



Principles of Finance

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Assignment 3

Instructions

- Assignments should be done in groups of 2 to 3 students.
- You should remain with the same group through the entire course.
- Submit on Moodle only one copy of solutions per group.
- For each assignment you can get a maximum of 100 points.
- All assignments turned in late will not be graded (zero points).

Due date

The due date is indicated on Moodle.

1. ABC Corp. is expected to pay a dividend of \$2.30 per share at the end of this year and a \$2 dividend per share at the end of the second year. You expect ABC's stock price to be \$29 at the end of the two years. ABC's equity cost of capital is 15%. Suppose you plan on purchasing ABC's stock in one year, right after the \$2.30 dividend is paid. You then plan on selling your stock at the end of year two, right after the \$2 dividend is paid. (10 points)
 - (a) What is the capital gain rate that you will receive on your investment?
 - (b) What is the dividend yield that you will receive on your investment?
 - (c) What is the total return in percent that you will receive on your investment?
2. Suppose ACap Corporation will pay a dividend of \$2.80 per share at the end of this year and \$3 per share next year. You expect ACap's stock price to be \$52 in two years, right after paying the dividend. If ACap's equity cost of capital is 10%: (10 points)
 - (a) What price would you be willing to pay for a share of ACap stock today, if you planned to hold the stock for two years?

- (b) Suppose instead you plan to hold the stock for one year. What price would you expect to be able to sell a share of ACap stock for in one year? What price will you be willing to pay for it today? How does this compare to your answer in (a)? Explain.
3. Roybus Inc., a manufacturer of flash memory, just reported that one of its main production facilities was destroyed in a fire. While the plant was fully insured, the loss of production will decrease dividends paid by Roybus by \$180 million at the end of this year and by \$60 million at the end of next year. (10 points)
- (a) If Roybus has 35 million shares outstanding and a cost of capital of 13%, what change in Roybus' stock price would you expect upon this announcement?
- (b) Would you expect to be able to sell Roybus' stock on hearing this announcement and make a profit? Explain.
4. Suppose ABC Corporation and XYZ Corporation have expected returns and volatilities shown below, with a correlation of 22%. (10 points)

	E[R]	SD[R]
ABC Corporation	7%	16%
XYZ Corporation	10%	20%

- (a) Calculate the expected return and the volatility of a portfolio that is equally invested in ABC and XYZ corporations.
- (b) Calculate the expected return and the volatility of a portfolio that consists of a long position of \$10,000 in ABC Corporation and a short position of \$2,000 in XYZ Corporation.
5. You are given the following sample: (20 points)

Year End	S&P 500	Dividends Paid
2000	1330.93	16.27
2001	1144.93	15.74
2002	899.18	16.07
2003	1080.64	17.39
2004	1199.21	19.44
2005	1262.07	22.22
2006	1416.42	24.88
2007	1479.22	27.73
2008	877.56	28.39
2009	1110.38	22.41
2010	1241.53	22.73
2011	1243.32	26.43
2012	1422.29	31.25
2013	1807.78	34.99
2014	2054.27	39.44

Source: <http://www.econ.yale.edu/~shiller/data.htm>

- (a) What is the average dividend yield for the S&P 500 from 2001 to 2014?
 - (b) What is the volatility of the dividend yield?
 - (c) What is the average capital gain rate of the S&P 500 from 2001 to 2014?
 - (d) What is the volatility of S&P 500 returns from capital gains?
 - (e) What is the volatility of total returns of the S&P 500 from 2001 to 2014?
6. Consider an economy with two types of firms, S and I. S firms all move together. I firms move independently. For both type of firms there is a 60% probability that the firms will have a 15% return and a 40% probability that the firms will have a -10% return. (10 points)
- (a) What is the volatility of a portfolio that consists of an equal investment in 20 firms of type S?
 - (b) What is the volatility of a portfolio that consists of an equal investment in 20 firms of type I?
7. Go to the webpage <http://finance.yahoo.com>. Download historical prices for the S&P 500 market index (^GSPC) and the Russell 2000 market index (^RUT) at a **monthly** frequency. Use for the date range “Jan 1 1990” until “Dec 31 2014”. Import the data into Excel. **Note:** For this question, you should hand in on paper answers to (b), (c), (d), and (e). For (b) and (c), just write down the statistics, and for (d) and (e) hand in the graphs with the histogram/cumulative distributions. Finally, please also hand in the Excel-file that contains your data and computations (one per group). (30 points)
- (a) Use the column labeled “Close” to compute the simple returns for the two series ($r_{t+1} = P_{t+1}/P_t - 1$).
 - (b) For each return series, compute the mean, variance, standard deviation, skewness, kurtosis, maximum, and minimum using the adequate Excel functions (use for these questions the monthly simple returns that you obtained in question (a)). What do you observe (compare for instance the standard deviation, the maximum and minimum returns of the two series)?
 - (c) Compute the correlation and covariance between the two series.
 - (d) In Excel, use the “Data Analysis” package to compute the empirical distribution of the S&P 500 index. For this purpose, generate bins with 2 percent intervals, i.e., start at 22%, then 20%, 18%, etc. until -22%, and -24%. Use these bins to construct your histogram and empirical cumulative distribution.
 - (e) Using the function NORMDIST as well as the mean and standard deviation computed in (b), construct a cumulative distribution assuming that returns are normally distributed with mean and standard deviation equal to that of the S&P 500 index. Draw a graph where you include both the empirical cumulative distribution and the cumulative distribution, assuming that returns are normally distributed. What do you observe?