

LAST NAME _____

FIRST NAME _____

Equation of the CAL with the tangency portfolio and one risk-free asset: $E(r_p) = r_f + \left(\frac{E(r_T) - r_f}{\sigma_T}\right) \sigma_p$

Variance of a portfolio composed of two assets, A and B: $Var(r_p) = w_A^2 \sigma_A^2 + w_B^2 \sigma_B^2 + 2w_A w_B \sigma_A \sigma_B \rho_{AB}$

Weight of asset A in the minimum variance portfolio with two assets, A and B: $w_A^{min} = \frac{\sigma_B(\sigma_B - \rho_{A,B}\sigma_A)}{\sigma_A^2 + \sigma_B^2 - 2\rho_{A,B}\sigma_A\sigma_B}$

The following applies to all questions below:

There are two risky assets, A and B, and one risk-free asset, r_f . $E(r_A)=15\%$, $E(r_B)=10\%$, $\sigma_A=8\%$, $\sigma_B=6\%$, $r_f=5\%$. The correlation between A and B is $\rho_{A,B} = -0.5$. The tangency portfolio has the following composition: $\{w_A; w_B\} = \{0.46; 0.54\}$. Short selling is allowed.

- a) What is the standard deviation of an efficient portfolio P that has $E(r_P)=20\%$, knowing that the standard deviation of the tangency portfolio is 3.48%?

- 35.78%
 14.90%
 7.15%
 9.74%

- b) Can I obtain a riskless portfolio by investing **only** in the two risky assets, A and B?

- Yes, by investing 100% in B and 0% in A
 Yes, by short-selling A and investing more than 100% in B
 No, such a portfolio cannot be obtained because assets A and B do not have the same standard deviation
 No, such a portfolio cannot be obtained because the correlation between A and B is not -1 or +1

- c) Which one of the following portfolios, $\{w_A; w_B; w_f\}$, is efficient?

- $\{0.2; -0.3; 1.1\}$
 $\{0.046; 0.054; 0.9\}$
 $\{0.06; 0.04; 0.9\}$
 $\{1.23; 0.27; -0.5\}$

- d) What is the weight of asset A in the Minimum Variance Portfolio?

- 0.41
 0
 0.73
 -0.12

- e) What is the weight of asset A in a portfolio P that has $E(r_P)=12\%$, and in which the weight of the risk-free asset is 0?

- 0.5
 0.75
 0.4
 -0.1

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Weight of asset A in the minimum variance portfolio with two assets, A and B: $w_A^{min} = \frac{\sigma_B(\sigma_B - \rho_{A,B}\sigma_A)}{\sigma_A^2 + \sigma_B^2 - 2\rho_{A,B}\sigma_A\sigma_B}$

The following applies to all questions below:

There are two risky assets, A and B, and one risk-free asset, r_f . $E(r_A)=15\%$, $E(r_B)=10\%$, $\sigma_A=8\%$, $\sigma_B=6\%$, $r_f=5\%$. The correlation between A and B is $\rho_{A,B} = -0.1$. The tangency portfolio has the following composition: $\{w_A; w_B\} = \{0.51; 0.49\}$. Short selling is allowed.

- a) Can I obtain a riskless portfolio by investing **only** in the two risky assets, A and B?

- Yes, by investing 100% in B and 0% in A
 Yes, by short-selling A and investing more than 100% in B
 No, such a portfolio cannot be obtained because the correlation between A and B is not -1 or +1
 No, such a portfolio cannot be obtained because assets A and B do not have the same standard deviation

- b) What is the standard deviation of an efficient portfolio P that has $E(r_P)=18\%$, knowing that the standard deviation of the tangency portfolio is 4.78%?

- 11.89%
 29.67%
 8.23%
 6.45%

- c) Which one of the following portfolios, $\{w_A; w_B; w_f\}$, is efficient?

- {1.23; 0.27; -0.5}
 {0.5; -0.8; 1.3}
 {0.051; 0.049; 0.9}
 {0.12; -0.02; 0.9}

- d) What is the weight of asset A in the Minimum Variance Portfolio?

- 0
 0.85
 -0.16
 0.37

- e) What is the weight of asset A in a portfolio P that has $E(r_P)=14\%$, and in which the weight of the risk-free asset is 0?

- 0.8
 0.75
 0.5
 -0.2

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The following applies to all questions below:

There are two risky assets, A and B, and one risk-free asset, r_f . $E(r_A)=15\%$, $E(r_B)=10\%$, $\sigma_A=8\%$, $\sigma_B=6\%$, $r_f=5\%$. The correlation between A and B is $\rho_{A,B}=0.5$. The tangency portfolio has the following composition: $\{w_A; w_B\}=\{0.75; 0.25\}$. Short selling is allowed.

- a) What is the standard deviation of an efficient portfolio P that has $E(r_P)=20\%$, knowing that the standard deviation of the tangency portfolio is 6.87%?

- 32.71%
 11.78%
 13.90%
 8.74%

- b) Which one of the following portfolios, $\{w_A; w_B; w_f\}$, is efficient?

- $\{0.2; -0.3; 1.1\}$
 $\{0.05; 0.05; 0.9\}$
 $\{1.23; 0.27; -0.5\}$
 $\{0.075; 0.025; 0.9\}$

- c) Can I obtain a riskless portfolio by investing **only** in the two risky assets, A and B?

- No, such a portfolio cannot be obtained because the correlation between A and B is not -1 or +1
 Yes, by investing 100% in B and 0% in A
 Yes, by short-selling A and investing more than 100% in B
 No, such a portfolio cannot be obtained because assets A and B do not have the same standard deviation

- d) What is the weight of asset A in the Minimum Variance Portfolio?

- 0
 0.83
 0.23
 -0.11

- e) What is the weight of asset A in a portfolio P that has $E(r_P)=11\%$, and in which the weight of the risk-free asset is 0?

- 0.5
 0.2
 0.65
 -0.3

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The following applies to all questions below:

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- a) What is the standard deviation of an efficient portfolio P that has $E(r_P)=20\%$, knowing that the standard deviation of the tangency portfolio is 5.39%?

- 36.78%
 15.91%
 9.79%
 10.43%

- b) Can I obtain a riskless portfolio by investing **only** in the two risky assets, A and B?

- Yes, by investing 100% in B and 0% in A
 Yes, by short-selling A and investing more than 100% in B
 No, such a portfolio cannot be obtained because the correlation between A and B is not -1 or +1
 No, such a portfolio cannot be obtained because assets A and B do not have the same standard deviation

- c) Which one of the following portfolios, $\{w_A; w_B; w_f\}$, is efficient?

- {0.3; -0.4; 1.1}
 {0.07; 0.03; 0.9}
 {1.24; 0.26; -0.5}
 {0.055; 0.045; 0.9}

- d) What is the weight of asset A in the Minimum Variance Portfolio?

- 0.15
 0
 0.79
 0.35

- e) What is the weight of asset A in a portfolio P that has $E(r_P)=13\%$, and in which the weight of the risk-free asset is 0?

- 0.6
 0.55
 0.8
 -0.3