***EXERCICE 1 (Risk , return, diversification)***

Consider the following assets X and Y, their return are described as follows:

|  |  |  |
| --- | --- | --- |
| **Probability** | **Return X** | **Return Y** |
| 0.2  0.2  0.2  0.2  0.2 | 0.18  0.05  0.12  0.04  0.06 | 0  -0.03  0.15  0.12  1 |

1. Determine the expected returns of X and Y

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1. Determine the return and risk of the following portfolios:

|  |  |  |  |
| --- | --- | --- | --- |
| **Portfolios** | | **Return** | **Risk** |
| X | Y |  |  |
| 125% | -25% |  |  |
| 100% | 0% |  |  |
| 75% | 25% |  |  |
| 50% | 50% |  |  |
| 25% | 75% |  |  |
| 0% | 100% |  |  |
| -25% | 125% |  |  |

1. Find the minimum variance portfolio:

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1. A & B are two portfolios made respectively of 75% & 25% of X; determine the covariance of the 2 portfolios.

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***EXERCICE 2 (CAPM)***

The expectation of a financial analysis related to next year is as follows:

1. Expected market return : 14%
2. T-bond yield rate : 9%
3. Standard deviation of the market return 8%
4. Future stock price next year = 46 SAR
5. Correlation of the stock with the market return : 0.6
6. Standard deviation of the stock return i : 12%

Determine

➊ The beta of the firm i ?

➋ The expected return of the stock (in accordance to CAPM)

➌ What do you think about the stock, if its market value is 42 SAR (undervalued /overvalued)

➍ What would the return of the portfolio made of the market & bond, with the same risk as the stock i

***EXERCICE 3(Risk, return, diversification, SML)***

You have the following information from the capital market related to securities A B & C:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Security A** | | **Security B** | | **Security C** | |
| **Time** | **Price** | **Div** | **Price** | **Div** | **Price** | **Div** |
| 0  1  2  3  4  5  6 | 57.750  59.875  59.375  55.500  56.250  59.000  60.250 | 0.725\*  0.725 | 333.000  368.000  368.500  382.250  386.000  397.750  392.000 | 1.350  1.350 | 106.750  108.250  124.000  122.250  135.500  141.750  165.750 | 0.400  0.420 |

a- Calculate for each of the securities:

- The expected return

- The standard deviation

- The correlation between the different securities

b) Calculate the expected return and risk of the different following portfolios:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **P1** | **P2** | **P3** | **P4** |
| % en A | 50 | 50 |  | 1/3 |
| % en B | 50 |  | 50 | 1/3 |
| % en C |  | 50 | 50 | 1/3 |

c) Calculate the diversification effect (in %) and analyze the result.

d) Determine the minimum variance portfolio

i) Which of these all portfolios dominate (are efficient).

***EXERCICE 4 (cost of capital , alternative projects)***

An unlevered firm has a beta of 1.2 and has to choose among 4 alternative projects A, B, C and D.



Which of these projects should be selected? Explain?

***EXERCICE 5 (cost of capital, alternative projects)***

Two levered firms have a respective beta of 0.5 and 2 and respective debt ratio of 50% and 10%.

If the risk free rate is 6%, and the expected market return is 18%, the marginal tax rate is 35%, which company would accept a project financed in the same proportion of the cap structure and have an after tax IRR of 25%?

***EXERCICE 6 (APT)***

Consider 3 securities X Y and Z, and two risk factors F1 and F2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **State of Nature** | **Probability** | **X** | **Y** | **Z** | **F1** | **F2** |
| 1 | 0.2 | -55 | 40 | 53 | -10 | -5 |
| 2 | 0.2 | 70 | 10 | 41 | -5 | 38 |
| 3 | 0.2 | -9 | 25 | -14 | 25 | 8 |
| 4 | 0.2 | -12 | -18 | 10 | 40 | -1 |
| 5 | 0.2 | 61 | 23 | 83 | 50 | 0 |

1- Find the expected return of securities and the factors

2- Find the variance and the standard deviation of the above securities and factors

3- Find the covariance of each security with both factors

4- Find the sensitivity of each security to both factors

5- If the risk free rate is 10%, what should be the expected return of the three securities according to APT?

6- Based on the results, what strategy would you choose?

***EXERCICE 7 CML & SML***

A portfolio made of the three following securities:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | weights | Beta | Risk (Standard deviation) | E( R) |
| Security 1 | 20% | 1,2 | 11% | ? |
| Security 2 | 40% | 0,9 | 14% | ? |
| Security 3 | 40% | 0,5 | 20% | ? |
| Market |  | 1 | 18% | 14% |
| Risk Free rate |  | 0 | 0% | 6% |

Complete the table and find the specific risk of this portfolio.

***EXERCICE 8 (Strategy of investment, performance)***

Three fund manager have the same amount of fund 1 000 000 SAR but different strategies passive, active and mixed.

The first try to replicate the Tadawel index however the second and the third try to bit the market.

They consider 4 securities A, B, C and D and five equiprobable scenarios for the expected return.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Scenarios | Tadawel | A | B | C | D |
| 1 | 0.3 | 0.3 | 0.15 | 0.35 | 0.3 |
| 2 | 0.2 | 0.38 | 0.04 | 0.14 | 0.45 |
| 3 | 0.06 | 0.01 | 0.25 | 0.03 | 0.009 |
| 4 | 0.07 | 0.06 | 0.2 | 0.08 | 0.16 |
| 5 | 0.11 | 0.002 | 0.18 | 0.001 | 0.49 |

The risk free rate is 5 % and the sensitivities to the market of the different securities are:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Tadawel | A | B | C | D |
| βi | 1 | 1.4538 | -0.4761 | 1.2552 | 0.9033 |

1. Determine the Sharpe and Treynor ratio for the different securities.
2. How are they ranked?
3. Determine the composition and the systematic risk of the passive portfolio manager if his targets expected return is 12.84 %.
4. Determine the Jensen alpha for each security. Is there any undervalued security?
5. Manager 2 has a target systematic risk of 0.33 and expects to bit the market. Determine the composition and expected return of his portfolio.
6. The third manager have timing skills, he anticipate a down shift of the market. Then he decided to undertake a mixed strategy. Determine the composition and the expected return of the portfolio if the return expected on the risky component of the portfolio is 15.5 % and the sum invested in the risk free security is 50 000 SAR.