

Practice Problem Set 2

Question 1 The Betas of four stocks in a perfect capital market are as follows:

$$\beta_A = -1 \qquad \beta_B = 0 \qquad \beta_C = 1 \qquad \beta_D = 2$$

Assume that the market is in equilibrium, that the returns on the risk-free asset is 6% and that the expected return on the “market portfolio” is 14%. Calculate the expected returns on shares A, B, C and D.

Question 2 Assume a perfect capital market in which investors are constrained to holding portfolios that consist only of a single risky asset, that borrowing or lending at a risk-free interest rate is possible, and that in equilibrium the following relationship between two risky securities i and j holds:

	Security i	Security j
Exp. ret. (%)	26	18
Standard Dev. (%)	15	9

(a) What is the risk-free rate of interest in this market? (Hint: in equilibrium under the above conditions both securities must lie on the same market line).

(b) If the investor wishes to hold a portfolio with a standard deviation of only 6%, what should be his investment strategy?

(c) What would his investment strategy be if he wanted to reach an expected return of 24%?

Question 3 Assume a perfect capital market in which investors are constrained to holding portfolios that consist of a single risky asset and the risk-free asset. In equilibrium the following relationship between two risky securities i and j holds:

	Security i	Security j
Exp. ret. (%)	18	25
Standard Dev. (%)	8	12

(a) What is the risk-free rate of interest in this market?

(b) What would the investment strategy of an investor be if the investor wanted to reach an expected return of 20%?

Question 4 There are three stocks in the market and the CAPM holds. The parameters of the stocks are as follows:

	A	B	C
r_i	15%	20%	30%
β_i	1/2	1	?

What should be β_3 such that the CAPM holds? What is the mean rate of return on the market portfolio? What is the risk-free interest rate?

Question 5 The following describes the mean return and betas of Du Pont, Dow Chemical and Union Carbide:

	Du Pont	Dow Chemical	Union Carbide
r_i	4.6%	10%	30%
β_i	.86	.74	.71

Determine the arbitrage portfolio with zero investment and a zero beta. Is there room for arbitrage profit? (Hint: fix the proportion of the Dow Chemical to be equal to 1 and find the other two proportions.)