

# Problem Set 5

## Foundations of Financial Markets

**Due date: 24<sup>th</sup> October 2007 in class**

1. Stocks A, B, C and D have betas of 1.5, 0.4, 0.9 and 1.7 respectively. What is the beta of an equally weighted portfolio of A, B and C?
2. Consider the CAPM.
  - (a) The risk-free rate is 5% and the expected return on the market is 15%. What is the beta on a stock with an expected return of 12%?
  - (b) The expected return on the market is 18%. The expected return on a stock with a beta of 1.2 is 20%. What is the risk-free rate?
3. Assume that the risk-free rate is 8% and the expected return on the market is 18%. A share of stock is now selling for \$100. It will pay a dividend of \$9 per share at the end of the year. Its beta is 1.0. What do investor expect the stock to sell for at the end of the year?
4. Suppose the yield on short term government securities (perceived as risk free) is 4%. Suppose also that the expected return required by the market for a portfolio with a  $\beta$  of 1.0 is 12%. According to the CAPM:
  - (a) What is the expected return on the market portfolio?
  - (b) What would be the expected return on a zero-beta stock?
  - (c) Suppose you consider to buying a share of stock at a price of \$40. The stock is expected to pay a dividend of \$3 next year and to sell then for \$41. The stock risk has been evaluated at  $\beta = -0.5$ . Is the stock overpriced or underpriced?
5. Consider the following data for a one factor economy. All portfolios are well diversified.

Portfolio	E(r)	$\beta$
A	10%	1
F	4%	0

Suppose another portfolio E is well diversified with a  $\beta = \frac{2}{3}$  and expected return of 9%. Would an arbitrage opportunity exist? If so, what would the arbitrage strategy be?

6. Consider the one-factor APT. The variance of return on the factor portfolio is .09. The beta of a well-diversified portfolio on the factor is 1.3. What is the variance of return on the well-diversified portfolio?