Practice set -2

You are considering investing $1,000 in a T-bill that pays 0.05 and a risky portfolio, P, constructed with 2 risky securities, X and Y. The weights of X and Y in P are 0.60 and 0.40, respectively. X has an expected rate of return of 0.14 and variance of 0.01, and Y has an expected rate of return of 0.10 and a variance of 0.0081.

1. If you want to form a portfolio with an expected rate of return of 0.11, what percentages of your money must you invest in the T-bill and P, respectively?
   A. 0.25; 0.75
   B. 0.19; 0.81
   C. 0.65; 0.35
   D. 0.50; 0.50
   E. cannot be determined.

2. If you want to form a portfolio with an expected rate of return of 0.10, what percentages of your money must you invest in the T-bill, X, and Y, respectively if you keep X and Y in the same proportions to each other as in portfolio P?
   A. 0.25; 0.45; 0.30
   B. 0.19; 0.49; 0.32
   C. 0.32; 0.41; 0.27
   D. 0.50; 0.30; 0.20
   E. cannot be determined

3. What would be the dollar values of your positions in X and Y, respectively, if you decide to hold 40% percent of your money in the risky portfolio and 60% in T-bills?
   A. $240; $360
   B. $360; $240
   C. $100; $240
   D. $240; $160
   E. Cannot be determined

4. What would be the dollar value of your positions in X, Y, and the T-bills, respectively, if you decide to hold a portfolio that has an expected outcome of $1,120?
   A. Cannot be determined
   B. $568; $378; $54
   C. $568; $54; $378
   D. $378; $54; $568
   E. $108; $514; $378

Suppose you hold a complete portfolio that consists of a portfolio of risky assets (P) and T-Bills. The information below refers to these assets.

$E(R_p)$	12.00%
Standard Deviation of P	7.20%
T-Bill rate	3.60%
Proportion of Complete Portfolio in P	80%
Proportion of Complete Portfolio in T-Bills	20%

Composition of P:

Stock A	40.00%
Stock B	25.00%
Stock C	35.00%
Total	100.00%

5. What is the expected return on your complete portfolio?
   A. 10.32%
   B. 5.28%
   C. 9.62%
   D. 8.44%
   E. 7.58%

6. What is the standard deviation of your complete portfolio?
   A. 7.20%
   B. 5.40%
   C. 6.92%
   D. 4.98%
   E. 5.76%

7. What is the equation of your Capital Allocation Line?
   A. $E(r_C) = 7.2 + 3.6 *$ Standard Deviation of C
   B. $E(r_C) = 3.6 + 1.167 *$ Standard Deviation of C
   C. $E(r_C) = 3.6 + 12.0 *$ Standard Deviation of C
   D. $E(r_C) = 0.2 + 1.167 *$ Standard Deviation of C
   E. $E(r_C) = 3.6 + 0.857 *$ Standard Deviation of C

8. What are the proportions of Stocks A, B, and C, respectively in your complete portfolio?
   A. 40%, 25%, 35%
   B. 8%, 5%, 7%
   C. 32%, 20%, 28%
   D. 16%, 10%, 14%
   E. 20%, 12.5%, 17.5%

9. Suppose you invest 40 percent of his wealth in a risky asset with an expected rate of return of 0.18 and a variance of 0.10 and 60 percent in a T-bill that pays 4 percent. His portfolio's expected return and standard deviation are _____ and _____, respectively.
   A. 0.114; 0.112
   B. 0.087; 0.063
   C. 0.096; 0.126
   D. 0.087; 0.144
   E. 0.106; 0.137
10. Suppose you invest 70 percent of his wealth in a risky asset with an expected rate of return of 0.11 and a variance of 0.12 and 30 percent in a T-bill that pays 3 percent. His portfolio's expected return and standard deviation are _____ and _____, respectively.
   A. 0.086; 0.242
   B. 0.087; 0.267
   C. 0.295; 0.123
   D. 0.087; 0.182
   E. 0.106; 0.137

You invest $100 in a risky asset with an expected rate of return of 0.11 and a standard deviation of 0.20 and a T-bill with a rate of return of 0.03.

11. What percentages of your money must be invested in the risky asset and the risk-free asset, respectively, to form a portfolio with an expected return of 0.08?
   A. 85% and 15%
   B. 75% and 25%
   C. 62.5% and 37.5%
   D. 57% and 43%
   E. cannot be determined
12. What percentages of your money must be invested in the risk-free asset and the risky asset, respectively, to form a portfolio with a standard deviation of 0.08?
   A. 30% and 70%
   B. 50% and 50%
   C. 60% and 40%
   D. 40% and 60%
   E. Cannot be determined.
13. The slope of the Capital Allocation Line formed with the risky asset and the risk-free asset is equal to
   A. 0.47
   B. 0.80
   C. 2.14
   D. 0.40
   E. Cannot be determined.

You invest $1000 in a risky asset with an expected rate of return of 0.17 and a standard deviation of 0.40 and a T-bill with a rate of return of 0.04.

14. What percentages of your money must be invested in the risky asset and the risk-free asset, respectively, to form a portfolio with an expected return of 0.11?
    A. 53.8% and 46.2%
    B. 75% and 25%
    C. 62.5% and 37.5%
    D. 46.2% and 53.8%
    E. Cannot be determined.
15. What percentages of your money must be invested in the risk-free asset and the risky asset, respectively, to form a portfolio with a standard deviation of 0.20?
    A. 30% and 70%
    B. 50% and 50%
    C. 60% and 40%
    D. 40% and 60%
    E. Cannot be determined.

You invest $100 in a risky asset with an expected rate of return of 0.11 and a standard deviation of 0.21 and a T-bill with a rate of return of 0.045.

16. What percentages of your money must be invested in the risky asset and the risk-free asset, respectively, to form a portfolio with an expected return of 0.13?
    A. 130.77% and -30.77%
    B. -30.77% and 130.77%
    C. 67.67% and 33.33%
    D. 57.75% and 42.25%
    E. cannot be determined.
17. What percentages of your money must be invested in the risk-free asset and the risky asset, respectively, to form a portfolio with a standard deviation of 0.08?
    A. 301% and 69.9%
    B. 50.5% and 49.50%
    C. 60.0% and 40.0%
    D. 61.9% and 38.1%
    E. cannot be determined.
18. A portfolio that has an expected outcome of $114 is formed by
    A. Investing $100 in the risky asset.
    B. Investing $80 in the risky asset and $20 in the risk-free asset.
    C. Borrowing $46 at the risk-free rate and investing the total amount ($146) in the risky asset.
    D. Investing $43 in the risky asset and $57 in the riskless asset.
    E. Such a portfolio cannot be formed.

Consider the following probability distribution for stocks A and B:

State	Probability	Return on Stock A	Return on Stock B
1	0.15	8%	8%
2	0.20	13%	7%
3	0.15	12%	6%
4	0.30	14%	9%
5	0.20	16%	11%

19. The expected rates of return of stocks A and B are _____ and _____, respectively.
    A. 13.2%; 9%
    B. 13%; 8.4%
    C. 13.2%; 7.7%
    D. 7.7%; 13.2%
    E. 12.7%; 9.2%
20. The standard deviations of stocks A and B are _____ and _____, respectively.
    A. 1.56%; 1.99%
    B. 2.45%; 1.66%
    C. 3.22%; 2.01%
    D. 1.54%; 1.11%
    E. 3.22%; 2.82%
21. The coefficient of correlation between A and B is
    A. 0.474.
    B. 0.612.
    C. 0.590.
    D. 1.206.
    E. 0.751.
22. If you invest 35% of your money in A and 65% in B, what would be your portfolio's expected rate of return and standard deviation?
    A. 9.9%; 3%
    B. 9.9%; 1.1%
    C. 10%; 1.7%
    D. 10%; 3%
    E. 11%; 2.6%

Consider two perfectly negatively correlated risky securities A and B. A has an expected rate of return of 12% and a standard deviation of 17%. B has an expected rate of return of 9% and a standard deviation of 14%.

23. The weights of A and B in the global minimum variance portfolio are _____ and _____, respectively.
    A. 0.24; 0.76
    B. 0.50; 0.50
    C. 0.57; 0.43
    D. 0.45; 0.55
    E. 0.76; 0.24

24. The risk-free portfolio that can be formed with the two securities will earn _____ rate of return.
    A. 9.5%
    B. 10.4%
    C. 10.9%
    D. 9.9%
    E. 11.2%
25. Security X has expected return of 14% and standard deviation of 22%. Security Y has expected return of 16% and standard deviation of 28%. If the two securities have a correlation coefficient of 0.8, what is their covariance?
    A. 0.038
    B. 0.049
    C. 0.018
    D. 0.013
    E. 0.054
26. Given an optimal risky portfolio with expected return of 16% and standard deviation of 20% and a risk free rate of 4%, what is the slope of the best feasible CAL?
    A. 0.60
    B. 0.14
    C. 0.08
    D. 0.36
    E. 0.31

Consider the following probability distribution for stocks C and D:

State	Probability	Return on Stock C	Return on Stock D
1	0.30	7%	-9%
2	0.50	11%	14%
3	0.20	-16%	26%

27. The expected rates of return of stocks C and D are _____ and _____, respectively.
    A. 4.4%; 9.5%
    B. 9.5%; 4.4%
    C. 6.3%; 8.7%
    D. 8.7%; 6.2%
    E. 6.9%; 11.7%
28. The standard deviations of stocks C and D are _____ and _____, respectively.
    A. 7.62%; 11.24%
    B. 11.24%; 7.62%
    C. 10.35%; 12.93%
    D. 12.93%; 10.35%
    E. 12.93%; 7.35%
29. The coefficient of correlation between C and D is
    A. 0.67.
    B. 0.50.
    C. -0.50.
    D. -0.67.
    E. 0.81.

30. If you invest 25% of your money in C and 75% in D, what would be your portfolio's expected rate of return and standard deviation?
    A. 9.891%; 8.70%
    B. 9.945%; 11.12%
    C. 8.225%; 8.70%
    D. 10.275%; 11.12%
    E. 8.75%; 9.70%

Consider two perfectly negatively correlated risky securities K and L. K has an expected rate of return of 13% and a standard deviation of 19%. L has an expected rate of return of 10% and a standard deviation of 16%.

31. The weights of K and L in the global minimum variance portfolio are _____ and _____, respectively.
    A. 0.24; 0.76
    B. 0.50; 0.50
    C. 0.46; 0.54
    D. 0.45; 0.55
    E. 0.76; 0.24
32. The risk-free portfolio that can be formed with the two securities will earn _____ rate of return.
    A. 9.5%
    B. 11.4%
    C. 10.9%
    D. 9.9%
    E. E.6.0%
33. Your opinion is that security A has an expected rate of return of 0.145. It has a beta of 1.5. The risk-free rate is 0.04 and the market expected rate of return is 0.11. According to the Capital Asset Pricing Model, this security is
    A. underpriced.
    B. overpriced by 5%.
    C. fairly priced.
    D. cannot be determined from data provided.
    E. overpriced by 2%.
34. Your opinion is that security C has an expected rate of return of 0.106. It has a beta of 1.1. The risk-free rate is 0.04 and the market expected rate of return is 0.10. According to the Capital Asset Pricing Model, this security is
    A. underpriced by 5%.
    B. overpriced.
    C. fairly priced.
    D. cannot be determined from data provided.
    E. underpriced by 2%.

35. The risk-free rate is 4 percent. The expected market rate of return is 12 percent. If you expect stock X with a beta of 1.0 to offer a rate of return of 10 percent, you should
    A. buy stock X because it is overpriced.
    B. sell short stock X because it is overpriced.
    C. sell stock short X because it is underpriced.
    D. buy stock X because it is underpriced.
    E. hold the stock because it is fairly priced.

36. The risk-free rate is 5 percent. The expected market rate of return is 11 percent. If you expect stock X with a beta of 2.1 to offer a rate of return of 15 percent, you should
    A. buy stock X because it is overpriced.
    B. sell short stock X because it is overpriced.
    C. sell stock short X because it is underpriced.
    D. buy stock X because it is underpriced.
    E. hold the stock because it is fairly priced.

37. You invest 50% of your money in security A with a beta of 1.6 and the rest of your money in security B with a beta of 0.7. The beta of the resulting portfolio is
    A. 1.40
    B. 1.15
    C. 0.36
    D. 1.08
    E. 0.80
38. You invest $200 in security A with a beta of 1.4 and $800 in security B with a beta of 0.3. The beta of the resulting portfolio is
    A. 1.40
    B. 1.00
    C. 0.52
    D. 1.08
    E. 0.80
39. Security A has an expected rate of return of 0.10 and a beta of 1.3. The market expected rate of return is 0.10 and the risk-free rate is 0.04. The alpha of the stock is
    A. 1.7%.
    B. -1.8%.
    C. 8.3%.
    D. 5.5%.
    E. -1.7%.

40. A security has an expected rate of return of 0.15 and a beta of 1.25. The market expected rate of return is 0.10 and the risk-free rate is 0.04. The alpha of the stock is
    A. 1.7%.
    B. -1.7%.
    C. 8.3%.
    D. 3.5%.
    E. -8.3%.

Solutions:

1. E(rp) = 0.6(14%) + 0.4(10%) = 12.4%; 11% = 5x + 12.4(1 - x); x = 0.189 (T-bills) (1-x) = 0.811 (risky asset).
2. 5w + 12.4(1 - w); w = 0.32 (weight of T-bills); as composition of X and Y are .6 and .4 of P, respectively, then for 0.68 weight in P, the respective weights must be 0.41 and 0.27; .6(.68) = 41%; .4(.68) = 27%.
3. 10% < 4% + 1.0(12% - 4%) = 12.0%; therefore, stock is overpriced and should be shorted.
4. 15% < 5% + 2.1(11% - 5%) = 17.6%; therefore, stock is overpriced and should be shorted
5. 0.5(1.6) + 0.5(0.70) = 1.15.0.2(1.4) + 0.8(0.3) = 0.52.
6. 10% - [4% + 1.3(10% - 4%)] = -1.8%.
7. 15% - [4% + 1.25(10% - 4%)] = 3.5%.
8. $400(0.6) = $240 in X; $400(0.4) = $160 in Y.
9. ($1,120 - $1,000)/$1,000 = 12%; (0.6)14% + (0.4)10% = 12.4%; 12% = w5% + 12.4%(1 - w);w = .054; 1-w = .946; w = 0.054($1,000) = $54 (T-bills); 1 - w = 1 - 0.054 = 0.946($1,000) = $946; $946 x 0.6 = $568 in X; $946 x 0.4 = $378 in Y.
10. $E(r_C)$ = .8 * 12.00% + .2 * 3.6% = 10.32%
11. Std. Dev. of C = .8 * 7.20% = 5.76%
12. The intercept is the risk-free rate (3.60%) and the slope is (12.00% - 3.60%)/7.20% = 1.167.
13. Proportion in A = .8 * 40% = 32%; proportion in B = .8 * 25% = 20%; proportion in C = .8 * 35% = 28%.
14. $E(r_P) = 0.4(18\%) + 0.6(4\%) = 9.6\%$; $s_P = 0.4(0.10)^{1/2} = 12.6\%$.
15. $E(r_P) = 0.7(11\%) + 0.3(3\%) = 8.6\%$; $s_P = 0.7(0.12)^{1/2} = 24.2\%$.
16. $8\% = w_1(11\%) + (1 - w_1)(3\%)$; $8\% = 11\%w_1 + 3\% - 3\%w_1$; $5\% = 8\%w_1$; $w_1 = 0.625$; $1 - w_1 = 0.375$; $0.625(11\%) + 0.375(3\%) = 8.0\%$.
17. 0.08 = x(0.20); x = 40% in risky asset.
18. (0.11 - 0.03)/0.20 = 0.40.
19. $11\% = w_1(17\%) + (1 - w_1)(4\%)$; $11\% = 17\%w_1 + 4\% - 4\%w_1$; $7\% = 13\%w_1$; $w_1 = 0.538$; $1 - w_1 = 0.462$; $0.538(17\%) + 0.462(4\%) = 11.0\%$.
20. 0.20 = x(0.40); x = 50% in risky asset.
21. $13\% = w_1(11\%) + (1 - w_1)(4.5\%)$; $13\% = 11\%w_1 + 4.5\% - 4.5\%w_1$; $8.5\% = 6.5\%w_1$; $w_1 = 1.3077$; $1 - w_1 = -0.3077$; $1.308(11\%) + (-0.3077)(4.5\%) = 13.00\%$.
22. 0.08 = x(0.21); x = 38.1% in risky asset.
23. For $100, (114 - 100)/100 = 14%; $.14 = w_1(.11) + (1 - w_1)(.045)$; $.14 = .11w_1 + .045 - .045w_1$; $0.095 = 0.065w_1$; $w_1 = 1.46($100) = 146; $(1 - w_1)$$100 = -$46.

24. $E(R_A) = 0.15(8\%) + 0.2(13\%) + 0.15(12\%) + 0.3(14\%) + 0.2(16\%) = 13\%$; $E(R_B) = 0.15(8\%) + 0.2(7\%) + 0.15(6\%) + 0.3(9\%) + 0.2(11\%) = 8.4\%$.

25. $s_A = [0.15(8\% - 13\%)^2 + 0.2(13\% - 13\%)^2 + 0.15(12\% - 13\%)^2 + 0.3(14\% - 13\%)^2 + 0.2(16\% - 13\%)^2]^{1/2} = 2.449\%$; $s_B = [0.15(8\% - 8.4\%)^2 + 0.2(7\% - 8.4\%)^2 + 0.15(6\% - 8.4\%)^2 + 0.3(9\% - 8.4\%)^2 + 0.2(11\% - 8.4\%)^2]^{1/2} = 1.655\%$.
26. $cov_{A,B} = 0.15(8\% - 13\%)(8\% - 8.4\%) + 0.2(13\% - 13\%)(7\% - 8.4\%) + 0.15(12\% - 13\%)(6\% - 8.4\%) + 0.3(14\% - 13\%)(9\% - 8.4\%) + 0.2(16\% - 13\%)(11\% - 8.4\%) = 2.40$; $\rho_{A,B} = 2.40/[(2.45)(1.66)] = 0.590$.
27. $E(R_P) = 0.35(13\%) + 0.65(8.4\%) = 10.01\%$; $s_P = [(0.35)^2(2.45\%)^2 + (0.65)^2(1.66)^2 + 2(0.35)(0.65)(2.45)(1.66)(0.590)]^{1/2} = 1.7\%$.

28. $w_A = 14/(17 + 14) = 0.45$; $w_B = 1 - 0.45 = 0.55$.
29. $E(R_P) = 0.45(12\%) + 0.55(9\%) = 10.35\%$.
30. $Cov(r_X, r_Y) = (.8)(.22)(.28) = .04928$
31. Slope = (16 - 4)/20 = .6
32. $E(R_C) = 0.30(7\%) + 0.5(11\%) + 0.20(-16\%) = 4.4\%$; $E(R_D) = 0.30(-9\%) + 0.5(14\%) + 0.20(26\%) = 9.5\%$.
33. $s_C = [0.30(7\% - 4.4\%)^2 + 0.5(11\% - 4.4\%)^2 + 0.20(-16\% - 4.4\%)^2]^{1/2} = 10.35\%$; $s_D = [0.30(-9\% - 9.5\%)^2 + 0.50(14\% - 9.5\%)^2 + 0.20(26\% - 9.5\%)^2]^{1/2} = 12.93\%$.
34. $Cov_{C,D} = 0.30(7\% - 4.4\%)(-9\% - 9.5\%) + 0.50(11\% - 4.4\%)(14\% - 9.5\%) + 0.20(-16\% - 4.4\%)(26\% - 9.5\%) = -66.9$; $\rho_{A,B} = -66.90/[(10.35)(12.93)] = -0.50$
35. $E(R_P) = 0.25(4.4\%) + 0.75(9.5\%) = 8.225\%$; $s_P = [(0.25)^2(10.35)^2 + (0.75)^2(12.93)^2 + 2(0.25)(0.75)(10.35)(12.93)(-0.50)]^{1/2} = 8.70\%$.
36. $w_K = 1 - 0.54 = 0.46$; $w_L = 19/(19 + 16) = 0.54$.
37. $E(R_P) = 0.46(13\%) + 0.54(10\%) = 11.38\%$.
38. 14.5% = 4% + 1.5(11% - 4%) = 14.5%; therefore, the security is fairly priced.
39. 4% + 1.1(10% - 4%) = 10.6%; therefore, the security is fairly priced.