國立臺北大學自然資源與環境管理研究所
106 學年度第二學期『環境災害與風險管理』

課程講義（14）：財務風險管理概要
Introduction to Financial Risk Management

- CATEGORIES OF RISK AND BUSINESS RISKS
  - Types of Business Risk (http://smallbusiness.chron.com/types-business-risk-99.html): Strategic Risk, Compliance Risk, Financial Risk, Operational Risk, Reputational Risk...
  - Business Risks: Financial vs. Non-financial Risks
  - How to Deal with Risk => Avoid, Reduce, Retain, Transfer, and Share
  - Approaches to Managing Risk: Identification, Quantification, Managing/Responding, Monitoring/Controlling
  - Key Measures for Risk Management: sensitivity, volatility, downside measures such as VaR (Value at Risk)

- FINANCIAL RISK MANAGEMENT
  - 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 => Basel Accord (Basel III)

Exhibit 1: Overview of the financial instruments universe

	Securities		Derivatives	
Users	On-exchange	OTC	On-exchange	OTC
Retail	■ Equities ■ Bonds		■ Equity-linked derivatives[1)]	■ CFDs
	■ ETFs/ETCs/ETNs ■ Certificates (e.g. index or bonus certificates) ■ Warrants ■ Funds/UCITS			
Wholesale/ professional	■ Equities ■ Bonds ■ ETFs/ETCs/ETNs ■ Funds/UCITS		■ Fixed-income derivatives ■ Equity-linked derivatives ■ Commodity derivatives	
		■ Structured credit-linked securities (CDOs, MBS etc.) ■ Other ABS		■ Foreign exchange derivatives ■ Credit derivatives

http://deutsche-boerse.com/blob/2532344/ebd7dc9b7aeac3efdf0c273309093130/data/the-global-derivatives-market-0909_en.pdf

- VALUE AT RISK (VaR; 風險值; 在险价值)
  - 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

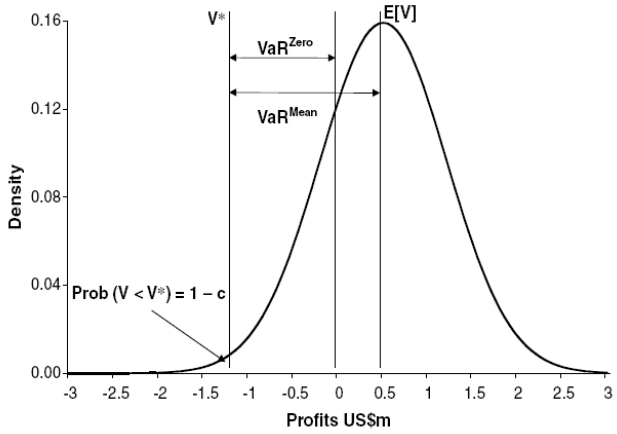
⇨Given the cumulative distribution function $F(V)$ of the value of an investment V at the end of a time horizon ΔT, the value of the investment is below V^* with a probability of $1-c$ satisfies the following relationship,

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

⇨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



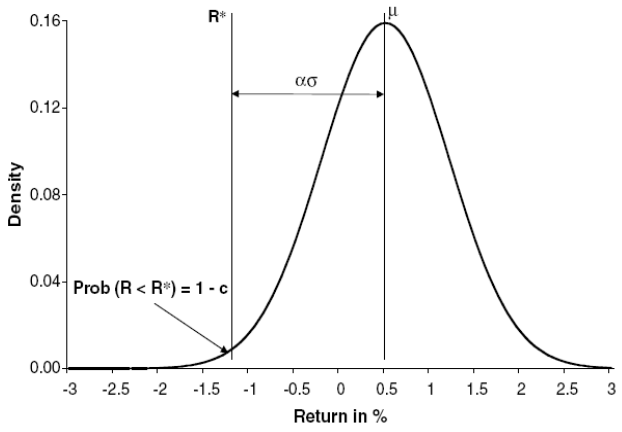
□ VaR in terms of returns

⇨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



□ Expected Shortfall (Conditional VAR, or Tail Loss)

VAR: "how bad can things get?" ES: "if things do get bad, what is our expected loss?"