Quiz 4a

LAST NAME \_\_\_\_\_

**HEC Paris** 

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 <u>all questions</u> 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.

 $\Box$  {0.2; -0.3; 1.1}

 $\Box$  {0.046; 0.054; 0.9}

- 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%?
- b) Can I obtain a riskless portfolio by investing **only** in the two risky assets, A and B?
- □ 35.78% □ 14.90% □ 7.15% □ 9.74%
  - □ Yes, by investing 100% in B and 0% in A
    □ Yes, by short-selling A and investing more than 100%

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- 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<sub>A</sub>; w<sub>B</sub>; w<sub>f</sub>}, is efficient?
- $\Box \{0.06; 0.04; 0.9\} \\\Box \{1.23; 0.27; -0.5\}$
- 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<sub>P</sub>)=12%, and in which the weight of the risk-free asset is 0?



Quiz 4b

LAST NAME \_\_\_\_\_

**HEC Paris** 

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:  $w_A^{min} = \frac{\sigma_B(\sigma_B - \rho_{A,B}\sigma_A)}{\sigma_A^2 + \sigma_B^2 - 2\rho_{A,B}\sigma_A\sigma_B}$ 

in B

#### The following applies to <u>all questions</u> below:

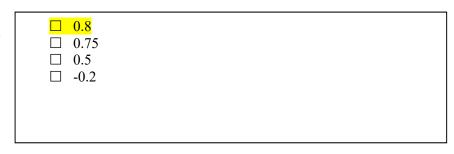
There are two risky assets, A and B, and one risk-free asset,  $r_f$ .  $E(r_A)=15\%$ ,  $E(r_B)=10\%$ ,  $\sigma_A=8\%$ ,  $\sigma_B=6\%$ ,  $r_f=5\%$ . The correlation between A and B is  $\rho_{A,B}=$  - 0.1. The tangency portfolio has the following composition:  $\{w_A; w_B\}=\{0.51; 0.49\}$ . Short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

 $\Box$  {0.12; -0.02; 0.9}

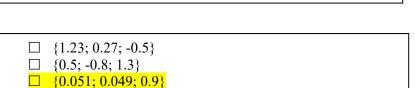
- a) Can I obtain a riskless portfolio by investing **only** in the two risky assets, A and B?
- b) What is the standard deviation of an efficient portfolio P that has  $E(r_P)=18\%$ , knowing that the standard deviation of the tangency portfolio is 4.78%?
- c) Which one of the following portfolios, {w<sub>A</sub>; w<sub>B</sub>; w<sub>f</sub>}, is efficient?
- d) What is the weight of asset A in the Minimum Variance Portfolio?

□ 0 □ 0.85		
□ -0.16		

e) What is the weight of asset A in a portfolio P that has E(r<sub>P</sub>)=14%, and in which the weight of the risk-free asset is 0?



□ 11.89% □ 29.67% □ 8.23% □ 6.45%



# .WIE \_\_\_\_\_

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 $\Box$  Yes, by investing 100% in B and 0% in A

 $\Box$  Yes, by short-selling A and investing more than 100%

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

Quiz 4c

LAST NAME \_\_\_\_\_

**HEC Paris** 

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

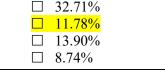
Variance of a portfolio composed of two assets, A and B:  $Var(r_P) = w_A^2 \sigma_A^2 + w_B^2 \sigma_B^2 + 2w_A w_B \sigma_A \sigma_B \rho_{AB}$ 

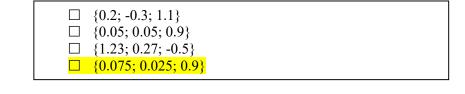
Weight of asset A in the minimum variance portfolio with two assets, A and B:  $w_A^{min} = \frac{\sigma_B(\sigma_B - \rho_{A,B}\sigma_A)}{\sigma_A^2 + \sigma_B^2 - 2\rho_{A,B}\sigma_A\sigma_B}$ 

# The following applies to <u>all questions</u> 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%?
- b) Which one of the following portfolios, {w<sub>A</sub>; w<sub>B</sub>; w<sub>f</sub>}, is efficient?
- c) Can I obtain a riskless portfolio by investing **only** in the two risky assets, A and B?





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- 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?



e) What is the weight of asset A in a portfolio P that has E(r<sub>P</sub>)=11%, and in which the weight of the risk-free asset is 0?



Quiz 4d

LAST NAME \_\_\_\_\_

**HEC Paris** 

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 <u>all questions</u> 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:  $\{w_A; w_B\}=\{0.55; 0.45\}$ . 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 5.39%?
- b) Can I obtain a riskless portfolio by investing **only** in the two risky assets, A and B?
- □ 36.78% □ 15.91% □ 9.79% □ 10.43%
  - $\Box$  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

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- No, such a portfolio cannot be obtained because assetsA and B do not have the same standard deviation
- c) Which one of the following portfolios, {w<sub>A</sub>; w<sub>B</sub>; w<sub>f</sub>}, is efficient?
- $\Box \{0.3; -0.4; 1.1\} \\\Box \{0.07; 0.03; 0.9\} \\\Box \{1.24; 0.26; -0.5\} \\\Box \{0.055; 0.045; 0.9\}$
- d) What is the weight of asset A in the Minimum Variance Portfolio?

□ -0.15 □ 0		
0.79		

e) What is the weight of asset A in a portfolio P that has E(r<sub>P</sub>)=13%, and in which the weight of the risk-free asset is 0?

$\begin{array}{c c} \hline 0.6\\ \hline 0.55\\ \hline 0.8\\ \hline -0.3 \end{array}$			