國立臺北大學自然資源與環境管理研究所
102 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

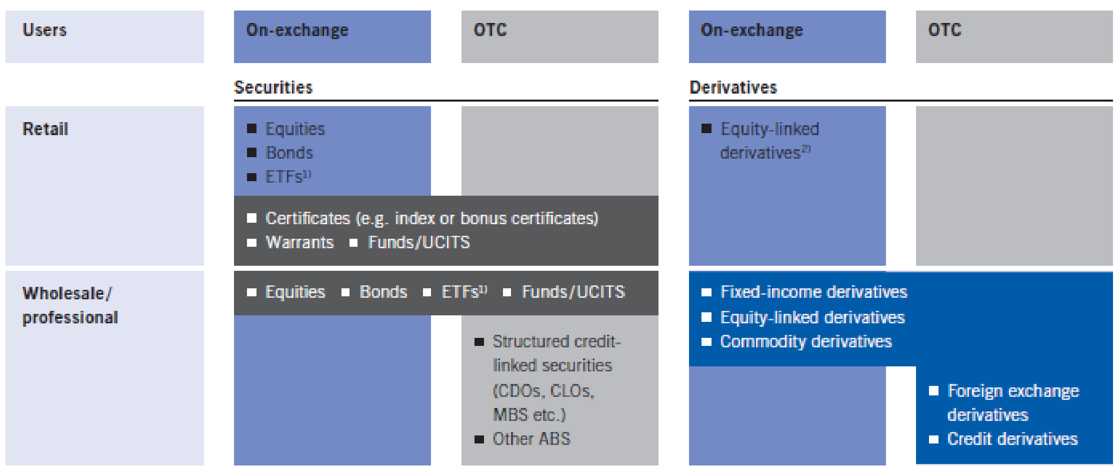
Introduction to Financial Risk Management

http://www.math.nyu.edu/faculty/avellane/global_derivatives_market.pdf
The Global Derivatives Market: An Introduction
http://zh.wikipedia.org/wiki/金融衍生工具; http://en.wikipedia.org/wiki/Derivative_(finance)
http://www.mathfinance.cn/value-at-risk/ Value at Risk xls

- CATEGORIES OF RISK AND BUSINESS RISKS (Holmes, 2002)
  - 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)

- FINANCIAL RISK MANAGEMENT (Jorion, 2007)
  - 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 financial instruments universe

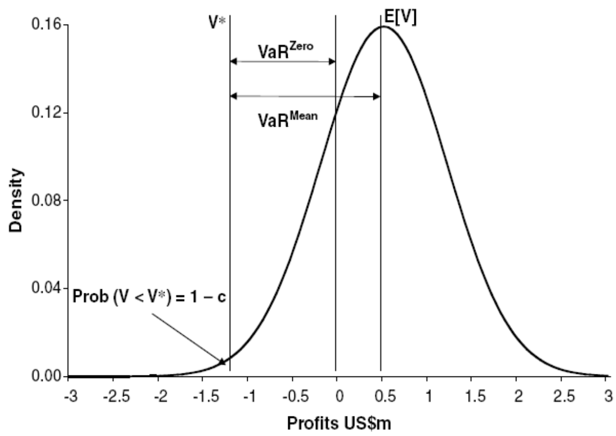


- VALUE AT RISK (VAR or VaR; Krause, 2003; 風險值; 在险价值)
  - Originally VaR was intended to measure the risks in derivatives markets
    - ⇨ Downside measure
    - ⇨ Widely applied in financial institutions to measure all kinds of financial risks
  - The Basic Idea of VaR: Value of an Investment
    - ⇨ 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