GESTÃO FINANCEIRA II

PROBLEM SET 4:

Chapters 10 and 11
Risk and Return
Optimal Portfolio Choice and the CAPM

(FROM BERK AND DEMARZO'S "CORPORATE FINANCE")

LICENCIATURA – UNDERGRADUATE COURSE

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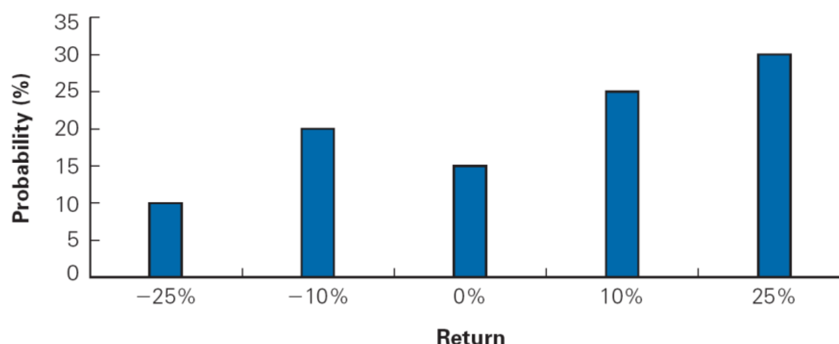
Chapter 10
Capital Markets and the Pricing of Risk

10-1. The figure below shows the one-year return distribution for RCS stock. Calculate

a. **The expected return.**

b. **The standard deviation of the return.**



10-6. Using the data in the following table, calculate the return for investing in Boeing stock from January 2, 2003, to January 2, 2004, and also from January 2, 2008, to January 2, 2009, assuming all dividends are reinvested in the stock immediately.

Historical Stock and Dividend Data for Boeing

Date	Price	Dividend	Date	Price	Dividend
1/2/03	33.88		1/2/08	86.62	
2/5/03	30.67	0.17	2/6/08	79.91	0.40
5/14/03	29.49	0.17	5/7/08	84.55	0.40
8/13/03	32.38	0.17	8/6/08	65.40	0.40
11/12/03	39.07	0.17	11/5/08	49.55	0.40
1/2/04	41.99		1/2/09	45.25	

10-9. Consider an investment with the following returns over four years:

1	2	3	4
10%	20%	–5%	15%

a. **What is the compound annual growth rate (CAGR) for this investment over the four years?**

b. **What is the average annual return of the investment over the four years?**

c. **Which is a better measure of the investment's past performance?**

d. **If the investment's returns are independent and identically distributed, which is a better measure of the investment's expected return next year?**

10-15. Download the spreadsheet from MyFinanceLab containing the data for Figure 10.1.

- **a. Compute the average return for each of the assets from 1929 to 1940 (The Great Depression).**
- **b. Compute the variance and standard deviation for each of the assets from 1929 to 1940.**
- **c. Which asset was riskiest during the Great Depression? How does that fit with your intuition?**

10-16. Using the data from Problem 15, repeat your analysis over the 1990s.

- **a. Which asset was riskiest?**
- **b. Compare the standard deviations of the assets in the 1990s to their standard deviations in the Great Depression. Which had the greatest difference between the two periods?**
- **c. If you only had information about the 1990s, what would you conclude about the relative risk of investing in small stocks?**

Chapter 11
Optimal Portfolio Choice and the Capital Asset Pricing Model

11-1. You are considering how to invest part of your retirement savings. You have decided to put $200,000 into three stocks: 50% of the money in GoldFinger (currently $25/share), 25% of the money in Moosehead (currently $80/share), and the remainder in Venture Associates (currently $2/share). If GoldFinger stock goes up to $30/share, Moosehead stock drops to $60/share, and Venture Associates stock rises to $3 per share,

a. What is the new value of the portfolio?

b. What return did the portfolio earn?

c. If you don't buy or sell shares after the price change, what are your new portfolio weights?

11-2. You own three stocks: 1000 shares of Apple Computer, 10,000 shares of Cisco Systems, and 5000 shares of Goldman Sachs Group. The current share prices and expected returns of Apple, Cisco, and Goldman are, respectively, $125, $19, $120 and 12%, 10%, 10.5%.

a. What are the portfolio weights of the three stocks in your portfolio?

b. What is the expected return of your portfolio?

c. Assume that both Apple and Cisco go up by $5 and Goldman goes down by $10. What are the new portfolio weights?

d. Assuming the stocks' expected returns remain the same, what is the expected return of the portfolio at the new prices?

11-5. Using the data in the following table, estimate (a) the average return and volatility for each stock, (b) the covariance between the stocks, and (c) the correlation between these two stocks.

Year	2004	2005	2006	2007	2008	2009
Stock A	–10%	20%	5%	–5%	2%	9%
Stock B	21%	7%	30%	–3%	–8%	25%

11-6. Use the data in Problem 5, consider a portfolio that maintains a 50% weight on stock A and a 50% weight on stock B.

a. What is the return each year of this portfolio?

b. Based on your results from part a, compute the average return and volatility of the portfolio.

c. Show that (i) the average return of the portfolio is equal to the average of the average returns of the two stocks, and (ii) the volatility of the portfolio equals the same result as from the calculation in Eq. 11.9.

d. Explain why the portfolio has a lower volatility than the average volatility of the two stocks.

For Problems 22–25, suppose Johnson & Johnson and the Walgreen Company have expected returns and volatilities shown below, with a correlation of 22%.

	E[*R*]	*SD*[*R*]
Johnson & Johnson	7%	16%
Walgreen Company	10%	20%

11-22. Calculate (a) the expected return and (b) the volatility (standard deviation) of a portfolio that is equally invested in Johnson & Johnson's and Walgreen's stock.

11-23. For the portfolio in Problem 22, if the correlation between Johnson & Johnson's and Walgreen's stock were to increase,

a. Would the expected return of the portfolio rise or fall?

b. Would the volatility of the portfolio rise or fall?

11-24. Calculate (a) the expected return and (b) the volatility (standard deviation) of a portfolio that consists of a long position of $10,000 in Johnson & Johnson and a short position of $2000 in Walgreen's.

11-25. Using the same data as for Problem 22, calculate the expected return and the volatility (standard deviation) of a portfolio consisting of Johnson & Johnson's and Walgreen's stocks using a wide range of portfolio weights. Plot the expected return as a function of the portfolio volatility. Using your graph, identify the range of Johnson & Johnson's portfolio weights that yield efficient combinations of the two stocks, rounded to the nearest percentage point.

11-47. Consider a portfolio consisting of the following three stocks:

	Portfolio Weight	Volatility	Correlation with the Market Portfolio
HEC Corp	0.25	12%	0.4
Green Midget	0.35	25%	0.6
AliveAndWell	0.4	13%	0.5

The volatility of the market portfolio is 10% and it has an expected return of 8%. The risk-free rate is 3%.

a. Compute the beta and expected return of each stock.

b. Using your answer from part a, calculate the expected return of the portfolio.

c. What is the beta of the portfolio?

d. Using your answer from part c, calculate the expected return of the portfolio and verify that it matches your answer to part b.

11-48. Suppose Intel stock has a beta of 2.16, whereas Boeing stock has a beta of 0.69. If the risk-free interest rate is 4% and the expected return of the market portfolio is 10%, what is the expected return of a portfolio that consists of 60% Intel stock and 40% Boeing stock, according to the CAPM?