**Economics 136. Financial Economics**
Midterm 2, 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 your explanation.

(i) Historically, low dividend-price ratios of the S&P 500 have predicted high (positive) subsequent price growth and essentially no subsequent change in dividends.

(ii) The following fact violates the semi-strong form of the efficient markets hypothesis: prices of companies tend to increase a few days before public announcement of good news.

(iii) Historically, stocks with high price-earnings ratios have outperformed stocks with low price-earnings ratios.

(iv) The efficient market hypothesis implies that the expected return of a call option must be the same as the expected return of the underlying stock.

(v) Evans Hall is more beautiful than the Golden Gate bridge. [Only if you have time; all answers, including leaving it blank, are accepted!]

**2. CAL and portfolio choice** (25 points, 5 each)

[Note: 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 assets: a stock index and a riskfree asset. The expected return of stocks is 12%, and the standard deviation is 20%. The riskfree return is 2%. You are advising a risk-averse client who has mean-variance preferences.

(a) Draw the capital allocation line (CAL).

(b) Your client's current portfolio has an expected return of 7% and standard deviation of 15%. Show this portfolio in your figure. Can you recommend an investment that your client will prefer to her current portfolio? Explain.

(c) Suppose that your client has a risk aversion coefficient of $A = 5$. 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.

(d) Now suppose that the standard deviation of the stock index falls to 10%, while all other parameters are unchanged. Draw the new CAL. What is the new optimal portfolio of your client after the change? How does it change relative to the optimal portfolio in (c), and why? What is it's mean and standard deviation? Show this portfolio in the figure.

(e) Is the following statement true? "If the stock market becomes safer, a mean-variance optimizing investor will be exposed to less risk." Explain.

**3. Stock valuation** (20 points, 5 each)

Company ABC has earnings next year of $E_1 = \$10$, and has a return on equity of $ROE = 12\%$ per year. The annual discount rate is $R = 8\%$.

(a) Suppose that the CEO retains $B = 50\%$ of earnings. What is the dividend next period $D_1$? What is the growth rate of dividends $G$? What is the current price $P_0$ according to the Gordon model?

(b) Now suppose that the return on equity of ABC falls to $ROE = 6\%$, while the other parameters given above (including $E_1$) are unchanged. What retention ratio $B$ should the CEO set to maximize the share price? Under this retention ratio, what is the dividend next period $D_1$? What is the growth rate of dividends $G$? What is the current price $P_0$?

(c) Is the following statement true? "The stock market is clearly inefficient: company ABC just announced an increase in dividends, and yet it's share price fell." Explain.

(d) Do investors earn a higher expected return from investing in ABC under scenario (a), or under scenario (b)?

**4. Portfolio choice and market timing** (30 points, 5 each)

[Note: use natural units when you compute variances and standard deviations, e.g., for a return of 30% write $R = 0.3$.]

Consider an economy over three periods, $t = 0$, $t = 1$ and $t = 2$. At $t = 0$, the market stock index is trading at a value of 100. At $t = 1$, the index either rises by 30 or falls by 10 with equal probabilities. Following an increase at $t = 1$, the index either increases by 30 with probability 1/4, or falls by 10 with probability 3/4. After a fall at $t = 1$, the index either increases by 30 with probability 3/4, or falls by 10 with probability 1/4. Thus the highest possible index value at $t = 2$ is 160, and the lowest is 80. The index pays no dividends, and the riskfree rate in each period is $R_f = 0$.

(a) Draw the event tree. For both nodes at $t = 1$, compute the net index return between periods 0 and 1. What is the expected return between $t = 0$ and $t = 1$?

(b) What is the expected index return between $t = 1$ and $t = 2$ if the market has gone up at $t = 1$? Is it higher or lower than the expected return between $t = 0$ and $t = 1$?

(c) For each node at $t = 2$, compute the probability of reaching that node and the realized index return between $t = 0$ and $t = 2$. What is the mean and variance of the index return between $t = 0$ and $t = 2$?

(d) Suppose that you wish to form a portfolio of the market index and the riskfree asset at $t = 0$ and hold it until $t = 2$ (no rebalancing at $t = 1$). If you are a mean-variance optimizer with risk aversion $A = 5$, what is the share of the market index in your optimal portfolio? What is the mean and variance of your portfolio return between $t = 0$ and $t = 2$? [Hint: use the mean and variance of the index return from (c) to answer this].

(e) Now consider the following "market-timing" investment strategy. At $t = 0$ invest 100% in the market index. At $t = 1$, if the market has gone up, sell all your holdings and invest everything in the riskfree asset. If the market has gone down at $t = 1$, continue to hold 100% in the index. If you start with \$100 at $t = 0$, then what is the payoff of this strategy for each node at $t = 2$? What is the net return between $t = 0$ and $t = 2$ for each node?

(f) What is the expected return between $t = 0$ and $t = 2$ of the strategy in (e)? Is it higher or lower than the expected return of the portfolio in (d)? What is the variance of the return from the strategy in (e)? Is it higher or lower than the variance of the portfolio in (d)? Would your mean-variance optimizing investor prefer the strategy in (e) to that in (d)? Does market timing – adjusting the portfolio when expected returns change – benefit the investor?