interests of these groups are not necessarily congruent; however, all parties are interested in ensuring that the institution does not take on risk positions that might endanger its continued existence. The traditional objective of capital regulation has been to reduce bank failures and to promote banking stability. Another important objective has been to reduce losses to depositors' and the deposit insurer when a bank fails. Regulators are particularly sensitive to deposit insurance losses because the Government not only often provides insurance through formal programmes, but also, in the absence of *de jure* coverage, acts as the insurer of last resort.

[1] Working Group on Capital Adequacy, BIS, 2000, page 2.

5.6 Even though regulators all over the world have been concerned about bank capital, there were no formal regulations that specified minimum capital ratios in the pre-Basel phase, *i.e.,* before the signing of the Basel Capital Accord in 1988. At the beginning of the 1980s, regulators became increasingly dissatisfied with many banks' capital ratios, especially those of the larger banking organisations and bank holding companies. As a result, regulators in the US specified minimum capital-to-asset ratios for all banks under their jurisdiction in 1981; the remaining banks were required to raise their capital-to-asset ratios; and were brought under numerical standards by 1983 (Wall, 1989). The banking industry in the US increasingly raised its capital ratios in the years subsequent to the adoption of the 1981 guidelines. However, the simplistic use of capital-to-total assets ratio as a measure of risk was called into question as banks adjusted their portfolios away from less risky and towards riskier assets. During the 1980s, however, banks in the US and western Europe reduced their investment in high liquidity, low-return assets and increased their exposure to potentially risky off-balance sheet transactions. Thus, the capital-to-total assets ratios that might have been adequate in the early 1980s lost their importance later in the decade. As a consequence, several countries adopted the risk-based capital standards that were popularised during this period under the aegis of the BIS.

5.7 The signing of the Basel Accord by 12 countries (all G-10 countries *plus* Luxembourg and Switzerland) in July 1988 was a landmark in the area of capital regulation. The Basel Accord, 1988 was designed to establish minimum levels of capital for internationally active banks. Its simplicity encouraged over 100 countries across the world not only to adopt the framework, but also apply it across the entire banking segment without restricting it to the internationally active banks. However, developments during the 1990s reduced the effectiveness of the 1988 Basel Capital Accord. Significant advances in technology and financial product innovations reshaped the role played by banks in the credit process. Core institutions started to move away from traditional buy-and-hold strategies to an originate-to-distribute or market-based model.

5.8 The worldwide trend towards deregulation of the financial sectors added to the widespread banking problems of many countries. Furthermore, with the increasing globalisation of the financial systems, concerns about bank soundness assumed heightened importance for international financial stability in general, and banking sector stability in particular (BIS, 2000). Hence, banking organisations' capital ratios became the focus of regulatory and supervisory attention. Recent market events have also highlighted emerging new risks for the banking system, which have created some intricate risk management challenges. As banks have extended their range of activities from basic lending to holding securities, trading complex instruments, providing liquidity facilities, engaging in off-balance sheet transactions, and conducting other financial activities, and as they have involved themselves in new markets, the risk management challenges have multiplied. As a result, bank supervisors are also taking keen interest in promoting strong risk management practices within banking organisations. At the heart of the contemporary banking supervision is an assessment of the quality of banks' procedures for evaluating, monitoring, and managing risk. Supervisors have also started to evaluate banks' internal models for determining economic capital which helps banking organisations link risk to capital as also to compare risks and returns across diverse business lines and locations.

5.9 In line with the international best practices, India has also been strengthening capital adequacy framework and risk management practices of banks. These, however, have varied over different banking segments, depending on their size and complexity. Basel I norms for scheduled commercial banks, which constitute the largest segment of the banking system, were introduced in 1992. These norms, subsequently, were also applied to urban co-operative banks. Internationally active domestic banks and foreign banks have already moved over to Basel II tailored to country-specific conditions, while other scheduled commercial banks are in the process of moving towards adoption of Basel II. India has put in place a comprehensive risk management system to take care of credit risk, market risk and operational risk, for enhancing financial stability.

5.10 This chapter is organised in seven sections. The introductory section is followed by a section on the relationship between risk and capital in Section II. Section III focuses on the international convergence of capital measurement and capital standards. Section IV delineates several issues relating to implementation of Basel II framework, including its benefits, limitations, its likely impact, challenges in implementation as well as the progress of its implementation in major countries. The policy developments in the area of managing capital and risk in the Indian context are discussed briefly in Section V. Besides, this section also includes the progress in implementation of Basel II risk management

practices, asset liability management and corporate governance in the Indian context. An analysis as to how banks managed capital in the post-reform period and an assessment of capital requirements in each of the next five years (2007-08 to 2011-12), with special focus on public sector banks, are also presented in this section. Section VI sets out the issues of relevance and challenges for the future. Section VII concludes the chapter.

II. RISK AND CAPITAL

5.11 The risks associated with providing banking services differ by the type of service rendered. Risk is the danger of an adverse deviation in the actual result from an expected result. This interpretation of risk can be expressed as a probability distribution, with future results fluctuating around an expected level. The actual risk to the bank thus consists of the possibility that the result will deviate negatively from the expected value due to random fluctuations. Risk is inherent in banking business. Banks that run on the principle of avoiding risks cannot meet the legitimate credit requirements of the economy. On the other hand, a bank that takes excessive risks is likely to run into difficulty. Credit risk is the most common risk in banking and possibly the most important in terms of potential losses. The default of a small number of key customers could generate very large losses and in an extreme case could lead to a bank becoming insolvent. This risk relates to the possibility that loans will not be paid or that investments will deteriorate in quality or go into default with consequent loss to the bank. Credit risk is not confined to the risk that borrowers are unable to pay; it also includes the risk of payments of the bills being delayed beyond the maturity time, which can also cause problems for the bank. Changes in the banking industry and financial markets have increased the complexity of banking risks faced by the banking institutions. Therefore, apart from some traditional risks, banks have also come to face several new risks (Table 5.1).

5.12 Having identified the risks, the management of risk in a financial institution consists of three elements - (i) the accurate measurement and monitoring of risk; (ii) controlling and pricing exposures; and (iii) the holding of adequate capital and reserves to meet unexpected losses. The trend in supervisory oversight in recent years has been to work on each of these aspects.

5.13 The definition of a suitable risk appetite is a basic operational pre-requisite for the bank to set consistent risk limits. Risk appetite is defined as the bank's willingness to take on financial risks as quantified by the appropriate indicators *(i.e.,* as a measure of the bank's risk-seeking behavior). Based on the defined risk appetite, an overview of the bank's actual risk structure can provide a starting point for defining its target risk structure. The bank's actual risk structure might include the current relative significance of various risk types at the overall bank level (credit risk, market risks in the trading book, interest rate risk in the banking book, *etc*.) and the distribution of risk concentrations among individual risk types. After assessing the bank's risk position, the next important step is to ensure that enough capital is available to absorb losses, should risk/s materialise.

5.14 Capital is the rarest and most expensive of a bank's resources and is directly and immediately available to cover losses. Insofar as a banking company is concerned, capital serves several purposes. It (i) is a permanent source of funding support for the bank's operations; (ii) absorbs losses and changes in asset values and thereby helps in maintaining solvency; (iii) encourages depositors' confidence; (iv) encourages shareholders' interest in governance of the bank; (v) provides protection to creditors in the event of liquidation; and (vi) protects the bank against uncertainty. The capital provided by a bank's shareholders, on the one hand, allows banks to take risk, and on the other hand, it requires that such risks provide an appropriate remuneration. It is, therefore, necessary to link capital management to value creation, while accurately and promptly monitoring cost (in terms of capital absorbed by potential losses) and benefits (in terms of net profits) generated by different types of risks.

5.15 Traditional approaches to bank regulation emphasise the positive features of capital adequacy requirements (Dewatripont and Tirole, 1994). Capital serves as a buffer against losses and hence failure. Capital adequacy requirements play a crucial role in aligning the incentives of bank owners with depositors and other creditors (Berger *et al.*, 1995 and Keeley and Furlong, 1990). On the other hand, it has been argued that capital requirements may increase risk-taking behavior. If equity capital is more expensive to raise than deposits, then an increase in risk-based capital requirements tends to reduce banks' willingness to screen and lend (Thakor, 1996). It has also been found that raising capital requirements forces banks to supply fewer deposits, which reduces the liquidity-providing role of banks (Gorton and Winton, 2000).

Table 5.1: Types of Risks Faced by Banks

Types of Risks	Definition
Credit Risk	Refers to the negative consequences associated with defaults or non-fulfillment of concluded contracts in lending operations due to deterioration in the counterparty's credit quality.
Counterparty Default Risk	Refers to the possibility that the other party in an agreement will default.
Equity Risk (Participations)	Refers to the possibility of depreciation in the banks' investments in the stock market due to adverse price movements of the equity due to company-specific factors.
Securitisation Risk	Securitisation is a process of distributing risk by aggregating debt instruments in a pool and then issuing new securities backed by the pool. There are two types of securitisations, *viz*., 'traditional' and 'synthetic' securitisations. A 'traditional' securitisation is one in which an originating bank transfers a pool of assets that it owns to an arm's length special purpose vehicle. Conversely, a 'synthetic' securitisation is one in which an originating bank transfers only the credit risk associated with the underlying pool of assets through the use of credit-linked notes or credit derivatives while retaining legal ownership of the pool of assets.
Concentration Risk	A concentration risk is any single exposure or group of exposures with the potential to produce losses large enough (relative to a bank's capital, total assets, or overall risk level) to threaten a bank's health or ability to maintain its core operations.
Market Risk	Market risk generally refers to risks which result from price changes in the money and capital markets. Market risk also results from sensitivity to foreign exchange fluctuations due to open foreign exchange positions and (in the broadest sense) open term positions.
Interest Rate Risk (IRR)	Interest rate risk (IRR) is defined as the change in a bank's portfolio value due to interest rate fluctuations. The IRR management system is concerned with measurement and control of risk exposures, both in trading book (*i.e*., assets that are regularly traded and are liquid in nature) and in banking book (*i.e.*, assets that are usually held till maturity and rarely traded). IRR can be classified in following four categories: repricing risk (*i.e.*, fluctuations in interest rate levels that have differing impacts on bank assets and liabilities), yield curve risk (*i.e.*, changes in portfolio values caused by unanticipated shifts in the slope and shape of yield curve), basis risk (*i.e.*, imperfect correlation between index rates across different interest rate markets for similar maturities) and optionality (*i.e.*, risks arising from interest rate options embedded in a bank asset, liabilities and off-balance-sheet positions).
Equity Price Risk	This risk arises due to fluctuations in market prices of equity due to general market-related factors.
Foreign Exchange Risk	This risk arises due to fluctuations in exchange rates.
Operational Risk	The risk of loss resulting from inadequate or failed internal processes, people and systems or from external events is called the operational risk. This definition includes legal risk, but excludes strategic and reputational risk.
Compliance/Legal Risk	Compliance/Legal risk includes, but is not limited to, exposure to fines, penalties or punitive damages resulting from supervisory actions, as well as private settlements. Legal/compliance risk arises from an institution's failure to enact appropriate policies, procedures, or controls to ensure it conforms to laws, regulations, contractual arrangements, and other legally binding agreements and requirements.
Documentation Risk	The unpredictability and uncertainty arising out of improper or insufficient documentation which gives rise to ambiguity regarding the characteristics of the financial contract is referred to as documentation risk.
Liquidity Risk	Liquidity risk arise from a bank's inability to meet its obligations when they come due, and refers to situations in which a party is willing but unable to find counterparty to trade an asset.
Term Liquidity Risk	This risk arises due to an unexpected prolongation of the capital commitment period in lending transactions (unexpected delays in repayments).
Withdrawal/Call Risk	The risk that more credit lines will be drawn or more deposits withdrawn than expected is referred to as withdrawal or call risk. This brings about the risk that the bank will no longer be able to meet its payment obligations without constraints.
Structural Liquidity Risk	This risk arises when the necessary funding transactions cannot be carried out (or can be carried only on less favourable terms). This risk is sometimes also called funding liquidity risk.
Contingent Liquidity Risk	Contingent liquidity risk is the risk associated with finding additional funds or replacing maturing liabilities under potential, future stressed market conditions.
Market Liquidity Risk	This risk arises when positions cannot be sold within a desired time period or can be sold only at a discount (market impact). This is especially the case with securities/derivatives in illiquid markets, or when a bank holds such large positions that they cannot be sold easily. These market liquidity risks can be accounted for by extending the holding period in risk measurements (*e.g*. the holding period for VaR) or by applying expected values derived from experience.
Other Risks	
Strategic Risk	Strategic risk refers to negative effects on capital and earnings due to business policy decisions, changes in the economic environment, deficient or insufficient implementation of decisions, or a failure to adapt to changes in the economic environment.
Reputation Risk	Reputation risk refers to the potential adverse effects which can arise from bank's reputation deviating negatively from its expected level. A bank's reputation refers to its image in the eyes of the interested public (investors/lenders, employees, customers, *etc*.) with regard to competence, integrity and reliability.
Capital Risk	Capital risk results from an imbalanced internal capital structure in relation to the nature and size of the bank, or from difficulties associated with raising additional risk coverage capital quickly, if necessary.
Earnings Risk	Earnings risk arises due to the inadequate diversification of a bank's earnings structure or its inability to attain a sufficient and lasting level of profitability.
Outsourcing Risk	While there are many ways to categorise outsourcing risk, four of the most convenient are operational disruption risk, data risk, quality risk and reputation risk.

5.16 Capital that needs to be maintained should be consistent with the risk profile and operating environment. In pursuing this objective, banks need to put in place robust methodology for linking risk to capital such that capital is adequate given its risk profile. The risk management is required to establish the amount and type of risks that the bank is willing to take, collect enough capital resources to cover such risks and allocate capital to the business units that are in a position to produce the desired profit flow. This process does not occur once and for all, but requires a continuous adjustment. More specifically, the business areas that cannot reach the profitability target are required to be analysed, restructured and eventually abandoned. Specific amounts of a bank's capital can be explicitly allocated to its various business lines (or to its business units), depending upon the bank's strategic decisions. Moreover, the allocations can vary over time, for example, within a business cycle. They can be increased or decreased as business conditions in a particular area improve.

5.17 Capital management is concerned mainly with defining the optimal amount of capital the bank should hold (economic capital) and the optimal regulatory capital mix. Thus, the capital of an individual bank can be viewed as a mix of regulatory capital and economic capital (Box V.1). Both regulatory and economic capital are expected to cover unexpected losses resulting from banks' business operations.

Box V.1
Economic Capital *versus* Regulatory Capital

Both regulatory and economic capital have to do with bank's financial staying power; Economic and regulatory capital are not determined by the same set of variables and also do not respond in the same manner to changes in the common variables that affect them, such as the loans' probability of default and loss given default. Regarding the determinants of economic and regulatory capital, while economic capital (EC) depends on the intermediation margin and the cost of bank capital, the regulatory capital depends on the confidence level set by the regulator. Hence, there does not exist a direct relationship between both capital levels. Variables that affect both economic and regulatory capital such as the loans' probability of default and loss given default, have a positive impact on both capital levels for reasonable values of these variables, but when they reach certain critical values, their effect on economic capital becomes negative, increasing the gap with regulatory capital (Elizalde and Repullo, 2007).

There are various methods for determining EC. A common methodology is to base EC on the probability of (statutory) ruin, which is the probability that liabilities will exceed assets on a present-value basis at a given future valuation date, resulting in technical insolvency. EC based on the probability of ruin is determined by calculating the amount of additional assets needed to reduce the probability of ruin to a target specified by management. When setting this target, management takes several factors into consideration that relate primarily to the solvency concerns of policyholders.

The variables that only affect economic capital, such as the intermediation margin and the cost of capital, can account for large deviations from regulatory capital. The relative position of economic and regulatory capital is mainly determined by the cost of bank capital: economic capital is higher (lower) than regulatory capital when the cost of capital is low (high) (Elizalde and Repullo, 2007).

To conclude, the two concepts reflect the needs of different primary stakeholders. For economic capital, the primary stakeholders are the bank's shareholders, and the objective is the maximisation of their wealth. For regulatory capital, the primary stakeholders are the bank's depositors, and the objective is to minimise the possibility of loss (Allen, 2006). With the regulatory tendency in recent years to come closer to credit risk modelling and to allow banks to develop their own models for determining the amount of regulatory capital to hold, comparing the current regulatory and economic capital is becoming an insightful exercise for the regulatory decisions of the future (Zhu, 2007).

References:

Allen, B. 2006. "Internal Affairs," *Risk*, 19, June, 45-49.

Basel Committee on Banking Supervision 2004. *International Convergence of Capital Measurement and Capital Standards: A Revised Framework*, Basel.

Carey, M. 2001. "Dimensions of Credit Risk and their Relationship to Economic Capital Requirements," in F. S. Mishkin (ed.), *Prudential Supervision: Why Is It Important and What Are the Issues,* Chicago: University of Chicago Press and NBER.

Caruana, J. 2005. "Basel II: Back to the Future," 7th Hong Kong Monetary Authority Distinguished Lecture, available at http://www.bde.es/ prensa/intervenpub/gobernador/ 040205e.pdf.

Elizalde, A. and R. Repullo. 2007. "Economic and Regulatory Capital in Banking: What is the Difference?" *International Journal of Central Banking*, 3(3), September.

Jones, D., and J. Mingo. 1998. "Industry Practices in Credit Risk Modelling and Internal Capital Allocations: Implications for a Models-Based Regulatory Capital Standard." *FRBNY Economic Policy Review*, October.

Zhu, H. 2007. "Capital Regulation and Banks' Financial Decisions". *BIS Working Papers* No 232, July.

Whereas regulatory capital is held compulsorily as a part of adherence to prudential regulations as per the national supervisor's directions, economic capital is held beyond the minimum required level at banks' own volition. Economic capital is defined by bank management for internal business purposes, without regard to the external risks the bank's performance poses on the banking system or broader economy. Moreover, the amount of economic capital held, its form and the areas of a bank's business that it supports, could vary from bank to bank. In contrast, regulatory capital requirements must set standards for solvency that support the safety and soundness of the overall banking system or broader economy. Though both types of capital differ in scope and substance, they are not mutually exclusive and are non-additive. Regulatory capital follows standardised definitions whereas economic capital is derived from bank-specific methodologies. Moreover, given the amount of capital that is necessary to tackle risks (economic capital) and to comply with the supervisors' requirements (regulatory capital), the goal of value creation can be pursued also by optimising the composition of the capital collected by the bank so as to minimise its average unit cost. For this purpose, in addition to the 'core' shareholders' capital, all the types of innovative and hybrid capital instruments can be used (for instance, preference shares, perpetual subordinated loans, contingent capital) that are available in the financial markets.

III. BASEL NORMS ON CAPITAL ADEQUACY

5.18 Internationally, there were no explicit capital adequacy standards before the introduction of Basel I norms in 1988. The most common approach was to lay down minimum capital requirements for banks in the respective banking legislations and determine the relative strength of capital position of a bank by ratios such as debt-equity ratio, or its other variants for measuring the level of leverage. Though capital regulation in banking existed even before the Basel Accord of 1988, there were vast variations in the method and timing of its adoption in different countries. In the pre-Basel phase, the use of capital ratios to establish minimum regulatory requirements was being tested for more than a century. In the US, between 1864 and 1950s, the supervisors did (i) try to make use of a variety of capital adequacy measures such as static minimum capital requirements based on the population of each bank's service area, ratios of capital-to-total deposits and capital-to-total assets; (ii) adjust assets for risk; and (iii) create capital-to-risk-assets ratios, but none was universally accepted at that time. Even the banking sector was in favour of a more subjective system where the regulators could decide which capital requirements were suited for a particular bank as a function of its risk profile (Laurent, 2006).

5.19 Early attempts to evolve a new financial architecture can be traced to the collapse of Bretton Woods system coupled with oil shocks of 1973-74. The introduction of flexible exchange rates, divergence of interest and inflation rates, emergence of new technology oriented companies which resulted in collapse of some of the traditional 'brick and mortar companies' led to many institutional failures. This in turn, led to the demand for Government intervention and new financial architecture (Kapstein, 2006). The G-10 central bankers met in June 1974, but failed to evolve a consensus. The US argued for an explicit signalling of lender of the last resort facility, while the Germans were on the other side citing lack of mandate and the moral hazard problem. However, the failure of the talks led to the exclusion of many small banks from the inter-bank market which resulted in strong political pressure on the central bankers to meet again in September 1974. In the meeting, concern was expressed about the inadequate supervision of international banking and an assurance was given that the means for the provision of temporary liquidity be made available, which could be used as and when necessary. In the autumn of 1974, the Bank of England began to conceptualise the formation of a G-10 group of bank supervisors leading to the formation of the Standing Committee on Banking Regulation and Supervisory Practices, or the Basel Committee in December 1974. The initial mandate of the Committee was for sharing of and application of each others' knowledge, rather than any comprehensive attempt to harmonise cross-country supervision. Nevertheless, it led to an unimaginable degree of regulatory harmonisation later.

5.20 The approach of regulation prescribed by the Committee focussed on home country control with no institution escaping supervision instead of multilateral surveillance of the supervisory arrangements. As a first step towards home country control, the Basel Committee in 1978 recommended that the use of consolidated financial statement for international banking supervision. While consolidated banking statements were a norm in the US and a few other countries, these were not so widespread in Europe. For example, in Germany, strict limits were placed on the ability of its supervisors to collect information about foreign activities of their banks. The emergence

of macroeconomic weakness, more bank failures and diminishing bank capital triggered a regulatory response in 1981 when, for the first time, the federal banking agencies in the US introduced explicit numerical regulatory capital requirements. The standards adopted employed a leverage ratio of primary capital (which consisted mainly of equity and loan loss reserves) to average total assets. However, each regulator had a different view as to what exactly constituted bank capital. The debt crisis of August 1982 led to injection of liquidity and left a corresponding demand of institution of minimum capital standards. The inadequate capitalisation of Japanese banks and differing banking structures (universal banks of Germany *vis-à-vis* narrow banks of US) and varying risk profile of individual banks made agreement on capital standards difficult.

5.21 Over the next few years, regulators worked to converge upon a uniform measure. The Congress in the US passed legislations in 1983, directing the federal banking agencies to issue regulations addressing capital adequacy. The legislation provided the impetus for a common definition of regulatory capital and final uniform capital requirements in 1985. By 1986, regulators in the US were concerned that the primary capital ratio failed to differentiate among risks and did not provide an accurate measure of the risk exposures associated with innovative and expanding banking activities, most notably off-balance-sheet activities at larger institutions.

5.22 Regulators in the US began studying the risk-based capital frameworks of other countries – France, the UK and West Germany had implemented risk-based capital standards in 1979, 1980 and 1985, respectively. The agencies also revisited the earlier studies of risk-based capital ratios. A proposal by the Federal Reserve Bank of New York, for example, assigned asset categories based on credit risk, interest rate risk and liquidity risk factors. The regulators agreed that the definition of capital adequacy needed to be better tailored to bank risk-taking in order to address two major trends in the banking industry. First, banks were moving away from safer, but lower yielding, liquid assets. At the same time, they were increasing their off-balance-sheet activities, whose risks were not accounted for by the then capital ratios. The regulators wanted a new 'risk asset ratio' to serve as a supplemental adjusted capital ratio to be used in tandem with existing ratios of capital-to-total-assets, on the belief that this would allow the capital framework to explicitly and systematically respond to individual banking organisations' risk profiles and account for a wider range of risky practices. However, leading the initiative in 1987, the US joined the UK in announcing a bilateral agreement on capital adequacy, soon to be joined by Japan (buoyed by a booming stock market in raising capital). Subsequently in December 1987 'international convergence of capital measures and capital standards', *i.e.*, Basel Accord (now Basel I) was achieved. In July 1988, the Basel I Capital Accord was created.

5.23 The Basel Committee on Banking Supervision (BCBS), thus, had been making efforts over several years to secure international convergence of supervisory regulations governing the capital adequacy of international banks. The Committee after a consultative process, whereby the proposals were circulated not only to the central bank Governors of G-10 countries, but also to the supervisory authorities worldwide, finalised the Basel Capital Accord in 1988 (now popularly known as Basel I). The Committee's work on regulatory convergence had two fundamental objectives. One, the framework should serve to strengthen the soundness and stability of the international banking system. Two, the framework should be fair and have a high degree of consistency in its application to banks in different countries with a view to diminishing an existing source of competitive inequality among international banks.

5.24 Three main components of the Basel I framework were constituents of capital, the risk weighting system, and the target ratio. The central focus of this framework was credit risk and, as a further aspect of credit risk, country transfer risk. Capital, for supervisory purposes was defined in two tiers. At least 50 per cent of a bank's capital base was to consist of core elements comprising equity capital and published reserves from post-tax retained earnings (Tier 1). The other elements of capital (supplementary capital) (Tier 2) were allowed up to an amount equal to that of the core capital. These supplementary capital elements and the particular conditions attaching to their inclusion in the capital base were prescribed in detail. Tier 2 or supplementary capital comprised unpublished or hidden reserves, revaluation reserves, general provisions/general loan loss reserves, hybrid debt capital instruments, and subordinated term debt.

5.25 The Committee recommended a risk-weighted assets ratio in which capital was related to different categories of asset or off-balance-sheet exposure, weighted according to broad categories of relative riskiness, as the preferred method for assessing the capital adequacy of banks - other

methods of capital measurement were considered supplementary to the risk-weight approach. The risk weighted approach was preferred over a simple gearing ratio approach because (i) it provided a fairer basis for making international comparisons among banking systems whose structures might differ; (ii) it allowed off-balance-sheet exposures to be incorporated more easily into the measure; and (iii) it did not deter banks from holding liquid or other assets which carried low risk. There were inevitably some broad-brush judgements in deciding which weight should apply to different types of asset and the framework of weights was kept as simple as possible with only five weights being used for on balance-sheet items, *i.e.,* 0, 10, 20, 50 and 100 per cent. Government bonds of the countries that were members of the Organisation for Economic Cooperation and Development (OECD) (which includes all members of the Basel Committee) were assigned a zero risk weight, all short-term inter-bank loans and all long-term inter-bank loans to banks headquartered in OECD countries a 20 per cent risk weight, home mortgages a 50 per cent risk weight, and most other loans a 100 per cent risk weight. The capital adequacy ratio was prescribed at eight per cent.

5.26 Basel I originally focused on credit risk, a major source of risk for most banks. Banks, however, developed new types of financial transactions that did not fit well into the risk weights and credit conversion factors in the laid down standards. For instance, there was a significant growth in securitisation activity, which banks engaged in partly as regulatory arbitrage opportunities. In order to respond to emerging risks, the Basel Committee members in 1996 adopted the Market Risk Amendment, which required capital for market risk exposures arising from banks' trading activities. Thus, through this amendment an explicit capital cushion was provided for the price risks to which banks were exposed, particularly those arising from their trading activities. The amendment covered market risks arising from banks' open positions in foreign exchange, traded debt securities, traded equities, commodities and options. The novelty of this amendment lay in the fact that it allowed banks to use, as an alternative to the standardised measurement framework originally put forward in April 1993, their internal models to determine the required capital charge for market risk. The standard approach defined the risk charges associated with each position and specified how these charges were to be aggregated into an overall market risk capital charge. The minimum capital requirement was expressed in terms of two separately calculated charges, one applying to the '*specific risk*' of each security, whether it was a short or a long position, and the other to the interest rate risk in the portfolio (termed '*general market risk*') where long and short positions in different securities or instruments could be offset.

5.27 The major achievement of the Basel Capital Accord 1988 was the introduction of discipline through imposition of risk-based capital standards both as measure of the strength of banks and as a trigger device for supervisors' intervention under the scheme of prompt corrective action (PCA). Over the years, however, several deficiencies of the design of the Basel I framework surfaced. The Basel I capital adequacy norms were criticised for the simple 'one-size-fits-all' approach that did not adequately differentiate between assets that have different risk levels. This standard encouraged capital arbitrage through securitisation and off-balance sheet exposures. The Basel rules encouraged some banks to move high quality assets off their balance sheet, thereby reducing the average quality of bank loan portfolios. Furthermore, banks took large credit risks in the least creditworthy borrowers who had the highest expected returns in a risk-weighted class (Kupiec, 2001). The approach incorrectly assumed that risks were identical within each bucket and that the overall risk of a bank's portfolio was equal to the sum of the risks across the various buckets. But, most of the times, the risk-weight classes did not match realised losses (Flood, 2001).

5.28 Securitisation of banks' credit portfolios became a widespread phenomenon in industrialised countries. At first, banks used to sell their mortgage loans, for such loans represented accurately evaluated risks. But after the advent of e-finance, it became possible to expand this activity to other types of loans, including those made to small businesses. This type of activity also allowed banks to have a much more liquid credit-risk portfolio and, in theory, to adjust their capital ratio to an optimal economic level rather than sticking to the ratio prescribed by the Basel Committee.

5.29 Moreover, diversification of a bank's credit-risk portfolio was not taken into account in the computation of capital ratios. The aggregate risk of a bank was not equal to the sum of its individual risks – diversification through the pooling of risks could significantly reduce the overall portfolio risk of a bank. Indeed, a well-established principle of finance is that the combination in a single portfolio of assets with different risk characteristics can produce less overall risk than merely adding up the risks of the individual

assets. The Accord, however, did not take into account the benefits of portfolio diversification.

5.30 Basel I offered only a limited recognition of credit risk mitigation techniques. In addition, significant financial innovations that occurred after Basel I suggested that a bank's regulatory capital ratios might not always be useful indicators of its underlying risk profile. Financial crises of the 1990s involving international banks highlighted several additional weaknesses in the Basel standards that permitted and in some cases, even encouraged, excessive risk taking and misallocations of bank credit (White, 2000). Basel I did not explicitly address all the risks faced by banks such as liquidity risk, and operational risks that may be important sources of insolvency exposure for banks.

5.31 Despite the amendment to the original framework in 1996, the simple risk weighting approach of Basel I did not keep pace with more advanced risk measurement approaches at large banking organisations. By the late 1990s, some large banking organisations, especially in advanced countries had begun developing economic capital models, which used quantitative methods to estimate the amount of capital required to support various elements of an organisation's risks. Banks used economic capital models as tools to inform their management activities, including measuring risk-adjusted performance, setting pricing and limits on loans and other products, and allocating capital among various business lines and risks. Economic capital models measure risks by estimating the probability of potential losses over a specified period and up to a defined confidence level using historical loss data. These models make more meaningful risk measurement than the Basel I regulatory framework, which differentiates risk only to a limited extent, mostly based on asset type rather than on an asset's underlying risk characteristics.

5.32 The Basel Committee itself recognised the deficiencies in the Basel I framework. The rapid rate of innovation in financial markets and the growing complexity of financial transactions reduced the relevance of Basel I as a risk managing framework, especially for large and complex banking organisations. Various shortcomings also distorted the behaviour of banks and made it much more complicated to monitor them. With a view to addressing the shortcomings of Basel I, the BCBS introduced a new capital adequacy framework for International Convergence of Capital Measurement and Capital Standards (Basel II) in June 2004 to replace the 1988 Capital Accord by year-end 2007 (Box V.2). Basel II norms aim at aligning minimum capital requirements to banks' underlying risk profiles. The framework is also designed to create incentives for better risk measurement and management. Major features of Basel II framework are presented below.

Pillar 1: Capital Adequacy

5.33 Under Pillar 1, commercial banks are required to compute individual capital adequacy for three categories of risks (*i.e.,* credit risk, market risk and operational risk) broadly under two sets of approaches – standardised and advanced.

Capital Charge for Credit Risk

5.34 Basel II marks a break from Basel I in the case of credit risk in that the loans to similar counterparts such as private firms, sovereigns *etc.*, require different capital coverage, depending upon their riskiness as evaluated by some external rating agency, or by the bank itself. Basel II proposes a range of approaches to credit risk. The simplest methodology is the standardised approach which aligns regulatory capital requirements more closely with the key elements of banking risk by introducing a wider differentiation of risk weights and a wider recognition of credit risk mitigation techniques, while avoiding excessive complexity. In this method, risk weights are defined for certain types of credit exposures primarily on the basis of credit assessments provided by rating agencies. The default risk as reflected in the credit rating is then translated into the resulting capital requirements (Chart V.1).

5.35 The standardised approach, however, does not differentiate between expected and unexpected losses. Expected losses should be calculated as standard risk costs in the credit approval process. The actual credit risk, which refers to a 'potential surprise loss' thus only comprises the unexpected loss beyond the expected loss assumed in the calculation of standard risk costs. In order to ensure that these data can be compared and aggregated with other risks (for instance, market risks), the unexpected loss should be used as the uniform basis for risk measurement. Regardless of whether a distinction is drawn between expected and unexpected loss, the most important criterion in selecting suitable risk quantification methods is their risk orientation (*i.e.*, increased risk requires increased capital).

5.36 Under the internal rating based (IRB) approach, banks that have received supervisory approval, arrive at their own internal estimates of risk

Box V.2
Basel II Norms: Main Elements

While the Basel I framework was confined to the minimum capital requirements for banks, the Basel II accord expands this approach to include two additional areas, *viz*., the supervisory review process and increased disclosure requirements for banks. In terms of Basel II, the stability of the banking system rests on the following three pillars, which are designed to reinforce each other: (i) Pillar 1: Minimum Capital Requirements - a largely new, risk-adequate calculation of capital requirements which (for the first time) explicitly includes operational risk in addition to market and credit risk; (ii) Pillar 2: Supervisory Review Process (SRP) - the establishment of suitable risk management systems in banks and their review by the supervisory authority; and (iii) Pillar 3: Market Discipline - increased transparency due to expanded disclosure requirements for banks.

The central focus of this framework as in Basel I, continues to be credit risk. In the revised framework, the minimum regulatory capital requirements take into account not just credit risk and market risk, but also operational risk. The measures for credit risk are more complex, for market risk they are the same, while those for operational risk are new. Besides, Basel II includes certain Pillar 2 risks such as credit concentration risks and liquidity risks.

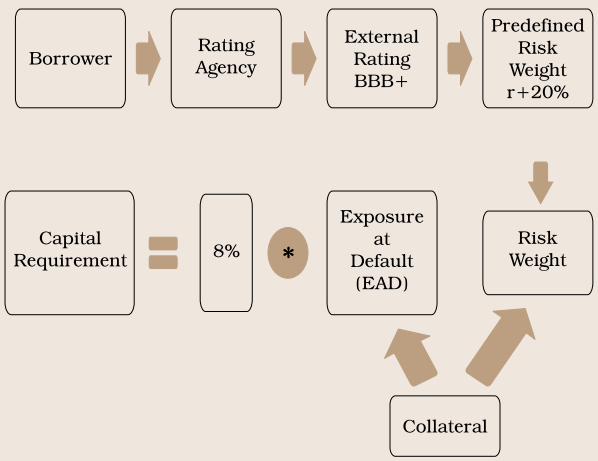
Apart from an increase in the number of risks, banks are required to achieve a more comprehensive risk management framework. While Basel I required lenders to calculate a minimum level of capital based on a single risk weight for each of the limited number of asset classes, under Basel II, the capital requirements are more risk sensitive. The credit risk weights are related directly to the credit rating of each counterparty instead of the counterparty category.

Basel II capital adequacy rules are based on a 'menu' approach that allows differences in approaches in relationship to the nature of banks and the nature of markets in which they operate (Table 1). The minimum requirements for the advanced approaches are technically more demanding and require extensive databases and more sophisticated risk management techniques. Basel II prescriptions have ushered in a transition from capital adequacy to capital efficiency which implies that banks adopt a more dynamic use of capital, in which capital will flow quickly to its most efficient use. Unlike Basel I, Basel II is quite complex as it offers choices, some of which involve application of quantitative techniques.

Basel II - Main Features

Items	Main Features
Pillar 1: Capital Adequacy	
Credit Risk 1 Simplified Standardised Approach (SSA)	Greater risk sensitivity than Basel I through more risk buckets and risk weights for sovereigns and banks based on External Credit Agency (ECA) risk scores.
Credit Risk 2 Standardised Approach (SA)	More risk buckets than SSA. Risk weights for asset classes based on ratings of external credit assessment institutions (ECAIs) or ECA scores. Enhanced credit risk mitigation available.
Credit Risk 3 Foundation Internal Ratings Based Approach (F-IRB)	Based on risk components: probability of default (PD), loss given default (LGD), exposure at default (EAD), and maturity (M). Banks can use own PD estimates and supervisory estimates for other components. Stress testing required.
Credit Risk 4 Advanced Internal Ratings Based Approach (A-IRB)	Capital requirements determined as in F-IRB. Banks can use own estimates for PD, LGD, EAD and M; subject to supervisory validation of systems. Stress testing required.
Operational Risk 1 Basic Indicator Approach	Flat rate of 15 per cent of the average gross annual income, during last three years.
Operational Risk 2 Standardised Approach	Operational risk charges for each business line, based on annual income per business line, multiplied by risk factor per business line.
Operational Risk 3 Advanced Measurement Approach	Full reliance on banks' internal risk measurement systems, subject to supervisory approval.
Pillar 2: Supervisory Review	Banks required to have a process for internal capital adequacy assessment process (ICAAP) and a strategy for maintaining capital level. Supervisors evaluate banks' internal capital adequacy systems and compliance. Higher capital adequacy levels for individual banks could be prescribed if risk profile requires. Early intervention by supervisors. Stress tests and assessment of interest rate risk and concentration risk.
Pillar 3: Market Discipline	Information to be disclosed *inter alia* includes available capital in the group, capital structure, detailed capital requirements for credit risk; breakdown of asset classification and provisioning; breakdown of portfolios according to risk buckets and risk components; credit risk mitigation (CRM) methods and exposure covered by CRM; and operational risk.

Chart V.1: Calculating Credit Risk using the Standardised Approach



components in determining the capital requirement for a given exposure. The risk components include measures of the probability of default (PD) – the probability that counterparty will default within one year, loss given default (LGD) – the amount of the loss expressed as a percentage of the amount outstanding at the time when the counterparty defaults, the exposure at default (EAD) – the credit amount outstanding at the time of default, and effective maturity (M). In some cases, banks may be required to use a supervisory value as opposed to an internal estimate for one or more of the risk components.

5.37 Under the IRB approach, banks must categorise banking-book exposures with different underlying risk characteristics into broad classes of assets, *viz.,* (a) corporate, (b) sovereign, (c) bank, (d) retail, and (e) equity. One essential pre-requisite for calculating unexpected loss is the availability of default probabilities (PDs). As it is also possible to rely on predefined supervisory values for the other risk parameters (LGD, EAD, M), the bank's internal calculation of default probabilities constitutes the central indicator in calculating a simple credit value at risk under the IRB Approach. Thus, the advanced approach for credit risk uses risk parameters determined by a bank's internal system for calculating minimum regulatory capital. In comparison with standardised approach, the IRB approach is more risk sensitive. However, such methods also increase the complexity of capital calculation.

Risk Mitigation Techniques

5.38 Historically, banks have been using various techniques like guarantees and security to support obligations of the borrowers. In recent years, credit intermediation has been vastly facilitated by the proliferation of complex risk transfer instruments, including credit derivatives and various types of asset-backed securities. One consequence is that a large number of banks shifted to 'originate-to-distribute' business models, transferring risk to other investors. In the calculation of capital requirements under Basel II, various credit risk mitigation techniques can be used in order to limit credit risk. Under the standardised approach, these include financial collateral as well as guarantees and credit derivatives. Basel II better assesses the risk inherent in arrangements using evolving technologies, such as securitisation and credit derivatives, that are used to buy and sell credit risk. Basel II also establishes benchmarks for recognising risk transfer and mitigation in securitisation and credit derivatives structures. It sets a boundary between the point at which a firm transfers risk and actually retains the risk. The Basel II framework suggests 'operational requirements' that must be met before an originating bank is able to recognise the transfer of the assets, or the risk related to them, and to exclude the assets from its risk-based capital calculations.

Capital Charge for Operational Risk

5.39 Operational risk has been defined by the BCBS '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. The most important types of operational risk involve breakdowns in internal controls and corporate governance. Such breakdowns can lead to financial losses through error, fraud, or failure to perform in a timely manner or cause the interests of the bank to be compromised in some other way, for example, by its dealers, lending officers or other staff exceeding their authority or conducting business in an unethical or risky manner. Other aspects of operational risk include major failure of information technology systems or events such as major fires or other disasters.

5.40 Two important indicators of operational risk are the size and complexity of a bank. As the number of employees, business partners, customers, branches, systems and processes at a bank increases, its risk potential also tends to rise. Other operational risk indicator is process intensity, *i.e.,*

number of lawsuits filed against a bank. In cases where business operations (for instance, the processing activities mentioned above) are outsourced, the bank cannot automatically assume that operational risks have been eliminated completely. This is because a bank's dependence on an outsourcing service provider means that risks incurred by the latter can have negative repercussions on the bank. Therefore, the content and quality of the service level agreement as well as the quality (for instance, ISO certification) and creditworthiness of the outsourcing service provider can also serve as risk indicators in this context.

5.41 Various methods can be used to assess operational risks. The Basel II framework has given guidance to three broad methods of capital calculation for operational risk – basic indicator approach (which is based on annual revenue of the financial institution), standardised approach (which is based on annual revenue of each of the broad business lines of the financial institution) and advanced measurement approaches (which are based on the internally developed risk measurement framework of the bank adhering to the standards prescribed and include methods such as internal measurement approach (IMA), loss distribution approach (LDA), scenario-based, and scorecard).

5.42 The basic indicator approach (for the calculation of minimum capital requirements) is the simplest method of quantifying operational risks. In this approach, a risk weight of 15 per cent is applied to a single indicator, specifically the average gross income (*i.e.,* the sum of net interest income and net non-interest income) over the previous three years. The advantage of applying the basic indicator approach primarily lies in its simplicity. However, there is no immediate causal relationship between bank's operational risks and its operating income. In order to come to a better assessment of the risk profile, it is advisable not to rely on the basic indicator approach alone to capture risks. For instance, a more specific calculation of a bank's risk situation can be performed by means of a systematic internal survey of realised operational risks using a loss database.

5.43 Under the standardised approach, operational risk is also calculated exclusively on the basis of the risk indicator described above. However, in this case the indicator is not calculated for the bank as a whole, but individually for specific business lines as defined by the supervisory authority (retail, corporate, trading, *etc*.). Accordingly, the standardised approach includes not only a risk weight of 15 per cent, but specific risk weights defined for each business line. This means that applying the standardised approach basically involves the same problems as applying the basic indicator approach. Advanced measurement approaches provide banks with substantial flexibility and do not prescribe specific methodologies or assumptions. However, they do specify several qualitative and quantitative standards to be met by banks before adopting these approaches. Such methods could be used to aptly reflect the bank's risk profile, but their design and implementation involve high levels of effort. The quantification models for operational risk using internal methods are currently in the developmental stage.

5.44 While Basel II is an international framework based on shared regulatory objectives, it is subject to country-specific implementation. Therefore, a country has the discretion to use multiple risk-based capital regimes depending on the banking organisation's size and complexity. Since the international accord was issued in 2004, individual countries have been implementing national rules based on the principles and detailed framework that it sets forth, and each country has used some measure of national discretion within its jurisdiction. The Basel Committee noted that as a result, regulators from different countries would need to make substantial efforts to ensure sufficient consistency in the application of the framework across jurisdictions. Furthermore, the Basel Committee emphasised that the international accord set forth only minimum requirements, which countries may choose to supplement with added measures to address such concerns as potential uncertainties about the accuracy of the capital rule's risk measurement approaches.

Pillar 2: Supervisory Review

5.45 On the one hand, Pillar 2 (Supervisory Review Process) requires banks to implement an internal process for assessing their capital adequacy in relation to their risk profiles as well as a strategy for maintaining their capital levels, *i.e.,* the Internal Capital Adequacy Assessment Process (ICAAP). On the other hand, Pillar 2 also requires the supervisory authorities to subject all banks to an evaluation process and to impose any necessary supervisory measures based on the evaluations (Box V.3).

5.46 The dynamic growth of financial markets and the increased use of complex bank products have brought about new challenges before credit institutions, which have highlighted the need for functioning systems aimed at containment and

Box V.3
Principles for the Supervisory Review Process

The Basel Committee has defined the following four basic principles for the supervisory review process.

Principle 1: Banks should have a process for assessing their overall capital adequacy in relation to their risk profile and a strategy for maintaining their capital levels.

Principle 2: Supervisors should review and evaluate banks' internal capital adequacy assessments and strategies, as well as their ability to monitor and ensure their compliance with regulatory capital ratios. Supervisors should take appropriate supervisory action if they are not satisfied with the result of this process.

Principle 3: Supervisors should expect banks to operate above the minimum regulatory capital ratios and should have the ability to require banks to hold capital in excess of the minimum.

Principle 4: Supervisors should seek to intervene at an early stage to prevent capital from falling below the minimum levels required to support the risk characteristics of a particular bank and should require rapid remedial action if capital is not maintained or restored.

Essentially, these include evaluations of the banks' internal processes and strategies as well as their risk profiles, and if necessary taking prudential and other supervisory actions.

Reference:

Bank for International Settlements. 2006. *Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework - Comprehensive Version*, Basel Committee on Banking Supervision, June.

targeted control of each institution's risk position. Banks are required to employ suitable procedures and systems in order to ensure adequate capital in the long-term with due attention to all material risks. These procedures are collectively referred to as the ICAAP. The selection and suitability of methods depend heavily on the complexity and scale of each individual institution's business activities.

5.47 The main motive for introducing the ICAAP is to ensure a viable risk position by dealing with risks in the appropriate manner. In particular, it is important to detect, at the earliest possible, developments which may endanger the institution in order to enable the bank to take suitable countermeasures. There are two basic objectives of ICAAP. The main objective of the ICAAP is to secure the institution's risk-bearing capacity. When calculating the bank's risk bearing capacity, it is necessary to determine the extent to which a bank can afford to take certain risks. For this purpose, the bank needs to ensure that the available risk coverage capital is sufficient at all times to cover the risks taken. Secondly, the bank must review the extent to which risks are worth assuming, that is, it is necessary to analyse the opportunities arising from risk taking (evaluation of the risk and return). The ICAAP thus constitutes a comprehensive package which delivers significant benefits from a business perspective.

5.48 An essential prerequisite for analysing the risk-bearing capacity is to assess all of a bank's material risks and aggregate them to arrive at the bank's overall risk position (Box V.4). The purpose of assessing risks is to depict the significance and effects of risks taken on the bank. Banks need to implement efficient and appropriate stress testing framework and assess the impact not only of specific events, but also the impact of various scenarios. In the first step, a bank needs to use risk indicators to assess which of its risks are actually material. In the second step, the bank needs to quantify its risks, wherever possible. The results of these impact studies need to be integrated into capital planning and business strategy. Finally, the bank needs to calculate the internal capital required to cover its risks.

Pillar 3: Market Discipline

5.49 Theoretically, regulation aimed at creating and sustaining competition among banks, notably through increased transparency, is believed to play an important role in mitigating bank solvency problems. Market discipline in the banking sector can be described as private counterparty supervision that has always been the first line of regulatory defence in protecting the safety and soundness of the banking system (Greenspan, 2001). Some authors have drawn attention to market pressure as an explanation for the rapid acceptance and diffusion of the Basel capital adequacy standards (Genschel and Plümper, 1997). Their contention is that these standards have increased transparency, thereby enabling financial markets to 'punish' poorly capitalised banks and rewarding banking systems with higher capital levels. Banks with higher capital ratios may be able to access the capital market for raising resources, which, in turn, allow banks to maintain higher capital levels.

5.50 The purpose of market discipline (detailed in Pillar 3) in the revised framework is to complement

Box V.4
Assessment of Risks

The area of validation might emerge as a key challenge for banking institutions in the foreseeable future. At present, few banks possess processes that both span the range of validation efforts listed and address all elements of model uncertainty. The components of model validation can be grouped into four broad categories: (a) backtesting, or verifying that the *ex ante* estimation of expected and unexpected losses is consistent with *ex post* experience; (b) stress testing, or analysing the results of model output given various economic scenarios; (c) assessing the sensitivity of credit risk estimates to underlying parameters and assumptions; and (d) ensuring the existence of independent review and oversight of a model.

Backtesting

The methodology applied to backtesting market risk VaR models is not easily transferable to credit risk models due to the data constraints. The Market Risk Amendment requires a minimum of 250 trading days of forecasts and realised losses. A similar standard for credit risk models would require an impractical number of years of data given the models' longer time horizons.

Given the limited availability of data for out-of-sample testing, backtesting estimates of unexpected credit loss are certain to be problematic in practice. It is difficult to find a formal backtesting programme for validating estimates of credit risk – or *unexpected* loss. Where analyses of *ex ante* estimates and *ex post* experience are made, banks typically compare estimated credit risk losses to a historical series of actual credit losses captured over some years. However, the comparison of *expected* and *actual* credit losses does not address the accuracy of the model's prediction of *unexpected* losses, against which economic capital is allocated. While such independent work on backtesting is limited, some literature indicates the difficulty of ensuring that capital requirements generated using credit risk models will provide an adequately large capital buffer.

Banks employ various alternative means of validating credit risk models, including so-called 'market-based reality checks' such as peer group analysis, rate of return analysis and comparisons of market credit spreads with those implied by the bank's own pricing models. However, the assumption underlying these approaches is that prevailing market perceptions of appropriate capital levels (for peer analysis) or credit spreads (for rate of return analysis) are substantially accurate and economically well founded. If this is not so, reliance on such techniques raises questions as to the comparability and consistency of credit risk models, an issue which may be of particular importance to supervisors.

Stress Testing

Stress tests aim to overcome some of the major uncertainties in credit risk models – such as the estimation of default rates or the joint probability distribution of risk factors – by specifying particular economic scenarios and judging the adequacy of bank capital against those scenarios, regardless of the probability that such events may occur. Stress tests could cover a range of scenarios, including the performance of certain sectors during crises, or the magnitude of losses at extreme points of the credit cycle.

In theory, a robust process of stress testing could act as a complement to backtesting given the limitations inherent in current backtesting methods. However, there is no ideal framework or single component of best practice on stress testing, and industry practices vary widely. In 2004, the Committee on the Global Financial System conducted an extensive survey covering 64 banks and securities firms from 16 countries (BIS, 2005). More than 80 per cent of the stress tests reported were based on trading portfolios. The use of stress tests has expanded from the exploration of exceptional but plausible events, to encompass a range of applications. Among the major challenges are those related to stress testing credit risk, integrated stress testing and the treatment of market liquidity in stress situtations.

With respect to stressed conditions, Basel II has advanced comprehensive stress testing frameworks. The Basel II framework requires that stress scenarios capture the effects of a downturn on market and credit risks, as well as on liquidity. Such an improved firm-wide approach to risk assessment is essential for ensuring that banks have a sufficient capital buffer that will carry them through difficult periods.

Sensitivity Analysis

The practice of testing the sensitivity of model output to parameter values or to critical assumptions is also not common. In the case of certain proprietary models, some parameter (and even structural) assumptions are unknown to the user, and thus sensitivity testing and parameter modification are difficult.

According to a survey conducted by the BCBS, a minority of banks indicated they conduct sensitivity analysis on a number of factors, including: (a) Expected Default Frequency (EDF) and volatility of EDF; (b) LGD, and (c) assignment of internal rating categories (BIS, 2000). However, the depth of the analysis differed between the 54 respondent banks. Furthermore, none of the respondents attempted to quantify the degree of potential error in the estimation of the probability distribution of credit losses, though a few compared the results generated by the internal model with those from a vendor model.

Management Oversight and Reporting

The mathematical and technical aspects of validation are important. Equally important, however, is the internal environment in which a model operates. The amount of senior manager oversight, the proficiency of loan officers, the quality of internal controls and other traditional features of the credit culture will continue to play a key part in the risk management framework.

References:

Riskmetrics Group. 1999. *Risk Management: A Practical Guide*.

Bank for International Settlements. 2000. *Range of Practices in Banks' Internal Rating Systems*, January.

Bank for International Settlements. 2005. *Stress Testing at Major Financial Institutions : Survey Results and Practice,* January.

the minimum capital requirements (detailed under Pillar 1) and the supervisory review process (detailed under Pillar 2). The aim is to encourage market discipline by developing a set of disclosure requirements which will allow market participants to assess key pieces of information on the scope of application, capital, risk exposures, risk assessment processes, and hence the capital adequacy of the institution. In principle, banks' disclosures should be consistent with how senior management and the board of directors assess and manage the risks of the bank.

5.51 Non-compliance with the prescribed disclosure requirements would attract a penalty, including financial penalty. However, direct additional capital requirements rarely serve as a response to non-disclosure, except in certain cases. In addition to the general intervention measures, the revised framework also anticipates a role for specific measures. Where disclosure is a qualifying criterion under Pillar 1 to obtain lower risk weights and/or to apply specific methodologies, there would be a direct sanction (not being allowed to apply the lower risk weighting or the specific methodology).

IV. ADVANTAGES, LIMITATIONS, ISSUES AND CHALLENGES OF BASEL II

5.52 The main incentives for adoption of Basel II are (a) it is more risk sensitive; (b) it recognises developments in risk measurement and risk management techniques employed in the banking sector and accommodates them within the framework; and (c) it aligns regulatory capital closer to economic capital. These elements of Basel II take the regulatory framework closer to the business models employed in several large banks. In Basel II framework, banks' capital requirements are more closely aligned with the underlying risks in the balance sheet. Basel II compliant banks can also achieve better capital efficiency as identification, measurement and management of credit, market and operational risks have a direct bearing on regulatory capital relief. Operational risk management would result in continuous review of systems and control mechanisms. Capital charge for better managed risks is lower and banks adopting risk-based pricing are able to offer a better price (interest rate) for better risks. This helps banks not only to attract better business but also to formulate a business strategy driven by efficient risk-return parameters. However, competition in the market where pricing is controlled by market might override the risk-based pricing. Risk levels enable estimation of risk appetite and capital allocation. Marketing of products thus becomes more focused/targeted.

5.53 The movement towards Basel II has prompted banks to make necessary improvement in their risk management and risk measurement systems. Basel II would improve the collection and use of data so that they could aggregate and better understand information about their risk portfolios. For instance, the framework requires fundamental improvement in the data supporting the probability of default (PD), exposure at default (EAD) and loss given default (LGD)[2] estimates that underpin economic and regulatory capital assessments over an economic cycle. This has spurred improvements in areas such as data collection and management information systems. These advances, along with the incentives to improve risk management practices, will support further innovation, and improvement in risk management and economic capital modelling. Basel II incorporates much of the latest 'technology' in the financial arena for managing risk and allocating capital to cover risk. Thus, banks would be required to adopt superior technology and information systems which aid them in better data collection, support high quality data and provide scope for detailed technical analysis. The recent financial turmoil exhibited that even such technical analysis have their limitations, such as incomplete data or assumptions that have not been tested across business cycles. Therefore, quantitative assessment of risks also needs to be supplemented by qualitative measures and sound judgement.

5.54 Basel II goes beyond merely meeting the letter of the rules. Under Pillar 2, when supervisors assess economic capital, they are expected to go beyond banks' systems. Pillar 2 of the framework provides greater scope for bankers and supervisors to engage in a dialogue, which ultimately will be one of the important benefits emanating from the implementation of Basel II.

5.55 The added transparency in Pillar 3 should also generate improved market discipline for banks, in

[2] PD, EAD and LGD are parameters used in the calculation of economic capital or regulatory capital under Basel II for a banking institution. The probability of default is the likelihood that a loan will not be repaid and will fall into default. In general EAD can be seen as an estimation of the extent to which a bank may be exposed to a counterparty in the event of, and at the time of, that counterparty's default. LGD is the fraction of EAD that will not be recovered following default.

some cases forcing them to run a better business. Indeed, market participants play a useful role by requiring banks to hold more capital than implied by minimum regulatory capital requirements - or sometimes their own economic capital models - and by demanding additional disclosures about how risks are being identified, measured, and managed. A strong understanding by the market of pillars 1 and 2 would make Pillar 3 more comprehensible and market discipline a more reliable tool for supervisors and the market.

5.56 The creation of a more risk sensitive framework for capital regulation which is one of the key objectives of Basel II is expected to provide supervisors, banks and other market participants with a measure of capital adequacy that better reflects the true financial condition of a large bank. A more risk sensitive minimum capital ratio is also intended to encourage large banks to make lending, investment, and credit risk hedging decisions based on the underlying economics of the transactions. Moreover, increasing the risk sensitivity of the minimum capital requirements is intended to give large banks stronger incentives to manage and measure their own risk. Finally, Basel II sets minimum risk-based capital requirements at the level of the individual credit exposure, and in doing so sharply differentiates in terms of quality of credit.

5.57 According to a survey published by Ernst & Young[3], processes and systems are expected to change significantly, alongwith the ways in which risks are managed. Over three-quarters of respondents believed that Basel II will change the competitive landscape for banking. Those organisations with better risk systems are expected to benefit at the expense of those which have been slower to absorb change. Eighty-five per cent of respondents believed that economic capital would guide some, if not all, pricing. Greater specialisation was also expected, due to increased use of risk transfer instruments. A majority of respondents (over 70 per cent) believe that portfolio risk management would become more active, driven by the availability of better and more timely risk information as well as the differential capital requirements resulting from Basel II. This could improve the profitability of some banks relative to others, and encourage the trend towards consolidation in the sector.

5.58 For a given amount of capital, more risk-sensitive capital requirements could improve the safety and soundness of the banking system through a number of channels – each of which more closely aligns required capital with associated risks – and provide a required level of capital more likely to absorb unexpected losses. First, holding assets with higher risk under Basel II would require banks to hold more capital relative to lower risk assets. Second, banks with higher risk credit portfolios or greater exposure to operational risk would be required to hold relatively more capital than banks with lower risk profiles. For instance, a bank with a business line more susceptible to fraud, could face relatively higher capital requirements in those areas. Third, although more risk sensitive capital requirements can help enhance safety and soundness, the level of regulatory capital must also be sufficient to account for broader risks to the economy and safety and soundness of the banking system, which will require ongoing regulatory scrutiny.

5.59 In light of recent financial market turbulence, the importance of implementing Basel II capital framework and strengthening supervision and risk management practices, and improving the robustness of valuation practices and market transparency for complex and less liquid products, have assumed greater significance. Moreover, it is essential to have robust and resilient core firms at the centre of the financial system operating on safe and sound risk management practices (Box V.5). The Basel II plays an important role in this respect by ensuring the robustness and resilience of these firms through a sound global capital adequacy framework along with other benefits including greater operational efficiencies, better capital allocation and greater shareholder value through the use of improved risk models and reporting capabilities.

Limitations of Basel II

5.60 The Basel II framework also suffers from several limitations, especially from the angle of implementation in emerging economies. Compared to Basel I, Basel II is considered to be highly complex, making its understanding and implementation a challenge to both the regulators and the regulated entities, particularly in the emerging market economies. The complexity of Basel II arises from

[3] An online survey titled 'Basel II: The Business Impact' was conducted for Ernst & Young by the Economist Intelligence Unit. The survey polled 307 Banking Executives at large banks around the world. Over 40 per cent of respondents were located in Europe, 25 per cent in North America and 24 per cent in the Asia/Pacific region.

Box V.5
Effect of Recent Financial Turmoil on Basel II

The financial turmoil that occurred in mid-2007 - widely known as the sub-prime crisis - has affected the balance sheets of some major global financial institutions and has also resulted in market liquidity crisis. This turmoil was a fallout of an exceptional credit boom and leverage in the financial system. A long period of consistent economic growth and stable financial conditions had resulted in increased risk appetite of borrowers as well as investors. Financial institutions responded by expanding the market for securitisation of credit risk and aggressively developing the originate-to-distribute model for financial intermediation. A slowdown in the US real estate market triggered a series of defaults and this snowballed into accumulated losses, especially in the case of complex structured securities.

The build-up to and unfolding of the financial turmoil took place under the Basel I capital framework as most of the countries have started implementation of Basel II framework only recently. This financial turmoil has, in fact, highlighted many of the shortcomings of the Basel I framework, including its lack of risk sensitivity and its inflexibility to rapid innovations. Basel I created perverse regulatory incentives to move exposures off the balance sheet and did not fully capture important elements of bank's risk exposure within the capital adequacy calculation.

In contrast, the Basel II framework has provision for better risk management practices by closely aligning the minimum capital requirements with the risks that banks face (Pillar 1), by strengthening supervisory review of bank practices (Pillar 2) and by encouraging improved market disclosure (Pillar 3).

Notwithstanding the improvements over the Basel I framework, the current Basel II framework still has certain deficiencies if evaluated in the light of current financial turmoil. Under the first pillar, a relook at the treatment of highly rated securitisation exposures, especially the so-called collateralised debt obligations (CDOs) of asset backed securities (ABS) is necessary. The role of this securitisation process in the current turmoil and its leverage capacity and their systemic implications have come under intense scrutiny in recent times. There is a pressing need to introduce a credit default risk charge for the trading book given the rapid growth of less liquid, credit sensitive products in banks' trading books. These products include structured credit assets and leveraged lending and the VaR-based approach is insufficient for these types of exposures and needs to be supplemented with a default risk charge. Though banks are already required to conduct stress tests of their credit portfolio under the second pillar of the Basel framework to validate the adequacy of their capital cushions, the importance of conducting scenario analyses and stress tests of their contingent credit exposures, both contractual and non-contractual, need to be reemphasised. In Pillar 3, there are opportunities to further leverage off the types of disclosures required under Basel II.

Against this backdrop, several measures have been suggested for mitigating the impact and improving the global financial system. The most noteworthy among these are the proposals made by the Financial Stability Forum (FSF)[1] and ratified in early April 2008 by the G-7 to be implemented over the next 100 days. By the mid-2008, the Basel Committee is expected to issue revised liquidity risk management guidelines and IOSCO is expected to revise its code of conduct for credit rating agencies. By end-2008 or at the latest by 2009, the BCBS is expected to revise capital requirements under Pillar 1 of Basel II (for instance, certain aspects of the securitisation framework), strengthening supervision and management of liquidity risk for banks, ensuring effective supervisory review under Pillar 2, enhancing transparency and valuation, improving the quality of credit ratings for structured products, strengthening authorities' responsiveness to risk and enhancing robust arrangements for dealing with stress in the financial system.

References:

Financial Stability Forum. 2008. *Report of the Financial Stability Forum on Enhancing Market and Institutional Resilience,* April.

Buiter, W. 2007. "Lessons from the 2007 Financial Crisis", *CEPR Discussion Paper Series* No. 6596.

Noyer, C. 2007. "Basel II-New Challenges", Speech before the Bank of Algeria and the Algerian financial community, Algiers, December 16.

Wellink, N. 2008. "Basel II-Market Developments and Financial Institution Resiliency", Opening address at the Risk Minds Asia Conference-Basel II Implementation Summit, Singapore, March 4.

Trichet, J. 2008. "Remarks on the Recent Turbulences in Global Financial Markets", Keynote address at the Policy Discussion 'Global Economic Policy Forum 2008', New York University, New York, April 14.

[1] A forum of select senior representatives of national financial authorities including central banks, supervisory authorities and treasury departments, international financial institutions, international regulatory and supervisory groupings and committees of central bank experts.

several options available. Consequently, many of the countries that have voluntarily adopted Basel I also view these issues with considerable caution. Since the revised Framework has been designed to provide options for banks and the banking systems worldwide, the Basel Committee on Banking Supervision (BCBS) acknowledged that moving toward its adoption in the near future may not be the first priority for all non-G10 supervisory authorities in terms of what was needed to strengthen their supervision. It observed that each national supervisor was expected to consider carefully the benefits of the Basel II framework in the context of its domestic banking system when developing a timetable and approach for implementation. While it is true that the Basel II framework is more complex, at the same time, it has also been argued that this complexity is largely unavoidable mainly because the banking system and related instruments that have evolved in recent times are inherently complex in nature. The risk management system itself has become more sophisticated over the time and applying equal risk weights (as done in the Basel I accord) may not be realistic anymore. Moreover, for banks with straightforward business models and non-complex loan portfolios, the option to use the standardised approach in the Basel II framework is open, which adds very little in the way of complexity to their already existing models.

5.61 In the Basel II framework, rating agencies have been assigned a crucial role. However, rating agencies have limited penetration in many emerging countries. In the absence of reliable ratings for different assets, banking industry will not be able to fully exploit the flexibility of Basel II and most credit risks will tend to end up in the unrated 100 per cent category and as a result there will be little change in capital requirements relative to Basel I. It has also been argued that in the case of standardised approach, unrated borrowers will have a lower risk weight (100 per cent) as compared to the lowest graded borrower (150 per cent) and this may lead to moral hazard problem with lower grade borrowers preferring to remain unrated. This may also lead to adverse selection. Concerns have also been expressed about the quality of rating agencies' judgments. Even in the developed economies, the recent sub-prime crisis has highlighted the problems relating to the role of rating agencies.

5.62 The risk weights/implied correlations for different exposures under standardised or IRB approaches are based upon certain assumptions which may not be applicable in the context of emerging economies. For instance, 35 per cent risk weight for mortgage lending is based upon PD estimates and LGD of developed European/US markets and may not be adequate as the losses in secured real estate lending in countries like Taiwan, Thailand and Indonesia have at times exceeded 35 per cent. Thus, the regulators in developing countries need to independently assess whether all the assumptions of Basel II framework are applicable to their domestic markets and modify them suitably, if required.

5.63 One of the basic requirements of Basel II framework is higher capital allocation for assuming higher credit risk. In such a situation, there are some concerns that small businesses and poor segments of the society would receive no or very costly credit. This problem may prove to be serious, especially in developing countries. The regulatory and supervisory authorities in developing countries were, therefore, required to initiate other steps to ensure adequate supply of credit to these areas.

5.64 The advanced Basel II risk-modeling approaches have the potential to better align capital with risk. However, the advanced approaches themselves are not without limitations, and realising the benefits of these approaches will depend on (i) the adequacy of bank's internal processes and supervisory review surrounding the development and maintenance of models; (ii) the sufficiency of credit default and operational loss event data used as inputs to the regulatory and bank models that determine capital requirements; and (iii) regulators' attention to the appropriate level of risk-based capital. While initial estimates of the potential impact of Basel II showed some decline in minimum required risk-based capital, a considerable amount of uncertainty remains about the potential impact of Basel II on the level of regulatory capital requirements and the degree of variability in these requirements over the business cycle.

Challenges to Effective Implementation of Basel II

5.65 Apart from certain deficiencies of Basel II, its implementation presents several challenges, especially in emerging market economies. One of the major challenges is the availability of long time series data. Good and reliable data and information as also sophisticated IT resources are critical to the proper risk assessment under the Basel II framework. However, this may prove to be a major challenge in developing countries given the level of industry expertise, lack of historical data and absence of adequate technology. In view of these constraints, banks in emerging economies are forced to adopt the standardised approach. Moreover, the cost that medium to small banks may incur on acquiring the

required technology as well as training staff may prove to be enormous given their size.

5.66 Banks need to put in place sound and efficient operational risk management framework since this will be a focus under the Pillar 2 framework. The most important Pillar 2 challenge relates to acquiring and upgrading the human and technical resources necessary for the review of banks' responsibilities under Pillar 1. Other areas of concern include coordination of home and host supervisors in the cross-border implementation of Basel II; issues relating to outsourcing; common reporting templates for easy comparability; and external benchmarks to be made available by the regulator, and to be used for comparison/self-evaluation for the risk components/operational losses.

5.67 Aligning supervisory disclosures under Pillar 3 with international and domestic accounting standards has emerged as a major challenge. There are also issues relating to (i) reporting framework/ disclosures in the context of risk appetite for the stated business objectives and risk management systems in place; and (ii) providing information, on the risks and the risk management systems in place, in the public domain which could be used for comparison among banks. Market discipline is not possible if counterparties and rating agencies do not have good information about banks' risk positions and the techniques used to manage those positions.

5.68 Full implementation of Basel II would require upgradation of skills both at the level of supervisory authority and the banks. Banks would be required to use fully scalable state of the art technology, ensure enhanced information system security and develop capability to use the central database to generate any data required for risk management as well as reporting. The emphasis on improved data standards in the revised accord is not merely a regulatory capital requirement, but rather it is a foundation for risk-management practices that will strengthen the value of the banking franchise.

5.69 Data limitations is a key impediment to the design and implementation of credit risk models. Most credit instruments are not marked to market; hence, the predictive nature of a credit risk model does not derive from a statistical projection of future prices based on comprehensive historical experience. The scarcity of the data required to estimate credit risk models also stems from the infrequent nature of default events and the longer term time horizons used in measuring credit risk. Thus, in specifying model parameters, credit risk models require the use of simplifying assumptions and proxy data. The relative size of the banking book – and the potential repercussions on bank solvency if modelled credit risk estimates are inaccurate – underscores the need for a better understanding of a model's sensitivity to structural assumptions and parameter estimates.

5.70 The validation of credit risk models is also fundamentally more difficult than the backtesting of market risk models. Where market risk models typically employ a horizon of a few days, credit risk models generally rely on a timeframe of one year or more. The longer holding period, coupled with the higher target loss quantiles[4] used in credit risk models, presents problems to model-builders in assessing the accuracy of their models. A quantitative validation standard similar to that in the Market Risk Amendment would require an impractical number of years of data, spanning multiple credit cycles.

5.71 The relative size of the banking book and the length of the relevant planning horizon at most institutions are much greater than those of the trading account. Hence, errors in measuring credit risk are more likely to affect the assessment of the bank's overall soundness. Moreover, it is more likely that significant losses can accumulate unnoticed in the banking book, as they are not marked to market.

5.72 The costs associated with Basel II implementation, particularly costs related to information technology and human resources, are expected to be quite significant for both banks and supervisors. Even in the absence of Basel II, well managed financial institutions and regulatory authorities would have continued to update and improve their IT systems and risk management practices simply to keep pace with the evolving practices in the marketplace. However, Basel II has pushed banks and supervisors for development of human resource skills and IT upgradation. In this context, the challenge that banks are likely to face will have many facets, *viz*., assessing requirements, identifying and bridging the gaps, identifying talents, putting the available talents to optimum use, attracting fresh talents, retention of talents, and change management.

[4] A value which divides a set of data into equal proportion.

5.73 Though the Basel II aims to achieve common standards, its implementation also requires closer cooperation, information sharing and co-ordination of policies among supervisors. The existence of separate supervisory bodies to regulate different segments of the markets within a jurisdiction may create challenges in implementation of Basel II not only within a jurisdiction but also across jurisdictions. This is because when different market participants are regulated by separate supervisors, it is difficult to maintain comparable quality of policy formulation and vigilance. In many developing countries, only the banks are coming under the ambit of Basel II and not other financial services providers, thus creating some scope for regulatory arbitrage.

5.74 The Basel Core Principles (BCPs) for banking supervision were first devised in 1997 and revised in October 2006 to incorporate a number of sound supervisory practices in tune with the changing financial environment, particularly in the areas of risk management and disclosure norms. The Executive Board of the International Monetary Fund (IMF) indicated that premature adoption of Basel II in countries with limited capacity could inappropriately divert resources from the more urgent priorities, ultimately weakening rather than strengthening supervision. Furthermore, they felt that countries should give priority to strengthening their financial systems comprising institutions, markets and infrastructure and focus on achieving greater level of compliance with the Basel Core Principles. In the same vein, it is recognised by the BCBS that while Basel II has been designed to provide options for banks and banking systems worldwide, moving towards its adoption may not be a first priority for all supervisory authorities in terms of what is needed to strengthen their supervision.

5.75 The IMF (jointly with the World Bank), as a part of its financial sector assessment programs, have reviewed countries' compliance with the Basel Core Principles (BCP). In the course of 71 confidential assessments covering 12 advanced, 15 transition and 44 emerging economies, it was found that all advanced economies under consideration complied with the core principles regarding market risk and risk management. In contrast, 66 per cent of emerging economies and 53 per cent of transition economies did not comply with such principles. Given this level of compliance, the challenges that are likely to be faced by the emerging economies in implementing the Basel II framework will be daunting.

5.76 The Reserve Bank of India is committed to the implementation of the Basel core principles on banking supervision. Based on assessment of its own position with respect to the 1997 principles, working groups were set up to make recommendations on strengthening certain areas such as risk management system for banks, amendments to banking legislation, developing a framework for home and host country relations, and enhancing inter-agency and inter-department cooperation. The new BCPs revised in 2006 include several new regulatory issues relating to capital adequacy, risk management, consolidated supervision and lack of supervisory independence, which are the building blocks for Basel II framework. As mentioned earlier, all scheduled commercial banks in India would be implementing the Basel II norms by end-March 2009. By then, several new core principles are expected to be complied with. The Reserve Bank is currently in the process of examining the new BCPs on banking supervision for implementation.

Basel II and Pro-cyclicality

5.77 A robust regulatory and supervisory regime for banks is fundamental to ensuring financial stability and growth. This is because banks continue to be the main source of credit for most businesses and entrepreneurs. While Basel II purportedly intends to improve financial stability, it is argued that the New Basel Capital Framework through greater sensitivity of bank's capital requirement to the risk of its assets, could make bank lending more pro-cyclical, and thus could entail adverse systemic impact.

5.78 The cyclical effects of bank capital regulation have been the subject matter of discussion in literature both at theoretical and empirical levels. The debate has become more animated since 1999 when the revision of the old Accord started to take shape (BIS, 2001).The concerns arising regarding cyclical effects of bank capital regulation have primarily been two-fold. On the one side, there is a belief that since in a downturn, specific provisions and write-offs increase, this would reduce banks' capital and diminish their appetite for making new loans. A second, more generalised concern, especially under the new Accord has been that as the condition of borrowers deteriorates during an economic downturn, they will be downgraded by banks with the consequence that extra capital has to be set aside, potentially exacerbating the capital shortage.

5.79 Business cycle expansions are often supported by increases in the profitability of financial institutions and a greater willingness of these institutions to take on risks and to compete aggressively for new business. In the downward phase

of the cycle, the process can work in reverse. As profitability declines and confidence falls, financial institutions can retreat from risk taking and seek greater compensation for the risks that they are prepared to take. This is especially the case if during the contraction phase, the balance sheet of financial institutions is significantly impaired (BIS, 2002).

5.80 At the theoretical level, an explicit treatment of the impact of capital requirements on the level of economic activity has been provided by Holmstrom and Tirole (1997) within a framework that offers a rationale for applying lower solvency ratios in recessions. Their findings reveal that, in a world where agents, both in the real and financial sector may be capital constrained, market-driven solvency ratios are pro-cyclical, *i.e*., they are higher during expansions and lower during recessions. More precisely, they show that a negative shock to banks' capital negatively impacts the level of economic activity and that the lower level of investment generated by the capital crunch requires a reduction of market-determined solvency ratios. Lack of discrimination between idiosyncratic and macroeconomic shocks may have undesirable effects by negatively affecting bank managers' risk-taking incentives (Dewatripont and Tirole, 1994). Bank managers would, in fact, be punished both for idiosyncratic shocks that are under their control and for macroeconomic shocks that are outside their control, and thus the Basel standards could prove 'excessively tough on bank managers in recessions'.

5.81 The potential of Basel II to amplify the cyclicality of capital requirements is also well-recognised empirically (Danielson, *et al.*, 2001; Lowe, 2002; Ayuso, *et al.*, 2004). Empirical evidence does suggest that the introduction of more severe capital regulation may have reduced bank credit supply across several emerging economies (Chiuri *et al.,* 2001). The literature estimating the cyclicality of capital requirements under Basel II reveals that Basel II impact can be large and economically significant (Kashyap and Stein, 2004). The response of capital ratios to default risks can reduce banks' incentives to lend during a recession and worsen economic activity. In the Indian context, the empirical evidence regarding cyclicality of loan loss provisions based on data of state-owned banks for the period 1997-2002 suggested that state-owned banks, on an average, tended to postpone provisioning when faced with favourable cyclical and income conditions, until negative conditions set in (Ghosh and Nachane, 2003). Thus, capital requirements as envisioned under Basel II could increase macroeconomic instability. However, this assertion is based on risk-based capital requirements considered largely as an isolated instrument, as opposed to merely one component of regulation. The question that arises is whether pro-cyclicality is inevitable under risk-based capital standards or whether there are other features of regulation that may attenuate it (Pennacchi, 2004).

5.82 That the risk-based capital requirements are pro-cycle in nature (more capital is required in recessions because credit risk in banks' portfolios increases in cyclical downturns) was also recognised by the Basel Committee on Banking Supervision (BCBS). In a Consultative Paper issued by the BCBS in 1999, the Financial Stability Forum had raised the question whether several features of the new capital framework discussed by the BCBS could increase the cyclical fluctuations in the economy. In response, the BCBS confirmed that risk-based capital requirements were inevitably pro-cyclical, but could be addressed by different instruments. During the course of consultation, the Basel Committee maintained that various features of the risk weights of the IRB approach under Pillar 1 can be expected to mitigate its pro-cyclical impact. For example, the length of the observation period mandated for estimating PD is at least five years and that for LGD and EAD seven years, with the qualification that if the observations for any of the sources used span a longer period, then the latter should be used. Basel II requires banks to estimate long run average PD and downturn LGD, which to a great extent reduced the variability of capital requirement with respect to business cycles.The greater allowance for eligible provisions can also be expected to reduce the importance in risk-weighted assets of defaulted loans during cyclical downturns, when such loans increase as a proportion of banks' portfolios. The Committee further recommended that national supervisors could also promote the use of internal models leading to lower pro-cyclicality. Measures such as through-the-cycles rating methodologies could also 'filter-out' the imapct of business cycle on borrower rating. Supervisors could also prescribe additional capital under Pillar 2 during a business cycle expansion.

Implementation of Basel II across Countries

5.83 Implementation of the Basel II Framework continues to move forward around the globe in both Basel Committee member and non-member countries. In July 2004, the BIS conducted a survey amongst non-Basel Committee members, which included 115 jurisdictions in Africa, Asia, the Caribbean, Latin America, the Middle East and non-

BCBS Europe with the objective of identifying Basel II implementation plans and determining corresponding capacity building needs in the non-BCBS supervisory community. Out of the 107 responses received, 88 non-BCBS jurisdictions indicated their intentions to adopt Basel II. Therefore, taking into account the 13 BCBS member countries, more than 100 countries worldwide were expected to implement Basel II.

5.84 A survey of select countries reveals that different countries have followed different time schedule for implementing Basel II norms. Japan implemented Basel II norms in 2007. In many other jurisdictions, the necessary infrastructure (legislation, regulation, supervisory guidance, *etc.*) to implement the Framework is either in place or is being put in place. This will allow more countries to proceed with implementation of Basel II in 2008 and 2009. During this timeframe, a little more than 5,000 banks controlling almost 75 per cent of banking assets in 73 non-BCBS jurisdictions are expected to switch over to Basel II. One of the major drivers for moving to Basel II in non-BCBS jurisdictions seems to be the intended implementation of this framework locally by foreign controlled banks or local branches of foreign banks. China would be adopting Basel II norms from 2010.

5.85 Different countries have shown their respective preferences for different approaches. While Singapore has allowed banks to choose any approach commensurate with the bank's risk profile, most countries have prescribed a particular approach/es to be followed by banks. For Pillar 1 - minimum capital requirements - the foundation internal ratings-based (IRB) approach is envisaged to be the most used methodology for calculating capital requirements for credit risk (in terms of banking assets moving to Basel II). The (simplified) standardised approach follows closely behind the foundation IRB. As regards operational risk, the basic indicator approach is expected to be widely employed across regions. The most advanced methodologies for credit and operational risks are expected to be applied in a few cases across jurisdictions (Annex V.1 and Table 5.2).

Table 5.2: Timeline and Approaches for Implementation of Basel II-Select Countries

Country	Implementation Date	Approaches	
		Credit Risk	Operational Risk
1	2	3	4
China	2010	..	..
Hong Kong	2007-2008	SA/F-IRB/A-IRB	BIA/SA/AMA
Indonesia	2009	SA (2009) F-IRB (2010)	BIA (2008) SA/AMA (2010)
Japan	End-March 2007	F-IRB (March 2007) / A-IRB (March 2008)	BIA/SA(2007)/AMA (2008)
Republic of Korea	2008	SA /F-IRB/A-IRB	SA
Malaysia	2008	SA (2008) / F-IRB (2010) / A-IRB (2010)	SA
Philippines	July 2007	SA/F-IRB (2010) / A-IRB (2010)	BIA/SA/AMA
Singapore	January 1, 2008	Any approach commensurate with the bank's risk profile	
Thailand	End-2008	SSA/F-IRB (2009)/A-IRB (2009)	BIA/SA
USA	2008	SA/F-IRB/ A-IRB	SA/AMA
Brazil	2006-2011	..	..
European Union	2007-2008	Capital Requirements Directive (CRD) which broadly follows Basel II.	
Russia	2008 (Pillar 1) 2009 (Pillar 2 and 3)	SSA	BIA
Australia	2007-2008	F-IRB/A-IRB	AMA
New Zealand	January 2008	SA/F-IRB/A-IRB	SA/AMA

.. : Not available.
SSA : Simplified Standardised Approach.
SA : Standardised Approach.
F-IRB: Foundation Internal Ratings Based Approach.
BIA : Basic Indicator Approach.
AMA : Advanced Measurement Approach.
A-IRB: Advanced Internal Ratings Based Approach.

5.86 The implementation plans in regard to Basel II, as far as Asia-Pacific is concerned, may be broadly divided into three ranges – one, where the simplest approaches and the most advanced approaches are available at the time of first implementation (Australia, Korea, Singapore and New Zealand); second, where the simplest approaches are available initially and at least one of the most advanced approaches is available within a year or two thereafter (Hong Kong, Japan, Indonesia and Thailand); and third, where the simplest approaches are allowed initially and the date of availability of the most advanced approaches is yet to be announced or are available after more than two years (China, India, Malaysia and Philippines). Further, one might be able to link the choice of the above broad ranges to the extent of share of foreign banks in the respective banking sectors. It is observed that the banking systems where foreign banks account for a significant share in the banking assets (Singapore and Hong Kong) are reflecting a desire to adopt the advanced approaches ahead of those territories where the foreign bank share is not significant. One might also see a similar trend in respect of countries which might remain on Basel I for a longer period before migrating to Basel II (China) (Annex V.1).

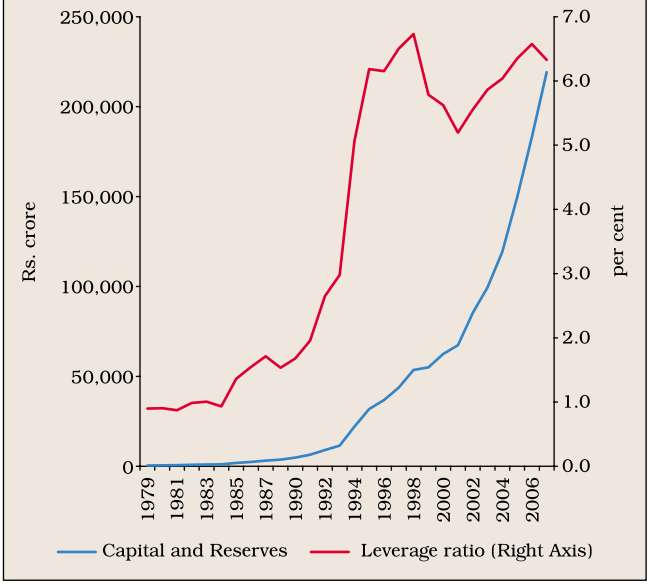
V. MANAGING CAPITAL AND RISK: INDIAN EXPERIENCE

5.87 Capital adequacy has traditionally been regarded as a sign of strength of the financial system in India. In terms of Section 17 of the Banking Regulation Act, 1949, every banking company incorporated in India is required to create a reserve fund[5]. In India, before adoption of Basel I, the only regulatory capital requirement for banks was the minimum capital requirements laid down in the Banking Regulation Act, 1949 and the respective acts governing the functioning of public sector banks.

5.88 In the pre-nationalisation phase of Indian banking, capital standards attracted some attention from the Reserve Bank. The declining ratio of capital (paid-up capital plus reserves) to total deposits from 9 per cent in 1950 to 4 per cent in 1960 for Indian banks, prompted the Reserve Bank to advise banks to aim at a ratio of 6 per cent, through compulsory transfers of 20 per cent of declared profits to reserves (Jagirdar, 1997). In the post-nationalisation period, however, the issue of capitalisation received less attention, and the capital to deposit ratio for public sector banks fell to fairly low levels (less than 2 per cent) in the early 1990s. The capital to debt ratio of the scheduled commercial banks, which was 0.9 per cent in 1979, increased 2.0 per cent by end-March 1991. The ratio increased to 3.0 per cent at end-March 1993 and sharply thereafter to 5.1 per cent in the next year before stabilising at around 6.0 per cent level thereafter (Chart V.2). The sharp increase in the ratio from the year ended March 1993 and onwards was on account of application of capital adequacy norms from the year ended March 1993.

5.89 Though the Government ownership of banks does provide greater comfort to the depositors and investors, internationally regulators do not distinguish between the public sector and private sector banks for the purpose of application of capital adequacy norms so as to ensure a level playing field between public sector and private sector banks. Moreover, there is a need to provide the right incentives to the management of public sector banks so that they can perform in a competitive environment. However, Government ownership makes an indirect favourable impact on the capital position of banks as at the same level of financial indicators, the rating agencies would perhaps accord a better rating to a public sector bank. Also, the customers in many areas still view the public

Chart V.2: Captial and Leverage Ratio for Indian Banks



[5] Recently banks have been advised to transfer a sum equivalent to not less than 25 per cent of its disclosed profits to the reserve fund every year.

sector banks as safer entities for placing their deposits and are ready to forego some higher interest on deposits offered by others.

5.90 The Statutory Liquidity Ratio (SLR), essentially conceived as a prudential safeguard, derives its legal sanction from Section 24 of the Banking Regulation Act, 1949. The definition of liquid assets included cash, gold or unencumbered approved securities, reflecting the concept of immediate mobilisation or liquefaction of the assets. The introduction of SLR was the outcome of the action taken to prevent banks from offsetting the impact of variable reserve requirements by liquidating their Government security holdings, amounting to not less than 20 per cent of the total demand and time liabilities. The Act was, therefore, amended in 1962 by insertion of a new sub-section (2A) in Section 24, requiring all banks to maintain a minimum amount of liquid assets equal to not less than 25 per cent of their demand and time liabilities in India, exclusive of the balances maintained under Section 42 of the Reserve Bank of India Act in the case of scheduled banks, and exclusive of the cash balances maintained under Section 18 of the Banking Regulation Act in the case of non-scheduled banks. Although the SLR was instituted as a prudential requirement, it became an instrument for financing the Government deficit and requirements of certain public sector entities in the 1970s and the 1980s. However, after the initiation of financial sector reforms in 1992, the SLR was gradually reduced to 25 per cent by October 1997, and has remained unchanged since then. Even though, the application of SLR reduces the free liquidity at the disposal of banks at any time for lending, it provides additional cushion to the banking system. To the extent, banks' invest in Government securities, it reduces the need for capital. This is because, unlike commercial loans, such investments carry nominal risk weight (2.5 per cent). Also, SLR investments provide cushion to banks to absorb shocks.

5.91 The Report of the Committee on the Financial System (Chairman: Shri M. Narasimham) suggested that the banks and financial institutions should achieve a minimum of 4 per cent capital adequacy ratio in relation to risk weighted assets by March 1993, of which Tier 1 capital should be not less than 2 per cent. Adopting the general approach of gradualism in harmonising regulations with the global standards, India implemented the Basel norms on capital adequacy in April 1992 spread over three years – banks with branches abroad were required to comply with minimum capital to risk weighted assets requirement of 8 per cent by end-March 1994, while other banks were required to comply by end-March 1996. It was decided in October 1998 to raise the stipulated minimum CRAR by one percentage point to 9 per cent from the year-ended March 2000. Further, India responded to the 1996 amendment to the Basel I framework, which required banks to maintain capital for market risk exposures, initially by prescribing various surrogate capital charges for these risks between 2000 and 2002. These were replaced with the capital charges as required under the Basel I framework in June 2004, which became effective from March 2005. India has gone a step further than the Basel I requirement in at least two respects. One, banks in India are required to maintain 9 per cent CRAR as against the Basel requirement of 8 per cent. Two, banks in India are required to maintain capital charge for market risk also on their 'available for sale' portfolio with effect from the year ended-March 2006, apart from 'held for trading' categories.

5.92 The main difficulty encountered in implementing Basel I was the poor financial health of all banks in India in general and public sector banks in particular. Besides, the lack of a well-developed equity capital market in India at that time and the poor fiscal position of the Central Government also made it difficult for the banks to raise enough capital to comply with the requirements of Basel I. The problem was resolved mainly through the issuance of recapitalisation bonds by the Government of India to public sector banks. The improvement in capital adequacy was not to be brought by capital infusion alone. There was need to increase internal accruals by lowering costs, improving profitability, reducing NPAs and improving recovery. The successful implementation of this strategy also required an overall change in corporate governance, work practices, attitude towards customer service and skill development. There was also need for improving the operating environment of banks in terms of debt recovery laws, development of financial markets, infrastructure facilities, accounting standards and improving competitive efficiency.

5.93 The Board for Financial Supervision (BFS) constituted in November 1994 within the Reserve Bank as one of the committees of the Central Board of Directors of the Reserve Bank played a key role in setting up capital adequacy parameters and disclosure norms in the Indian banking sector

(detailed in Chapter III and X). One of the early initiatives of the BFS was the restructuring of the system of bank inspections with focus on a modified version of the CAMEL model, *viz*., CAMELS which evaluates banks' capital adequacy, asset quality, management, earnings, liquidity and systems and control. Prompt corrective action (PCA), introduced in 2003 as a structured early intervention system, was linked to the capital adequacy ratio. A schedule of corrective actions based on three parameters, *i.e.,* capital adequacy (CRAR), asset quality (net NPAs to net advances) and profitability (return on assets) was put in place. For every trigger point, a set of mandatory and discretionary PCAs were laid down, and banks falling under the trigger zones were advised to take necessary corrective actions from time to time. Under the BFS guidance, the risk based supervision (RBS) process was introduced on a pilot basis in certain select banks during the inspection cycle 2003-04, initially in parallel with the present system of inspection under CAMELS/CALCS. The RBS process envisaged monitoring of banks by allocating supervisory resources and focusing supervisory attention, depending on the risk profile of each institution, and continuous monitoring and evaluation of the appropriateness of the risk management system in the supervised institution in relation to the riskiness of its business strategy and exposures.

Broad Contours of Basel II Implementation in India

5.94 As per normal practice with regard to all changes in the financial sector, and with a view to ensuring a smooth migration to Basel II, a consultative and participative approach was adopted for both designing and implementing Basel II framework. Accordingly, a Steering Committee was constituted comprising senior officials from 14 banks (public, private and foreign) and representatives of the Reserve Bank and the Indian Banks' Association (IBA). On the basis of the recommendations of the Steering Committee, the Reserve Bank released draft guidelines for implementation of Basel II in India on February 15, 2005. The draft guidelines were revised and released on March 20, 2007 for comments/feedback. On the basis of the feedback received, the guidelines were finalised on April 27, 2007 for implementation.

5.95 The final guidelines on Basel II, *i.e*., 'Prudential Guidelines on Capital Adequacy and Market Discipline – Implementation of the New Capital Adequacy Framework (NCAF)' by the Reserve Bank initially covered the Pillar 1 and Pillar 3 requirements under the revised framework released by the BCBS. The Pillar 2 guidelines were released recently on March 26, 2008. Accordingly, foreign banks operating in India and Indian banks having operational presence outside India have adopted the standardised approach (SA) for credit risk and basic indicator approach (BIA) for operational risk for computing their capital requirements under the revised framework with effect from March 31, 2008. All other commercial banks (excluding local area banks and regional rural banks) are required to migrate to these approaches under the revised framework in alignment with them but in any case not later than March 31, 2009. These banks shall continue to apply the standardised duration approach (SDA) for computing capital requirement for market risks under the revised framework. The standardised approach for credit risk is more risk sensitive than the Basel I framework and simpler to implement and supervise than the advanced approaches envisaged under the Basel II framework. The standardised approach could also be viewed as an interim solution to allow the regulators time to further assess the feasibility of the advanced approach. Banks are required to obtain the prior approval of the Reserve Bank to migrate to the internal rating based (IRB) approach for credit risk and the standardised approach or the advanced measurement approach (AMA) for operational risk for computing regulatory capital requirements. The Reserve Bank has advised banks to adopt a certain degree of infrastructure, which at times goes beyond the demands of the Accord. It has been made very clear that minimalistic compliance is not sufficient.

5.96 India has adopted a three-track approach for implementation of Basel II. In India, 79 commercial banks account for about 78 per cent of the total assets of the banking sector; over 3,000 co-operative banks account for 9 per cent; and 91 regional rural banks account for 3 per cent. Taking into account the size, complexity of operations, relevance to the financial sector, need to ensure greater financial inclusion and the need for having an efficient delivery mechanism, the capital adequacy norms applicable to these entities have been maintained at varying levels of stringency. On the first track, the commercial banks are required to maintain capital for both credit and market risks as per Basel II framework; the co-operative banks, on the second track, are required to maintain capital for credit risk as per Basel I framework and through surrogates for market risk; the regional rural banks, on the third track, have a

minimum capital requirement which is, however, not on par with the Basel I framework. Consequently, a major segment of systemic importance of the Indian banking sector will be on a full Basel II framework, a portion of the minor segment partly on Basel I framework, and a smaller segment on a non-Basel framework. Thus, in the post-March 2009 scenario, Basel II, Basel I and non-Basel entities would operate simultaneously in the Indian banking system. Similarly, even amongst the Basel II entities, it is likely that in due course, as and when the avanced approaches are permitted in India, banks will be implementing various combinations of the multiple options available for computing capital requirements for the three major risks. Consequently, Basel II implementation would be a part of a spectrum of frameworks within which there could be progressive enhancement of quality amongst different categories. Given the differential risk appetite across banks and their business philosophies, it is likely that banks would 'self select' their own approach which, in turn, is likely to engender a stabilising influence on the system as a whole (Reddy, 2006).

Pillar 1

5.97 Following the BCBS framework, Pillar 1 prescribes capital charge for three types of risks, *viz*., credit risk, market risk and operational risk. Under the standardised approach adopted for credit risk, the rating assigned by the eligible external credit rating agencies (CRAs), *i.e.,* those recognised by the Reserve Bank for assigning risk weights for capital adequacy purposes as per the mapping furnished in the guidelines, would largely support the measure of credit risk capital. Furthermore, for the purpose of assigning risk weights to on-balance sheet items, the entire fund based and non-fund based claims of the banks are required to be classified as per the counterparty into certain asset heads such as domestic sovereigns, foreign sovereigns, public sector entities, and corporate, among others.

5.98 For external credit rating assessment, four domestic credit rating agencies (*viz*., Credit Analysis and Research Ltd., CRISIL Ltd., Fitch India and ICRA Ltd.) and three international credit rating agencies (Fitch, Moody's and Standard and Poor's) have been accredited by the Reserve Bank (Box V.6).

5.99 The treatment of off-balance sheet exposures largely remains unchanged from the Basel I framework, with a few exceptions. The off-balance sheet items are to be divided into market related and non-market related categories. While the credit equivalent amount in the case of a non-market related off-balance sheet items would be determined by multiplying the contracted amount of that particular transaction by the relevant credit conversion factor specified in the regulation, in the case of a market related off-balance sheet item, whether held in the banking book or trading book, the credit equivalent amount is to be determined by the current exposure method.

5.100 For on-balance sheet securitisation exposures, banks are required to calculate the risk weighted amount exposure by multiplying the principal amount (after deduction of specific provisions) of exposures by the applicable risk weight as prescribed in the guidelines. For the rated off-balance sheet securitisation exposures, banks are required to calculate the credit equivalent amount by multiplying the principal amount of the exposure (after deduction of specific provisions) with a 100 per cent credit conversion factor, unless otherwise specified. If the off-balance sheet exposure is not rated, it must be deducted from capital, except an unrated eligible liquidity facility.

5.101 A wide range of credit risk mitigants for the banking book exposures and counterparty credit risk charges for OTC derivatives and repo-style transactions in the trading book, have been permitted under the revised framework provided these techniques satisfy certain principles and standards, including legal certainty, documentation and disclosure. The treatment for different types of credit risk mitigation (CRM) techniques, *viz*., collateralised transactions, on-balance sheet netting and guarantees, however, differs.

5.102 In India, the market for loan assets sale has a limited member of participants at present. The Reserve Bank had issued guidelines/directives to ARCs, permitting Indian banks and financial institutions to participate in papers issued by ARCs. The Reserve Bank has so far issued certificate of registration (CoR) to six securitisation companies/ reconstruction companies (SCs/ RCs), of which three have commenced their operations. At end-June 2007, the book value of total amount of assets acquired by SCs/RCs registered with the Reserve Bank was at Rs.28,544 crore. There is a large potential for such market to grow which would provide a very effective tool for credit risk management. Banks in the near future, driven by Basel II, would have a better risk profile of their credit portfolios. The imbalances in the portfolios would create a demand for hedging/balancing instruments,

Box V.6
State of Rating Practices in India

Credit-rating in India is relatively new, compared to the developed economies. The first rating agency, CRISIL, was set up in 1987. Credit-rating was made mandatory for commercial papers and debentures from 1991 - when ICRA, India's second credit-rating agency was established. Since then, the rating industry has grown significantly in terms of rated debt issued and subscribed, both at the corporate and retail levels (primarily fixed deposits).

The importance of credit rating agencies in India as information providers, which had been increasing, came to greater focus with the adoption of Basel II framework. The rating agencies in India face two constraints which impact their default statistics. One, they have a small base of rated entities. Two, they lack the geographical diversification benefits which the international rating entities enjoy. The processes and methodologies adopted by rating agencies in India are generally in alignment with those of the international rating agencies. Moreover, despite the above two constraining factors, their default statistics may not be out of sync with the Basel trigger ratios. The domestic rating agencies are equipped to scale up their resources, when required, to cater to a higher demand for ratings consequent upon implementation of Basel II. At present, the ratings in India are issue specific and not issuer specific. The rating agencies, therefore, are also working out methodologies for undertaking issuer ratings. It is, therefore, expected that with the implementation of Basel II in India, the proportion of rated entities is likely to increase over a period – providing the appropriate basis for risk discrimination in the system.

The rating system is required to undergo a validation process consisting of a formal set of activities, instruments and procedures for assessing the accuracy of the estimates of all material risk components and the regular operation, predictive power and overall performance of the IRB system adopted. In the validation process, the bank has to, on an ongoing, iterative basis, verify the reliability of the results generated by the rating system and its continued consistency with regulatory requirements, operational needs and developments in the reference market. Achieving these objectives requires the performance of quantitative and qualitative analyses, the breadth and depth of which is modulated in accordance with the type and scope of the portfolios examined, the overall complexity of the bank, and the reliability of the environment under analysis. The validation instruments and methods need to be periodically reviewed and adjusted in order to ensure that they remain appropriate in a context of continually evolving market variables and operating conditions. The validation process shall not consist solely of a statistical comparison of actual risk measures against the related *ex ante* estimates, but will also involve analysis of all the components of the IRB system, including operational processes, controls, documentation, IT infrastructure, as well as an assessment of their overall consistency. The validation process involves verifying compliance with the quantitative and organisational requirements for the rating systems. Specifically, this should include: (i) assessment of the model development process, with particular reference to the underlying logical structure and the methodological criteria supporting the risk parameter estimates; (ii) performance analyses of the rating system; (iii) parameter calibrations, benchmarking and stress tests verification that the rating system is actually used in the various areas of operations. The results of the validation process should be adequately documented and periodically submitted to the internal control functions and the governing bodies and should specifically address any problem areas.

Non-availability of adequate information, lack of separate departments for bond rating in different type of industries and subjective analysis of qualitative factors are some of the main problems which obstruct the smooth functioning of the working of the rating agencies in India. The objective operationalisation of subjective parameters, development of an independent database for industry-specific information, periodic organisation of training programmes and seminars by financial experts to improve the skills of rating analysts and establishment of private rating agencies to increase the competition and their efficiency which could go a long way for improving the functioning of the rating system.

which would form the core of the credit derivative market in India (Box V.7).

5.103 With regard to market risks, as banks in India are still in a nascent stage of developing internal risk management models, banks were allowed to adopt the standardised method to start with. As duration method is a more accurate method of measuring interest rate risk, it was decided to adopt standardised duration method to arrive at the capital charge.

5.104 The minimum capital requirement for market risks is expressed in terms of two separately calculated charges: (i) 'specific risk' charge for each security which is designed to protect against an adverse movement in the price of an individual security; and (ii) 'general market risk' charge towards interest rate risk in the portfolio, where long and short positions (which is not allowed in India except in derivatives) in different securities or instruments can be offset. Capital charge for specific risk (*akin to* credit

Box V.7
Credit Derivatives and Credit Risk Management

Credit derivatives are instruments that transfer a part or all of the credit risk of an obligation (or a pool of obligations), without transferring the ownership of the underlying asset(s). This is usually achieved by transferring risk on a credit reference asset. Three common forms of credit derivatives are credit default swap (CDS), total return swap (TRS) and credit linked note (CLN). The vast majority of credit derivatives take the form of the *credit default swap* (CDS), which is a contractual agreement to transfer the default risk of one or more *reference entities* from one party to the other. One party, the protection buyer, pays a periodic fee to the other party, the protection seller, during the term of the CDS. If the reference entity defaults, declares bankruptcy, or another *credit event* occurs, the protection seller is obligated to compensate the protection buyer for the loss by means of a specified *settlement* procedure. The reference entity is not a party to the contract, and it is not necessary for the buyer or seller to obtain the reference entity's consent to enter into a CDS.

Credit derivative markets are most active where credit quality measurement and rating systems are transparent and have widespread adoption as in North America and Europe. In addition, the demand for structured credit products in Asia and the Middle East, has been growing. The rapid pace of growth and widespread participation in the credit derivatives market in several countries has transformed the financial landscape. The development and growth of the market for credit derivatives has changed the way banks have been managing their credit risks, for instance by allowing the largest among them to reduce the degree of concentration of loan book exposures to single corporation or industries. Credit derivatives have significance for both banks and investors in mitigating credit risk. For instance, a commercial bank can use credit derivatives to manage the risk of its loan portfolio and an investment bank can use credit derivatives to manage the risks it incurs when underwriting securities. Investors, such as an insurance company, asset manager, or hedge fund, can use credit derivatives to align its credit risk exposure with its desired credit risk profile.

On the positive side, credit derivatives in international markets have effectively helped to enhance the efficiency of the financial system by providing to both bank and non-bank financial institutions access to a broader range of risk-return combinations and a wider pool of underlying risks and enhancing the liquidity of corporate bond markets. In addition, investors continue to effectively discriminate risk across sectors in periods of greater stress. The information revealed through credit derivative mechanism is very useful for supervision and market surveillance.

Credit derivatives, however, pose risk management challenges of their own. Credit derivatives can transform credit risk in intricate ways that may not be easy to understand. Complex credit derivatives rely on complex models, leading to model risk. Credit rating agencies interpret this complexity for investors, but their ratings can be misunderstood, creating rating agency risk. The settlement of a credit derivative contract following a default can have its own complications, creating settlement risk. However, apart from the above mentioned risk, the credit risk remains the core risk in the credit derivative segment. The use of credit derivatives instruments has typically changed the underlying borrower-lender relationship and establish new relationships between lenders that become risk shedders and the new risk takers. This new relationship has the potential for market failure due, for instance, to asymmetric information. The growth of hedge funds, particularly credit-oriented hedge funds, has accelerated market development and credit risk dispersion. While credit derivative markets increasingly facilitate the primary transfer of credit risk, secondary market liquidity is still lacking within some segments, creating the potential for market disruptions. As such, these markets are subject to increased attention from supervisors and policymakers and raise some supervisory concerns.

The role that credit derivatives played in the 2007 subprime crisis is well documented. The macroeconomic environment with a prolonged period of low interest rates, high liquidity and low volatility led to underestimation of risks by financial institutions, breakdown of credit and risk management practices in many financial institutions, and shortcomings in financial regulation and supervision. Banks, especially in the US, increasingly turned to 'originate and distribute' model in which they bundled and sold standardised mortgages as securities. Though favourable credit ratings were obtained for most of these bundled securities by carefully structuring their priority in receiving cash flow from servicing of the original portfolio, many of these were in reality subprime securities. As housing prices in the US declined, the defaults rose in several leading international banks. The kind of problems witnessed in the US sub-prime mortgage market could also surface in other types of lending such as leveraged loans and consumer credit. Furthermore, such problems may not confine to industrial countries, but could surface in other emerging economies as well where financial institutions take excessive risks in the wake of weak lending practices, and where regulatory and supervisory frameworks are found to be inadequate.

In the Indian context, although derivative instruments were introduced in July 1999 in the money/foreign exchange market in the form of forward rate agreements (FRAs) and interest rate swaps (IRS), credit derivatives are yet to be introduced. The Annual Policy Statement 2007-08 announced the introduction of credit derivatives in India in a calibrated manner. In view of certain adverse developments in the international financial markets, especially credit markets, resulting from recent financial turmoil, as also considering the level of risk management systems and possible non-adherence to the regulatory guidelines on complex products such as credit derivatives, it was widely felt that time is not opportune to introduce the credit derivatives in India for the present. As such, the Reserve Bank announced on June 19, 2008 its decision to keep in abeyance the issuance of the final guidelines on introduction of credit derivatives in India.

References:

Fitch Ratings. 2005. "Global Credit Derivatives Survey: Risk Dispersion Accelerates". *Fitch Ratings Special Report,* November.

IMF. 2006. "The Influence of Credit Derivative and Structured Credit Markets on Financial Stability". *Global Financial Stability Report.*

Long, D. 2004. "Credit Derivatives: Analyzing New Development and Risks". Available on http://www.ppllc.com/OurNews/Articles/2004_07_Garp_CDS.pdf

RBI. 2007. *Report of the Working Group on Introduction of Credit Derivatives in India*. May 16. Available on http://rbidocs.rbi.org.in./rdocs/PublicationsReport/Pdfs/35293.pdf

risk) as well as general market risk has been stipulated at nine per cent and is to be computed on the banks' gross equity positions (Box V.8).

5.105 To begin with, banks in India are required to compute their capital requirements for operational risk using the basic indicator approach. Under this approach, banks must hold capital for operational risk equal to the average over the previous three years of a fixed percentage (15 per cent at present) of positive annual gross income. If negative gross income distorts a bank's Pillar 1 capital charge for operational risk, the Reserve Bank could consider appropriate supervisory action under Pillar 2.

5.106 The basic indicator approach does not require elaborate computation for arriving at regulatory capital (as compared to the standardised or alternative standardised approaches), or for quantification of operational risk (advanced management approach, *i.e*. AMA). Though the Reserve Bank has mandated only the basic indicator approach to begin with, banks realise that the only way to reduce regulatory capital requirement on account of operational risk is to eventually migrate to AMA. While it might be possible for individual banks to collect loss data for 'high frequency and low severity' events that are sufficient to apply statistical techniques, the same might not be possible for 'low frequency and high severity' events. Hence, the need for sharing loss data among banks is strongly felt. One of the suggestions includes setting up of a data exchange by Indian Banks' Association (IBA) on similar lines as that of the Global

Box V.8
Adoption of Capital Charge for Market Risks in India

The major focus of prudential regulation in India as in other developing countries has traditionally been on credit risk. While banks and their supervisors have grappled with non-performing loans for several decades, interest rate risk is a relatively new problem. The easing of financial repression that took place in many countries in the 1980s and the 1990s generated some experience with interest rate volatility in these countries compared with administered interest rate regime with near-zero volatility. In India, administrative restrictions on interest rates have been steadily eased beginning 1993, leading to increased interest rate volatility. Low inflation, opening up of financial markets, and falling international interest rates resulted in a significant decline in interest rates in India during 2001-04. The drop in interest rates generated substantial trading profits for banks that had a large investment portfolio. This tendency, as well as difficulties in creating sound processes for handling credit portfolios, led some banks to hold Government securities in excess of reserve requirements. However, when the interest rates began to rise beginning October 2004, some of these banks were exposed to high interest rate risk.

This concern was reinforced by the relatively large share of Government securities in assets held by Indian banks. At end-March 2001, Government bond holdings of banks in India stood at 27.2 per cent of assets as against only 4.6 per cent in the United States, a mere 0.3 per cent in the United Kingdom and at 6.9 per cent in the Euro area (Study Group on Fixed Income Markets, 2001). In addition to the cash reserve ratio, banks are required to hold a part of their deposits in the form of liquid assets, comprising mostly Government securities. The statutory liquidity ratio (SLR) has remained unchanged at 25 per cent since October 1997.

While the duration mismatches between loans and advances on the asset side and deposits on the liability side are typically not very large, the bulk of Government bonds are fixed-rate products and have a higher duration than the typical credit portfolio. Movement of interest rates, thus, normally has a bigger impact on the investment portfolio of a bank.

Internationally, banks routinely use interest rate derivatives to hedge interest rate risk. In India, while the Reserve Bank allows banks to use forward rate agreements and interest rate swaps to hedge interest rate risks, these markets are not very liquid.

Interest rate risk, thus, became an important issue for banks in India and for the Reserve Bank. In India, as an initial step towards prescribing capital charge for market risks, banks were advised to: (i) assign an additional risk weight of 2.5 per cent on the entire investment portfolio; (ii) assign a risk weight of 100 per cent on open position limits on foreign exchange and gold; and (iii) build up investment fluctuation reserve up to a minimum of five per cent of investments in HFT and AFS categories in the investment portfolio. The Monetary and Credit Policy Statement announced in April 2002 that it would be appropriate for banks to adopt the BCBS norm on capital charge for market risk. Accordingly, the Reserve Bank through consultative process issued the final guidelines in June 2004, wherein banks were required to maintain capital charge for market risks in a phased manner over a two-year period. Banks were required to maintain capital for market risks on securities included in the HFT category, open gold position limit, open foreign exchange position limit, trading positions in derivatives and derivatives entered into for hedging trading book exposures by March 31, 2005. In addition to above, banks were required to maintain capital for market risk on securities included in the AFS category by March 31, 2006.

Operational Loss Database (GOLD) set up by the British Bankers' Association.

5.107 In the backdrop of increased leveraging of technology in the banking system, business continuity planning (BCP) has become an important part of operational risk management. On April 15, 2005, the Reserve Bank instructed banks to put in place a policy on BCP (Box V.9). More recently, the Reserve Bank in its guidelines on relief measures to be extended by banks in areas affected by natural calamities, advised banks to identify alternate branches for those located in areas prone to natural calamities as a BCP strategy. Banks were also advised to formulate a full-fledged comprehensive BCP rather than having only disaster-recovery (DR) arrangements.

Pillar 2

5.108 The guidelines for Pillar 2 issued by the Reserve Bank on March 26, 2008 identify internal capital adequacy assessment process (ICAAP) and supervisory review and evaluation process (SREP) as the two important components of Pillar 2. The ICAAP comprises a bank's procedures and measures designed to ensure (a) an appropriate identification and measurement of risks; (b) an appropriate level of internal capital in relation to the bank's risk profile; and (c) application and further development of suitable risk management systems in the bank. The SREP by the Reserve Bank would consist of a review and evaluation of the bank's ICAAP, conducting an independent assessment of the bank's risk profile, and taking appropriate prudential and supervisory actions.

5.109 Under the SREP, the Reserve Bank would assess the overall capital adequacy of a bank through a comprehensive evaluation that takes into account all relevant information such as a bank's compliance with regulatory minimum capital requirements, the quality and results of a bank's ICAAP, and supervisory assessment of the bank's risk management processes and control systems. The SREP for banks is required to be periodically conducted by the Reserve Bank, along with the Annual Financial Inspection (AFI) of the banks and the off-site returns received from the banks by the Reserve Bank, in conjunction with the ICAAP document submitted every year by the banks to the Reserve Bank. Through the SREP, the Reserve

Box V.9
Operational Risk and Business Continuity Planning

Business continuity planning (BCP) is a key pre-requisite for minimising the adverse effects of one of the important areas of operational risk – business disruption and system failures. It is imperative that all banks have BCP in place to be in readiness to tackle serious business disruptions. The BCP is a holistic management and governance process supported by senior management and resourced to ensure that the necessary steps are taken to identify the impact of potential losses, maintain viable recovery strategies and plans, and ensure continuity of products/ services through exercising, rehearsal, testing, training, maintenance and assurance.

The term 'disaster recovery' usually refers to the technology recovery effort. Disaster recovery is a component of the business continuity management programme. Other than restoration of technology, business continuity also requires the presence of people who perform critical functions, and the restoration of critical infrastructure and processes to ensure minimum assured level of service.

An effective BCP should take into account the potential for wide-area disasters that impact an entire region and for the resulting loss or inaccessibility of staff. The BCP methodology includes, *inter alia*, identification of critical businesses, owned and shared resources with supporting functions (the BCP template shall include IT Continuity Plan template); structured risk assessment based on comprehensive business impact analysis; formulating recovery time objectives (RTO) based on Business Impact Analysis. It may also be periodically fine-tuned by benchmarking against industry best practices; critical and tough assumptions in terms of disaster so that the framework would be exhaustive enough to address the most stressful situations; and identification of the recovery point objective (RPO) for data loss for each of the critical systems and strategy to deal with such data loss. BCP should also consider and address interdependencies, both market-based and geographic, among financial system participants as well as infrastructure service providers. In most cases, recovery time objectives are now much shorter than they were even a few years ago.

Responsibility in respect of BCP rests with the board of directors and the top management. The board fulfils its responsibilities by approving policy on BCP, prioritising critical business functions, allocating sufficient resources, reviewing BCP test results and ensuring maintenance and periodic updation of BCP. The top management is required to annually review the adequacy of the institution's business recovery, contingency plans and the test results and put up the same to the board, including periodic testing by service providers, whenever critical operations are outsourced.

Bank would evaluate the adequacy and efficacy of the ICAAP of the banks and the capital requirements derived by them therefrom. In addition to the periodic reviews, independent external experts may also be commissioned by the Reserve Bank, if deemed necessary, to perform *ad hoc* reviews and comment on specific aspects of the ICAAP process of a bank. If considered necessary, the SREP could also involve a dialogue between the bank's top management and the Reserve Bank from time to time wherein banks would be expected to defend the ICAAP adopted by them as fully responsive to their size, level of complexity, scope and scale of operations and the resultant risk profile/exposures. The banks are generally expected to hold capital above their minimum regulatory capital levels, while taking into account all material risks. Under the SREP, the Reserve Bank would also seek to determine whether a bank's overall capital remains adequate as the underlying conditions change.

5.110 The evaluation of the effectiveness of the ICAAP by the Reserve Bank would essentially be based on the understanding of the capital management processes and strategies adopted by the banks. Generally, material increases in risk that are not otherwise mitigated should be accompanied by commensurate increases in capital. Conversely, reductions in overall capital (to a level still above regulatory minimum) may be appropriate if risks had materially declined or had been appropriately mitigated. Based on such an assessment, the Reserve Bank could consider initiating appropriate supervisory measures such as requiring a modification or enhancement of the risk management and internal control processes of a bank, a reduction in risk exposures, or any other action as deemed necessary to address the identified supervisory concerns. These measures could also include the stipulation of a bank-specific minimum CRAR that could potentially be even higher, if so warranted by the facts and circumstances, than the regulatory minimum stipulated under the Pillar 1. In cases where the Reserve Bank decides to stipulate a CRAR at a level higher than the regulatory minimum, it would explain the rationale for doing so, to the bank concerned. As and when the advanced approaches envisaged in the Basel II document are permitted to be adopted in India, the SREP would also assess the ongoing compliance by the banks with the eligibility criteria for adopting the advanced approaches.

5.111 The Basel II framework is applicable to all commercial banks (except the local area banks and the regional rural banks) both at the solo level (global position) and at the consolidated level. Accordingly, the ICAAP is required to be prepared, on a solo basis, at every tier for each banking entity within the banking group, as also at the level of the consolidated bank (*i.e.*, a group of entities where the licensed bank is the controlling entity). This requirement would also apply to foreign banks in India and their ICAAP is required to cover their Indian operations only. The ultimate responsibility for designing and implementation of the ICAAP lies with the bank's board of directors, and with the Chief Executive Officer in the case of foreign banks with branch presence in India. As the ICAAP is an ongoing process, a written record including, *inter alia*, the risks identified, the manner in which those risks are monitored and managed, the impact of the bank's changing risk profile on the bank's capital position, details of stress tests/scenario analysis conducted and the resultant capital requirements on the outcome of the ICAAP, is required to be periodically submitted by the banks to their board of directors, which would assess and document whether the processes relating to the ICAAP implemented by the bank successfully achieve the objectives envisaged by the board.

5.112 In terms of the Pillar 2 guidelines, the ICAAP should form an integral part of the management and decision-making culture of a bank. This integration could range from using the ICAAP to internally allocate capital to various business units, to having to play a role in the individual credit decision process and pricing of products or more general business decisions such as expansion plans and budgets. The implementation of ICAAP is required to be guided by the principle of proportionality implying that though banks are encouraged to migrate to and adopt progressively sophisticated approaches in designing their ICAAP, the Reserve Bank would expect the degree of sophistication adopted in the ICAAP regarding risk measurement and management to be commensurate with the nature, scope, scale and the degree of complexity in the bank's business operations.

Pillar 3

5.113 In order to encourage market discipline, the Reserve Bank has over the years developed a set of disclosure requirements which allow the market participants to assess the key areas of information on capital adequacy, risk exposures, risk assessment processes and key business parameters which provide a consistent and understandable disclosure framework that enhances comparability. Banks are also required to comply with the Accounting Standard

(AS I) on Disclosure of Accounting Policies issued by the Institute of Chartered Accountants of India (ICAI). In view of the Pillar 3 disclosure framework of the BCBS, the enhanced disclosures have been achieved through enlarging the scope of disclosures to be made in 'notes on accounts'.

5.114 Banks in India, including consolidated banks, are required to provide all Pillar 3 disclosures, both qualitative and quantitative, as at end-March each year along with the annual financial statements. With a view to enhancing the ease of access to the Pillar 3 disclosures, banks may make their annual disclosures both in their annual reports and their respective websites. Banks with capital funds of Rs.100 crore or more are required to make interim disclosures on the quantitative aspects, on a stand alone basis, on their respective websites at end-September each year. Qualitative disclosures that provide a general summary of a bank's risk management objectives and policies, reporting system and definitions are required to be published only on an annual basis. In recognition of the increased risk sensitivity of the revised framework and the general trend towards more frequent reporting in capital markets, all banks with capital funds of Rs.500 crore or more, and their significant bank subsidiaries, must disclose their Tier 1 capital, total capital, total required capital and Tier 1 ratio and total capital adequacy ratio, on a quarterly basis on their respective websites. The disclosure requirement under Pillar 3 came into force from the reporting period ending March 31, 2008 for those banks which have migrated to Basel II as on that date.

Measures taken for Implementation of Basel II in India

5.115 With a view to ensuring smooth transition to the revised framework and providing opportunity to streamline their systems and strategies, the Reserve Bank has adopted a consultative process for calibrated and phased implementation of Basel II. In this respect, the Reserve Bank's association with the BCBS played a very important role. Reserve Bank of India became a member of the Core Principles Liaison Group of the BCBS in 1998 and subsequently, became a member of the Core Principles Working Group on Capital. Within the Working Group, the Reserve Bank has been actively participating in the deliberations on the Basel II framework. In accordance with the developments at the BCBS, the Reserve Bank issued guidelines from time to time covering several areas of banking operations with the objective of preparing the banking system for Basel II implementations.

5.116 The implementation of Basel II has put as much demand on the resources of regulators/ supervisors of the banking sector as on the banks themselves, if not more. More specifically, the regulators/supervisors have to assume the additional responsibilities. Accordingly, the Reserve Bank had initiated a number of measures with a view to implementing Basel II. The Reserve Bank made an assessment of the preparedness of the banking system in terms of their resources, capital position, state of computerisation, state of management information system (MIS) and risk management systems to switch over to Basel II. Based on such an assessment, a roadmap for switching over to specific approaches (standardised or Advanced) in a time bound manner was planned. Banks were encouraged to adopt better corporate governance and risk management systems and hold capital above the minimum regulatory capital level depending upon their risk profiles. The Reserve Bank also engaged in a constant dialogue with the banking industry and monitored the improvement in the risk management and capital management processes on a continuous basis, as also encouraged banks to improve the qualitative and risk management skills of the staff. Apart from this, the Reserve Bank also engaged in strengthening the skills of its own staff in the regulatory and supervisory departments so as to enable them to perform their respective roles under Basel II effectively. This was done keeping in view the future requirements in development of skills in the context of implementation of advanced approaches as the supervisor will have to approve the risk measurement models used by the banks to compute the capital requirements. In order to develop human resources development, the staff of the Reserve Bank is being trained in its own training establishments and overseas. Special training programmes by the overseas training institutes in the areas of risk management have also been arranged in India. Staffs are also being regularly exposed to international conferences/seminars to keep them abreast with the latest developments and issues involved. A team of 20 officials drawn from the regulatory and supervisory departments of the Reserve Bank, known as 'Basel II – Project Team', has been constituted and the team has been meeting at frequent intervals to discuss various issues involved in the implementation of Basel II. The core objective of the team is to ensure that required capacity to evaluate the banks' readiness for implementing the advanced approaches is built up in-house in time.

5.117 The Reserve Bank has been constantly reviewing the regulatory guidelines issued with regard to the implementation of Basel II norms. In terms of the laid down schedule, foreign banks operating in India and Indian banks having presence outside India have already implemented the Basel II norms during the year ended March 2008. All other banks in India have been gearing themselves up for implementation of Basel II. By and large, in terms of operational supporting systems and additional capital requirements, the respective banks are well positioned to implement Basel II from the year ended March 2009. Some of the banks have also begun to gear up themselves for implementation of advanced approaches in due course.

5.118 With a view to ensuring smooth transition to the revised framework and providing opportunity to banks to streamline their systems and strategies, banks were advised to commence a parallel run of the revised framework with effect from April 1, 2006. During the parallel run, banks were required to apply the prudential guidelines on capital adequacy–both under Basel I framework and Basel II framework, on an ongoing basis and compute their CRAR position under both the scenarios. Banks were advised to place a copy of an analysis on their parallel run to their boards of directors and forward a copy of the same to the Reserve Bank. Further, the banks were advised that the minimum capital maintained by them under Pillar 1, shall be subjected to a prudential floor which is required to be the higher of either the minimum capital in terms of Basel II framework or the specified proportion of minimum capital in terms of the Basel I framework, during the first three years of implementation of the revised Basel II framework by the respective banks (Box V.10).

5.119 The Basel II framework offers the national supervisors discretion in several areas to enable them to adopt the framework to suit their respective banking systems. In India, an objective approach has been adopted while deciding on the items of national discretion. There are several areas where the national discretion exercised by the Reserve Bank is at a more conservative level. One, the State Government guaranteed exposures attract a higher risk weight of 20 per cent, though the Basel framework allows a zero per cent risk weight. Two, exposures to public sector enterprises are treated on par with corporate exposures though the framework allows them to be treated on par with bank or sovereign exposures. Three, the Reserve Bank has the discretion to apply 20 per cent risk weight for exposures to all banks with CRAR above 9 per cent. However, this concessionary risk-weight is applied only to exposures to scheduled banks; exposures to non-scheduled banks are treated separately and assigned a risk-weight of 100 per cent if the CRAR is 9 per cent or above. Four, though the Basel II framework

Box V.10
Migration to New Capital Adequacy Framework:Parallel Run Process

The parallel run consists of several steps. Banks are required to apply the prudential guidelines on capital adequacy – both current guidelines and the guidelines on the revised framework – on an on-going basis and compute their CRAR under both the guidelines. An analysis of the bank's CRAR under both the guidelines is required to be reported to the board at quarterly intervals. While reporting the above analysis to the board, banks should also furnish a comprehensive assessment of their compliance with the other requirements relevant under the revised framework, which, at the minimum, include the following: (i) board approved policy on utilisation of credit risk mitigation techniques, and collateral management; (ii) board approved policy on disclosures; (iii) board approved policy on internal capital adequacy assessment process (ICAAP) along with the capital requirement as per ICAAP; (iv) adequacy of bank's management information system (MIS) to meet the requirements under the New Capital Adequacy Framework, the initiatives taken for bridging gaps, if any, and the progress made in this regard; (v) impact of the various elements/portfolios on the bank's CRAR under the revised framework; (vi) mechanism in place for validating the CRAR position computed as per the New Capital Adequacy Framework and the assessments/findings/ recommendations of these validation exercises; and (v) action taken with respect to any advice/guidance/direction given by the Board in the past on the above aspects. A copy of the quarterly report to the board is required to be submitted to the Reserve Bank.

The parallel run has helped the banks in identifying the gaps in the existing MIS and other relevant areas which were required to be filled in order to ensure smooth transition to Basel II framework with effect from March 31, 2008. The parallel run showed drop in CRAR of most of the banks mainly due to additional capital charge on account of operational risk. A few banks also showed fall in capital charge for credit risk. However, on the whole, the drop was within the manageable limits and it is not expected to cause any problem in the smooth transition to Basel II by the relevant banks.

allows lower risk-weight of 35 per cent for residential mortgages and 75 per cent for personal loans (as part of retail), a higher risk-weight of 75 per cent for residential mortgages and 125 per cent for personal loans has been assigned in the Indian case. These reflect the conservative view of the Reserve Bank as the true level of underlying risk is not known fully.

5.120 Under the Basel II framework, the concept of capital floors for banks is provided as transitional arrangement for banks adopting IRB approach for credit risk or the advanced measurement approaches (AMA) for operational risk. The capital floor is based on application of the 1988 Accord, and is derived by applying an adjustment factor. The adjustment factor for banks using the foundation IRB approach for the year beginning year-end 2006 was 95 per cent. The adjustment factor for banks using either (i) the foundation and/or advanced IRB approaches, and/or (ii) the AMA for the year beginning year-end 2007 was 90 per cent, and for the year beginning year-end 2008 was 80 per cent. The above concept has been modified and applied as a transitional arrangement by banks migrating from Basel I to Basel II. The minimum capital maintained by banks on implementation of Basel II norms is subject to a prudential floor computed with reference to the requirement as per Basel I framework for credit and market risks. In India, the floor has been fixed at 100 per cent, 90 per cent and 80 per cent for the position as at end-March for the first three years of implementation of the revised framework. The adequacy and the need for the capital floors would be reviewed periodically on the basis of the quality and integrity of Basel II implementation in banks. In case, the supervisory assessments indicate satisfactory level and quality of compliance by banks, the capital floor may be dispensed with even before the above period.

5.121 In the Indian context, the prescribed Tier I capital adequacy ratio is 6 per cent by March 31, 2010, which was also recommended by the Committee on Fuller Capital Account Convertibility. The actual holding of Tier I capital was also more than 6 per cent at end-March 2007, except for only three banks, one public sector bank, and two small old private sector banks.

5.122 For Indian banks, Tier 1 capital includes: (i) paid-up equity capital, statutory reserves, and other disclosed free reserves, if any; (ii) capital reserves representing surplus arising out of sale proceeds of assets; (iii) innovative perpetual debt instruments eligible for inclusion in Tier 1 capital which comply with the regulatory requirements as specified; and (iv) any other type of instrument generally notified by the Reserve Bank from time to time for inclusion in Tier 1 capital. Tier 2 capital includes (i) revaluation reserves; (ii) general provisions and loss reserves; (iii) hybrid debt capital instruments; and (iv) subordinated debt. Upper Tier 2 instruments along with other components of Tier 2 capital shall not exceed 100 per cent of Tier 1 capital. Subordinated debt instruments eligible for inclusion in Lower Tier 2 capital are subject to a ceiling of 50 per cent of Tier 1 capital after all deductions. The Reserve Bank on January 25, 2006, allowed banks to raise capital funds through the issue of innovative perpetual debt instruments (innovative instruments), debt capital instruments, perpetual non-cumulative preference shares and redeemable cumulative preference shares (Box V.11). However, Tier 3 capital for meeting a portion of banks' exposures to market risks has not been permitted as an element of regulatory capital in India.

5.123 In order to ensure that the drawdown by banks of their statutory reserves is done prudently and is not in violation of any of the regulatory prescriptions, banks were advised in September 2006, *inter alia*, to take prior approval from the Reserve Bank before any appropriation is made from the statutory reserve or any other reserves; and to ensure that suitable disclosures are made of such drawdown of reserves in the 'notes on accounts' to the balance sheet. Based on the final guidelines issued on April 18, 2007, banks are required to adopt the following business segments for public reporting purposes, from March 31, 2007: (a) treasury, (b) corporate/wholesale banking, (c) retail banking, and (d) other banking operations.

Risk Management Practices in Indian Banks

5.124 Risk management for banks and financial institutions is critically important because they are 'risk engines'; they take risks, they transform them and they embed them in their products and services. There are powerful motives for banks to implement risk-based practices; to provide a balanced view of risk and return from a management point of view, to develop competitive advantages and to comply with regulatory requirements. The broad principles governing risk management are the same for entities in both the real and financial sectors. However, risk management in banks and other financial intermediaries acquires added importance because of their three distinguishing characteristics: (i) they are much more leveraged; (ii) they hold public money; and (iii) payments systems operate through banks (Mohan, 2007).

Box V.11
Enhancement of Banks Capital Raising Options for Capital Adequacy Purposes

Under the Basel II framework, Indian banks are expected to have larger capital requirements as they would need to earmark capital for operational risk, apart for credit and market risks. For smooth transition to Basel II and with a view to providing an additional options for raising capital funds, banks were allowed in January 2006 to augment their capital funds by issuing innovative perpetual debt instruments (IPDI) eligible for inclusion as Tier I capital and debt capital instruments eligible for inclusion as Upper Tier II capital (Upper Tier II instruments). The total amount raised by a bank through IPDIs is not to be reckoned as liability for calculation of net demand and time liabilities for the purpose of reserve requirements and, as such, not to attract CRR/SLR requirements.

The total amount raised by a bank through IPDIs is not to exceed 15 per cent of total Tier I capital, and the eligible amount is required to be computed with reference to the amount of Tier I capital as on March 31 of the previous financial year, after deduction of goodwill and other intangible assets but before the deduction of investments. Banks can augment their capital funds through the issue of IPDI/Upper Tier II instruments in foreign currency without seeking the prior approval of the Reserve Bank, subject to the compliance with certain requirements. One, IPDI/Upper Tier II instruments issued in foreign currency should comply with all the terms and conditions as per instructions issued on January 25, 2006. Two, in the case of IPDI, not more than 49 per cent of the eligible amount could be issued in foreign currency. In the case of Upper Tier II instruments, the total amount issued in foreign currency should not exceed 25 per cent of the unimpaired Tier I capital and to be computed with reference to the amount of Tier I capital as on March 31 of the previous financial year, after deduction of goodwill and other intangible assets but before the deduction of investments. The amount raised by issue of these instruments in foreign currency is in addition to the existing limit for foreign currency borrowings by authorised dealers. Three, investment by FIIs in Upper Tier II Instruments raised in Indian Rupees is outside the limit for investment in corporate debt instruments, *i.e.*, US $ 3 billion. However, this limit is subject to a ceiling of US $ 200 million per registered entity.

With a view to providing a wider choice of instruments to Indian banks for raising Tier I and Upper Tier II capital, banks were allowed in October 2007 to issue preference shares in Indian Rupees, subject to extant legal provisions through issuance of perpetual non-cumulative preference shares (PNCPS) as Tier I capital. The perpetual cumulative preference shares (PCPS), redeemable non-cumulative preference shares (RNCPS) and redeemable cumulative preference shares (RCPS) were allowed as Upper Tier II capital. The perpetual non-cumulative preference shares are treated on par with equity, and hence, the coupon payable on these instruments is treated as dividend (an appropriation of profit and loss account). The Upper Tier II preference shares are treated as liabilities and the coupon payable thereon is treated as interest (charged to profit and loss account). The total amount raised by the bank by issue of PNCPS is reckoned as liability for calculation of net demand and time liabilities for the purpose of reserve requirements and, as such, does not attract CRR/SLR requirements. The total amount raised by a bank through the issue of Upper Tier II instruments is reckoned as liability for the calculation of net demand and time liabilities for the purpose of reserve requirements and, as such, attracts CRR/SLR requirements.

5.125 As is the case globally, banks in India have a very special role to play in promoting better risk management standards and practices. Being the chief repositories of credit risk, the quality of their loan assets depends critically on how effective the risk management policies, processes and procedures of their borrowers are. Among their borrowing clients themselves, there would be differentiated risk-bearing expertise and hence banks are expected to provide professional advice to their clients on risk management. Thus, banks have good business reasons for acquiring specialisation and professional expertise in risk management. This would, however, be possible only if banks themselves are good managers of their own risks (Mohan, 2007). In this context, an efficient credit information system could play a vital role in enhancing the quality of credit decisions and improving the asset quality of banks, apart from facilitating faster credit delivery. A scheme for disclosure of information regarding defaulting borrowers of banks and financial institutions was introduced, and Credit Information Bureau (India) Limited (CIBIL) was set up in 2000 to facilitate sharing of information related to credit matters. Following the Credit Information Act of 2005, the process of setting up of a few more credit information companies in India has been facilitated.

5.126 Risk management practices have undergone significant improvement since the introduction of financial sector reforms in 1992. The process gained momentum with the issue of regulatory guidelines and guidance notes on asset-liability management and management of credit risk, market risk and operational risk issued by the Reserve Bank in 1999. The announcement to implement the revised capital adequacy guidelines brought the issue of risk

management into greater focus. However, in most Indian banks risk management is still a compliance issue rather than a business issue.

5.127 With respect to risk management system, while the regulator's main objective is to ensure systemic stability, the banks look at their risk management system as a means of improving their risk-reward equation. Indian banks have been able to maintain their profitability by managing risk at the macro level as against relying on a fine-grained statistical risk evaluation system. Barring a few private sector and foreign banks, risk management was not viewed as a business opportunity available in terms of risk-return trade-off. Most Indian banks started adopting a structured approach to risk management only after the application of regulatory pressure to comply with the Basel II standards. Banks have gradually started using quantitative techniques and approaches to risk management that are data-centric requiring sufficient historical data for various models to predict PD, LGD and EAD, and also requiring analytical software that can stress test and back-test the models. For banks that are starting to adopt quantitative techniques and models, it is pertinent that their risk managers have a clear understanding of the capabilities and limitations of risk measurement techniques and models that they are employing.

5.128 The non-availability of required data has been a major issue in implementing quantitative approaches in risk management[6]. Three major issues on which most banks in India have faced difficulties are: (i) all activities not automated; (ii) software solutions not tuned to Indian market; and (iii) lack of hedging/transfer mechanisms. Despite these constraints, domestic banks are striving to move from an individual silo system to an enterprise-wide integrated risk management framework. While the organisational set up is in place at almost every bank, the process of integrating risk management with business and strategic processes across the bank is still in infancy at a majority of the banks. Most public sector banks are adopting the consultant route.

5.129 While the first milestone would be risk integration across the entity, the next step would entail risk aggregation across the group both in the specific risk areas as also across the risks. Banks would, therefore, be required to allocate significant resources towards this endeavour. In India, the risk-based approach to supervision is also serving as a catalyst to banks' migration to the integrated risk management systems. The critical need for the management of compliance risk and the reputational risk is also one of the key facets of integrated risk management or enterprise wide risk management framework (Box V.12).

Box V.12
Enterprise-wide Risk Management

The five key elements of enterprise-wide risk management (ERM) for financial institutions are process and practice assessments of risk governance, operational risk, market risk, credit risk and liquidity and funding. In addition, economic capital assessment is also a key component of the ERM assessment process. Market risk assesses risk management practices for both trading risk and for asset-liability management (ALM) or interest rate risk. In credit risk, a firm's underwriting processes, credit risk analytics and portfolio management practices are evaluated. For funding and liquidity risk, funding composition, liquidity management and stress-testing practices are assessed. The methodology to assess and rate ERM is consistent with the Trading Risk Management (TRM) assessment methodology. ERM criteria includes assessment of the quality and robustness of an institution's risk culture, its risk appetite, how it aggregates risk at the enterprise level, its risk disclosure quality and the practices it uses to guard against business, legal and reputation risk.

While economic capital evaluation is presently outside the scope of the ERM assessment process, some banks have developed economic capital model to quantify these different risk types more consistently.

The relative importance of each aspect of ERM in formulating any opinion of the quality of a firm's risk management practices will depend on the complexity, size and range of risk for each individual firm. The factor sets are by no means exhaustive or static. As the ERM practices of organisations evolve, ERM assessment factors will most likely evolve as well.

Reference:

Standard & Poor's. 2006. *"Assessing Enterprise Risk Management Practices of Financial Institutions"*. Commentary at http://www2.standardandpoors.com

[6] 'Current Perspectives on Risk Management: Indian Banking Industry,' IBA-IBS report, April 2006.

5.130 Globally, stress testing is becoming an integral part of banks' risk management systems and is used to evaluate their potential vulnerability to certain unlikely but plausible events or movements in financial variables. The need for banks in India to adopt 'stress tests' as a risk management tool was emphasised in the Annual Policy Statement of April 2006, which was followed by the issuance of the relevant guidelines. Most of the banks have already put in place their stress testing frameworks. An efficient stress test framework is necessary to incorporate a forward looking element in banks' business strategies. Banks would do well to approach stress testing not merely as a regulatory requirement but as an integral part of their risk management processes and Basel II implementation. The stress test results need to be suitably integrated into the risk management processes, business strategies and capital planning.

5.131 Many of the Indian banks have gone for complete computerisation of their branch network and have also integrated their treasury, forex, and lending segments. The information technology initiatives of these institutions provide significant advantage to them in risk management since it facilitates faster flow of accurate and reliable information. It also helps in terms of quicker decision-making from the head office since branches are networked and accounts are considered as belonging to the bank rather than a branch.

5.132 Indian public sector banks have very recently initiated moves to centralise data through core-banking. This has to be supplemented with the establishment of a Data Warehousing/Data Mart for building up historical data and analytics. There would be legacy issues for public sector banks related to the aligning and upgrading of data with the IT systems for consistency and integrity across the organisation. Setting up a Data Warehousing/Data Mart is cost intensive and will have to be effectively utilised for enhancing significantly the business and reducing costs. Costs are thus expected to be heavily focused on IT spending – both hardware & software – in addition to training for personnel. Many banks in developed countries are expected to spend 40 to 80 per cent of their total costs for upgrading their IT systems and interfaces in alignment with the requirements of Basel II.

5.133 Branches of Indian banks are quick to report technology failures but are not equally forthcoming on failures relating to people or processes. Most banks have already put in place, or have at least finalised a 'business continuity plan' and a 'disaster recovery plan' relating to technology system failures. Security policies for IT systems have been formulated by quite a few banks and the others are in the process of formulating them. Information security audits are also being carried out by most banks. Most banks have set up these plans and disaster recovery sites as a part of their core banking system implementation. Very few banks have carried out mock testing of these plans to test their usefulness and availability at all times (Box V.13). All banks are unanimous in reporting that they are not using any metric measure return on investments in technology.

Asset-Liability Management

5.134 Asset-liability management is an important constituent of a risk management system. Asset-liability management essentially refers to the process by which an institution manages its balance sheet in order to allow for alternative interest rate and liquidity scenarios. Asset-liability management models enable institutions to measure and monitor risk, and provide suitable strategies for their management.

5.135 The Reserve Bank has issued asset liability management guidelines in 1999 for dealing with overall asset-liability mismatches taking into account both on and off balance sheet items. In terms of the guidelines, banks were required to manage their liquidity and interest rate risk by calculating the maturity repricing mismatches of their assets and liabilities divided into maturity buckets. The liquidity risk management guidelines were revised on October 24, 2007.

5.136 In terms of the revised guidelines, the short term bucket of fourteen days for structural liquidity has been split into three and frequency of reporting made fortnightly from monthly. Banks are now required to shift from 'traditional gap analysis' to 'modified duration' of groups of assets. The duration gap is required to be applied not only to the trading book but also to the banking book. Modified duration of equity is also to be computed to assess the impact of interest rate shocks. While some of these ALM solutions support 'duration gap analysis' and also 'behavioral analysis' for non-maturing assets and liabilities, many banks are moving to Oracle Financial Services Application (OFSA) for balance sheet simulation, transfer pricing, and better support for embedded options. The recent guidelines for the Reserve Bank are expected to provide an impetus to banks for replacing their aging ALM solutions.

Box V.13
IT Applications in Risk Management Strategies of Banks

The role of information technology is critical in today's banking operations, especially in the areas of communication and business process reengineering. Without the progress in technology, the development of sophisticated market products, smoother enabling infrastructure, implementation of reliable techniques for control of risks and access to distant and diversified markets would have been unthinkable.

The Basel II guidelines envisage even a greater role for technology in banking operations. The implementation of Basel II guidelines requires a substantial on several parameters. Thus consolidated data on parameters such as operational loss incidents, financial instruments, credit losses and general ledger data. Banks that decide to adhere to one of the internal ratings based (IRB) approaches are required to develop databases to carry out the regression tests of their internal models. The Basel II compliant system is expected not only to carry out all the relevant calculations and categorise the calculations but also be able to switch between various Pillar 1 methodologies to allow auditors, regulators and internal users to audit, review and revise these calculations as necessary. Thus efficient storage and evaluation of time series data on alternative scenarios has assumed great importance under the Basel II guidelines. Banks and financial institutions either need to design and develop their own tailor-made software and systems or invest in software products made available by software firms with some changes to suit their specific requirements.

In case of India, the IT revolution in banks started in the mid-1980s, when the banks started computerising their branches. By the early 1990s most of the banks embarked on Total Branch Automation (TBA) packages, driven mainly by the reduction in hardware prices and also availability of reasonably priced PCs and servers, The setting up of the Indian Financial Network (INFINET), a Wide Area based satellite communication and terrestrial lines network using VSAT technology in June 1999, was a landmark in the area of communication technology insofar as the Indian financial system is concerned. The INFINET was the forerunner of an efficient telecommunication backbone for the banking and financial sector. It is a Closed User Group network for the banking sector. The hub and the network management system are located at the Institute for Development and Research in Banking Technology (IDRBT), Hyderabad, which is fully funded by the Reserve Bank. The INFINET, which initially comprised only public sector banks was subsequently opened up for participation by other categories of members.

Similarly, initiation of projects like the Negotiated Dealing System (NDS), Centralised Funds Management System (CFMS) and Structured Financial Messaging Solution (SFMS) gave a major boost to the payment and settlement system. The centralised funds management system (CFMS) has two components - the centralised funds enquiry system (CFES) and the centralised funds transfer system (CFTS). The CFTS, the funds transfer facility of the CFMS in operation since 2005-06, enables banks to better manage their current account balances with the Reserve Bank by electronically moving funds from one office of the Reserve Bank to another office, *i.e.,* from a surplus centre to a deficit centre. At present, nine Reserve Bank offices (Mumbai, Delhi, Chennai, Kolkata, Ahmedabad, Nagpur, Bangalore, Hyderabad and Chandigarh) have been brought under the system.

The real time gross settlement (RTGS) system, in operation since 2004-05, facilitates faster movement of high value transactions. The RTGS system has gained significance in terms of both coverage and value of transactions. As at end-March 2008, 43,512 bank branches were connected to RTGs and the value of RTGs transactions increased by 48 per cent during 2007-08.

Furthermore, core banking solutions (CBS) have been adopted at a large scale by almost all Indian banks. The CBS enables the customers of banks to undertake their transactions from any branch of a bank instead of being attached to a particular branch, thereby resulting in better delivery of various customer services by the banks. At end-March 2007, 45 per cent of the branches of the public sector banks were interlinked using the CBS. Internet banking, which has witnessed a sporadic growth in recent times, is another area where the technology plays a crucial role.

According to the 'IT Benchmarking Survey' carried out by the McKinsey & Co. in 2007, the IT effectiveness of top Indian banks compares well with the best banks internationally. Indian banks are, at present, some of the most technologically advanced banks with vast networks of branches empowered by the strong banking system. Most banks in India have used IT to achieve superior business performance, driven mainly by the cost advantage in India, the focus on avoiding legacy systems, superior IT governance that often entails competent outsourcing. However, there exist vast differences between the new private and foreign banks, on the one hand, and the old private and public sector banks, on the other. However, foreign and private sector banks used technology more effectively with a view to promoting growth while remaining operationally efficient. According to the findings of the survey, while foreign and new private sector banks focus on innovations rather than daily operations, the public sector banks focus on application development directed more towards augmenting their existing systems. This policy of old private and public sector banks has resulted in low value addition to their businesses. The new private sector banks and foreign banks focus more on value added activities like building new infrastructure for ATM networks and core banking solutions, customer service channels, including call centres, internet banking and mobile banking. The survey concludes that even though the Indian banks have a strong competitive advantage in several dimensions, including alignment between IT and business heads, management processes and the ability to streamline administrative overheads and to channel investments, several improvement opportunities do exist.

Reference:

McKinsey & Co. 2007. *Indian Banking: Towards Global Best Practices - Insights from Industry Benchmark Surveys*.

5.137 Support for OTC derivatives is available in solutions for Reuters, Murex and Sungard. Banks, which are on the solutions, use Quadryx from Credence Analytics for OTC derivatives. Some of the treasury solutions do not have a market risk management module and multiple third-party software solutions are being used to price these derivatives.

Corporate Governance

5.138 Governance and controls constitute one of the most fundamental aspects of risk management at banking organisations, and, thus, constitute the foundation for a sound financial system. To a large extent, many risk management failures reflect a breakdown in corporate governance which arise due to poor management of conflict of interest, inadequate understanding of key banking risks, and poor board oversight of the mechanisms for risk management and internal audit. Banks may have to cultivate a good governance culture building in appropriate checks and balances in their operations. There are four important forms of oversight that should be included in the organisational structure of any bank in order to ensure appropriate checks and balances: (i) oversight by the board of directors or supervisory board; (ii) oversight by individuals not involved in the day-to-day running of the various business areas; (iii) direct line supervision of different business areas; and (iv) independent risk management, compliance and audit functions. In addition, it is important that key personnel are fit and proper for their jobs.

5.139 Senior management must take on a very active and involved role in risk management. However, if the information is not adequately distributed both vertically and horizontally, this would prevent senior managers from developing an enterprise-wide perspective on risks to the whole entity. More so, if the risks of the different activities undertaken by the firm could, first, become correlated in times of stress and, second, result in high concentrations of risk exposures. To be specific, in a few cases, senior management was not fully aware of the firm's latent concentrations to U.S. subprime mortgages, because they did not realize that in addition to the subprime mortgages on their books, they had exposure through off-balance sheet vehicles holding mortgages, through claims on counterparties exposed to subprime, and through certain complex securities. Information must move up to senior management. Top executives must disseminate their views and analysis back down through the business lines. Senior managers should encourage risk managers to dig deep to uncover not only risks within each business unit, but also risk concentrations that can arise from the set of activities undertaken by the firm as a whole as well as latent risks – such as hidden risk concentrations that can arise from correlation of risk in times of stress.

5.140 Appropriate incentives reward good behavior and penalise inappropriate behavior. Naturally, in very large organisations, it is difficult for senior management to monitor each individual, so incentives need to be consistent, permeate even the lowest levels of the organisation. Limits and controls can be useful tools for creating the right incentives and sending appropriate signals, but they of course need to be tailored individually to each firm. Problems can arise when incentives are not properly structured and appropriate 'risk discipline' is not exercised.

5.141 In India, several measures have been taken to strengthen corporate governance practices in recent years. These include 'fit and proper' criteria for owners and directors of banks and diversified ownership.

Management of Capital and Future Requirements of Capital

5.142 The regulatory pressure on banks to maintain capital levels has, by and large, been effective in raising the capital levels of banks and in recent years, banks have been maintaining capital at a level well above the regulatory capital requirements, which implies that the safety of Indian banking system has improved (Box V.14).

5.143 In 1992, when India decided to adopt the Basel capital adequacy norms, the capital levels of Indian banks, especially public sector banks (PSBs) were very low. In order to enable public sector banks meet the eight per cent CRAR, the Government recapitalised weak PSBs beginning from 1993-94. The recapitalisation continued up to 1998-99. The total amount injected by the Government for strengthening the capital base of nationalised banks amounted to Rs.22,092 crore. Since capital infusion by the Government was inadequate, the Government allowed public sector banks to approach the capital market directly subject to 51 per cent public ownership as detailed in Chapter III. However, in view of an oversized equity base as against the projected streams of earnings coming in the way of tapping the capital market, some banks returned capital to the

Box V.14
Banks' Response Towards Capital Requirements: Indian Experience

Although the literature on capital regulation and bank behaviour is more than two decades old, adequate systematic and structured work has not been done in the Indian context. The question of whether banks respond to capital regulation hinges on two issues. One, whether regulatory capital requirements lie above the level that the market would require for at least some banks. Two, whether the penalties for falling below regulatory guidelines are large enough to induce banks to raise their capital ratios. Several studies examined the effectiveness of capital regulations in the US in the period before numeric standards were adopted in 1981 (Peltzman, 1970; Mingo, 1975; and Kimball and James, 1983). These results, although mixed, tend to indicate that regulators were ineffective in influencing banks' capital ratios. A problem with interpreting the results of these studies was that the regulatory requirements for any given bank organisation were set on a case-by-case basis and the factors used to evaluate capital adequacy were likely to be highly correlated with those used by the market.

A well-known fact is that most banks tend to hold a significant amount of capital above the regulatory requirement in practice, either for efficiency reasons or because the capital cushion is established as a precaution against contingencies such as adverse events or regulatory penalties (Barrios and Blanco, 2003). Some researchers suggest that the existence of capital buffers can potentially mitigate the volatility in total capital (Koopman *et al.*, 2005). By contrast, the empirical evidence in Germany (Stolz and Wedow, 2005) and Spain (Ayuso *et al*., 2004) shows that capital buffers are also anti-cyclical.

The expression 'capital crunch' was coined in the early 1990s to characterise the simultaneous shortage of capital and the contraction in the supply of new loans that affected banks in New England during the early 1990s recession in the United States (Bernanke and *et al.,* 1991; Peek and Rosengren 1995). A capital crunch could result in the reduction of total bank assets or alternately, in a shift towards less risky assets such as Government bonds. A survey of emprical studies by the Basel Committee observed that the bank capital pressures during cyclical downturns in the US and in Japan might have limited lending in those periods and contributed to economic weakness in some macroeconomic sectors (BIS, 1999).

In the context of Indian banks, Nachane *et al.* (2000) studied the impact on capital changes of regulatory pressures, alongwith a host of other variables that are expected to influence capital holding of banks. On the basis of their empirical analysis employing data for Indian public sector banks (PSBs) over the period 1997 Q1 to 1999 Q4, they concluded that regulatory prescriptions did influence Indian banks' capital ratio choices. However, they did not observe any significant shift from high-risk towards low-risk asset category by banks. To the extent that PSBs constitute a sufficiently heterogeneous sample and comprise the bulk of the banking system in India, an analysis based on PSBs suffices to draw broad inferences about the issue outlined above. In particular, the primary question is whether pressure from supervisory authorities affects bank capital dynamics when capital ratios approach their regulatory minimum. The study suggests that the capital requirements significantly affect bank behaviour, and among other factors, the profit variable seems to play an important role in influencing capital ratios. In the Indian context, the findings are reassuring that capital requirements over and above banks' own internally generated capital targets do seem to affect banks' behaviour. This fact assumes all the more importance in view of the growing concerns about banking stability. In simple terms, higher levels of capital can be useful in preventing systemic distress, which is an important lever in the hands of policymakers. However, in view of the fact that banks may respond to capital regulation in a variety of ways, regulators, while formulating such regulations, need to be clear about the response that they want to elicit. Moreover, regulators also need to put in place corrective measures if the increase in capital requirement is expected to result in reduced credit and/or reduced output in the economy.

References:

Ayuso, J., D. Perez and J. Saurina. 2004. "Are Capital Buffers Pro-cyclical? Evidence from Spanish Panel Data." *Journal of Financial Intermediation,* 13(2): 249-264.

Barrios, V. and J. Blanco. 2003. "The Effectiveness of Bank Capital Adequacy Regulation: A Theoretical and Empirical Approach". *Journal of Banking and Finance*, 27: 1935-1958.

Bernanke, B., C. Lown and B. Friedman. 1991. "The Credit Crunch". Brookings Papers on Economic Activity, 1991(2): 205-247.

Bank for International Settlements. 1999. "Capital Requirements and Bank Behaviour: The Impact of the Basel Accord. *Working Paper*, 1.

Kimball, D. and C. James. 1983. "Regulation and the Determination of Bank Capital Changes". *Journal of Finance*, 38: 1651-58.

Koopman, S., A. Lucas and P. Klaassen. 2005. "Empirical Credit Cycles and Capital Buffer Formation". *Journal of Banking and Finance*, 29 (12): 3159-3179.

Mingo, J. 1975. "Regulatory Influence on Bank Capital Investment". *The Journal of Finance,* 30 (4): 1111–1121.

Nachane, D., A. Narain, S. Ghosh and S. Sahoo. 2001. "Bank Response to Capital Requirements - Theory and Indian Evidence*". Economic and Political Weekly*, January.

Peek, J. and E. Rosengren. 1995. "Bank Regulation and the Credit Crunch". *Journal of Banking and Finance*, Elsevier, 19 (3-4): 679-692, June.

Peltzman, S. 1970. "Capital Investment in Commercial Banking and its Relationship to Portfolio Regulation." *The Journal of Political Economy*, 78 (1): 1-26.

Stolz, S. and M. Wedow, 2005. "Banks' Regulatory Capital Buffer and the Business Cycle: Evidence for German Savings and Co-opearative Banks" *Discussion Paper Series* 2: *Banking and Financial Studies*, No. 7, Deutsche Bundesbank, Research Centre.

Table 5.3: Public Sector Banks – Recapitalisation

(Amount in Rupees crore)

Period/ Year	Capital Contributed by the Government	Capital Returned
1	2	3
1985-86 to 1992-93	4,000	–
1993-94	5,700	–
1994-95	4,363*	–
1995-96	850	–
1996-97	1,509	842
1997-98	2,700	138
1998-99	400	–
1999-2000	–	–
2000-01	–	48
2001-02	1,300	176
2002-03	770	386
2003-04	–	110
2004-05	–	88
2005-06	500	–

– : Nil.
* : Excluding Rs.925 crore as a part of Tier II capital.
Source : Union Budgets and the Reserve Bank.

Government. The total amount returned aggregated Rs.1,789 crore (Table 5.3).

5.144 Scheduled commercial banks, both in public and private sectors, have raised large resources from the capital market since 1993-94. In all, there have been 37 equity issues by 16 public sector banks for an aggregate amount of Rs.34,679 crore, with several PSBs accessing the market more than once (Table 5.4).

5.145 Private sector banks have also raised capital from the capital market (Table 5.5). Since 1995-96, there have been 34 equity issues by private sector banks for an aggregate amount of Rs.23,330 crore in the capital market. Some public and private sector banks have also raised funds by way of ADRs/GDRs issues in the international capital market.

5.146 As a result of public sector banks accessing the capital market, the equity held by the Government has got diluted. As at end-September 2007, the holding by general public in nine banks ranged between 40 and 49 per cent (Table 5.6). Only in two banks, the Government holding was more than 90 per cent. In three public sector banks, the Government holding was close to 51 per cent. These include Oriental Bank of Commerce (51.1 per cent), Dena Bank (51.2 per cent), and Andhra Bank (51.6 per cent).

Table 5.4: Public Issues by Public Sector Banks

(Amount in Rupees crore)

Year	Equity	
	No. of Issues	Amount
1	2	3
1993-94	2	2,218
1994-95	1	374
1995-96	4	281
1996-97	3	1,705
1997-98	3	491
1998-99	–	–
1999-2000	1	125
2000-01	3	361
2001-02	1	164
2002-03	3	773
2003-04	5	1,104
2004-05	2	3,336
2005-06	6	5,413
2006-07	1	782
2007-08	2	17,552

5.147 Apart from equity issues banks also raised resources by way of discounted subordinated debt (Tier II), which increased sharply from Rs.18,482 crore at end-March 2003 to Rs.63,814 crore at end-March 2007. Another source of strengthening the capital position by public sector banks has been the ploughing back of profits and generation of resources. Public sector banks, as a group, which incurred net

Table 5.5: Public Issues by Private Sector Banks

(Amount in Rupees crore)

Year	Equity	
	No. of Issues	Amount
1	2	3
1995-96	8	404
1996-97	–	–
1997-98	2	206
1998-99	6	262
1999-2000	3	136
2000-01	–	–
2001-02	–	–
2002-03	1	36
2003-04	–	–
2004-05	4	3,946
2005-06	5	5,653
2006-07	2	284
2007-08	3	12,403

Table 5.6: Ownership Structure of Public Sector Banks
(As at end-September 2007)

(Per cent)

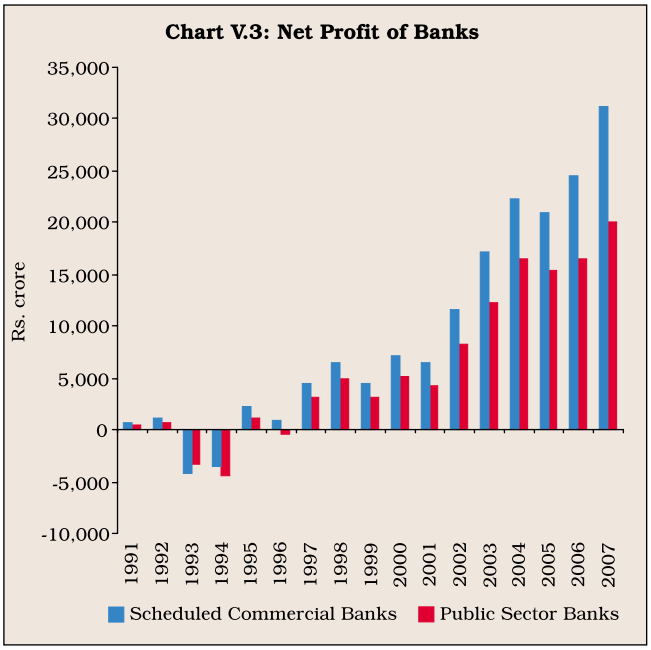
Banks	Government/ RBI Share	Share of Others	CRAR
1	2	3	4
Nationalised Banks			
Oriental Bank of Commerce	51.1	48.9	13.4
Dena Bank	51.2	48.8	11.3
Andhra Bank	51.6	48.4	11.1
Bank of Baroda	53.8	46.2	12.9
Vijaya Bank	53.9	46.1	11.3
Allahabad Bank	55.2	44.8	13.0
Union Bank of India	55.4	44.6	11.6
Corporation Bank	57.2	42.8	13.8
Punjab National Bank	57.8	42.2	13.1
Indian Overseas Bank	61.2	38.8	13.4
Syndicate Bank	66.5	33.5	12.2
Bank of India	69.5	30.5	12.6
Canara Bank	73.2	26.8	13.9
UCO Bank	75.0	25.0	11.5
Bank of Maharashtra	76.8	23.2	13.6
Central Bank of India	80.2	19.8	12.4
Indian Bank	80.0	20.0	13.9
Punjab & Sind Bank	100.0	0.0	13.3
United Bank of India	100.0	0.0	13.8
SBI and its Associates			
State Bank of India*	59.7	40.3	12.9
State Bank of Bikaner and Jaipur	100.0#	–	13.3
State Bank of Travancore	100.0#	–	12.9
State Bank of Mysore	100.0#	–	11.1
State Bank of Indore	100.0#	–	12.8
State Bank of Hyderabad	100.0#	–	12.2
State Bank of Patiala	100.0#	–	12.5
State Bank of Saurashtra	100.0#	–	12.1

* : Equity held by the Reserve Bank in SBI has since been transferred to the Government.
\# : Predominantly held by SBI.
– : Nil/Negligible.

losses in the three out of four years between 1992-93 and 1995-96, have made consistently large profits thereafter (Chart V.3).

5.148 Reserves generated by banks increased sharply in the post-reform period (Chart V.4).

5.149 The risk-weighted assets of scheduled commercial banks grew at an average annual rate of



22.4 per cent between end-March 1997 and end-March 2007 (Chart V.5).

5.150 The risk-weighted assets, in particular, increased sharply, *i.e.*, nearly three times between end-March 2003 and end-March 2007 (Table 5.7). To a large extent, the increase was on account of credit expansion and application of market risk norms. The increase in risk-weighted assets was also on account of increase in the risk weights by the Reserve Bank on certain categories of advances as

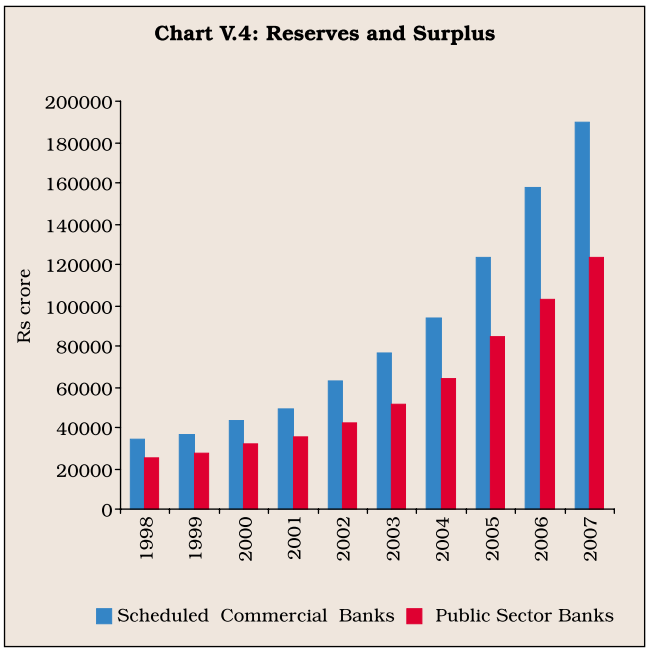


Chart V.5: Total Risk Weighted Assets

(As at end-March)

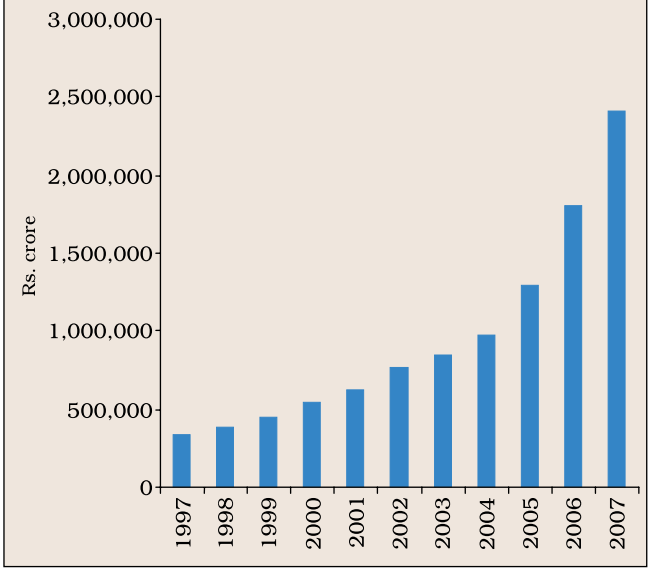
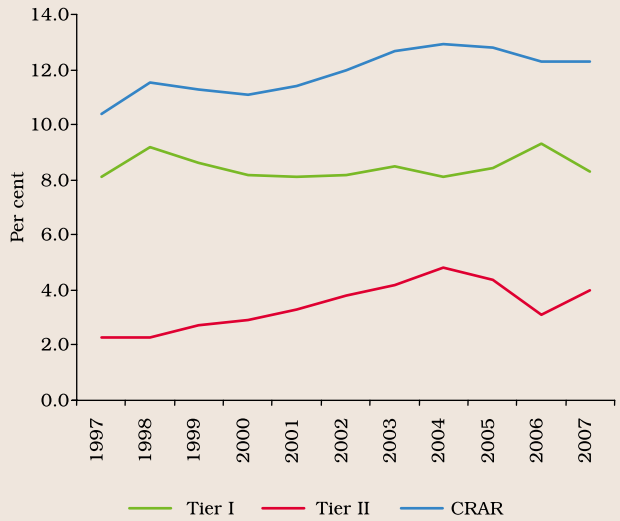


Chart V.6: CRAR of Scheduled Commercial Banks

(As at end-March)



a prudential measure to protect the balance sheets of banks during the phase of rapid credit growth expansion.

5.151 Despite the sharp increase in risk-weighted assets, banks were able to maintain the CRAR. In fact, the CRAR for the industry remained above 10 per cent from end-March 1997 and above 12 per cent from end-March 2002 (Chart V.6). The Tier I capital ratio declined somewhat to 8.3 per cent at end-March 2007 from 9.3 per cent a year ago. This was mainly due to relatively slower growth of reserves and surplus, while paid-up capital increased significantly. However, the Tier II capital increased significantly in contrast to decline in the previous year. As a result, the Tier II CRAR increased to 4.0 per cent from 3.1 per cent last year (Chart V.6). Despite the decline during the year, Tier I CRAR at 8.3 per cent was more than the present requirement of 4.5 per cent and also above the 6.0 per cent norm prescribed in the final guidelines for implementation of Basel II released by the Reserve Bank on April 27, 2007.

Table 5.7: Scheduled Commercial Banks – Capital Funds and Risk-Weighted Assets

(End-March)

(Amount in Rupees crore)

Item / Year	2003	2004	2005	2006	2007
1	2	3	4	5	6
A. Capital Funds (i+ii)	1,07,058	1,25,249	1,65,928	2,21,363	2,96,191
i) Tier I Capital	71,416	78,550	1,08,949	1,66,538	2,00,397
of which:					
Paid up Capital	21,594	22,022	25,724	25,142	29,489
Reserves	57,648	65,948	91,320	1,41,592	1,63,988
Unallocated/Remittable Surplus	4,194	4,983	6,937	11,075	20,387
Deductions for Tier-I Capital	11,646	14,403	15,031	11,271	13,573
ii) Tier-II Capital	35,643	46,699	56,979	54,825	95,794
of which:					
Discounted Subordinated Debt	18,482	20,011	26,291	43,214	63,814
B. Risk-weighted Assets	8,44,402	9,69,886	12,96,223	17,97,207	24,12,320
of which:					
Risk-weighted Loans and Advances	5,65,799	6,59,921	9,19,544	12,38,163	17,16,945

Source: Based on off-site returns submitted by banks.

Table 5.8: Capital Adequacy Ratio - Bank Group-wise
(As at end-March)

(Per cent)

Bank Group	2000	2001	2002	2003	2004	2005	2006	2007
1	2	3	4	5	6	7	8	9
Scheduled Commercial Banks	11.1	11.4	12.0	12.7	12.9	12.8	12.3	12.3
Public Sector Banks	10.7	11.2	11.8	12.6	13.2	12.9	12.2	12.4
Nationalised Banks	10.1	10.2	10.9	12.2	13.1	13.2	12.3	12.4
SBI & its Associates	11.6	12.7	13.3	13.4	13.4	12.4	12.0	12.3
Old Private Sector Banks	12.4	11.9	12.5	12.8	13.7	12.5	11.7	12.1
New Private Sector Banks	13.4	11.5	12.3	11.3	10.2	12.1	12.6	12.0
Foreign Banks	11.9	12.6	12.9	15.2	15.0	14.0	13.0	12.4

Source: Report on Trend and Progress of Banking in India, various issues.

5.152 The CRAR of all the bank groups, in general, has remained significantly above the minimum prescribed level. The CRAR of foreign banks, which usually remained much above the other bank groups, declined from 13.0 per cent at end-March 2006 to 12.4 per cent at end-March 2007 to converge with the industry average (Table 5.8).

5.153 At the individual bank level, only one bank could not meet the prescribed CRAR requirement at end-March 2007, which was subsequently amalgamated with a large private sector bank. The CRAR of all banks was above 10 per cent, except two banks whose CRAR was in the range of 9 to 10 per cent (Table 5.9).

5.154 Banks in India have managed their capital requirements in an efficient way. The capital requirements of banks in India are expected to increase on implementation of Basel II. Foreign banks and Indian banks with international presence migrated to the Basel II requirements since the year ended March 2008, and other scheduled commercial banks would adopt these norms not later than March 31, 2009. Ever since the Reserve Bank put the draft guidelines for adopting the revised framework in the public domain in 2005, several agencies and researchers have estimated the capital requirements of Indian banks in the light of the transition from Basel I to Basel II framework (Box V.15). It is generally believed that under the simpler approaches adopted in India, if the additional capital required under operational risk is not offset by the capital relief under credit risk, the overall regulatory requirements for banks would in most likelihood go up. With respect to credit risk, there is also a view emphasising that the adoption of standardised approach for credit risk under Pillar 1 of Basel II is not likely to be very different from the Basel I norms as most of the banks' customers still do not possess an external rating, in which case a risk weight of 100 per cent would be applied. Apart

Table 5.9: Distribution of Scheduled Commercial Banks by CRAR

(Number of banks)

Bank Group	End-March 2007			
	Below 4 per cent	Between 4-9 per cent	Between 9-10 per cent	Above 10 Per cent
1	2	3	4	5
Nationalised Banks*	–	–	–	20
SBI & its Associates	–	–	–	8
Old Private Sector Banks	–	–	2	14
New Private Sector Banks	–	–	–	8
Foreign Banks	–	–	–	29
Total	**–**	**–**	**2**	**79**

– : Nil/Negligible.
* : Including data for other public sector banks.
Source : Based on off-site returns submitted by banks.

Box V.15
Estimates of Capital Requirements of Indian Banks under Basel II by various Agencies

The Basel Committee on Banking Supervision (BCBS) has undertaken the Fifth Quantitative Impact Study (QIS-5) to assess the impact of adoption of the New Capital Adequacy Framework. Eleven Indian banks, accounting for about 50 per cent of market share (by assets), participated in the QIS-5 exercise. Preliminary analysis indicated that the combined capital adequacy ratio of these banks was expected to come down by about one per centage point when these banks apply Basel II norms for Standardised Approach for credit risk and Basic Indicator Approach for operational risk. Although none of these banks would be breaching the minimum capital adequacy ratio under the new framework, the net impact reflected a wide range.

Given the likely growth of the economy, the banking system itself will have considerable need for new capital. One estimate suggests that, in order to raise the bank credit ratio from 60 per cent to 80 per cent of GDP by 2010, the banking system will require extra capital of the order of 1¼ per cent of GDP (Lahiri, 2006). Raising such an amount of capital will require significant increases in profitability and efficiency in the sector.

According to the estimate made by the CRISIL, the overall impact of Basel II would decline by 1.6 percentage points in the CRAR. This is the combined effect of a 0.7 percentage point gain for credit risk, a 1.2 percentage points decline on account of market risk, and a 1.1 percentage points decline for operational risk. The CRISIL is of the view that the proposed framework will have a positive impact on the banking sector, and will place a modest capital demand on the banking sector.

In ICRA's estimates, Indian banks would need additional capital of up to Rs.120 billion (12,000 crore) to meet the capital charge requirement for operational risk under Basel II. Most of this capital would be required by PSBs (Rs.90 billion, or Rs.9,000 crore), followed by the new generation private sector banks (Rs.11 billion, or Rs 1,100 crore), and the old generation private sector bank (Rs.7.5 billion, or Rs.750 crore). In ICRA's view, given the asset growth witnessed in the past and the expected growth trends, the capital charge requirement for operational risk would grow 15-20 per cent annually over three years, which implies that the banks would need to raise Rs.180-200 billion (Rs 18,000-20,000 crore) over the medium term.

Reference:

Lahiri, A. 2006. "Financial Sector Reforms in India Step and Effects in International Financial System". Presentation to the Programme of Seminars *Asia in the World*, IMF/World Bank Annual Meeting, Singapore, September.

from the three types of risk, the growth of the real economy is also expected to impact on the growth of the risk-weighted assets and hence, the regulatory capital requirement of banks. Another widely discussed issue with regard to regulatory capital requirement under Basel II is about the ability of public sector banks to meet the growing capital requirements. This is because the shareholding of the Government in public sector banks cannot go below 51 per cent.

5.155 An attempt is made to arrive at the capital requirements over the five year period from 2007-08 to 2011-12, keeping in view (i) implementation of Basel II leading to a refined measurement of credit risk and an additional operational risk; and (ii) likely growth in banks' balance sheets. The CRAR estimates have been made under two scenarios. In the baseline scenario, it is assumed that banks would maintain the overall minimum capital ratio of 9 per cent and a Tier-I capital at 4.5 per cent. In the second scenario, it is assumed that banks would maintain CRAR at 12 per cent with 6 per cent Tier-I capital.

5.156 An estimation of capital requirements essentially requires estimation of risk-weighted assets (Box V.16).

5.157 Assuming that banks would maintain CRAR of 12 per cent, the total capital requirements for the banking sector are projected to go up to Rs.4,07,686 crore at end-March 2008 and Rs.8,64,935 crore at end-March 2012 from Rs.2,96,191 crore at end-March 2007 (Table 5.11). Thus, the banking sector would require additional capital of Rs.5,68,744 crore in the next five years. The estimated capital requirements for each year are fairly distributed at about Rs.1 lakh crore except for the year 2011-12 when the capital requirements are projected to increase sharply to Rs.1,39,802 crore. The capital requirements decline significantly, if CRAR is to be maintained at 9 per cent (Table 5.10). All bank groups would be required to raise their capital level from the first year (*i.e.*, 2007-08) itself mainly due to inclusion of operational risk under Basel II.

5.158 Of the total capital requirements at 12 per cent CRAR, Rs.3,69,115 crore (64.9 per cent of total banking sector) would be required by public sector

Box V.16
Estimation of Capital Requirements for Banks in India – Methodology

Capital requirements (both overall and Tier-I) as required under Basel II have been worked out by taking into consideration the increase in the risk-weighted assets (RWAs) for credit, market and operational risks. This, in turn, required estimation of expansion of credit for which the following methodology was adopted. It was assumed that real GDP would grow by 9 per cent (target growth given by the Planning Commission for the Eleventh Five Year Plan). Based on assumed real GDP growth, M3 growth was worked out by using the income elasticity of money demand plus inflation. Assuming a steady growth in currency (calculated on the basis of ARIMA model), deposits were arrived as a residual. From deposits, net demand and time liabilities (NDTL) were worked out. After deducting the pre-emptions in the form of CRR and SLR from NDTL, the credit was arrived at. Risk-weighted assets were estimated from credit by assuming stable relationship between them.

Assumptions for the Projections

1) Projection of M3

M3 was projected to grow at 18.5 per cent based on 9 per cent real GDP growth. Estimated income elasticity of demand for money was 1.5 and inflation rate was assumed at five per cent.

2) Forecasting Currency with the Public

Within the framework of Box-Jenkins' ARIMA model, the autocorrelation (ACF) and partial autocorrelation (PACF) functions were examined for the monthly series on currency with public (natural logarithm transformed) in four different forms: (i) first difference without seasonal adjustment; (ii) first difference with seasonal adjustment; (iii) annualised growth rate without seasonal adjustment; and (iv) annualised growth rate with seasonal adjustment. It was ascertained that the monthly currency with the public series could be modeled appropriately in terms of its seasonally adjusted annualised growth rate. In this form, the ACF showed the tendency of tapering off to zero, while the PACF cut off rapidly after the first lag. This suggested that the best ARIMA model was the first auto-regressive (AR) process along with a seasonal moving average term (SMA). The estimated ARIMA model for the currency variable showed that the dynamically forecast of monthly growth rate over a five-year horizon would hover around the structural component of its annual growth rate of 12.7 per cent.

3) Projection of Credit

The projected currency with public growth was deducted from the overall money supply to arrive at the residual total deposit amount. From deposits, net demand and time liabilities were arrived at based on stable relationship between the two. From NDTL, pre-emptions on account of CRR and SLR requirements were deducted and balance was taken as credit.

4) Projection of Enhanced Risk-weighted Assets

i) The risk-weighted assets for credit risk and market risk (at end-March 2007 actual data) were enhanced by including risk-weighted assets on account of operational risk. At end-March 2007, risk weighted assets were 1.4 times of outstanding credit.

ii) The ratio of risk-weighted assets to credit for 2006-07 was applied to the subsequent years on projected credit to estimate the risk-weighted assets.

5) Projections for Individual Banks

The market share of RWA for individual banks in total risk-weighted assets of the banking sector was arrived for 2006-07 based on their share in total assets and the same share was applied in the next five years.

banks, Rs.23,319 crore (4.1 per cent of total) by old private sector banks Rs.1,13,180 crore (19.9 per cent of total) by new private sector banks and Rs.63,131 crore (11.1 per cent of total) by foreign banks. Since banks are maintaining Tier I capital significantly above the required level, Tier I capital requirements for the banking sector were estimated to increase to Rs.2,33,564 crore during the period 2007-12, in which case the balance would have to come from Tier II capital. Tier I capital requirements for the next 5 years were estimated at Rs.1,55,569 crore by public sector banks, Rs.8,178 crore by old private sector banks, Rs.49,278 crore by new private sector banks and Rs.20,540 crore by foreign banks. Foreign banks and new private sector banks might not require additional capital for the year ended March 2008 to meet the 9 per cent CRAR, as their existing capital funds might be sufficient to meet Tier I requirements. However, they might need to raise Tier II capital funds.

5.159 Tier I capital requirements for public sector banks are projected to be small for 2007-08 at 12 per cent CRAR. However, they become larger in every successive year in the next 5 years (Table 5.11).

5.160 Insofar as the financing of capital requirements of nationalised banks is concerned, it was observed that in the past five years the increase in Tier I capital requirement was largely met by ploughing back of profits, while the increase in Tier II capital was predominantly through discounted subordinated debt. Reserves accounted for 86.0 per

Table 5.10: Risk-weighted Assets and Capital Requirements – Projection under Scenario I (9 per cent CRAR)

(Rupees crore)

End-March / Bank Group	Projected Risk-weighted Assets	Scenario II (Capital Requirement - 9 per cent Overall and 4.5 per cent Tier I)			
		Projected Capital Requirement	Projected Tier I Capital Requirement	Enahncement in Total Capital Required	Enhancement in Tier I Capital Required
1	2	3	4	5	6
Scheduled Commercial Banks					
2008	33,97,383	3,05,764	1,52,882	20,024	799
2009	42,39,008	3,81,511	1,90,755	69,541	8,821
2010	50,61,643	4,55,548	2,27,774	93,070	25,829
2011	60,41,344	5,43,721	2,71,860	1,09,604	40,031
2012	72,07,788	6,48,701	3,24,350	1,22,830	50,964
Public Sector Banks					
2008	22,12,938	1,99,164	99,582	7,786	430
2009	27,61,143	2,48,503	1,24,251	46,582	5,866
2010	32,96,979	2,96,728	1,48,364	48,225	17,832
2011	39,35,122	3,54,161	1,77,080	57,433	27,124
2012	46,94,903	4,22,541	2,11,271	68,380	33,893
Old Private Sector Banks					
2008	1,38,005	12,420	6,210	1,254	370
2009	1,72,192	15,497	7,749	2,582	388
2010	2,05,609	18,505	9,252	2,931	522
2011	2,45,405	22,086	11,043	3,550	1,065
2012	2,92,787	26,351	13,175	4,239	1,655
New Private Sector Banks					
2008	6,69,855	60,287	30,143	3,771	0
2009	8,35,796	75,222	37,611	14,430	2,353
2010	9,97,993	89,819	44,910	14,598	6,626
2011	11,91,159	1,07,204	53,602	17,385	8,632
2012	14,21,144	1,27,903	63,951	20,699	10,349
Foreign Banks					
2008	3,76,586	33,893	16,946	3,827	0
2009	4,69,876	42,289	21,144	7,428	214
2010	5,61,062	50,496	25,248	7,786	849
2011	6,69,658	60,269	30,135	9,301	3,209
2012	7,98,953	71,906	35,953	11,177	5,067

cent of total Tier I capital in 2006-07 (Table 5.12). It is, therefore, likely that banks in the next five years are able to increase their Tier I capital fund requirements largely through reserves.

5.161 Some banks also have headroom available as the Government shareholding in these banks was significantly above the minimum requirement of 51 per cent. Total headroom available to nationalised banks was Rs.2,637 crore, implying the nationalised banks could access the market to the extent of Rs.5,171 crore and still retain Government shareholding of 51 per cent (Table 5.13). However, of 20 nationalised banks (including IDBI), this headroom to a significant extent (above Rs.100 crore) was available to only six banks.

5.162 Since a significant proportion of banks' capital requirement in the next five years is estimated to be met by internal resources, *viz.*, growth in reserves and surplus, banks would be required to tap the capital market only for the residual small amount of capital. As per the estimates under scenario I, public sector banks would need around

Table 5.11: Growth in Risk-weighted Assets and Capital Requirements – Projection under Scenario II (12 per cent CRAR)

(Rupees crore)

End-March / Bank Group	Projected Risk- weighted Assets	Scenario II (Capital Requirement - 12 per cent Overall and 6 per cent Tier I)			
		Projected Capital Requirement	Projected Tier I Capital Requirement	Enhancement in Total Capital Required	Enhancement in Tier I Capital Required
1	2	3	4	5	6
Scheduled Commercial Banks					
2008	33,97,383	4,07,686	2,03,843	1,13,617	17,273
2009	42,39,008	5,08,681	2,54,341	1,00,407	41,697
2010	50,61,643	6,07,397	3,03,699	98,220	47,189
2011	60,41,344	7,24,961	3,62,481	1,17,083	57,943
2012	72,07,788	8,64,935	4,32,467	1,39,802	69,462
Public Sector Banks					
2008	22,12,938	2,65,553	1,32,776	71,418	11,510
2009	27,61,143	3,31,337	1,65,669	65,785	28,740
2010	32,96,979	3,95,637	1,97,819	64,300	31,443
2011	39,35,122	4,72,215	2,36,107	76,577	38,289
2012	46,94,903	5,63,388	2,81,694	91,174	45,587
Old Private Sector Banks					
2008	1,38,005	16,561	8,280	4,845	900
2009	1,72,192	20,663	10,332	4,058	956
2010	2,05,609	24,673	12,337	3,986	1,417
2011	2,45,405	29,449	14,724	4,747	2,142
2012	2,92,787	35,134	17,567	5,661	2,763
New Private Sector Banks					
2008	6,69,855	80,383	40,191	23,362	4,444
2009	8,35,796	1,00,296	50,148	19,913	9,713
2010	9,97,993	1,19,759	59,880	19,464	9,732
2011	11,91,159	1,42,939	71,470	23,180	11,590
2012	14,21,144	1,70,537	85,269	27,598	13,799
Foreign Banks					
2008	3,76,586	45,190	22,595	13,993	419
2009	4,69,876	56,385	28,193	10,651	2,288
2010	5,61,062	67,327	33,664	10,470	4,597
2011	6,69,658	80,359	40,179	12,579	5,923
2012	7,98,953	95,874	47,937	15,369	7,313

30 per cent of Tier I capital requirements to be raised from sources other than growth in reserves and surplus in the next five years in order to meet the minimum Tier I capital requirement of 4.5 per cent. This requirement is estimated to increase somewhat to 40 per cent under scenario II wherein the Tier I capital requirement to be met by PSBs is assumed at 6.0 per cent. This requirement could be fulfilled using the headroom available under innovative perpetual debt instruments (IPDI) and perpetual non-cumulative preference shares (PNCPS). In addition, some banks could make use of the headroom available for raising capital from the market where the Government holding is in excess of 51 per cent.

5.163 Banks are also allowed to raise capital by way of innovative perpetual debt instruments and perpetual non-cumulative preference shares to the extent of 40 per cent of Tier I capital (15 per cent IPDI and 25 per cent PNCPS; banks could utilise the entire 40 per cent limit for PNCPS, in which case they may not be able to raise IPDI). Total headroom

Table 5.12: Composition of Capital - Nationalised Banks

Item / Year	2002-03	2003-04	2004-05	2005-06	2006-07	2002-03	2003-04	2004-05	2005-06	2006-07
	Amount in Rs. crore					Share in Respective Total (per cent)				
1	2	3	4	5	6	7	8	9	10	11
A.Capital Funds (i+ii)	44,676	55,483	75,422	97,749	129,089	100.0	100.0	100.0	100.0	100.0
i) Tier I Capital	28,066	32,827	46,050	72,172	84,190	62.8	59.2	61.1	73.8	65.2
of Which:										
a) Paid up Capital	13,140	13,640	14,423	11,444	11,381	46.8	41.6	31.3	15.9	13.5
b) Reserves	21,172	25,291	37,984	61,233	72,400	75.4	77.0	82.5	84.8	86.0
c) Unallocated/ Remittable Surplus	741	763	1,748	2,729	3,417	2.6	2.3	3.8	3.8	4.1
d) Deductions for Tier I Capital	6,986	6,866	8,105	3,234	3,006	24.9	20.9	17.6	4.5	3.6
e) Share Premium (during the year)	383	940	3,040	5,004	696	1.4	2.9	6.6	6.9	0.8
ii) Tier II Capital	16,610	22,656	29,372	25,577	44,899	37.2	40.8	38.9	26.2	34.8
of Which:										
a) Discounted Subordinated Debt	9,452	10,764	14,444	20,157	27,936	56.9	47.5	49.2	78.8	62.2
b) Investment Fluctuation Reserve	4,121	8,827	10,751	72	–	24.8	39.0	36.6	0.3	0.0

available under these instruments for nationalised banks was Rs.33,676 crore at end-March 2007 (Table 5.14). However, headroom available would get reduced to the extent some banks have already raised capital under these instruments. Thus, as against Tier I capital projected requirements of Rs.102,875 crore

Table 5.13: Government Equity and Headroom Available - Nationalised Banks
(End-March 2007)

(Amount in Rupees crore)

Bank	Government/RBI Shareholding (per cent)	Total Paid- up Capital	Total Paid-up Capital held by Government	Government Holding in Excess of 51 per cent	Capital Raising Option by Dilution of Government Equity up to 51 per cent
1	2	3	4	5	6
Nationalised Banks		**11,381**	**8,441**	**2,637**	**5,171**
Allahabad Bank	55.2	447	247	19	37
Andhra Bank	51.6	485	250	3	6
Bank of Baroda	53.8	366	197	10	20
Bank of India	69.5	488	339	90	177
Bank of Maharashtra	76.8	431	331	111	218
Canara Bank	73.2	410	300	91	178
Central Bank of India	100.0	1,124	1,124	551	1,080
Corporation Bank	57.2	143	82	9	17
Dena Bank	51.2	287	147	1	1
IDBI Ltd.	52.7	724	382	12	24
Indian Bank	80.0	830	664	241	472
Indian Overseas Bank	61.2	545	333	56	109
Oriental Bank of Commerce	51.1	251	128	0	0
Punjab & Sind Bank	100.0	743	743	364	714
Punjab National Bank	57.8	315	182	21	42
Syndicate Bank	66.5	522	347	81	159
UCO Bank	75.0	799	600	192	376
Union Bank of India	55.4	505	280	22	44
United Bank of India	100.0	1,532	1,532	751	1,472
Vijaya Bank	53.9	434	234	13	25

Table 5.14: Capital Required (2007-08 to 2011-12) and Headroom Available – Nationalised Banks

(Rupees crore)

Bank	Total Enhancement in Capital Required at 9 per cent	Total Enhancement in Capital Required at 12 per cent	Total Enhancement in Tier-I Capital Required at 4.5 per cent	Total Enhancement in Tier-I Capital Required at 6 per cent	Headroom Available by Diluting Government Equity	Headroom Available under IPDI and Preference Shares
	End-March 2007 to End-March 2012				End-March 2007	
1	2	3	4	5	6	7
Nationalised Banks	**1,51,509**	**2,45,041**	**56,109**	**1,02,875**	**5,171**	**33,676**
Allahabad Bank	6,302	10,233	2,344	4,310	37	1,421
Andhra Bank	4,899	7,721	1,091	2,502	6	1,257
Bank of Baroda	13,142	20,945	4,097	7,998	20	3,043
Bank of India	13,647	21,633	6,155	10,148	177	2,330
Bank of Maharashtra	3,687	5,915	1,844	2,958	218	600
Canara Bank	14,670	24,485	6,873	11,780	178	3,140
Central Bank of India	8,579	13,242	3,705	6,037	1,080	1,316
Corporation Bank	4,706	7,654	759	2,233	17	1,465
Dena Bank	2,759	4,367	1,326	2,130	1	435
IDBI Ltd.	11,600	19,498	3,819	7,768	24	3,211
Indian Bank	3,763	6,407	344	1,666	472	1,449
Indian Overseas Bank	7,226	11,982	2,781	5,159	109	1,741
Oriental Bank of Commerce	7,308	11,864	1,725	4,002	0	2,043
Punjab and Sind Bank	1,738	2,850	480	1,036	714	475
Punjab National Bank	16,211	26,159	5,015	9,989	42	3,963
Syndicate Bank	7,735	12,311	3,679	5,966	159	1,274
UCO Bank	6,746	10,689	3,372	5,344	376	1,017
Union Bank of India	9,093	14,877	3,648	6,540	44	2,011
United Bank of India	3,629	5,817	1,397	2,491	1,472	754
Vijaya Bank	4,068	6,394	1,655	2,818	25	733

for nationalised banks during next five years at 12 per cent CRAR, banks have headroom to the extent of Rs.38,847 crore already and as their Tier I capital goes up, more headroom would be available under IPDI and PNCPS. Most importantly, banks in the past relied to a large extent (around 86 per cent Tier I capital requirements were met by reserves at end-March 2007) on ploughing back of profits, as alluded to earlier, and it is likely that banks continue to do so in future.

VI. THE WAY FORWARD

5.164 Basel II defines a new risk-sensitive framework consisting of three mutually reinforcing pillars that are expected to contribute to the safety and soundness of a financial system. Though the Indian banking sector has benefited from a supportive institutional and regulatory environment as reflected in their healthy and stable financial profile, certain weaknesses still need to be addressed, particularly in the light of the ongoing process of implementing Basel II standards.

5.165 India has currently adopted the standardised approach for credit risk and the basic indicator approach under Pillar 1. After adequate skills are developed, both by the banks and also by the Reserve Bank, some banks may be allowed to migrate to the advanced approaches available under Basel II framework. Capacity building, both in banks and the Reserve Bank is a serious challenge, especially with regard to adoption of the advanced approaches. Besides, there are several other issues that need to be addressed to ensure that the benefits of Basel II are maximised.

Implementation of Basel II across Banks

5.166 Commercial banks, co-operative banks and regional rural banks are placed at different levels insofar as capital adequacy norms are concerned. The non-Basel entities [RRBs and rural co-operatives such as state co-operative banks (StCBs) and district central co-operative banks (DCCBs)] constitute a small share of the financial system and are, therefore, not significant from the systemic perspective. However, the three track approach to Basel II

implementation, which has been adopted in India, might give rise to scope for regulatory arbitrage within the banking system. Non-Basel entities accept deposits from the public, enjoy deposit insurance and are part of the payment system. Going forward, therefore, the objective of the policy should be to reduce the scope for regulatory arbitrage and at the same time maintain a delicate balance so as to ensure that this does not constrain the non-Basel entities from discharging their respective specified roles in the national economy, *viz.*, achieving greater financial inclusion, playing a developmental role, and acting as conduits for credit delivery to the neglected sectors. As a first step in reducing regulatory arbitrage, it is felt that the non-Basel institutions be subjected to Basel I norms. Urban co-operative banks (UCBs) are already on Basel I for credit risk. Other banks such as RRBs and rural co-operatives could be given more flexibility to introduce new products and businesses when they decide to comply with Basel I. The package of recapitalisation and reform is under implementation for rural co-operatives wherein apart from recapitalisation through budgetary support from Central and State Governments, phased achievement of Basel I capital requirements is being contemplated. Furthermore, initiatives are being undertaken with a view to strengthening the rural co-operative structure as well as ensuring that these banks maintain financial discipline and also put in place an early warning mechanism so that the problems of depleting capital are addressed sufficiently early. After gaining the experience of implementation of Basel II norms for scheduled commercial banks, a view would need to be taken for applying Basel II norms for other banks. When these banks comply with Basel II norms, they would need to be provided the same treatment as the commercial banks.

5.167 Another likely scenario, which might arise post-Basel II implementation, is the asymmetry in regulatory regime amongst the competing broad segments of the financial sector, *viz.*, banking, securities and insurance sectors. With the commercial banking sector on Basel II, some scope for regulatory arbitrage amongst the three broad segments, especially between the banking and the insurance sectors would exist. The Joint Forum[7] has taken some initiatives in this direction, which may have to be pursued further to achieve parity in the level of regulatory burden across the three sectors, which compete amongst themselves for the business of financial intermediation.

Mitigation of Pro-cyclicality

5.168 An adverse consequence of implementation of Basel II could be pro-cyclical behaviour of banks. There is, therefore, need to guard against its adverse impact on India's macroeoconomy. One such way is to hold capital based on more stressed economic situations. This would ensure that banks maintain adequate capital during periods of economic downturns. Basel II contains a stress-testing requirement in which banks must simulate their portfolios in order to understand how economic cycles, especially downturn conditions, affect risk-based capital requirements. Also, under the prompt corrective action (PCA) framework that links supervisory actions closely, *inter alia*, to a bank's capital ratio, the Reserve Bank is required to take increasingly stringent forms of corrective action against banks as their risk-based capital ratios decline. The purpose is to ensure that timely regulatory action is taken to address problems of financially troubled banks. There is, therefore, a strong incentive for banks to maintain the minimum capital requirements significantly above the prescribed ratio as several banks have done in the past. It is expected that banks in future will manage their regulatory capital position in such a way that they remain adequately capitalised during economic downswings so that they are not required to raise capital. This would ensure that bank capital would be relatively stable while the cushion between required capital and actual capital held would vary during the economic cycle.

Safeguards before introducing Advanced Approaches

5.169 The Reserve Bank has already indicated that advanced approaches would be allowed in due course. Given the considerable costs and complexity of the advanced approaches and their attendant uncertainties and risks, there is a need to put in place adequate safeguards before allowing such approaches. One, the appropriateness of the capital requirements generated by the Basel II models depends in part on the sufficiency of the data inputs used by banks. Banks would also need data on

[7] The Joint Forum was established in 1996 under the aegis of the Basel Committee on Banking Supervision (BCBS), the International Organisation of Securities Commissions (IOSCO) and the International Association of Insurance Supervisors (IAIS) to deal with issues common to the banking, securities and insurance sectors, including the regulation of financial conglomerates.

stressed economic period for calibrating their models. However, to address these data sufficiency challenges and their effect on the ability of banks to use the advanced approaches for all portfolios, the Reserve Bank would have to decide whether and how to identify the banks to permit migration to the advanced approaches when adequate data to assess the risks of certain portfolios are limited. There would be need to address the limited data availability and lack of industry experience in incorporating economic downturn conditions into LGD estimates before allowing banks to follow advanced approaches. Two, while advanced approaches allow capital to be used more efficiently, it is possible that the capital requirements fall significantly even if banks continue to maintain the prescribed ratio of nine per cent. That is, even if banks continue to maintain the minimum prescribed ratio of nine per cent in relation to risk weighted assets, the absolute amount of capital the banks would hold may decline significantly under advanced approaches. It may, therefore, perhaps be desirable to prescribe minimum leverage ratio (capital in relation to total assets) to ensure that the capital held by banks has some proportion to the total size of its operations, irrespective of the measurement approaches. Some may argue that this defeats the very purpose of stipulating risk-sensitive capital requirements. However, the leverage ratio and the risk-sensitive ratios should be viewed as complementary. Just as the risk sensitive ratio offsets the weakness of the simple leverage ratio, the leverage ratio has the potential to offset the weaknesses of the risk-based ratio. For instance, some banks under the Basel II framework may not lend to the agriculture and the SME sectors as they are perceived to be risky and banks may choose to have only low risk portfolio. In those cases, the leverage ratio, by mitigating some of the risk sensitivity, could encourage banks to lend to the sectors which are perceived risky. The leverage ratio for the bank with low-risk profile could be higher than the risk sensitive Basel II requirements. Here, it may also be noted that the US has historically adopted the leverage ratio (simple capital to on-balance sheet assets ratio) and it continued to apply the leverage ratio even after Basel I and has stated that banks under Basel II would continue to be subject to the leverage ratio. The Reserve Bank has advised banks that the minimum capital maintained by them should be subject to a prudential floor. However, such requirement is only during the first three years of the revised Basel II framework. Once banks are also subjected to some leverage ratio, it would ensure that the capital maintained by them does not fall below a certain level. Three, in the implementation of advanced approaches, the Reserve Bank would have to deal with the increased complexity of issues. The Reserve Bank would have to exercise judgment on increasingly complex issues, including validating the models adopted by the banks. It would also be a challenge to apply Basel II requirements consistently across banks because of the flexibility allowed. To successfully meet this challenge, it would be necessary to develop appropriate human resource skills with a focus on quantitative techniques. Thus, while moving forward with advanced approaches could potentially entail certain risks, the proposed safeguards and stipulation of the leverage ratio should help mitigate potential negative effects.

Role of Rating Agencies

5.170 Under the standardised approach for credit risk adopted in India, the external rating assessment of portfolio has to play an important role. In view of the limited penetration of ratings and the absence of reliable ratings for different assets, the Indian banking industry will not be able to fully exploit the flexibility of Basel II. The role of rating agencies has also come under scrutiny in the recent sub-prime mortgage loan crisis. Some confusion surrounding the actual scope of the rating has also arisen. While rating agencies consider themselves responsible only for assessing credit risk, many fund managers, in particular short-term investment funds, might expect that ratings would cover all the risks (notably liquidity risk) that weigh on their investments. The second source of misunderstanding stems from the metric used by the rating agencies for rating structured products, which is identical, in terms of presentation, to that used for traditional bond products. The consequences of assigning a AAA rating to a CDO and to a corporate bond are not the same. The potential volatility of a AAA rating for a structured product, in particular, is far greater than that for a traditional product (for a shock, all other things are equal, of the same magnitude). Structured products are built on correlations and leverage. If one of the riskier tranches is affected by a default, the value (and the rating) of the other tranches will also be affected by contagion, through the decrease in their subordination level. Keeping these in view, in future, the possible improvements could be considered in three areas, among others. First, there should be greater transparency of rating methods and the overall role of rating agencies in the securitisation process. Second, a marked difference should be instituted in the metric used for rating bonds and structured

products, in order to distinguish the significance of ratings, either by adopting another rating scale for structured products (with another symbol for example) or by including an additional measure in the credit rating, in particular on its volatility in times of market or liquidity stress. Furthermore, a specific rating for liquidity risk also needs to be explored, although there are difficulties in such an exercise. The issues have also been raised about potential conflicts of interest in the activities of rating agencies as they are paid by the same entities which they rate. Therefore, there is need to change the incentive structure of rating agencies.

Constant Upgradation of Risk Management Systems

5.171 Though banks in India have been upgrading their risk management systems guided by the Reserve Bank's regulatory initiatives, under Basel II framework, the implementation of sound risk management practices should not be seen as an end in itself, but as a means whereby the risk management systems in banks are constantly upgraded to address the changing environment. The significance of this has been clearly borne out by the recent turmoil, which brought to light the interactions between credit, market liquidity and funding liquidity risks that many regulated financial institutions did not anticipate. On valuation, risk disclosure and accounting, the recent turmoil has exposed shortcomings in the transparency and valuation of complex products. It has also raised concerns about principles and practices for the consolidation of related off-balance sheet entities. There are a number of risk management challenges inherent in banking that require careful identification and attention. One of the most basic risk management challenges relates to concentration of risks. As risk management techniques grew over the centuries, bankers became more adept at identifying, measuring and managing risk concentrations, but the original problem presented by concentrations – that losses could occur all at the same time – still exists, usually unfavourable consequences. Risk concentrations can be hidden during normal times and may only manifest themselves during times of stress when activities or instruments that might in normal times have little or negative correlation suddenly become correlated, such as with a market-wide increase in the demand for liquidity as observed in the recent financial market crisis.

Strengthening Liquidity Risk Management

5.172 Effective liquidity risk management usually emerges as a challenge during periods of financial stress, when many markets become less liquid, making it difficult for some entities to fund themselves. In recent months, some of the well-known challenges associated with liquidity risk management became evident in the light of the US sub-prime crisis and the failure of the Northern Rock bank in the UK. Even banks with strong capital base experienced liquidity problems as they did not have a strong liquidity risk management system in place.

5.173 Under Basel II, though liquidity risk is not reckoned explicitly as Pillar 1 risk, it is provided that a bank's Pillar 2 assessment should cover the full range of risks facing an institution, including liquidity risks. The adequate stress and scenario testing for potential asset expansions arising from liquidity shocks becomes crucial to communicate to market participants about their risk profiles. The BCBS has already initiated the process of assessment of the weaknesses identified by the recent crisis with a view to setting global standards for liquidity risk management and supervision, and integrating it more closely with other risk management disciplines.

Role of Technology

5.174 Basel II framework is having a significant impact on the IT infrastructure of financial institutions as the bank managements are required to align the business needs of their enterprises with technologies that support them. The implementation of core banking solutions by some banks without assessing its scalability or adaptability to meet Basel II requirements could be an area of concern. The challenge in this regard for banks is to ensure that they derive maximum advantage out of their investments in technology and to avoid wasteful expenditure which might arise on account of uncoordinated and piecemeal adoption of technology; adoption of inappropriate/inconsistent technology; and adoption of obsolete technology. Apart from the technology, the existing levels of skills of human resources would also require to be supplemented/ upgraded at the bank level.

Building up of Supervisory Skills

5.175 The Reserve Bank faces several human capital challenges in implementing Basel II. Although the skills needed to oversee Basel II implementation are similar to the skills needed for all kinds of risk management oversight, there would be need for additional quantitative skills. The supervisory staff would need to be trained in several areas, including internal control reviews, economic capital, operational risk and validation of credit rating. The Reserve Bank

has already initiated several measures to develop its human resource skills in tune with the requirements of Basel II norms. Going forward, the need would be to constantly review human resource skill requirements and initiate timely measures.

Common Reporting Templates

5.176 Under Pillar 2, banks take the lead in developing internal risk management processes that support robust estimates of regulatory and economic capital. Under Pillar 2, the common reporting template prescribed by the Reserve Bank in the ICAAP document would ensure easy comparability across banks. In future, external benchmarks could also be made available by the Reserve Bank for comparison/self-evaluation of the risk components/ operational losses.

Greater Transparency

5.177 Through enhanced transparency and market discipline, Pillar 3 will become more important as banks increasingly access the capital markets. Banks are in the process of putting in place a system for assessing the appropriateness of their disclosures, including validation and frequency. Besides, banks are required to design reporting framework/disclosures in the context of stated business objectives and provide information on the risks and the risk management systems in the public domain. This information could be used by the Reserve Bank for comparison among banks.

Co-ordination of Home-Host Issues

5.178 There are several domestic banks which are internationally active. Several foreign banks also operate in India. Basel II implementation may pose challenge of home-host co-ordination on account of differences in concerns and objectives of supervisors across different countries. While host country supervisors face the costs of adjusting to differences the way in which foreign banks will implement Basel II, banks and home country supervisors are concerned about host supervisors' intrusions, questions and special rules (Bernanke, 2004). The ideal solution for managing a complex task of this nature is through mutual co-operation amongst the supervisors. They have indeed made strong progress to coordinate home-host implementation issues at the level of individual banks, particularly for Pillar 1 (minimum capital requirements). The Accord Implementation Group (AIG) at BCBS is now focusing its attention on Pillar 2 (supervisory review process) and it also will begin work on Pillar 3 (market discipline). Bilateral and multilateral cross-border implementation of Basel II alongwith the ongoing supervisory arrangements such as 'supervisory colleges,' are likely to result in a more effective cooperation and information exchange among supervisors. Nevertheless, going forward, home-host coordination issues could at times create tensions and it would be a challenge to deal with them appropriately (see also Chapter X).

VII. SUMMING UP

5.179 Basel I has served regulators and banks well for many years and it continues to do so for many smaller institutions. However, for large and complex banking organisations, it increasingly failed to adequately align regulatory capital required with the underlying risks. Basel II represents a fundamental shift in the regulatory capital framework by aligning the capital requirements with underlying risks through enhanced risk measurement techniques and encouraging banks to develop a more disciplined approach to risk management. Basel II, therefore, will help in promoting the safety and soundness of the banking system. However, in view of the recent financial market turmoil, a number of modifications have been suggested in the Basel II framework. These measures need to be evaluated in terms of their ability to prevent future crises. Direct regulatory interventions such as mandating more capital could entail economic costs, and it is in this context that the proposal of capital insurance, wherein it would be possible to transfer more capital onto the balance sheets of troubled banking firms, has been mooted (Kashyap, Rajan and Stein, 2008).

5.180 The Reserve Bank had announced the use of the standardised approach for credit risk and basic indicator approach for operational risk in the case of foreign banks operating in India and Indian banks having overseas presence from the year ended March 2008. Other banks are expected to adopt Basel II not later than March 2009. Measures were initiated to ensure smooth migration to Basel II norms. In fact, banks that were to apply such norms from the year ended March 2008 have already done so successfully. The parallel runs for other banks continue. As banks would have to maintain capital for operational risk, overall capital requirements are expected to go up, even if there is decline in the capital required on account of credit risk. Most of the banks in India at present are operating at higher capital adequacy ratio than the prescribed level. Therefore, meeting the Basel II requirements for the immediate future should

not be an issue. However, going forward, meeting the capital requirements would be a major challenge, especially for public sector banks.

5.181 Total capital requirements in the next five years (from end-March 2008 to end-March 2012) are projected to go up by Rs.5,69,129 crore assuming that banks maintain CRAR at 12 per cent. The total capital requirements by public sector banks are projected to go up by Rs.3,69,254 crore. However, in the past, more than 85 per cent of the capital requirements were met by generating reserves and it is likely that banks continue to do so in future. Besides, banks also have some headroom available for diluting Government equity and raising funds under innovative instruments (IPDI) and preference shares.

5.182 The implementation of Basel II would also pose several implementation challenges. Besides, several other issues would have to be addressed going forward. India has followed a three track mode, whereby as commercial banks, co-operative banks and regional rural banks are placed at different levels insofar as capital adequacy norms are concerned. Although this does not raise any concern from the systemic viewpoint, it does give rise to regulatory arbitrage. Non-Basel institutions therefore, need to be subjected to Basel I norms. Subsequently, based on the experience of implementing Basel II framework in respect of commercial banks, a view could be taken on the application of Basel II norms for other banks. A serious fallout of the Basel II norms could be pro-cyclical behaviour of banks. To mitigate the impact of such a behavior, it may be desirable for banks to hold capital above the prescribed minimum so that their lending to various sectors during downswings is not adversely affected and that they do not find it difficult to raise capital from the market. The Reserve Bank has already indicated that banks could be allowed to move to advanced approaches in due course. Advanced approaches are more risk sensitive and would, therefore, help promote financial stability. However, there are also uncertainties and risks attached to such approaches. It is, therefore, necessary to take enough safeguards before advanced approaches are adopted. These include developing human resource skills and prescribing the leverage ratio so that the capital held does not fall significantly. There are also certain issues relating to the rating agencies that need to be addressed. The issues have also been raised about potential conflicts of interest in the activities of rating agencies. Although banks have adopted risk management practices, going forward, the need would be to constantly upgrade such system in tune with the changing demands. Technology will continue to play a major role in the operations of banks. The challenge in this regard for banks is to ensure that they derive maximum advantage out of their investments in technology and that they avoid wasteful expenditure which might arise on account of uncoordinated and piecemeal adoption of technology, adoption of inappropriate/inconsistent technology, and adoption of obsolete technology. Banks, therefore, need to ensure that the technology adopted by them suit their requirements and is cost-effective. The implementation of Basel II norms is likely to create tensions on home-host coordination issues and it would be a challenge to mitigate such tensions. The Basel II is a significant improvement over Basel I, which became increasingly inadequate with the passage of time. Basel II norms by making capital requirements sensitive are expected to promote the safety and soundness of the banking system. However, its full benefits could be realised only by taking appropriate safeguards against some of its deficiencies.

Annex V.1: Basel II Implementation: Cross-Country Status

Country	Status of Implementation
Australia	The Australian Prudential Regulation Authority (APRA) finalised the Basel II prudential standards in 2005 after extensive industry consultations. Presently, majority of authorised deposit-taking institutions (ADIs) in Australia are using the standardised approaches available under the Basel II framework. The reporting requirements for these ADIs broadly replicate the previous capital reporting requirements, with some additions in areas such as operational risk and securitisation. In December 2007, the APRA announced a list of ADIs that have been given approval to adopt, from January 1, 2008, the advanced approaches available under Basel II framework. Subsequently, in February 2008, the APRA released its reporting requirements for ADIs under the new Basel II capital adequacy regime. These guidelines deal with the calculation of minimum regulatory capital for credit risk, market risk, operational risk and for ADIs approved by APRA to use the Basel II advanced approaches, interest rate risk in the banking book.
Brazil	In December 2004, Banco Central do Brasil issued a schedule for Basel II implementation in Brazil. This five-phased process is scheduled to culminate in 2011.
China	Big Chinese banks with large overseas operations, such as Industrial and Commercial Bank of China, will have to implement the new standard by 2010. Banks can apply for a deadline extension of up to three years. It was reported that the Chinese regulator has been pressing big local lenders to start developing the advanced internal ratings based system (A-IRB) as well.
European Union	The European Union has already implemented the Basel II framework via EU Capital Requirements Directives (CRD). Many European banks have already started reporting their capital adequacy ratios according to the new system. All the credit institutions are scheduled to adopt the framework by 2008.
Hong Kong	Hong Kong-based banks have begun implementation of the Basel II rules in a two-stage programme that extended from the beginning of 2007 to January 2008. The Capital and Disclosure Rules came into effect on January 1, 2007. In 2007, the Hong Kong Monetary Authority (HKMA) gave approval to four authorised institutions (AIs) to migrate to more advanced approaches. The HKMA also established a structured process for review of applications to adopt Standardised Approach or Alternative Standardised Approach for operational risk. The first round of Supervisory Review Process on local AIs under Pillar 2 was completed in 2007. The HKMA plans to continue to process Basel II applications in 2008. A review for enhancement of risk management practices after adoption of Basel II is also on cards.
Indonesia	Bank of Indonesia will introduce the standardised, internal rating-based and advanced approaches starting from 2009. These approaches will be phased in over time. The decision on the approach to be used will be made by individual banks with approval from the supervisor. If a bank has already used the internal rating based or advanced approach, it will not be permitted to replace the approach in use with the standardised approach without approval from the bank supervisor.
Japan	The Basel II was implemented by Financial Services Agency (FSA) from end of March 2007. At the end of March 2007, the FSA had approved the adoption of the F-IRB Approach by a total of 23 groups and 19 financial institutions. The adoption of the A-IRB Approach is scheduled for approval from the end of March 2008. For the measurement of operational risk, financial institutions are also allowed to choose the approach best suited for them from three options: the basic indicator approach, the Standardised Approach and the Advanced Measurement Approach. Financial institutions wishing to adopt the Standardised Approach or the Advanced Measurement Approach are required to obtain prior approval from the regulatory authorities. Regarding the Standardised Approach, the FSA granted approval for the use thereof to 22 groups and 45 financial institutions in March 2007. the Advanced Measurement Approach regarding operational risk is scheduled for introduction from end-March 2008.
Malaysia	In April 2007, the Bank Negara Malaysia issued the guidelines for revised capital framework for the banking institutions and insurers. This revised capital framework was implemented on a trial run basis beginning April 2007. The revised capital framework for banking institutions is based on the standardised approaches under Basel II, effective from 1 January 2008. Banking institutions that have made significant progress in developing robust internal rating standards would be given the flexibility to adopt IRB approach in 2010 without having to comply with the standardised framework. The revised capital framework for insurers will be effective from January 1, 2009. Insurers which possess the capacity to adopt the framework earlier will be given the flexibility to migrate to the framework in 2008.
New Zealand	Locally incorporated New Zealand banks are required to hold capital based on Basel II requirements from the first quarter of 2008. Banks may, if accredited, use the internal models approach to calculate their capital requirements under Basel II or otherwise must use standardised approach. For banks registered as branches in New Zealand, Basel II developments will have disclosure implications only.
Philippines	In June 2006, the Monetary Board of the Bangko Sentral ng Pilipinas (BSP) approved major revisions to the risk-based capital adequacy framework, to align the then existing Basel I-compliant framework with the new Basel II standards, effective from July 1, 2007. Accordingly universal/commercial banks (UBs/KBs) have started complying with the standardised

Annex V.1: Basel II Implementation: Cross-Country Status *(Concld.)*

Country	Status of Implementation
	approach for credit risk, and the basic indicator or standardised approaches for operational risk since 2007. By 2010, these banks may move to the F-IRB or A-IRB approaches for credit risk and advanced measurement approaches for operational risk. Implementation of Basel II for thrift banks (TBs) and rural/cooperative banks are at different stages of implementation.
Republic of Korea	As scheduled the implementation of Basel II has begun in 2008 for domestic banks. Of the 18 domestic banks, one bank (Kookmin) has received regulatory approval for the use of IRB approach; the 17 others are to begin with the standardised approach. Both the Industrial Bank of Korea and the Korea Development Bank are also working on regulatory approval for the use of IRB approach in 2009.
Russia	Basel II is expected to be implemented in Russia in 2008-2009, with Pillar 1 envisaged for implementation in 2008, and Pillars II and III in 2009. By this deadline, the Simplified Standardised Approach is expected to be implemented within the framework of Pillar 1 for the purpose of calculating regulatory capital for credit risk and the basic indicator approach for operational risk. For credit risk, the possibility and appropriateness of adopting the standardised approach based on the international rating agencies' ratings is being evaluated.
Singapore	Monetary Authority of Singapore (MAS) issued the Basel II guidelines for Singapore in December 2007. The Basel II framework for all Singapore incorporated banks has been implemented by the MAS on January 1, 2008. As per the guidelines, the banks are not required to adopt specific approaches from among those that are available under Pillar 1, but each bank is expected to adopt the approaches that are commensurate with its risk profile. The minimum Tier I and total capital adequacy ratios of 6 per cent and 10 per cent, respectively, have not been changed by the introduction of the Basel II rules in Singapore.
Thailand	The Basel II capital charge is expected to commence in Thailand at the end of 2008 for all approaches except for the AIRB Approach which will commence at the end of 2009. According to their risk profile, size and complexity, banks are free to choose appropriate credit risk capital calculation approaches. Banks that adopt advanced approaches, namely the F-IRB Approach and A-IRB Approach, are subjected to pre-requisites and the Bank of Thailand' s (BOT) approval. The BOT only allows retail banks to use the Simplified Standardised Approach (SSA). The BOT currently does not allow banks to adopt the Advanced Measurement Approaches (AMA) for operational risk capital calculation since risk measurement techniques in this area remains to be further validated with the local data. In addition, the BOT also believes that banks that adopt the IRB Approach for credit risk should have sufficient resources atleast adopting the SA for operational risks. Therefore, IRB banks are not allowed to use the Basic Indicator Approach (BIA) for operational risk.
USA	In the US, Basel IA was proposed initially as an intermediate between the Basel I framework and the Basel II framework. Basel IA would have been more risk sensitive than Basel I but would not be as complex as the advanced approach under Basel II. On July 20, 2007 however, by an understanding between the various US banking regulators (The Federal Reserve, the Office of the Controller of the Currency and the Office of Thrift Supervision and the Federal Deposit Insurance Corporation), it was decided to drop the proposed Basel IA and allow Basel II standardised approach in its place. Smaller banks who do not wish to move to Basel II Advanced or Basel IA approach could continue to operate under Basel I. The Federal Reserve Board also approved final rules to implement new risk-based capital requirements in the United States for large, internationally active banking organisations (so-called "core" banking organisations with at least $250 billion in total assets or at least $10 billion in foreign exposure) for whom Basel II would be mandatory. As per the rules, the core banking organisations would be required to have rigorous processes for assessing their overall capital adequacy in relation to their total risk profile and to publicly disclose information about their risk profile and capital adequacy. As a safeguard, the rules suggested that banking organisations satisfactorily complete a four-quarter parallel run period before operating under the Basel II framework. Following a successful parallel run period, a banking organisation would have to progress through three transitional periods (each lasting at least one year), during which there would be floors on potential declines in risk-based capital requirements. Those transitional floors would limit maximum cumulative reductions of a banking organisation's risk-based capital requirements to 5 per cent during the first transitional floor period, 10 per cent during the second transitional floor period, and 15 per cent during the third transitional floor period. A banking organisation would need approval from its primary federal regulator to move into each of the transitional floor periods, and at the end of the third transitional floor period to move to full Basel II. The federal banking agencies will publish a study after the end of the second transition year that examines the new framework for any material deficiencies. The agencies intend to issue a proposed rule that would provide all non-core banking organisations, which are not required to adopt Basel II's advanced approaches, with the option to adopt a standardised approach under Basel II. The proposed rule is intended to be finalised before the core banking organisations start their first transition period year under Basel II.

Source : Web-sites of respective regulators as well as news reports, available upto end-February 2008.