

Answer the following questions using the information found in these statements:

- a. Does BigBox generate positive cash flow from its operations?
- b. How much did BigBox invest in new capital expenditures over the last four years?
- c. Describe BigBox's sources of financing in the financial markets over the last four years.
- d. Based solely on the cash flow statement for 2010 through 2013, write a brief narrative that describes the major activities of BigBox's management team over the last four years.

- 3-16. **(Analyzing the Quality of Firm Earnings)** Kabutell, Inc. had net income of \$750,000, cash flow from financing activities of \$50,000, depreciation expenses of \$50,000, and cash flow from operating activities of \$575,000. Calculate the quality of earnings ratio. What does this ratio tell you?

- a. Kabutell, Inc. reported the following in its annual reports for 2011–2013:

(\$ millions)	2011	2012	2013
Cash Flow from Operations	\$478	\$403	\$470
Capital Expenditures (CAPEX)	\$459	\$447	\$456

- b. Calculate the average capital acquisitions ratio over the three-year period. How would you interpret these results?

- 3-17. **(Analyzing the quality of earnings and sustainability of capital expenditures)** Look up the statement of cash flows for both Home Depot and Lowes using Yahoo! Finance.

- a. Compute the quality of earnings ratio for both firms and all three years of data provided.
- b. Compare the quality of earnings ratio for the two firms. For which firm do you feel most comfortable about the reported earnings quality? Explain.
- c. Compute the capital acquisitions ratios for the latest three years for both firms.
- d. Compare Home Depot's and Lowes' abilities to use of operating cash flow to finance their capital expenditures. Which firm has relied more on the capital markets?

Mini-Case

In the introduction to this chapter, we describe the situation faced by Gap, Inc. (GPS). We learned that the retail clothing chain had grown dramatically over the first two decades of its existence but had fallen on difficult times in 2007. Assume that you were hired as a new management trainee by the corporate offices of Gap in the spring of 2009 and you report directly to the director of sales and marketing. Although your job is not

specifically in finance, your boss is a major contributor to the firm's overall financial success and wants you to familiarize yourself with the firm's recent financial performance. Specifically, she has asked that you review the following income statements for years 2005–2008. You are to review the firm's revenues, gross profit, operating income, and net income trends over the past four years.

Gap, Inc.

Income Statements (2005–2008)

In Millions of USD (except for per share items)	2008	2007	2006	2005
Total revenue	\$15,763	\$15,923	\$16,019	\$16,267
Cost of goods sold	10,071	10,266	10,145	9,886
Gross profit	\$ 5,692	\$ 5,657	\$ 5,874	\$ 6,381
Total operating expense	4,377	4,432	4,099	4,402
Net operating income	\$ 1,315	\$ 1,225	\$ 1,775	\$ 1,979
Interest income (expense)	91	90	48	(108)
Income before tax	\$ 1,406	\$ 1,315	\$ 1,823	\$ 1,871
Income taxes	539	506	692	721
Net income	\$ 867	\$ 809	\$ 1,131	\$ 1,150

After contemplating the assignment, you decide to calculate the gross profit margin, operating profit margin, and net profit margin for each of these years. It is your hope that by evaluating these profit margins you will be able to pinpoint any problems that the firm may be experiencing.

Finally, your boss pointed out that the firm may need to raise additional capital in the near future and suggested that you review the firm's past financing decisions using both the firm's balance sheets and statements of cash flows. Specifically, she asked that you summarize your assessment of the firm's use of debt financing over the last 4 years

Gap, Inc.
Balance Sheets (2005–2008)

In millions of USD (except for per share items)	2008	2007	2006	2005
Cash and short-term investments	1,901.00	2,600.00	2,987.00	3,062.00
Total inventory	1,575.00	1,796.00	1,696.00	1,814.00
Other current assets, total	610.00	633.00	556.00	1,428.00
Total current assets	4,086.00	5,029.00	5,239.00	6,304.00
Property/plant/equipment, total—gross	7,320.00	7,135.00	6,958.00	7,169.00
Other long-term assets, total	485.00	318.00	336.00	368.00
Total assets	7,838.00	8,544.00	8,821.00	10,048.00
Accounts payable	1,006.00	772.00	1,132.00	1,240.00
Accrued expenses	1,259.00	1,159.00	725.00	924.00
Notes payable/short-term debt	0.00	0.00	0.00	0.00
Current portion of long-term debt and leases	138.00	325.00	0.00	0.00
Other current liabilities	30.00	16.00	85.00	78.00
Total current liabilities	2,433.00	2,272.00	1,942.00	2,242.00
Long-term debt	50.00	188.00	513.00	1,886.00
Other liabilities, total	1,081.00	910.00	941.00	984.00
Total liabilities	3,564.00	3,370.00	3,396.00	5,112.00
Common stock	55.00	55.00	54.00	49.00
Additional paid-in capital	2,783.00	2,631.00	2,402.00	904.00
Retained earnings (accumulated deficit)	9,223.00	8,646.00	8,133.00	7,181.00
Treasury stock—common	(7,912.00)	(6,225.00)	(5,210.00)	(3,238.00)
Other equity	125.00	77.00	46.00	40.00
Total equity	4,274.00	5,174.00	5,425.00	4,936.00
Total liabilities and shareholders' equity	7,838.00	8,544.00	8,821.00	10,048.00

Legend:

Treasury stock—shares of a firm's common stock that had previously been issued to the public but that have been repurchased in the equity market by the firm.

Gap, Inc.
Statement of Cash Flows (2006–2008)

In Millions of USD (except for per share items)	2008	2007	2006
Net income	\$ 833	\$ 778	\$ 1,113
Depreciation	547	530	625
Deferred taxes	(51)	(41)	(46)
Non-cash items	107	67	(28)
Changes in working capital	645	(84)	(113)
Cash from operating activities	\$ 2,081	\$ 1,250	\$ 1,551
Capital expenditures	(682)	(572)	(600)
Other investing cash flow items, total	408	422	886
Cash from investing activities	\$ (274)	\$ (150)	\$ 286
Financing cash flow items	132	213	0
Total cash dividends paid	(252)	(265)	(179)
Issuance (retirement) of stock, net	(1,700)	(1,050)	(1,861)
Issuance (retirement) of debt, net	(326)	0	0
Cash from financing activities	\$(2,146)	\$(1,102)	\$(2,040)
Foreign exchange effects	33	(3)	(7)
Net change in cash	\$ (306)	\$ (5)	(210)

Legend:

Deferred taxes—A liability account that reflects the accumulated difference between the amount of income tax that the firm shows each year as an expense on its financial statements and the amount of income tax, usually lower, that the firm pays to the government.

Foreign exchange effects—the cash flow consequences of foreign exchange gains (losses) during the year.

Mini-Case

Go to <http://finance.yahoo.com/> and locate current financial information for Starbucks Corp. (SBUX) and McDonald's Corp. (MCD), both in terms of each company's current financial statements and stock market prices. With this information:

- a. Compute the financial ratios for both firms for the most recent year, and evaluate the relative performance of the two firms in the following areas:
 1. Liquidity
 2. Asset-management efficiency
 3. Financing practices (capital structure)
 4. Profitability
- b. What is each firm's current price-to-earnings ratio and market-to-book ratio? What do these ratios tell you about how investors value these two firms' future prospects?
- c. Based on your analysis, what is your personal assessment of the two firms' past performance?

Chapter 4

Making Interest Rates Comparable

- CHS
- 5-35. (Related to Checkpoint 5.7 on page 145) (Calculating an EAR) After examining the various personal loan rates available to you, you find that you can borrow funds from a finance company at 12 percent compounded monthly or from a bank at 13 percent compounded annually. Which alternative is the most attractive?
- 5-36. (Related to Checkpoint 5.7 on page 145) (Calculating an EAR) You have a choice of borrowing money from a finance company at 24 percent compounded monthly or borrowing money from a bank at 26 percent compounded annually. Which alternative is the most attractive?
- 5-37. (Related to Checkpoint 5.7 on page 145) (Calculating an EAR) Your grandmother asks for your help in choosing a certificate of deposit (CD) from a bank with a one-year maturity and a fixed interest rate. The first certificate of deposit, CD #1, pays 4.95 percent APR compounded daily, and the second certificate of deposit, CD #2, pays 5.0 percent APR compounded monthly. What is the effective annual rate (the EAR) of each CD, and which CD do you recommend to your grandmother?
- 5-38. (Related to Checkpoint 5.7 on page 145) (Calculating an EAR) Based on effective interest rates, would you prefer to deposit your money into Springfield National Bank, which pays 8.0 percent interest compounded annually, or into Burns National Bank, which pays 7.8 percent compounded monthly? (Hint: Calculate the EAR on each account.)
- 5-39. (Calculating an EAR) Payday loans issued by banks are often referred to as "direct deposit advances." In early 2013, the average direct deposit advance charged \$10 for a \$100 advance and was due in 10 days. What is the effective annual rate on this type of loan?
- 5-40. (Calculating an EAR) In early 2013, typical terms on a payday loan involved a \$15 charge for a two-week payday loan of \$100. Assuming there are twenty-six 14-day periods in a year, what is the effective annual rate on such a loan?

Mini-Case

Emily Dao, 27, just received a promotion at work that increased her annual salary to \$37,000. She is eligible to participate in her employer's 401(k) retirement plan to which the employer matches, dollar for dollar, workers' contributions up to 5 percent of salary. However, Emily wants to buy a new \$25,000 car in three years, and she wants to have enough money to make a \$7,000 down payment on the car and finance the balance. Fortunately, she expects a sizable bonus this year that she hopes will cover that down payment in three years.

A wedding is also in her plans. Emily and her boyfriend, Paul, have set a wedding date two years in the future, after he finishes medical school. In addition, Emily and Paul want to buy a home of their own as soon as possible. This might be possible because at age 30, Emily will be eligible to access a \$50,000 trust fund left to her as an inheritance by her late grandfather. Her trust fund is invested in 7 percent government bonds.

Questions

1. Justify Emily's participation in her employer's 401(k) plan using the time-value-of-money concepts by explaining how much an investment of \$10,000 will grow to in 40 years if it earns 10 percent.
2. Calculate the amount of money that Emily needs to set aside from her bonus this year to cover the down payment on a new car, assuming she can earn 6 percent on her savings. What if she could earn 10 percent on her savings?
3. What will be the value of Emily's trust fund at age 60, assuming she takes possession of half of the money (\$25,000 of the \$50,000 trust fund) at age 30 for a house down payment, and leaves the other half of the money untouched where it is currently invested?
4. What is the relationship between discounting and compounding?
5. List at least two actions that Emily and Paul could take to accumulate more for their retirement (think about i and n).

Mini-Case

Bill Petty, 56, just retired after 31 years of teaching. He is a husband and father of two children who are still dependent. He received a \$150,000 lump-sum retirement bonus and will receive \$2,800 per month from his retirement annuity. He has saved \$150,000 in a 403(b) retirement plan and another \$100,000 in other accounts. His 403(b) plan is invested in mutual funds, but most of his other investments are in bank accounts earning 2 or 3 percent annually. Bill has asked your advice in deciding where

to invest his lump-sum bonus and other accounts now that he has retired. He also wants to know how much he can withdraw per month, considering he has two children and a nonworking spouse. Because he has children, his current monthly expenses total \$5,800. He is not eligible for Social Security until age 62, when he will draw approximately \$1,200 per month; however, he would rather defer drawing on Social Security until age 67 to increase his monthly benefit amount to \$1,550.

Questions

1. Bill has an emergency fund already set aside, so he can use his \$400,000 of savings for retirement. How much can he withdraw on a monthly basis to supplement his retirement annuity if his investments return 5 percent annually and he expects to live 30 more years?
2. Ignoring his Social Security benefit, is the amount determined in question 1 sufficient to meet his current monthly expenses (keep in mind that he will receive a pension of \$2,800 per month)? If not, how long will his retirement last if his current expenses remain the same? What if his expenses are reduced to \$4,500 per month?
3. Considering the information obtained in question 2, should Bill wait until age 67 for his Social Security benefits? If he waits until age 67, how will his monthly Social Security benefit change the answers to question 2? (*Hint: Calculate his portfolio value as of age 67 and then calculate how long that amount will last if it earns 5 percent annually.*)
4. If the inflation rate averages 3.5 percent during Bill's retirement, how old will he be when prices have doubled from current levels? How much will a soda cost when Bill dies, if he lives the full 30 years and the soda costs \$1 today?

Chapter 6

- e. How is the annual rate of return calculated in part d related to the geometric rate of return? When you are evaluating the performance of an investment that has been held for several years, what type of average rate of return should you use (arithmetic or geometric)? Why?

Mini-Case

After graduating from college last spring with a major in accounting and finance, Jim Hale took a job as an analyst trainee for an investment company in Chicago. His first few weeks were filled with a series of rotations throughout the firm's various operating units, but this week he was assigned to one of the firm's traders as an analyst. On his first day Jim's boss called him in and told him that he wanted to do some rudimentary analysis of the investment returns of a semiconductor manufacturer called Advanced Micro Devices, Inc. (Ticker: AMD). Specifically, Jim was given the following month-end closing prices for the company spanning the November 1, 2011, through November 1, 2012:

Date	Closing Price	Date	Closing Price
1-Nov-11	5.69	1-Jun-12	5.73
1-Dec-11	5.4	2-Jul-12	4.06
3-Jan-12	6.71	1-Aug-12	3.72
1-Feb-12	7.35	4-Sep-12	3.37
1-Mar-12	8.02	1-Oct-12	2.05
2-Apr-12	7.36	1-Nov-12	1.88
1-May-12	6.08		

He was then instructed by his boss to complete the following tasks using the AMD price data (note that AMD paid no dividend during 2008).

Questions

1. Compute the monthly realized rates of return earned by AMD for the entire year.
2. Calculate the average monthly rate of return for AMD using both the arithmetic and geometric averages.
3. Calculate the year-end price for AMD, computing the compound value of the beginning-of-year price of \$5.69 per share for 12 months at the monthly geometric average rate of return calculated earlier:

$$\frac{\text{End-of-Year Stock Price}}{\text{Beginning-of-Year Stock Price}} = \left(1 + \frac{\text{Geometric Average Monthly Rate of Return}}{12}\right)^{12}$$
4. Compute the annual rate of return for AMD using the beginning stock price for the period and the ending price (i.e., \$5.69 and \$1.88).
5. Now calculate the annual rate of return using the geometric average monthly rate of return using the following relationship:

$$\text{Compound Annual Rate of Return} = \left(1 + \frac{\text{Geometric Average Monthly Rate of Return}}{12}\right)^{12} - 1$$
6. If you were given annual rate of return data for AMD or any other company's stock and you were asked to estimate the average annual rate of return an investor would have earned over the sample period by holding the stock, would you use an arithmetic or geometric average of the historical rates of return? Explain your response as if you were talking to a client who has had no formal training in finance or investments.

Chapter 7

Chapter
8

The risk-free rate is 4 percent. Also, the expected return on the market portfolio is 10 percent.

- Calculate the expected return of your portfolio. (Hint: The expected return of a portfolio equals the weighted average of the individual stock's expected return, where the weights are the percentage invested in each stock.)
 - Calculate the portfolio beta.
 - Given the preceding information, plot the security market line on paper. Plot the stocks from your portfolio on your graph.
 - From your plot in part c, which stocks appear to be your winners and which ones appear to be losers?
 - Why should you consider your conclusion in part d to be less than certain?
- 8-26. (Capital Asset Pricing Model) Anita, Inc. is considering the following investments. The current rate on Treasury bills is 4.5 percent, and the expected return for the market is 11 percent. Using the CAPM, what rates of return should Anita require for each individual security?

Stock	Beta
H	0.75
T	1.4
P	0.95
W	1.25

- 8-27. (Capital Asset Pricing Model) Grace Corporation is considering the following investments. The current rate on Treasury bills is 2.5 percent and the expected return for the market is 9 percent.

Stock	Beta
K	1.12
G	1.3
B	0.75
U	1.02

- Using the CAPM, what rates of return should Grace require for each individual security?
- How would your evaluation of the expected rates of return for Grace change if the risk-free rate were to rise to 4.5 percent and the market risk premium were to be only 5 percent?
- Which market risk premium scenario (from part a or b) best fits a recessionary environment? A period of economic expansion? Explain your response.

Mini-Case

Larry Lynch has been working for a year as an analyst for an investment company that specializes in serving very wealthy clients. These clients often purchase shares in closely held investment funds with very limited numbers of stockholders. In the fall of 2008, the market for certain types of securities based on real estate loans simply collapsed as the subprime mortgage scandal unfolded. Larry's firm, however, sees this market collapse as an opportunity to put together a fund that purchases some of these mortgage-backed securities that investors have shunned by acquiring them at bargain prices and holding them until the underlying mortgages are repaid or the market for these securities recovers.

The investment company began putting together sales information concerning the possible performance of the new fund and has made the following predictions regarding the possible performance of the new fund over the coming year as a function of how well the economy does:

State of the Economy	Probability	Fund Return
Rapid expansion	10%	50%
Modest growth	50%	35%
No growth	40%	5%
Recession	5%	-100%

Larry's boss has asked him to perform a preliminary analysis of the new fund's performance potential for the coming year. Specifically, he has asked that Larry address each of the following issues:

1. What are the expected rate of return and standard deviation?
2. What is the reward-to-risk ratio for the fund based on the fund's standard deviation as a measure of risk?
3. What is the expected rate of return for the fund based on the Capital Asset Pricing Model?

In addition to the information provided above, Larry has observed that the risk-free rate of interest for the coming year is 4.5 percent, the market risk premium is 5.5 percent, and the beta for the new investment is 3.55.

Based on your analysis, do you think that the proposed fund offers a fair return given its risk? Explain.

Mini-Case

Your grandfather is retired and living on his Social Security benefits and the interest he gets from savings. However, the interest income he receives has dwindled to only 2 percent a year on his \$200,000 in savings as interest rates in the economy have dropped. You have been thinking about recommending that he purchase some corporate bonds with at least part of his savings as a way of increasing his interest income.

Specifically, you have identified three corporate bond issues for your grandfather to consider. The first is an issue from the Young Corporation that pays annual interest based on a 7.8 percent coupon rate and has 10 years before it matures. The second bond was issued by Thomas Resorts and it pays 7.5 percent annual interest and has 17 years until it matures. The final bond issue was sold by Entertainment, Inc., pays an annual coupon interest payment based on a rate of 7.975 percent, and has only 4 years until it matures. All three bond issues have a \$1,000 par value. After looking at the bonds' default risks and credit ratings, you have very different yields to maturity in mind for the three bond issues, as noted below.

Before recommending any of these bond issues to your grandfather you perform a number of analyses. Specifically, you want to address each of the following issues:

1. Estimate an appropriate market's required yield to maturity for each of the bond issues using the table of credit spreads reported in Table 9.4.

	Young Corp.	Thomas Resorts Inc.	Entertainment Inc.
Coupon interest rates	7.8%	7.5%	7.975%
Years to maturity	10	17	4
Current market price	\$1,030	\$973	\$1,035
Par value	\$1,000	\$1,000	\$1,000
Bond rating	AA	B	BBB

2. The bond issues are currently selling for the following amounts:

Young Corp	\$1,030
Thomas Resorts	\$ 973
Entertainment, Inc.	\$1,035

What is the yield to maturity for each bond?

3. Given your estimate of the proper discount rate, what is your estimate of the value of each of the bonds? In light of the prices recorded above, which issue do you think is most attractively priced?
4. How would the values of the bonds change if (i) the market's required yield to maturity on a comparable-risk bond increases 3 percentage points or (ii) decreases 3 percentage points? Which of the bond issues is the most sensitive to changes in the rate of interest?
5. What are some of the things you can conclude from these computations?
6. Which one(s) of the bonds (if any) would you recommend to your grandfather? Explain.

Chapter 9

Mini-Case

You have finally saved \$10,000 and are ready to make your first investment. You have the three following alternatives for investing that money:

- Capital Cities ABC, Inc. bonds with a par value of \$1,000 and a coupon interest rate of 8.75 percent, are selling for \$1,314 and mature in 12 years.
- Southwest Bancorp preferred stock is paying a dividend of \$2.50 and selling for \$25.50.
- Emerson Electric common stock is selling for \$36.75. The stock recently paid a \$1.32 dividend and the firm's earnings per share has increased from \$1.49 to \$3.06 in the past five years. The firm expects to grow at the same rate for the foreseeable future.

Your required rates of return for these investments are 6 percent for the bond, 7 percent for the preferred stock, and 15 percent for the common stock. Using this information, answer the following questions.

- a. Calculate the value of each investment based on your required rate of return.
- b. Which investment would you select? Why?
- c. Assume Emerson Electric's managers expect an earnings downturn and a resulting decrease in growth of 3 percent. How does this affect your answers to parts a and b?
- d. What required rates of return would make you indifferent to all three options?

Chapter 10

The negative cash flow in Year 5 reflects the cost of a planned renovation and expansion of the facility. Finally, in Year 10 Garmen estimates some recovery of its investment at the close of the lease, and consequently a higher-than-usual cash flow. Garmen uses a 12 percent discount rate in evaluating its investments.

- As a preliminary step in analyzing the new investment, Garmen's management has decided to evaluate the project's anticipated payback period. What is the project's expected payback period? Jim Garmen, CEO, questioned the analyst performing the analysis about the meaning of the payback period because it seems to ignore the fact that the project will provide cash flows over many years beyond the end of the payback period. Specifically, he wanted to know what useful information the payback provides. If you were the analyst, how would you respond to Mr. Garmen?
- In the past, Garmen's management has relied almost exclusively on the IRR to make its investment choices. However, in this instance the lead financial analyst on the project suggested that there may be a problem with the IRR because the sign on the cash flows changes three times over its life. Calculate the IRR for the project. Evaluate the NPV profile of the project for discount rates of 0 percent, 20 percent, 50 percent, and 100 percent. Does there appear to be a problem of multiple IRRs in this range of discount rates?
- Calculate the project's NPV. What does the NPV indicate about the potential value created by the project? Describe to Mr. Garmen what NPV means, recognizing that he was trained as an engineer and has no formal business education.

Chapter 11

Mini-Cases

RWE Enterprises: Expansion Project Analysis

RWE Enterprises, Inc. (RWE) is a small manufacturing firm located in the hills just outside of Nashville, Tennessee. The firm is engaged in the manufacture and sale of feed supplements used by cattle raisers. The product has a molasses base but is supplemented with minerals and vitamins that are generally thought to be essential to the health and growth of beef cattle. The final product is put in 125-pound or 200-pound tubs that are then made available for the cattle to lick as desired. The material in the tub becomes very hard, which limits the animals' consumption.

The firm has been running a single production line for the past five years and is considering the addition of a new line. The addition would expand the firm's capacity by almost 120 percent because the newer equipment requires a shorter downtime between batches. After each production run, the boiler used to prepare the molasses for the addition of minerals and vitamins must be heated to 180 degrees Fahrenheit and then must be cooled down before beginning the next batch. The total production run entails about four hours and the cool-down period is two hours (during which time the whole process comes to a halt). Using two production lines increases the overall efficiency of the operation because workers from the line that is cooling down can be moved to the other line to support the "canning" process involved in filling the feed tubs.

The second production line equipment will cost \$3 million to purchase and install and will have an estimated life of 10 years, at which time it can be sold for an estimated after-tax scrap value of \$200,000. Furthermore, at the end of five years the production line will have to be refurbished at an estimated

cost of \$2 million. RWE's management estimates that the new production line will add \$700,000 per year in after-tax cash flow to the firm, such that the full 10-year cash flows for the line are as follows:

Year	After-tax Cash Flow
0	\$(3,000,000)
1	700,000
2	700,000
3	700,000
4	700,000
5	(1,300,000)
6	700,000
7	700,000
8	700,000
9	700,000
10	900,000

- If RWE uses a 10 percent discount rate to evaluate investments of this type, what is the net present value of the project? What does this NPV indicate about the potential value RWE might create by purchasing the new production line?
- Calculate the internal rate of return and profitability index for the proposed investment. What do these two measures tell you about the project's viability?
- Calculate the payback and discounted payback for the proposed investment. Interpret your findings.

Jamie Dermott: Mutually Exclusive Project Analysis

Jamie Dermott graduated from Midland State University in June and has been working for about a month as a junior financial analyst at Caledonia Products. When Jamie arrived at work on Friday morning he found the following memo in his e-mail:

TO: Jamie Dermott

FROM: V. Morrison, CFO, Caledonia Products

RE: Capital-Budgeting Analysis

Provide an evaluation of two proposed projects with the following cash flow forecasts:

	Project A	Project B
Initial Outlay	\$(110,000)	\$(110,000)
Year 1	20,000	40,000
Year 2	30,000	40,000
Year 3	40,000	40,000
Year 4	50,000	40,000
Year 5	70,000	40,000

Because these projects involve additions to Caledonia's highly successful Avalon product line, the company requires a rate of return on both projects equal to 12 percent. As you are no doubt aware, Caledonia relies on a number of criteria when evaluating new investment opportunities. In particular, we require that projects that are accepted have a payback of no more than three years, provide a positive NPV, and have an IRR that exceeds the firm's discount rate.

Give me your thoughts on these two projects by 9 a.m. Monday morning.

Jamie was not surprised by the memo, for he had been expecting something like this for some time. Caledonia followed a practice of testing each new financial analyst with some type of project evaluation exercise after the new hire had been on the job for a few months.

After re-reading the memo, Jamie decided on his plan of attack. Specifically, he would first do the obligatory calculations of payback, NPV, and IRR for both projects. Jamie knew that the CFO would grill him thoroughly on Monday morning about his analysis, so he wanted to prepare well for the experience. One of the things that occurred to Jamie was that the memo did not indicate whether the two projects were independent or mutually exclusive. So, just to be safe, he thought he had better rank the two projects in case he was asked to do so on Monday morning. Jamie sat down and made up the following "to do" list:

1. Compute payback, NPV, and IRR for both projects.
2. Evaluate the two projects' acceptability using all three decision criteria (listed above) and based on the assumption that the projects are independent. That is, both could be accepted if both are acceptable.
3. Rank the two projects and make a recommendation as to which (if either) should be accepted under the assumption that the projects are mutually exclusive.

Assignment—Prepare Jamie's evaluation for his Monday meeting with the CFO by filling out your responses to the "to do" list.

Ethics Case: Ford's Pinto and the Value of Life

In 1968, Ford Motor Company executives decided to produce a subcompact car called the Pinto in response to the onslaught of Japanese economy cars. Known inside the company as "Lee's car," after Ford president Lee Iacocca, the Pinto was to weigh no more than 2,000 pounds and cost no more than \$2,000.

Eager to have its subcompact ready for the 1971 model year, Ford decided to compress the normal drafting-board-to-showroom time from three-and-a-half down to only two years. The compressed schedule meant that design changes typically made before production-line tooling would have to be made during it.

Before producing the Pinto, Ford crash-tested 11 cars, in part to learn if they met the National Highway Traffic Safety Administration's (NHTSA) proposed safety standard that all autos be able to withstand a fixed-barrier impact of 20 miles per hour without fuel loss. Eight standard-design Pintos failed these tests. The three cars that passed the test all had some kind of gas-tank modification. One had a plastic baffle between the front of the tank and the differential housing; the second had a piece of steel between the tank and the rear bumper; and the third had a rubber-lined gas tank.

Ford officials faced a tough decision. Should they go ahead with the standard design, thereby meeting the production timetable but possibly jeopardizing consumer safety? Or should they delay production of the Pinto and redesign the gas tank to make it safer? If they chose the latter course of action, they would effectively concede another year of subcompact dominance to foreign companies.

To determine whether to proceed with the original design of the Pinto fuel tank, Ford compared the expected costs and benefits of making the change. Would the benefits of a new tank design outweigh design costs, or not? To find the answer, Ford estimated the costs of the design improvement to be \$11 per vehicle. The benefit to Ford of having a safer gas tank relates to the avoidance of the potential costs Ford might incur in the event of a fatality resulting from a fuel tank rupture if the auto was involved in an accident. To analyze this benefit, Ford's analysts did an analysis of the dollar value of the average loss resulting from a traffic fatality. The NHTSA estimated the cost of a traffic fatality to be \$200,725 for every time a person is killed in an auto accident. The costs were broken down as follows:

Future productivity losses

Direct	\$132,000
Indirect	41,300

Medical Costs

Hospital	700
Other	425
Property damage	1,500
Insurance administration	4,700
Legal and court expenses	3,000
Employer losses	1,000
Victim's pain and suffering	10,000
Funeral	900
Assets (lost consumption)	5,000
Miscellaneous accident costs	200
Total per fatality	\$200,725*

*Ralph Drayton, "One Manufacturer's Approach to Automobile Safety Standards," *CTLA News* 8 (February 1968), p. 11.

Ford used NHTSA's estimates and other statistical studies in its cost-benefit analysis, which yielded the following estimates:

Benefits

Losses avoided by re-designing the fuel tank in the Pinto

Savings:	180 burn deaths; 180 serious burn injuries; 2,100 burned vehicles
Unit cost:	\$200,000 per death; \$67,000 per injury; and \$700 per vehicle
Total benefit:	$(180 \times \$200,000) + (180 \times \$67,000) +$ $(2,100 \times \$700) = \49.5 million

Costs

Losses incurred by the re-design of the fuel tank in the Pinto

Sales:	11 million cars; 1.5 million light trucks
Unit cost:	\$11 per car and \$11 per truck
Total cost:	$12.5 \text{ million} \times \$11 = \$137.5 \text{ million}^*$

*Mark Dowle, "Pinto Madness," *Mother Jones* (September-October 1977), p. 20. See also Russell Mokhiber, *Corporate Crime and Violence* (San Francisco: Sierra Club Books, 1988), pp. 373-82, and Francis T. Cullen, William J. Maakestad, and Gary Cavender, *Corporate Crime Under Attack: The Ford Pinto Case and Beyond* (Cincinnati: Anderson Publishing, 1987).

Because the \$137.5 million cost of the safety improvement outweighed the \$49.5 million benefit of the redesign, Ford decided to push ahead with the original design.

Questions

1. Do you think Ford analyzed the problem of redesigning the Pinto fuel tank safety in a reasonable way?
2. Should questions involving the risk of loss of human life be analyzed in a cost-benefit analysis? After all, don't life insurance companies do this all the time in pricing life insurance policies to older versus younger customers?

Source: This case is based on William Shaw and Vincent Barry, "Ford's Pinto," *Moral Issues in Business*, 9th ed. (New York: Wadsworth, 2004), 84-86. © by Wadsworth, Inc.

12-31. (Replacement project cash flows) The Minot Kit Aircraft Company of Minot, North Dakota, uses a plasma cutter to fabricate metal aircraft parts for its plane kits. The company currently is using a cutter that it purchased used four years ago that has an \$80,000 book value and is being depreciated \$20,000 per year over the next four years. If the old cutter were to be sold today, the company estimates that it would bring in an amount equal to the book value of the equipment.

The company is considering the purchase of a new automated plasma cutter that would cost \$400,000 to install and that would be depreciated over the next four years toward a \$40,000 salvage value using straight-line depreciation. The primary advantage of the new cutter is the fact that it is fully automated and can be run by one operator rather than the three employees currently required. The labor savings would be \$100,000 per year. The firm faces a marginal tax rate of 30 percent.

- What are the differential operating cash flow savings per year during Years 1 through 4 for the new plasma cutter?
- What is the initial cash outlay required to replace the existing plasma cutter with the newer model?
- Sketch a timeline for the replacement project cash flows for Years 0 through 5.
- If the company requires a 15 percent discount rate for new investments, should the fleet be replaced?

12-32. (Replacement project cash flows) The Louisiana Land and Cattle Company (LL&CC) is one of the largest cattle buyers in the country. It has buyers at all the major cattle auctions throughout the U.S. Southeast who buy on the company's behalf and then have the cattle shipped to Sulphur Springs, Louisiana, where they are sorted by weight and type before shipping off to feed lots in the Midwest. The company has been considering the replacement of its tractor-trailer rigs with a newer, more fuel-efficient fleet for some time, and a local Peterbilt dealer has approached the company with a proposal. The proposal would call for the purchase of 10 new rigs at a cost of \$100,000 each. Each rig would be depreciated toward a salvage value of \$40,000 over a period of five years. If LL&CC purchases the rigs, it will sell its existing fleet of 10 rigs to the Peterbilt dealer for their current book value of \$25,000 per unit. The existing fleet will be fully depreciated in one more year but is expected to be serviceable for five more years, at which time they would be worth only \$5,000 per unit as scrap.

The new fleet of trucks is much more fuel-efficient and will require only \$200,000 in fuel costs compared to \$300,000 for the existing fleet. In addition, the new fleet of trucks will require minimal maintenance over the next five years, equal to an estimated \$150,000 compared to the almost \$400,000 that is currently being spent to keep the older fleet running.

- What are the differential operating cash flow savings per year during Years 1 through 5 for the new fleet? The firm pays taxes at a 30 percent marginal tax rate.
- What is the initial cash outlay required to replace the existing fleet with new rigs?
- Sketch a timeline for the replacement project cash flows for Years 0 through 5.
- If LL&CC requires a 15 percent discount rate for new investments, should the fleet be replaced?

Chapter
12

Mini-Cases

Danforth & Donnalley Laundry Products Company

Determining Relevant Cash Flows

At 3:00 p.m. on April 14, 2010, James Danforth, president of Danforth & Donnalley (D&D) Laundry Products Company, called to order a meeting of the financial directors. The purpose of the meeting was to make a capital-budgeting decision with

respect to the introduction and production of a new product, a liquid detergent called Blast.

D&D was formed in 1993 with the merger of Danforth Chemical Company (producer of Lift-Off detergent, the leading

laundry detergent on the West Coast) and Donnalley Home Products Company (maker of Wave detergent, a major laundry product in the Midwest). As a result of the merger, D&D was producing and marketing two major product lines. Although these products were in direct competition, they were not without product differentiation: Lift-Off was a low-suds, concentrated powder, and Wave was a more traditional powder detergent. Each line brought with it considerable brand loyalty; and, by 2010, sales from the two detergent lines had increased ten-fold from 1993 levels, with both products now being sold nationally.

In the face of increased competition and technological innovation, D&D spent large amounts of time and money over the past four years researching and developing a new highly concentrated liquid laundry detergent. D&D's new detergent, which it called Blast, had many obvious advantages over the conventional powdered products. The company felt that Blast offered the consumer benefits in three major areas. Blast was so highly concentrated that only 2 ounces were needed to do an average load of laundry, as compared with 8 to 12 ounces of powdered detergent. Moreover, being a liquid, it was possible to pour Blast directly on stains and hard-to-wash spots, eliminating the need for a pre-soak and giving it cleaning abilities that powders could not possibly match. And, finally, it would be packaged in a lightweight, unbreakable plastic bottle with a sure-grip handle, making it much easier to use and more convenient to store than the bulky boxes of powdered detergents with which it would compete.

The meeting participants included James Danforth, president of D&D; Jim Donnalley, director of the board; Guy Rainey, vice-president in charge of new products; Urban McDonald, controller; and Steve Gasper, a newcomer to the D&D financial staff who was invited by McDonald to sit in on the meeting. Danforth called the meeting to order, gave a brief statement of its purpose, and immediately gave the floor to Guy Rainey.

Rainey opened with a presentation of the cost and cash flow analysis for the new product. To keep things clear, he passed out copies of the projected cash flows to those present (see Exhibits 1 and 2). In support of this information, he provided some insights as to how these calculations were determined. Rainey proposed that the initial cost for Blast include \$500,000 for the test marketing, which was conducted in the Detroit area and completed in June of the previous year, and \$2 million for new specialized equipment and packaging facilities. The estimated life for the facilities was 15 years, after which they would have no salvage value. This 15-year estimated life assumption coincides with company policy set by Donnalley not to consider cash flows occurring more than 15 years into the future, as estimates that far ahead "tend to become little more than blind guesses."

Rainey cautioned against taking the annual cash flows (as shown in Exhibit 1) at face value because portions of these cash flows actually would be a result of sales that had been diverted from Lift-Off and Wave. For this reason, Rainey also produced the estimated annual cash flows that had been adjusted to include only those cash flows incremental to the company as a whole (as shown in Exhibit 2).

At this point, discussion opened between Donnalley and McDonald, and it was concluded that the opportunity cost on funds was 10 percent. Gasper then questioned the fact that no

costs were included in the proposed cash budget for plant facilities that would be needed to produce the new product.

Rainey replied that at the present time, Lift-Off's production facilities were being used at only 55 percent of capacity, and because these facilities were suitable for use in the production of Blast, no new plant facilities would need to be acquired for the production of the new product line. It was estimated that full production of Blast would only require 10 percent of the plant capacity.

McDonald then asked if there had been any consideration of increased working capital needs to operate the investment project. Rainey answered that there had, and that this project would require \$200,000 of additional working capital; however, as this money would never leave the firm and would always be in liquid form, it was not considered an outflow and hence not included in the calculations.

Donnalley argued that this project should be charged something for its use of current excess plant facilities. His reasoning was that if another firm had space like this and was willing to rent it out, it could charge somewhere in the neighborhood of \$2 million. However, he went on to acknowledge that D&D had a strict policy that prohibits renting or leasing any of its production facilities to any party from outside the firm. If they didn't charge for facilities, he concluded, the firm might end up accepting projects that under normal circumstances would be rejected.

From here the discussion continued, centering on the question of what to do about the lost contribution from other projects, the test marketing costs, and the working capital.

Exhibit 1: D&D Laundry Products Company Forecast of Annual Cash Flows from the Blast Product (Including cash flows resulting from sales diverted from the existing product lines)

Year	Cash flows	Year	Cash flows
1	\$280,000	9	\$350,000
2	280,000	10	350,000
3	280,000	11	250,000
4	280,000	12	250,000
5	280,000	13	250,000
6	350,000	14	250,000
7	350,000	15	250,000
8	350,000		

Exhibit 2: D&D Laundry Products Company Forecast of Annual Cash Flows from the Blast Product (Excluding cash flows resulting from sales diverted from the existing product lines)

Year	Cash flows	Year	Cash flows
1	\$250,000	9	\$315,000
2	250,000	10	315,000
3	250,000	11	225,000
4	250,000	12	225,000
5	250,000	13	225,000
6	315,000	14	225,000
7	315,000	15	225,000
8	315,000		

Questions

1. If you were put in the place of Steve Gasper, would you argue for the cost from market testing to be included in a cash outflow?
2. What would your opinion be as to how to deal with the question of working capital?
3. Would you suggest that the product be charged for the use of excess production facilities and building space?
4. Would you suggest that the cash flows resulting from erosion of sales from current laundry detergent products be included as a cash inflow? If there was a chance of competitors introducing a similar product if you did not introduce Blast, would this affect your answer?
5. If debt were used to finance this project, should the interest payments associated with this new debt be considered cash flows?
6. What are the NPV, IRR, and PI of this project, both including cash flows resulting from sales diverted from the existing product lines (Exhibit 1) and excluding cash flows resulting from sales diverted from the existing product lines (Exhibit 2)? Under the assumption that there is a good chance that competition will introduce a similar product if you don't, would you accept or reject this project?

Chapter 12

Caledonia Products

Calculating Free Cash Flow and Project Valuation

It's been two months since you took a position as an assistant financial analyst at Caledonia Products. Although your boss has been pleased with your work, he is still a bit hesitant about unleashing you without supervision. Your next assignment involves both the calculation of the cash flows associated with a new investment under consideration and the evaluation of several mutually exclusive projects. Given your lack of tenure at Caledonia, you have been asked not only to provide a recommendation, but also to respond to a number of questions aimed at judging your understanding of the capital-budgeting process. The memorandum you received outlining your assignment follows:

To: The Assistant Financial Analyst
From: Mr. V. Morrison, CEO, Caledonia Products
Re: Cash Flow Analysis and Capital Rationing

We are considering the introduction of a new product. Currently we are in the 34 percent tax bracket with a 15 percent discount rate. This project is expected to last five years and then, because this is somewhat of a fad project, it will be terminated. The following information describes the new project:

Cost of new plant and equipment: \$ 7,900,000
Shipping and installation costs: \$ 100,000

Unit sales:

Year	Units Sold
1	70,000
2	120,000
3	140,000
4	80,000
5	60,000

Sales price per unit: \$300/unit in Years 1-4 and \$260/unit in Year 5
Variable cost per unit: \$180/unit
Annual fixed costs: \$200,000 per year

Working capital requirements: There will be an initial working capital requirement of \$100,000 just to get production started. For each year, the total investment in net working capital will be equal to 10 percent of the dollar value of sales for that year. Thus, the investment in working capital will increase during Years 1 through 3, then decrease in Year 4. Finally, all working capital is liquidated at the termination of the project at the end of Year 5.

Depreciation method: Straight-line over five years assuming the plant and equipment have no salvage value after five years.

Questions

1. Why should Caledonia focus on project free cash flows as opposed to the accounting profits earned by the project when analyzing whether to undertake the project?
2. What are the incremental cash flows for the project in Years 1 through 5, and how do these cash flows differ from accounting profits or earnings?
3. What is the project's initial outlay?
4. Sketch out a cash flow diagram for this project.
5. What is the project's net present value?
6. What is its internal rate of return?
7. Should the project be accepted? Why or why not?