UNIT 7: RISK ASSESSMENT FOR SHARES AND OTHER FINANCIAL ASSETS

QUESTIONS

1. What information is necessary to compute the expected return of a portfolio?

2. What does correlation tell us?

3. Why is the total risk of a portfolio not simply equal to the weighted average of the risks of the securities in the portfolio?

4. What does beta measure? How do we use beta?

5. What, intuitively, does the CAPM say drives expected return?

6. What relationship does the security market line describe?

7. Say whether the following statement is true or false, and why: **A portfolio's risk can only be diversified by combining securities if the securities involved are negatively correlated**.

EXERCISES

EXERCISE 1. Suppose you have a portfolio with €1,200 invested in shares of company A, €1,400 in shares of company B, and €500 in shares of company C. If the expected returns on these shares are 11%, 16% and 9%, respectively:

Stock A: E(RA) = 11%
Stock B: E(RB) = 16%
Stock C: E(RC) = 9%

a) What is your portfolio's expected return?

Var-cov matrix	A	B	C
A	0.001	0.0003	0.0021
B		0.004	0.0012
C			0.0012

b) What is your portfolio's standard deviation?

Note: Covariance = Correlation12 * SD1 * SD2

EXERCISE 2. You have the following information on the returns of three stocks:

1. They all have the same expected return: E(RA) = E(RB) = E(RC) = 17.5%.
2. They all have the same standard deviation: SD(RA) = SD(RB) = SD(RC) = 4.031%.
3. The correlation matrix is as follows:

Correlation matrix	A	B	C
A	1	0.3846	-1
B		1	-0.3846
C			1

a) If you invest in a two-stock portfolio composed of 50% stock A and 50% stock B, what will its expected return and standard deviation be?
b) If you invest in a two-stock portfolio composed of 50% stock A and 50% stock C, what will its expected return and standard deviation be?
c) If you invest in a two-stock portfolio composed of 50% stock B and 50% stock C, what will its expected return and standard deviation be?
d) What do your answers to parts a), b) and c) entail with regard to diversification?

EXERCISE 3. You have a four-stock portfolio distributed as follows: 25% in stock Q, 20% in stock R, 15% in stock S, and 40% in stock T. The betas of the stocks are 0.6, 1.70, 1.15, and 1.34, respectively. What is the beta of your portfolio?

EXERCISE 4. You have an equal-weighted portfolio comprising a risk-free security and two stocks. The portfolio beta is equal to the market beta, and you know that one of the stocks has a beta of 1.9. What is the beta of the other stock?

EXERCISE 5. The table below contains data on the stock of three companies (A, B and C), the market portfolio and the risk-free asset.

Assets	Expected return	Standard deviation	Correlation	Beta
A	13%	38%	(i)	0.9
B	16%	(ii)	0.4	1.1
C	25%	65%	0.35	(iii)
Market portfolio	15%	20%	(iv)	(v)
Risk-free asset	5%	(vi)	(vii)	(viii)

a) Add the missing data to the table.
b) Based on the CAPM, do you think the stock of company A is appropriately priced? What about the stock of company B and that of company C? If the stocks are not appropriately priced, what investment would you recommend to someone who has a well-diversified portfolio?

PROBLEMS

1. Suppose Johnson & Johnson and the Walgreen Company have the expected returns and volatilities shown below, with a correlation of 22%.

Securities	E [R]	SD [R]
Johnson & Johnson	7%	16%
Walgreen Company	10%	20%

For a portfolio that is equally invested in Johnson & Johnson and Walgreen Company stock, calculate:

a. The expected return.

b. The volatility (standard deviation).

2. You have a portfolio with a standard deviation of 30% and an expected return of 18%. You are considering adding one of the two stocks shown in the table below. If, after adding the stock, you will have 20% of your money in the new stock and 80% of your money in your existing portfolio, which of stock A and stock B should you add?

Stocks	E [R]	SD [R]	Correlation with your portfolio's returns
Stock A	15%	25%	0.2
Stock B	15%	20%	0.6

3. Suppose the risk-free return is 4% and the market portfolio has an expected return of 10% and a standard deviation of 16%. Johnson & Johnson Corporation stock has a beta of 0.32. What is its expected return?

4. Suppose Intel stock has a beta of 1.6 and Boeing stock has a beta of 1. If the risk-free interest rate is 4% and the expected return of the market portfolio is 10%, according to the CAPM:

a) What is the expected return of Intel stock?
b) What is the expected return of Boeing stock?
c) What is the beta of a portfolio that consists of 60% Intel stock and 40% Boeing stock?
d) What is the expected return of a portfolio that consists of 60% Intel stock and 40% Boeing stock? (Show both ways to solve this.)

5. The stock of Acciona is trading at €182. An investor intends to buy a 100-day futures contract on this stock for a price of €182.5.

If the stock is trading at €183 in 100 days' time, what will the economic outcome be for the buyer of the futures contract?

6. The stock of Ferrovial is trading at €30.88. An investor intends to buy 1,000 180-day futures contracts on this stock for a price of €31.5.

If the stock is trading at €30.9 in 180 days' time, what will the economic outcome be for the buyer of the futures contract?

7. An investor buys a call option on a Solaria stock for a premium of €1.8, acquiring the right to buy the stock in four months at a price of €17.6. On the expiration date, the stock is trading at €19.6.

a) Should the option buyer exercise their right?

b) Taking into account your answer to part a), what will the economic outcome be for the buyer? And for the seller?

8. An investor buys a put option on a Meliá Hoteles stock for a premium of €1.5, acquiring the right to sell it in 10 months at a price of €4.7. On the expiration date, the stock is trading at €5.7.

a) Should the option buyer exercise their right?

b) Taking into account your answer to part a), what will the economic outcome be for the buyer? And for the seller?

9. An investor owns 100 shares in a company called XYZ, which are currently trading at €60 per share. The date is 1 January 2024. The investor wants to generate additional income by selling six-month call options on the stock in question. The exercise price is €65 and the premium price is €2. On the expiration date, the stock is trading at €70. Calculate the call option seller's profit.

10. An investor sells 1,043 put options on shares of the Phillie company. The exercise price is €20, the premium price is €0.5, and the trading price of the shares on the expiration date is €17.

a) Calculate the profit for the seller and the buyer of the put option.

b) Calculate the profit for the seller and the buyer of the put option if the trading price on the expiration date is €21.