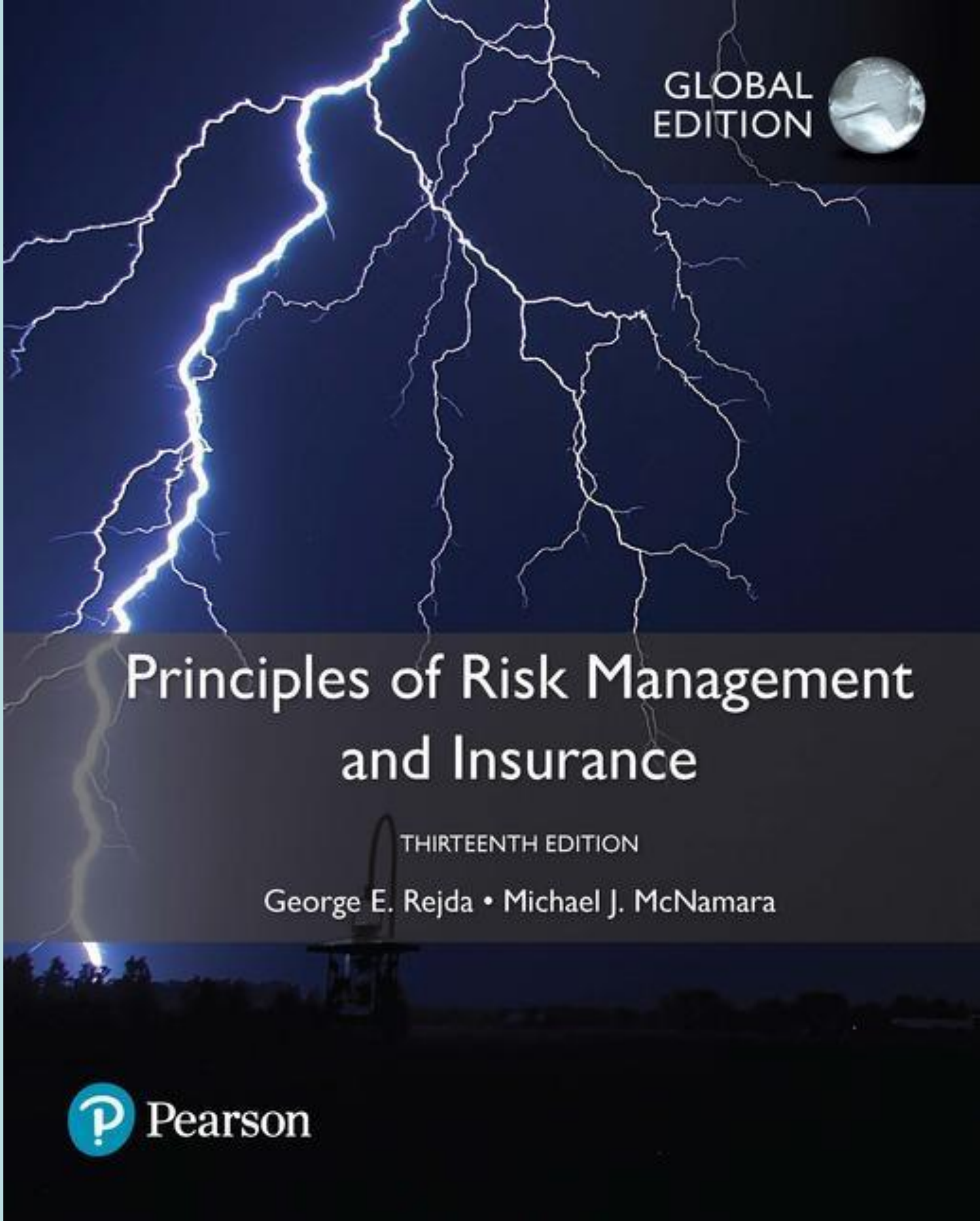
Chapter 2

Insurance and Risk



Agenda

- Definition and Basic Characteristics of Insurance
- Characteristics of An Ideally Insurable Risk
- Adverse Selection and Insurance
- Insurance and Gambling Compared
- Insurance and Hedging Compared
- Types of Insurance
- Benefits and Costs of Insurance to Society

Definition of Insurance

- Insurance is the pooling of fortuitous losses by transfer of such risks to insurers, who agree to indemnify insureds for such losses, to provide other pecuniary benefits on their occurrence, or to render services connected with the risk

Basic Characteristics of Insurance

- Pooling of losses
  - Pooling involves spreading losses incurred by the few over the entire group
  - Risk reduction is based on the Law of Large Numbers
  - According to the Law of Large Numbers, the greater the number of exposures, the more closely will the actual results approach the probable results that are expected from an infinite number of exposures.

Basic Characteristics of Insurance (Continued)

- Example of Pooling:
  - Two business owners own identical buildings valued at $50,000
  - There is a 10 percent chance each building will be destroyed by a peril in any year
  - Loss to either building is an independent event
  - Expected value and standard deviation of the loss for each owner is:

$$Expected\ loss = 0.90 * \$0 + 0.10 * \$50,000 = \$5,000$$

$$Standard\ deviation = \sqrt{0.90(0-\$5,000)^2 + 0.10(\$50,000-\$5,000)^2} = \$15,000$$

Basic Characteristics of Insurance (Continued)

- Example, continued:
  - If the owners instead pool (combine) their loss exposures, and each agrees to pay an equal share of any loss that might occur:

$$Expected\ loss = 0.81*\$0+0.09*\$25,000+0.09*\$25,000+0.01*\$50,000$$
$$= \$5,000$$

$$Standard\ deviation = \sqrt{0.81(0-\$5,000)^2 + (2)(0.09)(\$25,000-\$5,000)^2 + 0.01(\$50,000-\$5,000)^2}$$
$$= \$10,607$$

  - As additional individuals are added to the pool, the standard deviation continues to decline while the expected value of the loss remains unchanged

Basic Characteristics of Insurance (Continued)

- Payment of fortuitous losses
  - A <u>fortuitous loss</u> is one that is unforeseen, unexpected, and occur as a result of chance
- Risk transfer

A pure risk is transferred from the insured to the insurer, who typically is in a stronger financial position to pay the loss than the insured

- Indemnification
  - The insured is restored to his or her approximate financial position prior to the occurrence of the loss

Characteristics of an Ideally Insurable Risk

- Large number of exposure units
  - to predict average loss based on the law of large numbers
- Accidental and unintentional loss
  - to assure random occurrence of events
- Determinable and measurable loss
  - to determine how much should be paid

Characteristics of an Ideally Insurable Risk (Continued)

- No catastrophic loss
  - to allow the pooling technique to work
  - exposures to catastrophic loss can be managed

` Reinsurance

` dispersing their coverage over a large geographical area.

` financial instruments

average frequency and the average severity

- Calculable chance of loss
  - to establish a premium that is sufficient to pay all claims and expenses and yields a profit during the policy period

Characteristics of an Ideally Insurable Risk (Continued)

- Economically feasible premium
  - so people can afford to purchase the policy
  - For insurance to be an attractive purchase, the premiums paid must be substantially less than the face value, or amount, of the policy
- Based on these requirements:
  - Most personal, property and liability risks can be insured
  - Market risks, financial risks, production risks and political risks are difficult to insure

Exhibit 2.1 Fire as an Insurable Risk

Requirements	*Does the risk of fire satisfy the requirements?*
1. Large number of exposure units	Yes. Numerous exposure units are present.
2. Accidental and unintentional loss	Yes. With the exception of arson, most fire losses are accidental and unintentional.
3. Determinable and measurable loss	Yes. If there is disagreement over the amount paid, a property insurance policy has provisions for resolving disputes.
4. No catastrophic loss	Yes. Although catastrophic fires have occurred, all exposure units normally do not burn at the same time.
5. Calculable chance of loss	Yes. Chance of fire can be calculated, and the average severity of a fire loss can be estimated in advance.
6. Economically feasible premium	Yes. Premium rate per $100 of fire insurance is relatively low.

Exhibit 2.2 Unemployment as an Insurable Risk

Requirements	*Does the risk of unemployment satisfy the requirements?*
1. Large number of exposure units	Not completely. Although there are a large number of employees, predicting unemployment is often difficult because of the different types of unemployment and different types of labor.
2. Accidental and unintentional loss	Not always. Some unemployment is due to individuals who voluntarily quit their jobs.
3. Determinable and measurable loss	Not completely. The level of unemployment can be determined, but the measurement of loss may be difficult. Most unemployment is involuntary because of layoffs or because workers have completed temporary jobs. However, some unemployment is voluntary; workers voluntarily change jobs because of higher wages, a change in careers, family obligations, relocation to another state, or other reasons.
4. No catastrophic loss	No. A severe national recession or depressed local business conditions in a town or city could result in a catastrophic loss.
5. Calculable chance of loss	Not completely. The different types of unemployment in specific occupations can make it difficult for actuaries to estimate the chance of loss accurately.
6. Economically feasible premium	Not completely. Adverse selection, moral hazard, policy design, and the potential for a catastrophic loss could make the insurance too expensive to purchase. Some plans, however, will pay unemployment benefits in certain cases where the unemployment is involuntary, and the loss payments are relatively small, such as waiver of life insurance premiums for six months, or payment of credit card minimum payments for a limited period.

Adverse Selection and Insurance

- Adverse selection is the tendency of persons with a higher-than-average chance of loss to seek insurance at standard rates
- If not controlled by underwriting, adverse selection results in higher-than-expected loss levels
- Adverse selection can be controlled by:
  - careful underwriting (selection and classification of applicants for insurance)
  - policy provisions (e.g., suicide clause in life insurance)

Insurance vs. Gambling

Insurance

- Handles an already existing pure risk
- Is always socially productive:
  - both parties have a common interest in the prevention of a loss

Gambling

- Creates a new speculative risk
- Is not socially productive
  - The winner's gain comes at the expense of the loser

Insurance vs. Hedging

Insurance

- Risk is transferred by a contract
- Involves the transfer of pure (insurable) risks
- Moral hazard and adverse selection are more severe problems for insurers

Hedging

- Risk is transferred by a contract
- Involves risks that are typically uninsurable
- Fewer problems of moral hazard and adverse selection for entities who buy or sell futures contracts

Types of Private Insurance

- Life and Health

The benefits pay for funeral expenses, uninsured medical bills, estate taxes, and other expenses.

  - Life insurance pays death benefits to beneficiaries when the insured dies
  - Health insurance covers medical expenses because of sickness or injury

Medical expense plans pay for hospital and surgical expenses, physician fees, prescription drugs, and a wide variety of additional medical costs

health insurance industry overall is highly specialized and controlled by a relatively small number of insurers.

Types of Private Insurance (Continued)

- Property and Liability
  - Property insurance indemnifies property owners against the loss or damage of real or personal property
  - Liability insurance covers the insured's legal liability arising out of property damage or bodily injury to others, legal defense costs
  - Casualty insurance refers to insurance that covers whatever is not covered by fire, marine, and life insurance

Types of Private Insurance (Continued)

- Private insurance coverages can be grouped into two major categories
  - Personal lines: coverages that insure the real estate and personal property of individuals and families or provide protection against legal liability
  - Commercial lines: coverages for business firms, nonprofit organizations, and government agencies

Types of Government Insurance

- Social Insurance Programs
  - Financed entirely or in large part by contributions from employers and/or employees
  - Benefits are heavily weighted in favor of low-income groups
  - Eligibility and benefits are prescribed by statute
  - Examples: Social Security, Unemployment, Workers Comp
- Other Government Insurance Programs
  - Found at both the federal and state level
  - Examples:Federal flood insurance, state health insurance pools

Social Benefits of Insurance

- Indemnification for Loss
- Reduction of Worry and Fear
- Source of Investment Funds
- Loss Prevention
- Enhancement of Credit

Social Costs of Insurance

- Cost of Doing Business
  - Insurers consume scarce economic resources—land, labor, capital, and business enterprise—in providing
  - insurance to society
- Fraudulent Claims
- Inflated Claims

Higher premiums to cover additional losses reduce disposable income and consumption of other goods and services