

Probability	EBIT
0.10	(\$ 100,000)
0.20	200,000
0.40	500,000
0.20	800,000
0.10	1,100,000

Determine the times-interest-earned ratio for each probability. What is the probability of not covering the interest payment at the 30 percent debt level?

(16-4) **Capital Structure Analysis** Pettit Printing Company has a total market value of \$100 million, consisting of 1 million shares selling for \$50 per share and \$50 million of 10 percent perpetual bonds now selling at par. The company's EBIT is \$13.24 million, and its tax rate is 15 percent. Pettit can change its capital structure by either increasing its debt to 70 percent (based on market values) or decreasing it to 30 percent. If it decides to *increase* its use of leverage, it must call its old bonds and issue new ones with a 12 percent coupon. If it decides to *decrease* its leverage, it will call in its old bonds and replace them with new 8 percent coupon bonds. The company will sell or repurchase stock at the new equilibrium price to complete the capital structure change.

The firm pays out all earnings as dividends; hence, its stock is a zero growth stock. Its current cost of equity,  $r_s$ , is 14 percent. If it increases leverage,  $r_s$  will be 16 percent. If it decreases leverage,  $r_s$  will be 13 percent. What is the firm's WACC and total corporate value under each capital structure?

(16-5) **Optimal Capital Structure with Hamada** Beckman Engineering and Associates (BEA) is considering a change in its capital structure. BEA currently has \$20 million in debt carrying a rate of 8 percent, and its stock price is \$40 per share with 2 million shares outstanding. BEA is a zero growth firm and pays out all of its earnings as dividends. EBIT is \$14.933 million, and BEA faces a 40 percent federal-plus-state tax rate. The market risk premium is 4 percent, and the risk free rate is 6 percent. BEA is considering increasing its debt level to a capital structure with 40 percent debt, based on market values, and repurchasing shares with the extra money that it borrows. BEA will have to retire the old debt in order to issue new debt, and the rate on the new debt will be 9 percent. BEA has a beta of 1.0.

- What is BEA's unlevered beta? Use market value D/S when unlevering.
- What are BEA's new beta and cost of equity if it has 40 percent debt?
- What are BEA's WACC and total value of the firm with 40 percent debt?

(16-6) **WACC and Optimal Capital Structure** Elliott Athletics is trying to determine its optimal capital structure, which now consists of only debt and common equity. The firm does not currently use preferred stock in its capital structure, and it does not plan to do so in the future. To estimate how much its debt would cost at different debt levels, the company's treasury staff has consulted with investment bankers and, on the basis of those discussions, has created the following table:

Market Debt-to-Value Ratio ( $w_d$ )	Market Equity-to-Value Ratio ( $w_e$ )	Market Debt-to-Equity Ratio (D/S)	Bond Rating	Before-Tax Cost of Debt $r_d$
0.0	1.0	0.00	A	7.0%
0.2	0.8	0.25	BBB	8.0
0.4	0.6	0.67	BB	10.0
0.6	0.4	1.50	C	12.0
0.8	0.2	4.00	D	15.0

Elliott uses the CAPM to estimate its cost of common equity,  $r_s$ . The company estimates that the risk-free rate is 5 percent, the market risk premium is 6 percent, and its tax rate is 40 percent. Elliott estimates that if it had no debt, its "unlevered" beta,  $b_U$ , would be 1.2. Based on this information, what is the firm's optimal capital structure?

tal structure, and what would the weighted average cost of capital be at the optimal capital structure?

## SPREADSHEET PROBLEM

(16-7) Start with the partial model in the file *FM11 Ch 16 P7 Build a Model.xls* from the textbook's Web site. Rework Problem 16-6 using a spreadsheet model. After completing the problem as it appears, answer the following related questions.

- Plot a graph of the after-tax cost of debt, the cost of equity, and the WACC versus the debt/value ratio.
- Would the optimal capital structure change if the unlevered beta changed? To answer this question, do a sensitivity analysis of WACC on  $b_U$  for different levels of  $b_U$ .

## CYBERPROBLEM

Please go to our Web site, <http://brigham.swlearning.com>, to access any Cyberproblems.

## THOMSON ONE Business School Edition

Please go to <http://brighamxtra.swlearning.com> to access any Thomson ONE problems.

## MINI CASE

Assume you have just been hired as business manager of PizzaPalace, a pizza restaurant located adjacent to campus. The company's EBIT was \$500,000 last year, and since the university's enrollment is capped, EBIT is expected to remain constant (in real terms) over time. Since no expansion capital will be required, PizzaPalace plans to pay out all earnings as dividends. The management group owns about 50 percent of the stock, and the stock is traded in the over-the-counter market.

The firm is currently financed with all equity; it has 100,000 shares outstanding; and  $P_0 = \$25$  per share. When you took your corporate finance course, your instructor stated that most firms' owners would be financially better off if the firms used some debt. When you suggested this to your new boss, he encouraged you to pursue the idea. As a first step, assume that you obtained from the firm's investment banker the following estimated costs of debt for the firm at different capital structures:

Percent Financed with Debt, $w_d$	$r_d$
0%	—
20	8.0%
30	8.5
40	10.0
50	12.0

If the company were to recapitalize, debt would be issued, and the funds received would be used to repurchase stock. PizzaPalace is in the 40 percent state-plus-federal corporate tax bracket, its beta is 1.0, the risk-free rate is 6 percent, and the market risk premium is 6 percent.

- Provide a brief overview of capital structure effects. Be sure to identify the ways in which capital structure can affect the weighted average cost of capital and free cash flows.
- What is business risk? What factors influence a firm's business risk?
  - What is operating leverage, and how does it affect a firm's business risk? Show the operating break-even point if a company has fixed costs of \$200, a sales price of \$15, and variable costs of \$10.