Class 3
Risk and return

Reading: BM: Chapter 7, GT: Chapter 4.

Question 1

Lambeth Walk invests 60 percent of his funds in stock I and the balance in stock J. The standard deviation of returns on I is 10 percent, and on J it is 20 percent. The expected return on I is 5 percent, and on J it is 8 percent. Calculate the portfolio expected return and the standard deviation of portfolio returns, assuming:

a. The correlation between the returns is 1.0
b. The correlation is 0.5
c. The correlation is 0.

Plot the two stocks and the portfolio on a graph with expected returns and the standard deviation on the axes.

Question 2

Answer the following questions:

a. Briefly explain the difference between beta as a measure of risk and variance as a measure of risk.
b. What is the correlation coefficient between the two stocks that gives the maximum reduction in risk for a two-stock portfolio?
c. Historical nominal return for stock A is –8%, +10% and +22%. The nominal return for the market portfolio is +6%, +18% and 24%. Calculate the beta for stock A.
d. The correlation coefficient between stock B and the market portfolio is 0.8. The standard deviation of the stock B is 35% and that of the market is 20%. Calculate the beta of the stock.

Question 3

Suppose you are able to find a German stock with a beta of -.30 (minus .30) against the German market index (DAX).

a. How would you expect this stock's price to change if the DAX suddenly increases by 5 percent? What if the DAX falls by 5 percent? (For this part assume the time horizon is very short so the risk-free rate is close to zero.)
b. You hold a well diversified portfolio of German stocks worth €30,000. You are about to invest an additional €30,000. Which of the following additional investments fives you the safest return:
   i. Invest €30,000 in the DAX index?
   ii. Invest €30,000 in risk-free, short-term German government debt?
   iii. Invest €30,000 in a stock with β = -.30 and very little unique risk?

Question 4

Here are some historical data on the risk characteristics of Dell and Microsoft:

	Dell	Microsoft
β (beta)	1.77	1.70
Yearly standard deviation of return (%)	53.0	47.5

Assume standard deviation of the return on the market was 15 percent.

a. The correlation coefficient of Dell's return versus Microsoft's is .72. What is the standard deviation of a portfolio invested half in Dell and half in Microsoft?
b. What is the standard deviation of a portfolio invested one-third in Dell, one-third in Microsoft and one-third in Treasury bills?
c. Find the weights of Dell and Microsoft in a portfolio with the minimum variance. First, assume that short positions are possible. Next, assume that short positions are impossible.