

EE431 Economics of Financial Markets and Institutions

Semester 1/2016 Mean Variance Analysis

Problem Set 3 and Solution Guidance (Self Study)

There is no need to submit. No mark will be given for this problem set.

1. Consider the following stocks.

Stock	Expected Return	Standard Deviation
A	5%	10%
B	7%	11%
C	6%	12%
D	6%	10%

Which stock would you prefer between the following pairs.

- (a) A and D? [D]
(b) B and C? [B]
(c) C and D? [D]
2. The covariance of the returns on the two securities, A and B, is - 0.0005. The standard deviation of A's returns is 4% and the standard deviation of B's returns is 6%. What is the correlation coefficient between the returns of A and B?
[-0.2083]
3. Consider securities D and E with the following estimates:
 $E(R_D) = 8\%$, $\sigma_D = 12\%$, $E(R_E) = 13\%$, $\sigma_E = 20\%$.
Now consider the portfolios that can be formed with D and E, assuming that the investment is equal between D and E (that is, each has a weight of 50%). What is the portfolio's standard deviation if the correlation between D and E for each of the following?
- (a) $r_{DE} = 1.0$. [$\sigma_p = 0.16$]
(b) $r_{DE} = 0.3$. [$\sigma_p = 0.131149$]
(c) $r_{DE} = 0.0$. [$\sigma_p = 0.116619$]
(d) $r_{DE} = -1.0$. [$\sigma_p = 0.04$]
4. Consider securities X and Y with the following estimates:
 $E(R_X) = 5\%$, $\sigma_X = 10\%$, $E(R_Y) = 15\%$, $\sigma_Y = 25\%$.
If the portfolio is comprised of 40% X and 60% Y and if the correlation coefficient between the returns on X and Y is -0.25, what is the portfolio's expected return and risk?
[$ER_p = 11\%$, $\sigma_p = 14.5268\%$]
5. For each of the following probability distribution, calculate the expected value and standard deviation:

	Outcome	Probability	Outcome Value
(a)	Good	30%	\$40
	Normal	50%	\$20
	Bad	20%	\$10

$$[E(X) = \$24, \sigma_X^2 = 124, \sigma_X = \$11]$$

	Outcome	Probability	Outcome Value
(b)	Pessimistic	10%	\$1,000,000
	Moderate	40%	\$4,000,000
	Optimistic	50%	\$6,000,000

$$[E(X) = \$4,700,000, \sigma_X^2 = 2,410,000,000, \sigma_X = \$1,552,417]$$

	Outcome	Probability	Outcome Value
(c)	One	10%	60%
	Two	50%	40%
	Three	30%	20%
	Four	10%	-40%

$$[E(X) = 28\%, \sigma_X^2 = 656, \sigma_X = 25.61\%]$$

1. Use the following information. Answer all parts of this question.

Security	Expected Return (ER)	Standard Deviation (σ)
A	9	8
B	12	15

Correlation coefficient (r_{xy}) between the rate of return of portfolio X and the rate of return of portfolio Y is -0.2. The risk free rate (R_f) is 1%.

- (a) Let the market portfolio M has 0.7 of the asset invested in X and 0.3 of the asset invested in Y. Calculate the expected rate of returns and the variance of portfolio M.
- (b) Given that the capital market line (CML) is tangent to the efficient frontier at the market portfolio, M in question (b). Find the equation for the CML.
- (c) Suppose that Miss Helen chooses to invest 0.75 of his wealth in the market portfolio M in question (b) and the rest 0.25 of her wealth in the risk free asset. Calculate the expected rate of returns on her portfolio.