

CHAPTER 5:

RISK AND RETURN -- THEORY

5-1

a: because it has the highest expected return and the lowest standard deviation.

5-2

a. average annual return = 10.91% and standard deviation = 22.72%

b: Price in 1986 = $25.6 (1 - 2.2\%) (1 + 10.2\%) (1 + 11.4\%) (1 - 30.5\%)*$
 $(1 + 45.8\%) (1 + 10.3\%) (1 + 12.5\%) (1 + 20.4\%) (1 - 10.9\%) (1 + 42.1\%)$
= \$58.91

c: annual compounding growth rate = $(58.91/25.6)^{0.1} - 1 = 8.69\%$
the annual compounding growth rate is always smaller than the average return.

5-3

a: Expected return = $0.5 * 12\% + 0.5 * 18\% = 15\%$

Standard deviation =

$(0.5^2 * 0.25^2 + 0.5^2 * 0.4^2 + 2 * 0.5 * 0.5 * 0.8 * 0.25 * 0.4)^{0.5} = 30.92\%$

b: It would depend upon my risk aversion. If I were not risk averse, and wanted to maximize my returns, I would buy B. If I were really risk averse, and wanted to minimize my risk, I would buy A. If I were interested in getting the best return/risk ratio, I would invest in the portfolio.

5-4

a: Solving the equation: $W_a * 0.25 - (1 - W_a) * 0.45 = 0$

we get $W_a = 64.29\%$ and $W_b = 1 - W_a = 35.71\%$

b: the expected return = $.6429 * 12\% + .3571 * 15\% = 13.07\%$

c: borrowing from the bank and investing in this risk-free portfolio will create riskless profits.

5-5

a: 0.0 (Riskless assets are uncorrelated with any risky asset)

b: $W_a = 20\% / 40\% = 50\% = W_b$

c: the expected return = $(15\% + 5\%) / 2 = 10\%$

5-6

the expected return = $0.3 * 15\% + 0.4 * 20\% + 0.3 * 35\% = 23\%$

the standard deviation = $(0.3^2 * 0.2^2 + 0.4^2 * 0.4^2 + 0.3^2 * 0.7^2 + 2 * 0.3 * 0.4 * 0.5 * 0.2 * 0.4 + 2 * 0.3 * 0.3 * 0.7 * 0.2 * 0.7 + 2 * 0.4 * 0.3 * 0.9 * 0.4 * 0.7)^{0.5} = 40.13\%$

5-7

$1.5 * 10\% = 15\%$

5-8

the expected return = $5\% + 0.9 * (12.5\% - 5\%) = 11.75\%$

5-9

the expected return for the stock market = $12.5\% * (1 + 20\%) = 15\%$

the expected return for the stock = $5\% + 0.9 * (15\% - 5\%) = 14\%$

the percentage increase in the stock's expected return = $14\% / 11.75\% - 1 = 19.15\%$

5-10

Beta = $(15\% - 5\%) / (12\% - 5\%) = 1.43$

5-11

Conditional expected return of this mutual fund = $5\% + 1.4 (12\% - 5\%) = 14.8\%$

Mutual fund actually underperformed by 0.8% a year relative to the yardstick of CAPM.

5-12

the portfolio's beta = $0.4 * 1.2 + 0.3 * 0.9 + 0.3 * 1.8 = 1.29$

the expected return of this portfolio = $5\% + 1.29 * (12\% - 5\%) = 14.03\%$

5-13

a: Solving $12\% * W_{sp} + 5\% * (1 - W_{sp}) = 10\%$

we get $W_{sp} = 71.43\%$

b: $71.43\% * 1.0 = 0.7143$

5-14

a: 1.0

b: 12%

c. Not if markets are reasonably efficient. The trading costs incurred by active trading then will cause active money managers to fall short of the index.

5-15

a: $5\% + 1.2 * (6.5\% - 5\%) + 0.5 * (4.3\% - 5\%) + 0.8 * (8.0\% - 5\%) + 1.6 * (7.5\% - 5\%) = 12.85\%$

b: the actual return would be

$$5\% + 1.2 * (7.2\% - 5\%) + 0.5 * (5.2\% - 5\%) + 0.8 * (6.3\% - 5\%) + 1.6 * (10\% - 5\%) \\ = 16.78\%$$

the "surprise" on the return of this stock = $16.78\% - 12.85\% = 3.93\%$

5-16

if we assume that the average MV is the same for these two groups, then
the expected difference = $0.35 (\ln(0.3) - \ln(1.2)) = -0.4852\%$