Department of Industrial Engineering & Management

IIT Kharagpur

Mid-Term Examination Semester: Spring Session: 2012 - 2013

Subject: Financial Risk Modelling Subject Number: IM 41032

Answer all questions. Questions carry equal marks.

Question 1a

A portfolio consists of two assets with face value of Rs. 1,50,000 and Rs.2,50,000. The standard deviation of returns for asset A is 2% and that of asset B is 4%. Find, for the following cases, whether the portfolio is more or less risky compared to the individual assets:

a. The correlation of returns of asset A and that of asset B is 0.20.
b. The correlation of returns of asset A and that of asset B is –0.20.

What should have been the amount invested in each asset to make the portfolio least risky?

Question 1b

An amount of Rs. 4,00,000 is invested in a project that gives an average cash flow X_{avg} of Rs. 1,00,000. Find whether the project is economically justified given the following data:

$E(R_m) = 10\%$, $R_f = 5\%$, $\beta = 0.75$ $\sigma_m^2 = 0.04$

Question 2a

Discuss the methods of estimating the risk-free rates.

Question 2b

The current spot rate is 52 Indian Rupees per US dollar, and the current 10-year US T-bond rate is 5%. A one-year dollar-denominated forward rate is 54 Indian Rupees. If a one-year T-bill rate is 4% and the default spread is 2%, estimate the ten-year risk-free rate (in Indian Rupees).

Question 3

a. Brazil in 2001 was rated B1 by Moody's with a default spread of 4.69%. The annualized standard deviation of the Brazilian equity index over the previous year was 32.15%, while that of the Brazilian dollar-denominated C-bond was 15.75%. Find the Brazil's country risk premium.
b. Aracruz Celulose, a paper manufacturing company in Brazil, has a beta of 0.85. If the Brazil currency BR inflation rate is 10% and the US inflation rate is 5%, estimate Brazil's country risk premium in BR term, assuming the US T-bond rate as 5% and the US risk premium as 5.51%.

c. Aracruz derives 75% of its revenues from outside Brazil, whereas the average Brazilian firm derives 70% of its revenues from the local market. Estimate the cost of equity in US dollar term for Aracruz.

Question 4

a. Boeing's monthly returns on the S&P 500 market index between 1998 and 2012 are regressed on the monthly returns on the market portfolio, yielding the following values:

$\hat{\alpha} = 0.45\%$ $\quad \hat{\beta} = 0.52$ $\quad$ R2 = 25.43% $\quad \sigma_{\hat{\beta}} = 0.52$

Give an interpretation of the regression results.

b. Assuming that Boeing's monthly riskless rate is 0.42% and annualized excess return on similar firms between 1998 and 2012 is 1.05%, find the firm-specific excess return for Boeing and 95% confidence interval for true β.

Question 5

ABC Company Ltd. acquires XYZ. The pre-acquisition data for both the companies are as follows:

Company	Beta	Debt	Equity
ABC	0.85	4,000	40,000
XYZ	0.92	3,000	18,000

A new loan of 1,000 was taken for acquisition. Find the risk of the combined form. Assume a tax rate of 30%.