Economics 136. Financial Economics

Sample midterm 2A, suggested solution, Fall 2009

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

(i) False. The risk of the call option on Google may be different from the risk of the put option on Microsoft, and hence the two investments may have different expected returns.

(ii) True. a high ROE means that money is more productive inside the company. Therefore shareholder value and stock price are higher if earnings are retained and reinvested.

(iii) False. High dividend-price ratios predicted high (positive) subsequent price growth.

(iv) False. This comparison suffers from survivorship bias: the worst performing funds were likely closed down before 2005. Hence even if mutual funds have no ability in picking stocks, we expect the return of funds surviving to 2005 to be higher than that of the index.

(v) True. A broad stock portfolio like the S&P500 has reduced return variance due to the benefits of diversification. When many stocks are held in a portfolio, the low returns of some of them are cancelled by the high return of others, reducing risk.

2. Stock valuation (25 points, 5 each)

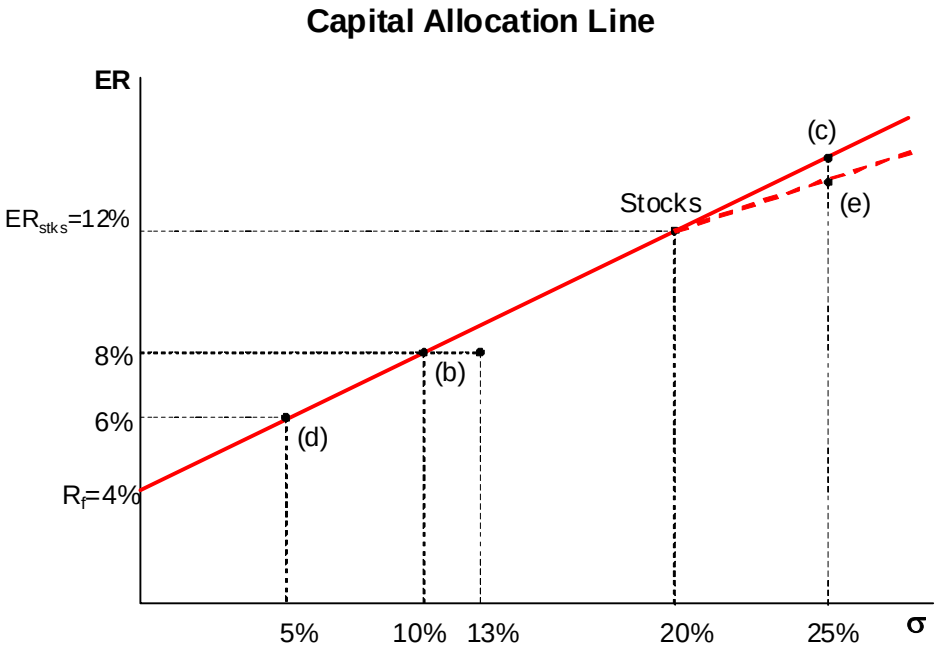
(a) By the Gordon model, $P_0^A = D_1/(R-G) = 10/(0.02) = \$500$. The dividend price ratio is $D_1/P_0 = 10/500 = 0.02$.

(b) We can compute $P_1 = D_2/(R-G) = D_1 \cdot (1+G)/(R-G) = \$525$. Thus $P_1/P_0 = 1.05$: stock prices are growing at a rate of 5%. This is not surprising: prices grow at a rate G, just like dividends do. The expected rate of return is just the discount rate $R = 7\%$. The expected rate of return is higher, because investors earn returns both from price appreciation and from dividend payments.

(c) By the Gordon model, $P_0^X = D_1/(R-G) = 10/0.08 = \$125$. The dividend price ratio is $D_1/P_0 = 10/125 = 0.08$.

(d) The growth rate in price is zero: company X is not growing, because its dividends are not growing. Formally, $P_1 = D_2/(R-G) = D_1/(R-G) = P_0$. The expected return is $R^X = 8\%$.

(e) Empirically, companies with high dividend-price ratios (value stocks) earn higher returns. In the example, company X has a higher dividend-price ratio and does earn a higher return than company A. This example suggests that X may be earning a higher return because it is riskier, which is consistent with the EMH.



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

(a) See the figure.

(b) This portfolio is below the capital allocation line in the figure, so it can be improved on, for example by reducing the standard deviation while holding fixed the expected return. An equal weighted portfolio of stocks and the riskfree asset has expected return $(4\% + 12\%)/2 = 8\%$ and standard deviation $20\%/2 = 10\%$, so this would be better than the client's current portfolio.

(c) This portfolio has an expected return of $R_f + 1.25\left(\overline{R}_1 - R_f\right) = 4\% + 1.25 \cdot 8\% = 14\%$ and standard deviation $\sigma_p = 1.25 \cdot \sigma_1 = 1.25 \cdot 20\% = 25\%$.

(d) The optimal stock share is $w_1 = \left(\overline{R}_1 - R_f\right)/A\sigma_1^2 = 0.08/\left(8 \cdot 0.2^2\right) = 0.25$. The optimal portfolio is to invest 25% in stocks. This portfolio has an expected return of $R_f + 0.25\left(\overline{R}_1 - R_f\right) = 4\% + 0.25 \cdot 8\% = 6\%$ and standard deviation $\sigma_p = 0.25 \cdot \sigma_1 = 0.25 \cdot 20\% = 5\%$.

(e) The slope of CAL to the right of the stocks only portfolio will be lower, reflecting the higher cost of borrowing (shown by the dashed segment in the figure). The standard deviation of the portfolio in (c) is still 25%, however, the expected return is now $1.25 \cdot \overline{R}_1 - 0.25 \cdot R_f^{\text{borrow}} = 1.25 \cdot 12\% - 0.25 \cdot 6\% = 13.5\%$. The expected return is reduced due to the costs of borrowing.

4. Efficient markets (25 points, 5 each)

(a) By the Gordon model, if growth is expected to be high, $P_1 = D_2/\left(R - G^h\right) = 20 \cdot \left(1 + G^h\right)/0.02 = \$1060$. If growth is expected to be low, $P_1 = D_2/\left(R - G^l\right) = 20 \cdot \left(1 + G^l\right)/0.04 = \$520$.

(b) We have $\mathrm{E}P_1 = 0.5 \cdot 1060 + 0.5 \cdot 520 = \$790$. The expected dividend is $\mathrm{E}D_1 = D_1 = \$20$ for sure. Thus

$$P_0 = \frac{\mathrm{E}P_1 + \mathrm{E}D_1}{1 + R} = \frac{810}{1.08} = \$750.$$

(c) The actual return is $(P_1 + D_1)/P_0 = 1080/750 = 1.44$ or 44% if growth is high, and $(P_1 + D_1)/P_0 = 540/750 = 0.72$ or -28% if growth is low.

(d) The abnormal return is $44 - 8 = 36\%$ if growth is high and $-28 - 8 = -36\%$ if it is a failure. The expected abnormal return is $0.5 \cdot 36\% + 0.5 \cdot (-36\%) = 0$. This is consistent with the EMH which says that the expected abnormal return should be zero.

(e) This argument is incorrect: in the example, the announcement that growth will be $G = 4\%$ leads to a fall in the stock price, because this growth rate is lower than what investors expected.