

④ Alpha Calculation

Step 1 Calculate ER on the basis of past data or probability

Step 2 Calculate K_e as per CAPM

$$\text{Alpha} = ER - K_e$$

- $ER > K_e$ [Alpha positive] $\rightarrow$ Underpriced $\rightarrow$ Buy
- $ER < K_e$ [Alpha Negative] $\rightarrow$ Overpriced $\rightarrow$ Not Buy
- $ER = K_e \rightarrow$ Correctly priced

⑤ Asset pricing

$$P_0 = \frac{D_1}{K_e - g} \quad K_e = R_f + (R_M - R_f)\beta$$

⑥ Systematic Risk, Unsystematic Risk & Total Risk

① Single stock

$$TR = \sigma_x^2, \quad SR = \beta^2 \sigma_m^2, \quad UR(\sigma_e^2) = TR - SR$$

" All calculation is this topic in Variance "

$$\text{Co-efficient of Determination } (r^2) = \frac{SR}{TR}$$

② Portfolio

$$SR_p = \beta_p^2 \sigma_m^2$$

Alternative 1

$$\textcircled{1} COV_{AB} = \beta_A \beta_B \sigma_m^2$$

$$\textcircled{2} \sigma_p^2 = \sigma_A^2 w_A^2 + \sigma_B^2 w_B^2 + 2 \times w_A \times w_B \times COV_{AB}$$

$$\textcircled{3} UR = TR - SR$$

Alternative 2

$$\textcircled{1} \sigma_p^2 = \sigma_A^2 w_A^2 + \sigma_B^2 w_B^2$$

$$\textcircled{11} PR_p = SR_p + UR_p$$

PART III Arbitrage pricing Theory [APT]

"CAPM is single factor & APT is multifactors"

$$ER = R_f + FRP_1 \times B_1 + FRP_2 B_2 \text{ ----- } FRP_n B_n$$

PART IV portfolio Rebalancing

"Rebalance means change in portfolio Regularly in Debt & Equity composition."

(1) Buy & Hold $\longrightarrow$ No change

(2) Constant Ratio plan $\longrightarrow$ Debt Equity ratio should be maintained. Ratio is given in question.

(3) Constant proportion portfolio Insurance [CPII]

Amount invested in Equity is calculated as under

$$E = m (A - F) \quad A = \text{Total portfolio}$$

$F = \text{Minimum Expected Value of portfolio}$

PART V Efficient Market Hypothesis

1 Strong form $\longrightarrow$ All useless

2 Semi strong form $\longrightarrow$ Charts x, Information x, Insider Trading ✓

3 Weak form $\longrightarrow$ Can't predict market with the help of charts
But use publicly available Information

Test of Weak form of efficiency

1 Run Test 2. Auto correlation Test

1 Run Test

Step 1 Find out sign change

$n_1 = \text{No. of plus}$, $n_2 = \text{No. of Minus}$, $\text{Run}(n) = \text{Sign change}$

Step 2 Calculate average run

$$\mu_r = \frac{2n_1n_2}{n_1+n_2} + 1$$

Step 3 Calculate standard deviation in run

$$\sigma_r = \sqrt{\frac{(\mu_r - 1)(\mu_r - 2)}{n_1 + n_2 - 1}}$$

Step 4 Calculate degree of freedom

$$df = n_1 + n_2 - 1$$

Step 5 Calculate Range

$$\text{Upper Limit} = \mu_r + \sigma_r$$

$$\text{Lower Limit} = \mu_r - \sigma_r$$

"Actual Run should be within the Range"

2 Auto Correlation Test

Step 1 Divide Total period into two parts

Suppose period = 20 days then 10 - 10 days

Step 2 calculate change in price

Step 3 Calculate Correlation between two periods

Step 4 If correlation between two period = 0 then
Called weak or efficient market.