

**FN241: Session 1**  
**Introduction to Risk Management  
and Insurance**

**Winai Homsombat**

Bachelor of Economics, International Program

Thammasat University

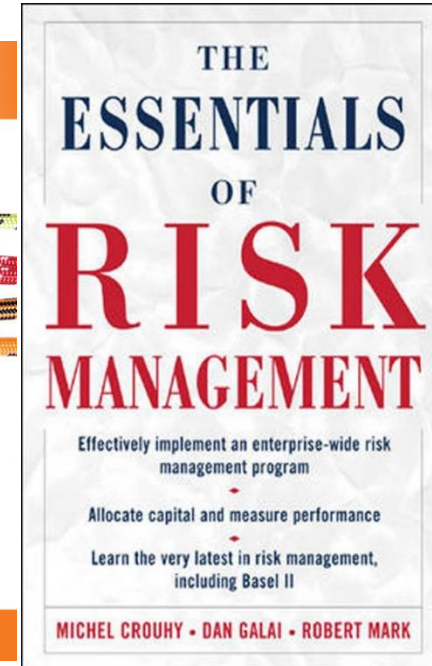
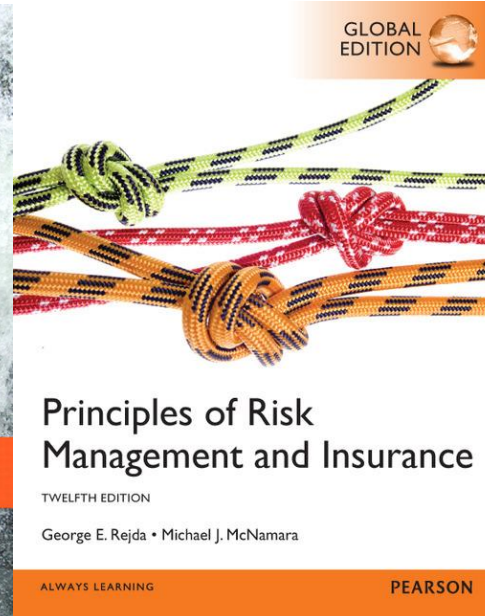
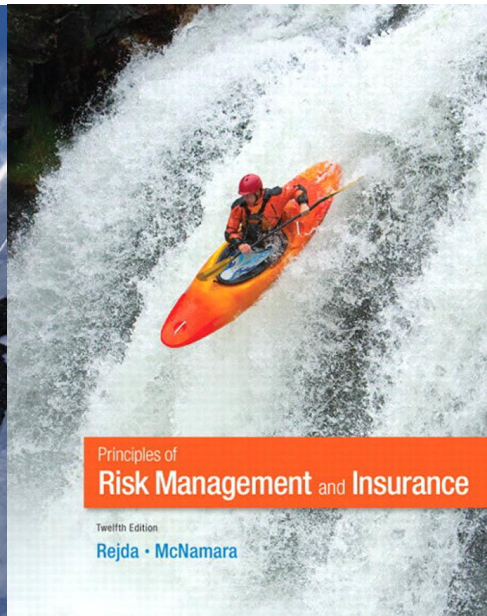
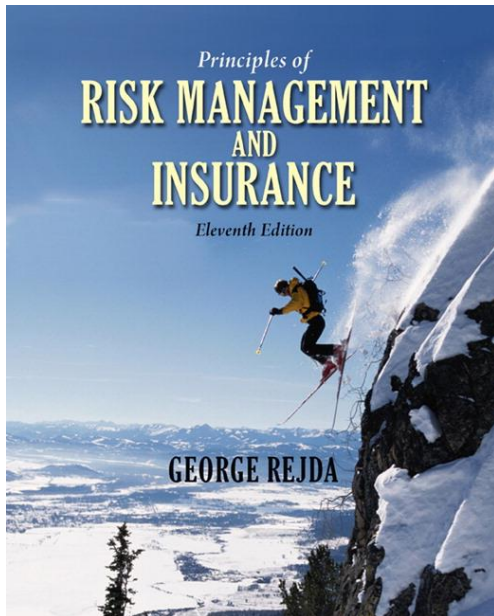
# Introduction to Course

# Tentative Teaching Schedule

Session	Topics
1	Introduction to Course Introduction to Risk Management and Insurance
2	Probability Concept Risk and Its Treatment
3	Corporate Governance and Risk Management Introduction to Probability Introduction to Random Variables
4 - 6	The Theory of Risk and Return The Insurance Mechanism
7	Fundamental of Risk Management in Insurance
<b>8</b>	<b>MIDTERM EXAMINATION</b>
9	Introduction to Enterprise Risk Management (ERM)
10	Legal Principles in Insurance
11-12	Analysis of Insurance Contracts The liability risk Life Insurance
13	Corporate Risk Management
14	Value at Risk Additional Topics in Risk Management
15 - 16	Term Project Presentation
<b>17</b>	<b>FINAL EXAMINATION</b>

# 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

<b>Assignment and quiz</b>	<b>20%</b>
<b>Term project*</b>	<b>10%</b>
<b>Presentation*</b>	<b>10%</b>
<b>Midterm exam</b>	<b>30%</b>
<b>Final exam</b>	<b>30%</b>

*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

Actuaries of the second kind - Casualty

Actuaries of the third kind - Financial

# Similarities

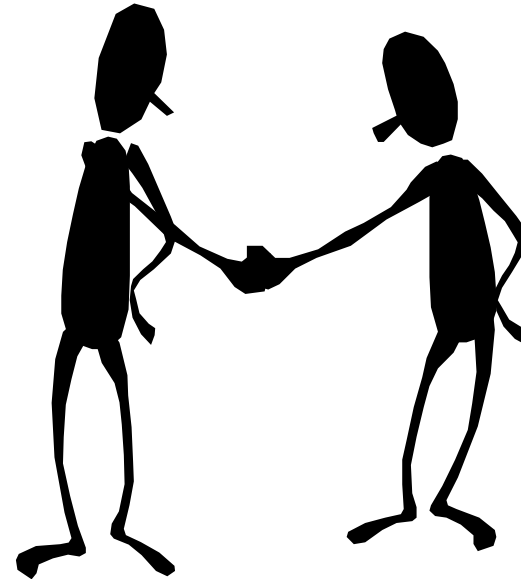
## **Both Actuaries and Financial Economists:**

Are mathematically inclined

Address monetary issues

Incorporate risk into calculations

Use specialized languages



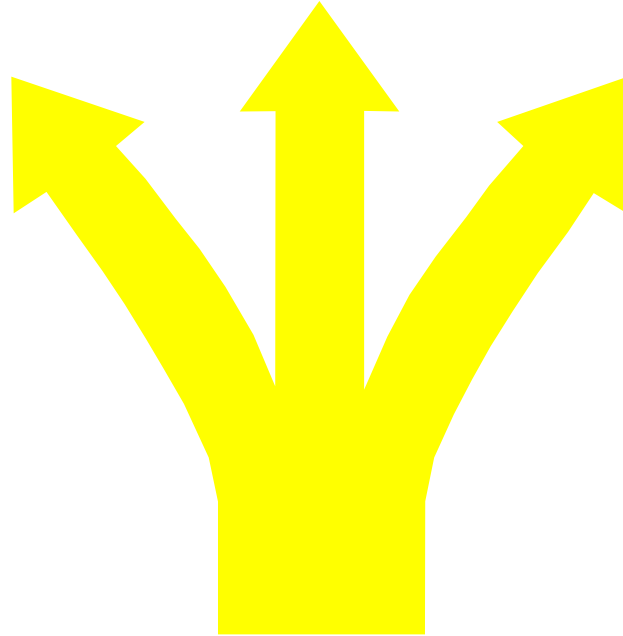
# Different Approaches

**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 pure risk is one in which there are only the possibilities of loss or no loss (earthquake)
- A speculative risk is one in which both profit or loss are possible (gambling)

- **Fundamental and Particular Risk**

- A fundamental risk affects the entire economy or large numbers of persons or groups (hurricane)
- A particular risk affects only the individual (car theft)

- **Enterprise Risk**

- Enterprise risk 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)

Rank	Date	Location	Hurricane	Estimated insured loss <sup>a</sup>	
				Dollars When Occurred	In 2005 Dollars <sup>b</sup>
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

<sup>a</sup>Property coverage only.  
<sup>b</sup>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

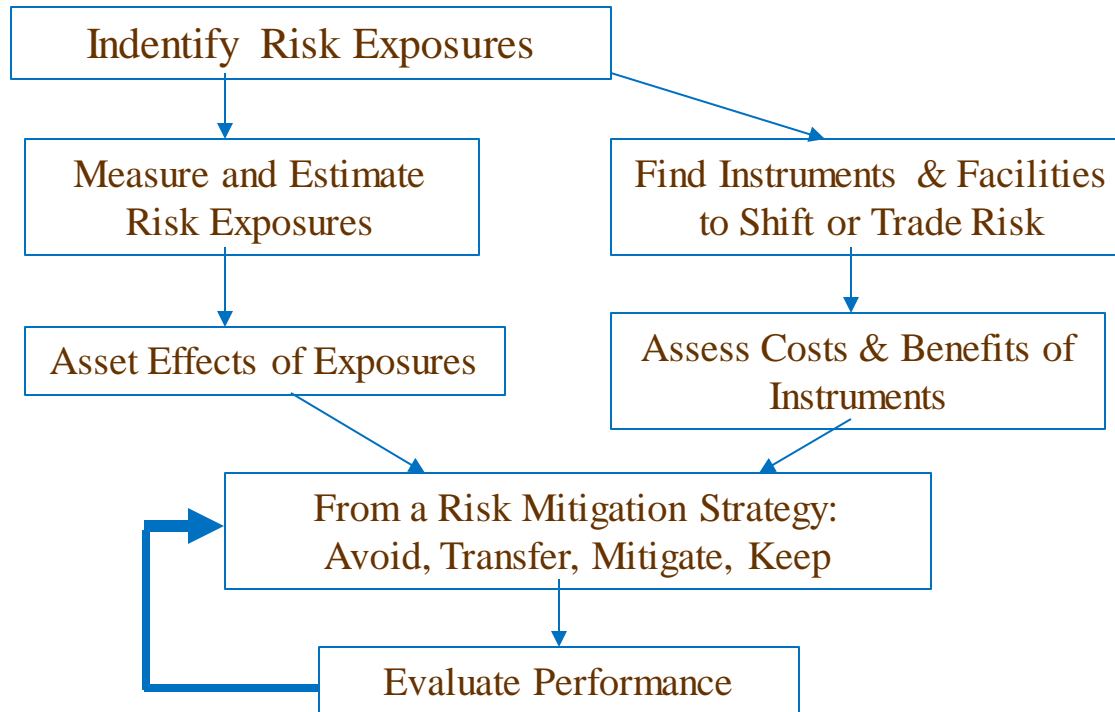
- **Property risks** involve the possibility of losses associated with the destruction or theft of property:
  - Physical damage to home and personal property from fire, tornado, vandalism, or other causes
- **Direct loss vs. indirect loss**
  - A direct loss is a financial loss that results from the 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

# A Helicopter View

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



# 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

# **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

---

<i>Requirements</i>	<i>Does the risk of fire satisfy the requirements?</i>
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	

---

# Example: Risk of Unemployment as an Insurable Risk

---

<i>Requirements</i>	<i>Does the risk of unemployment satisfy the requirements?</i>
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	

---

# 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 handling 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

# 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

**Question?**