

1. Which of these is not correct about the Capital Allocation Line (CAL)?

- a. The slope of the CAL is called reward to return ratio.
- b. The CAL provides us with all the possible combinations of the optimal risky portfolio with the risk-free asset.
- c. The slope of the CAL is called Sharpe ratio.
- d. The CAL goes from the risk-free rate and through the optimal risky portfolio.

Answer:

The correct answer is a.

The slope of the CAL is not called the reward to return ratio. It is called the reward to volatility ratio.

2. Which of the following statements is not true?

- a. Other things equal, investors would prefer a steeper-sloping CAL.
- b. The optimal capital allocation in the risky portfolio for an investor is proportional to the risk premium.
- c. Sharpe ratio is the ratio of the return of the risky asset to the return of the risk-free asset.
- d. The solution to the optimal capital allocation decision for an investor is found graphically by finding the tangency portfolio between the investor's indifference curve and the CAL.

Answer:

The correct answer is c.

This statement is not true: the Sharpe ratio is defined as the excess expected return offered by the risky portfolio per unit of risk.

3. Suppose you hold a portfolio of risky assets with an expected return of 10% and volatility of 17%. The risk-free asset has a return of 1.5%. What is the Sharpe ratio of the risky portfolio?

- a. 0.70
- b. 0.50
- c. 0.45
- d. 1.10

Answer:

The correct answer is b.

The expression of the capital allocation line is given by the following formula:

$$E(r_p) = r_f + \frac{E(r_s - r_f)}{\sigma_s} \cdot \sigma_p$$

where,

$E(r_p)$ is the expected return of the portfolio

r_f is the risk-free rate

$\frac{E(r_s - r_f)}{\sigma_s}$ is the sharpe ratio

σ_p is the volatility of the portfolio

The Sharpe ratio is equal to:

$$\frac{E(r_s - r_f)}{\sigma_s} = \frac{10\% - 1.5\%}{17\%} = 0.50$$

4. Suppose you would like to have a portfolio with a volatility of 30%. If a passive portfolio that mimics the S&P 500 stock index yields an expected rate of return of 13% and a standard deviation of 25%, and the current Treasury bill rate is 5%, what would your capital allocation between these two assets have to be?
- Invest 43.3% in the index fund and 56.67% in Treasuries
 - Borrow 20% of your wealth and invest 120% of your wealth in the index fund**
 - Invest 20% in Treasuries and 80% in the index fund
 - Invest 100% of your wealth in the index fund

Answer:

The correct answer is b.

The portfolio volatility is determined by how much you invest in the index fund.

$$\sigma_p = w_{\text{index fund}} \times \sigma_{\text{index fund}}$$

$$0.30 = w_{\text{index fund}} \times 0.25$$

$$w_{\text{index fund}} = 1.20 = 120\%$$

This means that you would have to borrow 20% of your wealth and invest 120% of your wealth in the index fund.

5. Suppose you expect the U.S. equities market portfolio to have an annual return of 10% and volatility of 15% going forward. Suppose also that the current Treasury bill rate is 5%. What would you advise a client with a risk aversion coefficient of 3 to allocate to the risk-free asset, if she were looking to maximize her mean-variance utility? Round off

your final answer to two digits after the decimal point. State your answer as a percentage rate (such as 5.55)

Answer:

The correct answer is 25.93.

The optimal capital allocation to the risky portfolio P would be:

$$y = \frac{E(r_P) - r_f}{A \cdot \sigma_P^2} \Rightarrow y = \frac{0.10 - 0.05}{3 \cdot 0.15^2} = 0.7407 = 74.07\%$$

So in the risk-free asset she will allocate $100\% - 74.07\% = 25.93\%$.