

Exercise Set 3

1. Consider the following data:

|  |  |  |
| --- | --- | --- |
|  | **Expected Return** | **Standard Deviation** |
| **Market Portfolio** | 10% | 18% |
| **Risk Free Rate** | 1% |  |

* 1. What is the expected return of the optimal portfolio (i.e., the portfolio on the Capital Market Line) with a standard deviation of 12%?
  2. What is the beta of the optimal portfolio (i.e., the portfolio on the Capital Market Line) with an expected return of 15%?

1. Assume that the CAPM holds and that exposure to the market is the only source of correlation for stocks. Consider that the market portfolio has an expected return of 10% and a standard deviation of returns of 25%. The risk-free rate is 3%. What is the covariance between two stocks that have betas of -0.5 and 1.8?
2. Consider the following data and assume that CAPM holds:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Expected Return** | **Standard Deviation** | **Beta** |
| **Apple** | 15% | 30% | 1.3 |
| **Walmart** | 10% | 15% | 0.8 |

* 1. What is the risk-free rate and the expected return on the market portfolio?
  2. Estimate the correlation coefficient between Apple and Walmart using a CAPM single- factor model. Assume that the volatility of the market portfolio is 15%

1. Which of the following statements is true?
2. A portfolio lying on the SML also lies on the CML
3. A portfolio lying on the CML also lies on the SML
4. Portfolios on the SML are called efficient portfolios because have no idiosyncratic risk
5. If a security is on the SML, then it has a correlation of 1 with the market portfolio
6. A portfolio management organization analyses 120 stocks and constructs a mean-variance efficient portfolio using only these 120 securities.
   1. How many estimates of expected returns, variances, and covariances are needed to optimize this portfolio?
   2. If stock market returns are accurately described by the CAPM, how many estimates would be needed?
7. Assume that there are only two portfolios in the world: portfolio A and portfolio B. The expected return of each portfolio is 10% and 20% and the standard deviation of the returns is 5% and 15%, respectively. The correlation between the returns of both portfolios is zero. Now suppose that there is a risk-free asset in the market with a return of 2% and you can combine only one risky portfolio with the risk-free asset. Which portfolio would you choose, A or B?
8. Consider the following information:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Asset** | **Expected Return** | **Standard Deviation** | **Corr(Ri,Rm)** | **Beta** |
| *Portfolio 1* | 0.125 | i) | 1 | 1.5 |
| *Portfolio 2* | 0.1625 | 0.18 | 0.5 | ii) |
| *Portfolio 3* | 0.07 | 0.037 | iii) | 0.5 |
| *Market* | 0.10 | 0.04 | iv) | v) |
| *Risk free* | 0.05 | 0 | vi) | vii) |

* 1. Complete the missing items on the table
  2. Evaluate whether the portfolios are efficient (on the Capital Market Line) and in and in equilibrium (on the Security Market Line)
  3. Plot the portfolios in the CML and in the SML

1. Assume stock S and E are each priced at €100 and €15 per share and their betas are 0.8 and 1.8, respectively. If you have €2,000,000 to invest in both assets, how many shares of each asset would you have to buy or short sell to obtain a portfolio with the same systematic risk as the market?
2. Assume the CAPM holds, and the market portfolio has an expected return of 12% and a standard deviation of 18%. What is the standard deviation of a portfolio on the Capital Market Line (CML) with a beta of 1.2? The risk-free rate is 3%.
3. A portfolio manager purchased a security last year by 250 € per share, and sold it today by 265 €, in between the stock paid a dividend of 2.5 €. The beta of the stock is 0.8. If the risk-free rate of return is 3% and the market return is 10%, calculate the alpha for the stock over the past year.

For the **questions from 11 to 14** please refer to the excel file: “DataExerciseSet3”

1. Regress the Beta for Inditex, using two different proxies for the market portfolio, the Spanish domestic index (IBEX 35) and a European index (Stoxx600). Conclude about the cyclicality of the stock and whether it has higher, equal or lower systematic risk than the market portfolio.
2. Compute the alpha of Inditex both using the IBEX 35 and the Stoxx600. Is it significant? Consider a 5% significance level. Note: To observe the significance of a coefficient, one should observe the p- value obtained in the regression for that same coefficient. In this case, the alpha of Inditex will be significant if its p-value is lower than 5%.
3. Calculate the expected return based on CAPM, once more using as a proxy both the IBEX 35 and Stoxx600. Is your answer in accordance with the conclusions from the prior question?
4. Estimate Inditex systematic and idiosyncratic volatility for both market proxies.