

CHAPTER 7

Problems and Questions

1. An income bondholder receives interest payments only if the firm makes income. If the firm does not make interest payments in a year, the interest is cumulated and paid in the first year the firm makes income. A preferred stock receives preferred dividends only if the firm makes income. If a firm does not make preferred dividend payments in a year, the dividend is cumulated and paid in the first year the firm makes income. Are income bonds really preferred stock? What are the differences? For purposes of calculating debt, how would you differentiate between income bonds and regular bonds?
2. A commodity bond links interest and principal payments to the price of a commodity. Differentiate a commodity bond from a straight bond, and then from equity. How would you factor these differences into your analysis of the debt ratio of a company that has issued exclusively commodity bonds?
3. You are analyzing a new security that has been promoted as equity, with the following features:
 - The dividend on the security is fixed in dollar terms for the life of the security, which is twenty years.
 - The dividend is not tax-deductible.
 - In the case of default, the holders of this security will receive cash only after all debt holders, secured as well as unsecured, are paid.
 - The holders of this security will have no voting rights.Based on the description of debt and equity in the chapter, how would you classify this security? If you were asked to calculate the debt ratio for this firm, how would you categorize this security?
4. You are analyzing a convertible preferred stock with the following characteristics for the security:

- There are 50,000 preferred shares outstanding, with a face value of \$100 and a 6 percent preferred dividend rate.
- The firm has straight preferred stock outstanding, with a preferred dividend rate of 9 percent.
- The preferred stock is trading at \$105.

Estimate the preferred stock and equity components of this preferred stock.

5. You have been asked to calculate the debt ratio for a firm that has the following components to its financing mix:
- The firm has 1 million shares outstanding, trading at \$50 per share.
 - The firm has \$25 million in straight debt, carrying a market interest rate of 8 percent.
 - The firm has 20,000 convertible bonds outstanding, with a face value of \$1,000, a market value of \$1,100, and a coupon rate of 5 percent.

Estimate the debt ratio for this firm.

6. You have been asked to estimate the debt ratio for a firm with the following financing details:
- The firm has two classes of shares outstanding: 50,000 shares of class A stock, with 2 voting rights per share, trading at \$100 per share, and 100,000 shares of class B stock, with 1/2 voting right per share, trading at \$90 per share.
 - The firm has \$5 million in bank debt, and the debt was taken on recently.

Estimate the debt ratio. Why does it matter when the bank debt was taken on?

7. Zycor Corporation obtains most of its funding internally. Assume that the stock has a beta of 1.2, the riskless rate is 6.5 percent, and the market risk premium is 6 percent.
- Estimate the cost of internal equity.
 - Now assume that the cost of issuing new stock is 5 percent of the proceeds. Estimate the cost of external equity.

8. Office Helpers is a private firm that manufactures and sells office supplies. The firm has limited capital and is estimated to have a value of \$80 million with the capital constraints. A venture capitalist is willing to contribute \$20 million to the firm in

exchange for 30 percent of the value of the firm. With this additional capital, the firm will be worth \$120 million.

- a. Should the firm accept the venture capital?
 - b. At what percentage of firm value would you (as the owner of the private firm) break even on the venture capital financing?
9. Assume now that Office Helpers decides to go public and would like to have its shares trade at a target price of \$10 per share. If the IPO is likely to be underpriced by 20 percent, how many shares should the firm have?
10. You are a venture capitalist and have been approached by Cirrus Electronics, a private firm. The firm has no debt outstanding and does not have earnings now but is expected to be earning \$15 million in four years, when you also expect it to go public. The average price-earnings ratio of other firms in this business is 50.
- a. Estimate the exit value of Cirrus Electronics.
 - b. If your target rate of return is 35 percent, estimate the discounted terminal value of Cirrus Electronics.
 - c. If you are contributing \$75 million of venture capital to Cirrus Electronics, at a minimum what percentage of the firm value would you demand in return?
11. The unlevered beta of electronics firms, on average, is 1.1. The riskless rate is 6.5 percent and the market risk premium is 6 percent.
- a. Estimate the expected return, using the CAPM.
 - b. If you are a venture capitalist, why might you have a target rate of return much higher than this expected return?
12. Sunshine Media has just completed an IPO, where 50 million shares of the 125 million shares outstanding were issued to the public at an offering price of \$22 per share. On the offering date, the stock price zoomed to \$40 per share. Who gains from this increase in the price? Who loses, and how much?
13. IPOs are difficult to value because firms going public tend to be small and little information is available about them. Investment bankers have to underprice IPOs

because they bear substantial pricing risk. Do you agree with this statement? How would you test it empirically?

14. You are the owner of a small and successful firm with an estimated market value of \$50 million. You are considering going public.
- What are the considerations you would have in choosing an investment banker?
 - You want to raise \$20 million in new financing, which you plan to reinvest back in the firm. (The estimated market value of \$50 million is based on the assumption that this \$20 million is reinvested.) What proportion of the firm would you have to sell in the IPO to raise \$20 million?
 - How would your answer to **b** change if the investment banker plans to underprice your offering by 10 percent?
 - If you wanted your stock to trade in the \$20–25 range, how many shares would you have to create? How many shares would you have to issue?
15. You have been asked for advice on a rights offering by a firm with 10 million shares outstanding trading at \$50 per share. The firm needs to raise \$100 million in new equity. Assuming that the rights subscription price is \$25, answer the following questions.
- How many rights would be needed to buy one share at the subscription price?
 - Assuming that all rights are subscribed to, what will the ex-rights price be?
 - Estimate the value per right.
 - If the price of a right were different (higher or lower) than the value estimated in **c**, how would you exploit the difference?
16. You are stockholder in a SmallTech, a company that is planning to raise new equity. The stock is trading at \$15 per share, and there are 1 million shares outstanding. The firm issues 500,000 rights to buy additional shares at \$10 per share to its existing stockholders.
- What is the expected stock price after the rights are exercised?
 - If the rights are traded, what is the price per right?

- c. As a stockholder, would you be concerned about the dilution effect lowering your stock price? Why or why not?
17. Assume that SmallTech has net income of \$1 million and that the earnings will increase in proportion with the additional capital raised.
- Estimate the earning per share that SmallTech will have after the rights issue described in the last problem.
 - Assume that SmallTech could have raised the capital by issuing 333,333 shares at the prevailing market price of \$15 per share (thus raising the same amount of equity as was raised in the rights issue) to the public. Estimate the earnings per share that SmallTech would have had with this alternative.
 - As a stockholder, are you concerned about the fact that the rights issue results in lower earnings per share than the general subscription offering (described in **b**).
18. MVP, a manufacturing firm with no debt outstanding and a market value of \$100 million, is considering borrowing \$40 million and buying back stock. Assuming that the interest rate on the debt is 9 percent and that the firm faces a tax rate of 35 percent, answer the following questions:
- Estimate the annual interest tax savings each year from the debt.
 - Estimate the present value of interest tax savings, assuming that the debt change is permanent.
 - Estimate the present value of interest tax savings, assuming that the debt will be taken on for ten years only.
 - What will happen to the present value of interest tax savings if interest rates drop tomorrow to 7 percent but the debt itself is fixed rate debt?
19. A business in the 45 percent tax bracket is considering borrowing money at 10 percent.
- What is the after-tax interest rate on the debt?
 - What is the after-tax interest rate if only half of the interest expense is allowed as a tax deduction?

- c. Would your answer change if the firm is losing money now and does not expect to have taxable income for three years?
20. WestingHome is a manufacturing company that has accumulated a net operating loss of \$2 billion over time. It is considering borrowing \$5 billion to acquire another company.
- Based on the corporate tax rate of 36 percent, estimate the present value of the tax savings that could accrue to the company.
 - Does the existence of a net operating loss carryforward affect your analysis? (Will the tax benefits be diminished as a consequence?)
21. Answer true or false to the following questions relating to the free cash flow hypothesis (as developed by Jensen).
- Companies with high operating earnings have high free cash flows.
 - Companies with large capital expenditures relative to earnings have low free cash flows.
 - Companies that commit to paying a large portion of their free cash flow as dividends do not need debt to add discipline.
 - The free cash flow hypothesis for borrowing money makes more sense for firms in which there is a separation of ownership and management.
 - Firms with high free cash flows are inefficiently run.
22. Assess the likelihood that the following firms will be taken over, based on your understanding of the free cash flow hypothesis. You can assume that earnings and free cash flows are highly correlated.
- A firm with high growth prospects, good projects, low leverage, and high earnings.
 - A firm with low growth prospects, poor projects, low leverage, and poor earnings.
 - A firm with high growth prospects, good projects, high leverage, and low earnings.
 - A firm with low growth prospects, poor projects, high leverage, and good earnings.
 - A firm with low growth prospects, poor projects, low leverage, and good earnings.

23. Nadir, an unlevered firm, has expected earnings before interest and taxes of \$2 million per year. Nadir's tax rate is 40 percent, and the market value is $V = E = \$12$ million. The stock has a beta of 1, and the risk-free rate is 9 percent. [Assume that $E(R_m) - R_f = 6\%$] Management is considering the use of debt; debt would be issued and used to buy back stock, and the size of the firm would remain constant. The default free interest rate on debt is 12 percent. Because interest expense is tax-deductible, the value of the firm would tend to increase as debt is added to the capital structure, but there would be an offset in the form of the rising cost of bankruptcy. The firm's analysts have estimated approximately that the present value of any bankruptcy cost is \$8 million and the probability of bankruptcy will increase with leverage according to the following schedule:

<i>Value of Debt</i>	<i>Probability of Failure</i>
\$2,500,000	0.00%
\$5,000,000	8.00%
\$7,500,000	20.5%
\$8,000,000	30.0%
\$9,000,000	45.0%
\$10,000,000	52.5%
\$12,500,000	70.0%

- What is the cost of equity and WACC at this time? <AQ: WACC has not been defined in this chapter, so it should be spelled out here.>
- What is the optimal capital structure when bankruptcy costs are considered?
- What will the value of the firm be at this optimal capital structure?

24. A firm that has no debt has a market value of \$100 million and a cost of equity of 11 percent. In the Miller-Modigliani world,

- what happens to the value of the firm as the leverage is changed (assume no taxes)?
- what happens to the cost of capital as the leverage is changed (assume no taxes)?
- how would your answers to **a** and **b** change if there are taxes?

25. Assume that personal investors pay a 40 percent tax rate on interest income and only a 20 percent tax rate on equity income. If the corporate tax rate is 30 percent, estimate whether debt has a tax benefit, relative to equity. If a firm with no debt and \$100

million in market value borrows money in this world, estimate what the value of the firm will be if the firm borrows \$50 million.

26. In the illustration in Problem 25, what would the tax rate on equity income need to be for debt to not have an effect on value?
27. XYZ Pharma is a pharmaceutical company that traditionally has not used debt to finance its projects. Over the past ten years, it has also reported high returns on its projects and growth and made substantial research and development expenses over the time period. The health care business overall is growing much slower now, and the projects that the firm is considering have lower expected returns.
- How would you justify the firm's past policy of not using debt?
 - Do you think the policy should be changed now? Why or why not?
28. Unitorde, which makes analog/linear integrated circuits for power management, is a firm that has not used debt in the financing of its projects. The managers of the firm contend that they do not borrow money because they want to maintain financial flexibility.
- How does not borrowing money increase financial flexibility?
 - What is the trade-off you would be making if you have excess debt capacity and you choose not to use it because you want financial flexibility?
29. Consolidated Power is a regulated electric utility that has equity with a market value of \$1.5 billion and debt outstanding of \$3 billion. A consultant notes that this is a high debt ratio relative to the average across all firms, which is 27 percent, and suggests that the firm is overlevered.
- Why would you expect a electric utility to be able to maintain a higher debt ratio than the average company?
 - Does the fact that the company is a regulated monopoly affect its capacity to carry debt?