

Basic Investment Management Statistics

QUIZ

Use the following data for the next 2 questions.

Year	% per annum
2015	-7
2016	12
2017	15
2018	3
2019	10

1. Given the returns above, what is the mean return per annum ?
 - A. 8.75%
 - B. 8.2%
 - C. 6.6%
 - D. 8.45%

2. Given the returns above, what is the population variance of the returns
 - A. 0.006194
 - B. 0.006184
 - C. 0.006284
 - D. 0.006384

3. A client starts the year with a \$5,000,000 portfolio. If 80% of the portfolio is invested in equities with a return of -8% , and 20% of the portfolio is invested in bonds with a 6% yield, what is the portfolio's total expected return for one year?
 - A. -7.6%
 - B. -5.2%
 - C. -2.0%
 - D. 3.1%

Use the following data for the next 2 questions.

Consider the following data. Assume that contributions are made at the **beginning of the year**.

Year	Year-End Value	Contributions
2017	\$300	-
2018	\$300	\$20
2019	\$310	\$30

4. What is the time-weighted rate of return on the fund?

- A. -6.156%
- B. -6.151%
- C. 6.151%
- D. 6.156%

5. What is the dollar weighted rate of return on the fund?

- A. -6.156%
- B. -6.151%
- C. 6.151%
- D. 6.156%

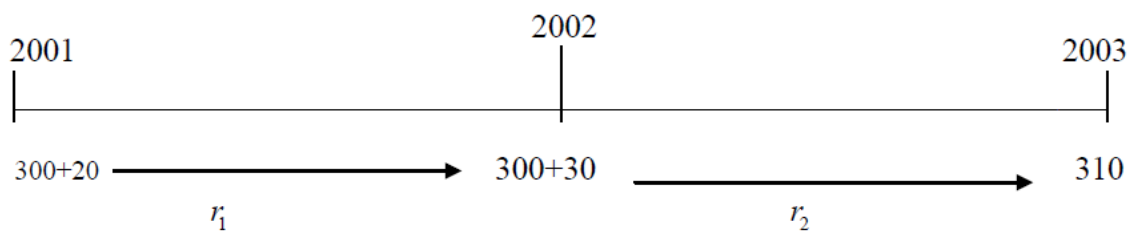
6.

Time Period	Observed Returns	
	ANZ	Market (M)
1	0.20	0.05
2	-0.10	-0.04
3	0.12	0.05
4	0.05	0.10

- a. Compute the mean returns for ANZ and M.
- b. Compute the sample standard deviations for the returns of ANZ and M.
- c. Compute the covariance between returns for ANZ and M.
- d. Compute the correlation coefficient between the returns of ANZ and M.

Solution: Q4 and 5

	End Year 1	End Year 2	End Year 3
Value before Inflow	300	300	310
Inflow	20	30	--
Value after inflow	320	330	310



$$r_1 = \frac{300 - 320}{320} = -0.0625$$

$$r_2 = \frac{310 - 330}{330} = -0.06061$$

$$r_{bw} = [(1 - 0.0625)(1 - 0.06061)]^{1/2} - 1 = -6.156\%$$

$$r_{vw} : (300 + 20)(1 + r_{vw})^2 + 30(1 + r_{vw}) = 310$$

Using IRR function in calculator:

$$r_{vw} = -6.151\%$$

Solution: Q6

	ANZ	Mkt
Average Ret	0.0675	0.040
StdDev	0.1274	0.0583
Variance	0.0162	0.0034
covariance	0.00473	
Correl	0.6373	

Note:

Sample covariance = 0.00473

Population covariance = 0.0035

Time Weighted vs Dollar Weighted Returns.

Question 1.

You have the following data on a mutual fund.

Year	Beginning Of Year Contributions	Year End Contributions	Year End Portfolio Value
1			1144
2	60	132	1256
3	89	0	1400

Assume that the year-end portfolio value is measured after year-end contributions but before any contributions made at the beginning of the next year.

- Compute the time-weighted return on the fund over each of the two years .
- Compute the dollar-weighted return on the fund over this period.
- Briefly explain the difference in general between a time-weighted and a dollar-weighted rate of return. In what circumstances would you use one versus the other?

Solution

Year 2 return = $(1256 - 132)/(1144 + 60) - 1 = (1124)/(1204) - 1 = -0.0664$ or -6.64%

Year 3 return = $(1400 - 0)/(1256 + 89) - 1 = (1400)/(1345) - 1 = 0.0409$ or 4.09%

$$r_{TW} = [(1 + (-0.0664)(1 + 0.0409))^{\frac{1}{2}} - 1 = -1.421\%$$

Dollar Weighted return solves

$$1204*(1+R)^2 + 221*(1+R) - 1400 = 0$$

The solution $(1+R) = 0.990449$ or $R = -0.009551$ or **-0.96%**

Question 2.

You have the following data on a mutual fund.

Year	Beginning Of Year Contributions	Year End Contributions	Year End Portfolio Value
1	50	120	1150
2	110	150	1310
3	90	30	1490

Assume that the year-end portfolio value is measured after year-end contributions but before any contributions made at the beginning of the next year.

- Compute the time-weighted return on the fund from the end of year 1 through the end of year 3.
- Compute the dollar-weighted return on the fund over this period.

Solution

Year 2 return = $(1310-150)/(1150 + 110) - 1 = (1160)/(1260) - 1 = -0.07937$ or -7.937%

Year 3 return = $(1490-30)/(1310+90) - 1 = (1460)/(1400) - 1 = 0.042857$ or 4.286%

$$r_{TW} = -2.016\%$$

Dollar Weighted return solves

$$1260*(1+R)^2 + 240*(1+R) - 1460 = 0$$

$$R = -1.459\%$$