1. The consensus forecast of security analysts of your favorite company is that earnings next year will be $5.00 per share. The company plows back 50% of its earnings and the Chief Financial Officer (CFO) estimates that the company’s ROE is 16%.

   a. If your estimate of the company’s required rate of return on its stock is 10%, what should be the price of the stock?

   b. Suppose you observe that the stock is selling for $50.00 per share, and that this is the best estimate of its equilibrium price, what would you conclude about either your estimate of the stock’s required rate of return or the CFO’s estimate of the company’s return on equity?

   c. Suppose you believe your own 10 percent estimate of the stock’s required rate of return, what does the market price of $50.00 per share imply about the market’s estimate of the company’s expected return on equity?

2. Assume that the constant growth dividend growth model can be used for valuation. The SSB corporation’s shares are expected to grow indefinitely by 6% per year.

   a. If the dividend to be paid one year from now is expected to be $5 and the market capitalization rate is 14% per year, what must the current stock price be?

   b. If expected earnings per share for the coming year are $8, what is the implied return on equity?

   c. How much is the market paying for growth opportunities?

3. Chapter 14, Problems 7, 23.

4. Chapter 15, Problems 6, 12, 16.

5. Chapter 16, Problems 1-4, 10-11.
The next two questions refer to the following four bonds:

<table>
<thead>
<tr>
<th>Bond</th>
<th>Par</th>
<th>Coupon</th>
<th>Maturity (yrs)</th>
<th>Duration (yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bond A</td>
<td>1,000</td>
<td>5%</td>
<td>10</td>
<td>7.9</td>
</tr>
<tr>
<td>Bond B</td>
<td>1,000</td>
<td>8%</td>
<td>25</td>
<td>12.2</td>
</tr>
<tr>
<td>Bond C</td>
<td>1,000</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Bond D</td>
<td>1,000</td>
<td>0</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

The yield curve is flat at 7%. Bonds C and D have just been issued.

6. Assume that you have a one-year investment horizon and are trying to choose among the four bonds:

   a. What are the prices of the bonds?

   b. If you expect the yield to maturity to remain constant (at 7%) through the end of the year, what are the expected pre-tax returns on the bonds? Briefly discuss.

   c. If you expect the yield to maturity to remain constant (at 7%) through the end of the year, what are your expected after-tax rates of return on each bond (assuming a rate of 30% on capital gains and 35% on ordinary income of coupon payments)? [The after-tax rates of return are computed as simple returns, except we subtract the tax on capital gains and coupon income.]

   d. If the yield to maturity shifts to 6% by the end of the year, what is your after-tax rate of return on bond A (assuming a rate of 30% on capital gains and 35% on ordinary income)?

7. The state lottery commission is setting up a bond portfolio to fund a winner’s payoff. The winner (or her estate) is entitled to $1 million per year for the next 20 years.

   a. How much should be invested today?

   b. What is the duration of the liability (the anticipated payout)?

   c. Form a portfolio (specify dollar amounts) from bonds A, B, C and D to achieve target-date immunization.

   d. Is the portfolio you set up in (c) unique? If so, indicate why. If not, indicate what considerations might influence your particular choice.

   e. Briefly discuss whether immunization is an appropriate strategy in this situation.
8. **Real Time Exercise**

Motivated by the strategies of LTCM hedge fund (about which you read in the readings for The Overview Lecture, LN 1) and by the class discussions in the Term-Structure lecture, you wish to profit by trading bonds of different maturity in the U.K. and in Japan. You believe that the best estimate of next year’s one-year interest rate is the current one-year rate (E[r_2]=r_1). Examine the yield curves for the U.K. and Japan to determine where you could earn, what you believe is, the largest liquidity premium (i.e., an average one-year return beyond r_1, which you can earn on holding a two-year zero for one year; a premium compensating one-year-horizon investors who otherwise would not hold two-year bonds). You thus can earn the premium (if f_2>E[r_2]) by buying a two-year security and selling short (e.g., via using repo) a one-year security. In particular, assume annual compounding and assume that the one- and two-year interest rates refer to zero coupon securities. Calculate the profit of buying a 100 face-value two-year zero, putting it out on a one year repo (a repurchase agreement where you sell the 2-year zero today at its current market value, Z, to be repurchased next year at Z(1+r_1), based on the rate r_1 of the current one-year zero – thereby effectively shorting just enough units, valued Z, of a one-year zero to purchase the two-year zero) and then selling it after one year using the projected one year rate next year. Which country gives you the highest profit per 100 face value (show profit calculation for each country, in its currency).

Note: All the information needed for this exercise is in the Bloomberg web site (http://www.bloomberg.com). Within Bloomberg, search under “Market Data” and then under “Rates & Bonds.” Find the U.K. and the Japanese tables, and use the YIELD entry in the “1 Year” and “2 Year” rows) as your input. That is, treat all one-year and two-year securities as zeros and as though they were issued on the day you collect the data. Ignore the precise maturity dates.

**Additional, SUGGESTED, Problems**

S1. An annual bond with a maturity of 10 years has a par value of $1,000, a coupon rate of 9% and a yield to maturity of 7.5%.
   a. What is the current price of the bond?
   b. In 10 years, you know that the one-year interest rates were 6% for the first five years and 7% for the next five years after that. What is your realized compound yield if you bought the bond, and annually reinvested all proceeds until maturity.

S2. a. An 8% coupon Bond with 20 years to maturity selling at par has a duration of 10.3 years. If the yield to maturity increases to 8.01, what happens to the price of the bond?
   b. A 17% coupon bond with 30 years to maturity yielding 8% has a duration of 10.1.
      Which of these bonds has a larger percentage change in price when the yield to maturity on each bond changes by one basis point?
   c. Are long term bonds riskier than short term bonds?