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30 April 2018

Online at <https://mpra.ub.uni-muenchen.de/86427/>

MPRA Paper No. 86427, posted 02 May 2018 14:20 UTC

RISK MANAGEMENT PROCESS IN BANKING INDUSTRY

Turgut Türsoy

Abstract

This paper covers the latest amendments proposed by the Basel Committee for managing the banking risks through the process of risk management. All the necessary steps in the process are explained in this paper to explain why banks need to have the BIS application to cover any losses from their activities. In summary, as a result of the latest crises, the Basel Committee has developed a new model for covering the shortage of liquidity at the bank level in order to improve their situation to well-performing levels. The main findings in this paper are that as a monetary authority, the support and development of the Basel applications in the banking industry is the most effective option and is a critical necessity for internationally serving banks around the world to continue their activities in a healthy manner.

1. INTRODUCTION

Risk management in banking is theoretically defined as “the logical development and execution of a plan to deal with potential losses”. Usually, the focus of the risk management practices in the banking industry is to manage an institution’s exposure to losses or risk and to protect the value of its assets. In general banking business is regarded as risky business. Economic theory suggests that there are two economic units - surplus unit and deficit unit - and these economic units prefer to use financial institutions (intermediaries) to transfer the necessary funds to each other. Certainly, this process increases the importance of the financial intermediaries in the economy, but also poses some risks to these institutions. Economic units

usually prefer to use intermediaries because of the problems associated with asymmetric information. In order to solve the asymmetric information problems, institutions are recruiting skilled employees and systems, that is why the scarce sources of funds are now used more effectively by units in the economy. Therefore, the funds are channelled to the most valuable projects that are beneficial to the economy. However, this process of channelling funds from one unit to another naturally has some inherent risks within the process. Banks are usually managing those risks are part of their normal operations.

The risk management process in banking raises various questions. These issues highlight the importance of having risk management practices in banking. These matters are:

- “What kind of events can damage banking business and how much damage can be done?”

This question highlights the importance of investigating the activities of the banks that are creating risk or losses and also assessing the potential damage that those risks could cause. Therefore, it can be said that the risk management process starts with the identification of the potential losses or risk and continues by assessing or measuring those issues.

- “What kind of actions should be taken by the institutions in order to manage those risks?”

After identifying and analysing the risk, it is necessary to determine what kind of actions/activities can be implemented by the banks to address these potential hazards. Otherwise, if banks do not address the risks, this can lead to significant losses for the institution. Therefore, in order to have a sound and healthy institution, new techniques have been developed in the modern banking industry to manage these losses. There

have been many banking crises around the world in previous decades. Now, many countries have implemented risk management practices to deal with these crises

- “Did the institution make the right decision?”

After a decision has been made and implemented by an institution, monitoring and reporting usually take place. This step is the last part of the risk management practices checking and reporting the activities of bank risk management.

The risk management process can be summarised with the following three steps:

1. Identifying and assessing the potential risk in the banking business,
2. Developing and executing an action plan to deal with and manage these activities that incur potential losses,
3. Continuously reviewing and reporting the risk management practices after they have been put into action/operation.

The overall purpose of the risk management process is to evaluate the potential losses for the banks in the future and to take precautions to deal with these potential problems when they occur.

1.1. Historical Perspective of Risk Management

The concept of risk management in banking arose in the 1990s. However, risk management before the 1990s was used to explain the techniques and risks related to insurance. This kind of risk management refers to the purchase of traditional insurance products that are suitable for any events to protect from future hazards. More recently in the financial markets, derivatives have also been promoted as risk management tools to use for hedging activity

purposes. This form of risk management is often called “financial risk management” and derivatives are used as solution to manage the risks associated with financial activities. Derivatives are not only used for hedging, but these instruments can also be used for speculation and arbitrage. Certainly, the derivative is a part of the risk management practices employed in the financial markets. Also, banks are using derivatives in their everyday business and showing those activities in their on/off balance sheet, although the meaning of risk management in banking is slightly different from financial risk management. The management of risk in banking became necessary in 1997 when the Basel Committee on Banking Supervision (BCBS) published the “core principles” for effective banking supervision. This framework provides an essential linkage between capital and risks. In particular, banks need to adopt risk measurement and risk management procedures and processes in order to guarantee their risk-adjusted return in their business. Therefore, the core concept of banking risk management is to ensure the profitability and the safety of the banking industry.

1.2. What type of risks are being considered in banking? A preliminary examination of banking risk.

When starting to discuss the risks that naturally emerge from banking activities, some of the risks related to the banking industry can be discussed. Theoretically, banking business involves several different activity classes, but the general classification is based on traditional banking and trading activities. Overall, banking activities create many unique risks, but in this case, various examples can be given to simplify the introduction. These risks are related to a bank’s credits, liquidity, trading, revenues and costs, earnings and solvency issues.

Credit Risk

One of the main activities conducted by a bank is lending. When some of its credits are not returned to the bank when a customer experiences financial problems, this is partially causing credit risk for the banks. This kind of financial loss results from the failure of credit customers to repay the banks.

Liquidity Risk

Banks are also highly focused on the problems of having insufficient liquid assets to compensate the cash needs or withdrawals from depositors and loan demands. Usually, maintaining the liquidity positions of the banks is one of their crucial tasks, because the consequences of having a low level of liquidity cause problems for the banks in terms of banking insolvency. Solvency is related to the obligations that banks are primarily giving promises to their customers. Faced with liquidity problems, the banks need to borrow funds immediately with extra cost in order to meet their cash needs. This kind of funding is usually done by the lender of last resort or interbank markets. Immediate fund needs can be covered by the central banks or other sources, but this process leads to additional costs for the banks and reduces their earnings.

Market Risk or Systematic Risk

Systematic risk is related with the bank's assets where their values are changed by the systematic factors. It is also called market risk and banks are usually engaged in market activities. Market risk can be related to any prices which are continuously traded on the financial markets. Based on the theory of diversification, some of the investment risks can be diversified away, but this is not possible with the rest. Certainly, new opportunities like hedging provide the opportunity for market participants to hedge their risk, but this is not completely diversified away from the risks that are related to the market. Conceptually,

derivative products provide one of the best tools to deal with price changes. Another important concept that can be discussed here is portfolio management. Portfolio management is also an important approach used to address the risk reduction that is related to the investment activities.

Interest Rate Risk

After deregulation, most of the ceilings and restrictions on the interest rates were removed by the regulators and authorities. Market interest rates are determined by the market dynamics. Nowadays, interest rates are changing based on the supply and demand conditions. Under these circumstances, movements of the interest rates which banks are using for their activities also have effects on the banks incomes and expenses. Some of the banks' assets are generating interest revenues such as loans and security investments, while on the other hand, some liabilities also have expenses like deposits. Therefore, the changing interest rates have had a substantial impact on the banks' profits. Consequently, this is called interest rate risk.

Earning Risk

Earning risk is related to a bank's net income, which is the last item on the income statement. Due to changes in the competition level of the banking sector as well as the law and regulations, this could cause a reduction in the bank's net income. Recent increases in banking competition may narrow the spread between return on bank assets and the cost of funding in bank liability. Banking authorities are encouraging new banks to enter the local banking market to improve the competition within the banking sector. The aim of increasing the competition within acceptable levels is to improve the local services and to reduce the cost of services. These improvements are reducing the abnormal returns in banking, and therefore, this is increasing the probability of earning risk.

Solvency or Default Risk

Banks' initial concerns about their institutions should be the long-term sustainability of the sector; this is related to the solvency or default of banks. Two critical situations may cause solvency problems, including when bank management has a significant amount of bad loans in their credit account, or when its portfolio investments substantially decline in value and generate a severe capital loss. In general, a bank's capital account, which is designed to absorb such losses, can be exhausted. If the counterparties of the bank become responsive to this problem and start to withdraw their deposits, for example, the authorities may be required to declare that the bank is insolvent. Massive withdrawals usually occur through bank runs, and this directly impacts the banks' capacity to solve their problems and meet their obligations.

1.3.Banks are in the Risk Business

While banks are providing financial services, they are also acting as a "middleman" in the transactions, but this role is causing various kinds of risks to the banks. Additionally, banks also use their own financial statements like their balance sheet to complete the transactions and to absorb the risks associated with those activities. Usually, most of the risks that banks are facing in their business are on their balance sheet activities. Therefore, the discussion and necessary procedures for risk management are centred on this area. Consequently, the balance sheet includes the risk related to the bank's traditional and trading activities. The risk management concept begins with the discussion over why these risks should be managed. According to the economic theory, core management principles are aimed at maximising the shareholders' wealth and this principle should also maximise the expected profit from their business. If there are any losses from the activities harming the core principles and if the risks

that occur in the business are not managed appropriately, it could directly impact the bank's profitability and soundness.

2. BANKING SYSTEM

2.1. Direct and Indirect Finance

Apart from other types of financial companies like investment banks, insurance firms and others, banks are one of the essential financial intermediaries and depository institutions that accept deposits and generate income by channelling money. Banks are middleman or intermediaries between depositors who supply funds (supplier of funds – surplus units) and borrowers who demand funds (demander of funds – deficit units). Because banks are using others' money or deposits to generate a profit, and they are highly leveraged firms, they are usually regulated by the authorities. The safeness and soundness of these institutions are crucial for the health of the financial system. A well-functioning financial system is always regarded as a primary condition for achieving economic growth and this is also supported by innovative researchers in the literature.

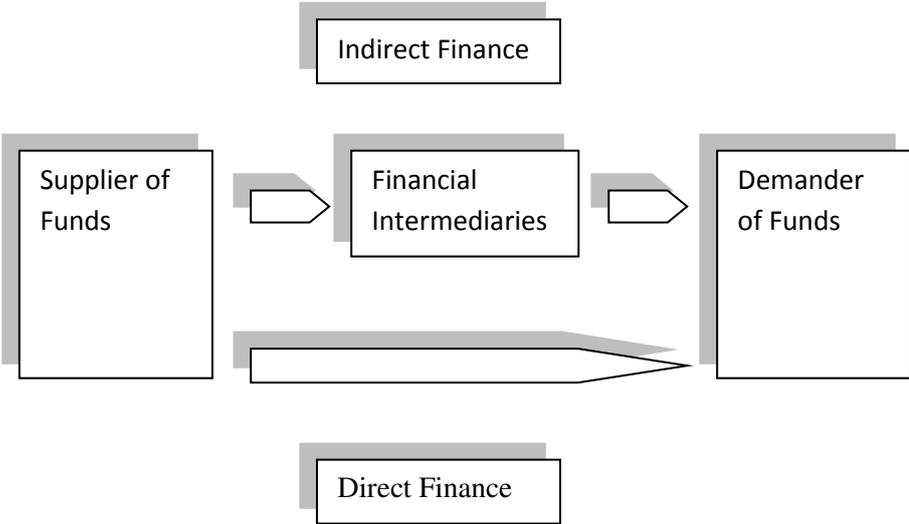


Figure 1. Diagram of Direct and Indirect Finance

As depository institutions, banks are collecting deposits from their customers; however, they also raise funds from other lenders and then lend this money to third parties as credits. Lending loans is not the only service provided by banks. Moreover, they are using the available funds for investments such as securities. Banks are a particular institution that allocate money to the most profitable projects in the economy. Therefore, these credits are used by the customers and the businesses for investment purposes. Certainly, these loans are returned to the banks as more deposits after the enterprises create income from those investments. The source of revenue for the banks is the difference between the interest rates of the deposits and credits. This difference is known as “spread” in the banking sector and it is one of the most important income sources for the banks. One of the crucial indicators for the banking sector is the ratio of credits to deposits. When the rate is high, the banking system is considered to be healthy, because the primary and oldest activities in the banking industry are accepting deposits and lending credits. During periods of crisis, banks might choose to offer a low level of loans to customers due to the asymmetric information problems. When deciding on whether the client is potentially right or wrong, credit rationing takes place.

2.2. What can we do with our excess money?

Theoretically, there are two choices for the surplus units: invest or keep them idle. When choosing the alternative, which is not funding the surplus money into the system, this creates a loss of opportunity cost. Delivering the surplus money to the investors in terms of investment activities provide them with an income and this concept is known as the time value of money. In finance, the sources that are not used for needs should be directly allocated to the best alternatives to generate income. Otherwise, investors are losing the return on their investments, and they will not receive any rewards for their surplus cash. Directly or indirectly individuals, companies, institutions, governments *etc.* can channel their excess funds to the deficit units, as shown in Figure 1. Therefore, the deficit units which need money

for their requirements find the necessary resources from financial intermediaries or directly from the financial markets. This process is crucial for an economy so that the most valuable and profitable projects can obtain the required capital. Therefore, surplus units can participate directly (as a shareholder) or indirectly (receiving interest) to those plans. It is the opportunity to join any economic activity that generates income. Otherwise, under circumstances where there is inflation, the value of money continue to diminish. Wisely, the choice is to invest the surplus money in protecting and acquiring capital gains. Previously, the original purpose of the banks was to provide safety for money in the vault, and this function is still relevant as customers expect banks to safeguard their wealth. Although with the above explanations, banks offer the possibility for investment and security, this not only provides the best option for its customers but also increases the possibility to earn income from interest.

Also, banks serve as payment agents in the financial system within a country. They usually arrange the transfers with other financial institutions. As payment agents, banks provide services for more convenient money transfers, not only for the daily purchase of goods and services, also for large amounts of transactions. Banks are also providing services for international trade with using their reputation and credibility for the deals.

2.3. Economic Concepts in Banking

The fundamental concepts of commercial banks are money creation and maturity transformation. These two ideas drive the importance of the bank's existence in the economy. Previously, it was explained that banks are financial intermediaries that are channelling the funds between economic units. However, there is another aspect that must be described in this process, namely maturity transformation. Usually, both sides (surplus unit and deficit unit) prefer a different maturity structure. For example, surplus units such as depositors typically prefer short-term maturities to holding accounts, because of the immediate cash needs. Being

liquid is better for covering the shortage in cash needs. In traditional bank accounts, it is necessary to wait until the end of the maturity in order to receive the corresponding interest income. If the depositors leave their money or their deposits for a more extended period, this increases the risk of withdrawing their savings without interest income. Based on the consideration of needing cash without income, depositors with or without technical knowledge usually opt for shorter periods. Certainly, finance theories indicate that more compounding generates more revenue, because accounts can generate more income on interest. Banks offer higher interest rates for the longer periods to attract depositors to invest over more extended periods. On the other hand, deficit units usually prefer long-term periods to get credits from banks as it provides them with the opportunity to pay back the loan and it is better for them to make the investment and collect the profit in the long-term. According to the concept of maturity transformation, banks transform the short-term deposits into long-term credits and generate profit from the difference between the rates of interest.

The other vital role of banks is money creation. Banks serve this function through “fractional reserve banking”. In this concept, banks usually keep a certain portion of the deposits and the remaining amount will be lent out to customers as a credit. This is the concept where banks increase the money supply and specially generate or create money. Otherwise, if all the deposits are saved in the vault, there would be less money available for lending purposes.

2.4 How do banks generate income in general?

As explained above, banks typically generate income by lending at a rate of interest that is higher than the cost of acquiring funds from depositors. The difference between the two interest rates is called the “spread.” Certainly, the spread is not the only source of income for the banks, but its known as net interest income. When the income statement of the commercial banks is investigated, it can be observed that the first account is the interest

income. Lending/deposits represent the primary activity of the banks and are also called “traditional banking activities.” However, the traditional banking activities are not the only activities performed by banks, as they are also now engaged in trading activities. Broadly, when the on-balance-sheet items are checked, it can be seen that the investment activities on the asset side can be classified as trading and traditional activities. All those business poles by the commercial banks are generating returns for them. Moreover, there will also be other activities conducted by banks that are reported in the off-balance-sheet. These are contingencies and guarantees, and even derivatives market operations. Theoretically, the spread represents the difference between the return from the use of the funds and the cost of the source of the funds. The next sub-section analyses the source and use of funds.

2.4.1. Source of Funds (Banks' liabilities and equities)

A large proportion of the banks' liability consists of deposits where these accounts represent the customer holdings kept in the bank for safekeeping, for future transaction or to earn interest income. Thus, many people currently hold deposit accounts around the world in order to save their wealth. Of course, these types of account vary around the globe. However, they are usually classified as checking or savings accounts. In most cases, the depositors prefer short-term maturity. The bank's crucial responsibility is that they are obliged to paying the full or partial amounts that are demanded by their customers. Therefore, depositors are always concerned about their future money needs and thus they preferer the least maturity when depositing their money. Before it reaches maturity, an immediate withdrawal from these accounts will generate income losses. For this reason, in order to meeting their urgent cash needs in the future, depositors choose shorter periods for deposit accounts. Usually, all banks pay interest on savings accounts, while they pay little to no interest on checking accounts.

The remaining part of the bank's balance sheet consists of debt and equity accounts. Undoubtedly, deposits are the primary source of loanable funds in the banking sector. However, banks' capital also has a vital role in the banking business. After the Basel Committee amendments were accepted in many countries around the world, the capital account became an essential buffer against possible losses in their activities. The proposed necessary methods to measure the risks of all the bank's' activities and the attempts to eradicate these potential failures are connected with the minimum capital requirement to compensate the possible future losses. Therefore, in the concept of risk management, the critical element is the minimum capital to cover the losses from the bank's activities. In the meanwhile, the bank's capital also represents another way of raising funds. Banks can issue shares to raise funds for special cases. For the purpose of collecting loanable funds, equity share may be expensive.

The final source of funds is debt. Banks also use debt to raise money for their businesses. Unfortunately, debt is a common feature on all banks' balance sheets, but it has a much smaller share in comparison with the total deposits. Also, debt is not a vital source of loanable resources.

2.4.2. Use of Funds (Banks' assets)

The principle way of earning income in the banking sector is lending. Primarily, banks use their available funds as loans. Accepting deposits and lending credits is the primary and traditional banking activity. Most of the sources of the banks are channelled through loan accounts. One of the substantial indicators for the banking sector is the loan-deposit ratio, which represents the usage of its deposits in the form of interest-bearing loans. A high rate means that the bank is using all of its deposits as credits. Like the other activities which are represented, the trading activities also generate income for the banks. Not only do the

traditional banking activities provide necessary income for the banks, but buying and selling securities generates income in the banking industry. Depending on the country, the legislation can differ for buying security instruments such as stocks and bonds. In Europe, all kinds of securities and activities are allowed by the universal banking activity, while in the U.S., due to the rules that were applied in 1933, buying/selling stocks is profited by banks in the manner of trading activity. However, as usual treasury bills and bonds are allowed for all banks throughout most of the world, trading those bills and bonds are also investment opportunities and it is a tool that provides funds for the treasury to acquire the necessary funds for public investments. Therefore, both activities generally provide the necessary income for the banks. Without these activities, banks would not engage in investment activities but would provide services for their clients. As they charge fees for these services, they also represent a source of income for financial institutions. Although all the main activities are represented on the on-balance sheet, banks also provide contingencies to facilitate global trade. All those activities are represented in the off-balance sheet activities. In the off-balance sheet activities, banks are engaged in derivatives for hedging against their risk. The derivatives market are very important markets for hedging and also speculation and arbitrage for a deal with the necessary risks which are created by the trading activities. Although the trading activity is related with the investment in the marketable securities, these securities' prices are changing and pose risks for banks.

2.5 Special Topic related Banking Business

Asymmetric Information

The most crucial concept in banking is the problem of asymmetric information. Informational asymmetries between the counterparties in the process of financing create two issues: the moral hazard and adverse selection problems. These two problems occur before and after the

transactions are approved by the institution. Usually, one party in the deal knows more than the other party and this unequal information between two sides is called *asymmetric information*. The most surplus units prefer indirect finance to solve the problem to determine necessary information regarding the deal, particularly those units that have savings and extra money who trust financial intermediaries to guarantee that their investment/savings will be returned with the required reward. Otherwise, merely trusting in their capability to obtain the crucial information about the other side of the deal will likely involve the potential risk of choosing the “bad” one rather than the “good” one. The most important action by the financial system is to channel the funds to the best profitable investment alternative in order to generate the required returns and support the soundness and the health of the system to ensure that they are well-functioning. Of course, indirect finance is not the only process that helps economic units which require capital for business. Also, the direct investment is involved in supporting the channelling of funds. The primary reason that attention is paid to the financial intermediaries/indirect finance here is that those institutions are skilled and have the appropriate internal components required to obtain the necessary information to deal with the problems that are created from the lack of information. Usually, financial institutions delegate monitors to collect and generate the *information* to give the correct investment decisions about the borrowing firms. Although it is vital for the institution to find the best alternative for the scarce sources to ensure the return on profitable projects, it is also vital for the surplus units, which can be individuals, firms, institutions and even governments, to find the best place in which to invest their wealth. As the issue is not only about selecting the “bad” one, the counterparty may engage in activities that are not acceptable from the perspective of the other side after the transaction has taken place. All those problems of adverse selection and moral hazards must therefore be solved by the institutions and markets in order to have a

working and well-functioning system to channel the funds to the correct places for optimal prosperity.

During periods of crisis, in which the institutions are not capable of accomplishing the necessary goals such as payment, credit intermediation and transactions, it is difficult for them to determine the good customers and bad customers. During a severe crisis, all customers have the potential to be bad customers for the institutions. Consequently, there is literature that shows that institutions can be reluctant to give credit to the units in the economy. This concept is called *credit rationing*, which explains why banks restrict the provision of credit during crises.

Lastly, the crises that have occurred in developed and developing countries show the importance of having well-functioning financial systems. Financial crises directly affect the health of a country's economy. Therefore, the purpose of risk management in the banking sector is to focus on the developments that can improve the necessary conditions required for a healthy system. Of course, not all countries are bank-based financial system; there are also capital-based financial systems in the world. However, this distinction may not be an issue when nations experience financial crises with bankruptcies in their banking sectors. Whether it is a capital-based or bank-based financial system, it can be concluded that having a sound and healthy banking system is important for a country to continue with its everyday businesses.

Agency Problem

The agency problem investigates the relationship between the principal and the agent. The principal is the owner of the company, and the agent is the management. This problem is concerned with the conflict between the principal and the agent. While the owner determines the direction of the company, the CEO is selected through a general election and is tasked

with disseminating the company's vision throughout the entire organisation. However, if the agent initiates its own interest in the company and passes the principal interest, this situation creates the conflict of the principal-agency problem. Also, it can occur in the banking industry between the bank and its clients within the context of the asymmetric information concept. Choosing and changing the purpose of the use of funds also creates problems such as adverse selection and moral hazards. Of course, the selection of senior management is done by the shareholders, and the management is continually trying to satisfy the needs of the stakeholders. If not, the management is changed by a general meeting and another team is tasked with meeting the owners' interests.

Signalling and screening are essential functions performed by banks to provide the necessary information in order to eliminate the problems initiated during the services. There is a risk of choosing non-profitable opportunities that are damaging the company as they do not collect the required income from interest-bearing activities. However, with the activities mentioned above, the banks endeavour to eliminate the events that are accompanied by a certain level of uncertainty as to whether the revenue can be subsequently collected by the bank. The uncertainty related to the future outcome generates risk for the banking activities. While monitoring the client's behaviours also eliminates some of the risks, screening is another option for banks to collect necessary information about their clients in order to make informed decisions. Selecting the best options for profitable investment project is a crucial task performed by banks as it improves the investment climate in the country's economy.

This all demonstrates the importance of having a well-functioning system to provide the necessary information to banks and even the principal and the agent to eliminate the unnecessary activities. Information efficiency is the most crucial and discussed issue in the financial markets in relation to giving proper decisions.

The Free-Rider Problem

The information that is necessary for making decisions on the concept of efficient market hypothesis is divided into two types: the first kind of information is publicly available information and the other is private information. Although some investors pay money for information when making decisions about investment activity, others do not. In this situation, some investors make decisions based on information, while some just follow others in the decision-making process. This is called the free-rider problem in the financial markets, where some market participants follow others when making decisions to buy or sell securities. While speculation and manipulation are not allowed according to the regulations, these kinds of activities that do not use the necessary information (publicly/private) to generate returns are regarded as a problem. The cheapest form of information is the news from television channels and newspapers/magazines, which are classified as publicly-available information and in some cases, the investors cannot make abnormal returns. Of course, with the highest efficiency in the financial markets, which is strong-form efficiency that was classified by Eugene Fama, it is not possible to have abnormal returns with private and public information.

3. BANKING INSOLVENCY AND CRISES

3.1. Introduction

In the early 1980's, the banking crises became an increasingly hot topic around the world with the attempts of to implement financial liberalisation. Financial liberalisation starts with the idea of freeing the markets in all countries around the world in order to increase the interconnectedness of the financial markets. However, globalisation not only involves financial integration, but also economic integration attempts are initiatives by some regions in the world such as the European Union, NAFTA, etc. There are two reasons for integrating the financial markets: first, it helps countries to access capital for developing their countries and

second, it improves investment opportunities for countries that have excess funds. Of course, giving credits or loanable funds to the nations that have deficiencies in finding the necessary capital for their public and private investments is also creating incentives for those countries to invest abroad to collect more income from their wealth. These reasons create the motivation for the supranational institutions to improve the integration among the countries around the world to improve the conditions of accessing capital. Certainly, these attempts are connected in the literature with the subject of financial crises. There are many studies in the literature on the issues of globalisation and economic crises. The main findings provide evidence that if a country is potentially not prepared for liberalisation, they can experience crises in the early stages of liberalisation. Although some countries have experienced currency, banking, twin and economic crises in the 1980s and 1990s, most of the states accessed the necessary funds and developed their countries based on their prosperity. The ability to access capital is vital to countries that have a current account deficit in order to compensate it with the surplus in the capital account. There are two types of capital that are of interest here, namely portfolio investments and foreign direct investment. Portfolio investments usually go through the capital markets, and FDI is Greenfield investment. The quicker form is, of course, portfolio investment because it takes time to develop a business plan for Greenfield investment. Portfolio investment usually occurs in the form of stocks and bonds.

All the activities involved in global trade, capital flows and national issues are recorded in the Balance of Payment system under the central bank. Nowadays, the most debated subject is the trade and streams of the business, which is directly affecting the economic environment of the country. In finance theory, the most crucial concept is the discounting process, which is where the principal and agent make a decision on the performance of a project based on investment appraisal criteria. Specifically, with the DCF method, the most important component that

affects the present value of streams is the required rate of return (also known as the opportunity cost and cost of capital). In the context of globalisation, just considering the RRR component that affects the value of the streams is not entirely correct, because corporations are now mostly engaging in global trade activities and it is likely not possible to only receive the streams in the same currency. Therefore, they also receive streams of other currencies. Consequently, the exchange rate also affects the value of the companies' streams. Hence, the exchange rate is considered as a component with the interest rate that changes the value of the streams at the same time as the value of the firm.

Paul Krugman started the discussion on the subject of crises with an investigation of having the pegged exchange rate system, which provided the framework of the first-generation currency crises. In this context, under the pegged or fixed exchange rate system, countries use their official reserves to compensate for the changes in the exchange rate to pursue the fixed exchange rate. After the official reserves are exhausted, either intentionally or unintentionally, governmental authorities have no other choice but to follow the promised exchange rate. Consequently, the decision is made that they need to follow the floating exchange rate system. This is known as a currency crisis, and these crises occurred before the 1980s. With the attempts to introduced financial liberalisation, banking systems in countries started to experience banking and twin crises, such as the Asian Tigers, Argentina, Russia and Turkey. All these are connected with financial liberalisation, which was earlier applied in these countries. Of course, all these supranational institutions solved the problems that occurred in these countries. Furthermore, the most prominent concept is the financial integration that connects the financial markets with each other.

Of course, countries not only experience banking and currency crises. More recently, financial and debt crises have occurred after 2008. The literature on crises started with Krugman's first generation, which was followed by a second and third generation, which is that self-fulfilling

and speculative attacks are considered to lead to crises. Of course, all these crises happened after the attacks on the currencies. Therefore, it can be easily understandable that the currency and the exchange rate are the important indicators for the economic units. All the relevant indicators, including the interest rate, exchange rate and inflation, are managed by the central banks. It is known that central banks use these three components for the purposes of controlling the monetary issues. Moreover, they are known as the impossible trinity (trilemma) as authorities cannot control them all at the same time. Central banks choose two components for instance inflation rate, namely price stability and interest rate, and leaving the exchange rate controls in order to implement the floating exchange rate regime. Of course, like other prices, exchange rates also show volatility based on the market dynamics. The volatility issue is a primary concern from the market participants as these potentially pose a risk.

Before Bretton Woods, most of the countries chose the pegged or fixed exchange rate system and they followed the tight monetary policy implications to pursue the fixed exchange rate system. Therefore, with those implications, the interest rate fluctuated. Nowadays, authorities are following floating exchange rate systems and are trying to control the inflation rate and interest rate with monetary policy implications. Although market participants expect to have control over all the monetary tools to eliminate the risk coming from the volatility of prices, the theory provides an explanation for the trilemma that it is not possible to manage them all at the same time. Thus, the problem of managing the price is addressed at the firm level. Consequently, firms are required to manage the risk at the management level, similar to banks. The derivatives market in particular has been developed for hedging the risk that the firms, institutions and even governments are facing in their operations. With their off-balance sheet activities, banks are engaging in the derivatives instruments to manage the risks that they are facing in their businesses. This concept is at the core of financial risk management,

which investigates and explains the derivatives instruments. Derivatives are forward, futures, options and swaps that are used for hedging, speculation and arbitraging.

3.2. Banking Stability and Solvency

The banking industry is the one of the most important sectors in the economy. While they are providing services like payment systems, credit intermediation, liquidity and settlements, asset transformation and money creation, the effective functioning of banks is a crucial tasks for authorities. The literature provides robust evidence that a well-functioning financial system is the *sine qua non* for the economy. Without the payment system, none of the transactions can be settled. Credit intermediation is also important because in some of the countries that have a bank-based financial system, credits represent the sole source of funds. The money in circulation affects everybody's lives and is also important to satisfy our daily needs. Of course, the other important task that banks provide is transformation. None of the economic units without finance (direct/indirect) trusts the other party to transfer the funds to each other. Financial institutions and markets are taking the main role to channel the funds to the necessary places in these transactions. As the middlemen in the concept of indirect finance, many surplus units choose the financial intermediaries that are special agents to transfer their wealth to the deficit units. As delegated monitors, banks can uniquely obtain the necessary information to allocate the funds into the most profitable investment projects. Although, just intermediation is not the crucial task here; surplus units also prefer to use indirect investment because of the choice of maturity. Corporations or firms usually want to collect the funds in the long-term to make an investment in their operation. However, on the other hand, deficit units prefer to lend their wealth in a short-time with a reward. Of course, surplus units lend their wealth for periodic income and they possibly want to collect their wealth with a short-term rewards. This allows institutions to match both sides' maturity preferences and to take the necessary risk related to the maturity. Of course, leaving their

wealth for an extended period creates for the economic units, because they potentially need their cash in the meantime. This leads them to prefer shorter term investments in their deposit accounts at the banks; therefore, the intermediaries collect shorter-term deposits in a pool and give the credits to the other units that prefer the longer term. This process is known as asset/maturity transformation in the banking sector and involves changing the preferred maturity for their client. All these processes are creating the connected risk by the application of the banking activities, although the banks are special units tasked with solving the necessary conditions that are created with intermediation. It is not possible to match the preferred maturity desired by depositors letting to a shorter period and other side, which is credit customers who would like to borrow for a longer period of time. This mismatching is solved by the intermediaries that are represented by indirect finance in financial markets, to provide the needed period of time for their clients by the banks. All these activities which involve borrowing short and lending long carry some risks for institution need to be solved in the form of risk. Some of the risks are solved by elimination, some are solved by transferring with derivatives and some need to be solved on the management side with risk management practices. Although some risks are maintained in the banking business, those need to be compensated with practices. Risk forms are classified as risks types and all these risks needs to be classified by their category. The activities that were classified with two categories before were traditional and trading activities; they pose broad market risks, credit risks and foreign exchange risks for the banks. Previously, it was explained that the prices such as interest rates, exchange rate and stock prices are moving with market dynamics and are determined by market supply and demand. Therefore, the above activities in which the banks are engaging are dependent on those prices, which is a concern for their business. These prices are not stable through the entire period, which is why there is sometimes some drift connected with volatility. Volatile prices are related to the concept of uncertainty, and uncertainty is

connected with risk of the assets in the fundamentals of investment theory. The risk is defined in the theory as uncertainty in the future outcomes and what is expected from the investment activity. Reward from investments or assets is a core concept of finance, but at the same time, it is also important to assess the risks in order to make proper decisions. Based on portfolio theory, investors that are individuals, institutions and even governmental authorities make decisions based on two components. In terms of single assets, they use statistical methods such as mean and variance, whereas in portfolio theory, Harry Markowitz proposed two commonly accepted manipulated risk and return formulas to determine the necessary components for making decisions on the optimal portfolio. Efficient frontiers are determined with these formulas and plotted on a graph. With the investors convex utility function, investors can find the optimal portfolio on the efficient frontiers.

These explanations prove that in a simple investment activity, all the participants in the market make a choice based on risk and return. The risk is defined and classified with the market index model and is based on this total model risk, which is divided into systematic and unsystematic risks. Usually, unsystematic risk is diversified away with the proper diversification, which is why the market participants who are holding portfolios are subject to market risk (systematic risk). Overall, market risk is consequently subject to price volatility in the market.

Banks are institutions that are also engaged in investment activities. Consequently, using the source of funds on the asset side which represents the investment activities, even they are subject to the price volatility. Hence, traditional banking activities can also be classified as investment activities because banks use their balance sheets to convert the deposits into credits. Both lending and borrowing are subject to market prices such as interest rates and exchange rates; moreover, it is also related to liquidity. Trading activities are also related to market prices.

A bank's solvency is related with the ALM in its balance sheet. Solvency is related to the profitability of the bank's operations where the return from investments covers its costs. The return is related to the activities that are represented on the asset side, also called return-generated assets (Credit and Portfolio), which needs to be higher than the *cost of funds* in liabilities. Bank insolvency occurs when the bank cannot meet its obligations in its operations, which means that the cost of funds is greater than the profit. This happens when the undoubted credits are increased in the asset side, which leads to a loss in profit and the cost does not cover the investments. Therefore, this leads to an insolvency situation for the banks and the authorities should be engaged in incentives to provide the necessary conditions to return the bank to a stable position and try to solve the problem of the loss of credits by providing the necessary funds. In the dire situation that the bank declares bankruptcy, the regulatory authority passes it to the *Deposit Insurance Fund* to resolve the problem by either acquisition or closing the bank. This is the bank insolvency situation in which regulators are concerned with the health of the sector by establishing sound practices in the sector. Otherwise, if authorities do not solve the problems of one bank, this can affect other banks like a Herstatt risk to contained in other banks. Likewise, risk management practices are implemented before a bank enters insolvency, with interventions made to the necessary bank to cover the bad losses on the asset side to provide sound practices in their operation. However, the primary objective of the bank management is to have a sound and healthy system to accomplish the necessary services in the economy. If not, leaving the bank with problems such as not being able to meet their obligations in terms of liability can create a systematic risk for the entire country. Therefore, applying the necessary conditions like risk management practices ensures the health of the banks by managing the concerned risks at the bank level and even in the sector as a whole.

In some cases, like the Turkish crisis that started in early 2001, many companies and banks become bankrupt. The reason for the occurrence of twin crises (liquidity/ banking crises) was the high level of public security investments and the bad debt loans that many companies failed. With the Istanbul Approach, also known as the London Approach, some of the banks were passed through the Fund and the authorities provided extra funds in addition to the bad loans to the banks to provide them with treasury securities as an investment. Of course, many companies' bad debts are solved by rescheduling by the banks. However, the crises have shown the importance of having a well-functioning banking sector because the impact of a crisis on a country can be costly and it can affect the economy severely. All economic activities after a crisis are harmed by bankruptcy such as payment systems and all transactions might strictly stop, which shows the importance of the soundness of the banking sector. All these factors are included in the discussions on the subject of bank solvency. A banking crisis is a situation where the solvency is more severe in the country.

4. CAPITAL ADEQUACY

In 1988, the Basel Committee published new amendments for the Basel applications under the risk management procedures for managing banks in order to eliminate the insolvency situation. This amendment which was proposed by the committee provided the first application to manage the exposure with the calculation of the ratio for minimum capital requirements by banks. This ratio also, also known as the Cooke Ratio, determines the minimum percentages for the capital to be a safety net for the potential losses from the asset activities. After the first application, the Basel Committee continued to provide new amendments, namely BASEL I, BASEL II, and are now working on improvements to the existent BASEL II based on the liquidity issue in order to release BASEL III. After the global crises, the liquidity issue became the most critical issue in the efforts to eliminate the banking crises around the world. Of course, the lender of last resort, which is the central banks or

monetary authorities provide the necessary buffers to the banks; hence, although interbank markets also give the same option, the crises showed that having sufficient liquidity in the bank is the most compelling option for the banks to compensate for the unexpected cash needs from their clients. The Herstatt case shows that banks are sometimes unable to access the necessary liquid funding to compensate the needs of their everyday businesses. Although the central bank channel can be used to compensate for the need for liquidity, it is not a good option for times of difficulty, because it can be costly for banks to turn to the lender of last resort. Also, using the interbank market, which is the market between banks, is not a good option for borrowing money during periods of crisis. A banking insolvency situation is where a bank experiences difficulty in fulfilling its responsibilities, creating difficulties for them to borrow. A potential solution is to sell its assets through a fire sale, but this leads to a loss in return. Without proper returns from the activities, it is difficult for them to compensate the necessary costs. However, the central bank or authorities are responsible for continuously verifying that the banks have the necessary liquidity/cash on hand to meet their needs. If not, they need to go the central bank or interbank market to borrow the necessary funds with higher interest rates. This eliminates the return which exceeds the cost and banks move towards bankruptcy. All these issues are formulated with the Basel application to solve the problems of the banks in order to have a well-functioning system and for everyday life to continue within a healthy economy.

4.1. 1988 Amendment and Basel I

A bank's activities are subject to the several risks related to its original purposes to provide services. These activities have been explained previously in this paper and naturally, the banking business creates risk. All these risks were of concern before 1988 and attempts were made to ensure banks survived in the sector within a well-functioning system. Although the market prices started to become volatile, after the floating exchange rate system was accepted

by the major developed countries all over the world after 1974, prices became volatile. These changes in the value of prices usually pose a risk to market participants including individuals, institutions and even governmental authorities. Therefore, with the attempts of the Bank for International Settlements (BIS) and its committee, they created new incentives with the central banks of the member nations. The incentive was to create a framework to have enough capital in the banks to manage the unexpected losses from their activities. The minimum capital requirement for the banks to properly manage the capital is the buffer against losses in future potential exposures. The first amendment that was proposed by the committee concerned the market and credit risks to calculate the minimum capital adequacy ratio, which is capital divided by the two risks and it must be greater than 8%.

4.2. BASEL II

After the Basel I application, the Basel committee under BIS improved the credit risk calculation with the weight classes for the type of instruments and also added operational risk as a third type of risk into the calculation of the minimum capital adequacy ratio calculation. It is similar to the previous method in that capital needs to be above 8% to compensate for the necessary capital for the requirements. The Basel II amendment that was called the new accord provided a three-pillar framework for the risk management procedure. Basel I provided the framework for the method of calculating the necessary capital for banks to compensate for future potential losses, and the accord provided and improved the old version by including other risks with the pillar issues. The new accord included the three pillars, which are a minimum capital requirement, supervision and market discipline. The first pillar of the minimum capital requirement is calculated as credit risk, market risk and operational risk. Although these risks appear to be the same as the previous, the measurement methods were in fact improved. There are several methods for calculating the concerned risks in the first pillar, and the committee proposed the necessary methods for calculating the risks. For

market risk, for instance, the Value at Risk (VaR) method is provided for the banks in order to measure the market risk of their portfolio. For another risk which is a credit risk, the process is divided into two parts, namely before credit lending and after credit launched. Before, banks usually used credit checking and scoring and may have used the old 5Cs to determine good customers for credits. All these processes provide grounds for the banks to obtain the necessary information for credit applications to determine the eligible potential clients for the banks. Also, this process is known as delegated monitors in which institutions that are skilled in obtaining necessary information allocate the scarce sources to the most profitable projects. This part represents the before lending part, and is half of the process of managing credit risk. The other part is managing the credit portfolio to eliminate potential losses from the lending activities. There are several methods such as VaR for credit portfolio, which provides an amount that would cover potential losses in the credit portfolio. The amount which is calculated by the risks that are concerned in Pillar I is necessary to determine the minimum capital for the banks.

Pillar II is related to the second part of Basel II, which is related to the regulatory supervision of the risk management process. This pillar that is regulatory supervision is responsible for investigating the position of the banks' risk-taking activities. Regulatory authorities are responsible for this pillar, and they usually check the residual risks which are not included in the first pillar. For example, banks are involved in credit intermediation activities, and the most important component is the interest rate between the credit and borrowing. The difference between the two interest rates is known as the *spread* and is another risk for the banks. For instance, the interest rates are changing based on the market dynamics, and the supply and demand are determining the market interest rates. For example, changes in the benchmark interest rates in the financial markets closely affect the bank's interest rates in deposits and credits. Like other market prices, interest rates also create several types of risk,

such as market risk and interest rate risk. This risk is also managed by the banks for dealing with price changes in the market. Although the banks do not manage all the risk (this is discussed in previous chapters), institutions sometimes use derivatives market instruments to transfer the price risk to the other participant. The interest rate risk can usually be managed at both the bank level and with derivatives; traditional techniques such as GAP, Duration and Simulation are methods used by the banks to manage the interest rate risk. Another risk that is investigated by the authorities is foreign exchange risk. This risk is related to the FX position, and an open position is not allowed by the authorities under the floating exchange rate system. In the 1970s, nations started to choose the floating exchange rate system instead of the pegged exchange rate system. After that, having an FX position was detrimental to the bank's current situation due to the changes in both sides of B/S. If banks use the same amount of foreign exchange related asset and liabilities on both sides, this eliminates the difference between the FX positions. In 2001 in Turkey, banks had an open position towards FX, and in one day, the authority left the pegged exchange system to join the floating exchange system. After that, banks started to collapse because they collected external resources for liability and used them as credits in the local currency. When the government left the pegged exchange system, the exchange rate doubled just a couple of couple days, and banks became insolvent because they could not meet their obligations. Also, there was a run on the banks as some customers attempted to collect their deposits. Bank runs are one of the fundamental reasons why banks become bankrupt. The reason for this is the liquidity issue. The other risk which is considered as the second pillar is liquidity and may impact the bank's reputation. If a bank is healthy, it means that it has a strong reputation in the eyes of customers, and bank runs do not usually occur. All these risks are called residual risks and are not included in the Pillar 1, but are considered by the supervisory authorities to be in the second pillar. Typically, banks and the

supervisory authorities are connected to ensure awareness about the bank's situations. This is pillar 2 under the BASEL II.

Lastly, in the new accord, pillar III ensures the market discipline of the banking industry in order to have a well-functioning banking industry. The crucial point in this pillar is the disclosure of the market participants for the health of the banks. Market disclosure is the platform that provides the necessary information for the market participants to eliminate any speculative misunderstanding about the banks. Disclosure provides the necessary information about banks' soundness and solvency to the clients and even the market participants who hold shares in the banks. Providing the correct information about the industry is beneficial for the authorities to ensure the soundness of the sector. This is the final pillar which represents the BASEL II concept as a new accord.

4.3. BASEL III

The regulatory authority provides the Basel amendments to have sufficient capital to compensate for future potential losses incurred by banking activities. Historically, the Basel application showed changes in the concept of adjusting the amendments based on daily needs. Unfortunately, with the most recent global crises, the new accord that was discussed previously was not adequate for the banking industry to survive when faced with the potential risks. Therefore, some of the major banks in the global market went bankrupt because of the liquidity issue. With the BASEL III, the committee tried to develop the new concept to cover the shortage of liquidity at the bank level to ensure their soundness. Basel III comprehensively analyses the method to calculate the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR) of the United States. There are important studies that have examined the potential links between the Basel III liquidity risk measures and bank failures by using a model that differentiates between idiosyncratic and systemic liquidity risks. The literature

found that both the NSFR and the LCR have limited effects on bank failures, and the systemic liquidity risk was significant contributor to bank failures in 2009 and 2010. The coverage ratio and liquidity requirement are the core concepts in the newly developed Basel application. That is Basel III, which is internationally agreed by the nation's authorities to set the regulations on the new capital requirement measurement provided by the Basel Committee on Banking Supervision in response to the financial crisis of 2007-09. The aim is to strengthen the regulation, supervision and risk management of banks. Liquidity coverage ratio reforms were accomplished by January 2013, the Net stable funding ratio in October 2014, and the revised version of Basel III with a global regulatory framework for more resilient banks and banking system was finalised in June 2011. The Basel III transitional arrangements will cover the period 2017-2027 by the Bank for International Settlement. The transitional arrangement consists of the leverage ratio, capital, risk coverage and liquidity.

CONCLUSION

The Basel III amendments have been created and nations are working to develop the new components into the old version by 2027. In the previous version, there were three pillars and this application determined the system for the banks to manage the risk that occurred in their activities. With the new version, the liquidity issue started to be considered by authorities to eliminate the liquidity problems at the bank level. With the global crises that started in 2007, all the market participants witnessed the bankruptcy of large banks in developed countries. With the new Basel III application, BIS started to consider the liquidity and other issues to increase the health of the countries' banking industry. This paper shows the importance of having well-functioning financial system with the Basel applications.

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