PORTFOLIO MANAGEMENT

CLASS 9

HOME WORK SUPPORT

COVERAGE

Question			Answer			Lecture Time
Q. No	Page no.	Book	Q. No	Page no.	Book	
17	35	HW Q BOOK	17	99	HW ANS BOOK	00:00:27 – 00:01:33
18	36	HW Q BOOK	18	99	HW ANS BOOK	00:01:34 – 00:04:55
EQ1	-	-	-	-	-	No Video

Topic 13 BETA MANAGEMENT

Question 17: HW Q BOOK PAGE 35

Ms. Preeti, a school teacher, after retirement has built up a portfolio of Rs. 1,20,000 which is as follow:

Stock	No. of shares	Market price per share (₹)	Beta
ABC Ltd.	1000	50	0.9
DEF Ltd.	500	20	1.0
GHI Ltd.	800	25	1.5
JKL Ltd.	200	200	1.2

Her portfolio consultant Sri Vijay has advised her to bring down the, beta to 0.8. You are required to compute:

i. Present portfolio beta
ii. How much risk free investment should be bought in, to reduce the beta to 0.8?

(Source: ICAI)

Answer: HW ANS BOOK PAGE 99

Security	No. of shares (1)	Market Price of Per Share (2)	(1) × (2)	% to total (w)	ß (x)	wx
ABC	1000	50	50000	0.4167	0.9	0.375
DEF	500	20	10000	0.0833	1	0.083
GHI	800	25	20000	0.1667	1.5	0.250
JKL	200	200	40000	0.3333	1.2	0.400
			120000	1		1.108

i. Portfolio beta 1.108

ii. Required Beta 0.8

It should become (0.8 / 1.108) 72.2 % of present portfolio

If Rs. 1,20,000 is 72.20%, the total portfolio should be

Rs. 1,20,000 × 100/72.20 or Rs. 1,66,205

Additional investment in zero risk should be (Rs. 1,66,205 – Rs. 1,20,000) = Rs.46,205

Topic 14 TR, SR AND UR OF A STOCK

Question 18: HW Q BOOK PAGE 36

The returns on stock A and market portfolio for a period of 6 years are as follows:

Year	Return on A (%)	Return on market portfolio (%)
1	12	8
2	15	12
3	11	11
4	2	-4
5	10	9.5
6	-12	-2

You are required to determine:

i. Characteristic line for stock A

ii. The systematic and unsystematic risk of stock A.

(Source: ICAI)

Answer: HW ANS BOOK PAGE 99

Characteristic line is given by

$\alpha + \beta Rm$

$$\beta i = \frac{\sum xy - n\bar{x}\bar{y}}{\sum x^2 - n(\bar{x})^2}$$

$$\alpha i = \bar{y} - \beta\bar{x}$$

Return on A (y)	Return on market (x)	xy	x^2	$(x-\bar{x})$	$(X-\bar{x})^2$	$(y-\bar{y})$	$(y-\bar{y})^2$
12	8	96	64	2.25	5.06	5.67	32.15
15	12	180	144	6.25	39.06	8.67	75.17
11	11	121	121	5.25	27.56	4.67	21.81
2	-4	-8	16	-9.75	95.06	-4.33	18.75
10	9.5	95	90.25	3.75	14.06	3.67	13.47
-12	-2	24	4	-7.75	60.06	-18.33	335.99
38	**34.5**	**508**	**439.25**		**240.86**		**497.34**

$\bar{y} = 38/6 = 6.33$

$\bar{x} = 34.5/6 = 5.75$

$$\beta = \frac{\sum xy - n\bar{x}\,\bar{y}}{\sum x^2 - n(\bar{x})^2} = \frac{508 - 6(5.75)(6.33)}{439.25 - 6(5.75)^2} = \frac{508 - 218.385}{439.25 - 198.357}$$

$$= \frac{289.615}{240.875} = 1.202$$

$$\alpha = \bar{y} - \beta\bar{x} = 6.33 - 1.202(5.57) = -0.58$$

Hence the characteristic line is -0.58 + 1.202 (R_m)

Total Risk of Market $= \sigma_{m^2} = \frac{\sum(x - \bar{x})^2}{n} = \frac{240.86}{6} = 40.14\%$

Total Risk of Stock $= \frac{497.34}{6} = 82.89(\%)$

Systematic Risk $= \beta i^2 \sigma_2 (1.202)^2 \times 40.14 = 57.99(\%)$

Unsystematic Risk is = Total Risk – Systematic Risk

= 82.89 - 57.99 = 24.90(%)

EXTRA QUESTION

Suppose that economy A is growing rapidly, and you are managing a global equity fund and so far you have invested only in developed- country stocks only. Now you have decided to add stocks of economy A to your portfolio. The table below shows the expected rates of return, standard deviations, and correlation coefficients (all estimates are for aggregate stock market of developed countries and stock market of Economy A).

	Developed Country Stocks	**Stocks of Economy A**
Expected rate of return (annualized percentage)	20	30
Risk [Annualized Standard Deviation (%)]	16	30
Correlation Coefficient (ρ) between stock of two economies	0.30	

Assuming the risk-free interest rate to be 6%, you are required to determine:

i. What percentage of your portfolio should you allocate to stocks of Economy A if you want to increase the expected rate of return on your portfolio by 1%?
ii. What will be the standard deviation of your portfolio assuming that stocks of Economy A are included in the portfolio as calculated above?
iii. Also show how well the Fund will be compensated for the risk undertaken due to inclusion of stocks of Economy A in the portfolio?

(Source: MTP April 24)

ANSWER:

i. Let the weight of stocks of Economy A be expressed as w, then
(1- w) × 20% + w × 30% = 21%
i.e. w = 0.1 or 10%.

ii. Variance of portfolio shall be:
$(0.9)^2(0.16)^2 + (0.1)^2(0.30)^2 + 2(0.9)(0.1)(0.16)(0.30)(0.30) = 0.02423$
Standard deviation is (0.02423) ½ = 0.15565 or 15.56%.

iii. The Sharpe ratio will improve by approximately 0.09, as shown below:

$$\text{Sharpe Ratio} = \frac{\text{Expected Return - Risk Free Rate of Return}}{\text{Standard Deviation}}$$

Investment in stock of developed countries only: (20-6) /16 = 0.875
Investment with inclusion of stocks of Economy A: (21-6)/15.56 = 0.964