FINM2063 Introduction to Finance

Chapter 4 Exercises

Solutions

1. a. The return on Stock A:

(.18)(.25) + (.14)(.5) + (.1)(.25) = 14%

The return on Stock B:

(.22)(.1) + (.12)(.6) + (.11)(.3) = 12.7%

Stock A has the higher expected return.

b. The standard deviation of Stock A: 2.83

The standard deviation of Stock B: 3.13

c. Since Stock A offers both a higher return for less risk lower standard deviation), it is to be preferred.

1. a. **** = 0.5 (–2%) + 0.1 (10%) + 0.4 (15) = 6.0%

**** = 0.5 (20%) + 0.1 (12%) + 0.4 (2%) = 12.0%

b. **** = wR**** + wS****

**** = 0.5(6.0%) + 0.5 (12.0%) = 9.0%

Alternative computation: Compute the portfolio return for each possible stock outcome.

Returns

Probability Stock R Stock S 50/50 Portfolio

0.5 –2% 20% 9.0% = 0.5 (–2%) + 0.5 (20%)

0.1 10 12 11.0 = 0.5 (10%) + 0.5 (12%)

0.4 15 2 8.5 = 0.5 (15%) + 0.5 ( 2%)

Then compute the expected return based on the probability of the outcome.

**** = 0.5(9.0%) + 0.1(11.0%) + (0.4)(8.5%) = 9.0%

c. ****

****

****

****

Stock S is riskier because its standard deviation is higher than that of Stock R. Clearly, however, the portfolio, or combination of the two stocks, has the lowest risk.

d. ****

CVR = 8.12%/6% = 1.35

CVS = 8.49%/12% = 0.71

According to the coefficient of variations computed here, Stock R is riskier than Stock S. Although Stock S has a higher amount of total risk, it also has a much higher expected return than Stock R. The coefficient of variation for the portfolio is 0.08 = 0.71%/9%, which is much lower than for either stock.

e.As the number of stocks in the portfolio increases substantially, we would expect that the risk associated with the portfolio should approach the standard deviation of the market, or average, portfolio.

1. βold = 1.2; there are five stocks in the portfolio

If one stock with β = 2.0 is sold, then the portfolio’s beta would change

βportfolio = 1.2 = 0.2(β1) + 0.2(β2) + 0.2(β3) + 0.2(β4) + 0.2(2.0) = 0.2(∑β of four stocks) + 0.2(2.0)

0.2(∑β of four stocks) + 0.4 = 1.2

(∑β of four stocks) = 0.8/0.2 = 4.0

βnew = 0.2(∑β of four stocks) + 0.2(1.0) = 0.2(4.0) + 0.2(1.0) = 1.0

1. a. = 0.1(10%) + 0.2(12%) + 0.4(13%) + 0.2(16%) + 0.1(17%) = 13.5%.

b. To determine the fund's beta, βF, the weight for the amount invested in each stock needs to be computed.

A = $160/$500 = 0.32

B = $120/$500 = 0.24

C = $80/$500 = 0.16

D = $80/$500 = 0.16

E = $60/$500 = 0.12

βF = 0.32(0.5) + 0.24(2.0) + 0.16(4.0) + 0.16(1.0) + 0.12(3.0)

= 0.16 + 0.48 + 0.64 + 0.16 + 0.36 = 1.8.

c. rRF = 8% (given)

Therefore, the SML equation is

rF = rRF + (rM - rRF)βF = 8% + (13.5% - 8%)βF = 8% + (5.5%)βF.

d. Use βF = 1.8 in the SML determined in Part b:

= 8% + (13.5% - 8%)1.8 = 8% + 9.9% = 17.9%.

e. rNew = Required rate of return on new stock = 8% + (5.5%)2.0 = 19%.

An expected return of 18 percent on the new stock is *below* the 19 percent required rate of return on an investment with a risk of β = 2.0. Because rNew = 19% > 18%, the new stock should *not* be purchased. The expected rate of return that would make McAlhany indifferent to purchasing the stock is 19 percent.