

Ross

Westerfield

Jaffe

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FIFTH EDITION

corporate finance

CORE PRINCIPLES & APPLICATIONS

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CORE PRINCIPLES & APPLICATIONS

THE MCGRAW-HILL EDUCATION SERIES IN FINANCE, INSURANCE, AND REAL ESTATE

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Consulting Editor

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FIFTH EDITION

corporate finance

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CORPORATE FINANCE: CORE PRINCIPLES & APPLICATIONS, FIFTH EDITION

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To our family and friends with love and gratitude.

—S.A.R. R.W.W. J.F.J. B.D.J.

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FROM THE AUTHORS

IN THE BEGINNING . . .

It was probably inevitable that the four of us would collaborate on this project. Over the last 20 or so years, we have been working as two separate “RWJ” teams. In that time, we managed (much to our own amazement) to coauthor two widely adopted undergraduate texts and an equally successful graduate text, all in the corporate finance area. These three books have collectively totaled more than 31 editions (and counting), plus a variety of country-specific editions and international editions, and they have been translated into at least a dozen foreign languages.

Even so, we knew that there was a hole in our lineup at the graduate (MBA) level. We’ve continued to see a need for a concise, up-to-date, and to-the-point product, the majority of which can be realistically covered in a typical single term or course. As we began to develop this book, we realized (with wry chuckles all around) that, between the four of us, we have been teaching and researching finance principles for well over a century. From our own very extensive experience with this material, we recognized that corporate finance introductory classes often have students with extremely diverse educational and professional backgrounds. We also recognized that this course is increasingly being delivered in alternative formats ranging from traditional semester-long classes to highly compressed modules, to purely online courses, taught both synchronously and asynchronously.

OUR APPROACH

To achieve our objective of reaching out to the many different types of students and the varying course environments, we worked to distill the subject of corporate finance down to its core, while maintaining a decidedly modern approach. We have always maintained that corporate finance can be viewed as the working of a few very powerful intuitions. We also know that understanding the “why” is just as important, if not more so, than understanding the “how.” Throughout the development of this book, we continued to take a hard look at what is truly relevant and useful. In doing so, we have worked to downplay purely theoretical issues and minimize the use of extensive and elaborate calculations to illustrate points that are either intuitively obvious or of limited practical use.

Perhaps more than anything, this book gave us the chance to pool all that we have learned about what really works in a corporate finance text. We have received an enormous amount of feedback over the years. Based on that feedback, the two key ingredients that we worked to blend together here are the careful attention to pedagogy and readability that we have developed in our undergraduate

books and the strong emphasis on current thinking and research that we have always stressed in our graduate book.

From the start, we knew we didn’t want this text to be encyclopedic. Our goal instead was to focus on what students really need to carry away from a principles course. After much debate and consultation with colleagues who regularly teach this material, we settled on a total of 21 chapters. Chapter length is typically 30 pages, so most of the book (and, thus, most of the key concepts and applications) can be realistically covered in a single term or module. Writing a book that strictly focuses on core concepts and applications necessarily involves some picking and choosing with regard to both topics and depth of coverage. Throughout, we strike a balance by introducing and covering the essentials, while leaving more specialized topics to follow-up courses.

As in our other books, we treat net present value (NPV) as the underlying and unifying concept in corporate finance. Many texts stop well short of consistently integrating this basic principle. The simple, intuitive, and very powerful notion that NPV represents the excess of market value over cost often is lost in an overly mechanical approach that emphasizes computation at the expense of comprehension. In contrast, every subject we cover is firmly rooted in valuation, and care is taken throughout to explain how particular decisions have valuation effects.

Also, students shouldn’t lose sight of the fact that financial management is about management. We emphasize the role of the financial manager as decision maker, and we stress the need for managerial input and judgment. We consciously avoid “black box” approaches to decisions, and where appropriate, the approximate, pragmatic nature of financial analysis is made explicit, possible pitfalls are described, and limitations are discussed.

NEW AND NOTEWORTHY TO THE FIFTH EDITION

All chapter openers and examples have been updated to reflect the financial trends and turbulence of the last several years. In addition, we have updated the end-of-chapter problems in every chapter. We have tried to incorporate the many exciting new research findings in corporate finance. Several chapters have been extensively rewritten.

- In the eight years since the “financial crisis” or “great recession,” we see that the world’s financial markets are more integrated than ever before. The theory and practice of corporate finance has been moving forward at a fast pace and we endeavor to bring the theory and practice to life with completely updated chapter

openers, many new modern examples, completely updated end of chapter problems and questions.

- In recent years we have seen unprecedented high stock and bond values and returns as well as historically low interest rates and inflation. Chapter 10 Risk and Return: Lessons from Market History updates and internationalizes our discussion of historical risk and return. With updated historical data, our estimates of the equity risk premium are on stronger footing And our understanding of the capital market environment is heightened.
- Given the importance of debt in most firms capital structure, it is a mystery that many firms use no debt. There is new and exciting research of this “no debt” behavior that sheds new light on how firms make actual capital structure decisions. Chapter 15 Capital Structure: Limits to the Use of Debt explores this new research and incorporates it into our discussion of Capital Structure.
- Chapter 16 Dividends and Other Payouts updates the record of earnings, dividends, and repurchases for large U.S. firms. The recent trends show repurchases far outpacing dividends in firm payout policy. Since firms may use dividends or repurchases to pay out cash

to equity investors, the recent importance of repurchases suggests a changing financial landscape.

- There are several twists and turns to the calculation of the firms weighted average of capital. Since the weighted average cost of capital is the most important benchmark we use for capital budgeting and represents a firm’s “opportunity cost,” its calculation is critical. We update our estimates of Eastman Chemical cost of capital using readily available data from the Internet to distinguish the nuances of this calculation.

Our attention to updating and improving also extended to the extensive collection of support and enrichment materials that accompany the text. Working with many dedicated and talented colleagues and professionals, we continue to provide supplements that are unrivaled at the graduate level (a complete description appears in the following pages). Whether you use just the textbook, or the book in conjunction with other products, we believe you will be able to find a combination that meets your current as well as your changing needs.

—**Stephen A. Ross**

—**Randolph W. Westerfield**

—**Jeffrey F. Jaffe**

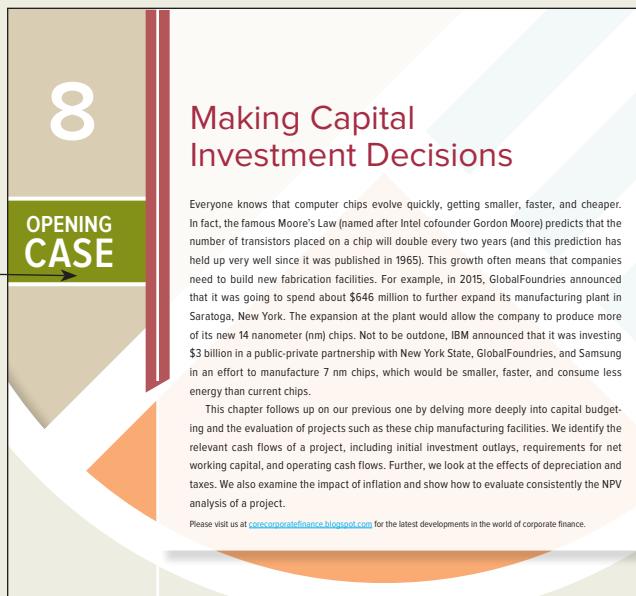
—**Bradford D. Jordan**

PEDAGOGY

Corporate Finance: Core Principles & Applications is rich in valuable learning tools and support to help students succeed in learning the fundamentals of financial management.

Chapter Opening Case

Each chapter begins with a recent real-world event to introduce students to chapter concepts.



8

Making Capital Investment Decisions

OPENING CASE

Everyone knows that computer chips evolve quickly, getting smaller, faster, and cheaper. In fact, the famous Moore's Law (named after Intel cofounder Gordon Moore) predicts that the number of transistors placed on a chip will double every two years (and this prediction has held up very well since it was published in 1965). This growth often means that companies need to build new fabrication facilities. For example, in 2015, GlobalFoundries announced that it was going to spend about \$646 million to further expand its manufacturing plant in Saratoga, New York. The expansion at the plant would allow the company to produce more of its new 14 nanometer (nm) chips. Not to be outdone, IBM announced that it was investing \$3 billion in a public-private partnership with New York State, GlobalFoundries, and Samsung in an effort to manufacture 7 nm chips, which would be smaller, faster, and consume less energy than current chips.

This chapter follows up on our previous one by delving more deeply into capital budgeting and the evaluation of projects such as these chip manufacturing facilities. We identify the relevant cash flows of a project, including initial investment outlays, requirements for net working capital, and operating cash flows. Further, we look at the effects of depreciation and taxes. We also examine the impact of inflation and show how to evaluate consistently the NPV analysis of a project.

Please visit us at copecorporatefinance.blogspot.com for the latest developments in the world of corporate finance.

Core Calculator Skills

This icon, located in the margins of the text near key concepts and equations, indicates that additional coverage is available describing how to use a financial calculator when studying the topic. This additional coverage can be found in a special calculator section, Appendix C.



www.mhhe.com/RossCore5e

Finance Matters

By exploring information found in recent publications and building upon concepts learned in each chapter, these boxes work through real-world issues relevant to the surrounding text.

FINANCE MATTERS

BEAUTY IS IN THE EYE OF THE BONDHOLDER

Many bonds have unusual or exotic features. One of the most common types is an asset-backed, or securitized, bond. Mortgage-backed securities were big news in 2007. For several years, there had been rapid growth in the market for prime mortgage loans, which are mortgages made to individuals with less than top-quality credit. However, a combination of cooling (and in some places dropping) housing prices and rising interest rates caused mortgage prices and foreclosures to rise. This increase in problem mortgages caused a significant number of mortgage-backed securities to drop sharply in value and created huge losses for investors. Bondholders of a securitized bond receive principal payments from a specific asset (or pool of assets) rather than a specific company. For example, rock legend David Bowie sold \$55 million in bonds backed by future royalties from his albums and songs (and so serious ch-ch-ch-change!). Owners of these "Bowie" bonds received the royalty payments, so if Bowie's career had faltered, there was a possibility the bonds could have defaulted. Other artists have sold bonds backed by future royalties from the estate of James Brown, Iron Maiden, and the estate of the legendary Marvin Gaye.

Mortgage-backed securities are the best known type of asset-backed security. With a mortgage-backed security, a company purchases mortgages from banks and merges them into a pool. Bonds are then issued, and the bondholders receive payments derived from payments on the underlying mortgages. One unusual twist with mortgage-backed securities is that as interest rates decline, the bonds can actually decrease in value. This can occur because homeowners are likely to refinance their mortgages at the lower rates, paying off their mortgages in the process. Securitized bonds are usually backed by asset

How to Calculate Bond Prices and Yields Using a Spreadsheet **SPREADSHEET TECHNIQUES**

Most spreadsheets have fairly elaborate routines available for calculating bond values and yields; many of these routines involve details that we have not discussed. However, setting up a simple spreadsheet to calculate prices or yields is straightforward, as our next two spreadsheets show:

	A	B	C	D	E	F	G	H
1								
2	Using a spreadsheet to calculate bond values							
3								
4	Suppose we have a bond with 22 years to maturity, a coupon rate of 8 percent, and a yield to maturity of 9 percent. If the bond makes semiannual payments, what is its price today?							
5								
6								
7	Settlement date:	1/1/00						
8	Maturity date:	1/1/22						
9	Annual coupon rate:	.08						
10	Yield to maturity:	.09						
11	Face value (FV of par):	100						
12	Coupons per year:	2						
13	Bond price (FV of par):	90.49						
14								
15	The formula entered in cell B13 is =PRICE(B7:B8,B9:B10,B11:B12); notice that face value and bond price are given as a percentage of face value.							
16								
17								

Spreadsheet Techniques

This feature helps students to improve their Excel spreadsheet skills, particularly as they relate to corporate finance. This feature appears in self-contained sections and shows students how to set up spreadsheets to analyze common financial problems—a vital part of every business student's education. For even more help using Excel, students have access to Excel Master, an in-depth online tutorial.

Numbered Equations

Key equations are numbered within the text and listed on the back end sheets for easy reference.

value of \$20, which is \$18.18 (= \$20/1.10).

Now that we know how to determine both the delta and the amount of borrowing, we can write the value of the call as:

$$\text{Value of call} = \text{Stock price} \times \text{Delta} - \text{Amount borrowed} \quad [17.2]$$

$$\$6.82 = \$50 \times \frac{1}{2} - \$18.18$$

We will find this intuition very useful in explaining the Black–Scholes model.

RISK-NEUTRAL VALUATION Before leaving this simple example, we should comment on a remarkable feature. We found the exact value of the option without even knowing the probability that the stock would go up or down! If an optimist thought the probability of an up move was very high and a pessimist thought it was very low, they would still agree on the option value. How could that be? The answer is that the current \$50 stock price already balances the views of the optimist and the pessimist. The option reflects that balance because its value depends on the stock price.

This insight provides us with another approach to valuing the call. If we don't need the probabilities of the two states to value the call, perhaps we can select any probabilities we want and still come up with the right answer. Suppose we selected probabilities such that the return on the stock is equal to the risk-free rate of 10 percent. We know that the stock return given a rise is 20 percent (= \$60/\$50 - 1) and the stock return given a fall is -20 percent (= \$40/\$50 - 1). Thus, we can solve for the probability of a rise necessary to

END-OF-CHAPTER MATERIAL

The end-of-chapter material reflects and builds on the concepts learned from the chapter and study features.

QUESTIONS AND PROBLEMS



Basic
(Questions 1–10)

- Building a Balance Sheet** Burnett, Inc., has current assets of \$6,800, net current liabilities of \$5,400, and long-term debt of \$13,100. What is the value of the equity account for this firm? How much is net working capital?
- Building an Income Statement** Bradds, Inc., has sales of \$528,600, cost of goods sold of \$41,700, interest expense of \$20,700, and a tax rate of 35 percent. What is the net income for the firm? Suppose the company paid out \$27,000 in cash dividends. What are the earnings?
- Market Values and Book Values** Klingon Cruisers, Inc., purchased new machinery 3 years ago for \$7 million. The machinery can be sold to the Romulans today for \$3.9 million. The current balance sheet shows net fixed assets of \$3.9 million, current liabilities of \$1.2 million, and net working capital of \$320,000. If all the current accounts were liquidated and the company received \$410,000 cash, what is the book value of Klingon's total assets today? What is the market value of NWC and market value of assets?
- Calculating Taxes** The Alexander Co. had \$328,500 in taxable income. In the chapter, calculate the company's income taxes. What is the average tax rate?
- Calculating OCF** Timsung, Inc., has sales of \$30,700, costs of \$11,100, and interest expense of \$1,140. If the tax rate is 40 percent, what is the operating cash flow?
- Calculating Net Capital Spending** Busch Driving School's 2016 balance sheet showed net fixed assets of \$3.75 million, and the 2017 balance sheet showed net fixed assets of \$3.9 million. The 2017 income statement showed a depreciation expense of \$205,000. What is the net capital spending for 2017?

Questions and Problems

Because solving problems is so critical to students' learning, we provide extensive end-of-chapter questions and problems. The questions and problems are segregated into three learning levels: Basic, Intermediate, and Challenge. All problems are fully annotated so that students and instructors can readily identify particular types. Also, most of the problems are available in McGraw-Hill's *Connect*—see the next section of this preface for more details.

What's On the Web?

These end-of-chapter activities show students how to use and learn from the vast amount of financial resources available on the Internet.

WHAT'S ON THE WEB?

- 1. Expected Return** You want to find the expected return for Honeywell using the CAPM. First you need to find the market risk premium. Go to money.cnn.com and find the current interest rate for three-month Treasury bills. Use the historic market risk premium from Chapter 10 as the market risk premium. Then go to finance.yahoo.com, enter the ticker symbol HON for Honeywell, and find the beta for Honeywell. What is the expected return for Honeywell using CAPM? What assumptions have you made to arrive at this number?
- 2. Portfolio Beta** You have decided to invest in an equally weighted portfolio consisting of American Express, Procter & Gamble, Home Depot, and DuPont and need to find the beta of your portfolio. Go to finance.yahoo.com and find the beta for each of the companies. What is the beta for your portfolio?
- 3. Beta** Which companies currently have the highest and lowest betas? Go to finance.yahoo.com and use the "Stock Screener" link. Enter 0 as the maximum beta and search. How many stocks currently have a beta less than or equal to 0? What is the lowest beta? Go back to the stock screener and enter 3 as the minimum. How many stocks have a beta above 3? What stock has the highest beta?
- 4. Security Market Line** Go to finance.yahoo.com and enter the ticker symbol IP for International Paper. Follow the "Key Statistics" link to get the beta for the company. Next, find the estimated (or "target") price in 12 months according to market analysts. Using the current share price and the mean target price, compute the expected return for this stock. Don't forget to include the expected dividend payments over the next year. Now go to money.cnn.com and find the current interest rate for three-month Treasury bills. Using this information, calculate the expected return on the market using the reward-to-risk ratio. Does this number make sense? Why or why not?



- invested in Stock Y, and 10 percent invested in Stock Z. The expected returns on these three stocks are 9.2 percent, 11.8 percent, and 14.3 percent, respectively. What is the expected return on the portfolio?
- 4. Portfolio Expected Return** You have \$10,000 to invest in a stock portfolio. Your choices are Stock X with an expected return of 12.4 percent and Stock Y with an expected return of 10.2 percent. If your goal is to create a portfolio with an expected return of 10.9 percent, how much money will you invest in Stock X? In Stock Y?

- 5. Calculating Expected Return** Based on the following information, calculate the expected return.

STATE OF ECONOMY	PROBABILITY OF STATE OF ECONOMY	RATE OF RETURN IF STATE OCCURS
Recession	.35	-.09
Normal	.50	.15
Boom	.15	.34



- 6. Calculating Returns and Standard Deviations** Based on the following information, calculate the expected return and standard deviation for the two stocks.

STATE OF ECONOMY	PROBABILITY OF STATE OF ECONOMY	RATE OF RETURN IF STATE OCCURS	
		STOCK A	STOCK B
Recession	.15	.11	.19

Excel Problems

Indicated by the Excel icon in the margin, these problems are integrated in the Questions and Problems section of almost all chapters. Located on the book's website, Excel templates have been created for each of these problems. Students can use the data in the problem to work out the solution using Excel skills.

EXCEL MASTER IT! PROBLEM

Companies often buy bonds to meet a future liability or cash outlay. Such an investment is called a dedicated portfolio because the proceeds of the portfolio are dedicated to the future liability. In such a case, the portfolio is subject to reinvestment risk. Reinvestment risk occurs because the company will be reinvesting the coupon payments it receives. If the YTM on similar bonds falls, these coupon payments will be reinvested at a lower interest rate, which will result in a portfolio value that is lower than desired at maturity. Of course, if interest rates increase, the portfolio value at maturity will be higher than needed.

Suppose Ice Cubes, Inc., has the following liability due in five years. The company is going to buy five-year bonds today to meet the future obligation. The liability and current YTM are below:

Amount of liability:	\$100,000,000
Current YTM:	8%

- At the current YTM, what is the face value of the bonds the company has to purchase today to meet its future obligation? Assume that the bonds in the relevant range will have the same coupon rate as the current YTM and these bonds make semiannual coupon payments.
- Assume the interest rates remain constant for the next five years. Thus, when the company reinvests the coupon payments, it will reinvest at the current YTM. What is the value of the portfolio in five years?
- Assume that immediately after the company purchases the bonds, interest rates either rise or fall by 1 percent. What is the value of the portfolio in five years under these circumstances?

One way to eliminate reinvestment risk is called immunization. Rather than buying bonds with the same maturity as the liability, the company instead buys bonds with the same duration as the liability. If you think about the dedicated portfolio, if the interest rate falls, the future value of the reinvested coupon payments decreases. However, as interest rates fall, the price of bonds increases. These effects offset each other in an immunized portfolio.

Another advantage of using duration to immunize a portfolio is that the duration of a portfolio is the weighted average of the duration of the assets in the portfolio. In other words, to find the duration of a portfolio, you simply take the weight of each asset multiplied by its duration and then sum the results.

Excel Master-It! Problems

These more in-depth mini-case studies highlight higher-level Excel skills. Students are encouraged to use Excel to solve real-life financial problems using the concepts they have learned in the chapter and the Excel skills they have acquired thus far.

End-of-Chapter Cases

Located at the end of each chapter, these mini-cases focus on common company situations that embody important corporate finance topics. Each case presents a new scenario, data, and a dilemma. Several questions at the end of each case require students to analyze and focus on all of the material they learned in that chapter.

CLOSING CASE

THE COST OF CAPITAL FOR SWAN MOTORS

You have recently been hired by Swan Motors, Inc. (SMI), in its relatively new treasury management department. SMI was founded eight years ago by Joe Swan. Joe found a method to manufacture a cheaper battery with much greater energy density than was previously possible, giving a car powered by the battery a range of 700 miles before requiring a charge. The cars manufactured by SMI are mid-sized and carry a price that allows the company to compete with other mainstream auto manufacturers. The company is privately owned by Joe and his family, and it had sales of \$97 million last year.

SMI primarily sells to customers who buy the cars online, although it does have a limited number of company-owned dealerships. The customer selects any customization and makes a deposit of 20 percent of the purchase price. After the order is taken, the car is made to order, typically within 45 days. SMI's growth to date has come from its profits. When the company had sufficient capital, it would expand production. Relatively little formal analysis has been used in its capital budgeting process. Joe has just read about capital budgeting techniques and has come to you for help. For starters, the company has never attempted to determine its cost of capital, and Joe 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. Joe wants you to use the pure play approach to estimate the cost of capital for SMI, and he has chosen Tesla Motors as a representative company. The following questions will lead you through the steps to calculate this estimate.

- 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 website at www.sec.gov. Go to the SEC website and enter "TSLA" for Tesla in the "Search for Company Filings" link and search for SEC filings made by Tesla. Find the most recent 10Q or 10K and download the form. 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 Tesla's long-term debt.
- To estimate the cost of equity for Tesla, go to finance.yahoo.com and enter the ticker symbol "TSLA." Follow the various links to find answers to the following questions: What is the most recent stock price listed for Tesla? What is the market value of equity, or market capitalization? How many shares of stock does Tesla have outstanding? What is the beta for Tesla? Now go back to finance.yahoo.com and

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prepared by Melissa Frye, University of Central Florida, Ann Marie Whyte, University of Central Florida, and Joseph Smolira, Belmont University

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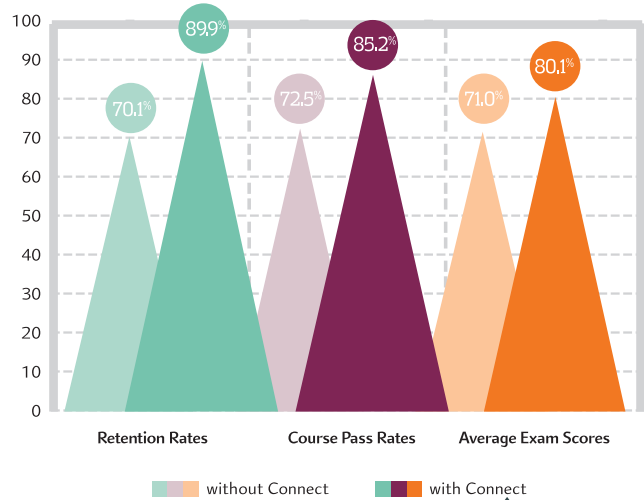
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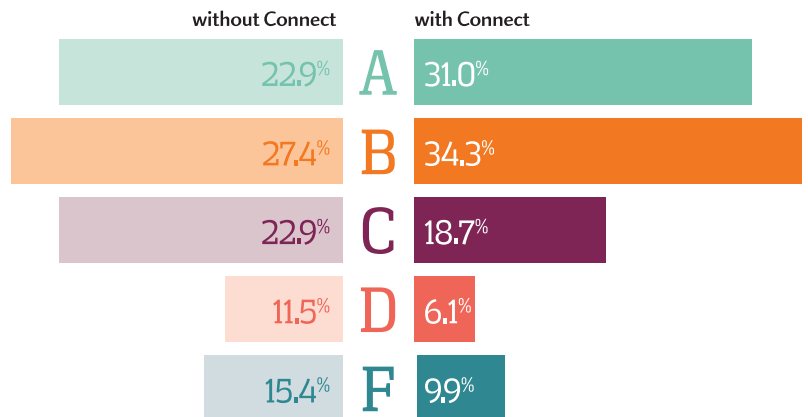
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To borrow a phrase, writing a finance textbook is easy—all you do is sit down at a word processor and open a vein. We never would have completed this book without the incredible amount of help and support we received from our colleagues, students, editors, family members, and friends. We would like to thank, without implicating, all of you.

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Throughout the development of this edition, we have taken great care to discover and eliminate errors. Our goal is to provide the best textbook available on the subject. To ensure that future editions are error-free, we gladly offer \$10 per arithmetic error to the first individual reporting it as a modest token of our appreciation. More than this, we would like to hear from instructors and students alike. Please write and tell us how to make this a better text. Forward your comments to: Dr. Brad Jordan, c/o Editorial-Finance, McGraw-Hill Education, 1333 Burr Ridge Parkway, Burr Ridge, IL 60527.

—Stephen A. Ross

—Randolph W. Westerfield

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Introduction to Corporate Finance

1

OPENING CASE

George Zimmer, founder of The Men's Wearhouse, for years appeared in television ads promising "You're going to like the way you look. I guarantee it." But, in mid-2013, Zimmer evidently didn't look so good to the company's board of directors, which abruptly fired him. It was reported that Zimmer had a series of disagreements with the board, including a desire to take the company private. Evidently, Zimmer's ideas did not "suit" the board. Of course, you can't keep a good entrepreneur down: After Zimmer was fired, he started zTailors, a marketplace for customers to contact tailors and have them visit the customer's home, as well as Generation Tux, an online tuxedo rental company with home delivery.

Understanding Zimmer's journey from the founder of a clothing store that used a cigar box as a cash register, to corporate executive, and finally to ex-employee takes us into issues involving the corporate form of organization, corporate goals, and corporate control, all of which we discuss in this chapter. You're going to learn a lot if you read it. We guarantee it.

Please visit us at corecorporatefinance.blogspot.com for the latest developments in the world of corporate finance.

1.1 WHAT IS CORPORATE FINANCE?

Suppose you decide to start a firm to make tennis balls. To do this you hire managers to buy raw materials, and you assemble a workforce that will produce and sell finished tennis balls. In the language of finance, you make an investment in assets such as inventory, machinery, land, and labor. The amount of cash you invest in assets must be matched by an equal amount of cash raised by financing. When you begin to sell tennis balls, your firm will generate cash. This is the basis of value creation. The purpose of the firm is to create value for you, the owner. The value is reflected in the framework of the simple balance sheet model of the firm.

The Balance Sheet Model of the Firm

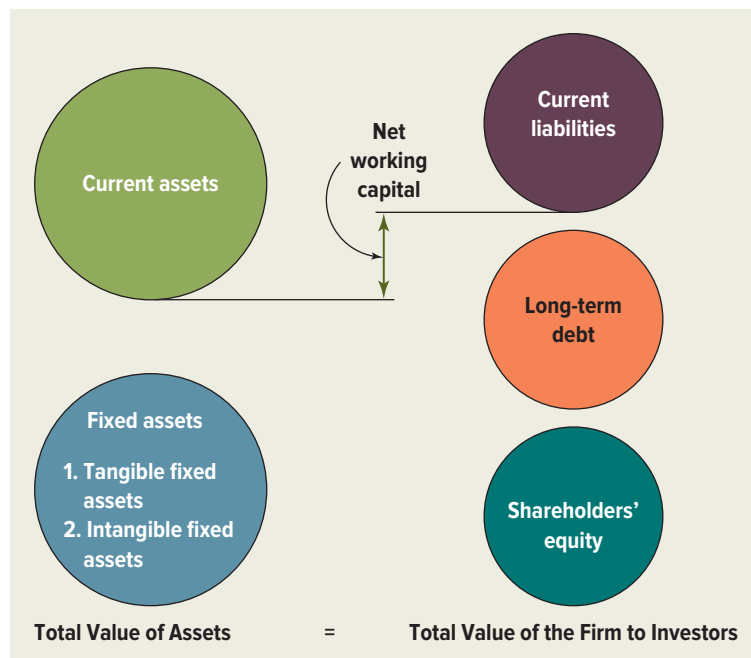
Suppose we take a financial snapshot of the firm and its activities at a single point in time. Figure 1.1 shows a graphic conceptualization of the balance sheet, and it will help introduce you to corporate finance.

The assets of the firm are on the left side of the balance sheet. These assets can be thought of as current and fixed. *Fixed assets* are those that will last a long time, such as buildings. Some fixed assets are tangible, such as machinery and equipment. Other fixed assets are intangible, such as patents and trademarks. The other category of assets, *current assets*, comprises those that have short lives, such as inventory. The tennis balls that your firm has made, but has not yet sold, are part of its inventory. Unless you have overproduced, they will leave the firm shortly.

Before a company can invest in an asset, it must obtain financing, which means that it must raise the money to pay for the investment. The forms of financing are represented on

FIGURE 1.1

The Balance Sheet Model of the Firm



the right side of the balance sheet. A firm will issue (sell) pieces of paper called *debt* (loan agreements) or *equity shares* (stock certificates). Just as assets are classified as long-lived or short-lived, so too are liabilities. A short-term debt is called a *current liability*. Short-term debt represents loans and other obligations that must be repaid within one year. Long-term debt is debt that does not have to be repaid within one year. Shareholders' equity represents the difference between the value of the assets and the debt of the firm. In this sense, it is a residual claim on the firm's assets.

From the balance sheet model of the firm, it is easy to see why finance can be thought of as the study of the following three questions:

1. In what long-lived assets should the firm invest? This question concerns the left side of the balance sheet. Of course the types and proportions of assets the firm needs tend to be set by the nature of the business. We use the term **capital budgeting** to describe the process of making and managing expenditures on long-lived assets.
2. How can the firm raise cash for required capital expenditures? This question concerns the right side of the balance sheet. The answer to this question involves the firm's **capital structure**, which represents the proportions of the firm's financing from current liabilities, long-term debt, and equity.
3. How should short-term operating cash flows be managed? This question concerns the upper portion of the balance sheet. There is often a mismatch between the timing of cash inflows and cash outflows during operating activities.

Furthermore, the amount and timing of operating cash flows are not known with certainty. Financial managers must attempt to manage the gaps in cash flow.

From a balance sheet perspective, short-term management of cash flow is associated with a firm's **net working capital**. Net working capital is defined as current assets minus current liabilities. From a financial perspective, short-term cash flow problems come from the mismatching of cash inflows and outflows. This is the subject of short-term finance.

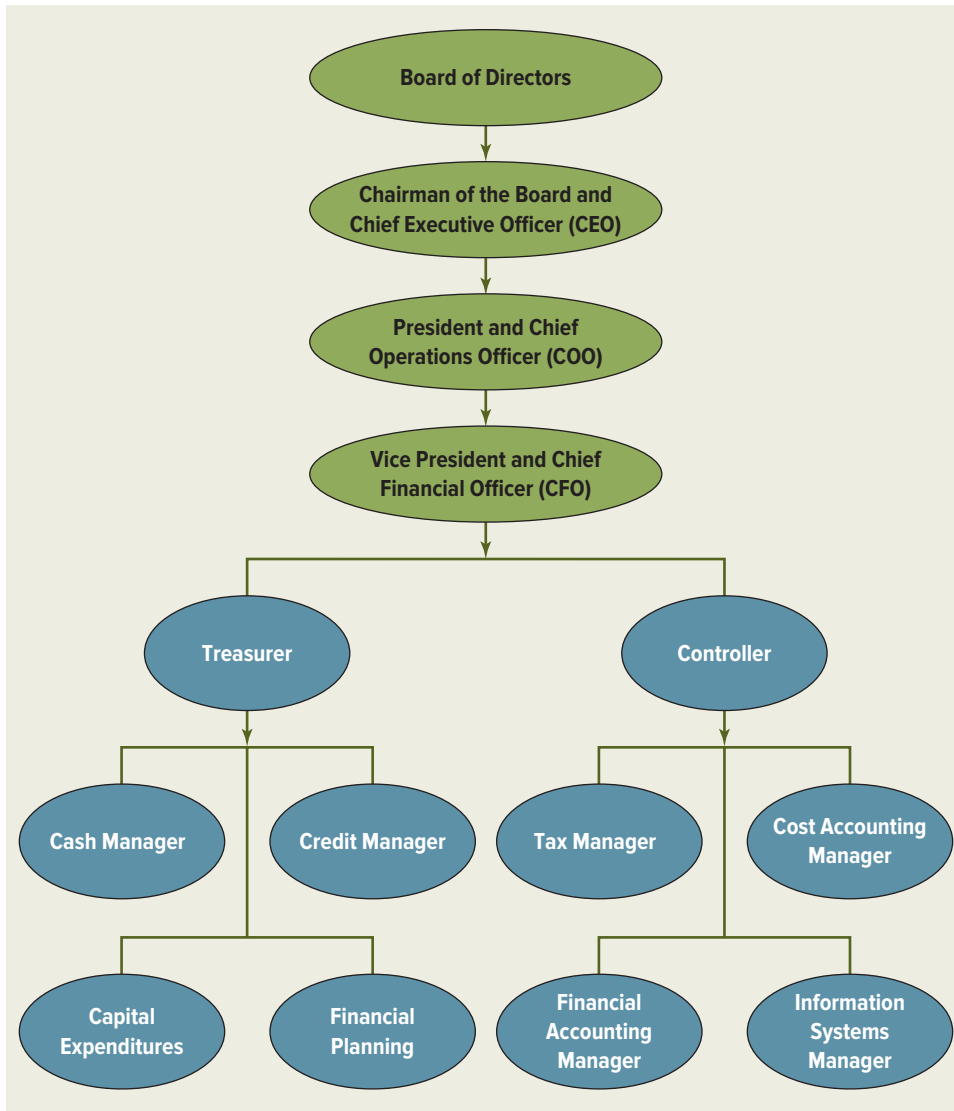


FIGURE 1.2
Hypothetical Organization Chart

The Financial Manager

In large firms, the finance activity is usually associated with a top officer of the firm, such as the vice president and chief financial officer, and some lesser officers. Figure 1.2 depicts a general organizational structure emphasizing the finance activity within the firm. Reporting to the chief financial officer are the treasurer and the controller. The treasurer is responsible for handling cash flows, managing capital expenditure decisions, and making financial plans. The controller handles the accounting function, which includes taxes, cost and financial accounting, and information systems.

For current issues facing CFOs, see www.cfo.com.

1.2 THE CORPORATE FIRM

The firm is a way of organizing the economic activity of many individuals. A basic problem of the firm is how to raise cash. The corporate form of business—that is, organizing the firm as a corporation—is the standard method for solving problems encountered in raising large amounts of cash. However, businesses can take other forms. In this section we

consider the three basic legal forms of organizing firms, and we see how firms go about the task of raising large amounts of money under each form.

The Sole Proprietorship

A **sole proprietorship** is a business owned by one person. Suppose you decide to start a business to produce mousetraps. Going into business is simple: You announce to all who will listen, “Today, I am going to build a better mousetrap.”

Most large cities require that you obtain a business license. Afterward, you can begin to hire as many people as you need and borrow whatever money you need. At year-end all the profits or the losses will be yours.

Here are some factors that are important in considering a sole proprietorship:

1. The sole proprietorship is the cheapest business to form. No formal charter is required, and few government regulations must be satisfied for most industries.
2. A sole proprietorship pays no corporate income taxes. All profits of the business are taxed as individual income.
3. The sole proprietorship has unlimited liability for business debts and obligations. No distinction is made between personal and business assets.
4. The life of the sole proprietorship is limited by the life of the sole proprietor.
5. Because the only money invested in the firm is the proprietor’s, the equity money that can be raised by the sole proprietor is limited to the proprietor’s personal wealth.

The Partnership

Any two or more people can get together and form a **partnership**. Partnerships fall into two categories: (1) general partnerships and (2) limited partnerships.

In a *general partnership* all partners agree to provide some fraction of the work and cash and to share the profits and losses. Each partner is liable for all of the debts of the partnership. A partnership agreement specifies the nature of the arrangement. The partnership agreement may be an oral agreement or a formal document setting forth the understanding.

Limited partnerships permit the liability of some of the partners to be limited to the amount of cash each has contributed to the partnership. Limited partnerships usually require that (1) at least one partner be a general partner and (2) the limited partners do not participate in managing the business. Here are some things that are important when considering a partnership:

1. Partnerships are usually inexpensive and easy to form. Written documents are required in complicated arrangements. Business licenses and filing fees may be necessary.
2. General partners have unlimited liability for all debts. The liability of limited partners is usually limited to the contribution each has made to the partnership. If one general partner is unable to meet his or her commitment, the shortfall must be made up by the other general partners.
3. The general partnership is terminated when a general partner dies or withdraws (but this is not so for a limited partner). It is difficult for a partnership to transfer ownership without dissolving. Usually all general partners must agree. However, limited partners may sell their interest in a business.
4. It is difficult for a partnership to raise large amounts of cash. Equity contributions are usually limited to a partner’s ability and desire to contribute to the partnership. Many companies, such as Apple Computer, start life as a proprietorship or partnership, but at some point they choose to convert to corporate form.
5. Income from a partnership is taxed as personal income to the partners.

6. Management control resides with the general partners. Usually a majority vote is required on important matters, such as the amount of profit to be retained in the business.

It is difficult for large business organizations to exist as sole proprietorships or partnerships. The main advantage to a sole proprietorship or partnership is the cost of getting started. Afterward, the disadvantages, which may become severe, are (1) unlimited liability, (2) limited life of the enterprise, and (3) difficulty of transferring ownership. These three disadvantages lead to (4) difficulty in raising cash.

The Corporation

Of the forms of business enterprises, the **corporation** is by far the most important. It is a distinct legal entity. As such, a corporation can have a name and enjoy many of the legal powers of natural persons. For example, corporations can acquire and exchange property. Corporations can enter contracts and may sue and be sued. For jurisdictional purposes the corporation is a citizen of its state of incorporation (it cannot vote, however).

Starting a corporation is more complicated than starting a proprietorship or partnership. The incorporators must prepare articles of incorporation and a set of bylaws. The articles of incorporation must include the following:

1. Name of the corporation.
2. Intended life of the corporation (it may be forever).
3. Business purpose.
4. Number of shares of stock that the corporation is authorized to issue, with a statement of limitations and rights of different classes of shares.
5. Nature of the rights granted to shareholders.
6. Number of members of the initial board of directors.

The bylaws are the rules to be used by the corporation to regulate its own existence, and they concern its shareholders, directors, and officers. Bylaws range from the briefest possible statement of rules for the corporation's management to hundreds of pages of text.

In its simplest form, the corporation comprises three sets of distinct interests: the shareholders (the owners), the directors, and the corporation officers (the top management). Traditionally, the shareholders control the corporation's direction, policies, and activities. The shareholders elect a board of directors, who in turn select top management. Members of top management serve as corporate officers and manage the operations of the corporation in the best interest of the shareholders. In closely held corporations with few shareholders, there may be a large overlap among the shareholders, the directors, and the top management. However, in larger corporations, the shareholders, directors, and the top management are likely to be distinct groups.

The potential separation of ownership from management gives the corporation several advantages over proprietorships and partnerships:

1. Because ownership in a corporation is represented by shares of stock, ownership can be readily transferred to new owners. Because the corporation exists independently of those who own its shares, there is no limit to the transferability of shares as there is in partnerships.
2. The corporation has unlimited life. Because the corporation is separate from its owners, the death or withdrawal of an owner does not affect the corporation's legal existence. The corporation can continue on after the original owners have withdrawn.
3. The shareholders' liability is limited to the amount invested in the ownership shares. For example, if a shareholder purchased \$1,000 in shares of a

corporation, the potential loss would be \$1,000. In a partnership, a general partner with a \$1,000 contribution could lose the \$1,000 plus any other indebtedness of the partnership.

Limited liability, ease of ownership transfer, and perpetual succession are the major advantages of the corporate form of business organization. These give the corporation an enhanced ability to raise cash.

There is, however, one great disadvantage to incorporation. The federal government taxes corporate income (the states do as well). This tax is in addition to the personal income tax that shareholders pay on dividend income they receive. This is double taxation for shareholders when compared to taxation on proprietorships and partnerships. Table 1.1 summarizes our discussion of partnerships and corporations.

Today all 50 states have enacted laws allowing for the creation of a relatively new form of business organization, the limited liability company (LLC). The goal of this entity is to operate and be taxed like a partnership but retain limited liability for owners, so an LLC is essentially a hybrid of partnership and corporation. Although states have differing definitions for LLCs, the more important scorekeeper is the Internal Revenue Service (IRS). The IRS will consider an LLC a corporation, thereby subjecting it to double taxation, unless it meets certain specific criteria. In essence, an LLC cannot be too corporation-like, or it will be treated as one by the IRS. LLCs have become common. For example, Goldman, Sachs and Co., one of Wall Street's last remaining partnerships, decided to convert from a private partnership to an LLC (it later "went public," becoming a publicly held corporation). Large accounting firms and law firms by the score have converted to LLCs.

To find out more about LLCs, visit www.incorporate.com.

A Corporation by Another Name . . .

The corporate form of organization has many variations around the world. The exact laws and regulations differ from country to country, of course, but the essential features of public ownership and limited liability remain. These firms are often called *joint stock companies*, *public limited companies*, or *limited liability companies*, depending on the specific nature of the firm and the country of origin.

Table 1.2 gives the names of a few well-known international corporations, their countries of origin, and a translation of the abbreviation that follows each company name.

TABLE 1.1 A Comparison of Partnerships and Corporations

	CORPORATION	PARTNERSHIP
Liquidity and marketability	Shares can be exchanged without termination of the corporation. Common stock can be listed on a stock exchange.	Units are subject to substantial restrictions on transferability. There is usually no established trading market for partnership units.
Voting rights	Usually each share of common stock entitles the holder to one vote per share on matters requiring a vote and on the election of the directors. Directors determine top management.	Some voting rights by limited partners. However, general partners have exclusive control and management of operations.
Taxation	Corporations have double taxation: Corporate income is taxable, and dividends to shareholders are also taxable.	Partnerships are not taxable. Partners pay personal taxes on partnership profits.
Reinvestment and dividend payout	Corporations have broad latitude on dividend payout decisions.	Partnerships are generally prohibited from reinvesting partnership profits. All profits are distributed to partners.
Liability	Shareholders are not personally liable for obligations of the corporation.	Limited partners are not liable for obligations of partnerships. General partners may have unlimited liability.
Continuity of existence	Corporations may have a perpetual life.	Partnerships have limited life.

TABLE 1.2 International Corporations

COMPANY	COUNTRY OF ORIGIN	TYPE OF COMPANY	
		IN ORIGINAL LANGUAGE	INTERPRETATION
Bayerische Motoren Werke (BMW) AG	Germany	Aktiengesellschaft	Corporation
Rolls-Royce PLC	United Kingdom	Public limited company	Public limited company
Shell UK Ltd.	United Kingdom	Limited	Corporation
Unilever NV	Netherlands	Naamloze Vennootschap	Joint stock company
Fiat SpA	Italy	Società per Azioni	Joint stock company
Volvo AB	Sweden	Aktiebolag	Joint stock company
Peugeot SA	France	Société Anonyme	Joint stock company

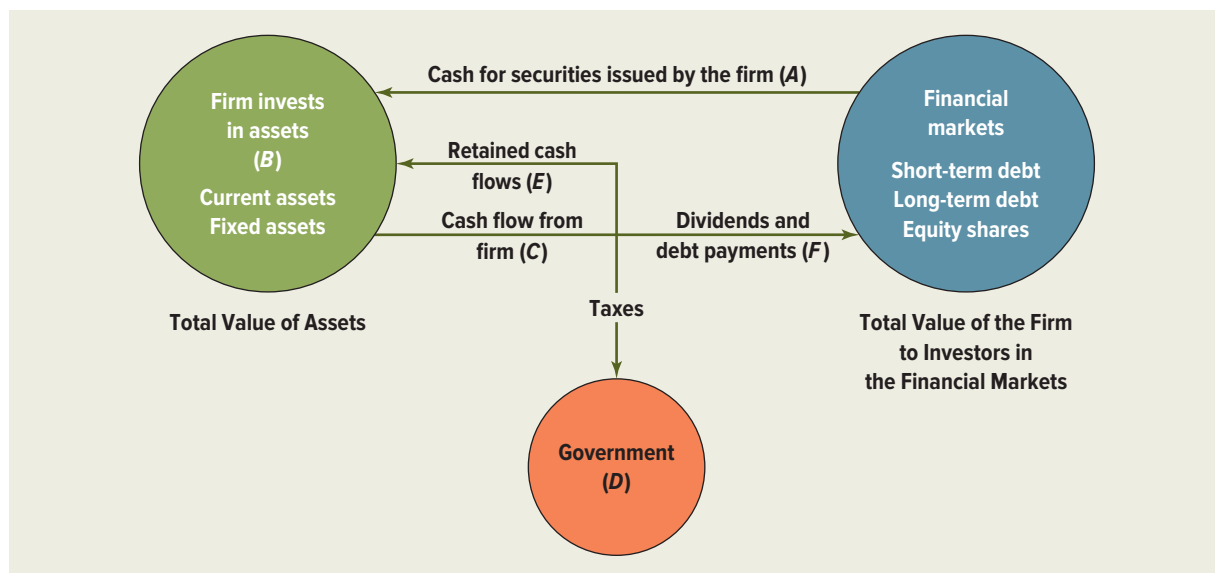
1.3 THE IMPORTANCE OF CASH FLOWS

The most important job of a financial manager is to create value from the firm’s capital budgeting, financing, and net working capital activities. How do financial managers create value? The answer is that the firm should create more cash flow than it uses.

The cash flows paid to bondholders and stockholders of the firm should be greater than the cash flows put into the firm by the bondholders and stockholders. To see how this is done, we can trace the cash flows from the firm to the financial markets and back again.

The interplay of the firm’s activities with the financial markets is illustrated in Figure 1.3. The arrows in Figure 1.3 trace cash flow from the firm to the financial markets and back again. Suppose we begin with the firm’s financing activities. To raise money, the firm sells debt and equity shares to investors in the financial markets. This results in cash flows from the financial markets to the firm (A). This cash is invested in the investment

FIGURE 1.3 Cash Flows between the Firm and the Financial Markets



activities (assets) of the firm (*B*) by the firm's management. The cash generated by the firm (*C*) is paid to shareholders and bondholders (*F*). The shareholders receive cash in the form of dividends; the bondholders who lent funds to the firm receive interest and, when the initial loan is repaid, principal. Not all of the firm's cash is paid out. Some is retained (*E*), and some is paid to the government as taxes (*D*).

Over time, if the cash paid to shareholders and bondholders (*F*) is greater than the cash raised in the financial markets (*A*), value will be created.

IDENTIFICATION OF CASH FLOWS Unfortunately, it is sometimes not easy to observe cash flows directly. Much of the information we obtain is in the form of accounting statements, and much of the work of financial analysis is to extract cash flow information from accounting statements. The following example illustrates how this is done.

EXAMPLE 1.1

Accounting Profit versus Cash Flows

The Midland Company refines and trades gold. At the end of the year, it sold 2,500 ounces of gold for \$1 million. The company had acquired the gold for \$900,000 at the beginning of the year. The company paid cash for the gold when it was purchased. Unfortunately it has yet to collect from the customer to whom the gold was sold. The following is a standard accounting of Midland's financial circumstances at year-end:

THE MIDLAND COMPANY Accounting View Income Statement Year Ended December 31	
Sales	\$1,000,000
-Costs	<u>-900,000</u>
Profit	\$ 100,000

By generally accepted accounting principles (GAAP), the sale is recorded even though the customer has yet to pay. It is assumed that the customer will pay soon. From the accounting perspective, Midland seems to be profitable. However, the perspective of corporate finance is different. It focuses on cash flows:

THE MIDLAND COMPANY Financial View Income Statement Year Ended December 31	
Cash inflow	\$ 0
Cash outflow	<u>-900,000</u>
	\$-900,000

The perspective of corporate finance is interested in whether cash flows are being created by the gold trading operations of Midland. Value creation depends on cash flows. For Midland, value creation depends on whether and when it actually receives \$1 million.

TIMING OF CASH FLOWS The value of an investment made by a firm depends on the timing of cash flows. One of the most important principles of finance is that individuals prefer to receive cash flows earlier rather than later. One dollar received today is worth more than one dollar received next year.

Cash Flow Timing

The Midland Company is attempting to choose between two proposals for new products. Both proposals will provide additional cash flows over a four-year period and will initially cost \$10,000. The cash flows from the proposals are as follows:

YEAR	NEW PRODUCT A	NEW PRODUCT B
1	\$ 0	\$ 4,000
2	0	4,000
3	0	4,000
4	20,000	4,000
Total	\$20,000	\$16,000

At first it appears that new Product A would be best. However, the cash flows from Product B come earlier than those of A. Without more information, we cannot decide which set of cash flows would create the most value for the bondholders and shareholders. It depends on whether the value of getting cash from B up front outweighs the extra total cash from A. Bond and stock prices reflect this preference for earlier cash, and we will see how to use them to decide between A and B.

RISK OF CASH FLOWS The firm must consider risk. The amount and timing of cash flows are not usually known with certainty. Most investors have an aversion to risk.

Risk

The Midland Company is considering expanding operations overseas. It is evaluating Europe and Japan as possible sites. Europe is considered to be relatively safe, whereas operating in Japan is seen as very risky. In both cases the company would close down operations after one year.

After doing a complete financial analysis, Midland has come up with the following cash flows of the alternative plans for expansion under three scenarios—pessimistic, most likely, and optimistic:

	PESSIMISTIC	MOST LIKELY	OPTIMISTIC
Europe	\$75,000	\$100,000	\$125,000
Japan	0	150,000	200,000

If we ignore the pessimistic scenario, perhaps Japan is the best alternative. When we take the pessimistic scenario into account, the choice is unclear. Japan appears to be riskier, but it also offers a higher expected level of cash flow. What is risk and how can it be defined? We must try to answer this important question. Corporate finance cannot avoid coping with risky alternatives, and much of our book is devoted to developing methods for evaluating risky opportunities.

1.4 THE GOAL OF FINANCIAL MANAGEMENT

Assuming that we restrict our discussion to for-profit businesses, the goal of financial management is to make money or add value for the owners. This goal is a little vague, of course, so we examine some different ways of formulating it to come up with a more precise definition. Such a definition is important because it leads to an objective basis for making and evaluating financial decisions.