- Risk ≈ Uncertaity (downside uncertaity)
- The Concept of Risk Aversion (see P. 201 of the Text)
- What is the difference between "Speculation & Gambling"?
- From Risk Attitude to see Financial Market Participants:

  (1) Speculators ← Risk Takers

  (2) Hedgers ← Risk Avoiders

  (3) Arbitrageurs ← Risk Users

Arbitrage: Zero Investment ① / No Risk ② / positive return ③

positive Investment ① / No Risk ② / unique risk-free return. ③

Basic Risk Measurement

Risk Aversion → Maximize Expected Return of Investment
→ Minimize Risk Exposure of Investment

Utility ~ Satifaction (Expected Utility ≅ Satisfaction)

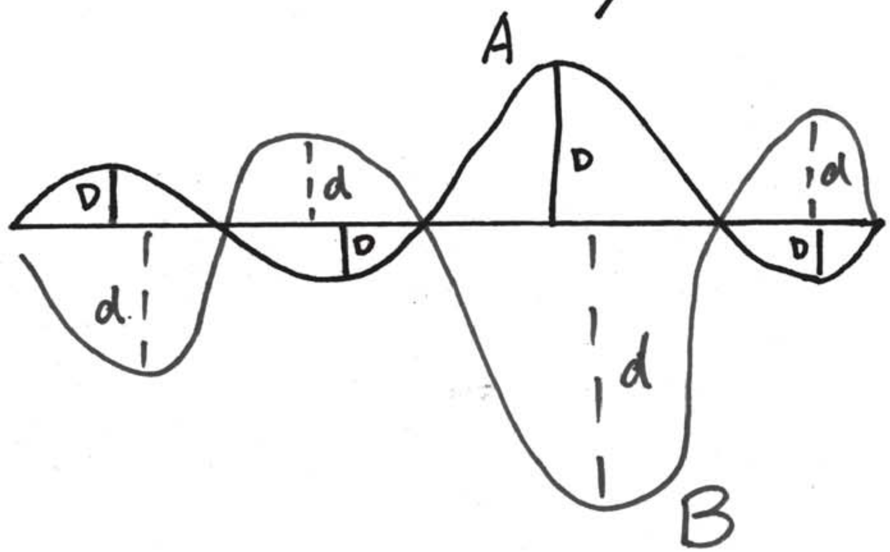
Expected Utility of Risk-Aversed Investor = Expected Return − Potential Risk Exposure

(Page 202 of the Text) $$EU = E(r) - \frac{1}{2} A \sigma^2$$

Risk Aversed Investors are maximizing their expected Utility subject to their budget constrain.

" Basic Risk Measurement "

In Finance, Risk ≈ Volatility ⇐ Deviation of Expected Return



Which Investment (A or B) is risker ?

Average of |d| > Average of |D|

Risk (Volatility) of B > Risk (Volatility) of A

Risk Measurement - The Basic

Volatility = Average absolute deviations

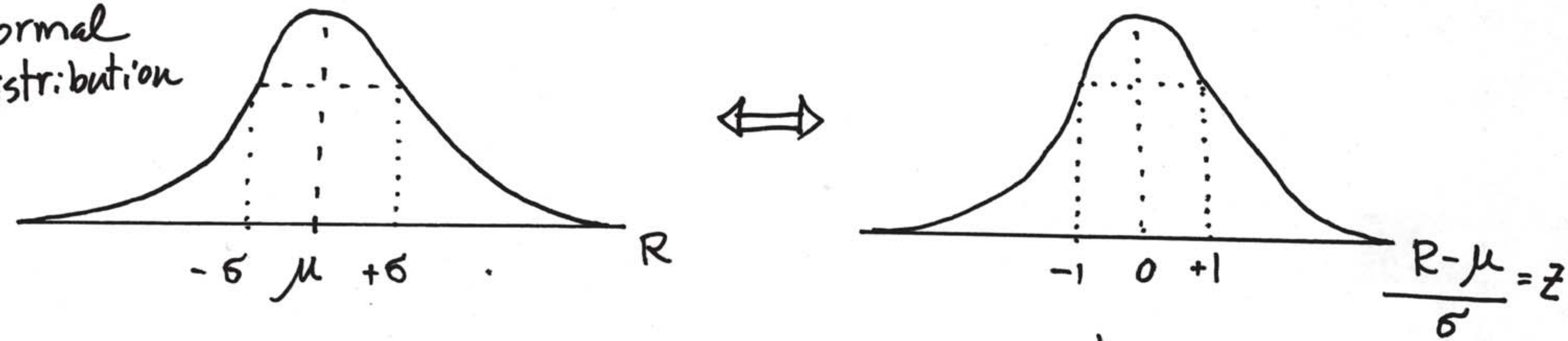
(Page 189) $$\sigma^2 = \frac{\sum_{t=1}^{T} (R_t - \mu)^2}{T} \quad , \quad S^2 = \frac{\sum_{t=1}^{T} (R_t - \bar{R})^2}{T-1}$$

Stand Deviation (σ) $$= \sqrt{\sigma^2} \quad , \quad S = \sqrt{S^2}$$

$$EU = E(R) - \frac{1}{2} A \sigma^2 \; ; \; \overline{EU} = \bar{R} - \frac{1}{2} A S^2$$

A = degree of risk-Aversion

Normal Distribution



So, if $\tilde{x}$ and $\tilde{y}$ are both normally distributed, then

$$\frac{R_x - \mu_x}{\sigma_x} \overset{d}{=} Z \overset{d}{=} \frac{R_y - \mu_y}{\sigma_y}$$

That is,

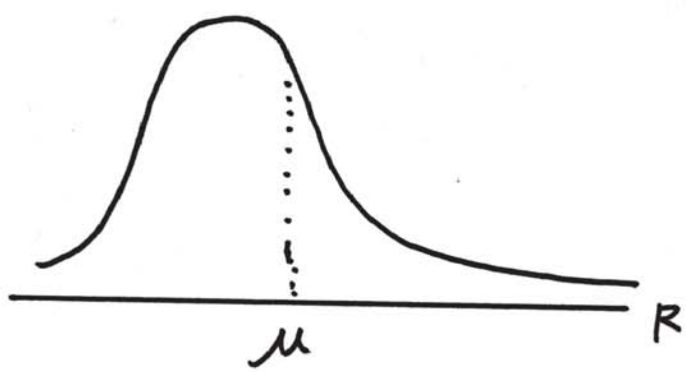
$$\begin{cases} R_x = \mu_x + \sigma_x Z \\ R_y = \mu_y + \sigma_y Z \end{cases}$$

(*) The return distributions of x and y are different by the difference of there means (μ_x & μ_y) and volatilities (σ_x & σ_y)

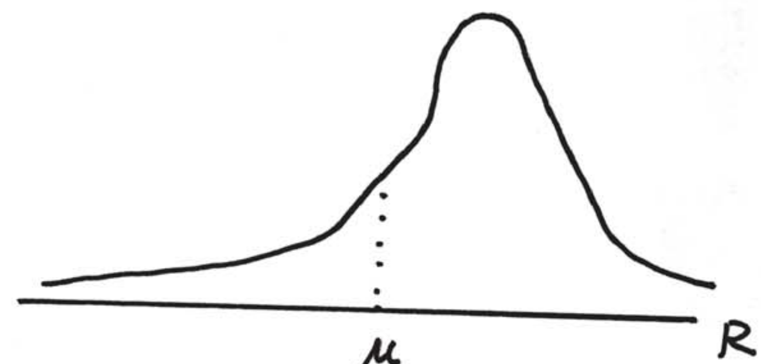
Return Distribution

Thus, if x and/or y are <u>NOT</u> normally distributed, then Volatility may <u>NOT</u> be an appropriate measure of investment risk.

Skewness



Skewed to the Right
(Positive skewed)



Skewed to the Left
(Negative skewed)