



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF ECONOMICS AND FINANCE

BACHELOR OF ECONOMICS

EAE 414: THEORY OF FINANCE

DATE: 3/12/2019

TIME: 2.00-4.00 PM

INSTRUCTIONS:

- (i) Answer question one (Compulsory) and any other two questions
- (ii) Do not write on the question paper

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Discuss the following concepts as used in finance:

- i. Market completeness (2 marks)
- ii. Asset redundancy (2 marks)
- iii. Arbitrage (2 marks)
- iv. State price (2 marks)
- v. Stochastic dominance (2 marks)

b) Consider the following set of returns for two risky securities X and Y:

Probability	X_i (%)	Y_i (%)
0.2	11	-3
0.2	9	15
0.2	25	2
0.2	7	20
0.2	-2	6

Required:

- i. Expected returns of the two securities (4 marks)
 - ii. Variance and standard deviation for each of the two securities (4 marks)
 - iii. Expected returns for the portfolio (assuming the securities have equal weights) (2 marks)
 - iv. Covariance between the two securities (4 marks)
- c) Distinguish between weak and strong k-fund separability. (6 marks)

QUESTION TWO (20 MARKS)

- a) Explain the elements of asset pricing (4 marks)
- b) Consider the following three securities which give the stated payoffs at the stated probabilities

Security 1		security 2		Security 3	
Payoff	Prob.	Payoff	Prob.	Pay off	Prob.
4	0.25	1	0.33	6	0.20
5	0.50	6	0.33	10	0.70
12	0.25	8	0.33	13	0.10

- i. Draw the pairwise cumulative distribution curves for the payoffs in separate panels (12 marks)
- ii. which pairs of these securities exhibit first order stochastic dominance and second order stochastic dominance (4 marks)

QUESTION THREE (20 MARKS)

- a) Using relevant examples, explain the financial problems faced by individuals and corporations. (8 marks)
- b) Consider a capital market with three states of the world (nature) and three securities. Security 1 is risk free and it has a payoff of 2 in all the 3 states, Security 2 has a payoff of 1 in state 1, 0 in state 2 and 0 in state 3 while Security 3 has a payoff of 0 in state 1, 1 in state 2 and 1 in state 3.

Required:

- i. Present the above information in a payoff matrix (2 marks)
- ii. Using the information given, is the capital market complete? (7 marks)

- iii. Suppose the three securities have the same price ($P=2$), Compute their respective returns. (3 marks)

QUESTION FOUR (20 MARKS)

- a) Asset pricing models are concerned with the prices of assets (securities) and portfolios in security markets. State the assumptions made in order to characterize the assets and portfolios. (5 marks)
- b) Suppose that there are two states and two securities with payoffs $x_1(2,2)$ and $x_2(4,0)$. The representative agent's utility function is given by;

$$U(c_0, c_1, c_2) = \ln(c_0) + \frac{1}{2}\ln(c_1) + \frac{1}{2}\ln(c_2)$$

Where $c_0, c_1, c_2 \gg 0$

If endowment at date 0 is 3 and at date 1 is (1, 4);

Find:

- i. The expression for the price of portfolio $h = (h_1, h_2)$ assuming that the price of h_1 and h_2 is p_1 and p_2 , respectively. (1 mark)
- ii. The asset span M. (2 marks)
- iii. Formulate and solve the consumption portfolio choice problem for this agent. (7 marks)
- c) Suppose there are two securities and two states of the economy. Security 1 pays off 2 in state 1 and 1 in state 2 while security 2 pays off 1 in state 1 and 2 in state 2. For simplicity, suppose that the prices are unity for securities 1 and 2, that is $p_i = 1$ for $i = 1, 2$. Compute the state prices and the risk free interest rate. (5 marks)

QUESTION FIVE (20 MARKS)

- a) Consider a one period two state economy with a risk free debt D and stock S (D and S represent values at the beginning of the period (date 0)). There are two states at date 1 in which the stock is up with return u and down with return d . $d < u$ for normal stock. Using this information, derive the no arbitrage condition and explain what happens if it does not hold. (8 marks)
- b) Given the following information about security A and security B:
 Mean of A = 10%; Mean of B = 8%; Variance of A = 0.0076; Variance of B = 0.00708
 Covariance (A, B) = -0.0024

The following table shows the different percentages that can be invested in each security to make up a portfolio.

% invested in A	% invested in B	E(R_p)	Var (P)
100	0		
75	25		
50	50		
25	75		
0	100		

Required:

- i. Compute the missing values on the tables for the expected return of the portfolio E (R_p) and Variance of the portfolio Var (P) given different combinations of the two securities. (10 marks)
- ii. What is the optimal combination of the two assets? Why? (2 marks)