1. What is a common measure of risk for returns?

    a. Expected return
    b. Standard deviation
    c. Inflation
    d. Geometric mean of returns

    Answer:

    The correct answer is b.

    Standard deviation is a measure of the dispersion in returns.

2. Based on the following distribution of returns for stock A, compute the standard deviation for stock A.

Probability	R_A
30%	10%
40%	5%
30%	30%

    Answer:

    The correct answer is $\sigma_A = \mathbf{10.68}\%$.

    The standard deviation of the return is defined as the square root of variance, which is the expected value of the squared deviations from the expected return. The variance is calculated as:

$$\sigma_x^2 = \sum \{[R_{xi} - E(R_x)]^2 \cdot P_i\}$$

    The expected return is calculated as the probability-weighted average of the returns. $P(R_i)$ is the probability of each scenario and R_i the return in each scenario, where scenarios are labeled by i. So we write the expected return as:

$$E(R) = \sum R_i \cdot P(R_i)$$

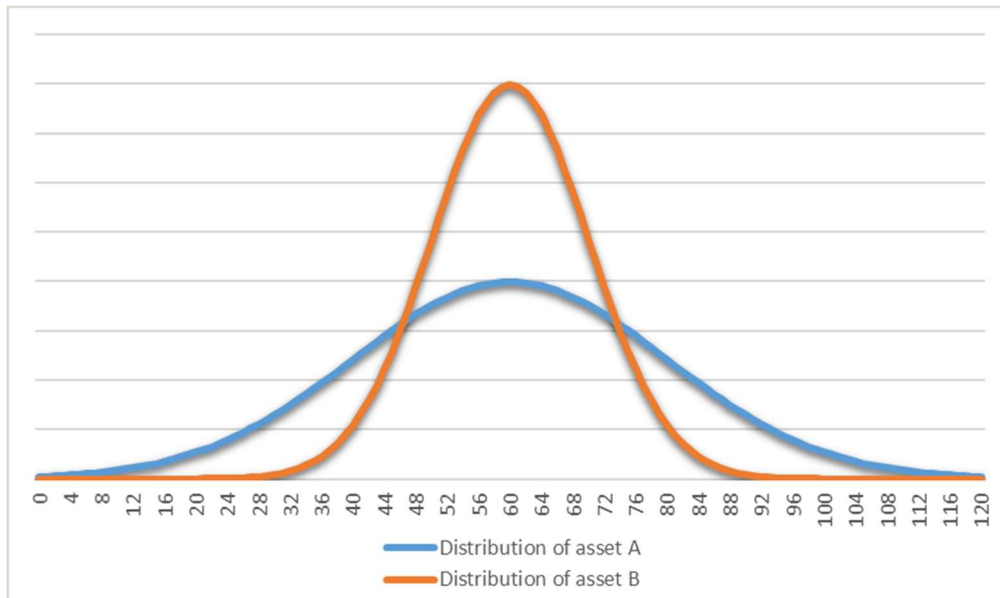$$E(R_A) = 10\% \cdot 0.30 + 5\% \cdot 0.40 + 30\% \cdot 0.30 = 14\%$$

    The variance for stock A is calculated as:

$$\sigma_A^2 = \sum \{[R_{Ai} - E(R_A)]^2 \cdot P_i\}$$

$$\sigma_A^2 = (10 - 14)^2 \cdot 0.30 + (5 - 14)^2 \cdot 0.40 + (30 - 14)^2 \cdot 0.30 = 114$$

Hence the standard deviation for A is equal to $\sigma_A = \sqrt{114} = \mathbf{10.68}\%$

3. In the following graph we observe the probability distributions of assets A and B. Which of the following statements is correct?

Distribution of asset A
Distribution of asset B

   a. $E(R_A) = E(R_B)$ and $\sigma_A < \sigma_B$
   b. $E(R_A) < E(R_B)$ and $\sigma_A = \sigma_B$
   c. $E(R_A) < E(R_B)$ and $\sigma_A > \sigma_B$
   d. $E(R_A) = E(R_B)$ and $\sigma_A > \sigma_B$

Answer:

The correct answer is d.

The central tendencies -- the means of the two distributions are equal to each other. On the other hand, the dispersion in the distribution of A is larger than that in B. Therefore, the standard deviation of A is greater than B's standard deviation.

4. When a distribution is skewed to the right:

   a. the extreme positive values dominate and the measure is positive
   b. the extreme negative values dominate and the measure is negative
   c. the standard deviation will underestimate risk
   d. both a and c are correct

Answer:

The correct answer is a.

5. Kurtosis measure the degree of fat tails of a distribution. Which of the following answers is or are true? (More than one answer can be correct)

    a. Fat tails implies that there is greater probability mass in extreme events in the tails
    b. Normal distribution has a kurtosis equal to 3
    c. Normal distribution has a kurtosis equal to 0
    d. Fat tails implies that there is lower probability mass in extreme events in the tails

Answer:

The correct answers are a and b.

Fat tails imply that there is greater probability mass for extreme events in the tails than a normal distribution and the kurtosis measure for the standard normal distribution is 3.