Instructor's Manual
and Test Item File
for

Principles of
Risk Management and **Insurance**

Twelfth Edition

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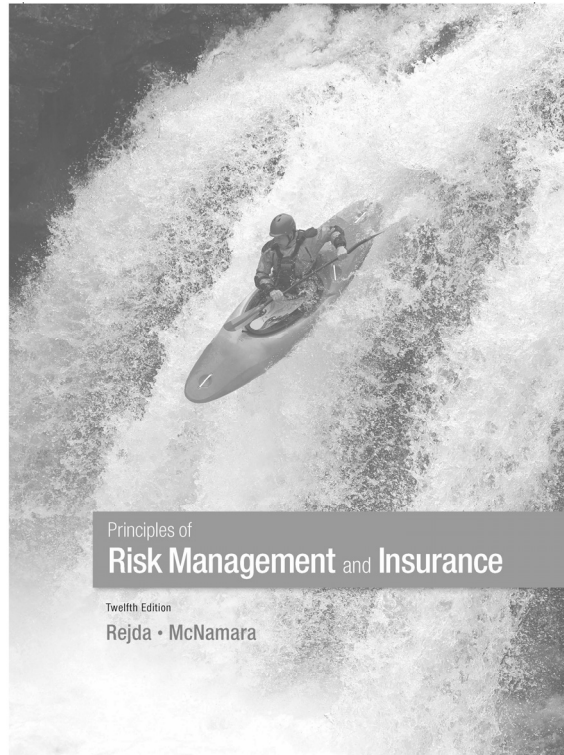
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Chapter 1
Risk and Its Treatment

■ Teaching Note

In presenting the material in this chapter, keep in mind that students must master a certain amount of new insurance terminology. Studying insurance is similar to becoming fluent in a foreign language. The student starts by building upon a basic vocabulary. The same is true for insurance. Insurance is a technical subject that requires a basic vocabulary.

It is also worthwhile to point out that there is no single definition of risk. However, risk has been traditionally defined as uncertainty concerning the occurrence of a loss.

Take some time to discuss the major types of pure risks that can result in great financial insecurity. ,This chapter summarizes the important points concerning the different types of risk and methods of handling risk. In particular, the risk of unemployment is a timely risk that could be emphasized in this chapter.

In discussing the major methods of handling risk, several points should also be stressed. First, explain that these concepts are discussed in greater detail in Chapter 3. Second, stress the idea that insurance is only one of several methods for handling risk. Finally, explain that in many cases other methods for handling risk may be more effective.

■ Outline

I. What is Risk?

  A. Different definitions of risk; risk historically has been defined as uncertainty.

  B. Objective Risk
    1. Defined as the relative variation of actual loss from expected loss
    2. Declines as the number of exposure units increases
    3. Can be measured by using the standard deviation or coefficient of variation

  C. Subjective Risk
    1. Defined as uncertainty based on one's mental condition or state of mind
    2. Difficult to measure

II. Chance of Loss

  A. Objective Probability
    1. A priori—by logical deduction such as in games of chance
    2. Empirically—by induction, through analysis of data

B.   Subjective Probability—a personal estimate of the chance of loss. It need not coincide with objective probability and is influenced by a variety of factors including age, sex, intelligence, education, and personality.

C.   Chance of Loss Distinguished from Risk—although chance of loss may be the same for two groups, the relative variation of actual loss from expected loss may be quite different.

III. Peril and Hazard

A.   Peril—defined as the cause of loss

B.   Hazard
1.   Physical hazard—physical condition that increases the chance of loss. Examples are icy streets, poorly designed intersections, and dimly lit stairways.
2.   Moral hazard—dishonesty or characteristics of an individual that increase the chance of loss
3.   Attitudinal (Morale) hazard—carelessness or indifference to a loss, which increases the frequency or severity of loss
4.   Legal hazard—characteristics of the legal system or regulatory environment that increase the frequency or severity of losses

IV. Basic Categories of Risk

A.   Pure and Speculative Risk
1.   Pure risk—a situation where there are only the possibilities of loss or no loss
2.   Speculative risk—a situation where either profit or loss is possible

B.   Diversifiable Risk and Nondiversifiable Risk—Diversifiable risk affects only individuals or small groups and not the entire economy; it can be reduced or eliminated by diversification. Nondiversifiable risk affects large numbers of persons or groups in the economy and cannot be eliminated or reduced by diversification.

C.   Enterprise Risk—This is a term that encompasses all major risks faced by a business firm, including pure risk, speculative risk, strategic risk, operational risk, and financial risk.

V. Major Personal Risks and Commercial Risks

A.   Personal Risks
1.   Risk of premature death
2.   Risk of insufficient income during retirement
3.   Risk of poor health
4.   Risk of unemployment

B.   Property Risks
1.   Direct loss
2.   Indirect or consequential loss

C.   Liability Risks

D.   Commercial Risks
1.   Property risks
2.   Liability risks
3.   Loss of business income

    4. Other risks—crime exposures, human resources exposures, foreign loss exposures, intangible property exposures, government exposures

VI. Burden of Risk on Society
    A. Need for a Larger Emergency Fund
    B. Loss of Needed Goods and Services
    C. Worry and Fear

VII. Techniques for Managing Risk

    A. Risk Control
       1. Avoidance
       2. Loss prevention
       3. Loss reduction

    B. Risk Financing
       1. Retention
       2. Noninsurance transfers
       3. Commercial insurance

■   Answers to Case Application

a. *Retention.* Because the car is old and has a limited market value, collision insurance should not be purchased. Retention can be used to deal with the exposure.

b. *Liability insurance.* Because the exposure has the potential for causing a catastrophic loss, auto liability insurance should be purchased.

c. *Insurance.* Property insurance could be purchased to deal with the property exposure of $10,000. The policy should contain a deductible.

d. *Retention.* The dollar value of the loss of a disposable contact lens is small.

e. *Loss control.* The waterbed should be carefully checked for possible leaks to reduce the possibility of damage to the apartment. As an alternative, an endorsement can be added to a homeowners policy to cover the liability exposure.

f. *Avoidance.* Michael should pick a new running route.

g. *Life insurance.* Michael's father should have purchased life insurance. The loss of tuition would have been replaced by life insurance.

■   Answers to Review Questions

1. (a) There is no single definition of *risk.* Historically, many insurance authors have defined risk in terms of uncertainty. *Risk* is uncertainty concerning the occurrence of a loss.
    (b) *A loss exposure* is any situation or circumstance in which a loss is possible, regardless of whether a loss occurs.

(c) *Objective risk* is the relative variation of actual loss from expected loss. As the number of exposure units under observation increases, objective risk declines. *Subjective risk* is uncertainty based on one's mental condition or state of mind. Accordingly, objective risk is measurable and statistical; subjective risk is personal and not easily measured.

2. (a) *Chance of loss* can be defined as the probability that an event will occur.
   (b) *Objective probability* refers to the long-run relative frequency of an event based on the assumption of an infinite number of observations and no change in the underlying conditions. *Subjective probability* is the individual's personal estimate of the chance of loss.

3. (a) *Peril* is the cause of loss. *Hazard* is a condition that creates or increases the chance of loss.
   (b) *Physical hazard* is a physical condition that increases the chance of loss. *Moral hazard* is dishonesty or character defects in an individual that increase the chance of loss. *Attitudinal hazard (morale hazard)* is carelessness or indifference to a loss. *Legal hazard* refers to characteristics of the legal system or regulatory environment that increase the frequency or severity of losses.

4. (a) *Pure risk* is defined as a situation in which there are only the possibilities of loss or no loss. *Speculative risk* is defined as a situation where either profit or loss is possible.
   (b) *Diversifiable risk* is a risk that affects only individuals or small groups and not the entire economy. It is a risk that can be reduced or eliminated by diversification. In contrast, *nondiversifiable risk* is a risk that affects the entire economy or large numbers of persons or groups within the economy. It is a risk that cannot be reduced or eliminated by diversification.

5. (a) *Enterprise risk* is a term that encompasses all major risks faced by a business firm, which include pure risk, speculative risk, strategic risk, operational risk, and financial risk.
   (b) *Financial risk* is the uncertainty of loss because of adverse changes in commodity prices, interest rates, foreign exchange rates, and the value of money.

6. (a) *Enterprise risk management* combines into a single unified treatment program all major risks faced by the firm. These risks include pure risk, speculative risk, strategic risk, operational risk, and financial risk.
   (b) *Traditional risk management* considered only major and minor pure risks faced by a corporation. Enterprise risk management considers all risks faced by a corporation as described in (a) above.

7. Pure risks associated with great financial and economic insecurity include the risks of premature death, insufficient income during retirement, old age, poor health, and unemployment. In addition, persons owning property are exposed to the risk of having their property damaged or lost from numerous perils. Finally, liability risks are also associated with great financial and economic insecurity.

8. Pure risk is a burden to society for at least three reasons:
   (a) The size of an emergency fund must be increased.
   (b) Society may be deprived of needed goods and services.
   (c) Worry and fear are present.

9. A direct loss is a financial loss that results from the physical damage, destruction, or theft of property. Indirect loss results from or is the consequence of a direct loss. For example, if a student's car is stolen (direct loss), he or she will lose the use of the car until it is replaced or recovered (indirect loss).

10. Major risks faced by business firms include property risks, liability risks, loss of business income, crime exposures, human resources exposures, foreign loss exposures, intangible property exposures, and government exposures.

11. (a) Risk control techniques refer to techniques that reduce the frequency or severity of losses. They include the following

  (1) *Avoidance.* This means a certain loss exposure is never acquired, or an existing loss exposure is abandoned. For example, a drug manufacturer can avoid lawsuits associated with a dangerous drug by not producing the drug.

  (2) *Loss prevention.* Certain activities are undertaken that reduce the frequency of a particular loss. One example of loss prevention is periodic inspection of steam boilers to prevent an explosion.

  (3) *Loss reduction.* This refers to measures that reduce the severity of a loss after it occurs. One example of loss reduction is an automatic sprinkler system in a department store that can reduce the severity of a fire loss.

  (b) Risk financing refers to techniques that provide for the payment of losses after they occur. They include the following

  (1) *Retention.* This means that an individual or business firm retains part or all of the losses that can result from a given loss exposure. For example, a motorist may retain the first $500 of a physical damage loss to his or her automobile by purchasing an auto insurance collision policy with a $500 deductible.

  (2) *Noninsurance transfers.* This means that a risk is transferred to another party other than an insurance company. For example, the risk of a defective television set can be shifted or transferred to the retailer by the purchase of a service contract by which the retailer is responsible for all repairs after the warranty expires.

  (3) *Insurance.* An auto insurance policy can be purchased covering the negligent operation of an automobile.

■ Answers to Application Questions

1. Objective risk is the relative variation of actual loss from expected loss. Although the chance of loss may be identical for two different groups, the relative variation of actual from expected loss may be quite different. For example, if a company has a fleet of 1000 trucks, the expected number of collision losses each year may be 30. However, actual losses may vary each year from 25 to 35. In contrast, another fleet of 1000 trucks may have the same number of expected losses (30), but the annual variation may be considerably higher, such as 20 to 40. Thus, objective risk is greater for the second fleet.

2. (a) This is a nondiversifiable risk because the entire nation can be affected by a terrorist attack.

  (b) This is a pure risk. The insured rarely profits if his or her house is damaged in a fire.

  (c) This is pure risk because of the loss of earned income. You usually do not profit if you are totally disabled.

  (d) This is a speculative risk. Profit or loss is possible.

  (e) This is a nondiversifieable risk because large numbers of people can lose their homes in a major flood.

  (f) This is a nondiversifiable risk because large numbers of home buyers will be adversely affected by higher interest rates and higher monthly mortgage payments. From the viewpoint of home

builders and realtors, a rise in interest rates is also a financial risk that can slow down the sale of new and used homes.

(g) This is a speculative risk because both profit and loss are possible.

3. (a) Risk control such as exercise, losing weight, and following a healthy diet can reduce the chance of dying prematurely from a heart attack. Life insurance can also be used, which reduces or eliminates the financial consequences to surviving family members if a family head dies prematurely.

(b) Property insurance is an appropriate technique for dealing with the risk of a hurricane. Retention can also be used by purchasing the policy with a deductible.

(c) Collision insurance on the new car is an effective way to deal with this exposure. Retention can also be used by purchasing the policy with a deductible for collision losses. The insured can also drive defensively, which is a form of risk control.

(d) A catastrophic loss exposure is present. Auto liability insurance should be purchased to deal with the exposure.

(e) Professional liability insurance should be purchased to deal with malpractice suits. The surgeon could also use risk control to reduce the possibility of injuring a patient.

4. Andrew has three noninsurance options.

(a) *Avoidance.* Andrew can avoid the risk of burglary or robbery by going into a different line of business. However, this is not a practical solution and may not be feasible.

(b) *Risk control.* Risk control efforts can be undertaken to reduce both the frequency and severity of losses. A burglar alarm system can be installed. The pawn shop can be relocated to another part of the city where crime rates are lower. Losses also can be prevented by hiring a guard or patrol service to protect the property.

(c) *Retention.* Andrew may decide to retain all losses, thereby eliminating the need for burglary insurance. However, since a large loss could result in financial ruin, he may decide to retain losses only up to a certain amount, such as $1000. Excess insurance can be purchased for losses exceeding the retention limit.

5. (a) *Retention.* The firm is retaining the earthquake exposure.

(b) *Risk control.* If a fire occurs, the sprinkler system will operate automatically to extinguish the fire, thereby reducing the size of the loss.

(c) *Avoidance.* The firm is avoiding a lawsuit by not manufacturing products that could injure customers who use the product.

(d) *Noninsurance transfer.* The firm manufacturing the product has transferred the risk of a liability suit to the retailers by such an agreement. This agreement is often called a hold-harmless agreement. For example, a manufacturer may insert a hold-harmless clause in a contract with a retailer by which the retailer agrees to hold the manufacturer harmless if a scaffold collapses and someone is injured.

Chapter 2
Insurance and Risk

■ Teaching Note

Three areas should be emphasized in teaching this chapter. First, the nature of insurance should be discussed. Second, the requirements of an insurable risk should also be stressed. Mention that the requirements of an insurable risk are ideal requirements and are seldom met completely in the real world. Finally, show how insurance differs from both gambling and speculation.

The remaining material is descriptive and fairly easy to grasp. It is not necessary to discuss in detail the various fields of insurance, other than to point out that the different fields of insurance are covered in future chapters. Likewise, the social benefits of insurance are quickly grasped by students and may not require a large amount of class time. However, it is worthwhile to spend some time on the less obvious costs of insurance, such as moral and attitudinal (morale) hazard. Point out that moral hazard has increased enormously in recent years, especially in the submission of fraudulent claims.

■ Outline

I. Meaning of Insurance

  A. Definition of Insurance

  B. Basic Characteristics of Insurance
     1. Pooling of losses
     2. Payment of fortuitous losses
     3. Risk transfer
     4. Indemnification

II. Requirements of an Ideally Insurable Risk

  A. General Requirements
     1. Large number of exposure units
     2. Accidental and unintentional loss
     3. Determinable and measurable loss
     4. No catastrophic loss
     5. Calculable chance of loss
     6. Economically feasible premium

  B. Application of the Requirements
     1. The risk of fire to a private dwelling satisfies the requirements.
     2. The risk of unemployment does not completely meet all requirements.

  C. Adverse Selection and Insurance
     1. Nature of adverse selection

      2. Consequences of adverse selection

III. Insurance and Gambling Compared

    A. Insurance eliminates a pure risk, while gambling creates a new speculative risk.

    B. Insurance is socially productive, while gambling is socially unproductive.

IV. Insurance and Hedging Compared

    A. Insurance transfers a pure risk, while hedging involves the transfer of a speculative risk.

    B. Insurance reduces objective risk, while hedging does not.

V. Types of Insurance

    A. Private Insurance

       1. Life insurance

       2. Health insurance

       3. Property and liability insurance

    B. Government Insurance

       1. Social insurance

       2. Other government insurance programs

VI. Social Benefits and Costs of Insurance

    A. Benefits of Insurance to Society

       1. Indemnification for loss

       2. Less worry and fear

       3. Source of investment funds

       4. Loss prevention

       5. Enhancement of credit

    B. Costs of Insurance to Society

       1. Cost of doing business

       2. Fraudulent claims

       3. Inflated claims

■ Answers to Case Application

a. This is not insurance. Although the risk of a defective television set is transferred to the manufacturer, there is no pooling of losses.

b. This is not insurance. Although the risk of defective tires for the first 50,000 miles is transferred to the manufacturer, there is no pooling of losses.

c. This guarantee is not insurance. Although the risk of a defective home is transferred to the builder, there is no pooling of losses, which is the essence of insurance. Any losses would fall directly on the builder.

d. This is not insurance. The risk of default has been transferred to the cosigner. If the debtor defaults, the cosigner must make the payments. The loss would fall directly on the cosigner, and there is no pooling of losses.

e. The elements of insurance are present here. First, risk transfer is present; the homeowner transfers the risk of fire to the group. Second, pooling of losses is also present. Pooling is the essence of insurance.

Fire losses would be pooled over the entire group, and average loss is substituted for actual loss. Third, fire losses generally are fortuitous. Finally, the homeowner would be indemnified for any loss.

■   Answers to Review Questions

1. Insurance plans have four distinct characteristics:
    (a) *Pooling.* Losses incurred by the few are spread over the entire group so that in the process, average loss is substituted for actual loss.
    (b) *Fortuitous loss.* Insurance plans provide for the payment of fortuitous losses. A fortuitous loss is one that is unforeseen and unexpected and occurs as a result of chance.
    (c) *Risk transfer.* In private insurance, a pure risk is transferred from the insured to the insurer, which is typically in a better financial position to pay the loss than the insured.
    (d) *Indemnification.* Compensation is given to the victim of a loss, in whole or in part, by payment, repair, or replacement.

2. The law of large numbers states that the greater the number of exposures, the more closely the actual results will approach the probable results expected from an infinite number of exposures. As the number of exposures increases, the relative variation of actual loss from expected loss will decline. Thus, the insurer can predict future losses with a greater degree of accuracy as the number of exposures increases. This is important, since an actuary must charge a premium that is adequate for paying all losses and expenses during the policy period. The lower the degree of objective risk, the more confidence an insurer has that the actual premium charged will be sufficient to pay all claims and expenses and leave a margin for profit.

3. There are several requirements of an ideally insurable risk:
    (a) There must be a large number of exposure units.
    (b) The loss must be accidental and unintentional.
    (c) The loss must be determinable and measurable.
    (d) The loss should not be catastrophic.
    (e) The chance of loss must be calculable.
    (f) The premium must be economically feasible.

4. Insurers can deal with the problem of a catastrophe loss by (1) reinsurance, (2) avoiding the concentration of risk by dispersing coverage over a large geographical area, and (3) use of certain financial instruments in the capital markets, such as catastrophe bonds.

5. These risks are generally uninsurable for several reasons. First, many of these risks are speculative risks, which are difficult to insure privately. Second, the potential for a catastrophic loss is great; this is particularly true for political risks, such as the risk of war. Finally, calculation of the correct premium may be difficult because the chance of loss cannot be accurately estimated.

6. (a) Adverse selection is the tendency of persons with a higher-than-average chance of loss to seek insurance at standard (average) rates, which, if not controlled by underwriting, results in higher-than-expected loss levels.
    (b) Adverse selection can be controlled by careful underwriting, by charging higher premiums to substandard applicants for insurance, and by certain policy provisions.

7. Insurance differs from gambling in two ways. First, gambling creates a new speculative risk that did not exist before, while insurance is a technique for handling an already existing pure risk. Second, gambling is socially unproductive, since the winner's gain comes at the expense of the loser. Insurance is always socially productive, since both the insured and insurer win if the loss does not occur.

8. Insurance differs from hedging. An insurance transaction usually involves the transfer of risks that are insurable, since the requirements of an insurable risk can generally be met. Hedging is a technique for handling risks that are typically uninsurable, such as protection against a substantial decline in the price of commodities. A second difference is that insurance may reduce objective risk because of application of the law of large numbers. In contrast, hedging typically involves only risk transfer, not risk reduction.

9. (a) The major fields of private insurance are life insurance, health insurance, and property and liability insurance (also called property and casualty insurance).

    (b) Property and casualty coverages can be divided into personal lines and commercial lines. Personal lines include private passenger auto insurance, homeowners insurance, personal umbrella liability insurance, earthquake insurance, and flood insurance.

    Commercial lines include fire and allied lines insurance, commercial multiple peril insurance, general liability insurance, products liability insurance, workers compensation insurance, commercial auto insurance, accident and health insurance, inland marine and ocean marine insurance, professional liability insurance, directors and officers liability insurance, boiler and machinery insurance (also known as equipment breakdown insurance), fidelity and surety bonds, and crime insurance.

10. (a) Social insurance programs are government insurance programs with certain characteristics. The programs are enacted into law to deal with social and economic problems. The programs generally are compulsory and financed by contributions from covered employers and employees; benefits are paid from specifically earmarked funds; benefits are skewed or weighted in favor of lower income groups; benefit amounts generally are related to the covered individual's earnings; and eligibility requirements and benefit rights are prescribed by statute.

    (b) Major social insurance programs are the following:

    - Old-age, survivors, and disability insurance (Social Security)
    - Medicare
    - Unemployment insurance
    - Workers compensation
    - Compulsory temporary disability insurance
    - Railroad Retirement Act

■ Answers to Application Questions

1. (i) Risk of fire

    (a) *Large number of exposure units.* This is generally met, since there are millions of homes that are insured.

    (b) *Accidental and unintentional loss.* This requirement is generally met, since most insureds do not deliberately start a fire.

    (c) *Determinable and measurable loss.* A fire loss can be determined and measured. In case of disagreement, a property insurance policy has a provision for resolving disputes.

    (d) *No catastrophic loss.* This requirement is met, since most homes do not burn at the same time.

    (e) *Calculable chance of loss.* Insurers can estimate within ranges the probability of a fire loss.

       (f) *Economically feasible premium.* For most insureds, this requirement is fulfilled.

    (ii) Risk of war

       (a) *Large number of exposure units.* This requirement is not fulfilled. Based on the law of large numbers, it is difficult to estimate accurately the number of wars that will occur.

       (b) *Accidental and unintentional loss.* This requirement is not met. Most wars are not accidental, but intentional.

       (c) *Determinable and measurable loss.* Although a war loss can be determined, the measurement of loss would be difficult.

       (d) *No catastrophic loss.* This requirement is not fulfilled, since large numbers of exposure units would simultaneously incur losses.

       (e) *Calculable chance of loss.* This requirement cannot be easily met.

       (f) *Economically feasible premium.* Because of the catastrophic potential of war, the premiums would not be economically feasible.

2. (a) (1) Indemnification means that insureds are restored to their former financial position after a loss occurs, either partly or wholly. As a result, individuals and families can maintain their economic security and are less likely to apply for public assistance or welfare, or seek financial assistance from relatives and friends.

         (2) Insurance makes a borrower a better credit risk because it guarantees the value of the borrower's collateral, or gives greater assurance that the loan will be repaid. For example, life insurance can be used to pay off a bank loan if the creditor dies prematurely, and so makes the creditor a better credit risk.

         (3) Premiums are collected in advance, and funds not needed to pay immediate losses and expenses can be loaned to business firms. These funds typically are invested in capital goods, such as housing developments, shopping centers, new plants, and machinery and equipment. Since the stock of capital goods is increased, economic growth and full employment are promoted. In addition, since the supply of loanable funds is increased, the cost of capital to business firms is lower than it would be in the absence of insurance.

    (b) The major social and economic costs of insurance are the following:

- Cost of doing business
- Fraudulent claims
- Inflated claims

3. (a) Ideal requirements of an insurable risk:

- Large number of exposure units
- Accidental and unintentional loss
- Determinable and measurable loss
- No catastrophe loss
- Calculable chance of loss
- Economically feasible premium

    (b) The requirement of not having a catastrophe loss is not met because large numbers of exposure units in a flood zone would be incurring losses at the same time. Also, the requirement of an economically feasible premium generally is not met. Without a government backup, premiums for flood insurance in major flood zones generally would be unaffordable for many insureds.