國立臺北大學自然資源與環境管理研究所
九十七學年度第二學期
『環境災害與風險管理』課程講義（十五）

主題：Financial Risk Management and Insurance
財務風險管理與保險

● CATEGORIES OF RISK AND BUSINESS RISKS (Holmes, 2002; Handout 1)

    □ Categories of Risk (Holmes, 2002, pp.6-7): Strategic Risk, Business/Financial Risk, Program and Project Risk, Operational Risk, and Technological Risk

    □ Business Risks: Financial vs. Non-financial Risks

    □ How to Deal with Risk => Avoid, Reduce, Retain, Transfer, and Share

    □ Approaches to Managing Risk (Holmes, 2002, pp.8-9): Identification, Quantification, Managing/Responding, Monitoring/Controlling

    □ Key Measures for Risk Management (Holmes, 2002, pp.9-10): sensitivity, volatility, downside measures such as VaR (Value at Risk)

    □ The e-Dimension and Global Dimension; Key Concepts related to Risk Management

● FINANCIAL RISK MANAGEMENT (Jorion, 2003; Handout 2)

    □ Bond Fundamentals => Engineering Economics

    □ Capital Market => Derivatives

      ⇨ Derivatives and Markets: Options, Securities… Equity, Commodities Markets…

      ⇨ Sources of Risk: Currency, Fixed-Income, Equity, and Commodity

    □ Credit Risk Management

      ⇨ Estimate default probabilities, credit exposures, recovery rates

      ⇨ Measuring expected credit loss and Measuring credit VaR

    □ Operational and Integrated Risk Management

    □ Legal, Accounting, and Tax Risk Management

TABLE 5-1 Global Derivatives Markets - 1995-2001
(Billions of U.S. Dollars)

|	Notional Amounts	
	March 1995	Dec. 2001
OTC Instruments	47,530	111,115
Interest rate contracts	26,645	77,513
Forwards (FRAs)	4,597	7,737
Swaps	18,283	58,897
Options	3,548	10,879
Foreign exchange contracts	13,095	16,748
Forwards and forex swaps	8,699	10,336
Swaps	1,957	3,942
Options	2,379	2,470
Equity-linked contracts	579	1,881
Forwards and swaps	52	320
Options	527	1,561
Commodity contracts	318	598
Others	6,893	14,375
Exchange-Traded Instruments	8,838	23,799
Interest rate contracts	8,380	21,758
Futures	5,757	9,265
Options	2,623	12,493
Foreign exchange contracts	88	93
Futures	33	66
Options	55	27
Stock-index contracts	370	1,947
Futures	128	342
Options	242	1,605
Total	55,910	134,914

Source: Bank for International Settlements

- VALUE AT RISK (VAR or VaR; Krause, 2003;)
  - □ Originally VaR was intended to measure the risks in derivatives markets
    - ⇨ Downside measure
    - ⇨ Widely applied in financial institutions to measure all kinds of financial risks
  - □ The Basic Idea of VaR: Value of an Investment
    - ⇨ Given the cumulative distribution function $F(V)$ of the value of an investment V at the end of a time horizon ΔT, the value of the investment is below V^* with a probability of $1 - c$ satisfies the following relationship,

$$\text{Prob}(V \leq V^*) = \int_{-\infty}^{V^*} dF(V) = 1 - c$$

    - ⇨ The VaR relative to the benchmark of zero profit V_0 is: $VaR_{c,\Delta T}^{zero} = V_0 - V^*$
    - ⇨ The VaR relative to the expected outcome $E[V]$ is: $VaR_{c,\Delta T}^{mean} = E[V] - V^*$

Definition of Value at Risk
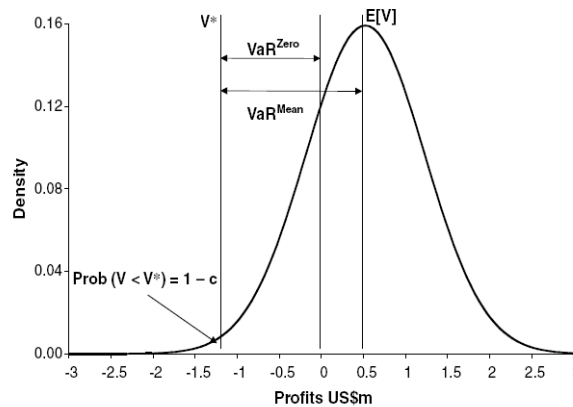
  - □ VaR in terms of returns
    - ⇨ Define R^* and μ such that $V^* = (1 + R^*) \cdot V_0$ and $E[V] = (1 + \mu) \cdot V_0$ then
    - ⇨ The VaR relative to the benchmark of zero profit V_0 is: $VaR_{c,\Delta T}^{zero} = -V_o \cdot R^*$
    - ⇨ The VaR relative to the expected outcome $E[V]$ is: $VaR_{c,\Delta T}^{mean} = -V_0 \cdot (R^* - \mu)$

Determination of the VaR with Normally Distributed Returns