

9. **New projects** are often funded by bonds and stock. The costs of issuance, generally called flotation costs, should be included in any NPV analysis.

Concept Questions

1. **Project Risk** If you can borrow all the money you need for a project at 6 percent, doesn't it follow that 6 percent is your cost of capital for the project?
2. **WACC and Taxes** Why do we use an aftertax figure for cost of debt but not for cost of equity?
3. **SML Cost of Equity Estimation** If you use the stock beta and the security market line to compute the discount rate for a project, what assumptions are you implicitly making?
4. **SML Cost of Equity Estimation** What are the advantages of using the SML approach to finding the cost of equity capital? What are the disadvantages? What are the specific pieces of information needed to use this method? Are all of these variables observable, or do they need to be estimated? What are some of the ways in which you could get these estimates?
5. **Cost of Debt Estimation** How do you determine the appropriate cost of debt for a company? Does it make a difference if the company's debt is privately placed as opposed to being publicly traded? How would you estimate the cost of debt for a firm whose only debt issues are privately held by institutional investors?
6. **Cost of Capital** Suppose Tom O'Bedlam, president of Bedlam Products, Inc., has hired you to determine the firm's cost of debt and cost of equity capital.
 1. The stock currently sells for \$50 per share, and the dividend per share will probably be about \$5. Tom argues, "It will cost us \$5 per share to use the stockholders' money this year, so the cost of equity is equal to 10 percent ($=\$5 \cdot 50$).\" What's wrong with this conclusion?
 2. Based on the most recent financial statements, Bedlam Products' total liabilities are \$8 million. Total interest expense for the coming year will be about \$1 million. Tom therefore reasons, "We owe \$8 million, and we will pay \$1 million interest. Therefore, our cost of debt is obviously $\$1 \text{ million} / \$8 \text{ million} = 12.5 \text{ percent}$." What's wrong with this conclusion?
 3. Based on his own analysis, Tom is recommending that the company increase its use of equity financing because, "debt costs 12.5 percent, but equity only costs 10 percent; thus equity is cheaper." Ignoring all the other issues, what do you think about the conclusion that the cost of equity is less than the cost of debt?
7. **Company Risk versus Project Risk** Both Dow Chemical Company, a large natural gas user, and Superior Oil, a major natural gas producer, are thinking of investing in natural gas wells near Houston. Both are all-equity financed companies. Dow and Superior are looking at identical projects. They've analyzed their respective investments, which would involve a negative cash flow now and positive expected cash flows in the future. These cash flows would be the same for both firms. No debt would be used to finance the projects. Both companies estimate that their projects would have a net present value of \$1 million at an 18 percent discount rate and a - \$1.1 million NPV at a 22 percent discount rate. Dow has a beta of 1.25, whereas Superior has a beta of .75. The expected risk premium on the market is 8 percent, and risk-free bonds are yielding 12 percent. Should either company proceed? Should both? Explain.
8. **Divisional Cost of Capital** Under what circumstances would it be appropriate for a firm to use different costs of capital for its different operating divisions? If the overall firm WACC was used as the hurdle rate for all divisions, would the riskier divisions or the more conservative divisions tend to get most of the investment projects? Why? If you were to try to estimate the appropriate cost of capital for different divisions, what problems might you encounter? What are two techniques you could use to develop a rough estimate for each division's cost of capital?
9. **Leverage** Consider a levered firm's projects that have similar risks to the firm as a whole. Is the discount rate for the projects higher or lower than the rate computed using the security market

line? Why?

10. **Beta** What factors determine the beta of a stock? Define and describe each.

Questions and Problems connect™

BASIC (Questions 1-17)

1. **Calculating Cost of Equity** The Dybvig Corporation's common stock has a beta of 1.15. If the risk-free rate is 4.5 percent and the expected return on the market is 11 percent, what is Dybvig's cost of equity capital?
2. **Calculating Cost of Equity** The Devon Co. just issued a dividend of \$2.40 per share on its common stock. The company is expected to maintain a constant 5.5 percent growth rate in its dividends indefinitely. If the stock sells for \$52 a share, what is the company's cost of equity?
3. **Calculating Cost of Equity** Stock in Country Road Industries has a beta of .85. The market risk premium is 8 percent, and T-bills are currently yielding 5 percent. The company's most recent dividend was \$1.60 per share, and dividends are expected to grow at a 6 percent annual rate indefinitely. If the stock sells for \$37 per share, what is your best estimate of the company's cost of equity?
4. **Calculating Cost of Debt** Advance, Inc., is trying to determine its cost of debt. The firm has a debt issue outstanding with 12 years to maturity that is quoted at 95 percent of face value. The issue makes semiannual payments and has a coupon rate of 8 percent annually. What is Advance's pretax cost of debt? If the tax rate is 35 percent, what is the aftertax cost of debt?
5. **Calculating Cost of Debt** Shanken Corp. issued a 30-year, 7 percent semiannual bond 7 years ago. The bond currently sells for 108 percent of its face value. The company's tax rate is 35 percent.
 1. What is the pretax cost of debt?
 2. What is the aftertax cost of debt?
 3. Which is more relevant, the pretax or the aftertax cost of debt? Why?
6. **Calculating Cost of Debt** For the firm in the previous problem, suppose the book value of the debt issue is \$60 million. In addition, the company has a second debt issue on the market, a zero coupon bond with seven years left to maturity; the book value of this issue is \$80 million and the bonds sell for 73 percent of par. What is the company's total book value of debt? The total market value? What is your best estimate of the aftertax cost of debt now?
7. **Calculating WACC** Mullineaux Corporation has a target capital structure of 70 percent common stock and 30 percent debt. Its cost of equity is 15 percent, and the cost of debt is 8 percent. The relevant tax rate is 35 percent. What is Mullineaux's WACC?
8. **Taxes and WACC** Miller Manufacturing has a target debt–equity ratio of .45. Its cost of equity is 17 percent, and its cost of debt is 10 percent. If the tax rate is 35 percent, what is Miller's WACC?
9. **Finding the Capital Structure** Fama's Llamas has a weighted average cost of capital of 9.8 percent. The company's cost of equity is 15 percent, and its cost of debt is 7.5 percent. The tax rate is 35 percent. What is Fama's debt–equity ratio?
10. **Book Value versus Market Value** Filer Manufacturing has 7.5 million shares of common stock outstanding. The current share price is \$49, and the book value per share is \$4. Filer Manufacturing also has two bond issues outstanding. The first bond issue has a face value of \$60 million and a 7 percent coupon and sells for 93 percent of par. The second issue has a face value of \$50 million and a 6.5 percent coupon and sells for 96.5 percent of par. The first issue matures in 10 years, the second in 6 years.

1. What are Filer's capital structure weights on a book value basis?
 2. What are Filer's capital structure weights on a market value basis?
 3. Which are more relevant, the book or market value weights? Why?
11. **Calculating the WACC** In the previous problem, suppose the company's stock has a beta of 1.2. The risk-free rate is 5.2 percent, and the market risk premium is 7 percent. Assume that the overall cost of debt is the weighted average implied by the two outstanding debt issues. Both bonds make semiannual payments. The tax rate is 35 percent. What is the company's WACC?
12. **WACC** Kose, Inc., has a target debt–equity ratio of .65. Its WACC is 11.2 percent, and the tax rate is 35 percent.
1. If Kose's cost of equity is 15 percent, what is its pretax cost of debt?
 2. If instead you know that the aftertax cost of debt is 6.4 percent, what is the cost of equity?
13. **Finding the WACC** Given the following information for Huntington Power Co., find the WACC. Assume the company's tax rate is 35 percent.

<i>Debt:</i>	5,000 8 percent coupon bonds outstanding, \$1,000 par value, 20 years to maturity, selling for 103 percent of par; the bonds make semiannual payments.
<i>Common stock:</i>	160,000 shares outstanding, selling for \$57 per share; the beta is 1.10.
<i>Market:</i>	7 percent market risk premium and 6 percent risk-free rate.

14. **Finding the WACC** Titan Mining Corporation has 8.5 million shares of common stock outstanding and 200,000 7.5 percent semiannual bonds outstanding, par value \$1,000 each. The common stock currently sells for \$34 per share and has a beta of 1.20, and the bonds have 15 years to maturity and sell for 93 percent of par. The market risk premium is 7 percent, T-bills are yielding 5 percent, and Titan Mining's tax rate is 35 percent.
1. What is the firm's market value capital structure?
 2. If Titan Mining is evaluating a new investment project that has the same risk as the firm's typical project, what rate should the firm use to discount the project's cash flows?
15. **SML and WACC** An all-equity firm is considering the following projects:

Project	Beta	Expected Return
W	.75	10.0%
X	.90	10.2
Y	1.20	12.0
Z	1.50	15.0

The T-bill rate is 5 percent, and the expected return on the market is 11 percent.

1. Which projects have a higher expected return than the firm's 11 percent cost of capital?
2. Which projects should be accepted?
3. Which projects would be incorrectly accepted or rejected if the firm's overall cost of capital was used as a hurdle rate?

16. **Calculating Flotation Costs** Suppose your company needs \$20 million to build a new assembly line. Your target debt–equity ratio is .75. The flotation cost for new equity is 8 percent, but the flotation cost for debt is only 5 percent. Your boss has decided to fund the project by borrowing money because the flotation costs are lower and the needed funds are relatively small.
1. What do you think about the rationale behind borrowing the entire amount?
 2. What is your company's weighted average flotation cost, assuming all equity is raised externally?
 3. What is the true cost of building the new assembly line after taking flotation costs into account? Does it matter in this case that the entire amount is being raised from debt?
17. **Calculating Flotation Costs** Southern Alliance Company needs to raise \$45 million to start a new project and will raise the money by selling new bonds. The company will generate no internal equity for the foreseeable future. The company has a target capital structure of 65 percent common stock, 5 percent preferred stock, and 30 percent debt. Flotation costs for issuing new common stock are 9 percent, for new preferred stock, 6 percent, and for new debt, 3 percent. What is the true initial cost figure Southern should use when evaluating its project?

INTERMEDIATE (Questions 18-21)

18. **WACC and NPV** Och, Inc., is considering a project that will result in initial aftertax cash savings of \$3.5 million at the end of the first year, and these savings will grow at a rate of 5 percent per year indefinitely. The firm has a target debt–equity ratio of .65, a cost of equity of 15 percent, and an aftertax cost of debt of 5.5 percent. The cost-saving proposal is somewhat riskier than the usual projects the firm undertakes; management uses the subjective approach and applies an adjustment factor of +2 percent to the cost of capital for such risky projects. Under what circumstances should Och take on the project?
19. **Preferred Stock and WACC** The Saunders Investment Bank has the following financing outstanding. What is the WACC for the company?

<i>Debt:</i>	40,000 bonds with a 7 percent coupon rate and a current price quote of 119.80; the bonds have 25 years to maturity. 150,000 zero coupon bonds with a price quote of 18.2 and 30 years until maturity.
<i>Preferred stock:</i>	100,000 shares of 4 percent preferred stock with a current price of \$78, and a par value = \$100.
<i>Common stock:</i>	1,800,000 shares of common stock; the current price is \$65, and the beta of the stock is 1.1.
<i>Market:</i>	The corporate tax rate is 40 percent, the market risk premium is 7 percent, and the risk-free rate is 4 percent.

20. **Flotation Costs** Goodbye, Inc., recently issued new securities to finance a new TV show. The project cost \$15 million, and the company paid \$850,000 in flotation costs. In addition, the equity issued had a flotation cost of 7 percent of the amount raised, whereas the debt issued had a flotation cost of 3 percent of the amount raised. If Goodbye issued new securities in the same proportion as its target capital structure, what is the company's target debt–equity ratio?
21. **Calculating the Cost of Equity** Floyd Industries stock has a beta of 1.50. The company just paid a dividend of \$.80, and the dividends are expected to grow at 5 percent per year. The expected return on the market is 12 percent, and Treasury bills are yielding 5.5 percent. The most recent stock price for Floyd is \$61.
1. Calculate the cost of equity using the DDM method.
 2. Calculate the cost of equity using the SML method.
 3. Why do you think your estimates in (a) and (b) are so different?

CHALLENGE (Questions 22–24)

22. **Flotation Costs and NPV** Photochronograph Corporation (PC) manufactures time series photographic equipment. It is currently at its target debt–equity ratio of .70. It's considering building a new \$45 million manufacturing facility. This new plant is expected to generate aftertax cash flows of \$6.2 million a year in perpetuity. The company raises all equity from outside financing. There are three financing options:
1. A new issue of common stock: The flotation costs of the new common stock would be 8 percent of the amount raised. The required return on the company's new equity is 14 percent.
 2. A new issue of 20-year bonds: The flotation costs of the new bonds would be 4 percent of the proceeds. If the company issues these new bonds at an annual coupon rate of 8 percent, they will sell at par.
 3. Increased use of accounts payable financing: Because this financing is part of the company's ongoing daily business, it has no flotation costs, and the company assigns it a cost that is the same as the overall firm WACC. Management has a target ratio of accounts payable to long-term debt of .20. (Assume there is no difference between the pretax and aftertax accounts payable cost.)

What is the NPV of the new plant? Assume that PC has a 35 percent tax rate.

23. **Flotation Costs** Trower Corp. has a debt–equity ratio of 1.20. The company is considering a new plant that will cost \$145 million to build. When the company issues new equity, it incurs a flotation cost of 8 percent. The flotation cost on new debt is 3.5 percent. What is the initial cost of the plant if the company raises all equity externally? What if it typically uses 60 percent retained earnings? What if all equity investments are financed through retained earnings?
24. **Project Evaluation** This is a comprehensive project evaluation problem bringing together much of what you have learned in this and previous chapters. Suppose you have been hired as a financial consultant to Defense Electronics, Inc. (DEI), a large, publicly traded firm that is the market share leader in radar detection systems (RDSs). The company is looking at setting up a manufacturing plant overseas to produce a new line of RDSs. This will be a five-year project. The company bought some land three years ago for \$4 million in anticipation of using it as a toxic dump site for waste chemicals, but it built a piping system to safely discard the chemicals instead. The land was appraised last week for \$5.1 million. In five years, the aftertax value of the land will be \$6 million, but the company expects to keep the land for a future project. The company wants to build its new manufacturing plant on this land; the plant and equipment will cost \$35 million to build. The following market data on DEI's securities are current:

<i>Debt:</i>	240,000 7.5 percent coupon bonds outstanding, 20 years to maturity, selling for 94 percent of par; the bonds have a \$1,000 par value each and make semiannual payments.
<i>Common stock:</i>	9,000,000 shares outstanding, selling for \$71 per share; the beta is 1.2.
<i>Preferred stock:</i>	400,000 shares of 5.5 percent preferred stock outstanding, selling for \$81 per share.
<i>Market:</i>	8 percent expected market risk premium; 5 percent risk-free rate.

DEI uses G.M. Wharton as its lead underwriter. Wharton charges DEI spreads of 8 percent on new common stock issues, 6 percent on new preferred stock issues, and 4 percent on new debt issues. Wharton has included all direct and indirect issuance costs (along with its profit) in setting these spreads. Wharton has recommended to DEI that it raise the funds needed to build the plant by issuing new shares of common stock. DEI's tax rate is 35 percent. The project requires \$1,300,000 in initial net working capital investment to get operational. Assume Wharton raises all equity for new projects externally.

1. Calculate the project's initial time 0 cash flow, taking into account all side effects.

2. The new RDS project is somewhat riskier than a typical project for DEI, primarily because the plant is being located overseas. Management has told you to use an adjustment factor of +2 percent to account for this increased riskiness. Calculate the appropriate discount rate to use when evaluating DEI's project.
3. The manufacturing plant has an eight-year tax life, and DEI uses straight-line depreciation. At the end of the project (that is, the end of year 5), the plant and equipment can be scrapped for \$6 million. What is the aftertax salvage value of this plant and equipment?
4. The company will incur \$7,000,000 in annual fixed costs. The plan is to manufacture 18,000 RDSs per year and sell them at \$10,900 per machine; the variable production costs are \$9,400 per RDS. What is the annual operating cash flow (OCF) from this project?
5. DEI's comptroller is primarily interested in the impact of DEI's investments on the bottom line of reported accounting statements. What will you tell her is the accounting break-even quantity of RDSs sold for this project?
6. Finally, DEI's president wants you to throw all your calculations, assumptions, and everything else into the report for the chief financial officer; all he wants to know is what the RDS project's internal rate of return (IRR) and net present value (NPV) are. What will you report?

Appendix 13A Economic Value Added and the Measurement of Financial Performance

To access the appendix for this chapter, please visit www.mhhe.com/rwj.

Mini Case: THE COST OF CAPITAL FOR GOFF COMPUTER, INC.

You have recently been hired by Goff Computer, Inc. (GCI), in the finance area. GCI was founded eight years ago by Chris Goff and currently operates 74 stores in the Southeast. GCI is privately owned by Chris and his family and had sales of \$97 million last year.

GCI sells primarily to in-store customers. Customers come to the store and talk with a sales representative. The sales representative assists the customer in determining the type of computer and peripherals that are necessary for the individual customer's computing needs. After the order is taken, the customer pays for the order immediately, and the computer is assembled to fill the order. Delivery of the computer averages 15 days but is guaranteed in 30 days.

GCI's growth to date has been financed from its profits. Whenever the company had sufficient capital, it would open a new store. Relatively little formal analysis has been used in the capital budgeting process. Chris has just read about capital budgeting techniques and has come to you for help. The company has never attempted to determine its cost of capital, and Chris would like you to perform the analysis. Because the company is privately owned, it is difficult to determine the cost of equity for the company. You have determined that to estimate the cost of capital for GCI, you will use Dell as a representative company. The following steps will allow you to calculate this estimate:

1. Most publicly traded corporations are required to submit 10Q (quarterly) and 10K (annual) reports to the SEC detailing their financial operations over the previous quarter or year, respectively. These corporate filings are available on the SEC Web site at www.sec.gov. Go to the SEC Web site, follow the "Search for Company Filings" link and the "Companies & Other Filers" link, enter "Dell Computer," and search for SEC filings made by Dell. Find the most recent 10Q and 10K and download the forms. Look on the balance sheet to find the book value of debt and the book value of equity. If you look further down the report, you should find a section titled either "Long-Term Debt" or "Long-Term Debt and Interest Rate Risk Management" that will list a breakdown of Dell's long-term debt.
2. To estimate the cost of equity for Dell, go to finance.yahoo.com and enter the ticker symbol

"DELL." Follow the various links to find answers to the following questions: What is the most recent stock price listed for Dell? What is the market value of equity, or market capitalization? How many shares of stock does Dell have outstanding? What is the beta for Dell? Now go back to finance.yahoo.com and follow the "Bonds" link. What is the yield on 3-month Treasury bills? Using a 7 percent market risk premium, what is the cost of equity for Dell using the CAPM?

3. Go to www.reuters.com and find the list of competitors in the industry. Find the beta for each of these competitors, and then calculate the industry average beta. Using the industry average beta, what is the cost of equity? Does it matter if you use the beta for Dell or the beta for the industry in this case?
4. You now need to calculate the cost of debt for Dell. Go to cxa.marketwatch.com/finra/BondCenter/Default.aspx, enter Dell as the company, and find the yield to maturity for each of Dell's bonds. What is the weighted average cost of debt for Dell using the book value weights and the market value weights? Does it make a difference in this case if you use book value weights or market value weights?
5. You now have all the necessary information to calculate the weighted average cost of capital for Dell. Calculate the weighted average cost of capital for Dell using book value weights and market value weights assuming Dell has a 35 percent marginal tax rate. Which cost of capital number is more relevant?
6. You used Dell as a representative company to estimate the cost of capital for GCI. What are some of the potential problems with this approach in this situation? What improvements might you suggest?