

PROBLEM SET: Capm

Exercise 1. *Mitro* [1]

Calculate the expected return on the stock of Mitro Corporation. The beta of Mitro is estimated to be 1.2, the market risk premium is 8%, and the current risk free rate is 4%

Exercise 2. *CAPM* [4]

Given the following information on 3 stocks

	Stock A	Stock B	Stock C	T-bills	Market Portfolio
Expected return	0.19	0.15	0.09	0.07	0.18
Variance	0.02	0.1196	0.0205		0.0064
Covariance with market portfolio	0.007	0.0045	0.0013		0.0064

1. Using the CAPM, calculate the expected return for the three stocks (A, B, and C)
2. Which stock(s) would you recommend purchasing?

Exercise 3. *Interest rate changes* [2]

According to the CAPM, a firm's cost of equity depends on its own systematic risk (β) and on general conditions in financial markets as measured by current interest-rate levels (the risk-free rate). and by the market's attitude toward risk (the "market price of risk", or $E[r_m] - r_f$). What would you expect to happen to a firm's cost of equity if interest rates fall but the expected return on the market portfolio remains unchanged?

Exercise 4. [3]

The treasury bill rate is 4% and the expected return on the market portfolio is 12%. On the basis of the capital asset pricing model:

1. Draw a graph showing how expected return vary with beta (β).
2. What is the risk premium in the market?
3. What is the required return on an investment with a β of 1.5.
4. If an investment with a β of 0.8 offers an expected return of 9.8%, does it have a positive NPV?
5. If the market expects a return of 11.2% from stock X, what is its beta?

Exercise 5. *Fund* [2]

Suppose you are the manager of an investment fund in a CAPM world. Ignore taxes. Given the following forecast:

$$E[\tilde{r}_m] = 16\%$$

$$\sigma(r_m) = 0.20$$

$$r_f = 8\%$$

1. Would you recommend investment in a security j with the following characteristics: $E[\tilde{r}_j] = 12\%$ and $\text{cov}(\tilde{r}_j, \tilde{r}_m) = 0.01$?
2. Suppose next period it turns out that this security j has had a return of only 5%. How would you explain this, given that $E[\tilde{r}_j] = 12\%$?

Exercise 6. *Analyst (RWJ 10.25)* [3]

A stock has a beta of 1.8. A security analyst who specializes in studying this stock expects its return to be 18%. Suppose the risk free rate is 5% and the market risk premium is 8%.

1. Is the analyst pessimistic or optimistic about this stock relative to the markets expectation?

Exercise 7. [3]

You are given the following information about three stocks that are in your portfolio. In addition, you know that the market portfolio has an expected return of 13% and a standard deviation of 18%. The risk free rate is 5%.

Stock	Beta	Weight in portfolio
A	1.1	20%
B	0.8	50%
C	1.0	30%

1. What is the expected return on your portfolio?

Exercise 8. *CAPM: Divisional and Corporate Betas* [4]

You have been asked to estimate the beta of a high-technology firm which has three divisions with the

	Division	Beta	Market Value
following characteristics	Personal Computers	1.60	100 million
	Software	2.00	150 million
	Computer Mainframes	1.20	250 million

1. What is the beta of the equity of the firm?
2. What would happen to the beta of equity if the firm divested itself of its software business?
3. If you were asked to value the software business for the divestiture, which beta would you use in your valuation?