FN241
Risk Management and Insurance
Risk and Its Treatment

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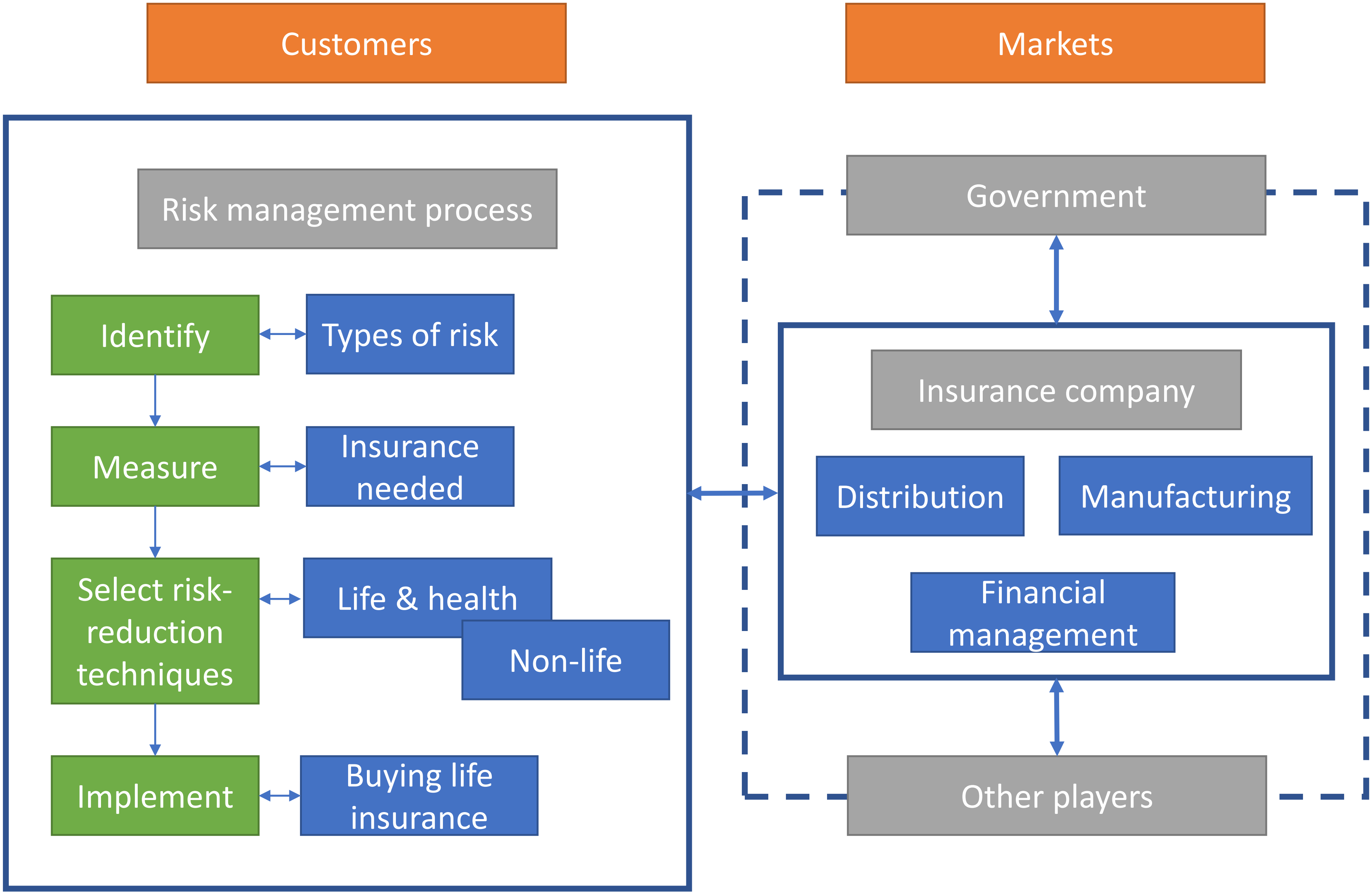
This course is **not** about…

- Financial risk management, e.g. stock price risk, currency risk, interest risks
- Financial risk and return, portfolio management, Capital Asset Pricing Model (CAPM), Fixed-income analysis and basic derivatives (they will be in FN312)
- Value-at-risk (VaR), derivatives, option pricing, hedging, delta, gamma (you will learn more about these concepts in FN415 and FN452)
- Cost of capitals, capital structure, dividend policies, valuation, IPOs, M&A, LBO, Company restructuring (They will be in other corporate finance courses - FN311, FN413, FN428)

This course is about…

- Pure risk management (3 classes), insurance products – life & health insurance and non-life insurance (6 classes or more!), and insurance operation management (4 classes)
- So I guess this course is probably useful to you if…
  - You want to know more about **risks in broader sense**
  - You want to understand more about **various kinds of insurance products** and how you can use them to protect particular pure and diversifiable risks
  - You want to understand **how insurance company functions** (which is totally different from other FIs)
  - Any interesting products and trends in insurance industry which you will learn from your friends



Customers
Markets
Risk management process
Identify
Types of risk
Measure
Insurance needed
Select risk-reduction techniques
Life & health
Non-life
Implement
Buying life insurance
Government
Insurance company
Distribution
Manufacturing
Financial management
Other players

Risk and its treatment

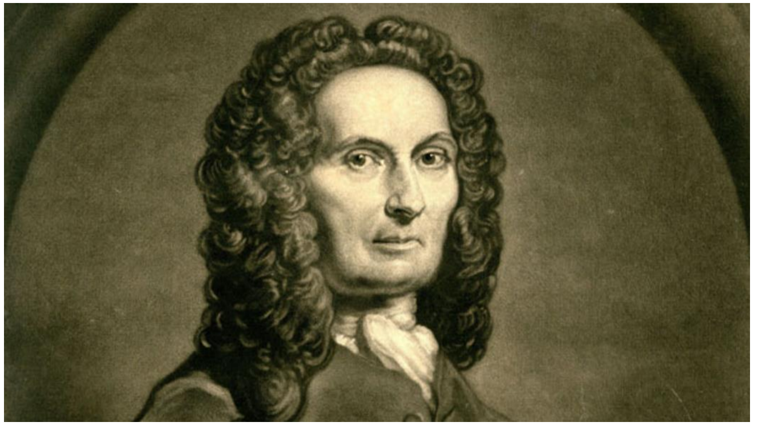
- History of risk
- Risk definition, chance of loss, and objective risk
- Peril and hazard
- Classification of risk
- Major personal risks and commercial risks
- Burden of risk on society

History of risk

- The word “risk” comes from ancient Italian *risicare*, which means “to dare” (ท้าทาย). In that sense, risk is an option, and not fate
- Our freedom of choice depends on the actions we dare to take
- The study of risks began in the Renaissance, when people released themselves from the constraints of the past and openly challenged the sacred beliefs
- It was an era when the world was discovered and greatly explored, and a lot of resources were found

(Some) Risk Milestones

- 1733 The development of the normal probability distribution by Abraham de **Moivre**, a French Protestant transplanted to England who never held a proper academic position



- He demonstrated the normal distribution – also known as the bell curve – and discovered the concept of standard deviation

(Some) Risk Milestones

- In 1738, Daniel **Bernoulli** defined for the first time the systematic process by which most people make choices and come to conclusions
- He proposed the idea that the satisfaction that comes from a slight increase in richness will be inversely proportional to the amount of goods possessed before
- Application…
  - Why people are usually risk averse and
  - Why prices have to fall before investors/consumers can be persuaded to buy more

(Some) Risk Milestones

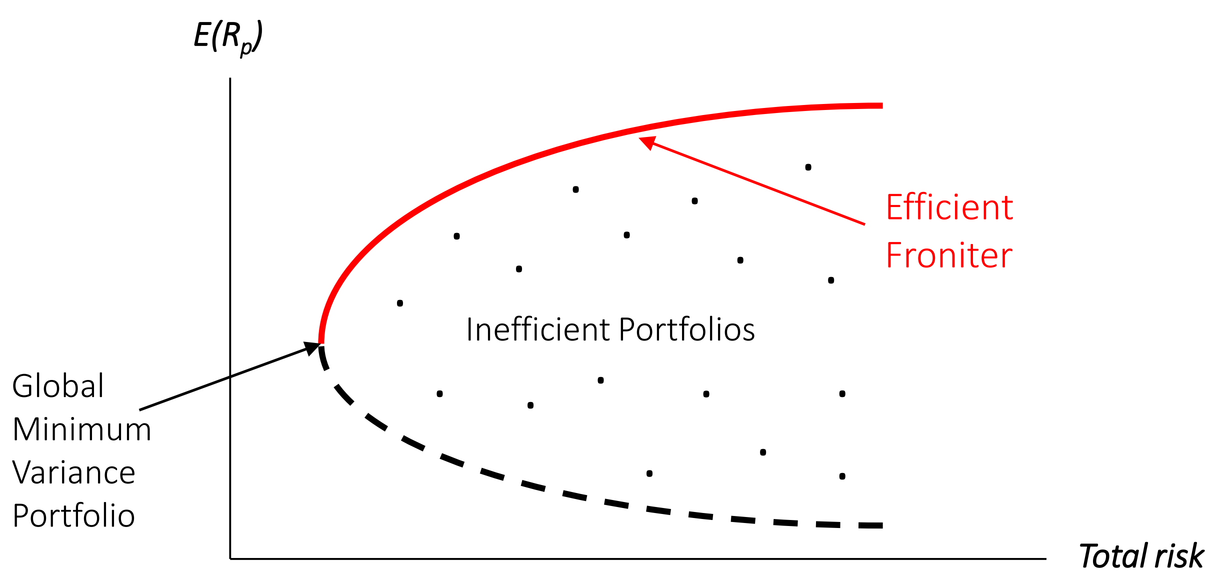
- 1877 Development of the concept of regression toward the mean, applied to human characteristics by Francis **Galton**

- 1900 Louis **Bachelier**'s doctoral dissertation, "The Theory of Speculation," laid the foundation for modern finance and provided the underpinnings for modern option pricing models

Source: https://www.bostonfed.org/economic/nerr/rr1997/spring/bkrv97_2.htm

Modern Risk Management

- The introduction of modern portfolio theory in a 14 page paper titled **"Portfolio Selection“,** by Harry **Markowitz**, a graduate student in economics, in 1952



Modern Risk Management

- William **Sharpe**'s extension of Markowitz's insights into an understanding of the role of risk as a factor in determining in security prices, in a paper titled "Capital Asset Prices" or what we will know later as **CAPM** in 1964

- In 1973, the development of modern **option pricing theory** by Fischer **Black**, an academic nomad, and economist Myron **Scholes**, published in a paper that was first rejected by many academic journals.

Source: https://www.bostonfed.org/economic/nerr/rr1997/spring/bkrv97_2.htm

Different Definitions of Risk

- Risk (ความเสี่ยง): Uncertainty concerning the occurrence of a loss
- Loss Exposure (การเปิดรับความเสียหาย): Any situation or circumstance in which a loss is possible, regardless of whether a loss occurs
- Objective risk (ความเสี่ยงภัยเชิงวัตถุวิสัย): is defined as the relative variation of actual loss from expected loss
  - Objective risk can be statistically calculated by some measure of dispersion

Chance of Loss vs. Objective Risk

- Chance of loss is the probability that an event that causes a loss will occur
- Objective risk is the relative variation of actual loss from expected loss

The chance of loss may be identical for two different groups, but objective risk may be quite different!

City	# homes	Average # fires	Range	Chance of Fire	Objective Risk
Philadelphia	10,000	100	75 – 125	1%	25%
Los Angeles	10,000	100	90 - 110	1%	10%

Peril and Hazard

- A peril (ภัย) is defined as the cause of the loss
  - In an auto accident, the collision is the peril
- A hazard (ภาวะแห่งภัย) is a condition that increases the chance of loss
  - A physical hazard (ภาวะด้านกายภาพ) is a physical condition that increases the frequency or severity of loss
  - Moral hazard (ภาวะด้านศีลธรรม) is dishonesty or character defects in an individual that increase the frequency or severity of loss
  - Attitudinal Hazard (Morale Hazard) (ภาวะด้านจิตสำนึก) is carelessness or indifference to a loss, which increases the frequency or severity of a loss
  - Legal Hazard (ภาวะด้านกฎหมาย) refers to characteristics of the legal system or regulatory environment that increase the frequency or severity of loss

Classification of Risk

1. Pure and Speculative Risk
   - A pure risk (ความเสี่ยงที่แท้จริง) is a situation in which there are only the possibilities of loss or no loss (e.g. earthquake)
   - A speculative risk (ความเสี่ยงที่มุ่งเน้นกำไร) is a situation in which either profit or loss is possible (e.g. gambling, investment)

- Distinguishing points
  - Private insurers generally concentrate on insuring certain pure risk
  - The law of large numbers can be applied more easily to pure risks (except for gambling, where casino operators can apply this law efficiently)
  - Society is harmed if a pure risk is present whereas it may benefit from speculative risk

Classification of Risk

2 Diversifiable Risk and Non-diversifiable Risk

- A <u>diversifiable risk</u> affects only individuals or small groups (e.g. car theft). It is also called nonsystematic or particular risk.
  - can be reduced or eliminated by diversification

- A <u>non-diversifiable risk</u> affects the entire economy or large numbers of persons or groups within the economy (e.g. hurricane, war, rapid inflation, cyclical unemployment). It is also called systematic risk or fundamental risk.
  - Government assistance may be necessary to insure non-diversifiable risks.

Classification of Risk

3 Enterprise risk (ความเสี่ยงระดับองค์กร) encompasses all major risks faced by a business firm, which include: pure risk, speculative risk, strategic risk, operational risk, and financial risk

- Strategic Risk (ความเสี่ยงด้านกลยุทธ์) refers to uncertainty regarding the firm's financial goals and objectives.
- Operational risk (ความเสี่ยงด้านปฏิบัติการ) results from the firm's business operations.
- Financial Risk (ความเสี่ยงด้านการเงิน) refers to the uncertainty of loss because of adverse changes in commodity prices, interest rates, foreign exchange rates, and the value of money.

Classification of Risk

- Enterprise Risk Management (การบริหารความเสี่ยงระดับองค์กร) combines into a single unified treatment program all major risks faced by the firm
- As long as all risks are not perfectly correlated, the firm can offset one risk against another, thus reducing the firm's overall risk
- Treatment of financial risks requires the use of complex hedging techniques, financial derivatives, futures contracts and other financial instruments

Application question

- Several types of risk are present in the Thai economy. For each of the following, identify the type of risk that is present.
  a) The government alerts the nation of a possible attack by terrorists
  b) A house may be severely damaged in a fire
  c) A family head may be totally disabled in a plant explosion
  d) An investor purchases 100 shares of GOOGLE stock
  e) A river that periodically overflows may cause substantial property damage to thousands of homes
  f) Home buyers may be faced with higher mortgage payments if the Bank of Thailand (BOT) raises interest rates at its next meeting
  g) A worker on vacation plays the slot machines in a casino

* Adapted from Rejda and McNamara (2014)

Major Personal Risks

- Personal risks (ความเสี่ยงภัยส่วนบุคคล) are risks that directly affect an individual or family. They involve the possibility of a loss or reduction in income, extra expenses or depletion of financial assets, due to:
  1) Premature death of family head
     - The human life value of the family head is lost forever
     - Additional expenses may be incurred
     - Insufficient income for the family
     - Noneconomic costs e.g. emotional grief

Major Personal Risks

2) Insufficient income during retirement
    - Loss of income upon retirement
    - Not enough savings for a comfortable retirement

3) Poor health (catastrophic medical bills and loss of earned income)
    - Medical bills
    - Loss of income if disabled

Major Personal Risks

4) Involuntary unemployment – resulting from business cycle downswings, technological and structural changes in the economy
   - Workers lose their earned income and employer-sponsored health insurance benefits
   - Hours of work may be cut → insufficient income
   - Past savings and unemployment benefits may be exhausted

Major Personal Risks

- Property risks (ความเสี่ยงต่อทรัพย์สิน) involve the possibility of losses associated with the destruction or theft of property

- Direct loss vs. indirect loss
  - A direct loss (ความเสียหายโดยตรง) is a financial loss that results from the physical damage, destruction, or theft of the property, such as fire damage to a home
  - An indirect or consequential loss (ความเสียหายโดยอ้อมหรือความเสียหายต่อเนื่อง) is a financial loss that results indirectly from the occurrence of a direct physical damage or theft loss, e.g., the additional living expenses after a fire

Major Personal Risks

- Liability risks (ความเสี่ยงภัยตามความรับผิด) involve the possibility of being held legally 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 (สิทธิในการยึดครองทรัพย์สินผู้อื่น) may be placed (by the court) on your income and financial assets when you are legally liable for damage
  - Legal defense costs can be enormous

Major Commercial Risks

- Firms face a variety of pure risks that can have serious financial consequences if a loss occurs:
  - Property risks, such as damage to buildings, furniture and office equipment
  - Liability risks, such as suits for defective products, pollution, and sexual harassment
  - Loss of business income, when the firm must shut down for some time after a physical damage loss
    - Loss of business income while certain expenses may still continue
    - Extra expenses during restoration period
  - Other risks to firms include crime exposures, human resource exposures, foreign loss exposures, intangible property exposures, and government exposures

Burden of Risk on Society

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