NPTEL

Course Name: Security Analysis and Portfolio Management

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Session # 4: Risk and Return – II

Q.1:

a) If nominal rate of return and inflation rate are 12.4% and 5.6% respectively, what is the real rate of return?
b) If real rate of return and nominal rate of return are 8.5% and 15.4% respectively, what is the inflation rate?

Ans.:

a) Real rate of return = (1+.124)/(1+.056) – 1 = 0.0644 i.e. 6.44%
b) Inflation rate = (1+.154)/(1+.085) – 1 = 0.0636 = 6.36%

Q.2: What is systematic risk? What are the different types of risk that make systematic market risk?

Ans.: Systematic risk relates the variance of the investment to the variance of the market. Systematic risk also refers to the portion of an individual asset's total variance attributable to the variability of the total market portfolio. The different types of risks that make the systematic risk are: Business Risk, Financial Risk, Liquidity Risk, Exchange Rate Risk and Country Risk among others.

Q.3: The following table provides the market values of stocks in one's portfolio and their expected rates of return. What is the expected rate of return for the portfolio?

Stock:	Infosys	RIL	ONGC	SBI	DRL	TATA Steel
Market Value (Rs.'000)	30,000	20,000	40,000	50,000	20,000	40,000
$E(R_i)$	0.18	.016	0.12	0.20	-0.10	0.10

Ans:

Stock:	Infosys	RIL	ONGC	SBI	DRL	TATA Steel	Portfolio

Market Value (Rs.'000)	30,000	20,000	40,000	50,000	20,000	40,000	200,000
Weight	0.15	0.10	0.20	0.25	0.10	0.20	1.00
$E(R_i)$	0.18	.016	0.12	0.20	-0.10	0.10	
W_i*R_i	0.027	0.0016	0.024	0.05	-0.01	0.02	0.1126

Hence the expected return for the portfolio = 11.26%

Q.4: The weights, returns and variance of returns of two stocks that constitute an investment portfolio are given below. Find the portfolio return and risk.

Stock	$E(R_i)$	W_i	Variance (σ_i^2)	Standard Deviation (σ_i)
A	0.12	0.40	0.0064	0.08
B	0.18	0.60	0.0100	0.10

Correlation coefficient between returns of Stocks A and B = 0.8

Portfolio Return = 0.40*0.12 + 0.60*0.18 = 0.156 = 15.6%

$$\sigma_{port} = \sqrt{\sum_{i}^{n} w_i^2 \sigma_i^2 + \sum_{i=1}^{n} \sum_{j}^{n} w_i w_j Cov_{ij}}$$

Portfolio Standard Deviation = $(0.4 \times 0.4 \times 0.08 \times 0.08 + 0.6 \times 0.6 \times 0.10 \times 0.10 + 0.4 \times 0.6 \times 0.8 \times 0.08 \times 0.10 + 0.6 \times 0.4 \times 0.8 \times 0.10 \times 0.08)^{½} = (0.0049312)^{½} = 0.070223 = 7.02\%$

Q.5: The weights, returns, standard deviation of returns of three stocks (P, Q and R) along with the correlation matrix of returns of such stocks are as below. Find the portfolio return and risk.

Stock	$E(R_i)$	W_i	Standard Deviation (σ_i)
P	0.16	0.30	0.12
Q	0.20	0.40	0.14
R	0.24	0.30	0.16

Correlation Coefficients:

P and Q	Q and R	P and R

0.6	0.7	0.5

Ans.:

Portfolio Return: 0.30*0.16 + 0.40*0.20 +0.30*0.24 = 0.048+0.080+0.072 = 0.20 = 20%

Portfolio Risk (σ_p) = $(0.30^2*0.12^2 + 0.40^2*0.14^2 + 0.30^2*0.16^2 + 2*0.6*0.30*0.40*0.12*0.14 + 2*0.7*0.40*0.30*0.14*0.16 + 2*0.5*0.30*0.30*0.16*0.12)^{½}$

= $(0.0217984)^{½}$ =0.1476 = 14.76%