FN241: Session 1
Introduction to Risk Management and Insurance

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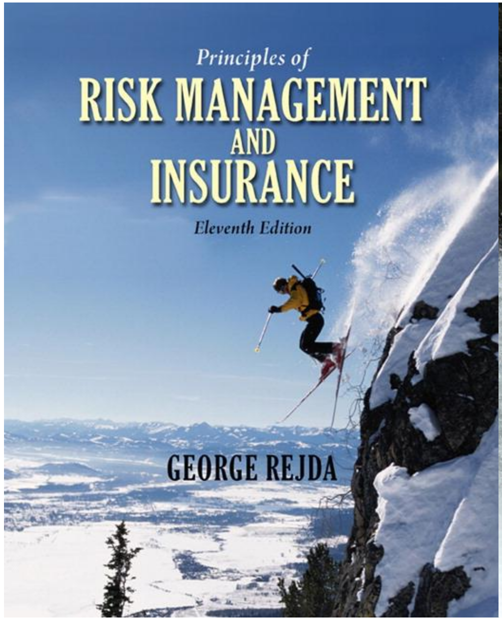
Bachelor of Economics, International Program

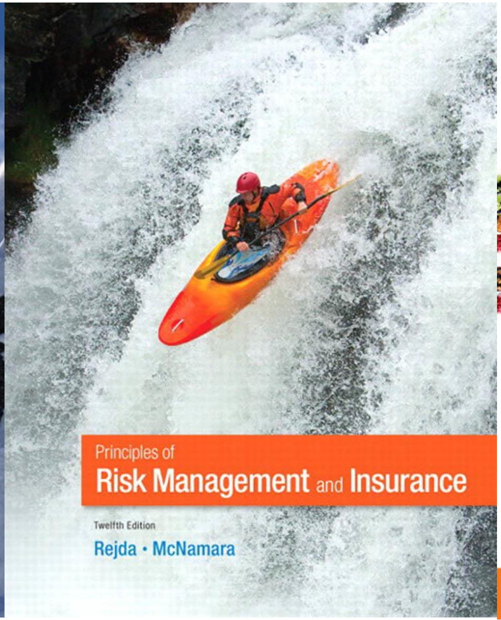
Thammasat University

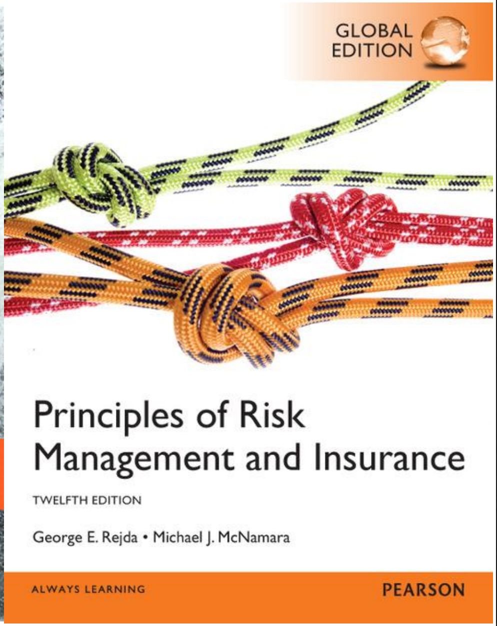
Introduction to Course

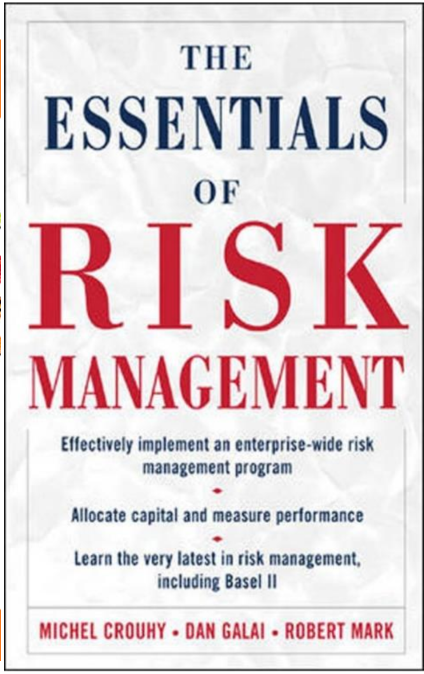
Course Requirements and Materials

- George, E. Rejda, and Michael McNamara, “Principal of Risk Management and Insurance”, Pearson; 12th Edition (2013).
- Crouhy, Michel, Dan Galai, and Robert Mark, “The Essentials of Risk Management”, McGraw-Hill Education: 2nd Edition (2014)









Course Assessment

Assignment and quiz	20%
Term project*	10%
Presentation*	10%
Midterm exam	30%
Final exam	30%

Note that we have term project and presentation in the last 2 sessions of this course. Your project must incorporate key concept of risk management and insurance into the analysis. Details will be discussed later in class.

Insurance vs. Finance

Actuarial Science Meets Financial Economics

Buhlmann's classifications of actuaries

- Actuaries of the first kind - Life
  - Deterministic calculations
- Actuaries of the second kind - Casualty
  - Probabilistic methods
- Actuaries of the third kind - Financial
  - Stochastic processes

Similarities

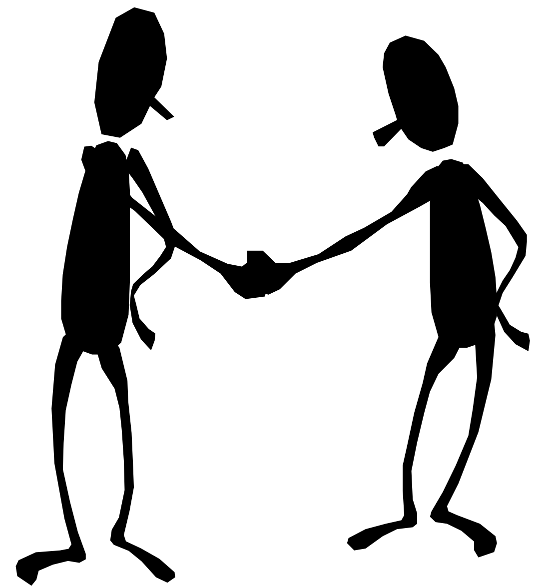
Both Actuaries and Financial Economists:

Are mathematically inclined

Address monetary issues

Incorporate risk into calculations

Use specialized languages



Different Approaches

Risk

Interest Rates

Profitability

Valuation

Risk

Insurance

- Pure risk - Loss/No loss situations
- Law of large numbers

Finance

- Speculative risk - Includes chance of gain
- Portfolio risk

Interest Rates

Insurance

- One dimensional value
- Constant
- Conservative

Finance

- Multiple dimensions
- Market versus historical
- Stochastic

Profitability

Insurance

- Profit margin on sales
- Worse yet - underwriting profit margin that ignores investment income

Finance

- Rate of return on investment

Valuation

Insurance

- Statutory value
  - Amortized values for bonds
  - Ignores time value of money on loss reserves

Finance

- Market value
- Difficulty in valuing non-traded items

Risk in Our Society

Key concept …

- Meaning of Risk
- Chance of Loss
- Peril and Hazard
- Basic Categories of Risk
- Types of Pure Risk
- Burden of Risk on Society
- Methods of Handling Risk

Meaning of Risk

- Risk: Uncertainty concerning the occurrence of a loss
- **Objective Risk vs. Subjective Risk**
  - Objective risk is defined as the relative variation of actual loss from expected loss
    - It can be statistically calculated using a measure of dispersion, such as the standard deviation
  - Subjective risk is defined as uncertainty based on a person's mental condition or state of mind
    - Two persons in the same situation may have different perceptions of risk
    - High subjective risk often results in conservative behavior

Chance of Loss

- **Chance of loss:** The probability that an event will occur
- **Objective Probability vs. Subjective Probability**
  - Objective probability refers to the long-run relative frequency of an event assuming an infinite number of observations and no change in the underlying conditions
    - It can be determined by deductive or inductive reasoning
  - Subjective probability is the individual's personal estimate of the chance of loss
    - A person's perception of the chance of loss may differ from the objective probability

Peril and Hazard

- A **peril** is defined as the cause of the loss
  - In an auto accident, the collision is the peril
- A **hazard** is a condition that increases the chance of loss
  - Physical hazards are physical conditions that increase the chance of loss (icy roads, defective wiring)
  - Moral hazard is dishonesty or character defects in an individual, that increase the chance of loss (faking accidents, inflating claim amounts)
  - Morale Hazard is carelessness or indifference to a loss because of the existence of insurance (leaving keys in an unlocked car)
  - Legal Hazard refers to characteristics of the legal system or regulatory environment that increase the chance of loss (large damage awards in liability lawsuits)

Basic Categories of Risk

- **Pure and Speculative Risk**
  - A <u>pure risk</u> is one in which there are only the possibilities of loss or no loss (earthquake)
  - A <u>speculative risk</u> is one in which both profit or loss are possible (gambling)
- **Fundamental and Particular Risk**
  - A <u>fundamental risk</u> affects the entire economy or large numbers of persons or groups (hurricane)
  - A <u>particular risk</u> affects only the individual (car theft)
- **Enterprise Risk**
  - <u>Enterprise risk</u> encompasses all major risks faced by a business firm, which include: pure risk, speculative risk, strategic risk, operational risk, and financial risk

Example: The 10 Most Costly Hurricanes in the United States ($ millions)

				Estimated insured loss[a]	
Rank	Date	Location	Hurricane	Dollars When Occurred	In 2005 Dollars[b]
1	Aug. 25–29, 2005	AL, FL, GA, LA, MS, TN	Katrina	$40,600	$40,600
2	Aug. 23–24, 25–26, 1992	FL, LA, MS	Andrew	15,500	21,576
3	Oct. 24, 2005	FL	Wilma	10,300	10,300
4	Aug. 13–15, 2004	FL, NC, SC	Charley	7,475	7,728
5	Sep. 16–21, 2004	AL, FL, GA, OH, PA, NY, NC, 8 other states	Ivan	7,110	7,351
6	Sep. 17–18, 21–22, 1989	U.S. Virgin Islands, PR, GA, SC, NC, VA	Hugo	4,195	6,607
7	Sep. 20–26, 2005	AL, AR, FL, LA, MS, TN, TX	Rita	5,000	5,000
8	Sep. 5, 2004	FL, GA, SC, NC, NY	Frances	4,595	4,751
9	Sep. 15–25, 2004	PR, FL, PA, GA, SC, NY	Jeanne	3,440	3,557
10	Sep. 21–28, 1998	PR, U.S. Virgin Islands, AL, FL, LA, MS	Georges	2,900	3,475

[a] Property coverage only.
[b] Adjusted to 2005 dollars by the Insurance Information Institute.

SOURCE: ISO; Insurance Information Institute, *Insurance Factbook*.

Types of Pure Risks

- **Personal risks** involve the possibility of a loss or reduction in income, extra expenses or depletion of financial assets:
  - Premature death of family head
  - Insufficient income during retirement
    - Most workers are not saving enough for a comfortable retirement
  - Poor health (catastrophic medical bills and loss of earned income)
  - Involuntary unemployment

Example: Reported Total Savings and Investments among Those Responding, by Age

(not including value of primary residence or defined benefit plans)

	Worker Age Group					
	All Workers	**Ages 25–34**	**Ages 35–44**	**Ages 45–54**	**Ages 55+**	**All Retirees**
Less than $10,000	39%	54%	34%	31%	36%	30%
$10,000–$24,999	14	19	15	13	6	12
$25,000–$49,999	12	11	14	14	8	14
$50,000–$99,999	12	7	16	12	12	11
$100,000–$149,999	5	1	7	5	7	7
$150,000–$249,999	6	3	5	10	5	6
$250,000–$499,999	6	1	5	8	13	12
$500,000 or more	6	4	4	8	13	10

SOURCE: Employee Benefit Research Institute, "Will More of Us Be Working Forever? The 2006 Confidence Survey," *EBRI Issue Brief, No. 292,* Figure 3, April 2006.

Types of Pure Risks

- **Property risks** involve the possibility of losses associated with the destruction or theft of property:
  - Physical damage to home and personal property from fire, tornado, vandalism, or other causes
- **Direct loss vs. indirect loss**
  - A direct loss is a financial loss that results from the physical damage, destruction, or theft of the property, such as fire damage to a restaurant
  - An indirect loss results indirectly from the occurrence of a direct physical damage or theft loss, such as lost profits due to inability to operate after a fire

Types of Pure Risks

- **Liability risks** involve the possibility of being held liable for bodily injury or property damage to someone else
  - There is no maximum upper limit with respect to the amount of the loss
  - A lien can be placed on your income and financial assets
  - Defense costs can be enormous

Burden of Risk on Society

- The presence of risk results in three major burdens on society:
  - In the absence of insurance, individuals would have to maintain large emergency funds
  - The risk of a liability lawsuit may discourage innovation, depriving society of certain goods and services
  - Risk causes worry and fear

Methods of Handling Risk

- Risk Control:
  - Avoidance
  - Loss control
  - Loss prevention refers to activities to reduce the frequency of losses
  - Loss reduction refers to activities to reduce the severity of losses
- Risk Financing:
  - Retention
    - An individual or firm retains all or part of a loss
    - Loss retention may be active or passive
  - Noninsurance transfers
    - A risk may be transferred to another party through contracts, hedging, or incorporation
  - Insurance

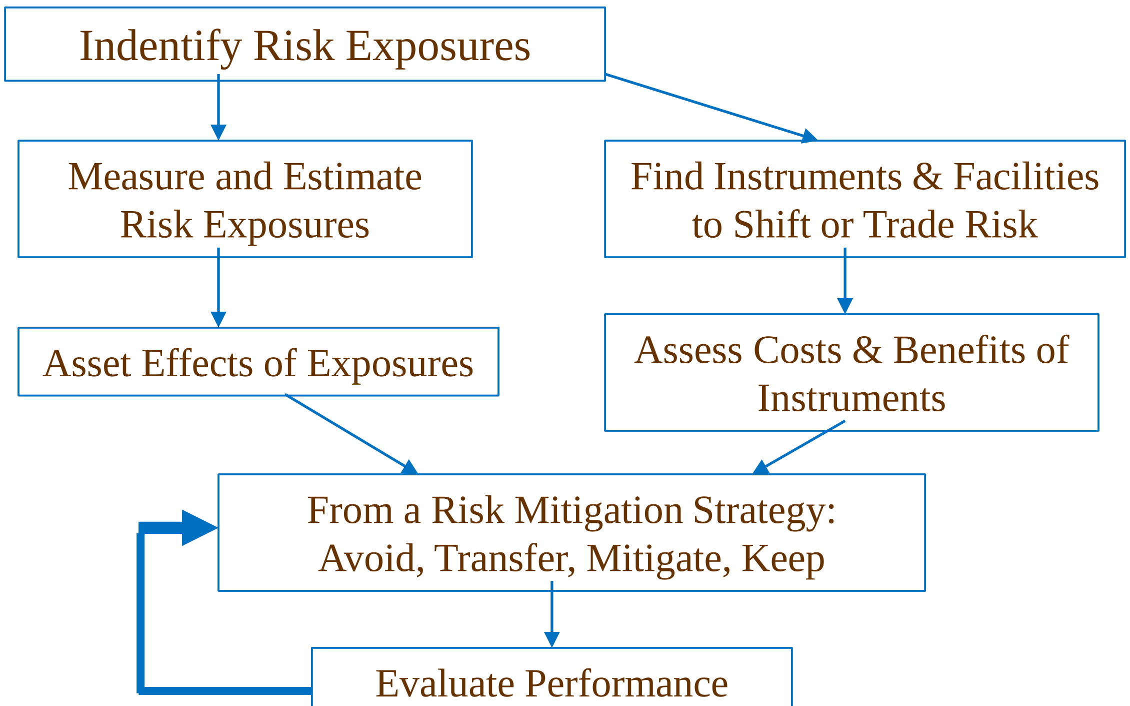
Why Manage Risk?

- **Hedging Irrelevance Proposition:**
  - When the cost of bearing risk is same for firms and individuals, hedging cannot add value!

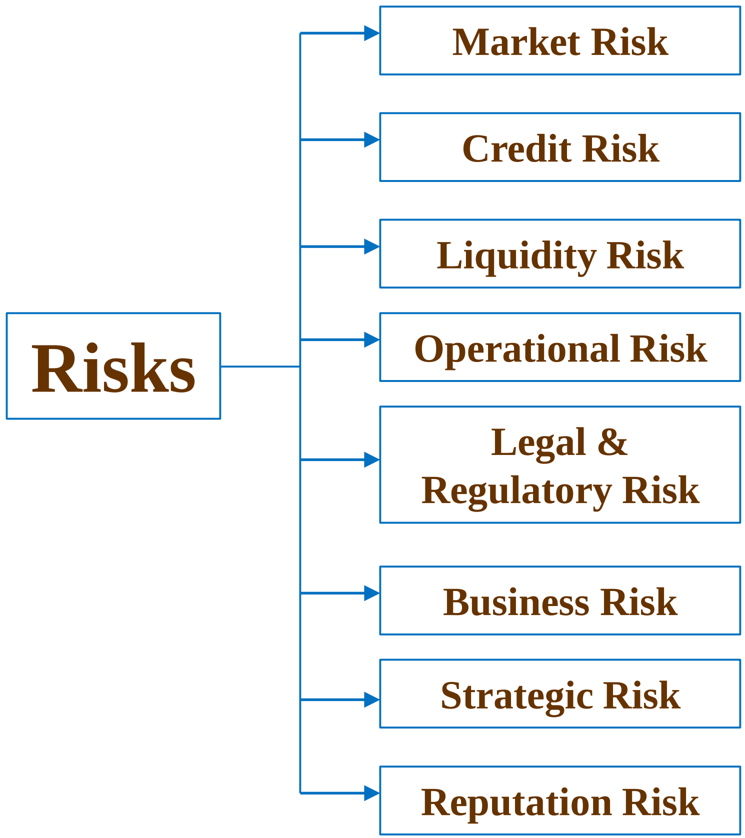
- Risk management is only beneficial only if firms can perform hedging at lower cost than their shareholders.

A Helicopter View

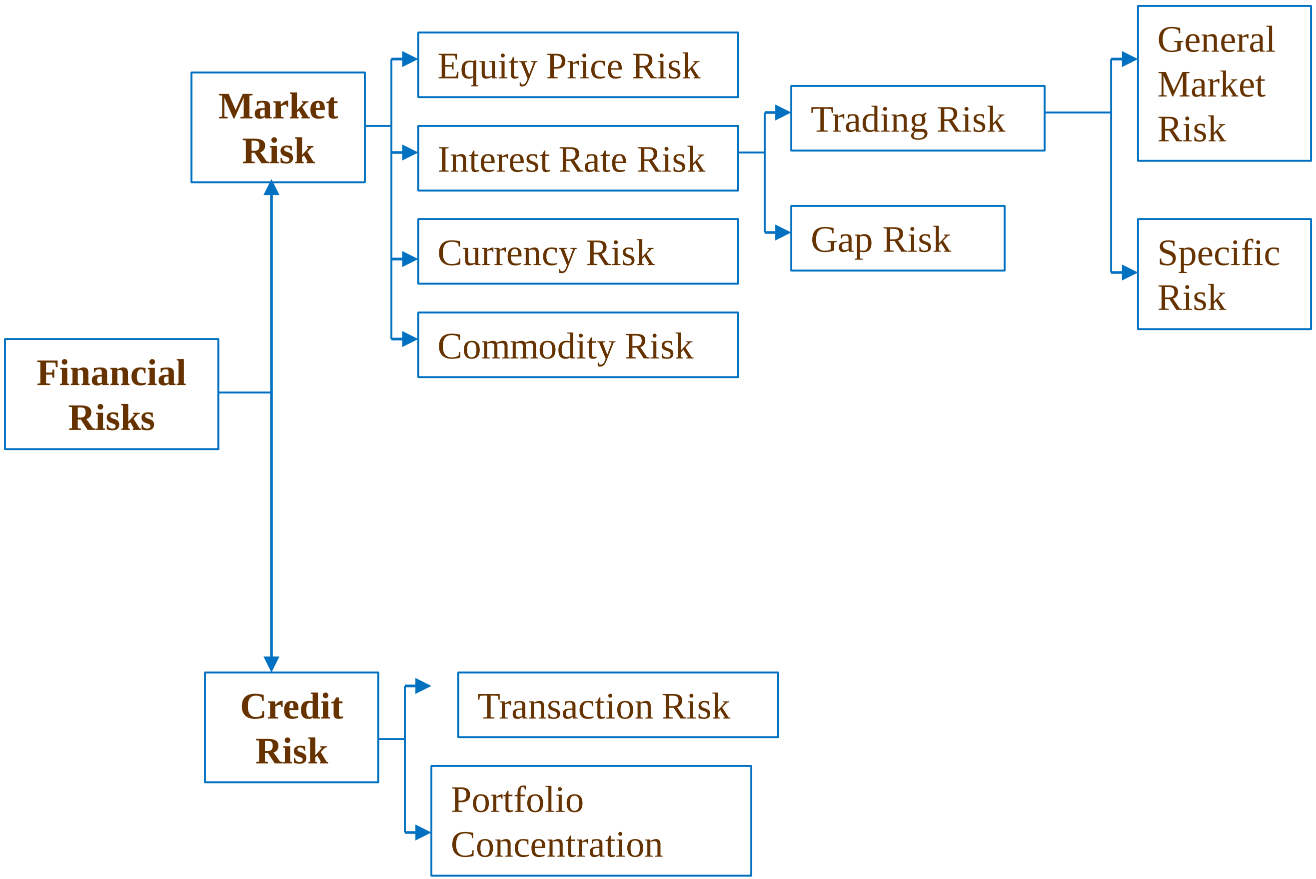
Uncertainty is a fact of life, so there is no crystal ball! But risk can be managed!



Topology of Risk



Financial Risks



Insurance and Risk

Key concept …

- Definition and Basic Characteristics of Insurance
- Requirements of an Insurable Risk
- Adverse Selection and Insurance
- Insurance vs. Gambling
- Insurance vs. Hedging
- 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
  - Spreading losses incurred by the few over the entire group
  - Risk reduction based on the Law of Large Numbers
- Payment of fortuitous losses
  - Insurance pays for losses that are 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
- Indemnification
  - The insured is restored to his or her approximate financial position prior to the occurrence of the loss

Requirements of an Insurable Risk

- **Large number of exposure units**
  - to predict average loss
- **Accidental and unintentional loss**
  - to control moral hazard
  - to assure randomness
- **Determinable and measurable loss**
  - to facilitate loss adjustment
    - insurer must be able to determine if the loss is covered and if so, how much should be paid.

Requirements of an Insurable Risk

- **No catastrophic loss**
  - to allow the pooling technique to work
  - exposures to catastrophic loss can be managed by:
    - dispersing coverage over a large geographic area
    - using reinsurance
    - catastrophe bonds
- **Calculable chance of loss**
  - to establish an adequate premium

Requirements of an Insurable Risk

- **Economically feasible premium**
  - so people can afford to buy
  - Premium must be substantially less than the face value 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

Example: Risk of 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.

Example: Risk of 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 difficult because of the different types of unemployment and labor.
2. Accidental and unintentional loss	No. A large proportion of 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 is difficult. Some unemployment is involuntary; however, some unemployment is voluntary.
4. No catastrophic loss	No. A severe national recession or depressed local business conditions could result in a catastrophic loss.
5. Calculable chance of loss	No. The different types of unemployment generally are too irregular to estimate the chance of loss accurately.
6. Economically feasible premium	No. Adverse selection, moral hazard, and the potential for a catastrophic loss could make the premium unaffordable.

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, adverse selection result 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

- Insurance is a technique for handing an already existing pure risk
- Insurance is socially productive:
  - both parties have a common interest in the prevention of a loss

Gambling

- Gambling creates a new speculative risk
- Gambling 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
- Insurance involves the transfer of insurable risks
- Insurance can reduce the objective risk of an insurer through the Law of Large Numbers

Hedging

- Risk is transferred by a contract
- Hedging involves risks that are typically uninsurable
- Hedging does not result in reduced risk

Types of Insurance

- Private Insurance
  - Life and Health
  - Property and Liability
- Government Insurance
  - Social Insurance
  - Other Government Insurance

Private Insurance

- Life and Health
  - Life insurance pays death benefits to beneficiaries when the insured dies
  - Health insurance covers medical expenses because of sickness or injury
  - Disability plans pay income benefits
- 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
  - Casualty insurance refers to insurance that covers whatever is not covered by fire, marine, and life insurance

Private Insurance

- 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

Example: Property and Casualty Insurance Coverages

1. Personal lines
   - Private passenger auto insurance
   - Homeowners insurance
   - Personal umbrella liability insurance
   - Boatowners insurance
2. Commercial lines
   - Fire and allied lines insurance
   - Commercial multiple-peril insurance
   - General liability insurance
   - Workers compensation insurance
   - Commercial auto insurance
   - Accident and health insurance
   - Inland marine and ocean marine insurance
   - Professional liability insurance
   - Equipment breakdown insurance (formerly called boiler and machinery insurance)
   - Fidelity and surety bonds
   - Crime insurance
   - Other miscellaneous lines

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
  - Contributes to family and business stability
- Reduction of Worry and Fear
  - Insureds are less worried about losses
- Source of Investment Funds
  - Premiums may be invested, promoting economic growth
- Loss Prevention
  - Insurers support loss-prevention activities that reduce direct and indirect losses
- Enhancement of Credit
  - Insured individuals are better credit risks than individuals without insurance

Social Costs of Insurance

- Cost of Doing Business
  - Insurers consume resources in providing insurance to society
  - An <u>expense loading</u> is the amount needed to pay all expenses, including commissions, general administrative expenses, state premium taxes, acquisition expenses, and an allowance for contingencies and profit
- Fraudulent and Inflated Claims
  - Payment of fraudulent or inflated claims results in higher premiums to all insureds, thus reducing disposable income and consumption of other goods and services

Question?