CHAPTER - 3

CREDIT RISK MANAGEMENT:

CONCEPTUALISATION

3.1 Risk

The etymology of the word “Risk” can be traced to the Latin word “Rescum” meaning Risk at Sea or that which cuts.

3.2 Credit Risk

According to Duffie and Singleton (2003), credit risk can be defined as the risk of default caused by changes in the credit quality of counterparties. Generally speaking, it is common in every business. Whenever a payment or performance to a contractual agreement by counterparty is expected, this risk exists. Conventionally, credit risk arises through lending, investing as well as credit granting activities and concerns the return of borrowed money or the payment for sold goods or services provided. Besides, it also appears through the performance of counterparties in contractual agreements such as derivatives (Horcher 2005). Undoubtedly, when the obligation is not
discharged completely, a loss occurs. Horcher (2005) suggests that “when an organization has accumulated large losses, owes many other counterparties or when its creditors or counterparties have financial difficulties or have failed”, credit failure is more likely.

3.3 Credit Risk of Banks

According to the Basel (1999a), credit risk is defined as “the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed term”. The Monetary Authority of Singapore (2006) has defined it to be the “risk arising from the uncertainty of an obligor’s ability to perform its contractual obligations”, where the term “obligor” refers to any party that has either direct or indirect obligations under the contract. Regarding the importance of this kind of financial risk, Kaminsky and Reinhart, as cited by Jackson and Perraudin (1999), think of it to be the largest element of risk in the books of most banks and if not managed in a proper way, can weaken individual banks or even cause many episodes of financial instability by impacting the whole banking system. Thus to the banking sector, credit risk is definitely an inherent and crucial part.

According to the Reserve Bank of India, the credit risk is most simply defined as the potential that a bank’s borrower or counterparty may fail to meet its obligations in accordance with agreed terms. The goal
of credit risk management is to maximize a bank’s risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters. Banks need to manage the credit risk inherent in the entire portfolio, as well as, the risk in the individual credits or transactions. Banks should have a keen awareness of the need to identify measure, monitor and control credit risk, as well as, to determine that they hold adequate capital against these risks and they are adequately compensated for risks incurred (Master Circular No. DBOD.No.BP.BC. 6 /21.01.002/2009-10 dated July 1, 2009, RBI/2009-2010/37, RBI, www.rbi.org.in).

3.4 Risk Reward Equation for Banks

It is abundantly evident that the business of banking creates risks for reward. The risk-reward equation has the generic form:

\[ \text{Reward} = C \times \text{Risk} \]

where the coefficient $C$ reflects the efficiency of risk management. (Hari Misra 2004)

3.5 Categories of Credit Risk

To gain a better understanding on the nature of credit risk, it is necessary to introduce the types of credit risk involved in financial activities before any further discussion. Concerning the categorizing of credit risk, different authors have expressed various criteria. For
example, Hennie (2003) points out in his book that the three main types of credit risk are consumer risk, corporate risk and sovereign or country risk, while Culp and Neves (1998) consider realized default risk and resale risk to be the two types of credit risk. What is adopted here is part of the views from Horcher (2005), who defines six types of credit risk, including default risk, counterparty pre-settlement risk, counterparty settlement risk, legal risk, country or sovereign risk and concentration risk. However, since legal risk is more likely to be considered as independent or belonging to operational risk nowadays (Casu, Girardone and Molyneux 2006) and concentration risk, together with adverse selection as well as moral hazard, is more reasonably to be thought of as an important issue in managing credit risk rather than a type of the risk itself (see Duffie and Singleton 2003), in the following illustration, only the rest of the four kinds of credit risk mentioned by Horcher (2005) will be touched upon.

a. Default Risk

According to Horcher (2005), traditional credit risk relates to the default on a payment, especially lending or sales. And a likelihood of the default is called the probability of default. When a default occurs, the amount at risk may be as much as the whole liability, which can be recovered later, depending on factors like the creditors’ legal status. However, later collections are generally difficult or even impossible
because huge outstanding obligations or losses are usually the reasons why organizations fail.

**b. Counterparty Pre-Settlement Risk**

Pre-settlement risk arises from the possibility that the counterparty will default once a contract has been entered into but a settlement still does not occur. During this period, a contract has unrealized gains, which indicates the risk. The potential loss to the organization depends on how market rates have changed since the establishment of the original contract, which can be evaluated in terms of current and potential exposure to the organization (Horcher 2005). As explained by Horcher (2005), current exposure is the organization’s exposure if the counterparty defaulted on its obligation at current market rates and potential exposure is an estimate of losses if a counterparty were to default under different rate scenarios.

**c. Counterparty Settlement Risk**

According to Casu, Girardone and Molyneux (2006), settlement risk is a risk typically faced in the interbank market and it refers to the situation where one party to a contract fails to pay money or deliver assets to another party at the settlement time, which can be associated with any timing differences in settlement. Horcher (2005) points out
that the risk is often related with foreign exchange trading, where “payments in different money centers are not made simultaneously and volumes are huge”. The case of the small German bank Bankhaus Herstatt, which received payments from its foreign exchange counterparties but had yet to make payments to counterparty financial institutions on the shutting down date, can serve as a typical example for the failure caused by settlement risk (Heffernan 1996).

d. Country or Sovereign Risk

Country risk arises due to the impact of deteriorating foreign economic, social and political conditions on overseas transactions and sovereign risk refers to the possibility that governments may enforce their authority to declare debt to external lenders void or modify the movements of profits, interest and capital under some economic or political pressure (Casu, Girardone and Molyneux 2006). Then as Horcher (2005) has concluded, since evidence shows that countries and governments have temporarily or permanently imposed controls on capital, prevented cross-border payments and suspended debt repayments etc, problems arise for issuers to fulfill obligations in such environment. Also financial crisis may precipitate sometimes.
3.6 Identifying Credit Risk Exposures in Banks

Generally, credit risk is related to the traditional bank lending activities. Some credit risk also arises from holding bonds and other securities, which not being material has been excluded for the purpose of this study. Basel (1999a) reports that for most banks, loans are the largest and most obvious source of credit risk; both on and off the balance sheet. Various financial instruments including acceptances, interbank transactions, financial futures, guarantees, etc increase banks' credit risk. Therefore, it is indispensable to identify all the credit exposures - the possible sources of credit risk for most banks, which can also serve as a starting point for the following parts of this work.

3.6.1 On-Balance Sheet Exposures

According to Saunders and Cornett (2006), the major types of bank loans are commercial and industrial (C&I), real estate, consumer and others. Commercial and industrial loans can be made for periods from a few weeks to several years for financing firms' working capital needs or long term assets credit needs respectively. Real estate loans are primarily mortgage loans whose size, price and maturity differ widely from C&I loans. Consumer loans refer to those such as personal and auto loans while the so called other loans include a wide variety of borrowers such as other banks, nonbank financial
Credit risk is the predominant risk in on balance sheet bank loans. Over the decades the credit quality of many banks' lending has attracted a large amount of attention. One major change is on the shift in focus of the banks from C&I loans and commercial real estate loans to consumer loans, auto loans as well as credit cards. Since the default risk is usually present to some degrees in all loans (Saunders and Cornett 2006), the individual loan and loan portfolio management is undoubtedly crucial in banks' credit risk management.

**Non-performing Loan Portfolio**

According to Hennie (2003), nonperforming loans are those not generating income, and loans are often treated as nonperforming when principal or interest is due and left unpaid for 90 days or more. Thus the nonperforming loan portfolio is a very important indication of the bank's credit risk exposure and lending decisions quality.

**3.6.2 Off-Balance Sheet Exposures**

Since the 1980s, off-balance sheet commitments have grown rapidly in major banks, among which there are swaps, forward rate agreements, bankers' acceptances, revolving underwriting facilities,
Those commitments give rise to new types of credit risk from the possibility of default by the counterparty. Some of the off-balance sheet credit exposures are as under:

**a. Derivatives Contracts**

According to Saunders and Cornett (2006), banks can be dealers of derivatives that act as counterparties in trades with customers for a fee. Contingent credit risk is quite likely to be present when banks expand their positions in derivative contracts. Since the counterparty may default on payment obligations to truncate current and future losses, risk will arise, which leaves the banks unhedged and having to substitute the contract at today's interest rates and prices. This is also more likely to happen when the banks are in the money and the counterparty is losing heavily on the contract. Comparatively, the type of credit (default) risk is more serious for forward contracts and swap contracts, which are nonstandard ones entered into bilaterally by negotiating parties. While trading in options, futures or other similar contracts may expose banks to lower credit risk since contracts are held directly with the exchange and there are margining requirements. However, the credit risk is also not negligible.

**b. Guarantees and Acceptances**

Bank Guarantee is an undertaking from the bank which ensures that
the liabilities of a debtor will be met, while a bankers’ acceptance is an obligation by a bank to pay the face value of a bill of exchange on maturity (Basel 1986). It is mentioned by Basel (1986) that since guarantees and acceptances are obligations to stand behind a third party, they should be treated as direct credit substitutes, whose credit risk is equivalent to that of a loan to the ultimate borrower or to the drawer of the instrument. In this sense, it is clear that there is a full risk exposure in these off balance sheet activities.

c. Interbank Transactions

Banks send the bulk of the wholesale rupee/dollar payments through wire transfer systems such as the Clearing House InterBank Payments System (CHIPS). The funds or payments messages sent on the CHIPS network within the day are provisional, which are only settled at the end of the day. Therefore, when a major fraud is discovered in a bank’s book during the day, which may cause an immediate shutting down, its counterparty bank will not receive the promised payments and may not be able to meet the payment commitments to other banks, leaving a serious plight. As pointed out by Saunders and Cornett (2006), the essential feature of the above kind of settlement risk in interbank transactions is that, “banks are exposed to a within-day, or intraday, credit risk that does not appear on its balance sheet”, which needs to be carefully dealt with.
d. Loan Commitments

A loan commitment is a formal offer by a lending bank with the explicit terms under which it agrees to lend to a firm a certain maximum amount at given interest rate over a certain period of time. In this activity, contingent credit risk exists in setting the interest or formula rate on a loan commitment. According to Saunders and Cornett (2006), banks often add a risk premium based on its current assessment of the creditworthiness of the borrower, and then in the case that the borrowing firm gets into difficulty during the commitment period, the bank will be exposed to dramatic declines in borrower creditworthiness, since the premium is preset before the downgrade.

3.7 Credit Risk Mitigation and Transfer

The last step for any kind of risk management is to mitigate and transfer the risk in order to avoid or reduce losses. In this area, a variety of approaches are available and new methods keep on emerging. Generally speaking, the traditional methods for reducing credit risk focus on loan underwriting process and diversification, while the new means refer to asset securitization and hedging with credit derivatives (Neal 1996).
3.7.1 Traditional Methods for Controlling Credit Risk

a. Accurate Loan Pricing

One of the most obvious ways for minimizing credit risk, as mentioned by Heffernan (1996), is that banks should ensure the price of a loan exceeds the risk adjusted rate, and includes any loan administration costs. Basically, the risk premium is higher for riskier borrowers and the loan rate should keep changing with the alteration of the loan risk profile. However, adverse selection is a potential problem, in which case the higher loan rate actually implies higher default probability.

b. Credit Rationing

The tenet of credit rationing, as concluded by Horcher (2005), is that credit granting favors the most attractive risk-to-return tradeoff. According to Mishkin (2004), credit rationing takes two forms in a bank. The bank may either refuse to make a loan to a borrower regardless of his/her willingness to pay a higher interest rate, or restrict the quantity of the credit, which can be much less than what the borrower want.
c. **Credit Limits**

The use of credit limits on both single and group obligors assists a careful counterparty selection in the risk management process, and the limits should be prepared for different products, activities as well as industries respectively. For example, they can be applied to the asset management in the form of exposure size limits while to trading activities in the form of exposure position limits.

d. **Collateral**

The use of collateral to support various lending agreements for reducing credit risk has been adopted by banks for a long time already. It is applied not only to loans but also in other transactions such as derivative trading, where it works as an initial margin. However, the usefulness and importance of collateral use has actually been doubted. Wesley (1993) used to comment that collateral seldom provides a way out for a loan because when it matters most it has the least value. Since the value of collateral diminishes very quickly, it may not be able to generate enough cash flow for the debt as planned. Therefore, what really matters is actually whether the borrower has continuing access to sufficient cash flow when needed, not merely an existence of the collateral.
e. Diversification

Diversification is a very common concept in the area of risk management. For minimizing credit risk, diversification can be used to offset the additional volatility created from an increase in the number of risky loans. Seeking out assets whose yield returns are negatively correlated, banks can combine different types of loans into a portfolio and diversify away the non-systematic risk. Since the loss from defaulted loans will be offset by the earnings from other loans, the total probability for the bank to suffer a loss can be well reduced.

f. Netting Agreements

A netting agreement nets the amounts to be exchanged between counterparties, which reduce the credit exposure. For banks, netting agreements are mostly applied to interbank transactions, including bilateral payments netting, multilateral payment systems with net settlement and master derivative agreements (Emmons 1995). In a bilateral netting agreement, for instance, all payments for the given day are totaled and what the participants need to make is only the net payments. Emmons (1995) has commented that interbank netting agreements reduce interbank credit exposures and shift the default risk to bank creditors whose claims are not included in such netting agreements. Therefore, they are also useful tools for bank credit risk control.
3.7.2 Newer Methods for Credit Risk Transfer

The last two decades have witnessed the development of more efficient and less costly financial instruments, which make credit risk more manageable. Banks begin to pool assets with credit risk and sell parts of the pool; loan sales come into play; and credit derivatives are also gaining importance (Broll, Pausch and Welzel 2002). In the following part, these methods are described individually.

a. Asset Securitization

Asset securitization is about turning traditional, non-marketed balance sheet assets into marketable ones and moving them off balance sheet (Twinn 1994). For a bank, securitization requires it to set aside a bunch of incoming-earning assets and to sell securities against those assets in the open market, which means transforming loans into public traded securities in effect (Rose and Hudgins 2008). Many kinds of assets can be securitized including residential mortgages, commercial mortgages, credit card loans, trade receivables. Asset securitizations can improve credit risk management because they help to diversify a bank’s credit risk exposure and reduce the need for monitoring each individual loan’s condition. For instance, if a bank finds its lending too concentrated in a given sector, it can securitize some of lending to reduce exposures.
However, there are also two important problems with asset securitization. The first one involves the Special Purpose Entities (SPE), which are set up by banks for separating and securitizing loans. As pointed out by Tavakoli (2003), the SPEs are off-balance sheet and bankruptcy remote, which facilitate the risk management of banking community, but can also be used for illegitimate uses, such as embezzlement and mischaracterizing revenues and losses. Just as he mentioned, the SPEs are ideal for both securitizing assets and hiding assets, since "any legitimate means can be exploited for illegitimate gain". Good news is that ever after the Enron case, much more attention is given to this issue and it is always treated as a focus area of the regulators. The second problem about asset securitization is that banks which are securitizing their assets for transferring credit risk may also purchase the assets-backed securities issued by other banks. Due to the fact that those purchased securities may be riskier than the issued ones, the extent to which credit exposures can be reduced by asset securitization can actually be quite ambiguous for banks to tell.

b. Loan Sales

Rather than being collateral in the securitization, bank loans themselves can be sold in entirety to a new owner and such a bank loan sale occurs when a bank originates a loan and sells it either with or without recourse to an outside buyer (Saunders and Cornett
2006) In practice, the seller bank usually provides no recourse to the buyer to show that the risk is totally shifted to the buyer, which allows the bank to legally remove the loan from the balance sheet.

According to Haubrich and Thomson (1993), there are two types of loan sales, the participation and the assignment. In the participation, the original contract between the borrower and the bank remains in place, and the bank still keeps on collecting payments, overseeing the collateral as well as examining the books. While in the assignment the debtor-creditor relationship is transferred to the buyer by allowing the buyer to take direct action against the borrower.

Loan sales have existed for many years already and their use has been increasingly recognized as a valuable tool in a bank manager’s portfolio of credit risk management techniques. Neal (1996) thinks the strategy of loan sales is attractive to banks since a fee from the loan origination is earned but the credit risk is assumed by the new investor. And in the occasion where the banks lend large amounts in a single takeover, loan sales are especially important for controlling credit risk.

c. Credit Derivatives

The continuous development of credit risk transfer techniques brought credit derivatives several years ago, which recently have gained
importance rapidly in situations where the diversity of loans and credit risk makes it difficult to carry out securitizations or sell loans individually (Broll, Pausch and Welzel 2002). They are contractual agreements based on credit performance that mainly refers to predetermined events such as default, nonpayment of loan obligations, downgrading and insolvency. According to Neal (1996), credit derivatives can help banks to manage the credit risk by insuring against adverse movements in the credit quality of the borrowers, and the major types of credit derivatives are credit default swaps, credit options and credit-linked notes.

i) Credit Default Swaps

Credit default swaps (CDS) are the most common and liquid credit derivatives, which together with the related products, account for roughly half of the worldwide credit derivative market today (Duffee and Zhou 2001). A CDS is a bilateral contract that offers protection against the risk from a particular credit event, under which the buyer makes periodic payments to the seller until the occurrence of a credit event or the maturity while the seller makes a contingent payment to compensate the buyer if the defined event occurs. Blanco, Brennan and Marsh (2003) point out that the economic effect of a CDS is like that of an insurance contract, but the difference is that it is not necessary to hold an insured asset for claiming compensation under a CDS.
ii) Credit Options

Credit options are credit-spread derivatives based on the interest rate differences between the debts of different types of issuers (Horcher 2005). For example, in a credit spread call option, the buyer pays premium to the seller in exchange for a contingent payment when the credit spread widens past a certain level, thus a bank that worries about the increasing risk on a loan can purchase such an option for hedging purposes.

iii) Credit-linked Notes

A credit-linked note is a kind of debt instrument with an embedded credit derivative, which can therefore be treated as a combination of a bond and a credit option. It is the credit derivative suitable for debt issuers to hedge against credit risk, which reduced payments for the issuer when a specified credit event happens.

The reason for the wide acceptance of credit derivatives in controlling credit risk is that these instruments provide a mechanism permitting the transfer of unwanted risk from organizations with too much or wrong types of credit risk to the willing counterparty, as concluded by Horcher (2005). Besides, credit derivatives facilitate a portfolio approach to credit risk management and diversification since banks
can enter into a derivative contract to transfer some credit risk in order to reduce the risk in their portfolios.

3.8 PSU Banks' Other Defenses against Credit Risk

When all the approaches for managing credit risk fail in a PSU bank, its capital will form the ultimate defense against risk. According to Rose and Hudgins (2008), the capital acts as the last line of defense against failure and absorbs losses from bad loans to keep the bank operating. Regarding this, the Basel (2006) has defined comprehensive formula for banks to calculate minimum capital requirements against credit risk, which safeguard the whole banking sector. Basel (1988) required that the total capital ratio of a bank should be no less than 8% with the tier_1 ratio no less that 4% to cover the potential credit, market and operational risk, in which credit risk is the primary focus. Tier_1 capital includes the book value of common stock, non-cumulative perpetual preferred stock and public reserves from post-tax retained earnings, according to Basel (1988). By meeting the Basel requirements, banks can maintain an adequate level of capital, which is important for risk management purposes and the achievement of financial stability.
3.9 General Principles of Sound Credit Risk Management in Banking

Hennie (2003) states that despite innovations in the financial services sector over the years, credit risk is still the major single cause of bank failures, for the reason that "more than 80 percent of a bank's balance sheet generally relates to this aspect of risk management". The consultative paper issued by Basel (1999a) also points out that the major cause of serious banking problems continues to be directly due to the loose credit standards for borrowers and counterparties, poor portfolio risk management and so on. All such evidence proves the extremely vital role credit risk management plays in the whole banking risk management approach as well as the sustainable success of the organization. In this section, the goal and principles of banking credit risk management will be summarized briefly, which together with the above part on the identification of the existing credit risk in banking activities, will provide a basic framework for the understanding and discussion of PSU banks' credit risk management practices.

3.9.1 The Goal of Credit Risk Management

The goal of credit risk management, as presented by the Basel (1999a), is to maximize a bank's risk adjusted rate of return by
maintaining credit risk exposure within acceptable parameters. Consistent with principles of managing portfolio, it is desirable that both the credit risk arising from individual creditors or transactions and the risk of the entire portfolio should be managed, and the relationship between credit risk and others must be considered as well.

3.9.2 The Principles of Credit Risk Management

A review of the general principles of credit risk management can provide a clearer picture on how banks carry out their credit risk management, despite of the specific approaches that may differ among banks. According to Basel (1999a), the sound practices of bank credit risk management should cover the following four areas:

a. Establishing an Appropriate Credit Risk Environment

To establish an appropriate credit risk environment mainly depends on a clear identification of credit risk and the development of a comprehensive credit risk strategy as well as policies.

To banks, the identification of existing and potential credit risk inherent in the products they offer and the activities they engage in is a basis for an effective credit risk management, which requires a careful understanding of both the credit risk characteristics and
their credit-granting activities, especially the complicated or newly
developed ones. Besides, the design of objective credit risk strategies
and policies that guide all credit-granting activities is also the
cornerstone in bank credit risk management process. It is stated that a
credit risk strategy should clarify the types of credit the bank is
willing to grant and its target markets as well as the required
characteristics of its credit portfolio. While credit policies express the
bank’s credit risk management philosophy as well as the parameters
within which credit risk is to be controlled, covering topics such as
portfolio mix, price terms, rules on asset classification, etc (Hennie
2003). Both the strategies and policies should be designed and
implemented well in conducting credit-granting activities, and they
help to establish a beneficial credit environment. Moreover,
establishing an appropriate credit environment also indicates the
establishment of a good credit culture inside the bank, which is the
implicit understanding among personnel about the lending
environment and behavior that are acceptable to the bank (Strischek
2002).

b. Operating under a Sound Credit Risk Granting Process

A sound credit granting process requires the establishment of well-
declared credit granting criteria as well as credit exposure limits in
order to assess the creditworthiness of the obligors and to screen out
the preferred ones. A bank’s credit criteria are designed to shape the
types and characteristics of its preferred obligors, and they should set out who are eligible for the credit, the amount of the credit and the relative terms and conditions (Monetary Authority of Singapore, 2006). These criteria, together with the credit exposure limits on single and groups of counterparties that usually base on internal credit rating, should help banks to generate sufficient information on credit risk profiles and instruct the safe credit approval process, which are applicable to credit extension activities as well.

c. Maintaining an Appropriate Credit Administration, Measurement and Monitoring Process

Credit administration, as emphasized by Wesley (1993), can play a vital role in the success of a bank, since it is influential in building and maintaining a safe credit environment and usually saves the institution from lending sins. Therefore, banks should never neglect the effectiveness of their credit administration operations. It is required that banks should adopt effective methodologies for assessing the credit risk inherent both in the exposures to individual borrowers and credit portfolios. The last focus in this area of principles is related to credit risk monitoring, which is definitely a must in banks’ risk management procedure. Banks should keep track on the borrowers’ current financial conditions and ensure their compliance with the covenants. Both cash flows and collateral adequacy should be ensured and the potential problem credits should
be considered. In this way, banks are well in control of their credit qualities as well as all the related situations, and can react to any future changes timely and readily.

d. Ensuring Adequate Controls over Credit Risks

The means for guaranteeing adequate controls over credit risk in banks lay in the establishment of different kinds of credit reviews. Regular credit reviews can verify the accordance between granted credits and the credit policies, and an independent judgment can be provided on the asset qualities.

3.10 Other Issues in Credit Risk Management

3.10.1 Adverse Selection

It is often the case that in the lending process, a borrower knows more than the bank about his/her own credit risk and the bank, being at an information disadvantage, may attempt to increase a borrower’s interest rate for compensating the unknown credit risk. The problem is that the higher interest rate does not prevent riskier borrowers but those with less probability to default, and it is suggested that the more effective way be used to limit access to credit instead. However, what is likewise noticeable is that the quantitative credit exposure limits
also deserves careful consideration. According to Duffie and Singleton (2003) since a smaller limit reduces lending volume as well as profits while a larger one encourages borrowers with low credit quality, the choice of an optimal limit is an important task for banks.

3.10.2 Moral Hazard

It is said that "if you owe your bank $100 million that you don't have, your bank is in big trouble". For banks, large loan are considered riskier than small ones because they provide incentives for borrowers to undertake riskier behaviors. Also, large borrowers who default have stronger bargaining power, which puts lending bank in a worse position. Therefore banks always have their own limits on credit for certain counterparties, to deal with moral hazard.

Another interesting aspect with moral hazard in the banking system involves central banking, since it is argued that central banks' help will encourage banks to engage in riskier behaviors. The most recent example may be the one about the crisis with American subprime mortgage-backed securities. As mortgage lending institutions, hedge funds and many banks were seriously affected, worldwide central banks made quick reaction for maintaining the financial stability and public confidence, among which European Central Bank provided $131 billion of extra funds to the money market (Anonymous 2007a) and the Federal Reserve cut the rate for
emergency lending to banks from 6.25% to 5.75%, with lengthening term to 30 days (Anonymous 2007b). However, whether such central bank bailout was correct is quite arguable. It is mentioned by Grauwe (2007) that central banks should provide liquidity only against good assets and let the banks which loaned massive amounts of money to hedge funds get their punishment or even collapse. If the irresponsible banks can get away with it cheaply, they will be incited to take such activities again. Therefore, moral hazard at this level may be a dilemma, in which banks need to make decisions considering both current and future financial stability.

3.10.3 Credit Risk Concentration

Concentrations, as pointed out by Basel (1999a), are probably the single most important cause of major credit problems. They are regarded as any exposure where the potential losses are large relative to the bank’s capital and are quite common in the banking sector. The reason is that banks usually cannot avoid specializing in certain industries or geographical areas due to the convenience for collecting information and the benefits of being more knowledgeable as well as better able to predict defaults of the targets they are familiar with. However, by doing this, banks should also bear the cost of charge-offs, nonperforming asset and strict reserve requirements. In fact, concentration is the major cause of bank failures due to credit risk management problems, as concluded by Heffernan (1996), which
is proved by many examples such as the cases of Japanese Toyo Sogo Bank, Johnson Matthey Bankers in the UK and the US commercial bank failures. According to Heffernan, Toyo Sogo Bank ran into problems because of excessive exposure to a local shipbuilder; Johnson Matthey Bankers got into trouble because of a huge amount of bad loans to the third world countries; and the US commercial bank failure is largely because of a concentration of lending in the energy sector.