

Risk and return

Question 1:

The stock price for Stock A was \$10 per share 1 year ago. The stock is currently trading at \$9.50 per share and shareholders just received a \$1 dividend.

What return was earned over the past year?

$$((9.5+1) - 10) / 10 = 5\%$$

Question 2:

A game of chance offers the following odds and payoffs. Each play of the game costs \$100, so the net profit per play is the payoff less \$100.

Probability	Payoff	Net Profit
.1	\$500	\$400
.5	100	0
.4	0	-100

What are the expected cash payoff and expected rate of return?
Calculate variance and standard deviation of this rate of return.

Payoff is \$100 and expected return is zero.
Variance is 20 000, std div = 141%.

Question 3:

Consider the following information:

State	Probability	ABC, Inc. (%)
Boom	.25	15
Normal	.50	8
Slowdown .15		4
Recession .10		-3

- What is the expected return?
- What is the variance?
- What is the standard deviation?

$$E(R) = .25(15) + .5(8) + .15(4) + .1(-3) = 8.05\%$$

$$\text{Variance} = .25(15-8.05)^2 + .5(8-8.05)^2 + .15(4-8.05)^2 + .1(-3-8.05)^2 = 26.7475$$

$$\text{Standard Deviation} = 5.1717985\%$$

Question 4:

Suppose you have \$15,000 to invest and you have purchased securities in the following amounts:

\$2000 of Doubleclick (DCLK)

\$3000 of Coca-Cola (KO)

\$4000 of Intel (INTC)

\$6000 of Keithley Industries (KEI)

What are your portfolio weights in each security?

DCLK: $2/15 = .133$

KO: $3/15 = .2$

INTC: $4/15 = .267$

KEI: $6/15 = .4$

Sum: 1

Question 5:

Consider a portfolio which consists of stock A with a beta of 1.2 and expected return of 18%, and a Treasury bill with a 7% return.

Calculate the return and beta of portfolios with following weights:

W_A	W_T	$E(R_p)$	β_p
0.0	1.00	7%	0
0.25	0.75		
0.50	0.50		
0.75	0.25		
1.00	0.00		
1.50	-0.50	18%	1.2

Consider the following information:

State	Probability	X	Z
Boom	.25	15%	10%
Normal	.60	10%	9%
Recession	.15	5%	10%

What are the expected return and standard deviation for a portfolio with an investment of \$6000 in asset X and \$4000 in asset Z?

How this compares to the expected return and standard deviation of individual assets?

Portfolio return in Boom: $.6(15) + .4(10) = 13\%$

Portfolio return in Normal: $.6(10) + .4(9) = 9.6\%$

Portfolio return in Recession: $.6(5) + .4(10) = 7\%$

Expected return = $.25(13) + .6(9.6) + .15(7) = 10.06\%$

Variance = $.25(13-10.06)^2 + .6(9.6-10.06)^2 + .15(7-10.06)^2 = 3.6924$

Standard deviation = 1.92%

Compare to return on X of 10.5% and standard deviation of 3.12%

And return on Z of 9.4% and standard deviation of .49%

Using covariances:

$COV(X,Z) = .25(15-10.5)(10-9.4) + .6(10-10.5)(9-9.4) + .15(5-10.5)(10-9.4) = .3$

Portfolio variance = $(.6*3.12)^2 + (.4*.49)^2 + 2(.6)(.4)(.3) = 3.6868$

Portfolio standard deviation = 1.92% (difference in variance due to rounding)

Question 11:

If Stephen holds a one-stock portfolio and Jennifer holds a multiple-stock portfolio. Thus Stephen is exposed to more risk than Jennifer. Do you think Stephen should be compensated for all the risk he bears?

No!

Even though Stephen holds only one stock, he will not be compensated for the additional risk he bears.

Stand-alone risk as a whole is not as important to a well-diversified investor, and most of it can be eliminated at virtually no cost through diversification.

Thus, bearing the diversifiable risk should not be rewarded.

Rational risk averse investors are concerned with σ_p , which is based on market risk.

Question 12:

Consider the following information:

	Standard Deviation	Beta
Security C	20%	1.25
Security K	30%	0.95

- Which security has more total risk?
- Which security has more systematic risk?
- Which security should have the higher expected return?

Security K has the higher total risk

Security C has the higher systematic risk

Security C should have the higher expected return

Question 15:

Suppose the risk-free rate is 4%, the market risk premium is 8.6%, and a stock has a beta of 1.3.

Based on the CAPM, what is the expected return on this stock?

What would the expected return be if the beta were to double?

$$E(R) = R_f + \beta [E(R_M) - R_f] = 4\% + 1.3 * 8.6\% = 15.18\%$$

$$E(R) = R_f + \beta [E(R_M) - R_f] = 4\% + 2.6 * 8.6\% = 26.36\%$$

Question 16:

In December 1995, Company X's stocks had a beta of 0.95. The treasury bill rate at the time was 5.8%, and the treasury bond rate was 6.4%. The firm had debt outstanding of \$ 1.7 billion and a market value of equity of \$ 1.5 billion; the corporate marginal tax rate was 36%.

- a. Estimate the expected return on the stock for a short term investor in the company.
- b. Estimate the expected return on the stock for a long term investor in the company.

Answer:

a. Expected Return to Short-term Investor = $5.8\% + 0.95 (8.5\%) = 13.88\%$

(I am using the historical premium of 8.5% to estimate expected returns)

b. Expected Return to Long-term Investor = $6.4\% + 0.95 (7.9\%) = 13.90\%$

Question 18:

Consider following portfolios:

Portfolio	Return	beta
A	12%	0.5
B	16%	1.1
C	20%	2

Which portfolio is the best and why?

(Hint: see if you can duplicate B with combination of A and C?)

A portfolio containing 60% A and 40% C will have the same beta as that of B but has lower return (15.2%) than that of B. Thus B is the best choice.