

1. Problem 4.5 (page 163) in textbook.
2. Problem 4.21 (page 165) in textbook.
3. A company has an outstanding bond with face value  $F = \$1,000$ , bond interest rate  $r = 8\%$ , with  $m = 1$  payment per year, that matures in  $N = 8$  years. Suppose the bond is now selling for  $P = \$837.50$ .
  - (a) Find the bond's yield to maturity  $i$ .
  - (b) Suppose the company has excess cash, describe an investment the company can make that earns interest rate  $i$ .
  - (c) Suppose the company is considering raising new capital by issuing new bonds that will mature in eight years. Argue why the company cannot expect to sell these bonds at par value unless the interest rate is at least equal to the yield  $i$  found in part (a).
  - (d) Suppose the company sells new bonds that mature in eight years, with  $F = \$1,000$ ,  $m = 1$ , and bond interest rate  $r = i$ . Suppose further that the bonds sell at par value, and that the unit cost of issuing these new bonds is  $S = \$75.50$ . Find the yield of the new bonds taking into account the issuing costs.
4. Recall that under the growth model

$$i_e = \frac{DPS_1}{P_o} + g,$$

where  $DPS_1$  is the dividend per share at the end of year 1, and  $P_o$  is the ex-post current price of the stock.

- (a) Find an expression for  $P_o$  in terms of  $DPS_1$ ,  $i_e$ , and  $g$ . We will be using this formula to study the sensitivity of the price  $P_o$  to changes in  $DPS_1$ ,  $i_e$ , and  $g$ .
  - (b) Suppose that your current estimates of  $DPS_1$ , and  $g$  are \$1, and  $g = 10\%$  respectively. What is the value of  $P_o$  if  $i_e = 15\%$ ?
  - (c) Now assume that you revise your estimates of  $DPS_1$  and  $g$  to \$0.90, and  $g = 8\%$  respectively. At the same time, investors perceive the company to be more risky and demand  $i_e = 17\%$ . Find the new value of  $P_o$ .
  - (d) Find the ratio of the  $P_o$ 's obtain in parts (a) and (b).
5. Consider a company that uses half debt and half equity as its capital structure. Assume that lenders require a return of  $i_b = 10\%$  and equity investors require a return of  $i_e = 14\%$ , and that the company pays no taxes (so  $k_b = i_b$ ).
  - (a) Find the WACC.
  - (b) An investment costing \$1,000 generates cash flow of \$700 a year for two years, so the cash flow is  $F_0 = -\$1,000$ ,  $F_1 = F_2 = \$700$ . Find the present value of this cash at the WACC.
  - (c) Find the equity cash flow assuming that debt and equity are kept in the same proportion every year. Thus at any time, debt should be equal to one half the present value of the remaining cash inflows discounted at the WACC.
  - (d) Find the present value of the equity cash flow at rate  $i_e$ .
  - (e) Compare parts (b) and (d). Is this a coincidence?
6. Suppose you can borrow money at  $i = 25\%$  per year. Currently you have no cash, but you anticipate that you can earn  $j = 5\%$  per year on cash holdings. You want to determine whether or not it is profitable for you to borrow money to invest it in a project with the following cash flow:  $F_0 = -\$1,000$ ,  $F_1 = \$1,300$ ,  $F_2 = -\$1,000$ ,  $F_3 = \$1,250$ .

- (a) Suppose you borrow \$1,000 and invest this money in the project. What is your balance at the end of year 1? Is it positive?
- (b) How much do you need to borrow at the end of year 2?
- (c) What is your balance at the end of year 3? Is it positive?
- (d) Interpret the meaning of the balance at the end of year 3.
- (e) Should you borrow to invest in this project?
- (e) What is the meaning of a positive balance at the end of year 3 if you are borrowing from yourself at rate  $i = 25\%$ ?