Lecture

IAQS | INSTITUTE OF ACTUARIAL & QUANTITATIVE STUDIES

Class: TY BSc

Subject : Risk Management & Investment Management -1

Subject Code: PUSASQF5.

Chapter: Unit 1 Chp 2

Chapter Name: Corporate Risk Management

We previously learned

- Risk is the uncertainty or variability around expected outcomes.
- Ability to identify risk, to measure it, to appreciate its consequences, and then to take action accordingly is known as Risk Management.
- **Risk taking** refers to the active acceptance of incremental risk in the pursuit of incremental gains.
- **Risk management process** is a formal series of actions designed to determine if the perceived reward justifies the expected risks. It involves five steps : Identify and classify risk; measure risk; perform cost-benefit analysis; develop risk mitigation strategy; assess performance and amend strategy.
- Concentration of risk, use of complex derivatives understating risk, herd behaviour and transfer of risk to unworthy participants are some of the issues with risk management.
- Risk can be measured with quantitative tools like VaR (Value at Risk) and Economic Capital (Reserves).
- Qualitative assessment can be done using scenario analysis and stress testing.
- Historical parameters and estimated variables are the types of factors used to perform qualitative assessment.
- ERM (Enterprise Risk Management) is a combination of both quantitative and qualitative measures to take a holistic view of risks faced by an organization and how to tackle it effectively.
- Loss can be classified into expected loss (which is generally accounted for in business costs) and unexpected loss (which occurs in rare event scenarios and is unforeseen).

Continued

- There is a trade-off between risk and expected return. Higher the risk taken, higher the expected return (different from actual return).
- Poor risk management and risk governance culture sometimes allow powerful business leaders to significantly understate risks and can cause troubles in risk management. There are conflicts of interest which arise due to compensation structure and lack of proper checks and balances.
- Risk can be classified into various types. Namely; Market Risk; Credit Risk; Liquidity Risk; Operational Risk; Legal and Regulatory Risk; Business Risk; Strategic Risk and Reputation Risk.

Topics to be covered

1. Should risk be managed or not?
    1. Why not to manage or hedge risks?
    2. Why manage or hedge risks?

2. Risk Management Strategies

3. Putting risk management into practice
    1. Determining the objective
    2. Board of Directors
        a. How should it be constituted?
        b. Role of Board of Directors

    3. Risk Decision-Making
    4. Risk Appetite & Mapping
        a. Risk Appetite
        b. Risk Mapping

Continued…

4. Hedging
    1. What is hedging?
    2. Hedging in practice
    3. Pricing Risk
    4. Foreign Currency Risk
    5. Interest Rate Risk
    6. Static & Dynamic Hedging

5. Risk Management Instruments
    1. Forwards and Futures Contracts
    2. Call and Put Options Contracts
    3. Swap and Swaptions Contracts
    4. Exotic Options and Credit Derivatives
    5. Impact of Risk Management Instruments

Discussion

- We've learnt about the various types of risks. And we've briefly learnt to measure & classify them.
- What do you think can be done to tackle them? And do you think it is even worth tackling risks or uncertain events?

1.1 Why not to manage or hedge risks?

- There are a few theoretical arguments against managing risks:
- A famous analysis by two professors, Franco Modigliani and Merton Miller (M&M), laid out in 1958, which shows that the value of a firm cannot be changed merely by means of financial transactions.
- According to CAPM, all specific risks are diversified away in a large investment portfolio and, under the perfect capital markets assumption, this diversification is assumed to be costless and risk management is considered futile.
- The M&M analysis is based on an important assumption: that the capital markets are perfect, in the sense that they are taken to be highly competitive and that participants are not subject to any friction (transaction costs, commissions, etc)
- Those opposed to active corporate risk management often argue that hedging is a zero-sum game and cannot increase earnings or cash flows.
- Active hedging may distract management from its core business. A risk management strategy that is not carefully structured and monitored can drag a firm down even more quickly than the underlying risk.

1.2 Why manage or hedge risks?

- The assumption that capital markets operate with perfect efficiency does not reflect market realities.
- Risk management activities allow management better control over the firm's natural economic performance. Each firm may legitimately communicate to investors a different "risk appetite," confirmed by the board.
- By employing risk management tools, management can better achieve the board's objectives and also lower the cost of compliance.
- Firms regularly take out traditional insurance policies to insure property and other assets at a price that is higher than the expected value of the potential damage (as assessed in actuarial terms). Yet that hasn't been questioned as rigorously as new-age risk management tools.
- The most important argument in favor of risk management, however, is its potential to reduce the cost of capital and enhance the ability to finance growth.

Discussion

Suppose you and your friend or colleague have just got done with some important work and are carrying important documents related to it. Suddenly the sky looks cloudy but only one of you was wise enough to carry an umbrella. What are the potential ways for you both to keep the important documents safe?

A video on how to approach risks.

2 Risk Management Strategies

- After understanding why hedging is useful, we'll look at some ways in which it can be done.
- Firms can use different strategies to manage their risks. They broadly can be classified in the following manner :
  - **Accept the risk** : One reason to retain a risk is that it is perceived to have a small impact on the firm and managing the risk might prove more costly than it is worth.
  - **Avoid the risk** : If a business risk is not a natural part of normal business operation, then it should be considered as a possible risk to avoid.
  - **Mitigate the risk** : Mitigation can take many different forms depending on the risk factor involved. For e.g. A bank may mitigate credit risk by offering loans at higher interest rates, with shorter maturities, and/or with enhanced collateral requirements.
  - **Transfer the risk** : Transferring can be costly because it usually involves either purchasing insurance coverage or investing in derivatives. Transferring risk also introduces *counterparty risk* because the firm is relying on the third party to make good on the insurance provided if a risk event arises.

Question 1

Bank Y has decided to use currency futures and forward to offset its estimated foreign sales exposure. Which high-level risk mitigation strategy does this description represent?

a. Retain risk
b. Avoid risk
c. Mitigate risk
d. Transfer risk

3 Putting risk management into practice

3.1 Determining the Objective

- A corporation should not engage in risk management before deciding clearly on its objectives in terms of risk and return.
- Without clear goals, determined and accepted by the board of directors, management is likely to engage in inconsistent, costly activities to hedge an arbitrary set of risks.
- Some of these goals will be specific to the firm, but others represent important general issues.
- This brings us to the key role that board of directors play and how the board should be constituted for risk management to be effective.

Discussion

What do you think they do and how should a Board be constituted?

3.2 Board of Directors

a How should it be constituted?

- It should be comprised of a majority of independent members with basic knowledge of the firm's business and industry.
- The board should watch out for the interests of all stakeholders, including shareholders and bond holders.
- It should maintain its independence from management.

3.2 Board of Directors

b Role of the Board of Directors

- Explicitly stating (qualitatively) which risks the firm wants to retain (i.e., leave risks unhedged) and, which risks to either avoid, mitigate, or transfer (i.e., either avoid or hedge the risk).
- Using a quantitative metric such as value at risk (VaR) to convey the maximum loss the firm will tolerate for a given confidence level for a given period of time.
- Using stress testing whereby management considers possible but very severely negative scenarios to determine the level of losses. The results of stress testing can be used to inform the decision to retain, avoid, mitigate, or transfer known risks.
- The board must ensure that its goals are stated in a clear and actionable manner. It should be done in the following two ways:
  - The first is a broad statement of risk appetite that can be used in external communications.
  - The second is a very detailed statement that can be used internally so that risk managers and line managers understand the enterprise-level expectations.

3.3 Risk Decision-Making

Once risk managers are aware of the various strategies at their disposal, they can proceed through a five-step risk management process.

The risk management process is as follows:

i. Identify risk appetite based on
   - Risk willingness
   - Risk ability

ii. Map known risks

iii. Operationalize risk appetite

iv. Implement a plan

v. Monitor and adjust the plan as needed

3.4 Risk Appetite & Mapping

a Risk Appetite

- **Risk appetite** refers to the level (and types) of risk that a firm is willing to retain.
- There are two very important subcomponents: risk willingness and risk ability.
- **Risk willingness** relates to a firm's desire to accept risk in pursuit of its business goals, while **risk ability** can put a cap on risk willingness for various reasons.
- The most common reasons for reduced risk ability are internal risk controls (to keep risk in a desired range) and regulatory constraints.
- Actual risk levels should be set below the maximum capacity of a company. There is always the potential for error in the risk estimation process.

3.4 Risk Appetite & Mapping

b Risk Mapping

- After a firm establishes its risk appetite, it should assemble an inventory of all known risks. This process is called **risk mapping.**
- This robust approach systematically considers any risk with a known (or potential) cash impact on the firm. Every type of risk is considered.
- The robustness of the risk mapping process will directly correlate with the level of granularity of the inputs. At the least, this granular process should be conducted for the top-10 risk exposures for a firm, but it is best to do this exercise for all known risks if possible.
- When mapping a firm's risks, it is important to differentiate between risks that can be insured against, risks that can be hedged, and risks that are non-insurable and non-hedgeable.
- The ultimate goal is to understand the risk landscape for a firm, which will enable senior managers to determine which risks to retain, avoid, mitigate, or transfer.

Question 2

These are the steps in the risk management process:

i. Operationalize risk appetite
ii. Monitor and adjust the plan as needed
iii. Identify risk appetite
iv. Map known risks
v. Implement a plan

Arrange them in the correct order

a. iii – iv – v – i - ii
b. iv – iii – v – i - ii
c. iii – iv – i – v - ii
d. iv – iii – i – v - ii

Question 3

The involvement of the board of directors is important within the context of a firm's decision to hedge specific risk factors. Which of the following statements regarding the setting of risk appetite is correct?

I. Risk appetite may be conveyed strictly in a qualitative manner.
II. Debtholders and shareholders are both likely to desire minimizing the firm's risk appetite

a. I only
b. II only
c. Both I and II
d. Neither I nor II

4 Hedging

4.1 What is hedging?

- The best way to understand hedging is to think of it as a form of insurance.
- When people decide to hedge, they are insuring themselves against a negative event's impact on their finances.
- This doesn't prevent all negative events from happening. However, if a negative event does happen and you're properly hedged, the impact of the event is reduced.
- In financial markets, however, hedging is not as simple as paying an insurance company a fee every year for coverage.

4.2 Hedging in practice

- Hedging operational risk covers a firm's activities in production and sales (i.e., expenses and revenue). These operational risks can be considered as income statement risks.
- Financial risk relates to a firm's balance sheet (i.e., assets and liabilities). By making the realistic assumption that there are some imperfections in the financial markets, a firm could benefit from hedging financial risk.
- Hedging activities should cover both the firm's assets and liabilities to fully account for the risks.

4 Hedging

4.3 Pricing Risk

- The cost of inputs may have a significant impact on the firm's ability to conduct its business in a competitive manner.
- It makes sense to hedge such pricing risk by purchasing a forward or futures contract to buy a specific quantity of that input at a fixed cost, which can be determined in advance.

4 Hedging

4.4 Foreign Currency Risk

- The goal of hedging foreign currency risk is to control exposure to exchange rate fluctuations that impact both future cash flows (revenue) and the fair value of assets and liabilities.
- Instruments that could be used include currency put options and forward contracts.
- Foreign currency debt (liability) could also serve as a natural offset against a decrease in the value of a firm's foreign investment (asset).
- Note that in some instances hedging is cost prohibitive, so some foreign currency positions may be left deliberately unhedged.

4 Hedging

4.5 Interest Rate Risk

- The goal of hedging interest rate risk is to control the firm's net exposure (asset or liability) to unfavorable interest rate fluctuations.
- From both an investing and a borrowing perspective, interest rate swaps (or swaptions) may be used to protect a firm against losses. It may help a firm to minimize its borrowing costs.

4.6 Static and Dynamic Hedging

- A **static hedging strategy** is a simple process in which the risky investment position is initially determined, and an appropriate hedging vehicle is used to match that position as closely as possible (minimize basis risk).
- A **dynamic hedging strategy** is a more complex process that recognizes that the attributes of the underlying risky position may change with time.
- Assuming it is desired to maintain the initial risky position, there will be additional transaction costs required to do so. Significantly more time and monitoring efforts are required with a dynamic hedging strategy.

Question 4

John is a junior risk analyst who recently prepared a report on the advantages and disadvantages of hedging risk exposures. An excerpt from his report contains four statements. Which of John's statements is correct?

a. "Purchasing an insurance policy is an example of hedging."
b. "In practice, hedging with derivatives may not be a zero-sum game."
c. "The existence of significant costs of financial distress and bankruptcy is a natural consideration by perfect capital markets."
d. "Hedging with derivatives is advantageous in the sense that there is often the ability to avoid numerous disclosure requirements compared with other financial instruments."

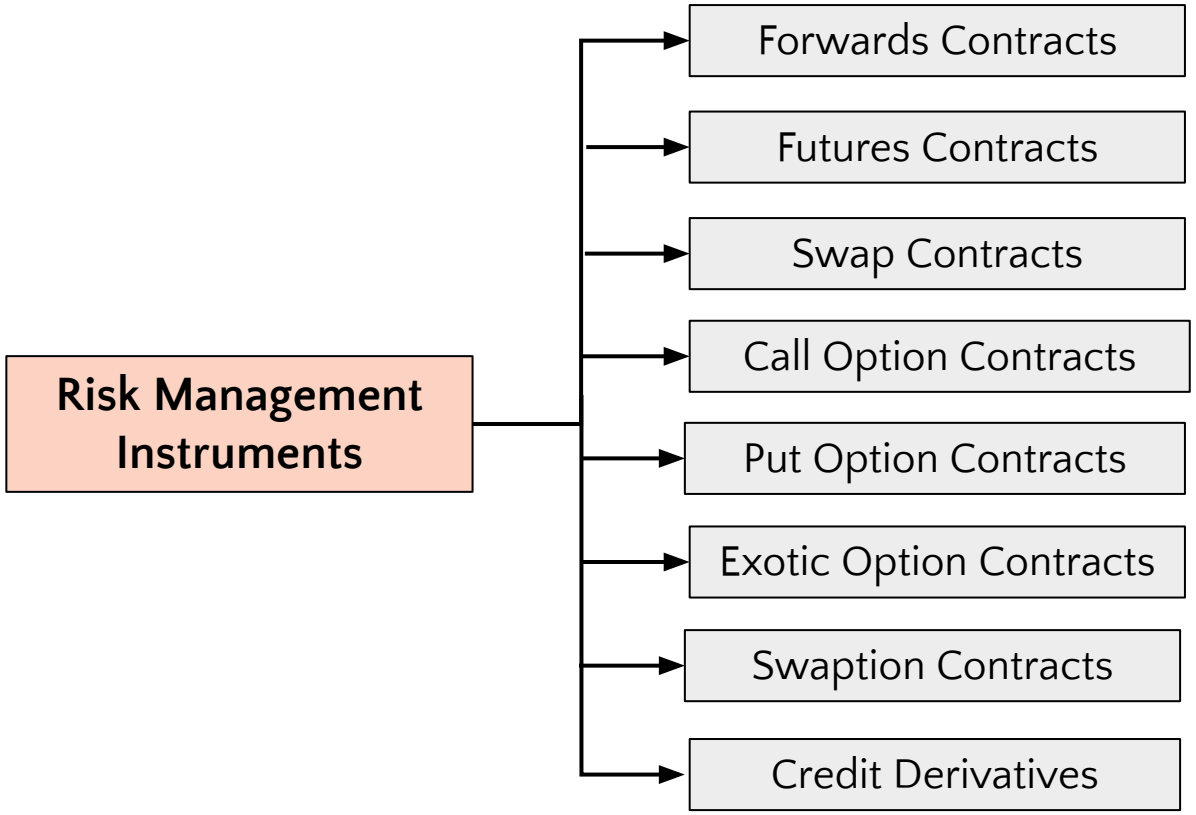
Question 5

Jasmine Cellars is a U.S. wine producer that purchases a significant amount of cork (from Asia) for its wine bottles. Eighty percent of their sales are to customers in North America. Based on these two broad transactions, which of the following risks does Cellars most likely face?

a. Financial risk and operational risk
b. Operational risk and pricing risk
c. Pricing risk only
d. Financial position risk, operational risk, and pricing risk

5 Risk Management Instruments

Some financial instruments which can be used to manage risks are :



5.1 Forwards and Futures Contracts

- **Forward contracts** are OTC products that involve a transaction directly between two counterparties. The terms of the contract can be completely customized. Settlement may either be in cash or a physical item (e.g., tonnes of mineral ores).
- **Futures contracts** are exchange-traded products that are standardized in their terms and conditions (i.e., no customization as with a forward contract).
- Futures contract are similar to a forward contract except that a futures contract uses a financial intermediary (middle man that reduces counterparty risk) as a clearing agent to facilitate the transaction.

5.2 Call and Put Option Contracts

- **Call option contracts** : The buyer of a call option has the right (not the obligation) to *buy* shares of an underlying security (e.g., shares of stock or an index) at a specified (strike) price either at the maturity date (European options) or before the maturity date (American options).
- **Put option contracts** : The buyer of a put option has the right (not the obligation) to *sell* shares of an underlying security (e.g., shares of stock or an index) at a specified (strike) price either at the maturity date (European options) or before the maturity date (American options).

5.3 Swap and Swaption Contracts

- **Swap contracts** are customizable OTC products in which two parties agree to swap economic positions. For example, an interest rate swap could be structured for one party to pay a fixed interest rate and receive a variable rate from the counterparty.
- **Swaption contracts** are a combination of a swap and option contracts. A swaption provides the swaption buyer the right (not the obligation) to enter a swap contract at some future date but with terms established when the swaption is initiated.

5.4 Exotic Options and Credit Derivatives

- **Exotic option contracts** : They are complex options in the global marketplace that provide call- and/or put-like features with different twists, like Asian options that use average pricing.
- **Credit derivatives** are OTC contracts between two parties in a creditor/debtor relationship. These allow the creditor to effectively transfer some or all of the risk of a debtor defaulting to a third party.
- A few types of credit derivatives are :
  - Credit Default Swap
  - Collateralized Debt Obligations
  - Collateralized Loan Obligations
  - Total Return Swap

5.5 Impact of Risk Management Instruments

- A firm needs to decide if its hedging strategy is a one-off event or if it is part of broader risk management need. This decision is sometimes referred to as *rightsizing* a risk management program.
- The financial markets are very dynamic, and a broadly-applied risk management strategy requires investment in complex systems and hiring experienced traders.
- There are several risk limits that need to be understood and potentially controlled depending on the results of the risk mapping process.
- Derivatives contracts have different benefits/drawbacks, depending on their trading location. Exchange-traded derivatives are attractive to investors seeking liquidity, low transaction costs, and reduced counterparty risk.
- However they are standardized and there may not be an exact match to a risk manager's need in terms of underlying security, timing, or location of delivery.
- Risk managers will need to balance the benefits and drawbacks to select the best combination of risks and risk reducers for a given need.

Question 6

You have just been hired as the vice president of risk management at Henry Controllers. Your new employer is domiciled in the United States, but 35% of their sales are in Japan. The highest priority task is to hedge the firm's exposure to the Japanese yen (their currency). You want to use a product that minimizes basis risk and can accommodate the firm's dynamic and sometimes unique cash flow patterns. Which tool would you recommend?

a. Futures contracts
b. Forward contracts
c. Swap contracts
d. Call option contracts

Quick Recap

- M&M analysis and CAPM are important theoretical arguments against risk management. But they function on the assumption that capital markets are perfect, which we hardly see in practice. Those opposed also point out that risk management is a zero-sum game and can be detrimental when implemented wrongly.
- Risk management in practice though smoothens cash flow and reduces cost of capital and compliance for the firm. It also helps set up a risk appetite and enhances the ability of firms to finance growth while communicating well with the shareholders about objectives.
- Firms can broadly use four different strategies to manage risks, namely; Accept the risk, Avoid the risk, Mitigate risk & Transfer the risk.
- After getting an idea of the strategies that can be used, the firms should put risk management into practice. The first step involves determining the objective of the risk management policy of the firm.
- A independent Board of Directors is necessary for formulating a good risk management policy and how the board is constituted is crucial. The BoD formulates the strategy and conveys risk appetite of the firm and how to manage it.
- Risk appetite refers to the level (and types) of risk that a firm is willing to retain. Risk willingness relates to a firm's desire to accept risk in pursuit of its business goals, while risk ability can put a cap on risk willingness for various reasons.
- After a firm establishes its risk appetite, it should assemble an inventory of all known risks. This process is called risk mapping.

Continued

- After a risk appetite is established and risks mapped, hedging is undertaken according to the needs of the firm. Hedging is essentially insuring the firm against various negative events and can be undertaken in various forms.
- Pricing risk, Foreign Currency risk and Interest-rate risk are the significant business and financial risks to be hedged against. By making the realistic assumption that there are some imperfections in the financial markets, a firm could benefit from hedging financial risk.
- Hedging activities should cover both the firm's assets and liabilities to fully account for the risks. A dynamic or a static hedging strategy can be used depending on the expertise available and the risks faced by the firm.
- There are various instruments available to manage risks, namely; Forwards and Futures contracts, Call and Put options, Swap and Swaption contracts, Exotic options and Credit Derivatives.
- A well calibrated and executed risk management strategy can lower the risks for the firm while also allowing it to use it as a growth opportunity. The limits and complexity of using these instruments should be understood well before using them.