

Module 2: Chap 2

Risk

Concepts of Risks & Returns.

historical returns - return on asset of single security portfolio.

We earn returns in two forms:
- income from asset in form of interest or dividend

- change in price of assets (capital gain or capital loss)

So the total return is sum total of interest/dividend + capital gain or loss.

Rate of return:

$$R = \frac{\text{Div}_1}{P_0} + \frac{P_1 - P_0}{P_0} \quad R = \frac{\text{Div}_1 + (P_1 - P_0)}{P_0}$$

dividend yield (%) capital gain/loss yield (%)

Average rate of return

$$\bar{R} = \frac{1}{n} \sum_{i=1}^n R_i \quad \text{SM}$$

Holding Period return

- calculated by multiplying

notional amount of 1 with returns on for each period + subtracting 1 from total value.

Measures of Risk for 1 security.

1. Variance (σ^2)
2. Std (σ)

$$\sigma^2 = \frac{1}{(n-1)} \sum_{i=1}^n (R_i - \bar{R})^2$$

$$\sigma = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (R_i - \bar{R})^2}$$

Expected Return of single security.

$$E(R) = \sum_{i=1}^n R_i P_i$$

P_i = probability of outcome

Expected Risk of single security

$$\sigma^2 = \sum_{i=1}^n P_i (R_i - E(R))^2$$

$$\sigma = \sqrt{\sigma^2}$$

Normal distribution

$$S = \frac{R - E(R)}{\sigma}$$

$S \neq$ btw actual R & mean R
expressed as multiple of std.

Two Security Portfolio - Historical Return.

$$R_p = W_1 R_1 + W_2 R_2$$

W_1 = weightage of Sy_1

W_2 = " " " " Sy_2

Expected return of 2 security portfolio

$$E(R_p) = W \times E(R_1) + (1-W) E(R_2)$$

Measuring Portfolio Risk for 2 security P.

$$\sigma^2 = W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2 W_A W_B (COV_{AB})$$

W = weightage of $Sy A + B$

$\sigma_A \sigma_B$ = std of $Sy A + B$

COV_{AB} = covariance of AB

$$= (\sigma_A)(\sigma_B)(\rho_{AB})$$

$$\rho_{AB} = \frac{COV_{AB}}{(\sigma_A)(\sigma_B)}$$

Risks of portfolio:

- 1- Corr of 2 Sy s
- 2- Proportion of investment in each security
- 3- std of each Sy .

Min σ^2 portfolio

$$W_A = \frac{(\sigma_B^2 - COV_{AB})}{(\sigma_A^2 + \sigma_B^2 - COV_{AB})}$$