

## Economics 136. Financial Economics

Sample Midterm 2B, Fall 2009

Write your name, your GSI's name and your section time on your blue book. You may use a calculator and two double sided sheets of handwritten notes.

### 1. True or false. (25 points, 5 each)

Are the following statements true or false? Explain your answer in no more than two sentences. You will be graded on the quality of your explanation.

(i) Historically, high dividend/price ratios predicted low (negative) subsequent dividend growth and essentially no subsequent changes in prices.

(ii) In the Gordon model, if two companies have the same dividend growth, they must have the same dividend/price ratios.

(iii) Consider a trading strategy where you buy a stock if it had positive price growth during the past week and sell it if it had negative price growth during the past week. If the weak form of the efficient markets hypothesis holds, on average you should not be able to earn positive abnormal returns using this strategy.

(iv) If the expected return on stocks is higher than the return on the riskfree asset, a risk-averse mean-variance investor will choose to hold some stocks even if stocks returns have a very high (but finite) variance.

(v) For an investor holding a mortgage pass-through, a fall in interest rates is generally good news, because it means that more homeowners prepay their debt and hence the money is returned to the investor earlier.

### 2. Stock valuation (25 points, 5 each)

Company ABC pays no dividends for the next seven years. In year 8, the dividend is expected to be  $D_8 = \$20$ , and in subsequent years, annual dividend growth will be  $G = 4\%$ . The discount rate is  $R = 6\%$ .

(a) What is the price of a share of ABC in year 7 (i.e., what is  $P_7$ )?

(b) What is the price of a share of ABC today (i.e., what is  $P_0$ )?

(c) Now let's consider the growth of ABC's price per share. What is the annual growth rate of ABC's price during the time between today and year 7? [Note: you can answer this directly, or by computing  $P_1$  and comparing it to  $P_0$ .] Is it smaller, larger or equal to the discount rate? Why?

(d) What is the annual growth rate of ABC's stock price in the years after year 7? [As above, you can answer this directly, or by comparing  $P_8$  and  $P_7$ .] Is it smaller, larger or equal to the discount rate? Why?

(e) Would an investor buying a share of ABC earn a higher annual expected return in the years before year 7 or in the years after year 7? Why?

### 3. CAL and portfolio choice (25 points, 5 each)

Note: please use natural units in your solution (e.g., a standard deviation of 20% means  $\sigma = 0.2$  and  $\sigma^2 = 0.2^2 = 0.04$ ).

You are a financial advisor who works with two asset classes: stocks and Treasury bills (which are considered riskfree). Suppose that the expected return of stocks is 15%, and the standard deviation is 20%. The rate of return on Treasury bills is 5%. You are advising a risk-averse client who has mean-variance preferences and would like to invest in a portfolio of stocks and T-bills.

(a) Draw the capital allocation line.

(b) Suppose your client's current portfolio has an expected return of 8% and standard deviation of 10%. Indicate this portfolio in your figure. Can you recommend your client a portfolio that she will prefer to her current portfolio? Which one? Why?

(c) Suppose your client wants to invest 120% of her wealth in stocks and -20% in T-bills (i.e., she wants to short T-bills). Show this portfolio in your figure. What is its expected return and standard deviation?

(d) Now suppose that your client has a risk aversion coefficient of  $A = 10$ . What is the share of stocks in her optimal portfolio? What is the expected return and standard deviation of the portfolio return? Show this portfolio in the figure.

(e) What are the Sharpe-ratios of the portfolios you recommended in (b), (c) and (d)? Is one of them larger? Why or why not?

### 4. Efficient markets (25 points, 5 each)

Drug company XYZ will pay dividends of \$10 next year (i.e., at  $t = 1$ ) financed from sales of its current product. XYZ is also working on a new product which either becomes a success or a failure at  $t = 1$ . At  $t = 0$  we only know that the product will be a success with probability 64.8% (and a failure with probability 35.2%). If the product is a success, XYZ makes a public announcement at  $t = 1$  that future dividends starting  $t = 2$  will be \$20 per share per year (forever). If the product is a failure, XYZ makes **no** announcement at  $t = 1$  and dividends stay at a level of \$10 per share (forever). The discount rate for the company is  $R = 8\%$  per year.

(a) What is  $P_1$ , the price per share of the company in  $t = 1$ , if the product is successful? What is  $P_1$  if the product is a failure? [This is the price after dividends for  $t = 1$  have already been paid, so you can ignore them in this calculation.]

(b) What is  $EP_1$ , the expected value of  $P_1$  from the perspective of  $t = 0$ ? What is  $ED_1$ , the expected value of  $D_1$  (dividends in year 1) from the perspective of  $t = 0$ ? Compute  $P_0$ , the price of a share at  $t = 0$ , as the discounted value of  $EP_1 + ED_1$ .

(c) Consider an investor who buys one share of the company at  $t = 0$  and holds it for one period. What is the actual, realized rate of return the investor earns between  $t = 0$

and  $t = 1$  if the product is a success? If the product is a failure?

(d) Define the abnormal return between period 0 and 1 as the difference between the actual rate of return you computed in part (c) and the discount rate  $R$ . What is the expected abnormal return? Is this consistent with the efficient markets hypothesis?

(e) Using the above analysis, comment on the following argument in no more than two sentences: “The stock market is clearly inefficient. After all, there have been no public announcements about drug company XYZ during this year, and yet it’s share price dropped by a substantial amount. This must be due to investor sentiment.”