

## CHAPTER 9

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*Problems and Questions*

(In the problems below, you can use a risk premium of 5.5% and a tax rate of 40% if either is not specified)

1. BMD is a firm with no debt on its books currently and a market value of equity of \$2 billion. Based on its EBITDA of \$200 million, it can afford to have a debt ratio of 50 percent, at which level the firm value should be \$300 million higher.

a. Assuming that the firm plans to increase its leverage instantaneously, what are some of the approaches it could use to get to 50 percent?

b. Is there a difference between repurchasing stock and paying a special dividend? Why or why not?

c. If BMD has a cash balance of \$250 million at this time, will it change any of your analysis?

2. MiniSink is a manufacturing company that has \$100 million in debt outstanding and 9 million shares trading at \$100 per share. The current beta is 1.10, and the interest rate on the debt is 8 percent. In the latest year, MiniSink reported a net income of \$7.50 per share, and analysts expect earnings growth to be 10 percent a year for the next five years. The firm faces a tax rate of 40 percent and pays out 20 percent of its earnings as dividends (the Treasury bond rate is 7 percent).

a. Estimate the debt ratio each year for the next five years, assuming that the firm maintains its current payout ratio.

b. Estimate the debt ratio each year for the next five years, assuming that the firm doubles its dividends and repurchases 5 percent of the outstanding stock every year.

3. IOU has \$5 billion in debt outstanding (carrying an interest rate of 9 percent), and 10 million shares trading at \$50 per share. Based on its current EBIT of \$200 million, its optimal debt ratio is only 30 percent. The firm has a beta of 1.20, and the current Treasury bond rate is 7 percent. Assuming that the operating income will increase 10

percent a year for the next five years and that the firm's depreciation and capital expenditures both amount to \$100 million annually for each of the five years, estimate the debt ratio for IOU if it

- a. maintains its existing policy of paying \$50 million a year in dividends for the next five years.
- b. eliminates dividends.

4. DGF Corporation has come to you for some advice on how best to increase their leverage over time. In the most recent year, DGF had an EBITDA of \$300 million, owed \$1 billion in both book value and market value terms, and had a net worth of \$2 billion (the market value was twice the book value). It had a beta of 1.30, and the interest rate on its debt is 8 percent (the Treasury bond rate is 7 percent). If it moves to its optimal debt ratio of 40 percent, the cost of capital is expected to drop by 1 percent.

- a. How should the firm move to its optimal? In particular, should it borrow money and take on projects or should it pay dividends/repurchase stock?
- b. Are there any other considerations that may affect your decision?

5. STL has asked you for advice on putting together the details of the new debt issues it is planning to make. What information would you need to obtain to provide this advice?

6. Assume now that you have uncovered the following facts about the types of projects STL takes:

- The projects are primarily infrastructure projects, requiring large initial investments and long gestation periods.
- Most of the new projects will be in emerging markets, and the cash flows are expected to be in the local currencies, when they do occur.
- The magnitude of the cash flows will largely depend on how quickly the economies of the emerging markets grow in the long run.

How would you use this information in the design of debt?

7. You are attempting to structure a debt issue for Eaton Corporation, a manufacturer of automotive components. You have collected the following information on the market values of debt and equity for the past ten years:

<i>Year</i>	<i>Market Value of Equity (in millions \$)</i>	<i>Debt (in million s \$)</i>
1985	1,824.9	436
1986	2,260.6	632
1987	2,389.6	795
1988	1,960.8	655
1989	2,226	836
1990	1,875.9	755
1991	2,009.7	795
1992	2,589.3	833
1993	3,210	649
1994	3,962.7	1,053

In addition, you have the following information on the changes in long-term interest rates, inflation rates, gross national product (GNP), and exchange rates over the same period.

<i>Year</i>	<i>Long Bond Rate</i>	<i>GNP Growth</i>	<i>Weighted Dollar</i>	<i>Inflation Rate</i>
1985	11.40%	6.44%	125.95	3.50%
1986	9.00%	5.40%	112.89	1.90%
1987	9.40%	6.90%	95.88	3.70%
1988	9.70%	7.89%	95.32	4.10%
1989	9.30%	7.23%	102.26	4.80%
1990	9.30%	5.35%	96.25	5.40%
1991	8.80%	2.88%	98.82	4.20%
1992	8.10%	6.22%	104.58	3.00%

1993	7.20%	5.34%	105.22	3.00%
1994	8.00%	5.97%	98.6	2.60%

Using this information,

- Estimate the duration of this firm's projects. How would you use this information in designing the debt issue?
- How cyclical is this company? How would that affect your debt issue?
- Estimate the sensitivity of firm value to exchange rates. How would you use this information in designing the debt issue?
- How sensitive is firm value to inflation rates? How would you use this information in designing the debt issue?
- What factors might lead you to override the results of this analysis?

8. Repeat the analysis in Problem 7 for a private firm that has provided you with the following estimates of operating income for the ten years, for which you have the macroeconomic data:

<i>Year</i>	<i>Operating Income (in \$ thousands)</i>
1985	463.05
1986	411.696
1987	483.252
1988	544.633
1989	550.65
1990	454.875
1991	341.481
1992	413.983
1993	567.729
1994	810.968

9. Assuming that you do the analysis in Problem 8 with both firm value and operating income, what are the reasons for the differences you might find in the results, using each? When would you use one over the other?

10. Pfizer, a major pharmaceutical company, has a debt ratio of 10.30 percent and is considering increasing its debt ratio to 30 percent. Its cost of capital is expected to drop from 14.51 percent to 13.45 percent. Pfizer had an EBIT of \$2 billion in 1995, and a book value of capital (debt + equity) of approximately \$8 billion. It also faced a tax rate of 40 percent on its income. The stock in the firm is widely held, but the corporate charter includes significant antitakeover restrictions.

- a. Should Pfizer move to its desired debt ratio quickly or gradually? Explain.
- b. Given the choice in part a, explain how you would move to the optimal?
- c. Pfizer is consider using the excess debt capacity for an acquisition. What are some of the concerns it should have?

11. Upjohn, also a major pharmaceutical company, is considering increasing its debt ratio from 11 percent to 40 percent, which is its optimal debt ratio. Its beta is 1.17, and the current Treasury bond rate is 6.50 percent. The return on equity was 14.5 percent in the most recent year, but it is dropping as health care matures as a business. The company has also been mentioned as a possible takeover target and is widely held.

- a. Would you suggest that Upjohn move to the optimal ratio immediately? Explain.
- b. How would you recommend that Upjohn increase its debt ratio?

12. U.S. steel companies have generally been considered mature in terms of growth and often take on high leverage to finance their plant and equipment. Steel companies in some emerging markets often have high growth rates and good growth prospects. Would you expect these companies to also have high leverage? Why or why not?

13. You are trying to decide whether the debt structure that Bethlehem Steel has currently is appropriate, given its assets. You regress changes in firm value against changes in interest rates, and arrive at the following equation

$$\text{Change in Firm Value} = 0.20\% - 6.33 (\text{Change in Interest Rates})$$

a. If Bethlehem Steel has primarily short-term debt outstanding, with a maturity of one year, would you deem the debt structure appropriate?

b. Why might Bethlehem Steel be inclined to use short-term debt to finance longer-term assets?

14. Railroad companies in the United States tend to have long-term, fixed rate, dollar denominated debt. Explain why.

15. The following table summarizes the results of regressing changes in firm value against changes in interest rates for six major footwear companies:

$$\text{Change in Firm Value} = a + b(\text{Change in Long-Term Interest Rates})$$

Company	Intercept ( <i>a</i> )	Slope Coefficient ( <i>b</i> )
LA Gear	-0.07	-4.74
Nike	0.05	-11.03
Stride Rite	0.01	-8.08
Timberland	0.06	-22.50
Reebok	0.04	-4.79
Wolverine	0.06	-2.42

a. How would you use these results to design debt for each of these companies?

b. How would you explain the wide variation across companies? Would you use the average across the companies in any way?

16. You have run a series of regressions of firm value changes at Motorola, the semiconductor company, against changes in a number of macroeconomic variables. The results are summarized here:

$$\text{Change in Firm Value} = 0.05 - 3.87 (\text{Change in Long-Term Interest Rate})$$

$$\text{Change in Firm Value} = 0.02 + 5.76 (\text{Change in Real GNP})$$

$$\text{Change in Firm Value} = 0.04 - 2.59 (\text{Inflation Rate})$$

$$\text{Change in Firm Value} = 0.05 - 3.40 (\$/DM)$$

- a. Based on these regressions, how would you design Motorola's financing?
- b. Motorola, like all semiconductor companies, is sensitive to the health of high-technology companies. Is there any special feature you can add to the debt to reflect this dependence?