

# **An Survey of International Financial Risk Management System**

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## **Abstract**

Rising global competition, increasing deregulation, and introduction of innovative products have pushed financial risk management to the forefront of today's financial landscape. Identification of different types of risks and effective management of these risks in the international financial system would help to alleviate crisis, financial losses and also helpful to the long term success of all the financial institutions. The present study aims to analyze different types of risk management strategies and throws some light on challenges and opportunities regarding implementation of Basel-II in international financial system. The present paper also attempts to discuss the different methods and techniques used to measure financial risk management. There are three types of risk faced by all financial institutions: market risk, credit risk and operational risk. In commercial banking, credit risk is the biggest risk; in investment banking, its market risk; and in asset management, its operational risk.

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## 1. INTRODUCTION

Recent global financial crisis, rising volatility in the financial markets, increasing deregulation, poor management practices at banks and other financial institutions, speculative transactions, huge financial losses, introduction of innovative financial products and their growing complexity are some of the current challenges faced by the financial researchers all over the world. These factors have pushed financial risk management to the forefront by giving new direction. Financial risk management is not a modern issue. It is the possibility of losses resulting from unpredicted events like volatility in market prices, adverse changes in currency rates, unfavorable price variation in securities and business partners' defaults. It arises because of raising various financial business activities, huge number of financial transactions including savings, investment, loans, sales and purchases. Except this, mergers and acquisitions, legal transactions, debt financing, growing management activities, rising competition, intervention of the foreign governments and weather are some major factors responsible for the fluctuations in the financial markets. Since it is not possible or desirable to eliminate risk completely; as some kind of risk is necessary to remain in business. It involves an opportunity to earn profit in future transactions. So understanding and identification of different kinds of risks, their interrelationship and the factors responsible for its happening are essential for the management of different kinds of risks.

Risk management is a dynamic process which relates to the institution and its business. It includes and affects many parts of the institutions like treasury, sales, tax, marketing, purchase, investment pattern, credit worthiness and corporate finance. The risk management process entails both internal and external factor analysis. The internal part of the analysis includes identification and prioritization of the financial risks facing an institution and understanding their importance. It is necessary to examine the institution and its management, customers, suppliers, competitors, balance sheet structure, and position in the market. It is also essential to consider stakeholders and their objectives and acceptance for risk. Once a clear understanding of the risks emerges, appropriate strategies can be implemented in combination with risk management policy. The process of financial risk management is an ongoing one. Appropriate strategies need to be implemented and refined in accordance with the changes in market and requirements of the organizations. Here refinements refers to the changes in the business environment, changes in expectation about the exchange rate, market rate and commodity rate and also includes changes in the international political scenario. The present study broadly examines different types of financial risk and appropriate strategies for their management, specifically the objectives are:

1. To analyze different types of financial risks and the factors affect these risks.
2. Aims to discuss various methods and techniques essential for financial risk management.
3. To examine the challenges and opportunities regarding the implementation of Basel Accords in international financial system.

The remaining part of this paper is organized into five sections including introduction. Section 2 presents the reviews of both theoretical and empirical literatures. Section 3 discusses different types of financial risk. Section 4 presents strategies and the methods used for management of the financial risks. Section 5 presents the summary and conclusion of the paper.

## 2. LITERATURE SURVEY

In the last two years we can observe extensive work has been done on the financial risk management practices particularly after the financial crisis in 2008. A large number of studies have been done in the field of financial risk management. Some of the major studies are reviewed and discussed below.

Allayannis *et al.* (2003) have examined a firm's choice between local, foreign and synthetic local currency debt by using a data set of East Asian Non financial companies. They have found that there is an unique as well as common factor that determines use of each debt, indicating the importance of examining debt at a disaggregated level. They have used the Asian financial crisis as a natural experiment to investigate the role of debt in firm performance. Finally, they have concluded that the use of synthetic local currency debt is associated with the biggest drop in market value, possibly due to currency derivative market illiquidity during the crisis.

Kaen (2005) has defined financial risk as the variability in cash flows and market values which caused by unpredictable changes in three major variables such as; commodity prices, interest rates and exchange rates. He has described that accurate identification and management of the financial risks will help a firm to reduce the exposure to financial risk. The similar studies by Bartram *et al.* (2007) have developed three different methods to quantify the risks of a systematic failure in the global banking system.

They have taken a sample of 334 banks (representing 80% of global bank equity) in 28 countries around five global financial crises. Their results become statistically significant, but economically small. They explained that although policy responses are endogenous, the low estimated probabilities

suggest that the distress of central bankers, regulators and politicians about the procedures could be overstated and the current policy responses to financial crises could be adequate to handle major macroeconomic events.

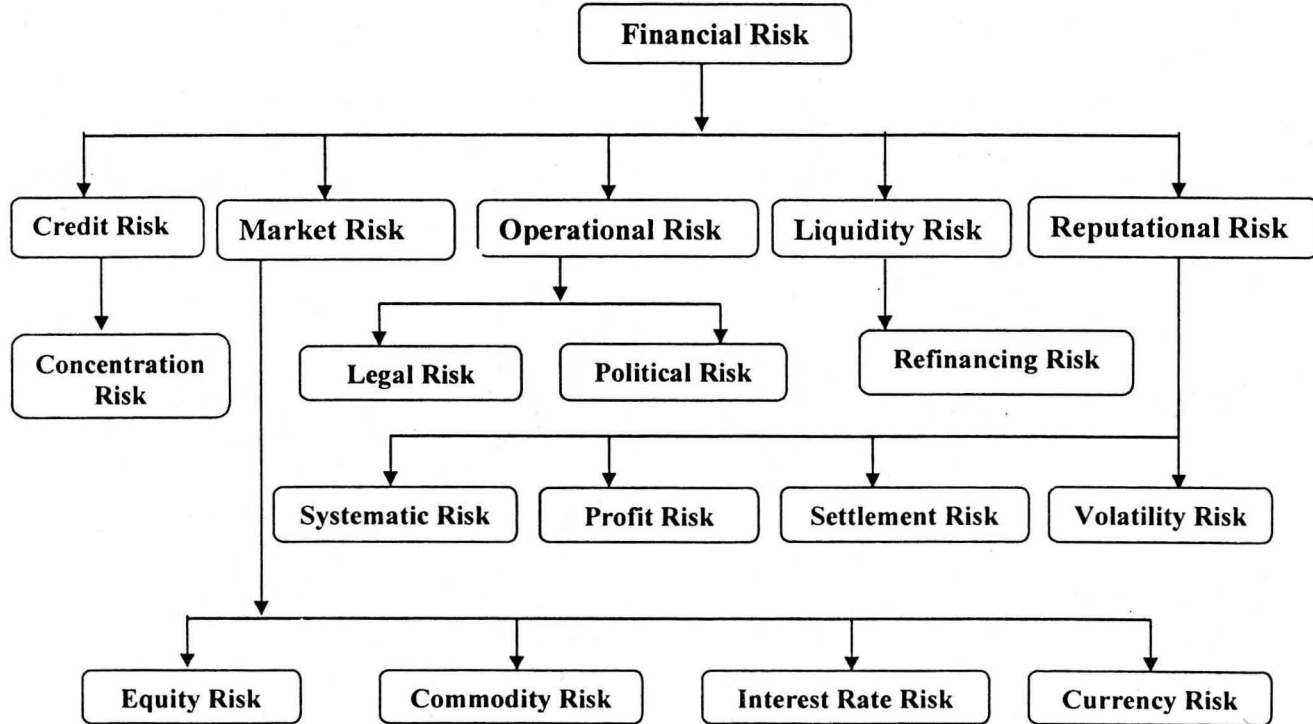
Daianu and Lungu (2008) have examined the factors which are directly responsible for the exposure in the financial market transactions and indirectly contributed to the current financial crisis. These factors include introduction of innovative financial products and their growing complexity; inappropriate regulation and supervision of financial markets; poor risk management practices at banks and other financial institutions; increased complexity of financial systems; financial market speculation. Stulz (2008) has examined there are five major factors which are responsible for the failure of risk management systems particularly before and during the current financial crisis. These factors are (1) failure to use appropriate risk metrics; (2) mis-measurement of known risks; (3) failure to take known risks into account; (4) failure in communicating risks to top management; (5) failure in monitoring and managing risks. Both Stulz (2008) and Daianu and Lungu (2008) have suggested that there is a need to improve the Integrated Risk Management (IRM) technique which is used as one of the risk management processes where all the risks are assembled in a strategic and coordinated framework.

Hassan (2009) has evaluated the degree to which the Islamic banks in Brunei Darussalam implemented risk management practices and analyze how they operate by using different techniques to deal with various kinds of risks. The major risks that were faced by these banks were foreign exchange risk, credit risk and operating risk. He has used a regression model and showed that risk identification, assessment and analysis were the most influencing variables. He has concluded that it is essential to understand the true application of Basel-II Accord to improve the efficiency of Islamic Bank's risk management systems.

### **3. TYPES OF FINANCIAL RISK**

Financial risk refers to the possibility of losses expected by any financial institution when it will not have adequate amount of cash to meet its financial obligations. It refers to the uncertainty of a return and the potential for financial losses relating to the financial transactions of any institution or organization. Risk refers to that there is a possibility that you won't receive a return on your investment. It is essential to consider some events in business which involves some kind of risks and steps should be taken to mitigate them. This study is only focus on the credit risk which is the major component of financial risk. The following Diagram 1 shows the major classification of financial risks:

Diagram 1



**3.1 Credit Risk:** Credit risk is most simply defined as the potential that a borrower or counterparty of the bank will fail to meet its obligations in accordance with agreed terms. Credit risk management has always been on the radar of the top management of any company. For most banks, loans are the largest and most obvious source of credit risk, however, other sources of credit risk exist throughout the activities of a bank, including in the banking book and in the trading book, and both on and off the balance sheet. Banks are increasingly facing credit risk (or counterparty risk) in various financial instruments other than loans, including acceptances, interbank transactions, trade financing, foreign exchange transactions, financial futures, swaps, bonds, equities, options, and in the extension of commitments and guarantees and the settlement of transactions. 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 individual credits or transactions. Banks should also consider the relationships between credit risk and other risks. The effective management of credit risk is a critical component of a comprehensive approach to risk management and essential to the long-term success of any banking organization.

**3.1.1 Credit Risk Management Process:** Since exposure to credit risk continues to be the leading source of problems in banks world-wide, banks and their supervisors should be able to draw useful lessons from past experiences. Banks should now 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 that they are adequately compensated for risks incurred.

Credit risk is calculated on the basis of possible losses from the credit portfolio. Potential losses in the credit business can be divided into: expected losses and unexpected losses. Expected losses are derived from the borrowers expected probability of default. Unexpected losses result from deviations in losses from the expected loss. Unexpected losses indirectly consider equity cost in the course of income planning and setting of credit conditions. The most commonly used management tools include:

- a. Risk-adjusted pricing of individual loan transactions.
- b. Setting of risk limits for individual positions or portfolios.
- c. Use of guarantees, derivatives and credit insurance.
- d. Securitization of risks.
- e. Buying and selling of assets.

**3.1.2 Principles of Credit Risk Management:** There are about 20 principles for credit risk management in banks some of them are listed below:

**Principle 1:** The strategy should reflect the bank's tolerance for risk and the level of profitability the bank expects to achieve for incurring various credit risks.

**Principle 2:** Senior management should implement the credit risk strategy approved by the board of directors and developing policies and procedures for identifying, measuring, monitoring and controlling credit risk.

**Principle 3:** Banks should identify and manage credit risk in all products & activities. Banks should ensure that the risks of products and activities new to them are subject to adequate risk management policies

**Principle 4:** Banks must operate within sound, well-defined credit-granting criteria including clear indication of the bank's target market and of the borrower or counterparty

**Principle 5:** Banks should establish credit limits at the level of individual borrowers and counterparties, both in the banking and trading book and on and off the balance sheet.

**Principle 6:** Banks should have a clearly-established process in place for approving new credits as well as the amendment, renewal and re-financing of existing credits.

**Principle 7:** Banks should have in place a system for the ongoing administration of their various credit risk-bearing portfolios.

**Principle 8:** Banks must have in place a system for monitoring the condition of individual credits, including determining the adequacy of provisions and reserves.

**Principle 9:** Banks are encouraged to develop and utilize an internal risk rating system in managing credit risk. The rating system should be consistent with the nature, size and complexity of a bank's activities.

**3.2 Market Risk:** This is the risk where the value of an investment portfolio or trading portfolio will expected to decline due to the change in the value of the market risk factors. It may be defined as the possibility of loss to bank caused by the changes in the market variables. It is the risk that

the value of on/off balance sheet positions will be adversely affected by movements in equity and interest rate markets, currency exchange markets and commodity prices. This market risk is divided into four types such as equity risk (volatility in stock prices), interest rate risks (volatility in interest rates), currency risks (volatility in foreign exchange rates) and commodity risks (volatility in commodity prices). Market risk management provides a comprehensive and dynamic framework for measuring, monitoring and managing liquidity, interest rate, foreign exchange and equity as well as commodity price risk of a bank that needs to be closely integrated with the bank's business strategy.

**3.3 Operational Risk:** This risk is arising from execution of a company's business functions which considers the people, systems and processes through which a company operates. It also includes fraud risks, Legal risks and environmental risk. This can be defined as the loss incurred by an institution resulting from inadequate or failed internal processes, people and systems. It is not used to generate profit like credit risk and market risk. Sometimes operational risks can also result from unforeseen external events such as transportation systems breaking down, or a supplier failing to deliver goods.

**3.4 Liquidity Risk:** This is the risk arising when a security or asset cannot be traded quickly in the market to avoid a loss or to make some required amount of profit. It arises mainly because of the uncertainties involved in the trading of liquidity assets of an institution or organization. In simple words it refers to a situation when a party cannot able to trade its asset in the market as because of non-participation of other parties involved in trading. It is very much important for those parties who want to hold their current assets with them and not interested in trading. This will affect adversely their ability to trade in future. This kind of risks is mostly found in emerging markets. An institution might face the liquidity risk when there will be a possibility of fall in the credit rating of it which is caused due to sudden unexpected cash outflows or non-participation of counterparties in trading.

**3.5 Reputational Risk:** Reputational risk is one of type of financial risk which related to the trustworthiness of business or an organization or an institution. It adversely affects the reputation of an organization which likely to destroy the value of the share holders. It results loss of revenue, litigation, adverse publicity, withdrawal of chief employees, fall in share values, loss of trade partners. Sometimes it is used as a tool of crisis prevention but extreme cases may even lead to bankruptcy. It arises when the system of an organization do not work properly as the expectation is made which cause widespread public reaction. Sometimes mistakes and



fraud made by the third party are also responsible for reduction of the reputation of the institution. A comprehensive systematic reputational risk assessment is an integral part of the financial risk management system.

#### **4. STRATEGIES AND METHODS FOR FINANCIAL RISK MANAGEMENT**

Financial risk management is the systematic identification, estimation and prioritization of possibility of financial losses caused due to some unfortunate events in the financial sector. Financial risk management operates within a specified guideline, limits and target and it is quite different from other financial activities like settlement, accounting, controlling and reporting. In order to implement sound, consistent and efficient risk management methods, a well developed IT system with sophisticated infrastructure is required. The methods used to show how risks are captured, measured and aggregated by the organization. In order to choose suitable management processes, the methods should be used to determine the risk limits, measure the effect of management instruments, monitor the risk positions in terms of observing the defined limits and other requirements. Processes and organizational structures have to make sure that risks are measured on a timely basis, so that risk positions are always matched with the defined limits and that risk mitigation measures are taken in time. It is necessary to determine how risk measurement can be combined with determining the limits, risk controlling, monitoring.

**4.1 Basic Principles of Financial Risk Management:** Financial risk management system is based on certain principles or ideology which is identifies by the International Standardization of Organization (ISO). The following are some of the major principles on which the risk management process should be based:

- Value creation via extension of resources.
- To be an integral part of the decision making process.
- To be a vital part of the organizational process.
- It must be transparent, planned, systematic and comprehensive.
- Should be considering human factors.
- Should be reassessed within certain regular intervals.
- Should not be rigid and ready to accept the changes for improvement and enhancement.
- Should be based on the available information.
- Explicitly address the possibility of uncertainty.

**4.2 Strategies for Financial Risk Management:** The strategies to manage financial risk include transformation of risk from the original risk bearer to another party without reducing the possibility of losses, reducing the possibility of the risk, avoiding the risk and accepting a portion or all the potential consequences of a particular risk.

**4.2.1 Basel Accords:** It is a list of agreements set by the Basel Committee on Bank Supervision (BCBS), which provides recommendations on banking regulations in regards to the management of capital risk, market risk and operational risk. The main purpose of this accord is to ensure that financial institutions have enough capital on account to meet obligations and absorb unexpected losses.

**1. Basel I Accord:** The first Basel Accord, popularly known as Basel I, was issued in 1988 which focuses on the capital adequacy of financial institutions. The capital adequacy risk indicates the risk that a financial institution will be getting due to some unexpected loss. It primarily focused on credit risk. It has divided the assets of financial institution into five categories i.e., 0%, 10%, 20%, 50% and 100%. It has mentioned that those banks which operate internationally are required to hold capital equal to 8% of the risk weighted assets. Currently nearly 100 numbers of countries have adopted its principles with different efficiency in enforcement. Now it is considered as outmoded as it is unable to fulfill its target due to the versatile nature of the international financial sector and the introduction of various financial innovative products.

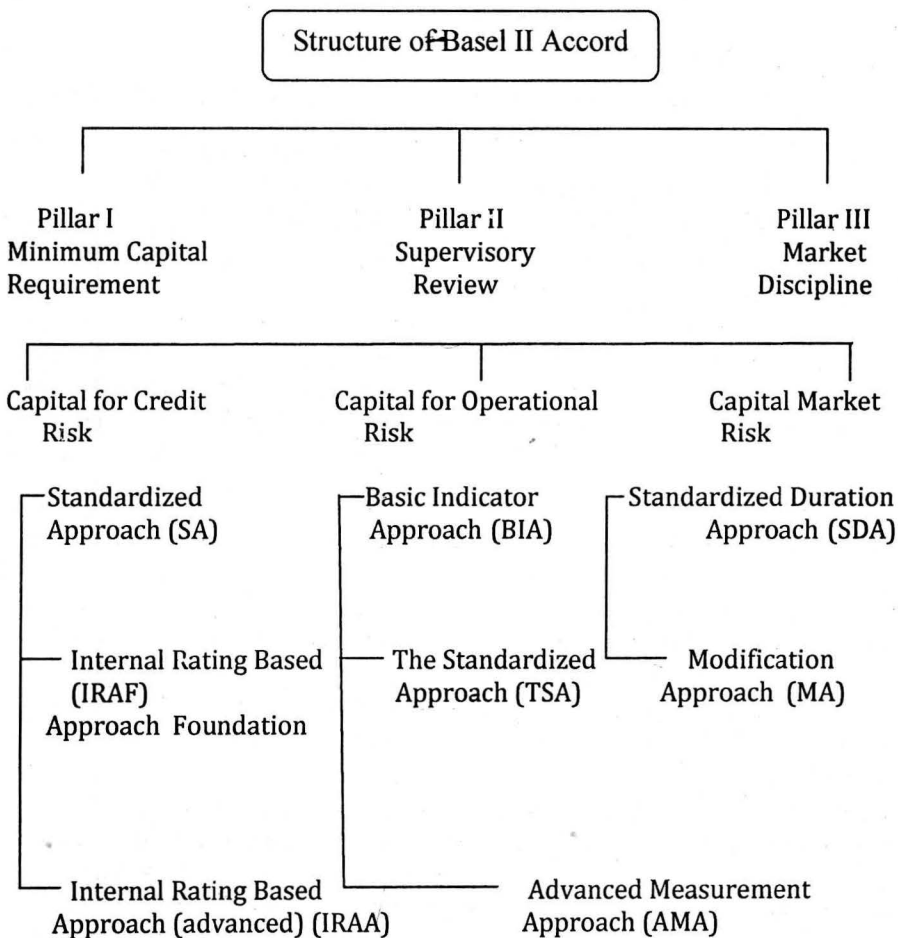
**2. Basel II Accord:** Basel II accord is the second Basel Accords which was published in June 2004 with adopting certain improved laws and regulations relating to the financial risk management than Basel I accord. It considers different types of financial risk where the Basel I Accord dealt with credit risk. Basel II Accord aims to create an international standard about the amount of capital that a bank needs to hold against the financial risk in future. That international standard will help to protect the international financial system from different types of financial risks which may responsible for the collapse of the whole system. To meet with financial risk and capital management requirements, it has designed appropriate rules and regulations relating to the lending and investment practices of the institution. These rules indicate that the greater risk to which the institution is exposed, the greater the amount of capital it needs to hold to safeguard its solvency and overall economic stability. It has the following objectives:

- To ensure that high capital accumulation is more risk responsive.
- Raise the disclosure requirements which will permit market participants to evaluate the capital adequacy of an institution.

- Try to ensure that credit risk, market risk and operational risk are quantified which based on availability of data and formal techniques.
- Attempts to reduce the regulatory arbitrage by supporting more both regulatory and economic capital.

The following Diagram 2 shows the structure and functioning of the Basel II Accord:

**Diagram 2**



Basel II Accord is based on three major pillars for its functioning i.e,

- Pillar I - Minimum capital requirement (to address risk).
- Pillar II -Supervisory review process.
- Pillar III -Market discipline requirement.

**Pillar 1: *Minimum Capital Requirements*:** Designing the minimum capital requirement involved a number of objectives:

- To be directionally correct and reasonably calibrated.
- To be sensible in its composition.
- To be in line with current internal measurement systems but flexible enough to accommodate future developments in operational risk.
- To be as consistent as possible with approaches to market risk and credit risk.
- To generate the right incentives.
- To be pragmatic

**Pillar 2: *Supervisory Review Process*:** BIS Sound Practices paper:

- Outlines a set of 10 principles that provide a framework for the effective management and supervision of operational risk.
- Develop an Appropriate Risk Management Environment.

**Risk Management:** Identification, Assessment, Monitoring, and Mitigation/Control

**Pillar 3: *Market Discipline Requirement*:** Banks should make sufficient public disclosure to “allow market participants to assess key pieces of information on the scope of application, capital, risk exposures, risk assessment processes, and hence the capital adequacy of the institution”.

**3. *Basel III Accord*:** Basel III Accord is the third international regulatory standard on bank capital and liquidity announced by the Basel Committee on Bank Supervision (BCBS) in December 2010. It is developed in a response to the limitations in financial regulation revealed by the global financial crisis. It is both an opportunity as well as a challenge for the banks. It provides a solid foundation for the development of the banking sector by addressing the past uncertainties and introduces new way to address the management of risks and finance. It strengthens the capital requirement by introducing new regulatory requirements related to the process of liquidity and leverage. According to Basel III Accord, the banks should hold 4.5% of common equity and 6% of Tier I capital from the risk-weighted assets. This new regime gives more emphasis on greater integration of the finance and risk management functions. The following are some of the major characteristics of this accord:

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strengthens the capital requirement by introducing new regulatory requirements related to the process of liquidity and leverage. According to Basel III Accord, the banks should hold 4.5% of common equity and 6% of Tier I capital from the risk-weighted assets. The following are some of the major characteristics of this accord:

- The quality, consistency and transparency of the capital base should be raised.
- The risk coverage of the capital framework should be strengthened.
- It will introduce a new leverage ratio (3%) as a supplementary technique to raise the profit margin.
- It is introducing a series of measure to promote capital buffers in good times to support the stress in future.
- It is introducing Net Stable Funding Ratio, as a global minimum liquidity standard for internationally active banks.

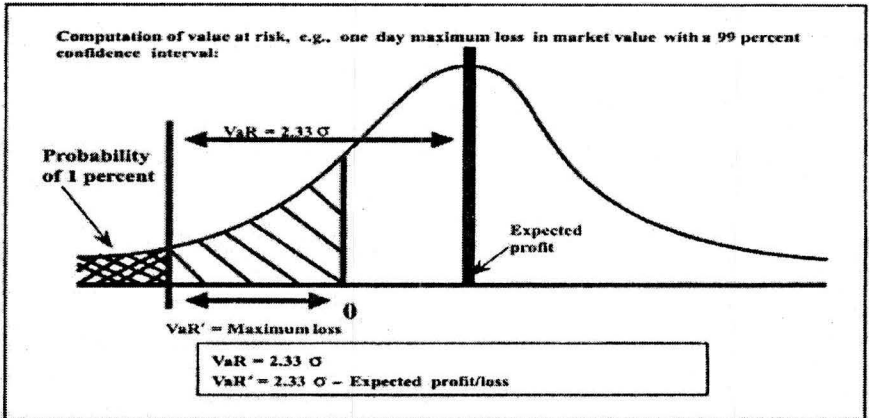
**4.3 Methods for Financial Risk Management:** Although there are many types of financial risk faced by the financial institutions but three types of risk are very much common among them. They are market risk, credit risk and operational risk. The following are some of the methods used to address these three types of risks:

**4.3.1 Methods for Credit Risk Management:** There are two methods used to measure risks i.e., (a) Value-at-Risk technique and (b) Scenario techniques. Both methods are intended to measure the credit risk as adequately as possible. However, they differ strongly in their calculation methods and their precision, with the scenario analysis as the simpler method being used in cases where a calculation of the VaR is not possible.

**(a) Value-at-Risk (VaR) Technique:** The VaR states the maximum loss that will not be exceeded with a certain probability (confidence level) at a given horizon (holding period). To determine the value at risk, a confidence level is determined which reflects the probability that the calculated maximum loss will not be exceeded within the holding period. The confidence level is usually between 95% and 99.95%, which means that higher losses are possible, but will only occur with a probability of between 5% and 0.05%. The holding period states the horizon during which the losses can occur and is derived from the liquidity of the assets observed. To calculate the credit VaR, it is necessary to determine the distribution of potential losses in the credit portfolio. The value-at-risk analysis has limited explanatory power; while it does state the amount of losses within the confidence level chosen, it does not offer any prediction as to the probability

distribution of losses beyond that confidence level. Moreover, it usually does not take into account any extreme market movements as would occur, for example, in an economic crisis with extremely high default rates.

It's defined as the worst loss that might be expected out of a security or portfolio over a given period of time, given a specific level of probability. For eg; if we say that a position has a daily VaR of \$10 million at 99% confidence level, we mean that the realised daily losses from the position will on average be higher than the \$10 million on one day every 100 trading days. VaR is not the answer to the simple question. "How much can I lose on my portfolio over a given period of time?" The answer is everything or almost the entire portfolio. If 11 markets collapse at the same time, then naturally prices may plunge and at least in theory, the value of portfolio may drop near to zero. Instead VaR provides a probability statement about the potential change in the value of a portfolio resulting from a change in the market focus, over a specific period of time. VaR is answer to following question. "What is the maximum loss over a period of time such that there is a low probability; say a 1% probability--- that the actual loss over the given period will be larger?"



*Note:* that VaR measure does not state how much actual losses will exceed the VaR figure; it simply states how likely it is that the VaR figure will be exceeded. VaR models designed to measure risks over a short period of time, such as a day or, in the case of risk measurements required by regulators to report regulatory capital, 10 days.

***VaR is for Managing as well as Measure Risk:*** VaR provides a common, consistent and integrated measure of risk across risk factors, instruments, and asset classes, leading to greater risk transparency and a consistent treatment of risks across the firm. VaR provides an aggregate measure of risk: a single number that is related to the maximum loss that

might be incurred on a position at a given confidence level. VaR system allows a firm to assess the benefits from portfolio diversification within a line of activity, but also across businesses. It allows managers to assess the daily revenue volatility they might expect from any given trading area. VaR has become an internal and external reporting tool. VaR reports are produced daily for managers of business lines and are then aggregated for senior management. VaR is also communicated to the regulators and has become basis for calculating regulatory capital.

**Calculation of Value at Risk (VaR):** To calculate VaR the first thing to be taken care of is generation of a forward distribution for the portfolio only after which we can calculate the mean and quartile of the distribution. There are usually two approaches adopted for the calculation of VaR.

- (a) Monte Carlo Approach
- (b) Historical Simulation Approach

These share the following preliminary steps:

**Selection of Risk Factors:** Change in value of portfolio is driven by the change in market factors that influence price of each instrument. The relevant risk factors depend on the composition of the portfolio. The selection of factors is straightforward for simple security, but requires judgment for more complex products. The market factors that affect prices vary by instruments. In case of stock portfolio, the risk factor is the stock price of the stocks that compose the portfolio. For bond portfolio, the choice of risk depends on the “granularity” that one needs to achieve.

**Choice of Methodology for Modeling Changes in Market Risk Factors:** The historical approach doesn't allow the user to oblige to any analytical assumption regarding the distributions. VaR is derived from the empirical distributions generated by the historical realization of the risk factors over a considerable period of time. The Monte-Carlo can be implemented by choosing any analytic multivariate distribution for the risk factors. The only ability is to estimate the parameters of the distribution such as mean, variances and covariance's. This methodology is flexible and allows the analyst to choose distributions that exhibit fat tail and skewness. Processes with mean reversion can also be simulated.

**Scenario Technique:** Under scenario analysis, the available historical market data and/or internal bank data are used to create scenarios concerning the possible development of default rates. In this the worst case scenario already occurred is under review, worst case scenarios assuming the incurrence of extreme losses are assumed. These scenarios are used to determine the extent of the fluctuations in the portfolio value for the

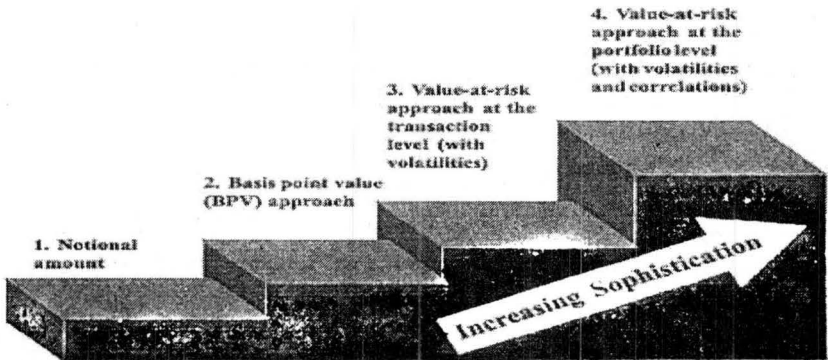


occurrence of the event. The highest possible risk is calculated on the basis of the scenario analysis. The scenario analysis is limited in its explanatory power as it takes into account only a few changes in parameters.

**4.3.2 Methods for Market Risk Management:** As per the Bank for International Settlements (BIS) 1998 regulatory reform there are two approaches in dealing with Market Risk Management.

1. Standardized Approach
2. Internal Model Approach

The standardize approach which is based on the constant factors determined by the BIS for various instruments possesses severe competitive disadvantage. This disadvantage encourages banks to invest in more sophisticated methodologies in order to reap the benefits of the lower regulatory capital.



**4.3.3.1 Standardized Approach:** It uses the building block methodology. The charge for each risk categorize i.e interest rates, equities, foreign exchange and commodities, is first determined separately. Then the four measures are simply added to get the global capital charge that arises from the bank's market risk.

**(a) Interest Rate Risk:** The interest risk capital charge is the sum of two components of market risk, each of which is separately calculated. The first component "specific risk" applies to the net holdings for each particular instrument. The Second component is related to "general market risk" and in this case the long and short positions in different securities or derivatives can be particularly offset.



**(b) Equity Risk:** It consists of the net spot position, is 8% of each net position. The capital charge for any specific risk is 8%, unless the portfolio is both liquid and well diversified, in which the charge is 4%. Equity Derivatives are treated in the same way as interest rate derivatives. While there is no specific charge that the underlying is a government security or a market rate, for diversified broad market indices there is a specific risk charge of 2% of the underlying market value.

**(c) Foreign Exchange Risk:** There are two steps in the calculation of capital charge. First the exposure in each currency is measured and, second, the net long and net short exposures in all currencies are translated into an overall capital charge according to a rule called the "shorthand methods". The measurement of the exposure consists of the net spot position, the net forward position, accrued interest and expenses and other future income and expenses which are already fully hedged.

**4.3.3.2 International Model Approach:** Nowadays the institutions that trade in financial products rely on their proprietary expertise in modeling as much as they rely on traditional trading skills. The risk that models will be wrong or wrongly implemented- what is known in the derivative industry as "model risk".

State of art modeling give many institutions with a unique competitive edge. Pricing models are kept relatively secret, as the face value or notional amount for an individual security to the latest technologies for computing VaR numbers. Each measure has been applied first to individual securities and then to be adopted to measure the risk of complex portfolios such as those containing derivatives.

**4.3.3.3 Factor Sensitivity Measures:** These capture the sensitivity of an instrument or portfolio to changes in the value of the primary risk factors such as interest rates, yield to maturity, volatility, and stock price, stock index etc.

For fixed income products a popular risk measure among trades is DV01 also known as "value of 01". This describes the sensitivity of security prices to a 0, one-base point parallel shift in the yield curve. This is similar to conventional duration analysis; small parallel shifts of the yield curve, the price sensitivity of a fixed-income product can be approximated by a linear function of the change in yield.

$$\frac{dP}{dy} = -P \frac{D}{1+y} = -PD^*$$

where,

$P$  = denotes price of security

$y$  = is yield to maturity

$dP/dy$  = is change in security price for change in yield to maturity

$D$  = is Macaulay duration of security

$D^*$  = is modified duration ( $D^* = D / (1+y)$ )

**4.3.4 Methods for Management of Operational Risk:** Basel II and various Supervisory bodies of the countries have prescribed various soundness standards for Operational Risk Management for Banks and similar Financial Institutions. To complement these standards, Basel II has given guidance to 3 broad methods of Capital calculation for operational risk.

- Basic Indicator Approach - based on annual revenue of the Financial Institution.
- Standardized Approach-based on annual revenue of each of the broad business lines of the Financial Institution.
- Advanced Measurement Approaches -based on the internally developed risk measurement framework of the bank adhering to the standards prescribed.
- The Operational Risk Management framework should include identification, measurement, monitoring, reporting, and control and mitigation frameworks for Operational Risk.

The U.S Department of Defense summarizes the principles of ORM as follows:

- Accept risk when benefits outweigh the cost.
- Accept no unnecessary risk.
- Anticipate and manage risk by planning.
- Make risk decisions at the right level.

## 5. SUMMARY AND CONCLUSION

The present study examines different types of financial risk and discusses appropriate strategies and methods for their management. There are three major types of risk faced by all financial institutions: market risk, credit risk and operational risk. "In commercial banking, credit risk is the biggest risk; in investment banking, it is the market risk; and in asset management, it's operational risk." One of the major problem in aggregating credit, market and operational risks is that the underlying probability distributions are quite different.

The gains and losses from market risk are approximately-normally distributed; credit risk losses are skewed; and operational risk losses involve high-frequency, low-severity losses coupled with low-frequency, high-severity losses. Understanding these different types of risk and how they are integrated is the key to successful risk management for a large financial institution.

This study has examined basic principles for financial risk management. It has also discussed three types of Basel Accords and their usefulness in the financial risk management. The objective of risk management is not to prohibit or avoid risk taking activity, but also to ensure that the risk are consciously taken with full knowledge, clear purpose and understanding so it can be measured and controlled. It also controls an institution from suffering high losses causing an institution to fail materially its competitive position.

The functions of risk management should be bank specified by the size and quality of balance sheet, complexity of functions and technical manpower in that bank. The effectiveness and efficient risk management in bank needs computerization and networking of the branch activities.

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