1. Describe the current yield curve for US Treasury Securities (you can find this information by visiting the Bloomberg web site and clicking on US Treasuries; note the date and time in your answer). Provide an explanation for the shape of the yield curve. [3]

2. Suppose that a zero coupon bond which matures after one year and has face value $1000 is priced at $943.40, while a similar bond which matures after two years costs $873.44. Calculate the yield to maturity for each of these bonds. Suppose an investor believes confidently that the future short rate (a year from today) will be 8.25%. What does this investor believe will be the price of the second bond a year from today? Calculate this investor’s expected return from each of the following strategies: (a) purchase the first bond and hold to maturity, and (b) purchase the second bond and sell it after one year. Given her expectations, which strategy would she choose? [4]

3. The following table gives the prices of two zero-coupon bonds with different maturity dates. Both bonds have face value $1000.

<table>
<thead>
<tr>
<th>Bond</th>
<th>Years to Maturity</th>
<th>Bond Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>952.38</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>890.00</td>
</tr>
</tbody>
</table>

Calculate the yield to maturity for each bond. Suppose investors have complete confidence in their forecast of the future short rate $r_2$. In this case, what do they expect the price of Bond B will be a year from today? What do they expect the short rate $r_2$ to be a year from today? Suppose, instead, that investor forecasts of the future short rate are not held with confidence (so $r_2$ is a random variable). Explain why the information in the table is consistent with the hypothesis that $E(r_2)$ is equal to the current short rate, and determine the liquidity premium. [4]

4. Suppose that the current share price of IBM is $P_0 = 87.50$ and its beta is $\beta = 0.90$. The annual risk free rate of interest is $r_f = 3\%$ and the expected annual rate of return on the market portfolio is $r_m = 13\%$.

(a) Use the CAPM to determine the required rate of return on this stock.
(b) Suppose that IBM is expected to pay a dividend of $D_1 = 0.60$ per share over the course of the coming year, and its dividend is expected to grow at a constant rate $g$ thereafter. Assuming that the current stock price is equal to its intrinsic value, what is the expect rate of dividend growth $g$?

(c) Suppose instead that IBM is expected to pay a dividend of $D_1 = 0.60$ per share over the course of the coming year, and its dividend is expected to grow at a constant rate of 15% over the subsequent two years (so $D_2$ is 15% greater than $D_1$ and $D_3$ is 15% greater than $D_2$). Its dividend is expected to grow at a constant rate $g$ thereafter. Assuming that the current stock price is equal to its intrinsic value, what is the expected rate of eventual dividend growth $g$?

(d) Earnings per share for IBM are forecast at $E_1 = 4.80$ for the coming year. What is the stock’s $P/E$ ratio? Assuming that the pattern of expected future dividends is the same as in part (b), what is the retention ratio and the dividend payout ratio for the coming year?

(e) Finally, suppose that the beta for this asset rises to $\beta = 1.00$, while the pattern of expected future dividends remains the same as in part (b). What will happen the share price of IBM?

5. Suppose you purchase one MSFT call contract (100 options) with strike price $55$, expiration October 2002, and premium $7.00$, and simultaneously purchase one MSFT put contract with strike price $55$, expiration October 2002, and premium $4.50$. If the share price upon expiration can range between $20$ and $100$, find the maximum potential profit you could make and the maximum potential loss that you could suffer. What are the two stock prices at which you would break even?