Lecture 1

INSTITUTE OF ACTUARIAL & QUANTITATIVE STUDIES

Class: MSc Sem 4

Subject : Actuarial Practice 2

Chapter: Unit 1 Chapter 2

Chapter Name: Identifying Risk

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1 Risk identification

Overview

Risk identification is the recognition of the risks that can threaten an organization's business plan.

For each risk identified it is necessary to determine any **risk control processes** that can be put in place which will reduce either the **likelihood** of the risk event occurring, or the **impact** of the risk event should it occur.

It is also important to identify opportunities to exploit risks and gain a **competitive advantage** over other providers. Taking on risk is a potential source of profit if the risk is priced correctly.

1 Risk identification

Overview

Identifying all the risks in an organization is a difficult task and requires good knowledge of:

- the circumstances of the organization concerned
- the features of the business environment in which it operates
- the general business and regulatory environment.

Not all risks are immediately obvious.
Identifying **new** and **emerging risks** and risks that have yet not been faced by the company is difficult.

? *Can you think of any emerging risks that the Banking and Insurance industries are exposed to*

1 Risk identification

Risk identification techniques

To complete a full identification of risks requires gaining **input** from everyone involved in the business, at all levels. Senior management may not be aware of a weakness in an operational process that is a risk to the business, which the more junior operators of the process could readily identify.

There are some techniques available to ensure that all relevant risks have been identified:

- use <u>risk classification</u> to ensure that all types of risk have been considered
- use techniques from <u>project management</u>
- use <u>risk checklists</u>, for example as used for regulatory purposes
- use the <u>experience of staff</u> who have joined from similar organizations, and of consultants with broad experience of the industry concerned.

1 Risk identification

Risk checklists

Where there is a **risk-based capital requirement** regime, such as Solvency II in Europe, there may be lists of risks that regulators believe are relevant to the business.

For example, the standard formula for calculating capital requirements covers many risks relevant to financial product providers.

Such lists may **not be exhaustive**. For example, the Solvency II standard formula does not include equity volatility as a risk, which could be highly relevant to a business offering equity-backed products with point guarantees.

?

Do you know which risks are covered in the standard formula for calculating capital requirements under Solvency II

1 Risk identification

Risk in project management

Identification and Analysis of Risks

The steps necessary to achieve an effective **identification and analysis** of the risks facing a **project** can be summarized as follows:

- Make a **high-level preliminary risk analysis** to confirm that the project does not have such a high-risk profile that it is not worth analyzing further – in which case, the project should not proceed.

- Hold a **brainstorming session** of project experts and senior internal and external people who are used to thinking strategically about the long term.

- Carry out a **desktop analysis** to supplement the results from the brainstorming session, by identifying further risks and mitigation options, eg by researching similar projects undertaken by the sponsor or others in the past (including overseas experiences).

1 Risk identification

Risk in project management

Identification and Analysis of Risks

- Obtain the **considered opinions of experts** who are familiar with the details of the project and the outline plans for financing it.

- Carefully set out all the identified risks in a **risk register** or a **risk matrix**, with cross-references to other risks where there is interdependency.

If the **correlation** between individual risks is high, it will result in a higher **overall variance** of returns from the project, as here there is no scope of individual risks cancelling each other out.

Risk matrix is an effective toll for a risk analyst as it acts as a reminder to consider particular types of risk, which may not be sufficiently considered. It is often linked to the use of risk checklists and also provides for categorization of risks.

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2 Risk classification and categorization

Risk classification

The term **risk classification** is a broad term and can be perceived in different ways in different contexts

In the context of data, it may mean the **grouping of risks** into homogeneous cells in order to allow the data to be used for various purposes.

In the wider risk management context, risk classification refers to **allocating identified risks** into higher level **categories**, in order to aid the other stages of the risk management control cycle.

?

Can you state the stages of the risk management control cycle

2 Risk classification and categorization

Risk categories

A broad classification of the risks that impact the providers of products and schemes that provide benefits on future contingent events are listed below.

It can be used as a structure when considering any other type of organization.

Market risk	Credit risk	Liquidity risk
Business risk	Operational risk	External risk

2 Risk classification and categorization

Risk categories

A clear understanding of the business undertaken by a provider and the organizational structure is a prerequisite to assessing the significance of each risk and how the outcome of that risk translates into a financial impact on the balance sheet and cashflow requirements. The main effort in the analysis can then be directed to those key risks.

The specific nature and relative importance of risk will depend on the type of organization and its specific circumstances.

The risk categories are **not standardized**, and organizations may categorize the same type of risk differently.

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3 Market risk

Market risk | Credit risk | Liquidity risk
Business risk | Operational risk | External risk

Essentially market risks are the risks related to **changes in investment market values** or other features correlated with **investment markets**, such as **interest and inflation rates**.

The risk can be divided into:

- the consequences of changes on **asset values** (this is the most obvious implication)
- the consequence of investment market value changes on **liabilities**
- the consequences of a provider not **matching asset and liability cashflows**.

Market risk | Credit risk | Liquidity risk
Business risk | Operational risk | External risk

3 Market risk

Asset value changes

Asset value changes can result from:

- Changes in the market values of equities and property. These risks can be systematic if they occur across the whole market under consideration or may be specific to particular markets and can therefore be diversified by holding a range of assets and asset classes.

- Changes in interest and inflation rates. These primarily affect the value of fixed-interest and index-linked securities, although there is usually some effect on equities and property too.

?

Describe the likely effect of short-term interest rates on the value of:
Fixed-interest bonds
Index-linked bonds
Equities
Property

Market risk | Credit risk | Liquidity risk
Business risk | Operational risk | External risk

3 Market risk

Liability value changes

Liability value changes might arise because **promises** to stakeholders, policyholders or benefit scheme members are directly related to **investment market values or interest rates**.

Alternatively, a change in **interest** or **inflation rates** might affect the level of provisions a provider needs to establish for future liabilities.

For example, a reduction in interest rates may reduce the discount rate used to assess the liabilities and therefore increase the provisions that a benefit scheme is required to hold to meet its liabilities.

3 Market risk

Asset liability matching

The fundamental principle of investment is that **assets should be selected to match the liabilities in nature, term and currency.** If it were possible to find such a perfect match, then market risk could be completely diversified away by choosing a matched portfolio.

In practice a perfect match may be impossible because:

- there may not be a wide enough **range of assets** available
- liabilities may be **uncertain** in amount and timing
- liabilities may include **options** and hence have **uncertain cashflows** after the option date
- liabilities may include **discretionary benefits**
- the **cost** of maintaining a fully-matched portfolio is likely to be prohibitive.

Hence even a well-matched portfolio is likely to retain some **element of risk**.

3 Market risk

Asset liability matching

The existence of additional capital gives freedom to intentionally take an unmatched position in the hope of achieving an additional return. The capital will be used to cover the cost of the risk taken.

The consequences of mismatching are:

- The **exposure to market risk increases**, as now assets and liabilities do not move in line with each other
- There is a **higher liquidity risk** as the possibility of assets being available when liability matures may vary
- **Reinvestment risk** when assets have matured before the liabilities and now need to be reinvested on unknown future terms.

Market risk	Credit risk	Liquidity risk
Business risk	Operational risk	External risk

4 Credit risk

Credit risk is the **risk of failure of third parties** to meet their obligations.

Particular examples are:

- The issuer of a corporate bond defaulting on the interest or capital payments.
- The term 'credit risk' is sometimes also used to describe the risk associated with any kind of credit-linked event. This could include changes to credit quality (up or down) or variations in credit spreads in the market as well as the default events described above.
- Counterparty risk, where one party to a transaction fails to meet their side of the bargain. An example of counterparty risk is settlement risk, which arises when a party pays away cash or delivers assets before the counterparty is known to have performed their part of the deal.

Suggest the possible credit risk exposures of a life insurance company.

4 Credit risk

Security

The extent of credit risk present while lending an amount, depends on the **security** or **collateral** of the loan.

If a borrower can provide security, providing finance to that borrower will be more attractive to a lender. However, the existence of security is not an excuse for otherwise bad lending. The decision as to what security is taken is dependent on:

- the nature of the transaction underlying the borrowing
- the covenant of the borrower
- market circumstances and the comparative negotiating strength of lender and borrower
- what security is available.

The most common form of collateral is **property**. This can be built into the debt issue on a fixed or a floating charge basis. It must be within the ability of the lender to realize the security if necessary, in a cost-effective manner.

4 Credit risk

Credit rating

A **credit rating** is given to a company's debt by a **credit-rating agency** as an indication of **creditworthiness**, i.e., the likelihood of default / credit loss.

Credit rating plays a significant role in a company's financial and strategic management.

Rating agencies are specialized independent companies providing high quality, objective credit analysis. The analysis is carried out on the relative quality of tradable bonds.

A company may act to improve its credit rating, and these actions may affect the market for that company's and other companies' shares

Market risk | Credit risk | Liquidity risk
Business risk | Operational risk | External risk

5 Liquidity risk

Liquidity risk is the risk that the individual or company, although solvent, does not have **available sufficient financial resources** to enable it to meet its obligations as they fall due.

Liquidity risk for different organizations

- Non-financial Institutions

Liquidity pressures are the most common reason why a trading company goes into liquidation. The phrase 'into liquidation' immediately gives the reason for the action.
A trading company may well have sufficient assets, probably largely stock and work in progress, to cover its liabilities, but if those assets cannot be realized the company may not be able to satisfy its creditors.

- Insurance Companies and Benefit Schemes

Insurance companies and benefit schemes normally have little exposure to liquidity risk, because a large proportion of their assets are in cash deposits or bond and stock market assets. In general, these can readily be sold in the market to raise cash when required.

5 Liquidity risk

Liquidity risk for different organizations

A general insurance company may face liquidity risk if it faces worsening of claims experience, where claim costs are higher than expected for a particular level of premium, in event of a catastrophe
A benefit scheme may face liquidity risk in the event of a bulk transfer out of the scheme.

- Banks

Banks are generally exposed to significant liquidity risk. They lend depositors' funds and funds raised from money markets to other organizations and generally do so for longer periods than they offer to the providers of the funds.

A retail bank that offers customers instant access to their deposits needs to maintain sufficient liquid resources to withstand a large number of customers asking for their money back.
For this reason, banks frequently offer good investment returns on fixed term deposits, where the depositors are not able to access their funds until the maturity date.

Market risk
Credit risk
Liquidity risk
Business risk
Operational risk
External risk

5 Liquidity risk

Liquidity risk for different organizations

- <u>Collective Investment Schemes and Insurance Funds</u>

Similarly, collective investment schemes and insurance funds that invest in real property need to protect themselves if clients request access to their funds when the underlying properties cannot be sold. Such funds frequently have the power to defer withdrawals by up to six months, if necessary, to allow time for property sales.

Hedge funds that invest in illiquid assets also often have lock-in periods to mitigate liquidity risk.
Here insurance funds means unit trusts and other funds used as the backing investments for unit-linked business face liquidity risk if more policyholders than expected surrender their policies

5 Liquidity risk

Managing liquidity risk

Financial companies usually maintain a certain level of liquidity to face **anticipated liability withdrawals**.

In case of these withdrawals being higher than expected, the company may have to convert its less liquid assets to cash or else try to borrow additional funds.

These companies allow for liquidity risk to some extent, by allowing a margin for withdrawals being higher than they expect and by allowing for seasonal variation.

Market risk | Credit risk | Liquidity risk
Business risk | Operational risk | External risk

5 Liquidity risk

Market liquidity risk

In the context of financial markets, **liquidity risk** can arise where a market does not have the capacity to handle (at least, without a potential adverse impact on the price) the volume of an asset to be bought or sold at the time when the deal is required.

In general, the **larger a market** is, the easier it is to trade and the more liquid it will be, because more participants in the market will be trading at any one time. Thus, when any member of the market wishes to complete a trade, it is likely that the market will be able to find a counterparty willing to accept the trade.

The market is sensitive to factors such as changes in interest rates and the economic outlook, which means that the price of the assets can vary significantly over time, so there is a risk that the asset holder may make a loss if they are required to make a sudden sale at a time the price is depressed.

Although the terms marketability and liquidity are used interchangeably in layman language, there is a slight difference in their interpretation: **Marketability** is the ease of buying or selling an asset, whereas **liquidity** the measure of how quickly an asset can be converted to cash at a given price.

Market risk | Credit risk | Liquidity risk
Business risk | Operational risk | External risk

5 Liquidity risk

Do you know the characteristics of a highly liquid asset?

5 Liquidity risk

A highly liquid asset is characterized by the following:

- It can be quickly **converted to cash** because of the terms of the asset, or else there is sufficient surety that the asset can be sold quickly if required.
- The amount of cash it can be converted to is also certain.

Market risk | Credit risk | Liquidity risk
Business risk | Operational risk | External risk

6 Business risk

Business risks are risks that are specific to the business undertaken.
Business risk **differs from operational risk** in that the latter are non-financial events that have financial consequences

Business risk is an umbrella term, which consists of the following risks:

- **Underwriting risk** – risks arising due to the underwriting approach and the level of underwriting
- **Insurance risk** – due to unpredictability of claim rates and claim amounts
- **Financing risk** – risks due to the non-availability of funds in financing of projects and other activities
- **Exposure risk** – risks due to the lack of diversification of assets

Market risk | Credit risk | Liquidity risk
Business risk | Operational risk | External risk

6 Business risk

<u>Examples of business risk are:</u>

- a life or general insurer not having adequate underwriting standards, and thus taking on risks at an inadequate price

- an insurer suffering more claims than anticipated

- a reinsurer having greater exposure than planned to a particular risk event – for example through writing whole account protection covers as well as primary reinsurance of the risk

- a music production company promoting a CD that fails to sell

- a competitor launching a new product in the week before your similar product launch

  It might be argued that a drought, as an external event, is an external risk. However, the profits of the company will be so closely correlated with the amount of rainfall that the risk is key to the company's business.

Market risk | Credit risk | Liquidity risk
Business risk | Operational risk | External risk

7 Operational risk

Operational risk refers to the risk of loss resulting from **inadequate or failed internal processes, people and systems or from external events**.

Operational risks can be controlled or mitigated by an organization. For individuals, operational risks arise in carrying out their normal lifestyle. Operational risk can arise from:

- **inadequate or failed internal processes, people or systems**
- the **dominance** of a single individual over the running of a business, sometimes called **dominance risk**
- **reliance on third parties** to carry out various functions for which the organization is responsible
- the **failure of plans** to recover from an external event.

Computer models can be developed to analyze and price operational risk, such models are only as good as the parameters input. Whether or not a model is used, identification of operational risks requires considerable input from owners, senior management and other individuals having a detailed working knowledge of the operations of the business.

8 External risk

External risk is a form of **non-financial risk** but is separate to operational risk.

Non-financial risks arise from events other than a financial transaction, that can have negative consequences for the company’s operations.

External risk arises from external events, such as storm, fire, flood, or terrorist attack.

However, the failure to arrange mitigation against such risks is an operational risk.

In general, these are **systematic risks**. Only for the largest entities is it economically efficient to diversify these by carrying out the same operation on different sites.

Topics covered

- Risk identification
- Risk classification and categorization
- Market risk
- Credit risk
- Liquidity risk
- Business risk
- Operational risk and external risk