Chapter 7

Practice Problems

1. According to the CAPM, what will happen to the price of a stock if investors determine that it plots below the SML? Above the SML? Why?
2. According to the CAPM, why are investors not rewarded for accepting firm specific risk (i.e. why is market risk rewarded, but firm specific risk is not)?
3. A security's total risk can be separated into firm specific risk and systematic risk. According to the CAPM, which type of risk is reflected in market prices?
4. You have $1,000 to invest. You invest $300 in ATT, which has a beta of 1; you invest $500 in Cisco Systems, which has a beta of 2; and you invest $200 in Ford, which has a beta of 0.8. What is the beta of your portfolio?
5. Suppose the CAPM holds, and assume that investors A and B have each taken positions in either the risk-free asset, the market portfolio, or both in some combination of the two. Investor A is now faces a standard deviation of returns which is higher than that of the market portfolio, and investor B expects to receive 2% less than the expected return on the market. Investor A has (on net) _____ money at the risk-free rate, while investor B has (on net) _____ at the risk-free rate.
    (a) lent, lent
    (b) lent, borrowed
    (c) borrowed, lent
    (d) borrowed, borrowed
6. According to the CAPM, will adding a (risk-free) T-bill to a portfolio that was previously identical to the market portfolio cause the beta of the new portfolio to increase or decrease (or neither) from the beta of the original market portfolio?
7. (True or False) According to the CAPM, we should never find a stock with a beta of 0.8 having a lower price than a stock with a beta of 1.2.
8. You are given the following information on two assets:

	Expected Return	**Variance**	**Beta**
Asset A	10%	3.6%	1.0
Asset B	16%	6.4%	2.0

   Suppose an investor holds a portfolio consisting solely of the above two assets, with 40% of the investor's wealth invested in asset A. Calculate the portfolio's expected return, and the portfolio's beta.
9. Gumby Stock pays a constant annual dividend of $4.00, has a beta of 1.25, and its current price is $50. Assume that the CAPM holds, and that the risk-free rate is 3%. What is the required rate of return for the stock? What is the rate of return on the market?
10. You live in a CAPM world. The market consensus is that a particular stock will pay annual dividends of $2 forever. This stock, which just paid a dividend yesterday, currently trades in the market for $12.50. After spending all weekend crunching numbers, you are convinced that this stock has a beta of 1.0. The market-risk premium is 9%, and the risk-free rate is 4%. What is the required rate of return on this stock implied by the CAPM? Should you buy or sell the stock?

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Practice Problems

1. According to the CAPM, what will happen to the price of a stock if investors determine that it plots below the SML? Above the SML? Why? **The price of the stock will go down because it is over-valued at its current price. That is, its expected return at its current price is not high enough to compensate investors for risk. Investors will sell the stock, driving its price down.**

2. According to the CAPM, why are investors not rewarded for accepting firm specific risk (i.e. why is market risk rewarded, but firm specific risk is not)? **Firm-specific risk can be diversified away at "no expense" by holding the market portfolio. Market risk reflects the stocks contribution to the remaining risk.**

3. A security's total risk can be separated into firm specific risk and systematic risk. According to the CAPM, which type of risk is reflected in market prices? **Systematic risk.**

4. You have $1,000 to invest. You invest $300 in AT&T, which has a beta of 1; you invest $500 in Cisco Systems, which has a beta of 2; and you invest $200 in Ford, which has a beta of 0.8. What is the beta of your portfolio? **1.46**

5. Suppose the CAPM holds, and assume that investors A and B have each taken positions in either the risk-free asset, the market portfolio, or both in some combination of the two. Investor A is now faces a standard deviation of returns which is higher than that of the market portfolio, and investor B expects to receive 2% less than the expected return on the market. Investor A has (on net) _____ money at the risk-free rate, while investor B has (on net) _____ at the risk-free rate.
   (a) lent, lent
   (b) lent, borrowed
   (c) borrowed, lent
   (d) borrowed, borrowed

6. According to the CAPM, will adding a (risk-free) T-bill to a portfolio that was previously identical to the market portfolio cause the beta of the new portfolio to increase or decrease (or neither) from the beta of the original market portfolio? **Decrease**

7. (True or False) According to the CAPM, we should never find a stock with a beta of 0.8 having a lower price than a stock with a beta of 1.2. **False. The CAPM is a statement about returns and not prices, and only makes statements about expected returns, not returns.**

8. You are given the following information on two assets:

	Expected Return	Variance	Beta
Asset A	10%	3.6%	1.0
Asset B	16%	6.4%	2.0

Suppose an investor holds a portfolio consisting solely of the above two assets, with 40% of the investor's wealth invested in asset A. Calculate the portfolio's expected return, and the portfolio's beta. **13.6% and 1.6**

9. Gumby Stock pays a constant annual dividend of $4.00, has a beta of 1.25, and its current price is $50. Assume that the CAPM holds, and that the risk-free rate is 3%. What is the required rate of return for the stock? What is the rate of return on the market? **7%**

10. You live in a CAPM world. The market consensus is that a particular stock will pay annual dividends of $2 forever. This stock, which just paid a dividend yesterday, currently trades in the market for $12.50. After spending all weekend crunching numbers, you are convinced that this stock has a beta of 1.0. The market-risk premium is 9%, and the risk-free rate is 4%. What is the required rate of return on this stock implied by the CAPM? Should you buy or sell the stock? **The required return is 13%, which is below the expected return implied by the dividend discount model (2 / 12.50 = 0.16, or 16%). Therefore, the stock is undervalued: buy the stock. (Alternatively, the correct price of the stock—at its required return—is 2 / 0.13 = $15.385 > $12.50).**