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FORMULAE IN CAPM

1. Expected Return = Mean = $(P * r)$

P = Probability

R = Return

2. Variance = $(\sigma^2) = P (r - \bar{r})^2$

3. $\sigma = \sqrt{\text{Variance}} = \sqrt{P (r - \bar{r})^2}$

4. Covariance (x,y) = $P (r_x - \bar{r}_x) (r_y - \bar{r}_y)$

5. Correlation Coefficient : (Should always be in between “- 1” to “+1”)

$$\text{Correlation Coefficient} = \frac{\text{Covariance}(x,y)}{\sigma_s * \sigma_m}$$

σ_s = Standard deviation of the Security

σ_m = Standard Deviation of the Market

6. Beta

Method: 1

$$\beta = \frac{\sigma_s}{\sigma_m} * \text{Cor}(s, m)$$

Method: 2

$$\beta = \frac{\text{Covariance}(x,y)}{\text{variance of } m}$$

7. Portfolio Risk (Risk of the Portfolio)

$$\text{Risk} = \sqrt{[(P_a^2 * \sigma_a^2) + (P_b^2 * \sigma_b^2) + (2 * P_a * P_b * \sigma_a * \sigma_b * \text{cor}(a, b))]}$$

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$$8. \beta_u = \frac{E}{E+D(1-\tau)} * \beta_l + \frac{D(1-\tau)}{E+D(1-\tau)} * \beta_d$$

9. Maxims of CAPM:

Situation	Pricing Strategy	Action/ Decision
SML Returns > Expected Returns	Security is Overpriced	Sell the security
SML Returns < Expected Returns	Security is Underpriced	Buy the security
SML Returns = Expected Returns	Security is Perfectly priced	Hold the security

10. Portfolio Beta = Weighted Beta of all securities constituting the portfolio. Weight is determined based on values constituting the portfolio.

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