Advanced Financial Theory (1741)

Fall - 2011

Second Exam: 26.11.2011 Time allowed: 4 hours

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Please attempt all question as they carry equal marks. **Good Luck!**

Question 1: Please select the right answer from the following multiple choice questions. You can only pick one option as a correct answer.

1. Diversification among assets improves the opportunities faced by all risk-averse investors

   a. irrespective of the correlation coefficients

   b. only if correlations are not larger than 0

   c. only if the assets have similar variances

   d. for assets with relatively large variances

   e. none of the above

2. Which statement is true?

   a. An efficient portfolio always provides the highest expected rate of return.

   b. An efficient portfolio has less risk than any other asset or portfolio with comparable expected return and more return than any other asset or portfolio with comparable risk.

   c. Neither one of the above statements is true.

3. With a riskless asset and risky assets, the efficient portfolio opportunity set is a straight line. The preceding statement

   a. is true.

   b. is false.

   c. could be true or false, depending on the correlations of the risky assets.

4. Consider the following data for portfolios A and B, which are both on the efficient frontier:

$$\bar{R}_A = 11\%;\ \bar{R}_B = 14\%;\ \sigma_A = 10\%;\ \sigma_B = 17\%$$

$w \cdot 11 + (1-w) \cdot 14 = 12$

$11w + 14 - 14w = 12$

$2 = 3w$

If you want to earn 12% by investing in A and B, what portion of your money must you invest in A?

   a. 1/5

   b. 2/3

c. 1/3

d. 4/5

5. Which of the following investment strategies is inconsistent with a "contrarian" philosophy?

a. buying low, selling high

b. buying when odd-lot buying is lower than normal

c. buying when mutual fund cash positions are low

d. buying when most investment advisory services are bearish

e. selling after a market crash or decline

6. In a strongly efficient market, no mutual fund manager will beat the market in any period.

a. true

b. false

7. Studies show that stocks with high dividend yields and low P/E ratios earn excess returns.

a. true

b. false

8. Which of the following statement is true of the efficient markets hypothesis?

a. It implies perfect forecasting ability.

b. It implies that prices reflect all available information.

d. It implies that market is irrational.

e. It implies that prices do not fluctuate.

Question 2: Assume that the mean-variance opportunity set is constructed from only 2 risky assets, A and B. Their variance-covariance matrix is:

$$\Sigma = \begin{pmatrix} \sigma_a^2 & \sigma_{ab}^2 \\ \sigma_{ab}^2 & \sigma_b^2 \end{pmatrix} = \begin{pmatrix} 0.0081 & 0 \\ 0 & 0.0025 \end{pmatrix}$$

and the vector of expected returns is:

$$r = \begin{pmatrix} r_a \\ r_b \end{pmatrix} = \begin{pmatrix} 0.3 \\ 0.2 \end{pmatrix}$$

i. Suppose investor I chooses his market portfolio to consist of 75% in asset A and 25% in asset B, whereas investor J chooses a different market portfolio with 50% in asset A and 50% in asset A. Weight chosen by I are $(0.75; 0.25)$. Weight chosen by J are: $(0.5; 0.5)$. Given these facts, what β will each investor calculate for asset A?

ii. Given your answer, which of the following is true and why?

a. Investor *I* will require a higher rate of return on asset A then investor *J*
b. They will both require the same return on asset A.
c. Investor *J* will require a higher rate of return on asset A than investor *I*.

Question 3: Suppose there are only two possible future states of the world, and the utility function is logarithmic. Let the probability of state 1, π_1, equal $\frac{2}{3}$, and the prices of the pure securities, p_1 and p_2, equal €0.60 and €0.40, respectively. An individual has an initial wealth or endowment, W_0, of €50,000.

(a) What amount will risk averse individual invest in pure securities 1 and 2?
(b) How will the individual divide his or her initial endowment between current and future consumption?

[Hint: You could use the Lagrange multiplier technique to solve this problem]

Question 4: A firm has a senior bond obligation of €20 due this period and €100 due next period. It also has a subordinated loan of €40 owed to Jack and Jill and due next period. It has no projects to provide cash flows this period. Therefore, if the firm cannot get a loan of €20, it must liquidate. The firm has a current liquidation value of €120. If the firm does not liquidate, it can take one of two projects with no additional investment. If it takes project A, it will receive cash flows of €135 next period, for sure. If the firm takes project B, it will receive either cash flows of €161 or €69 with equal probability. Assume risk neutrality, a zero interest rate, no direct bankruptcy costs and no taxes.

i. What has a higher PV: liquidating, project A, or Project B?
ii. Should Jack and Jill agree to loan the firm the €20 it needs to stay operating if they receive a (subordinated) bond with a face value of €20.50?
iii. If the firm does receive the loan from Jack and Jill, which project will the managers choose if they act in the interest of the equity holders?

Question 5:

i. How can macroeconomic variables be used in a multi factor asset pricing model? Please provide your own intuition and some examples of the macroeconomic factors.

ii. Given the following Fama-French three factor model:

$$r_i - r_f = \alpha_i + \beta_{Mkt,i}[r_i - r_f] + \beta_{smb,i}SMB + \beta_{hml,i}HML + \varepsilon_i$$

a. Please explain the model and provide intuitive explanation of the factors.
b. If α_i is statistically indistinguishable from zero in the above model, what does it imply?