

BUSN3049 Corporate Finance

Tutorial 5

1. You find a certain stock that had returns of 15%, -17%, 23%, and 11% for four year of the last five years. If the average return of the stock over this period was 10%, what was the stock's return for the missing year? What is the standard deviation of the stock's return?

Answer

Here, we know the average share return, and four of the five returns used to compute the average return. We can work the average return equation backward to find the missing return. The average return is calculated as:

$$0.10 = \frac{(0.15 - 0.17 + 0.23 + 0.11 + R)}{5}$$
$$0.50 = 0.15 - 0.17 + 0.23 + 0.11 + R$$
$$R = 0.18$$

The missing return has to be 13%. Now, we can use the equation for the variance to find:

$$\sigma^2 = \frac{1}{5 [(0.15 - 0.10)^2 + (-0.17 - 0.10)^2 + (0.23 - 0.10)^2 + (0.11 - 0.10)^2 + (0.18 - 0.10)^2]}$$
$$= 0.01976$$

And the standard deviation is:

$$\sigma = \sqrt{\sigma^2} = \sqrt{0.01976} = 0.1406$$

2. A stock has had the following year-end prices and dividends:

Year	Price	Dividend
1	64.10	-
2	74.05	1.10
3	67.61	1.25
4	76.25	1.45
5	82.70	1.60
6	93.15	1.75

What are the arithmetic and geometric average returns for the stock?

Answer

To calculate the arithmetic and geometric average returns, we must first calculate the return for each year. The return for each year is:

$$\begin{aligned}
 R_1 &= (74.05 - 64.10 + 1.10) / 64.10 = 0.1724 = 17.24\% \\
 R_2 &= (67.61 - 74.04 + 1.25) / 74.04 = -0.0701 = -7.01\% \\
 R_3 &= (76.25 - 67.61 + 1.45) / 67.61 = 0.1492 = 14.92\% \\
 R_4 &= (82.70 - 76.25 + 1.60) / 76.25 = 0.1056 = 10.56\% \\
 R_5 &= (93.15 - 82.70 + 1.75) / 82.70 = 0.1475 = 14.75\%
 \end{aligned}$$

$$\begin{aligned}
 R_A &= (0.1724 - 0.0701 + 0.1492 + 0.1056 - 0.1475) / 5 \\
 &= 0.1009 = 10.09\%
 \end{aligned}$$

And the geometric average return was:

$$\begin{aligned}
 R_G &= [(1 + 0.1724)(1 - 0.0701)(1 + 0.1492)(1 + 0.1056)(1 + 0.1475)]^{1/5} - 1 \\
 &= 0.0971
 \end{aligned}$$

3. You bought one of the Rocky Mountain Manufacturing Co.'s 5.7% coupon bonds one year ago for \$1,032.15. These bonds make annual payments and mature nine years from now. Suppose you decide to sell your bonds today, when the required return on the bond is 5.1%. If the inflation rate was 3.5% over the past year, what would be your total return on the investment?

Answer

To find the return on the coupon bond, we first need to find the price of the bond today, so:

$$PVIFA_{5.1\%,9} = \left(\frac{1 - (1 + r)^{-n}}{r} \right) = \left(\frac{1 - (1 + 0.051)^{-9}}{0.051} \right) = 7.076$$

$$\begin{aligned}
 P_1 &= \frac{57(PVIFA_{5.1\%,9}) + 1,000}{(1.051)^9} \\
 &= 1042.46
 \end{aligned}$$

You received the coupon payments on the bond, so the nominal return was:

$$\begin{aligned}
 R &= \frac{(1042.46 - 1032.15 + 57)}{1032.15} \\
 R &= 0.0652 = 6.52\%
 \end{aligned}$$

And using the Fisher Effect equation to find the real return, we get:

$$r = \frac{1.0652}{1.035} - 1 = 0.0292 = 2.92\%$$