Chapter XI

INTERNATIONAL PORTFOLIO INVESTMENT

PROBLEMS

Problem 1

An Indian investor purchased securities on the New York Stock Exchange when the exchange rate was Rs. 35/$. One year later, his investments had fetched dollar returns of 50%. At that time, the spot rate was Rs. 36/$. Calculate the investor's returns if he brings his funds back to India at the end of one year.

Solution

Assume the investor wants to invest $100,000

Rupee investment = (35) (100,000) = Rs. 3,500,000

Value of investment after one year = $ (100,000) (1+0.5)
= $150,000
= Rs. (36) (150,000)
= Rs. 5,400,000

Hence rupee returns
= (5,400,00 - 3,500,000) / (3,500,000) x 100
= 54.29%

The rupee returns are more than the dollar returns owing to appreciation of the dollar.

Problem 2

An American investor purchased stocks on the Bombay Stock Exchange when the exchange rate was Rs. 35/$. One year later, he finds that his portfolio has moved in line with the Bombay Sensex and appreciated by 25%. The spot rate prevailing at the end of one year was Rs. 36/$. If the investor decides to withdraw from India, what would be his dollar returns?

Solution

Suppose, the investor wants to buy stocks worth Rs.1,000,000.

Dollar finds invested = (1,000,000) / (35) = $28,571.

Value of portfolio after one year = Rs. (1,000,000) (1.25)
= Rs. 1,250,000
= $ (1,250,000)/36
= $34,722

Return on investment = $\frac{(34,722-28,571)}{(28,571)}$ x 100 = 21.53%

The dollar returns are lesser than the rupee returns owing to depreciation of the rupee.

Problem 3

An Indian investor obtains dollar returns of 15% in New York. At the time of investment, the exchange rate was Rs. 35/$. The rates of inflation during the following year were 8% in India and 3% in USA. Estimate the investor's rupee returns if he decides to cash his investment at the end of the year.

Solution

Spot rate = Rs. 35/$

If we assume Purchasing Power Parity to hold good, the exchange rate after one year will be (35) (1.08/1.03) = Rs. 36.70/$

Assume the investor decides to buy stocks worth $100,000.

Rupee funds needed = (100,000) (35) = Rs. 3,500,000

Value of investment after one year = $ (100,000) (1.15)
= $115,000
= Rs. (36.70) (115,000)
= Rs. 4,220,500

Rupee returns = [(4,220,500 - 3,500,000) / (3,500,000)] x 100 = 20.59%

The rupee returns have exceeded the dollar returns owing to depreciation of the rupee.

Problem 4

You are given that the risk free rate of return in India is 10%. An American investor decides to buy Indian securities with Beta = 1.50 and variance of returns = 20%. The

Indian rupee has been depreciating at 5% against the dollar with a variance of 15%. If the market portfolio fetches a return of 20% in India and the correlation between the return on security and the exchange rate is 0.20, estimate the expected return and risk for the US investor.

Solution

Expected returns in India = $R_F + B (R_M - R_F)$

= 0.10 + 1.50 (0.20-0.10)

= 0.25

Suppose an investor buys Rs. 100,000 worth of securities.

Then value of investment after one year

= Rs. (100,000) (1.25)

= 125,000

If spot rate was $ S/Re at the beginning of the year, it is $0.95S/Re at the end of the year.

So, dollar return on investment

$$= \frac{(125,000)(0.95S) - (100,000)S}{(100,000)(S)}$$

= 0.1875

Thus expected rate of return = 18.75%

Variance = 20 + 15 + (2) (0.20) v (20) (15)

= 41.93%

So, total risk = 41.93%.

Problem 5

The risk free rate of return in India is 8% and the market portfolio's rate of return is 25%. The security's beta is 1.15 and the variance of returns is 20%. The Indian Rupee has been depreciating relative to US $ at the rate of 5% per annum with a variance of 15%.

Compute the return and total risk an US investor can expect from this security, assuming that the correlation between returns on the security and the exchange rate is 0.25

Solution

R = 0.08 + 1.15 (0.25 - 0.08) = 0.2755
Thus, the expected rupee rate of return is 27.55%.
Suppose $ 100 is invested.
If spot rate = Rs S/$, investment in India = Rs 100 S
Rupee returns at the end of the year
= (100) (S) (1.2755) = 127.55S
= $ [(127.55) S] / [(S/0.95)]
= $ 121.17
So, dollar returns = [(121.17-100) / (100)] x (100) = 21.17%
Total Risk = 20% + 15% + (2) (0.25) [sq root of (20) (15)]

Problem 6

Exchange rates at the beginning of 1981 and 1982 were Rs. 18.53 and Rs. 25.53 per US $. If the percentage return on American Securities is a) - 50% b) -25% c) 50% d) 25%, compute the net return to the Indian investor.

Solution

To invest $ 100, the Indian investor needs Rs. 1853.
The net return can now be worked out for each case separately.

$$\text{Net Return} = \frac{(50)\ (25.53) - 1853}{1853} = -31.11\%$$

$$\text{Net Return} = \frac{(75)\ (25.53) - 1853}{1853} = 3.33\%$$

$$\text{Net Return} = \frac{(150)\ (25.53) - 1853}{1853} = 106.66\%$$

$$\text{Net Return} = \frac{(125)\ (25.53) - 1853}{1853} = 72.22S\%$$

Problem 7

The spot exchange rate in 1983 was Rs. 25/$. The interest rate was 9% in India and 4% in USA. What would be expected percentage return to an American Investor, if the percentage return on Indian Securities is a) 10% b) 30% c) 50%

Solution

We first calculate the expected spot rate after one year using the interest parity principle.

S_n = (25) ((1.09) / (1.04) = 26.20

Suppose the American investor has surplus funds of $100.

$ 100 = Rs 2500

The investor can hence buy securities worth Rs 2500 in India.

We can now calculate the returns for each scenario as follows.

$$\frac{(2500)(1.1)/(26.20) - 100}{100} * 100 = 4.96\%$$

$$\frac{(2500)(1.3)/(26.20) - 100}{100} * 100 = 24.05\%$$

$$\frac{(2500)(1.5)/(26.20) - 100}{100} * 100 = 43.13\%$$

Problem 8

The spot exchange rate at the beginning of 1982 was Rs. 25 per US $. The annual inflation rates are 11% in India and 3% in USA. Compute the expected percentage return to an Indian investor for that year, if the percentage return on American Securities is a) -5% b) 15% c) 50%

Solution

We first determine the exchange rate after one year using the Purchasing Power Parity principle .

S_1 = (25) (1.11) / (1.03) = 26.94

Suppose the Indian investor has surplus funds of Rs 2500. Rs 25000 = $ 100. So, the investor can buy American Securities worth $ 100.

We can now work out the returns for each scenario.

$$\frac{100\ (0.95)\ (26.94)\ -\ 2500}{2500} * 100 = 2.37\%$$

$$\frac{100\ (1.15)\ (26.94)\ -\ 2500}{2500} * 100 = 23.92\%$$

$$\frac{100\ (1.50)\ (26.94)\ -\ 2500}{2500} * 100 = 61.64\%$$

Problem 9

A company has surplus funds of £1,000,000. The following rates are being quoted.

Spot	:	DM 1.50/$ $1.50/£
3 month interest rates	:	£ - 8% DM - 4% $ - 5%
3 month forward	:	DM 1.45/$ $1.40/£

In which currency should it invest ?

Solution

Alternative 1

Invest in £.

Returns after 3 months	=	£ (1,000,000) (1+0.08/4)
	=	£1,020,000
Profits	=	1,020,000 - 1,000,000
	=	£20,000.

Alternative 2

Invest in $ after converting £1,000,000 at the rate of $1.50/£

It can sell the $ returns forward at $1.40/£

Returns after 3 months	=	$ (1,000,000) (1.5) (1+0.05/4)
	=	$1,518,750
	=	£ (1,518,750)/1.40
	=	£1,084,821.

So, profits = 1,084,821 - 1,000,000
= £84,821.

Alternative 3

Invest in DM after converting £1,000,000 into DM at the rate of DM (1.5) (1.50) / £ = DM 2.25/£

The DM returns can be sold forward at DM (1.40)(1.45)/£
= DM 2.03/£
Returns after 3 months = (2.25) (1,000,000) (1+0.04/4)
= DM 2,272,500
= £ (2,272,500) / (2.03)
= £1,119,458.1
So, profits = 1,119,458.1 - 1,000,000
= £119,458.1

Investing in DM hence yields the best returns.