ECO764A: Financial Econometrics

Assignment 1

Date: January 20, 2023

Last date of Submission: 5th February by midnight (positively)

Total Marks

Instructions:

1. All questions are compulsory.
2. It is an individual assignment, and it is mandatory for everyone.
3. Please go through Bodie, Kane and Marcus (BKM) Chapters 5-9 to understand the problem statement.
4. Spreadsheet work needs solver and for your convenience, I have attached the user document that explains the usage of Solver. An excel file is also attached for your reference. Please have a look.

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1. Consider the following variance covariance matrix for assets A, B and C

	A	B	C
A	2	1	0
B	1	2	1
C	0	1	2

The expected returns over the assets A, B & C are 11%, 9% and 5% respectively. The risk free rate is 2% . Then the minimum variance portfolio is.

a. A=0.5, B=0, C=0.5
b. A=0.5, B=0.5, C=0
c. A=1/3, B=1/3, C=1/3
d. A=0.25, B=0.5, C=0.25

2. Consider an efficient portfolio with following values

Expected Return $E(R_j)$	20%

Market return, $E(R_M)$	15%
Market standard deviation, σ_M	20%
Risk free rate, R_f	5%

Then the value of σ_j is

a. 10%
b. 15%
c. 20%
d. 5%

3. Consider the following variance covariance matrix

Asset	A	B	C
A	15	-20	70
B	-10	15	5
C	8	7	7

The covariance of a portfolio that has 25% in asset 1, 50% in asset 2 and 25% in asset 3 with another portfolio having equal weights in all three.

a. 8.92
b. 6.15
c. 5.42
d. 11.26

4. Sunpharma stock has a beta of 1.25, and the growth is 10% and gives a dividend of ₹7 next year, the stock is currently selling at a price of rupees 60. Assume the risk-free rate to be 5%. Due to some economic mishappening the company now has a new estimated beta of 1, ceteris paribus price of its new share will be.
a. 82
b. 84
c. 88
d. 90

5. Consider an efficient portfolio with following values

Expected Return $E(R_j)$	30%
Market return, $E(R_M)$	20%
Market standard deviation, σ_M	10%
Risk free rate, R_f	5%

Then the value of covariance of market and portfolio is

a. 5/300

b. 4/300

c. 7/200

d. 9/200

6. A portfolio manager observed following assets and market forecasts

Asset forecasts

instrument	Expected returns (%)	β	σ(residual) %
P	20	1.3	58
Q	18	1.8	71
R	17	0.7	60
S	12	1.0	55

Market forecast

instrument	Expected return (%)	σ(residual) %
Govt bills	8	0
Passive equity portfolio	16	23

Then the Sharpe ratio is

a. 0.3662

b. 0.4175

c. 0.2547

d. 0.1764

7. Consider the values for a given portfolio in the following table

Expected Return $E(R_j)$	20%

Market return, $E(R_M)$	10%
Risk free rate, R_f	5%

Then the value of beta and the portfolio weight (w) is
a. beta = 2, w = 100%
b. beta = 3, w = 300%
c. beta = 2, w = 200%
d. beta = 3, w = 50%

8. The joint distribution for the returns of the 2 instruments A and B,(R_a and R_b for returns) is given below

$P(R_a = -1 \text{ and } R_b = 0.15) = 0.1$
$P(R_a = 0.5 \text{ and } R_b = 0.15) = 0.8$
$P(R_a = 0.5 \text{ and } R_b = 1.65) = 0.1$

Then Which of the statement is true
   a. Will choose A based on mean-variance optimization concept.
   b. Will choose B based on mean-variance optimization concept.
   c. Both A and B
   d. Neither A nor B should be chosen
9. Let the risk-free rate be 6% and return on the market be 16%, you do an investment over a project which has a cash flow of ₹1000 per year but you are unaware of the risk you are taking. You found out that beta was 0.5 then valuation of the firm is
   a. Rs 8015
   b. Rs 7025
   c. Rs 6150
   d. Rs 9092
10. Consider the following portfolio risk profiles:

Portfolio	Risk premium (%)	Expected return (%)	Standard devi. (risk)
X	9	14	22
Y	5	11	10
Z	3	9	6

There are three investors with following index of risk aversion

Investor	Risk aversion index

A	3
B	4
C	5

Then which of the following is true

a. A chooses X, while B and C choose Y

b. A and B choose Z, while C chooses Z

c. All choose Z

d. All choose X

11. Download the monthly data (at-least five years) of five stocks of your choice from Yahoo Finance and calculate the following:
    a. Calculate the minimum variance portfolio with optimal weights by considering only two stocks. Also, draw the efficient frontier of the same.
    b. Find the optimal weights and maxim Sharpe ratio by considering all five stocks portfolio and draw the efficient frontier.