Risk and Its Management

1

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What is Risk?

- Uncertainty that leads to the loss.
- In insurance industry, risk is a measure of insurability—good risk, bad risk, and unacceptable risk.

2

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Two main types of risk:

1. *Objective Risk* is a relative variation of actual loss from expected loss.
   - It could be calculated by standard deviation or coefficient of variation.
   - It declines with an increase in the number of exposures.

1. Objective Risk

- As the number if exposures increases, the future loss experience can be more accurately predicted by relying on the law of large numbers, which states that as the number of exposure units increases the lower the standard deviation, and thus the more closely the actual loss experience will approach the expected loss.

2. *Subjective Risk*

Subjective Risk is the mental uncertainty.

- The impact of it varies across individuals depending on each person's perception of risk.
- High subjective risk is correlated with prudent behavior.

2. *Subjective Risk*

- For example, Willy McIntosh who was previously arrested for drunk driving is more likely to be aware of his behaviors.
- Given his mental uncertainty, he will try to get someone else to drive him home when drunk while those drivers who have not been arrested might perceive the risk as slight and tend to be more careless.

Chance of Loss

Chance of Loss

- Chance of loss is the probability that a loss event will occur.

1. *Objective Probability* is the long-run relative frequency of an event based on the assumption of infinite number of observations and of no change in the underlying condition.
   - It can be determined either by deductive reasoning (e.g. tossing a coin or rolling a die) or inductive reasoning (e.g. the probability that a person age x will die before age x + t.)

Chance of Loss

2. *Subjective Probability* is the individual's personal estimate of the chance of loss.
   - Factors that influence subjective probability include age, gender, intelligence, education, and the use of alcohol.

Pure and Speculative Risk

Pure Risk

- **Pure risk** refers to a situation in which there are only the possibilities of loss or no loss.
- Examples are premature death, job-related accidents, catastrophic medical expenses, property damage from fire, lightning, flood, or other natural disasters.

Pure risks

- Pure risks can be divided in to following three main types:

1. **Personal risk**
2. **Property risk**
3. **Liability risk**

Pure risk:
1. Personal risk

Personal risks are risk that directly affects individual. There are four main types of personal risks:

1.1 Premature death

1.2 Poor Health

1.3 Unemployment

1.4 Longevity risk

Pure risk:
2. Property risk

There are two main types of loss associated with the property:

2.1 ***Direct loss*** refers to a financial loss that results from the physical damage, destruction, or theft of the property.

2.2 ***Indirect or consequential loss*** is a financial loss that results indirectly from the occurrence of a direct physical damage.

Pure risk:
3. Liability risk

Liability risks are the risks of being held legally liable if you do something that results in bodily injury or property damage to someone else. A lien can be placed on your income and financial asset to satisfy legal judgment. Moreover, legal defense costs can be greatly significant.

Speculative risk

- Speculative risk refers to a situation in which either profit or loss is possible.
  - For example, when you buy shares of stocks, you are exposed to the risk of making a profit if the stock price increases and making loss if the stock price declines.
  - Other types of investment also involve speculative risks. These include investing in real estate, betting on a soccer game, and running your own business.

Speculative risk

- Private insurers generally insure only pure risks.
- Unlike the case of pure risk, the law of large number cannot be easily applied to speculative risk.

Speculative risk

- As opposed to the pure risk that it is harmed when pure risk is present and a loss occurs, society may benefit from a speculative risk even though a loss occur.
- For example, a firm developing new technology for producing inexpensive computer may drive other competitors into bankruptcy. Despite the bankruptcy, society benefits from cheaper computers.

How risk can be handled?

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How risks can be handled?

1. Avoidance
2. Loss Control
3. Risk retention
4. Non-insurance transfer.
5. Insurance

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Objective of Risk Management

Risk Management Objective

- Risk refers to either variability or the expected value of losses.
- Either measurement of risk is costly. That is, the risk reduces the value of engaging in various activities.

Risk Management Objective

- Risk management is thus aimed to mitigate this reduction in value and increase welfare.
- To see how risk can reduce the value, consider the following examples :

The risk of product liability claims against a pharmaceutical company

- Consider a pharmaceutical company that is developing a new prescription drug for the treatment of rheumatoid arthritis
- Thus, the firm faces the risk of the negative side effect of the drug and thus legal liability claims by injured users

The risk of product liability claims against a pharmaceutical company

- This type of risk obviously increases the expected cost to the firm. These higher costs could come in the form of loss control such as expenditures on product safety testing
- The firm may elect to purchase product liability insurance to finance part of the potential losses

The risk of product liability claims against a pharmaceutical company

- The premium for product liability insurance usually includes loading factor to cover the insurer's administrative costs and provide a reasonable expected return on the insurer's capital
- In any case, there is a possibility of uninsured damage claims, which are either self-insured losses or losses in excess of liability insurance coverage limits

The risk of product liability claims against a pharmaceutical company

- Such uninsured claims can still create uncertainty about the amount of costs that will be incurred in a given period
- Some or all of these factors can result in an increase in the price that the firm will have to charge for the drug, thus reducing the demand for the drug

The risk of product liability claims against a pharmaceutical company

- If the price is prohibitively high, the doctor may prescribe the drug only to the most sever cases of the disease, which might cause the firm to decide not to introduce the drug
- Thus, the risk of consumer injury could have a significant effect on the value of introducing the drug

Cost of Risk

- Most risk management decisions must be made before losses are known
- Before losses occur, the cost of direct and indirect losses reflects the predicted or expected value of losses during an upcoming time period

Cost of Risk

- Regardless of the type of risk being considered, the cost of risk has five main components

  1. Expected Cost of Losses

  2. Cost of Loss Control

  3. Cost of Loss Financing

  4. Cost of Internal Risk Reduction

  5. Cost of Any Residual Uncertainty

Firm Value Maximization and the Cost of Risk

- Cost of risk = Value without risk – Value with risk

  ➔***Value with risk = Value without risk – Cost of risk***

- Maximizing firm's value to shareholder is similar to minimizing the cost of risk

Measuring the Cost of Risk

- A business needs to estimate the size of the various components of the cost of risk and consider how these costs will be affected by the firm's operating and risk management decisions
- However, the analysis is practically costly. Plus, some components are too difficult to measure, e.g. opportunity cost

Measuring the Cost of Risk

- As a result, business often will not attempt to quantify all of their costs precisely
- Small businesses especially are unlikely to measure costs with much precision
- Even when quantifying the various components of the cost of risk is not cost-effective, managers need to understand these components and how chosen risk management methods will affect these components

Measuring the Cost of Risk

- For nonprofit firms, if the cost of risk is defined as the reduction in value of the nonprofit firm’s activities due to risk, the appropriate goal of risk management remains minimization of the cost of risk

Risk Management and Social Welfare

- How risky activities and risk management by individuals and businesses can best be arranged to minimize the total cost of risk for society
- Minimizing the total cost of risk in society would maximize the value of social welfare

Risk Management and Social Welfare

- Minimizing the total cost of risk should be made to produce an **efficient level of risk**, which requires individuals and businesses to pursue activities until the **marginal benefit equals the marginal cost.**
- Note that achieving the efficiency goal does not eliminate losses because it is simply too costly to do so

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Risk Management and Social Welfare

- Regulation that results in subsidization of premium will increase cost to society. Although these regulations produce fairer distribution of costs, they increase the total cost of risk to the society by encouraging too much risky activities by individuals whose insurance premiums are subsidized

Risk Management and Social Welfare

- If organizations do not bear the full cost of their risky activities, the total cost of risk in society will not be minimized when businesses maximize value. Organizations may not consider personal harms to persons from risky activities, may produce products that are too risky and expose workers to an excessive risk of workplace injury, and thus increase the cost of risk in society

Risk Management Process

Five Major Steps in Risk Management Decision-Making

1. Risk Identification
2. Risk Evaluation
3. Risk Management Strategy
4. Risk Management Implementation
5. Performance Monitoring

Risk Identification

Risk Identification

- It is the identification of loss exposures
- Risk identification requires an overall understanding of the organization and the specific economic, legal, and regulatory factors that affect the organization.
- Unidentified loss exposures will likely result in an implicit retention decision, which may not be optimal

Risk Identification

- One way to identify loss exposures is through comprehensive checklists of common business exposures, analysis of the firm's financial statements, discussion with managers, surveys of employees, and discussions with insurance agents and risk management consultants

Identifying Risk Exposures

1. Property Loss Exposures - These are practical questions to be asked when identifying property loss exposures

Identifying Risk Exposures

- **Direct Losses** :

  1. What types of properties are subject to damage ?

  2. What peril can lead to loss ?

  3. What is the value of the property exposed to loss ?

  4. Will the property be replaced if it is lost ?

Identifying Risk Exposures

- **Indirect Losses**

  1. Will the organization have to raise external funds to replace uninsured losses ?

  2. Assuming replacement, will the organization suspend or cut back operations following a direct loss ?

  3. If the organization suspends or cuts back its operations: (business interruption insurance)

Identifying Risk Exposures

- What is the potential duration and how much normal profit should be lost ?
- What operating expenses would continue despite the suspensions ?
- Will revenue losses continue after normal levels of production are resumed, and, if so, what actions might reduce these losses at what cost ?

Identifying Risk Exposures

4. If the organization continues operating at pre-loss levels: (extra expense coverage)

- What facilities or resources will be needed ?
- What will be the additional cost from using alternative facilities or resources ?

Identifying Risk Exposures

2. Liability Losses

- Organization faces potential legal liability losses as a result of relationship with many parties, including suppliers, customers, employees, shareholders, and members of the public
- Legal liability lawsuits can harm the firm's reputation as well as impose substantial losses to the firm
- Practical questions to be asked when identifying liability losses

Identifying Risk Exposures

Direct Losses :

1. What parties might be harmed by the firm ?
2. How might these parties be harmed ?
3. What is the potential magnitude of damages ?
4. What is the potential magnitude of defense cost ?

Identifying Risk Exposures

Indirect Losses

1. Will revenues decline in response to possible damage to the firm's reputation ?

- What is the potential magnitude of this loss ?
- What actions might reduce the resulting indirect losses at what cost ?

Identifying Risk Exposures

2. Will products and services likely be abandoned or products recalled in the event of large uninsured losses ?

3. Will the organization have to raise additional capital in the event that cash flows decline ?

4. Could large uninsured losses push the organization into financial distress ?

Identifying Risk Exposures

3. **Losses to Human Resources**

- These are losses in firm value due to worker injuries, disabilities, death, retirement, and turnover
- Firm may purchase insurance to compensate for death or disability of important employees
- Employment contracts can also be designed to reduce employee turnover

Identifying Risk Exposures

4. Losses from External Economic Forces

- These are losses arise from factors that are outside of the firm—changes in input and output prices, changes in exchange rate, and financial distress experienced by important suppliers or purchasers

Risk Evaluation

Probability and Statistics

- To assess risk, basic understanding of concepts from probability and statistics is required

Random Variable

- What is random variable ?

  ➔The variable whose outcome is uncertain

  ➔Consider flipping a coin, X is a random variable defining the outcome if heads or tails appears

Random Variable

➔Prior to the coin flip, the value of X is unknown, and thus X is a random variable

➔Once the coin is flipped and the outcome revealed, the uncertainty about X is resolved

Probability Distribution

- Information about a random variable is summarized by the random variable's probability distribution
- In other words, a probability distribution identifies all the possible outcomes for the random variable and the probability of the outcomes

Probability Distribution

- Probability distribution can be represented either in the graphical or numerical measures
- Information about probability distribution is needed to make good risk management decisions

Probability Distribution

- Example

X	Probability
0	0.4
100	0.3
1000	0.2
10000	0.1

Frequency and Severity of Losses

Frequency and Severity of Losses

- Usually, risk managers use summary measures of probability distributions, such as frequency and severity measures, as well as expected losses and the standard deviation of losses during a given period, to assess costs and benefits of loss control and retention versus insurance

Frequency

- The frequency of losses measures the number of losses in a given period
- Probability of a loss per exposure (# of losses / # of exposures) can also be estimated if there exists historical data on a large number of exposures

Severity

- Severity of losses measures the magnitude of loss per occurrence
- One way is to use the average severity of loss per occurrence (total loss / # of occurrence) during a historical period
- When adequate data is not available, risk managers should estimate the range of possible loss severity, maximum and minimum loss, for a given exposure

Risk Management for Public Organization

Why managing risk?

- By including risk in its strategic planning process, a public organization can plan safely to expand into service areas that it might otherwise avoid.
- Some risk, managed properly, can actually present opportunity.

Difficulties

- Many of risks faced by a public organization arise from legally mandated activities.
- It is difficult to identify the full spectrum of risks.
- Loss data or past experience may be unavailable.
- Every province has different needs and environment, the approaches described here should be modified as necessary.

Nine-steps for Risk Management in Public Organization

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Risks for a Public Organization

"Risks that may damage the organization's financial stability or ability to deliver services."

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Step :1 Priority Concern

Priority concern over risk from everyone

➔ Policy statement

- Awareness—knowledge transfer
- Define risk as a priority for everyone
- Require participation

Step 2: Risk Team Leader

- Responsible for the risk program.
- Good communications skills and knowledge of risk.
- Look beyond insurable risks.
- Responsible for periodically reporting to upper management or the governing body on the team's progress.

Step 3: Scopes and Goals

- Risk team leader defines scopes and goals of the risk team's initial activities.
- Goal: Creation of risk action plan.
- An organization that is establishing a risk team for the first time may prefer to limit the scope of its initial review to one particular area before undertaking an entity-wide approach.

Step 4: Analytical Framework

- Capture the organization's risks and their potential impact as fully as possible without detailing all the potential losses that may result.
- The team leader can choose potential team members.
- See grid format.

ที่มาของความเสี่ยง	ผลกระทบต่อด้านต่างๆขององค์กร							
	การเงิน	ทรัพย์สิน	บุคลากร	การบริการ	ชื่อเสียง	ความรับผิด	สิ่งแวดล้อม	ชุมชน
ภัยธรรมชาติ								
สัญญาและนิติสัมพันธ์								
การดำเนินงานทางการเงิน								
การกระทำมิชอบของเจ้าหน้าที่รัฐ								
การกระทำหรือละเว้นโดยบุคคลที่สาม								
กฎหมายหรือระเบียบ								
สภาวะเศรษฐกิจ								
กิจกรรมและการให้บริการของรัฐ								
การพึ่งพิงแหล่งเงินทุนและวัตถุดิบจากภายนอก								
ความสูญเสียทางทรัพย์สิน								
การใช้เทคโนโลยี								
แรงงาน								

Step 5: Recruit Team member

- Depend on scope of the risk program.
- Additional expertise may be added later.
- Note that the risk members do not need to be risk experts. They only need to have interest in risk management.
- Reliability and commitment are crucial to success.
- Over time, membership of the team may change, but the combined backgrounds of members must continue to reflect the broad view of risks faced by the organization.

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Step 6: Risk Identification and Evaluation

- Identify as fully as possible within the scope of its initial activities, the range of risks to which the public entity is exposed
- Estimate the anticipated frequency and severity of losses arising from these risks.
- Public Risk Database Warehouse

Step 6: Risk Identification and Evaluation

Frequency:

- Loss history: future may differ!→ focus on current environment.
- More complex for infrequent loss.
- Even the loss occur with some regularity, the team must carefully consider any changes in operations that may have increased or decreased risk exposure.

Step 6: Risk Identification and Evaluation

Severity:

- The baht value of the expected loss.
- The amount of loss the organization can sustain without having to curtail operation.
- The governing board's tolerance for risk.
- The potential impact of a major loss on the community that the entity serves.

Step 6: Risk Identification and Evaluation

Ability to absorb losses:

- Ability to absorb losses without damage to its financial stability or capacity to deliver services
- Size of contingency fund.

Risk tolerance:

- How comfortable the boards are with potential losses.

Impact on community

- Some risks do not directly affect a public entity's assets, but can severely damage the community it serves.

Frequency and Severity

	รายละเอียดของความสูญเสีย	ความถี่	ความรุนแรง	วิธีการจัดการความเสี่ยง
การเงิน				
ทรัพย์สิน				
บุคลากร				
การบริการ				
ชื่อเสียง				
ความรับผิด				
สิ่งแวดล้อม				
ชุมชน				

Step 6: Risk Identification and Evaluation

Identify potential strategies

– How to avoid, control, or transfer losses?

Develop a consensus on potential frequency and severity of losses associated with the organization’s risks.

– Might be difficult to reach a consensus, especially if the organization has never experienced similar loss or if the loss is the one to which it is difficult to be evaluated.

Step 7: Plot a Risk Map

A risk map is a scattergram that segregate potential losses into categories according to their frequency and severity.

A simple risk map include:

- High frequency/high severity
- High frequency/low severity
- Low frequency/high severity
- Low frequency/low severity

Risk Map

	Frequency	
Severity	Low F/High S	High F/High S
	Low F/Low S	High F/Low S

Step 7: Plot a Risk Map

A risk map provides a visual guide to help the team assign priorities to risks for intervention.

After making revisions that take team members' responses into account and reconciling any conflict, a final version of the risk map is developed.

Step 8: Create and Action Plan

- Assign priority to risks for intervention.
- Evaluate alternative strategies for each risk.
- Evaluate anticipated costs and benefits and the time it takes to implement.
- The risk team collaborates with representatives from individual operational areas to identify the best strategies for each high-priority risks.

Step 8: Create and Action Plan

- Determine how to finance the risks of loss that cannot be cost-effectively avoided, reduced, controlled, or transferred to others.
- Communication between the risk team and the risk financing decision-maker is very important.
- The final action plan is submitted to the appropriate management for approval.

Step 9: Implementing and Monitoring

- Implementation is an ongoing process and has to be monitored.
- The risk team is responsible for monitoring the organization’s losses and for identifying and analyzing and changes in risk.

Conclusions

- Risk is a major concern for all kinds and all sizes of organization.
- The steps outlined in this session should be modified to fit the needs and environment of the public organization.
- The implementation can begin with the area that produce the greatest risks.

Conclusions

- RISK MANGEMENT IS AN ONGOING PROGRAM!
- Benefits: Protect and improve the ability to deliver services to citizens and strengthen the ability to fulfill the mission.