



**Finance**  
**Final Exam – Spring 2012/2013**

**2 hours and 15 minutes**

The exam consists of 5 problems. This is a closed book exam. Calculators are permitted.  
Good luck!

$$W_M^* = \frac{E(r_M) - r_f}{\gamma \times \sigma_M^2}$$

**Problem 1 (3 points)**

Suppose you purchase today a three-year bond with a face value of \$100, a coupon rate of 6% with annual coupon payments and yield to maturity (effective annual rate) of 6%

- a) What is the clean and dirty price of the bond today?
- b) If the yield to maturity remains constant, what will be the clean and dirty price of the bond one year and three months later?
- c) If the bond is traded at \$90 two years from today, what will be yield to maturity?

**Problem 2 (3 points)**

Sea Enterprises will pay an annual dividend of \$0.45 per share one year from now. Analysts forecast a 8% per year growth rate in dividends over the subsequent three years (until year 4). After then, dividend growth will level off at 2% per year. The cost of equity is 10%.

- a) What is Sea's stock price today?
- b) If Sea announces it will cut its next year dividend to \$0.1 per share and use the extra funds to invest in new projects with an annual return of 8% forever, what will be the stock price after the announcement?

**Problem 3 (6 points)**

Ocean Enterprises is deciding whether to expand its production facilities. The management has projected increased sales of \$800 per year in the next two years and a gross margin of 30%. Capital expenditures today are \$300 (with an economic life of two years) and net working capital is 20% of next year sales. The marginal tax rate is 30%. The project unlevered beta is 1.5 and cost of debt is 5%. The risk-free rate is 5% and the expected market risk premium is 6%.

- a) What are the project's free cash flows for year 0, 1 and 2?
- b) If the project is entirely financed with equity, what is the NPV?
- c) If the project is financed with 60% equity and 40% debt, what is the NPV?

- d) If the project is financed with \$200 loan paid in two annual instalments and an interest rate of 2% (the remaining investment is financed with equity), what is the APV?

**Problem 4 (5 points)**

Apple's expected return is 20% with a standard deviation of 30% and BlackBerry's expected return is 10% with a standard deviation of 20%. The stocks have a correlation of 0.7. The market portfolio has an expected return of 15% and a standard deviation of 20%. The risk-free rate is 5%.

- a) If you decide to invest \$10,000 in Apple and short sell \$5,000 of BlackBerry, what is the expected return and standard deviation of the portfolio?
- b) If the correlation of Apple and BlackBerry with the market portfolio is 0.6 and 0.4, respectively, what is the beta and the expected return of the portfolio in part a) according to the CAPM?
- c) If you can borrow or lend at a risk-free rate of 5% and your risk aversion coefficient is 3, what is the optimal portfolio expected return and standard deviation according to the CAPM?

**Problem 5 (3 points)**

Biotech, Inc. must choose one of three different research projects with zero initial investment. The free cash flows and their probabilities are shown in the table below. The beta of each project is zero and the risk-free rate is zero.

Project	Probability	Free Cash Flow
A	100%	\$75
B	50%	\$140
	50%	\$0
C	10%	\$300
	90%	\$40

- a) Which project has the maximum NPV?
- b) If Biotech has debt of \$40 due at the time of the project's cash flow, which project equity holders choose?
- c) If Biotech has debt of \$110 due at the time of the project's cash flow, which project equity holders choose?
- d) What is the expected agency cost to the firm in parts b) and c)? Explain your answer.