ASSIGNMENT 3

ECO423A: Financial Economics

Last date of submission: 08 July 2017

Total Marks: 60 (5*12)

1. Suppose you have invested Rs.8 million each in DLF and Reliance and Rs. 4 million in Hindustan Lever. For your purpose, you have prepared a report using CAPM, to know about the following.

    a. What is the expected return and risk (standard deviation) of the portfolio?

    b. What is the scope for appreciation in market price of the three stocks-are they overvalued or undervalued?

    Suppose the betas of DLF and Reliance stocks are 1.7 and 0.8 respectively. Further, you have obtained the following historical data on the returns of Hindustan Unilever (HUL).

Period	Market returns (%)	Return on HUL (%)
1	10	14
2	5	8
3	-2	-6
4	-1	4
5	5	10
6	8	11
7	10	15

On the future returns of the three stocks, you are able to obtain the following forecast from a reputed firm of portfolio managers.

State of the economy	Probability	T Bills (%)	DLF	Reliance	HUL	NSE
Recession	0.3	7	5	15	-10	-2
Recovery	0.4	7	18	8	16	17
Expansion	0.3	7	30	12	24	26

Prepare a detailed report on your investment scheme.

2. A portfolio consists of 4 securities, 1, 2, 3, and 4. The proportions of these securities are: w_1=0.3, w_2=0.2, w_3=0.2, and w_4=0.3. The standard deviations of returns on these securities (in percentage terms) are : σ_1=5, σ_2=6, σ_3=12, and σ_4=8. The correlation coefficients among security returns are: ρ_{12}=0.2, ρ_{13}=0.6, ρ_{14}=0.3, ρ_{23}=0.4, ρ_{24}=0.6, and ρ_{34}=0.5. Assume equiproportional investment.

    a. What is the standard deviation of portfolio return?

3. The returns of 4 stocks, *A, B, C,* and *D* over a period of 5 years have been as follows:

	1	2	3	4	5
A	8%	10%	-6%	-1%	9 %
B	10%	6%	-9%	4 %	11%
C	9%	6%	3%	5%	8%
D	10%	8%	13%	7%	12%

Calculate the return on:

a. portfolio of one stock at a time

b. portfolios of two stocks at a time

c. portfolios of three stocks at a time.

d. a portfolio of all the four stocks.

4. The required return on the market portfolio is 16 percent. The beta of stock A is 1.6. The required return on the stock is 22 percent. The expected dividend growth on stock A is 12 percent. The price per share of stock A is Rs.260.

    a. What is the expected dividend per share of stock A next year?

    b. What will be the combined effect of the following on the price per share of stock?

        i. The inflation premium increases by 5 percent.

        ii. The decrease in the degree of risk-aversion reduces the differential between the return on market portfolio and the risk-free return by one-half.

        iii. The expected growth rate of dividend on stock A decrease to 10 percent.

        iv. The beta of stock A falls to 1.1

5. The risk-free return is 7 percent and the return on market portfolio is 13 percent. Stock P's beta is 0.8; its dividends and earnings are expected to grow at the constant rate of 5 percent. If the previous dividend per share of stock P was Rs.1.00, what should be the intrinsic value per share of stock P?

6. The risk-free return is 8 percent and the return on market portfolio is 16 percent. Stock X's beta is 1.2; its dividends and earnings are expected to grow at the constant rate of 10 percent. If the previous dividend per share of stock X was Rs.3.00, what should be the intrinsic value per share of stock X?

7. Mammoth Corporation is facing gloomy prospects. The earnings and dividends are expected to decline at the rate of 10 percent. The previous dividend was Rs.3.00. If the current market price is Rs.25.00, what rate of return do investors expect from the stock of Mammoth Limited?

8. You decide to invest your money in a stock portfolio consisting of 60% Delta Systems and 40% in Flipkart. Using the data in the following table, you find that Delta has an annual standard

deviation of 0.363 and Flipkart 0.34. The correlation coefficient between the returns of both stock is 0.34.

a. Calculate the variance and standard deviation of this portfolio.

b. Calculate the relative contribution of each stock to this portfolio's variance

c. Calculate the β of each stock relative to this two-stock portfolio. Check your results

d. Now calculate portfolio risk (standard deviation) and return using some different values for the weights and plot the results in risk-return space. Using the given table.

e. The graph you plotted under (d) gives you a good idea what the minimum variance portfolio looks like, but can you calculate the properties exactly? What weights give the portfolio its minimum variance? What are this portfolio's standard deviation and return?

f. How would the graph you under (d) look if Delta and Flipkart were perfectly positively correlated?

	Correlation Matrix							
	Factset	Delta	ABC	Flipkart	TCS	Return	Ann. St.dev	weight
Factset	1					0.08	0.287	0.1
Delta	0.43	1				0.075	0.363	0.1
ABC	0.34	0.28	1			0.06	0.462	0.6
Flipkart	0.55	0.34	0.35	1		0.125	0.340	0.1
TCS	0.62	0.43	0.39	0.58	1	0.10	0.250	0.1

9. Assume that you are assigned the task of evaluating the stock of Reliance Industries. To evaluate stock, you calculate its required return using the CAPM. The following information is available:
Expected market risk premium 5%
Risk-free rate 4%
Reliance industry' beta 1.5
Using CAPM, calculate and interpret the expected return of reliance industries.

10. An investment firm, UBS, employs two-factor APT model. The risk free rate equals 5%. Determine the expected return for UBS using the following data:

	Factor 1	Factor 2
UBS	1.50	2.00
Factor risk premiums	0.0300	0.0125

Also, suppose UBS uses a single factor model to evaluate assets and exploit the possible arbitrage opportunities. Consider the following data for portfolios A, B and C

Portfolio	Expected return	Beta
A	10%	1
B	20%	2
C	13%	1.5

Calculate the arbitrage opportunity from the above data.

11. Spreadsheet work

Download the monthly data from **Yahoo Finance** for Nifty, Tata Motors, TCS and Hindustan Unilever Ltd for 31 months and calculate the following:

a. For risk free rate, you can assume the rate of 91 days treasury bills rate available on the website of RBI or banks deposit rate, available online freely.

b. Calculate the monthly returns and standard deviation of sample stocks and market index

c. Draw the efficient frontier by pairing these stocks except Nifty and calculate the risk premium and Sharpe ratio

d. Using the risk free rate, please exhibit the most efficient portfolio combination given the risk free rate.

e. What weights give the portfolio its minimum variance? What are this portfolio's standard deviation and return?

f. Calculate also the beta of the company using three different options

12. Download the monthly data of 61 months from **Yahoo Finance** on 10 stocks and form a portfolio to calculate the following details
    a. Calculate the average monthly returns of all the sample stocks

    b. Calculate the variance and standard deviation of these stocks

    c. Calculate the variance- covariance and correlation matrices of these stocks

    d. Calculate the beta of the company using three different options. You can assume the market index and risk free rate as per your choice

    e. Optimize the portfolio using Excel solver for these stocks and analyze the optimal weights

    f. Evaluate each stock with respect to market index using Sharpe ration, Treynor Ratio and Jensen's Alpha.

THE END