Building Financial Models with Microsoft® Excel®

Second Edition
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For Kimmell, Page, and Harris
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Before joining Microsoft, I spent a decade in consulting, focused primarily on helping customers implement financial and customer systems. These systems were the lifeblood of a company’s financial modeling and decision support systems; they were responsible for ensuring quick and reliable business decisions, making the company more competitive while driving shareholder value. Given their importance to the business, we took great care in designing and delivering the analytical and reporting capabilities of these systems.

After implementing the modeling and reporting capabilities, I always enjoyed sitting down with the users to understand how they were utilizing their new tools. To my amazement, in almost every discussion with a user, the most noted feature of the reporting capabilities we delivered was the “Export to Excel” button. The robust capabilities that we had built for users were replaced by a tool that sat on every information worker’s desktop that we could not match with any amount of effort—Microsoft Office Excel.

Financial modeling represents the practice of projecting a business’s operating results. The process of building, maintaining, and using financial models involves many interrelated and complex steps. The extent to which the process of building financial models is made more straightforward through the use of Excel as a financial modeling tool is captured nicely in the title of this book, *Building Financial Models with Microsoft Excel*.

As one would expect, we use Excel for financial modeling inside Microsoft. In fact, when Microsoft deployed its financial, human resources, and customer systems, we started with Excel as the primary modeling, analytical, and reporting tool. We use financial models on a regular basis inside Microsoft to achieve business goals, and financial modeling has represented a key component of Microsoft’s practice of planning for, and investing in, the future.

It is impressive to see employees at Microsoft model scenarios with Excel that are completely integrated with our back-end customer, product, and financial data. In addition, employees feel empowered in their ability to spend most of their time analyzing, modeling, and making business decisions, rather than hunting for data, crunching numbers, or making assumptions because of a lack of reliable data.
Watching employees collaborate between models, leverage the power of Excel, and run complex scenarios is very satisfying. It is especially satisfying to me, since as an information technology person I do not need to build many of the modeling capabilities that employees are using. Excel’s capabilities go a long way in helping to make the process of building a financial model more straightforward.

The process of building financial models, which involves many integrated calculations, is made more manageable by Excel’s ability to identify and track all of the points of linkage in calculations across financial models. Excel also enables users to test assumptions underlying financial models and run sensitivity analyses in real time with a high degree of accuracy—something that was not possible before the advent of the electronic spreadsheet.

As the world becomes increasingly connected from an electronic communications perspective, the ability to share and collaborate on financial models will increase. As more people use electronic spreadsheets such as Excel, the power to build complex financial models will extend to a wider audience. As standards underlying financial models emerge, such as XBRL (eXtensible Business Reporting Language), the ability to distribute and use clearly defined and well-understood elements of financial models will increase as well.

You can help ensure the success of your business through the use of financial models. Building a financial model helps to project a business’s future operating results and allows for better business decision making. Microsoft has benefited in many ways through the efficient and effective use of financial models. This book will allow you to bolster your financial modeling skills and knowledge.

Building useful, accurate, and robust financial models can help ensure the success of your business. The opportunities have never been greater to use financial modeling tools such as Excel to make your company and your career more successful. The need for reliable modeling capabilities is stronger now than it has ever been. New features and functionality embedded in Excel 2007 offer users the ability to collaborate on, secure, and integrate financial models in new and exciting ways.

I highly recommend K. Scott Proctor’s book as one of the best I have seen at providing the fundamental knowledge and insight for financial modeling in Excel. The book does a great job of walking through practical examples to help you build your financial modeling skills through the use of Excel—skills that will benefit you for years to come as financial modeling in Excel advances in this interconnected world.

—RON MARKEZICH
Corporate Vice President – MS Online, Microsoft
PURPOSE OF THIS BOOK

Building Financial Models with Microsoft Excel is a step-by-step comprehensive guide to the process of building financial models using Microsoft Excel. I designed and wrote this book with the specific goal of making you an advanced financial model-builder using Excel. This is neither an accounting/finance textbook nor a “how to use Microsoft Excel” book. Rather, this book represents a real-world guide to using a powerful tool (Microsoft Excel) to accomplish a complex task (building a financial model). When you are finished reading this book, you should have a firm understanding of the steps involved in building financial models and you should know how to use Excel to put that understanding to work in the form of a working financial model.

A financial model is a quantitative representation of a company’s past, present, and future business operations. Companies of all types and sizes use financial models every day to analyze and plan their business activities. Financial models serve as the foundation and basis of standard financial accounting reports, including the Balance Sheet, the Income Statement, and the Statement of Cash Flows.

This book contains step-by-step instructions for building a financial model. As such, this book can serve as either a tutorial or a reference. It is my hope that this book helps to demystify the process of building a financial model.

Microsoft Excel is a powerful application for the collection, analysis, and presentation of data in the business world. This book aims to build on the solid functionality and usability of Excel and extend these features into a specific and focused business application—that of building a working financial model. In so doing, this book extends the how-to nature of many Excel-oriented books to the subject matter of financial modeling.

Excel is an ideal tool for the design, construction, and maintenance of financial models. While many businesspeople are familiar with the output of financial models, namely the consolidated financial statements (Balance
Sheet, Income Statement, and Statement of Cash Flows), few professionals are truly adept at building an accurate and effective financial model from the ground up. This book aims to endow you with the skills required to build a good financial model.

This book applies to two specific versions of Microsoft Excel: Microsoft Excel 2007 (running on the Microsoft Vista operating system) and Microsoft Excel 2008 for Mac (running on the Mac OS X (10.5.6 or higher) operating system). The general approach outlined in this book applies also to earlier versions of Excel, but the book is geared towards Excel 2007 (running on the Microsoft Vista operating system). Moreover, Excel 2008 for Mac interface (running on the Mac OS X (10.5.6 or higher) operating system) differs from the interface shown in this book, but the relevant functionality of Excel 2008 for Mac closely mirrors the Excel functionality covered in this book.

**NEED FOR THIS BOOK**

While a number of books have been written on financial modeling with Microsoft Excel, the vast majority of these books are extremely advanced, often requiring extensive technical knowledge (such as the use of VBA—Visual Basic for Applications) and/or extensive corporate finance knowledge (including the mastery of topics such as efficient frontiers, variance–covariance matrices, Monte Carlo simulations, and Value-at-Risk). This book addresses the real, immediate, and significant need for a publication that covers how to build a financial model using Microsoft Excel from the perspective of a beginning- or intermediate-level computer user.

**TARGET AUDIENCE FOR THIS BOOK**

*Building Financial Models with Microsoft Excel* is for business professionals, entrepreneurs, and students who currently, or would like to, create or use financial models and/or statements as a part of their work. This book is targeted at individuals with a beginning to intermediate level of experience with both Microsoft Excel and finance/accounting.

While many business professionals and students have a working knowledge of Excel, few people possess the skill set required to build and maintain a financial model from the ground up. This is surprising, given the fact that several hundred thousand new businesses are launched and several hundred thousand business students graduate each year in the United States alone.
If any of these scenarios applies to you, this book is for you:

- As a working professional, your job responsibilities include the analysis, use, and/or preparation of financial statements. Such responsibilities could include the preparation of a sales or departmental budget, the analysis of a division’s financial performance compared to the rest of the company, or the valuation of a publicly traded company, among others. Examples of professionals in these scenarios could include: financial analysts, accounting managers, and vice presidents (and above) across all corporate divisions, among other professionals.

- As an entrepreneur, or someone starting a new business, you are required to prepare and submit a set of financial statement projections to your bank or other source(s) of financing, such as a venture capital firm. Nearly all business plans associated with a new (or existing) company/business are required to have a set of “pro forma,” or projected, financial statements.

- As a business/management student at either the undergraduate or graduate level, you are required to build and analyze financial models. Financial literacy and skills are important in today’s market; all business students should be well-versed in the use of financial models.

I have designed this book as a practical guide to get you started building a financial model quickly. As such, electronic copies of each of the examples and answers in the book are provided as Excel worksheets on a compact disc that is included with the book.

**SUMMARY OF CONTENTS**

Building a financial model is a step-by-step logical process—each component of the model builds on or feeds into another component of the model. This book, which is organized in a manner that follows this process, is divided into three major parts and includes an appendix that provides a general overview of Microsoft Excel’s features and functionality.

Part One of the book introduces the concepts of budgets and financial models and covers the steps involved in building the Master Budget. You will learn about the various components of a Master Budget and how these components are related to one another. At the highest level of abstraction, the Master Budget contains two key components: the Operating Budget and the Financial Budget. The Master Budget template provided in this part of the book will serve as a roadmap for building each individual component of the financial model. This is the place to learn the fundamentals of the
budgeting process and the nature of the relationships between the various components of the Master Budget.

Part One also covers the steps involved in building the Operating Budget, the first of the two key components of the Master Budget. Examples are provided for each of the steps described in this part of the book. It is important to work through this part of the book in detail, as the components of the Operating Budget are required elements of the overall financial model.

The steps involved in building the Financial Budget, the second of the two key components of the Master Budget, are also covered in Part One. As with the Operating Budget, examples are provided for each of the steps associated with building the Financial Budget. Each component of the Financial Budget is a required element of the overall financial model, so it is important to work through this part of the book in detail as well.

Part Two of the book deals with a company’s consolidated financial statements and free cash flows. The consolidated financial statements include the Balance Sheet, the Income Statement, and the Statement of Cash Flows. This part of the book is built on data, calculations, and work from Part One. Many businesspeople are familiar with these consolidated financial statements—this part of the book provides a guide to building these statements from the ground up based on the Operating and the Financial Budgets for a company. Free cash flow calculations are covered in this part of the book as well to provide a cash-based perspective on a company’s business operations and to provide a foundation for valuation calculations at a later point in the book.

Part Three deals with several topics, including various ways to analyze a financial model, the concept of valuation, and capitalization, or ownership, charts. The analytical techniques related to financial modeling include sensitivity analyses to test the assumptions underlying the financial model, contribution margin analyses to assess the fixed- and variable-cost elements of a company’s cost structure, and financial ratios analyses to measure important financial ratios such as net income to sales (profit margin).

Valuation, covered in Part Three, is a complex issue—entire books are devoted to the subject. This part aims to cover some traditional valuation methodologies and link these techniques to the financial model built earlier in Parts One and Two. A capitalization chart provides a record of a company’s ownership structure. Valuation and ownership are closely related (especially if a company raises any type of equity financing) and deceptively complex topics—this part of the book addresses how these topics relate to a financial model.

Finally, the book concludes with an Appendix that provides a high-level overview of Microsoft Excel’s features and functionality and detailed answers to all of the end-of-chapter questions. Note that you will often need
to access the end-of-chapter question files on the accompanying CD-ROM to answer the questions.

**A FINAL NOTE**

While this book is written with United States GAAP (Generally Accepted Accounting Principles) in mind, the book’s modular nature aims to help make the process of transitioning the modeling process to other accounting systems as straightforward as possible.
Acknowledgments

I would like to thank the editorial team at John Wiley & Sons for their support and assistance with this book. Special thanks to Bill Falloon, Meg Freeborn, and Skyler Balbus for helping to turn my ideas into a book.

I would also like to thank Gene Fife, Bob Coleman, and Dimitri Azar for their training, help, and guidance over the past years. Thanks also to Bob Bruner for his role in inspiring my interest in, and pursuit of, the field of Finance. Finally, thanks to my family for their support and understanding as I put this book together.
PART

One

The Master Budget
Overview of Budgets and Financial Models

The Cambridge Dictionary defines a budget as “a plan to show how much money a person or organization will earn and how much they will need or be able to spend.” Businesses use several different types of budgets to manage their operations. Whatever form various budgets may take, the primary goal of all budgets is to provide a tangible and quantifiable estimate of the receipt and allocation of resources. In the context of this book, a budget represents a core element of a financial model; financial models are discussed later in the chapter.

Businesses use several types of budgets for planning purposes. These budgets are typically categorized by the timeframe that they cover. A “long-range plan,” one type of budget, typically forecasts financial statements out 5 to 10 years into the future. Long-range plans usually evolve from “strategic plans,” which define the overall mission and goals for a business. These long-range plans are coordinated with Capital Budgets, which map out large monetary commitments for things such as facilities and large pieces of equipment.

From a budgeting perspective, this book is focused on the “Master Budget,” which forecasts a business’s complete operations over the medium-term (1–5 years). The Master Budget consists of many interrelated financial and operating schedules, including sales, purchases, and operating expenses, among many others. While some of the key outputs of a Master Budget are the consolidated financial statements (Balance Sheet, Income Statement, and Statement of Cash Flows), a vast array of supporting schedules are also part of the Master Budget. Figure 1.1 outlines the various components of the Master Budget.

As Figure 1.1 indicates, there are two key components of the Master Budget: the Operating Budget and the Financial Budget.
The Master Budget

Figure 1.1 Components of the Master Budget

Operating Budget

The Operating Budget focuses on the Budgeted Income Statement and its supporting components and schedules—these items are described below.

Sales and Collections Budget  The Sales and Collections Budget represents one of the first steps in the budgeting process, as items such as inventory levels and operating expenses are driven off of the Sales and Collections Budget. Effective sales budgeting is a key factor in building a useful and representative financial model for a business. Regardless of the nature of your business (for example, whether it is product- or service-based), this book takes a unit-based approach in which forecast sales are based on (1) projected unit sales and (2) projected unit prices. This topic is covered in detail later in the book.
Overview of Budgets and Financial Models

Cost-of-Goods-Sold Budget  The Cost-of-Goods-Sold Budget decomposes, or breaks down, the components of a business’s cost of goods sold (in some cases referred to as the cost of revenues). This budget breaks out each separate factor underlying the cost of goods sold for a business.

Inventory and Purchases Budget  The Inventory and Purchases Budget, which represents what a business plans to buy and how much inventory it intends to hold over a given timeframe, is based on three factors: a business’s desired ending inventory, cost of goods sold, and beginning inventory. A business's desired ending inventory will drive that business’s budgeted purchases over a given period of time. A larger desired ending inventory will typically lead to a larger Purchases Budget and vice-versa. While the Purchases Budget, a component of the Inventory and Purchases Budget, represents an estimate of future purchases, this is an accrual-based accounting figure, and it is the Disbursements for Purchases Budget (another component of the Inventory and Purchases Budget) that drives a company’s cash flows. This concept is discussed in detail later in the book.

Operating Expenses Budget  The Operating Expenses Budget forecasts all of the elements of a business’s operating expenses, such as salaries, rent, depreciation, and others. Some of these expenses are fixed and some are variable (in other words, based on another measure or metric, such as revenues); this concept of fixed versus variable costs is discussed in detail later in the book. While the Operating Expenses Budget represents an estimate of future expenses, this is an accrual-based accounting figure, and it is the Disbursements for Operating Expenses Budget, a component of the Operating Expenses Budget, that drives a company’s cash flows. This concept is also discussed in detail later in the book.

Budgeted Statement of Income  The Budgeted Statement of Income (also referred to as the Budgeted Income Statement) integrates components of each of the other Operating Budget schedules. The Income Statement compares a business’s revenues and costs for a given period of time and often serves as a benchmark for the performance of a business.

Financial Budget

The Financial Budget is focused on capital expenditures (large purchases of assets such as equipment and facilities) and on a business’s budgeted cash position and Balance Sheet.

Capital Budget  A business’s Capital Budget forecasts large expenditures for items such as machinery. Different companies set different thresholds for
what qualifies as a capital expenditure (versus an expense). If the purchase of an item (such as a piece of machinery) is classified as a capital expenditure, it is then depreciated (or amortized in some cases) over a predetermined period of time. The Capital Budget covers Capital Expenditures, Disbursements for Capital Expenditures, and Depreciation Budgets.

**Cash Budget**  The Cash Budget tracks a business’s anticipated cash receipts and disbursements. This is a very detailed and important schedule that draws on information in the Operating Budget.

**Budgeted Balance Sheet**  The Budgeted Balance Sheet represents the final step in building the Master Budget as outlined in Figure 1.1. The budgeted Balance Sheet integrates components from both the Operating and the Financial Budgets.

**FINANCIAL MODELS**

A financial model is a quantitative representation of a company’s past, present, and future business operations. This quantitative representation is expressed through the use of accounting—the language of business. Finance, which may be broadly defined as the science of managing money and other assets, is based on accounting. As such, it is important to recognize the central role accounting, or the enumeration of business transactions, plays in building financial models. While this book does not cover or address accounting concepts in any level of detail, it is worth noting that the consolidated financial statements (Balance Sheet, Income Statement, and Statement of Cash Flows) represent the product of a series of accounting transactions.

A financial model is a required component of nearly any business plan. Anyone interested in starting a new business, starting a new line of business within an existing company, assessing the operations of an existing or proposed business, and/or comparing the operations of two or more businesses, among other tasks, should know how to build, use, and modify a financial model.

While there are a variety of approaches to building financial models, this book will focus on the inclusion of the following sections in a financial model: (1) a Master Budget (which is made up of an Operating Budget and a Financial Budget), (2) the consolidated financial statements (Balance Sheet, Income Statement, and Statement of Cash Flows), (3) a free cash flow analysis, (4) a sensitivity analysis of the model’s outputs versus inputs, (5) a contribution margin analysis, (6) a financial ratios analysis, (7) a valuation analysis, and (8) a capitalization chart.
For the sake of illustration, sample templates for each of these sections are shown below. Please note that no numbers/values have been inserted into these templates—over the course of this book, I will walk through the process of filling in all of these templates one step at a time.

A financial model integrates all of the components of a Master Budget into a working model of a company’s planned financial activities for a given time period. As this represents a significant amount of information, the components of a financial model are presented in several figures.

As discussed earlier, the components of the Master Budget are broken into the two primary budgets—the Operating Budget and the Financial Budget. Please note that the areas shaded in gray in the screenshots represent the areas in which I will fill in values to build a financial model over the course of this book. These figures are presented as a road map for the next several chapters of the book.

**Master Budget—Operating Budget**

The following figures represent components of the Operating Budget. Note the following convention used throughout the book for time periods: “1Q X4” is to be interpreted as “the first quarter of a year ending in the number 4.” The use of “X4” for a year is a common practice in accounting and finance—it is meant to refer to a specific year without referring to an exact time period such as “94” or “04.” I also use the following convention throughout the book: “X4” is to be interpreted as “the year X4.” Again, this is meant to refer to a particular year without referring to an exact time period.

**Sales and Collections Budget**  The Sales and Collections Budget, shown in Figure 1.2, consists of a Sales Budget and a Collections Budget.

**Cost-of-Goods-Sold Budget**  The Cost-of-Goods-Sold Budget, shown in Figure 1.3, breaks out each component of a business’s cost of goods sold.

**Inventory and Purchases Budget**  The Inventory and Purchases Budget, shown in Figure 1.4, consists of an Inventory Budget and a Purchases Budget.

**Operating Expenses Budget**  The Operating Expenses Budget, shown in Figure 1.5, consists of an Operating Expenses Budget and a Disbursements for Operating Expenses Budget.

**Budgeted Statement of Income**  The Budgeted Statement of Income, shown in Figure 1.6, compares a business’s revenues and expenses.
THE MASTER BUDGET

FIGURE 1.2  Sales and Collections Budget

FIGURE 1.3  Cost-of-Goods-Sold Budget
FIGURE 1.4  Inventory and Purchases Budget

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</tr>
<tr>
<td>18</td>
<td>Accounts Payable (A/P) Budget</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>19</td>
<td>Beginning A/P balance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>+ Additions to A/P</td>
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<tr>
<td>21</td>
<td>- Subtractions from A/P</td>
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</tr>
<tr>
<td>22</td>
<td>= Ending A/P</td>
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<td>23</td>
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FIGURE 1.5  Operating Expenses Budget

<p>| | | | | | |</p>
<table>
<thead>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>1</td>
<td>Period</td>
<td>1Q X4</td>
<td>2Q X4</td>
<td>3Q X4</td>
<td>4Q X4</td>
</tr>
<tr>
<td>2</td>
<td>OPERATING EXPENSES BUDGET</td>
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<td></td>
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<tr>
<td>3</td>
<td>Operating Expenses Budget</td>
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<tr>
<td>4</td>
<td>Salaries</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Miscellaneous expenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td>Research and development</td>
<td></td>
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<tr>
<td>7</td>
<td>Rent</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>8</td>
<td>Depreciation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>= Total operating expenses</td>
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<tr>
<td>10</td>
<td></td>
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<tr>
<td>11</td>
<td>DISBURSEMENTS FOR OPERATING EXPENSES BUDGET</td>
<td></td>
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<tr>
<td>12</td>
<td>Disbursements for Operating Expenses Budget</td>
<td></td>
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</tr>
<tr>
<td>13</td>
<td>Salaries</td>
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<tr>
<td>14</td>
<td>Miscellaneous expenses</td>
<td></td>
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<tr>
<td>15</td>
<td>Research and development</td>
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<tr>
<td>16</td>
<td>Rent</td>
<td></td>
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<tr>
<td>17</td>
<td>Depreciation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>= Total disbursements for operating expenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
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<td>20</td>
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</tbody>
</table>
The following figures represent components of the Financial Budget.

**Capital Budget** The Capital Budget, shown in Figure 1.7, consists of three components: the Capital Expenditures Budget, the Disbursements for Capital Expenditures Budget, and the Depreciation Budget.

**Cash Budget** The Cash Budget, shown in Figure 1.8, offers a detailed reconciliation of a business’s beginning and ending cash balances for a given period of time.

**Budgeted Balance Sheet** The Budgeted Balance Sheet, shown in Figure 1.9, compares a business’s Assets, Liabilities, and Owners’ Equity.

**Additional Components of a Master Budget**

A working financial model should include several additional schedules beyond those presented in Figures 1.2 through 1.9. These schedules include an
FIGURE 1.7  Capital Budget

FIGURE 1.8  Cash Budget
Assumptions and Dashboard worksheet and Headcount worksheets, among others.

**Consolidated Financial Statements**

The consolidated financial statements consist of the Balance Sheet, the Income Statement, and the Statement of Cash Flows. Publicly traded companies are required to report these statements to the SEC (U.S. Securities and Exchange Commission) on a regular basis, so many readers may be familiar with each of these statements. Templates for each of these financial statements are provided below.

**Balance Sheet** A Balance Sheet, shown in Figure 1.10, offers a view of a business’s financial position in terms of its Assets, Liabilities, and Owners’ Equity.
Overview of Budgets and Financial Models

### Income Statement
An Income Statement, shown in Figure 1.11, presents a summary of a business’s results of operations in terms of its revenues and expenses.

### Statement of Cash Flows
A Statement of Cash Flows, shown in Figure 1.12, reconciles a business’s net income to its change in cash position over a given time period in terms of Cash Flows from Operating Activities, Cash Flows from Investing Activities, and Cash Flows from Financing Activities.

### Free Cash Flow Analysis
The concept of free cash flows is central to modern finance. Broadly speaking, free cash flows represent the amount of cash a business generates (or, in some cases, consumes) over a given timeframe after paying all of its “required” costs for that period. I will discuss free cash flows in Chapter 9, but technically speaking, free cash flows represent the cash available to all
THE MASTER BUDGET

FIGURE 1.11  Income Statement

FIGURE 1.12  Statement of Cash Flows
Overview of Budgets and Financial Models

FIGURE 1.13 Free Cash Flows Worksheet

providers of capital (providers of both debt and equity) after all “required” expenses have been paid. Figure 1.13 presents a view of the free cash flows worksheet. All of the terms in this worksheet will be explained and discussed in Chapter 9.

Sensitivity Analysis

Sensitivity analyses are used to model the effect of changing input variables on some output of interest, such as net income or free cash flows. It is often helpful to build a series of sensitivity analyses to get a sense for what input variables will have a significant influence on your output measure or metric of interest (for example, net income). Figure 1.14 shows a data table template that could be used to test the effect of varying the assumed growth rate in revenues on net income. Chapter 10 is devoted entirely to the coverage of sensitivity analyses.
THE MASTER BUDGET

FIGURE 1.14 Data Table Template

Contribution Margin Analysis

Contribution margin is defined as the extent to which each unit sale contributes to a business’s fixed cost base. This is calculated as unit price – variable costs per unit. Key operating measures and metrics, such as operating leverage (calculated as fixed costs/total costs), breakeven value in units (how many units must be sold before the business reaches “breakeven,” or the point at which revenues cover all costs), and breakeven value in dollars (the level of sales, as measured in dollars, at which the business reaches breakeven), are covered in detail in Chapter 11. Figure 1.15 highlights several of these metrics.

Financial Ratios Analysis

Financial ratios, such as gross margin (calculated as gross profit/sales), net profit margin (calculated as net income/sales), and return on equity (calculated as net income/owners’ equity), among others, are often used to analyze financial models. Figure 1.16 highlights several of the financial ratios used in Chapter 12.

Valuation Analysis

Business valuation is the process of determining how much a company is worth—in other words, determining its value. The valuation of a business is
Overview of Budgets and Financial Models

FIGURE 1.15 Examples of Contribution Margin Operating Metrics

a complex subject—many books have been written on this topic alone. This book will cover the concept of “triangulation,” in which several well-known valuation techniques are used—and are weighed appropriately—to estimate the value of a business. Figure 1.17 highlights a model in which various valuation techniques are used to triangulate on the value of a business. Valuation is covered in detail in Chapter 13.

Capitalization Chart

A capitalization chart represents the ownership structure of a business. While this is one of a business’s most important documents, few books on financial modeling cover this subject. Figure 1.18 demonstrates one approach to displaying a capitalization chart. I will build a set of capitalization charts in Chapter 14 to model the effects of an investment into a business over time.
FIGURE 1.16  Financial Ratios Examples

FIGURE 1.17  Valuation Model Example
FIGURE 1.18 Capitalization Chart

QUESTIONS

1. What is the main goal of all budgets?
2. What are the two main components of a Master Budget?
3. What is a financial model?
4. What are the names of the three components of standard consolidated financial statements?
5. What do free cash flows represent for a business?
6. Why should a business use a sensitivity analysis? A contribution margin analysis? A financial ratios analysis?
7. What is valuation?
8. What is a capitalization chart?
The Operating Budget, also known as a “profit plan,” focuses on a company’s Income Statement and its supporting components or “schedules.” While Chapter 1 provides an overview of the concept of a Master Budget, this chapter covers the specific steps involved in building the sales components of an Operating Budget from the ground up. Chapters 3 and 4 provide detailed coverage of the steps involved in building the cost components of an Operating Budget. Figure 2.1 highlights the separate sales-oriented components of the Operating Budget.

Preparing an Operating Budget is the first step in the process of building a Master Budget. The preparation of an Operating Budget is a sequential process—it is critical to follow each step outlined below in the order presented. Moreover, the preparation of a financial budget in Chapters 6 and 7 and the consolidated financial statements in Chapter 8 build on the work in this chapter.

NAPAVALE—BACKGROUND INFORMATION ON EXAMPLE COMPANY

I will use a fictitious company named “Napavale” to illustrate the process of building a financial model. Napavale develops, markets, and sells advanced flat-screen computer monitors directly to consumers. These products are sold exclusively through a direct channel of distribution—the monitors are not sold through electronics stores or resellers, for example. Napavale offers customers several ways to purchase its monitors: through a mail-order catalog, over the telephone, or through Napavale’s web site on the Internet.

Napavale’s monitors, which are thin, lightweight, and offer excellent visibility and resolution, are sold on both cash and credit terms. Napavale’s
management prepares financial models so that they may run their business more efficiently and effectively.

Over the course of the next several chapters in which I will build a complete financial model for Napavale, I will project results out four quarters (one year) into the future. While most real-world budgets project results out three, and sometimes five years, the presentation of financial projections using Microsoft Excel screenshots in a book format is much more practical using four quarters of projections as opposed to using a three- or five-year time horizon. The process involved in building financial models is the same,
however, for four quarters as it is for any other timeframe. Once you have a firm grasp of the process underlying the construction of financial models, you can build your models and projections for any timeframe, be it weeks or decades.

For the sake of presentation, I am assuming Napavale was founded and began operations in the first accounting period (quarter) covered throughout Napavale’s financial model. While few businesses may be able to begin functioning operationally as quickly as Napavale, Napavale’s financial model is meant to address the many facets of building a financial model (as opposed to modeling an actual business).

Any forward-looking financial model will be based on a set of underlying assumptions. In the interests of simplicity and readability, I will introduce the specific assumptions underlying Napavale’s financial model at the appropriate points within this chapter and Chapters 3 through 7. The remainder of this chapter will cover the construction of the Assumptions and Dashboard worksheet and the sales elements of the Operating Budget.

**STEP 1: ASSUMPTIONS AND DASHBOARD WORKSHEET**

The first step involved in building a financial model is developing an “Assumptions and Dashboard” worksheet. This worksheet will contain the vast majority of the financial model’s input variables. The Assumptions and Dashboard worksheet will contain, for example, projected unit sales and unit prices, projected salary levels for employees, and projected capital expenditures, among many other values. This worksheet will serve as the central point of reference for all of the input variables underlying Napavale’s entire financial model.

By centralizing all of the input variables of a financial model into a single location (the Assumptions and Dashboard worksheet), users can easily test and evaluate the implications of changes in the values of input variables across all elements of a financial model, including the consolidated financial statements and other metrics of interest, such as free cash flows. The use of an Assumptions and Dashboard worksheet represents a core financial modeling concept: that of avoiding “hard coding,” or entering specific input variables directly into a worksheet. Whenever possible, I represent input variables as values on a separate worksheet (or area of a worksheet). If you adhere to this technique in your own financial models, you stand to save yourself significant time and effort when you modify your financial models in the future.
The Assumptions and Dashboard worksheet includes an element that I refer to as the “Dashboard.” The Dashboard offers a high-level gauge of a financial model’s condition and state of health. A Dashboard can provide a synopsis of a financial model’s key outputs, such as revenues and net income, and can also indicate, for example, whether the balance sheet is balanced. I will not cover the Dashboard, however, until Chapter 10. These are key features for all users of financial models, but especially for users that must present their financial models to audiences and executives that ask for changes in input variables in real time.

An Assumption and Dashboard worksheet allows you to, for example, change unit sales projections during a meeting and immediately evaluate the impact of this change and determine whether the model is still functioning properly—important and helpful features to have in a financial model. I refer to the Assumptions and Dashboard worksheet frequently over the course of this book.

For the sake of presentation, Figure 2.2 indicates the placeholders for some of the input variable assumptions that I will fill in with values over the next several chapters. As I work through each of the steps involved in building a financial model, I provide screenshots of the Assumptions worksheet with the relevant values indicated.

I use the following formatting convention for the remainder of the book: any input cells (those cells whose values/contents I can change) will be formatted in black with white numbers, and any output cells (those cells whose values are contingent on formulas and/or the values in other cells) will be formatted in gray with black numbers.

**FIGURE 2.2** Placeholders for Several Input Variable Assumptions
The Unit Sales and Price Budget represents a central component of a financial model. Many other elements in the financial model, including inventory levels, operating expenses, and purchases, are often based off of projected sales levels.

The first step in building a sales budget is to project total sales levels for a time period, such as a fiscal quarter, or three months. An effective way in which to project these sales is on a per-unit basis. As Napavale, my fictitious company, sells computer monitors, I will project the number of monitors sold. Thus, “number of monitors sold” represents my unit of measure for sales projections. If you are modeling a service-oriented company, such as a consulting firm, you could just as easily use a measure such as “hours billed” as your unit for sales projections.

In addition to projecting unit sales of Napavale’s product, I need to project the average selling price per unit over a period of time. While Napavale sells only one product, I could easily project sales levels in terms of units and selling price per unit for a range of products. I am using only one product for Napavale in the interest of ease of presentation for Excel screenshots.

Once the unit sales and the average selling price per unit are determined, I multiply these two values together for a time period (such as a quarter) to calculate the total sales figure in dollars for this time period.

Figure 2.3 indicates the assumptions underlying Napavale’s unit sales projections (using the Assumptions and Dashboard worksheet). The Unit

FIGURE 2.3 Assumptions Underlying Napavale’s Unit Sales Projections
Sales and Price Budget is shown in Figure 2.4. Note that I have included a row in Figure 2.4 to calculate sales in dollars for each accounting period. Dollar sales are calculated as unit sales * price per unit.

**FORMATTING TIPS**

As you can see in Figures 2.3 to 2.7, certain formatting techniques aid in the construction of a worksheet. Take note of these uses of formatting (these formatting tips are also covered in the appendix):

- **Bold headings**—to change text in a cell to a bold format, select the cell of interest, select the “Home” tab on the Excel ribbon, and choose the “bold” selection (usually a bold uppercase “B” icon) in the “Font” section of the ribbon.
- **Center alignment**—to center text in a cell, select the cell of interest, select the “Home” tab on the Excel ribbon, and choose the “center” selection (usually an icon with a series of centered lines) in the “Alignment” section of the ribbon.
Borders for cells—to add a border to a cell, select the cell of interest, select the “Home” tab on the Excel ribbon, and choose the specific border that you would like to add to the selected cell (usually an icon with a box of dotted lines and one solid line on the bottom) using the drop-down “Border” icon from the “Font” section of the ribbon.

Center text across columns—to center text across a number of columns, select the columns of interest, select the “Home” tab on the Excel ribbon, and choose the “Merge & Center” icon in the “Alignment” section of the ribbon.

Indent text—to indent text, select the cell of interest, select the “Home” tab on the Excel ribbon, and click on the “Indent” icon (usually an icon with a blue arrow pointing to the right with a series of black lines next to the blue arrow) in the “Alignment” section of the ribbon.

Formatting numbers as currency—to format numbers as currency, select the cell(s) of interest, select the “Home” tab on the Excel ribbon, and select the “$” icon from the “Number” section of the ribbon.

Please note that the projected price for each monitor decreases from quarter to quarter. As in many high-technology product-oriented companies such as Napavale, price competition is severe and it is often essential to remain competitive from a pricing perspective to maintain or increase market share.

Figure 2.5 presents an alternative view of the Unit Sales and Price Budget in which the values and formulas underlying each worksheet cell are exposed. You can always switch between the original and the alternative views in your worksheets by pressing and holding the Control (CTRL) key and then pressing the “∼” key. In Figure 2.5, note that equations such as that found in cell B7 (= B5 * B6) are to be interpreted as follows: the value in cell B7 is equal to the value in B5 multiplied by the value in B6. For the sake of clarity, remember that the following symbols are used to represent arithmetic operators: + (plus/addition), − (minus/subtraction), * (times/multiplication), and / (divided by or division). I provide many of these alternative views of worksheets over the course of this book so that you can see the specific calculations underlying Napavale’s financial model.

It is important to note that, over the course of building the financial model for Napavale, I will be naming many of the input and output cells in
Excel for Napavale. One of Microsoft Excel’s more powerful features is the ability to refer to information across worksheets. I make frequent use of this feature throughout this book. The naming of cells and ranges of cells makes this ability to reference other worksheets and cells much easier.

**FEATURE TIP: NAMING CELLS AND CELL RANGES**

The ability to name cells and cell ranges is a useful and powerful feature offered by Microsoft Excel. Cell references (discussed in the Appendix) are used regularly when building financial models—the use of names instead of obscure cell references, such as $AC165, makes it easier to build and modify models.

The easiest way to name a cell or a range of cells is to use the Name Box in Excel. The Name Box typically is found directly above the label for Column A in an open worksheet.
To name a cell or a range of cells, select the cell or range of cells that you would like to name, click on the “Formula” tab on the Excel ribbon, and choose the “Define Name” button (usually an icon labeled “Define Name” with a white tag on a string next to the label) in the “Defined Names” section of the ribbon. Next, simply type your desired name for the cell or range of cells into the “Name” field of the dialog box that appears after you click on the “Define Name” button. Note that you may not use any spaces in this name.

The names of each input and output cell related to the Unit Sales and Price Budget are shown in Figure 2.6 from the Assumptions and Dashboard worksheet.

Figure 2.7 shows the names for each of the input and output cells in the Unit Sales and Price Budget itself. Note that all of the figures in which I show the names of the input and output cells are for display purposes only—no calculations actually take place in such figures. I clearly note when I am presenting worksheets for the purpose of showing the names of input and output cells over the course of the book.

For the sake of clear and consistent presentation of the steps involved in building each component of Napavale’s Master Budget (covered in Chapters 2–7), I present the following figures related to each step in the Master Budget building process: (1) a view of the Assumptions and Dashboard

![Figure 2.6](image-url)  
**FIGURE 2.6** Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet
Operating Budget—Assumptions, Sales, and Collections

FIGURE 2.7  Names of the Input and Output Cells in the Unit Sales and Price Budget

worksheet, with the relevant areas shown, (2) a view of the specific budget worksheet I am describing (for example, the Unit Sales and Price Budget), (3) an alternative view of the specific budget worksheet I am discussing in which the values and formulas underlying the worksheet cells are exposed and visible, (4) a view of the Assumptions and Dashboard worksheet in which the names of all of the relevant cells are shown, and (5) a view of the specific budget worksheet I am discussing in which all of the names of the relevant cells are shown.

STEP 2B: SALES COMPOSITION BUDGET

Since a portion of Napavale’s sales will be credit sales and a portion will be cash sales, I need to calculate the relative percentage of each type of sales in the financial model. Figure 2.8 highlights the assumptions underlying the Sales Composition Budget (using the Assumptions and Dashboard worksheet). Figure 2.9 presents the Sales Composition Budget itself.

Figure 2.10 represents an alternative view of the worksheet shown in Figure 2.9. This alternative view exposes all of the formulas used to calculate
**FIGURE 2.8** Assumptions Underlying the Sales Composition Budget

**FIGURE 2.9** Sales Composition Budget
values such as Total Sales. All of the columns in this worksheet are not visible due to the length of the formulas underlying some of the worksheet cells.

Figure 2.11 shows all of the names for the input and output cells in the Assumptions and Dashboard worksheet. Figure 2.12 highlights all of the names for the input and output cells in the Sales Composition Budget itself.
The Cash Collections from Customers Budget calculates and tracks sales on a cash basis. Cash collections from customers are calculated as: cash sales for a given time period + credit sales for a given period collected in that same period + credit sales from a previous period collected during the given period. The credit sales collections amounts are based on two assumptions: the number of days per time period and the number of days receivable.

Days receivable (also known as Days Sales Outstanding, or DSO) is a financial metric that indicates how many days sales are “outstanding” or uncollected. A company’s days receivable value is calculated as: the average accounts receivable balance for a time period/the dollar value of one day’s worth of sales. For the sake of simplicity, I will use Napavale’s Accounts Receivable balance at the end of specific accounting periods (as opposed to an average of two accounting periods) in Napavale’s financial model.

Figure 2.13 shows the assumptions underlying the cash collections calculation (using the Assumptions and Dashboard worksheet). Note that Figure 2.13 presents another view of the assumptions shown in Figure 2.8.

Figure 2.14 shows the Cash Collections Budget worksheet itself. Note that the “credit sales collected” line in the Cash Collections Budget is not completed. This is because credit sales collections are driven off of Accounts Receivable calculations, which are shown in the next step.
Operating Budget—Assumptions, Sales, and Collections

FIGURE 2.13 Assumptions Underlying the Cash Collections Calculation

Figure 2.15 represents an alternative view (in which all of the equations are exposed) of the Cash Collections Budget worksheet. Figure 2.16 shows the names of the input and output cells in the Assumptions and Dashboard worksheet. Figure 2.17 shows the names for the input and output cells from the Cash Collections from Customers Budget worksheet.

FIGURE 2.14 Cash Collections Budget
FIGURE 2.15  Alternative View of the Cash Collections Budget

FIGURE 2.16  Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet
STEP 2D: ACCOUNTS RECEIVABLE BUDGET

Napavale sells its monitors on both cash and credit terms. The Accounts Receivable Budget tracks Napavale’s credit sales. As noted in Step 2C (Cash Collections from Customers Budget), credit sales collections are based on the assumptions underlying Napavale’s days receivable and days per accounting period. Figure 2.18 highlights the assumptions underlying the Accounts Receivable calculation (using the Assumptions and Dashboard worksheet).

Figure 2.19 shows the Accounts Receivable Budget. Note that I am assuming Napavale began the year X4 with no (zero) accounts receivable. Also note that I am assuming Napavale’s days receivable measure is always less than the days-per-quarter measure. While this is a simplifying assumption, as you will see below, the Accounts Receivable calculations are already detailed enough and I do not want to introduce excessive complications into the financial model at this point.

In the Accounts Receivable Budget calculations, note that the “Subtractions from Accounts Receivable” row in Figure 2.19 is always equal to the
FIGURE 2.18  Assumptions Underlying the Accounts Receivable Calculation

FIGURE 2.19  Accounts Receivable Budget
“Additions to Accounts Receivable” row from the immediately preceding quarter. This is because, as noted above, I am assuming the days receivable metric is always less than the days-per-quarter measure. Assuming this is the case, all the Accounts Receivables added during a given period will be collected in the subsequent period.

Figure 2.20 offers an alternative view of the Accounts Receivable calculations from the Accounts Receivable Budget in which the calculations within the worksheet cells are exposed. Only a portion of the columns of the worksheet are shown due to the length of the formulas associated with the underlying calculations.

Given the complex nature of some of the calculations underlying the worksheet shown in Figure 2.20, I will walk through the logic behind the contents of two worksheet cells. The first cell that I will discuss, cell B17, calculates a value for “credit sales collected.” This represents the dollar value of credit sales collected during the 1Q X4 time period. The general
logic behind this calculation is as follows: credit sales collected for 1Q X4 are equal to: the percentage of credit sales from 1Q X4 that were collected in 1Q X4 + the subtractions from Napavale’s Accounts Receivable for 1Q X4.

Looking specifically at the formula underlying cell B17, note that the credit sales value for 1Q X4 is multiplied by: (days per quarter – days receivable)/(days per quarter). This formula will yield the dollar value of the credit sales that took place in 1Q X4 that were collected in 1Q X4. Also note in cell B17 that the result of this formula is added to the subtractions from Napavale’s Accounts Receivable balance.

The second cell, cell B22, calculates a value for “Additions to A/R.” This represents the dollar value of credit sales that took place in 1Q X4 that were not collected in 1Q X4. As the contents of cell B22 indicate, the credit sales value for 1Q X4 is multiplied by: (days receivable)/(days per quarter).

While these formulas may seem complex, their purpose is to divide up credit sales between different periods based on my assumptions regarding days receivable for Napavale. The approach that I am taking regarding Accounts Receivable and credit sales collections is one of many different ways to address the financial modeling of these topics; I am presenting this particular approach due to its utility and flexibility.

Figure 2.21 presents a view of the names of all of the input and output cells for the Accounts Receivable Budget in the Assumptions and Dashboard worksheet. Figure 2.22 offers a view of the input and output cells in the Accounts Receivable Budget itself.
QUESTIONS

Each of the questions for this chapter relates to a hypothetical company named Company XYZ. Company XYZ sells “tablet” Personal Computers (PCs) to the consumer market. As such, Company XYZ is a product-oriented (as opposed to a service-oriented) business. The questions will address the fiscal year X5 on a quarterly basis (four specific quarters, 1Q–4Q for the year X5).

The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to build the schedules discussed in this chapter for Company XYZ.

1. Build the first section of an Assumptions and Dashboard worksheet for Company XYZ given the following projections for the four quarters in the year X5: (i) 10,500 PCs (units) will be sold in 1Q, 15,250 PCs will be sold in 2Q, 25,000 units will be sold in 3Q, and 31,200 units will be sold in 4Q, and (ii) the selling price per PC (unit) will be as follows for each quarter: $3,100 in 1Q, $3,050 in 2Q, $3,000 in 3Q, and $2,910 in 4Q.
2. Build a Unit Sales and Price Budget based on the Assumptions and Dashboard worksheet that you built in Question 1.

3. Update the Assumptions and Dashboard worksheet for Company XYZ from Question 1 given the following projections for the breakdown between cash sales (as a percentage of total sales) and credit sales (as a percentage of total sales): (i) 100 percent cash sales and 0 percent credit sales in 1Q, (ii) 90 percent cash sales and 10 percent credit sales in 2Q, (iii) 70 percent cash sales and 30 percent credit sales in 3Q, and (iv) 50 percent cash sales and 50 percent credit sales in 4Q.

4. Build a Sales Composition Budget based on the updated Assumptions and Dashboard worksheet from Question 3.

5. Update the Assumptions and Dashboard worksheet for Company XYZ from Question 3 given the following projections for the Company’s Days Receivable, otherwise known as Days Sales Outstanding (DSO), and the number of days per quarter: (i) 20 days receivable and 90 days per quarter for 1Q, (ii) 25 days receivable and 90 days per quarter for 2Q, (iii) 30 days receivable and 90 days per quarter in 3Q, and (iv) 30 days receivable and 90 days per quarter in 4Q.

6. Build a Cash Collections from Customers Budget based on your work in Questions 1–5. Note that you should not be able to complete the “credit sales collected” line in this Budget until the Accounts Receivable Budget is built (in Question 7).

7. Build an Accounts Receivable Budget based on your work in Questions 1–6 and complete the Cash Collections from Customers Budget from Question 6. Assume that Company XYZ had (i) a beginning Accounts Receivable value of 0 (zero) and (ii) 0 (zero) subtractions from Accounts Receivable for 1Q X5.
CHAPTER 3

Operating Budget—Cost of Goods Sold, Inventory, and Purchases

This chapter covers the first set of cost components for the Operating Budget, specifically the Cost-of-Goods-Sold Budget, the Inventory Budget, and the Purchases Budget. Whereas Chapter 2 addressed the sales components of the Operating Budget, this chapter, in conjunction with Chapters 4 and 5, addresses the budgets (in the Operating Budget) associated with planning for and purchasing the resources required to support a business’s sales. Figure 3.1 highlights the separate Cost of Goods Sold, Inventory, and Purchases components of the Operating Budget in the context of the Master Budget.

As in Chapter 2, I use the Assumptions and Dashboard worksheet for Napavale to introduce and focus on important assumptions underlying Napavale’s financial model. The remainder of this chapter will cover the steps involved in the continued construction of the Assumptions and Dashboard worksheet and the Cost of Goods Sold, Inventory, and Purchases elements of the Operating Budget.

STEP 3: COST-OF-GOODS-SOLD BUDGET

The first cost-oriented step in building Napavale’s financial model, labeled Step 3 in Figure 3.1, is developing a Cost-of-Goods-Sold Budget. This budget is most applicable to product-oriented companies (as opposed to service-oriented companies), as service-oriented companies do not typically sell “goods.” Some service-oriented companies refer to the cost of selling their service(s) as the “cost of revenues.” In other cases, service-oriented companies may not even report a cost of revenues line item in their financial model.
As Napavale sells a specific product (a flat-screen computer monitor), I will be using a Cost-of-Goods-Sold Budget. If you are building a financial model for a service-oriented company, you may either identify and allocate the costs associated with service revenues to an account named “cost of revenues” or ignore this account altogether—it is up to you. It is essential, however, to account for all costs somewhere in your financial model.

Returning to my example company, Napavale has identified three specific cost components in the Cost-of-Goods-Sold Budget: monitor screen,
monitor casing, and assembly labor. Figure 3.2 highlights each of these components on a per-unit basis in the Assumptions and Dashboard worksheet.

Please note that the projected cost values for each of the three cost components decreases from quarter to quarter. As in many high-technology product-oriented companies such as Napavale, the cost of materials often drops quickly.

These assumptions regarding the cost components of Napavale’s cost of goods sold are fed directly from the Assumptions and Dashboard worksheet into the Cost-of-Goods-Sold Budget. The aggregate cost-of-goods-sold figure for each quarter is based on that quarter’s projected unit sales. Figure 3.3 presents the Cost-of-Goods-Sold Budget.

Figure 3.4 shows an alternative view of the Cost-of-Goods-Sold Budget in which the values and calculations underlying the worksheet cells are exposed.

Figure 3.5 presents a view of the Assumptions and Dashboard worksheet in which the names of the input and output cells are highlighted. I have used the acronym “CPU” in several of the names in this worksheet—CPU stands for “cost per unit” in this context.
THE MASTER BUDGET

FIGURE 3.3  Cost-of-Goods-Sold Budget

FIGURE 3.4  Alternative View of the Cost-of-Goods-Sold Budget

FIGURE 3.5  Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet
Figure 3.6 offers a view of the Cost-of-Goods-Sold Budget in which the names of the input and output cells are shown. The acronym “COGS” is used in several of these names to stand for “Cost of Goods Sold.”

**STEP 4A: INVENTORY BUDGET**

The Inventory Budget tracks Napavale’s desired ending inventory for each of the four quarters covered in the financial model. Inventory represents goods that are, or will be, available for sale. Holding inventory has direct financial implications (specifically, it often costs money to purchase and hold inventory), so it is important to budget inventory levels appropriately. The budgeting process for inventory is often a balancing act, as a business does not want to hold too much inventory (because this often costs money), but it does want to have goods ready to sell and deliver when a customer makes a purchase.

In my financial model, I am basing a specific quarter’s desired ending inventory on Napavale’s “desired days inventory.” Days inventory is defined as a company’s average inventory level for a period of time (such as a quarter) divided by a day’s worth of cost of goods sold for that same period of time.

For the sake of simplicity, I am going to use the ending inventory value for a given time period (as opposed to the average inventory value) for Napavale’s financial model. In Napavale’s case, for a given quarter, I will use the projected cost of goods sold for the subsequent quarter and the desired days inventory for that given quarter as the basis for my calculation of Napavale’s “desired ending inventory” in the Inventory Budget.
THE MASTER BUDGET

Figure 3.7 highlights my assumptions for Napavale’s desired days inventory in the Assumptions and Dashboard worksheet. Figure 3.8 below presents a view of the Inventory Budget itself.

Note the following assumption underlying Napavale’s financial model: The desired ending inventory for 4Q X4 is equal to the desired ending inventory for 3Q X4. As I am building a financial model for only year X4, I will not address assumptions related to year X5. As such, this assumption represents a straightforward solution to the problem of including any information related to year X5.

Figure 3.9 offers an alternative view of the Inventory Budget in which the values and calculations underlying the worksheet are exposed. Only a portion of the columns of the worksheet are shown due to the length of the formulas associated with the underlying calculations.

The names of the input and output cells in the Assumptions and Dashboard worksheet are highlighted in Figure 3.10. Figure 3.11 offers a view of the names of the input and output cells in the Inventory Budget.

For the sake of reference, the cost of goods sold projections presented in the Inventory Budget are referenced directly from the Cost-of-Goods-Sold Budget.
FIGURE 3.8  Inventory Budget

FIGURE 3.9  Alternative View of the Inventory Budget
FIGURE 3.10  Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet

FIGURE 3.11  Names of the Input and Output Cells in the Inventory Budget
STEP 4B: PURCHASES BUDGET

The Purchases Budget, which deals with goods that will eventually be sold to customers, is based on Napavale’s desired ending inventory, cost of goods sold, and beginning inventory for each quarter. The specific budgeted purchases for a time period may be calculated using the following formula:

\[
\text{Budgeted purchases} = \text{desired ending inventory} + \text{cost of goods sold} - \text{beginning inventory}.
\]

I have already calculated all of the input variables in this equation (desired ending inventory and cost of goods sold) except for Napavale’s beginning inventory for each period, so the Purchases Budget represents a straightforward calculation. Furthermore, as Napavale’s beginning inventory level for each accounting period is the result of a calculation, there are no unique assumptions underlying the Purchases Budget (beyond those contained in the previous budgeted steps). As such, I will not present another view of the Assumptions and Dashboard worksheet at this point. Figure 3.12 presents a view of the Purchases Budget. Figure 3.13 offers an alternative
FIGURE 3.13 Alternative View of the Purchases Budget

FIGURE 3.14 Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet
view of the Purchases Budget in which the values and formulas contained in the worksheet cells are exposed and visible.

The names of the input and output cells in the Assumptions and Dashboard worksheet are shown in Figure 3.14. Figure 3.15 offers a view of the names of the input and output cells in the Purchases Budget itself.

**STEP 4C: DISBURSEMENTS FOR PURCHASES BUDGET**

The Disbursements for Purchases Budget reconciles the accrual values from Step 4B to cash figures. This schedule ties into the creation of the Cash Budget, which is covered in Chapter 6. This section of Napavale’s financial model is based on two assumptions: the number of days per time period and the number of days payable.

Days payable is a financial metric that indicates how many days payables are “outstanding” or unpaid. A company’s days payable value is calculated as: the average Accounts Payable balance for a time period/the dollar value of one day’s worth of cost of goods sold. For the sake of simplicity, I will be using ending Accounts Payable values for a given time period (as opposed
Figure 3.16 Assumptions in the Assumptions and Dashboard Worksheet to average Accounts Payable values) in Napavale’s financial model. Figure 3.16 illustrates these assumptions from the Assumptions and Dashboard worksheet.

Figure 3.17 presents a view of the Disbursements for Purchases Budget worksheet. Note that the “payment of payables” line in the disbursements for purchases is not completed. This is because the payment of payables is driven off of accounts payable calculations, which are shown in the next step (Step 4D).

An alternative view of the Disbursements for Purchases Budget, in which the values and calculations underlying the worksheet cells are exposed and visible, is presented in Figure 3.18. Only a portion of the columns of the worksheet are shown due to the length of the formulas associated with the underlying calculations.

Figure 3.19 presents a view of the names of the input and output cells in the Assumptions and Dashboard worksheet. The names of the input and output cells in the Disbursements for Purchases Budget are shown in Figure 3.20.
Operating Budget—Cost of Goods Sold, Inventory, and Purchases

**FIGURE 3.17** Disbursements for Purchases Budget

**FIGURE 3.18** Alternative View of the Disbursements for Purchases Budget
FIGURE 3.19  Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet

FIGURE 3.20  Names of the Input and Output Cells in the Disbursements for Purchases Budget
STEP 4D: ACCOUNTS PAYABLE BUDGET

Napavale pays for its inventory on both cash and credit terms. The Accounts Payable Budget tracks Napavale’s credit purchases. As noted in Step 4C (Disbursements for Purchases Budget), payments of Accounts Payable are based on the assumptions underlying Napavale’s days payable and days per accounting period. While there are no additional assumptions beyond those already mentioned associated with the Accounts Payable Budget, Figure 3.21 highlights the assumptions underlying the Accounts Payable calculation (using the Assumptions and Dashboard worksheet) for the sake of reference.

Figure 3.22 shows the Accounts Payable Budget worksheet. Note that I am assuming Napavale began the year X4 with no (zero) accounts payable. Also note that I am assuming Napavale’s days payable measure is always less than the days-per-quarter measure. While this is a simplifying assumption, the Accounts Payable calculations are already detailed enough (as you will

FIGURE 3.21 Assumptions Underlying the Accounts Payable Calculation
see below) and I do not want to introduce excessive complications to the model at this point.

Figure 3.23 offers an alternative view of the Accounts Payable calculations worksheet in which the calculations within the worksheet cells are exposed. Only a portion of the columns of the worksheet are shown due to the length of the formulas associated with the underlying calculations.

Given the complex nature of some of the calculations underlying the worksheet shown in Figure 3.23, I will walk through the logic behind the contents of two worksheet cells. The first cell that I will discuss, cell B16, calculates a value for “payment of payables.” This represents the dollar value of purchases made during the 1Q X4 period that were paid for during 1Q X4. The general logic behind this calculation is as follows: The payment for purchases made during 1Q X4 is equal to: the percentage of purchases from 1Q X4 that were paid for in 1Q X4 + the subtractions from Napavale’s Accounts Payable.

Looking specifically at the formula underlying cell B16, note that the purchases value for 1Q X4 is multiplied by: (days per quarter – days payable)/(days per quarter). This formula will yield the dollar value of the purchases that took place in 1Q X4 that were paid for in 1Q X4. Also note
FIGURE 3.23 Alternative View of the Accounts Payable Budget Worksheet

in cell B16 that the result of this formula is added to the subtractions from Napavale’s Accounts Payable balance.

The second cell that I will discuss, cell B21, calculates a value for “additions to A/P.” This represents the dollar value of purchases that took place in 1Q X4 that were not paid for in 1Q X4. As the contents of cell B21 indicate, the purchases value for 1Q X4 is multiplied by: (days payable)/(days per quarter).

While these formulas may seem complex, their purpose is to divide up purchases between different periods based on my assumptions regarding days payable for Napavale. The approach that I am taking regarding Accounts Payable is one of many different ways to address the financial modeling of these topics—I am presenting this particular approach due to its utility and flexibility. Note that my approach for projecting Accounts Payable is similar to my approach for projecting Accounts Receivable, covered in Chapter 2.

The names of the input and output cells in the Assumptions and Dashboard worksheet are presented in Figure 3.24. Figure 3.25 offers a view of the names of the input and output cells in the Accounts Payable Budget.
FIGURE 3.24  Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet

FIGURE 3.25  Names of the Input and Output Cells in the Accounts Payable Budget
QUESTIONS

Each of the questions for this chapter relates to a hypothetical company named Company ABC. Company ABC sells functional desks to the business market. As such, Company ABC is a product-oriented (as opposed to a service-oriented) business. The questions for this chapter will address fiscal year X6 on a quarterly basis (four specific quarters, 1Q–4Q for the year X6).

The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to build the schedules discussed in this chapter for Company ABC.

To prepare you for this chapter’s questions, two figures provide background information related to Company ABC's operations. Figure Q3.1 offers a view of Company ABC’s Assumptions and Dashboard worksheet. Note that there are three cost-of-goods-sold components for Company ABC’s desks: (1) desk top, (2) desk body, and (3) assembly and labor. Figure Q3.2 presents a view of Company ABC’s Unit Sales and Price Budget,
1. Given the information regarding Company ABC, build a Cost-of-Goods-Sold Budget for Company ABC.

2. Based on the information presented and the Cost-of-Goods-Sold Budget that you built in Question 1, build an Inventory Budget for Company ABC. Use the days inventory approach outlined in this chapter and use the assumptions regarding days inventory shown in Figure Q3.1. Furthermore, assume that Company ABC’s desired ending inventory for 4Q X6 is equal to the desired ending inventory for 3Q X6.

3. Build a Purchases Budget for Company ABC based on your work in Questions 1 and 2.

4. Build an Accounts Payable Budget for Company ABC based upon the Assumptions and Dashboard worksheet and your work in Questions 1–3. Assume that Company ABC started 1Q X6 with a beginning A/P balance of 0 (zero).

5. Based on your work in Questions 1–4 and the Assumptions and Dashboard worksheet, build a Disbursements for Purchases Budget for Company ABC.
This chapter covers the second set of cost components for the Operating Budget, specifically the Operating Expenses Budget. Operating expenses represent those expenses required to run, or operate, a business. These expenses typically include items such as salaries, research and development, and rent. Specific operating expenses vary from business to business and I will cover the operating expenses incurred by Napavale in this chapter. Figure 4.1 highlights the separate operating expense components of the Operating Budget in the context of the Master Budget.

Please note that operating expenses are different from the expenses listed in the Purchases budget from Step 4B in Chapter 3. It is helpful to divide operating expenses into two categories: variable and fixed. Variable operating expenses are those expenses that are directly influenced by other drivers, such as sales volume. Fixed operating expenses are those expenses that are not affected by drivers such as sales volume. I cover the concept of fixed versus variable expenses in Chapter 11.

As in Chapters 2 and 3, I will be using the Assumptions and Dashboard worksheet for Napavale to introduce and focus on important assumptions underlying Napavale’s financial model. The remainder of this chapter will cover the steps involved in the continued construction of the Assumptions and Dashboard worksheet and the operating expense elements of the Operating Budget.

**STEP 5A: HEADCOUNT BUDGET**

The Headcount Budget tracks both the projected number of employees by position and the projected salary by position. This is a very important budget as the headcount expenses, which are otherwise known as “salaries,” represent a significant portion of many business’s overall operating expenses.
**FIGURE 4.1** Separate Operating Expense Components of the Operating Budget in the Context of the Master Budget
Headcount Overview Worksheet

Figure 4.2 presents the assumptions underlying the Headcount Overview worksheet, the first of two headcount worksheets for Napavale that are drawn from the Assumptions and Dashboard worksheet. Note that Figure 4.2 highlights both the number of employees projected by position and the projected annualized base salary by position. Figure 4.3 shows the Headcount Overview worksheet, which includes a separate table that calculates the periodic Headcount Cost based on the projected annualized base salary and the number of accounting periods per year. (In Napavale’s case, this is four accounting periods per year as I am working with quarters as my accounting period.) Figure 4.4 offers an alternative view of the Headcount Overview worksheet in which the values and calculations underlying the worksheet are exposed and visible.
FIGURE 4.3  Headcount Overview Worksheet

FIGURE 4.4  Alternative View of the Headcount Overview Worksheet
The names of the input and output cells in the Assumptions and Dashboard worksheet are highlighted in Figure 4.5. Figure 4.6 offers a view of the names of the input and output cells in the Headcount Overview worksheet.

**Headcount Cost Worksheet**

The Headcount Cost worksheet, which is the second worksheet included in the Headcount Budget, calculates the periodic Headcount Costs based on the projected number of employees by position and the projected periodic cost per position. The only new assumption underlying the Headcount Cost worksheet is that of Napavale’s benefits rate. In addition to base salaries, companies often must pay taxes and employment benefit costs (such as health care costs). As such, I am modeling these benefits costs as an incremental percentage above the base salary projections for Napavale. Figure 4.7 highlights the benefits rate assumption using the Assumptions and Dashboard worksheet.
FIGURE 4.6  Names of the Input and Output Cells in the Headcount Overview Worksheet

FIGURE 4.7  Benefits Rate Assumption in the Assumptions and Dashboard Worksheet
FIGURE 4.8  Headcount Cost Worksheet

The Headcount Cost worksheet is presented in Figure 4.8. Figure 4.9 offers an alternative view of the Headcount Cost worksheet in which the values and calculations underlying the worksheet cells are exposed and visible.

The names of the input and output cells in the Assumptions and Dashboard worksheet are shown in Figure 4.10. The names of the input and output cells in the Headcount Cost worksheet are shown in Figure 4.11.
**FIGURE 4.10** Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet

**FIGURE 4.11** Names of the Input and Output Cells in the Headcount Cost Worksheet
STEP 5B: OPERATING EXPENSES BUDGET

The Operating Expenses Budget covers all of Napavale’s operating expenses (salary expenses, a component of operating expenses, are covered in Step 5A: Headcount Budget). For Napavale, operating expenses include rent, research and development, depreciation, and miscellaneous expenses, among others. Specific operating expenses will vary from business to business, but the expenses covered in this Step 5B are fairly typical for product-oriented companies such as Napavale.

Please note that I am not entering any values into the depreciation line item at this point. Depreciation is an expense that is based on the Capital Budget, which is covered in Chapter 6. Once the depreciation projections have been calculated for Napavale in Chapter 6, I will revisit the Operating Expenses Budget with the inclusion of the depreciation expense projections.

Figure 4.12 highlights the assumptions underlying the operating expenses for Napavale from the Assumptions and Dashboard worksheet. The

FIGURE 4.12 Assumptions Underlying the Operating Expenses from the Assumptions and Dashboard Worksheet
Operating Expenses Budget is presented in Figure 4.13. Figure 4.14 offers an alternative view of the Operating Expenses Budget in which the values and formulas underlying the worksheet cells are exposed and visible.

The names of the input and output cells in the Assumptions and Dashboard worksheet are shown in Figure 4.15. Figure 4.16 offers a view of the names of the input and output cells in the Operating Expenses Budget.
Operating Budget—Operating Expenses

FIGURE 4.15 Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet

FIGURE 4.16 Names of the Input and Output Cells in the Operating Expenses Budget
STEP 5C: DISBURSEMENTS FOR OPERATING EXPENSES BUDGET

The Disbursements for Operating Expenses Budget reconciles the accrual-based values from Steps 5A and 5B to cash values. Remember that Napavale’s operating expenses include both the headcount expenses calculated in Step 5A and the other operating expenses calculated in Step 5B. As there are no new assumptions underlying the Disbursements for Operating Expenses Budget, I will not present a view of the Assumptions and Dashboard worksheet at this point.

I am assuming Napavale disburses payments for its operating expenses in the periods in which such operating expenses occur. Note that I am treating disbursements for purchases (covered in Chapter 3) separately from disbursements for operating expenses. More specifically, my assumptions regarding days payable in Chapter 3 relate to purchases of goods that will eventually be sold to customers; my assumptions regarding the disbursement for operating expenses are treated as a separate category of disbursements.

As with the Disbursements for Purchases Budget covered in Step 4C in Chapter 3, the Disbursements for Operating Expenses Budget ties into the creation of the Cash Budget, which is covered in Chapter 6. I will assume that Napavale disburses 100 percent of its operating expenses in the period in which such expenses are incurred.

The Disbursements for Operating Expenses Budget is presented in Figure 4.17. Figure 4.18 presents an alternative view of the Disbursements for Operating Expenses Budget in which the formulas underlying the values

Figure 4.17  Disbursements for Operating Expenses Budget
FIGURE 4.18 Alternative View of the Disbursements for Operating Expenses Budget

are exposed. Figure 4.19 offers a view of the names of the input and output cells in the Disbursements for Operating Expenses Budget.

Steps 1 through 5C in the Master Budget building process, covered in Chapters 2–4, provide nearly all of the required information to build a budgeted Income Statement (from operations). I need to add another line item, interest expense, to complete this budgeted Income Statement, which I will cover in Chapter 6.

FIGURE 4.19 Names of the Input and Output Cells in the Disbursements for Operating Expenses Budget
QUESTIONS

Each of the questions for this chapter relates to a hypothetical company named Company DEF. Company DEF sells functional steering wheels to automobile manufacturers. As such, Company DEF is a product-oriented (as opposed to a service-oriented) business. Assume that company DEF disburses 100 percent of its operating expenses in the period in which such expenses are incurred. The questions for this chapter will address fiscal year X4 on a quarterly basis (four specific quarters, 1Q–4Q for year X4).

The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to build the schedules discussed in this chapter for Company DEF.

To prepare you for this chapter’s questions, several figures provide background information related to Company DEF’s operations. Figure Q4.1

![Figure Q4.1](image)
Operating Budget—Operating Expenses

FIGURE Q4.2 Company DEF’s Unit Sales and Price Budget

offers a view of a portion of Company DEF’s Assumptions and Dashboard worksheet. Note that there are three cost-of-goods-sold components for Company DEF’s steering wheels: (1) wheel frame, (2) air bag, and (3) assembly and labor.

Figure Q4.2 presents a view of Company DEF’s Unit Sales and Price Budget, Sales Composition Budget, Cash Collections from Customers Budget, and Accounts Receivable Budget. Company DEF’s Cost-of-Goods-Sold Budget is shown in Figure Q4.3. Figure Q4.4 presents a view of Company
FIGURE Q4.4  Company DEF’s Inventory Budget, Purchases Budget, Disbursements for Purchases Budget, and Accounts Payable Budget

DEF’s Inventory Budget, Purchases Budget, Disbursements for Purchases Budget, and Accounts Payable Budget.

1. Given the information regarding Company DEF, build a Headcount Overview worksheet for Company DEF.
2. Based on the information presented and the headcount worksheet that you built in Question 1, build a Headcount Cost worksheet for Company DEF.
3. Build an Operating Expenses Budget for Company DEF based on the information presented and your work in Questions 1 and 2. Note that you will not be able to enter any values into the depreciation line item for the Operating Expenses Budget, as depreciation is based on the Capital Budget (which is not covered in this chapter or in the questions for this chapter).
4. Based on the information presented and your work in Questions 1–3, build a Disbursements for Operating Expenses Budget for Company DEF.
This chapter covers the Budgeted Statement of Income, otherwise known as the Income Statement. The Income Statement (also called the “P&L” by financial professionals) is a central component of a financial model. The ultimate output of the Income Statement is known as “net income.” Net income represents the difference between a business’s revenues and a business’s expenses. Figure 5.1 highlights the Budgeted Statement of Income and its relative position in the Master Budget hierarchy.

**STEP 6: BUDGETED STATEMENT OF INCOME**

The Budgeted Statement of Income combines elements from several different schedules on which I have worked thus far for Napavale. More specifically, the Income Statement draws from the Unit Sales Budget, Headcount Budget, and the Operating Expenses Budget.

Copying the sales and cost-of-goods-sold projections for Napavale into the Income Statement worksheet is the first step in building the Budgeted Statement of Income. Figure 5.2 shows the first section of the Income Statement, highlighting the sales and cost-of-goods-sold projections in addition to the resultant gross profit projections. Remember that gross profit is calculated as sales – cost of goods sold.

As I have indicated, the proper linking of information between worksheets is essential at all stages of building a financial model, and I am going to make frequent references to alternative views of worksheets in which the values and formulas contained within each cell are exposed for viewing and to views of the worksheets in which the names of the input and outputs cells are highlighted. In so doing, it should be easier to follow the extensive references and linkages between worksheets.
As I have discussed in previous chapters, I am naming all of the important cells in Napavale’s financial model. Each of these names is available across all worksheets—in other words, I am free to reference a cell named “Sales1Q” in any and all worksheets in my Napavale financial model workbook.
Figure 5.3 offers an alternative view of the first section of the Income Statement in which the values and formulas underlying the sales, cost-of-goods-sold, and gross margin projections are all exposed and visible. A view of the Income Statement in which the names of the input and output cells are shown is presented in Figure 5.4. “GrossP” is an abbreviation for “Gross Profit” in Figure 5.4.

Copying the salaries projections for Napavale into the Income Statement worksheet is the next step in building the Budgeted Statement of Income. The salaries projections flow out of the Headcount Cost worksheet that I built in Chapter 4. Figure 5.5 shows the inclusion of this line item in the Income Statement. An alternative view of the evolving Income Statement is presented in Figure 5.6. This view exposes the contents of the worksheet cells. Figure 5.7 offers a view of the Income Statement in which the names of the input and output cells are shown. Note that this is the same worksheet as presented in Figure 5.4.

The next step in building the Income Statement is to copy the remaining elements of the Operating Expenses Budget (other than (1) salaries, as I have just copied these values into the Income Statement as shown in Figures 5.5 through 5.7; (2) taxes, which I cover later in this chapter; and
FIGURE 5.3  Alternative View of the First Section of the Income Statement

FIGURE 5.4  Names of the Input and Output Cells in the Income Statement
FIGURE 5.5   Income Statement

FIGURE 5.6   Alternative View of the Income Statement
FIGURE 5.7  Names of the Input and Output Cells in the Income Statement

(3) depreciation, which I cover in Chapter 6) into the Income Statement worksheet. Figure 5.8 highlights the inclusion of these additional other operating expense items into the Income Statement.

As you can see in Figure 5.8, there is a line entitled “income from operations” in the Income Statement. Income from operations is calculated as gross profit – operating expenses. As discussed in Chapter 4, operating expenses represent the costs required to operate a business. Figure 5.9 offers an alternative view of the growing Income Statement worksheet in which the values and formulas underlying the worksheet cells are exposed and visible. Figure 5.10 shows the names of the input and output cells in the Income Statement worksheet.

Please note that the depreciation line item does not contain any values yet. As discussed in Chapter 4, depreciation is an operating expense that is derived from the Capital Expenditures Budget, which is covered in Chapter 6. Financial models represent a set of highly integrated calculations—I am covering each of these calculations in as serial, or straightforward, a manner as possible. In this case, the vast majority of the elements of the Income Statement have been calculated. As I mentioned, I will cover the calculation of depreciation expense in Chapter 6. I will present a complete view of
FIGURE 5.8  Income Statement

FIGURE 5.9  Alternative View of the Income Statement
Interest expense, an item which I will also calculate in Chapter 6, represents expenses associated with borrowed funds. If a business borrows money, it is often required to pay periodic interest on these borrowed funds. Interest expense represents these expenses. I will cover interest expense in Chapter 6 as well.

Figure 5.11 shows the Income Statement with the addition of a calculation for an item entitled “taxable income.” Taxable income is calculated as income from operations – interest expense. Figure 5.12 offers an alternative view of the Income Statement in which the values and underlying formulas in the worksheet cells are exposed and visible. The names of the input and output cells in the Income Statement are shown in Figure 5.13.

Determining the periodic tax expense for Napavale represents the final calculation on the Income Statement. While calculating taxes may appear to be a simple exercise—multiply the taxable income by a tax rate—accounting for taxes is actually a complex exercise. Given the scope of this book, I am going to address the issue of taxes in a very simple and straightforward manner. Entire books have been written that address the issue...
### Operating Budget—Income Statement

#### FIGURE 5.11 Income Statement

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$1,000,000</td>
<td>$1,440,000</td>
<td>$1,932,000</td>
<td>$2,520,000</td>
<td>$6,892,000</td>
</tr>
<tr>
<td>Cost of goods sold</td>
<td>200,000</td>
<td>291,000</td>
<td>373,800</td>
<td>462,000</td>
<td>1,326,800</td>
</tr>
<tr>
<td>Gross profit</td>
<td>$800,000</td>
<td>$1,149,000</td>
<td>$1,558,200</td>
<td>$2,058,000</td>
<td>$5,555,200</td>
</tr>
<tr>
<td>Salaries</td>
<td>$470,400</td>
<td>$470,400</td>
<td>$683,600</td>
<td>$697,200</td>
<td>$2,301,600</td>
</tr>
<tr>
<td>Miscellaneous expenses</td>
<td>30,000</td>
<td>43,200</td>
<td>57,960</td>
<td>75,600</td>
<td>206,760</td>
</tr>
<tr>
<td>Research and development</td>
<td>70,000</td>
<td>100,800</td>
<td>154,560</td>
<td>201,600</td>
<td>526,960</td>
</tr>
<tr>
<td>Rent</td>
<td>20,000</td>
<td>20,000</td>
<td>20,000</td>
<td>20,000</td>
<td>80,000</td>
</tr>
<tr>
<td>Income from operations</td>
<td>$209,600</td>
<td>$514,600</td>
<td>$662,800</td>
<td>$1,063,600</td>
<td>$2,449,880</td>
</tr>
<tr>
<td>Interest expense</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Taxable income</td>
<td>$209,600</td>
<td>$514,600</td>
<td>$662,800</td>
<td>$1,063,600</td>
<td>$2,449,880</td>
</tr>
<tr>
<td>Tax expense</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Net income</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

#### FIGURE 5.12 Alternative View of the Income Statement

The alternative view of the income statement provides a different perspective, often showing the income statement components as formulas rather than direct values. This approach can be useful for understanding the calculations and relationships between different components of the income statement.
of income taxes; this book is not meant to cover income taxes in any detail.

I am modeling Napavale’s income taxes using the following formula:

\[
\text{tax expense} = \text{taxable income} \times \text{tax rate.}
\]

Please note that this is a very simplistic approach to income taxes that does not address the reality facing corporations today. If, for instance, you project negative taxable income for a specific period in your own financial model, you should modify this calculation to indicate a tax expense of zero as opposed to a negative tax expense. As Napavale’s taxable income is positive across all periods presented in the financial model presented in this book, negative taxable income is not an issue in this case.

Figure 5.14 shows the income tax rate assumption from the Assumptions and Dashboard worksheet. A view of the Income Statement, including the calculation of tax expense, is presented in Figure 5.15. Figure 5.16 presents an alternative view of the Income Statement in which the values and formulas underlying the worksheet cells are exposed and visible. The names of the input and output cells from the Assumptions and Dashboard worksheet are shown in Figure 5.17. Figure 5.18 offers a view of the names of the input and output cells in the Income Statement.
Operating Budget—Income Statement

**FIGURE 5.14** Income Tax Rate Assumptions from the Assumptions and Dashboard Worksheet

**FIGURE 5.15** Income Statement
FIGURE 5.16  Alternative View of the Income Statement

FIGURE 5.17  Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet
The next step in building Napavale’s financial model is to calculate the company’s net income. Net income is defined as taxable income – tax expense. Figure 5.19 offers a view of the Income Statement, which is now complete except for the calculation of depreciation expense and interest expense, both of which are covered in Chapter 6.
FIGURE 5.20  Alternative View of the Income Statement

Figure 5.20 offers an alternative view of the completed Income Statement in which the values and formulas in each cell are exposed and visible. The names associated with the input and outputs cells for the Assumptions and Dashboard worksheet are shown in Figure 5.21.

FIGURE 5.21  Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet
QUESTIONS

Each of the questions for this chapter relates to a hypothetical company named Company GHI. Company GHI sells stethoscopes to physicians. As such, Company GHI is a product-oriented (as opposed to a service-oriented) business. The questions for this chapter will address fiscal year X4 on a quarterly basis (four specific quarters, 1Q–4Q for year X4).

The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to build the schedules discussed in this chapter for Company GHI.

To prepare you for this chapter’s questions, several figures provide background information related to Company GHI’s operations. Figure Q5.1 offers a view of a portion of Company GHI’s Assumptions and Dashboard worksheet. Note that there are three cost-of-goods-sold components for

**FIGURE Q5.1** Company GHI’s Assumptions and Dashboard Worksheet
Company GHI’s stethoscopes: (1) casing, (2) sensing element, and (3) assembly and labor.

Figure Q5.2 presents a view of Company GHI’s Unit Sales and Price Budget, Sales Composition Budget, Cash Collections from Customers Budget, and Accounts Receivable Budget. Company GHI’s Cost-of-Goods-Sold Budget is shown in Figure Q5.3. Figure Q5.4 presents a view of Company GHI’s Inventory Budget, Purchases Budget, Disbursements for Purchases Budget, and Accounts Payable Budget. Company GHI’s Headcount Overview worksheet is shown in Figure Q5.5. Company GHI’s Headcount Cost worksheet is shown in Figure Q5.6. Figure Q5.7 offers a view of Company GHI’s Operating Expenses Budget and Disbursements for Operating Expenses Budget.

1. Given the information regarding Company GHI, build the first section of an Income Statement for Company GHI. This section should include sales, cost-of-goods-sold, and gross profit projections for Company GHI.

2. Given your work from Question 1 and the information presented, build an updated version of Company GHI’s Income Statement by inserting the salaries projections for Company GHI into the Income Statement.
3. Build an updated version of Company GHI’s Income Statement by adding in the projections for (i) miscellaneous expenses, (ii) research and development, and (iii) rent. Remember that the depreciation projections will not be added to the Income Statement until a Capital Budget is completed (which is not covered in the chapter or in the questions for
this chapter). Be sure to calculate Company GHI’s projected income from operations in the updated version of Company GHI’s Income Statement.

4. Build another updated version of Company GHI’s Income Statement by calculating the projected tax expenses for Company GHI. Assume that Company GHI will pay taxes if it generates positive taxable income and will not pay taxes if it does not generate positive taxable income. Be sure to include line items for taxable income and for net income in your updated Income Statement. Remember that the interest expense projection will not be added to the Income Statement until Chapter 6.
Operating Budget—Income Statement

**FIGURE Q5.6** Company GHI’s Headcount Cost Worksheet

**FIGURE Q5.7** Company GHI’s Operating Expenses Budget and Disbursements for Operating Expenses Budget
The Financial Budget represents the second of the two components of the Master Budget (the Operating Budget represents the first component) and includes the following components: the Capital Budget, the Cash Budget, and the budgeted Balance Sheet. In conjunction with the steps outlined in Chapters 2 through 5, this chapter represents the final step in building the Master Budget. Subsequent chapters in this book will cover topics such as the consolidated financial statements, free cash flows, and a variety of financial modeling tools and techniques. Figure 6.1 highlights the components of the Financial Budget and their relative position in the Master Budget hierarchy.

**STEP 7A: CAPITAL EXPENDITURES BUDGET**

The Capital Expenditures Budget (also know as the “CAPEX” budget) covers Napavale’s projected purchases of large items such as equipment and furniture. When a business purchases something such as a computer or a desk for its own use, it must decide if it will expense or capitalize such an item. While many accounting regulations and pronouncements surround this issue of expensing versus capitalizing purchased goods, I will cover this topic in a very general fashion. In basic terms, Napavale’s financial model assumes that large-value purchases, such as for furniture, are capitalized. When and if you build your own financial model, the issue of capitalization versus expensing is something you must address in a manner consistent with the business for which you are building a financial model. Figure 6.2 presents a view of the Assumptions and Dashboard worksheet in which my assumptions underlying Napavale’s projected capital expenditures are shown.
Note that I am including three line items for Napavale’s Capital Expenditures Budget: equipment (used for manufacturing and assembling Napavale’s products), furniture, and fixtures. These are broad categories for capital expenditures and you may choose to use different line items if and when you build your own financial model. Figure 6.3 presents a view of the Capital Expenditures Budget worksheet.
FIGURE 6.2  Assumptions and Dashboard Worksheet

FIGURE 6.3  Capital Expenditures Budget
Figure 6.4 offers an alternative view of the Capital Expenditures Budget worksheet in which the values and formulas underlying the cells in the worksheet are exposed and visible. Note that I continue to name each cell that contains an important value for ease of reference.

The names of the input and output cells in the Assumptions and Dashboard worksheet are shown in Figure 6.5. Figure 6.6 offers a view of the names of the input and output cells in the Capital Expenditures Budget worksheet.
STEP 7B: DISBURSEMENTS FOR CAPITAL EXPENDITURES BUDGET

The Disbursements for Capital Expenditures Budget reconciles the accrual values from Step 7A to cash figures. This schedule ties into the creation of the Cash Budget, which is covered later in this chapter. My financial model makes the assumption that Napavale disburses, or pays for, 100 percent of the current period’s capital expenditures purchases. This assumption is highlighted in the Assumptions and Dashboard worksheet in Figure 6.7. Note that I am treating the disbursements for capital expenditures in a fundamentally different way than I treated the disbursements for operating expenses in Chapter 4.

While I utilized the concept of “days payable” in Chapter 4 for the Disbursements for Operating Expenses Budget, I address the issue of linking disbursements for capital expenditures to the purchases projections for capital expenditures by assuming a certain percentage of a given period’s purchases are paid for, or disbursed, in that same period.

It is important to note that I am assuming all capital expenditures will be paid for in either the period in which the item underlying the capital expenditure is bought or in the following period. As such, all capital expenditure purchases are either paid for in the period in which they were purchased or
in the immediately subsequent period. This is not an issue in my financial model for Napavale as I am assuming all capital expenditure purchases are paid for in the period incurred, but you can modify this style of financial model to account for different assumptions.

This “percentage paid for in a given period” approach to linking accrual-based budget figures and actual cash disbursements for those purchases represents another approach to building a financial model as compared to the days payable approach highlighted in Chapter 4. I am presenting this percentage approach for the sake of reference. You should feel free to use whichever approach is most appropriate for your own financial models.

Figure 6.8 presents the Capital Expenditures Budget worksheet, which now includes projections for the disbursements for capital expenditures.

Figure 6.9 offers an alternative view of the Capital Expenditures Budget worksheet in which the values and formulas contained within the worksheet's cells are exposed. Due to the length of several of the formulas in this worksheet, only a few of the columns are shown in Figure 6.9. Based on the manner in which the “percentage disbursement” approach for capital expenditures works, I need to account for the payment of capital expenditures incurred in prior periods using the formulas shown in the rows in Figure 6.9.
FIGURE 6.8  Capital Expenditures Budget

The names of the input and output cells in the Assumptions and Dashboard worksheet are presented in Figure 6.10. Figure 6.11 offers a view of the names of the input and output cells in the Disbursements for Capital Expenditures Budget worksheet.

FIGURE 6.9  Alternative View of the Capital Expenditures Budget
STEP 7C: DEPRECIATION BUDGET

The Depreciation Budget addresses projected depreciation expenses for Napavale. When a business accounts for the purchase of an item as a capital expenditure, that item must be depreciated. The philosophy underlying the concept of depreciation is this: If a company purchases and capitalizes an asset, the benefits that accrue from that asset will be recognized over a
number of accounting periods in the future—that asset is depreciated over the expected period of benefit underlying the associated asset. Depreciation is an expense that appears as an operating expense in Napavale’s Operating Budget.

Depreciation expenses, when calculated using the “straight line” method, are calculated in the following manner: the beginning value of an asset/the number of periods of expected benefit. So, for example, if a company capitalizes an asset with a value of $100 and the company believes it will receive benefit from that asset for five accounting periods, the depreciation expense for each accounting period will be equal to $100/5, or $20. Figure 6.12 presents a view of the Assumptions and Dashboard worksheet in which the assumptions underlying depreciation for Napavale’s asset classes are shown.

The “depreciation multiplier” line items in Figure 6.12 represent the value by which capital expenditure purchases will be multiplied in each period over the purchases’ depreciable life. The product of this multiplication will equal the depreciation expense for each line item for each period. This process is covered in greater detail over the course of this chapter.

Figure 6.13 offers a view of Napavale’s Depreciation Budget and includes a line item that calculates the total depreciation expense for each period. Remember that this total depreciation expense flows directly into Napavale’s Income Statement from Step 6.
An alternative view of Napavale’s Depreciation Budget in which the values and formulas underlying the contents of each worksheet cell is presented in Figure 6.14. Note the references to the asset values and the depreciation multipliers in each calculation cell. Due to the length of some of the formulas in the worksheet shown in Figure 6.14, not all of the columns in the worksheet are visible.
Figure 6.15 shows the names of the input and output cells from the Assumptions and Dashboard worksheet. The names of the input and output cells in the Depreciation Budget worksheet are presented in Figure 6.16.

It is important to calculate the net effect (or total affect) of capitalized asset purchases and depreciation expenses on Napavale’s base of fixed assets. Fixed assets, which are calculated net of depreciation (or after subtracting

<table>
<thead>
<tr>
<th>A1</th>
<th>B1</th>
<th>C1</th>
<th>D1</th>
<th>E1</th>
<th>F1</th>
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<td></td>
<td>Tax rate</td>
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<tr>
<td>2</td>
<td>Capital Worksheet</td>
<td></td>
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<td></td>
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<tr>
<td>3</td>
<td>Equipment purchases</td>
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<td></td>
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<tr>
<td>4</td>
<td>Furniture purchases</td>
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<td></td>
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<tr>
<td>5</td>
<td>Fixtures purchases</td>
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<td></td>
</tr>
<tr>
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<td>CAPEX Disbursements</td>
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<td></td>
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<td></td>
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<tr>
<td>7</td>
<td>% of purchases paid for in purchase period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>8</td>
<td>Depreciation inputs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Equipment depreciable life (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Furniture depreciable life (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Fixtures depreciable life (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Equipment depreciation multiplier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Furniture depreciation multiplier</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>14</td>
<td>Fixtures depreciation multiplier</td>
<td></td>
<td></td>
<td></td>
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<td>15</td>
<td>Financial ratios</td>
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<tr>
<td></td>
<td>Valuation</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capitalization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 6.16 Names of the Input and Output Cells in the Depreciation Budget
Depreciation expenses), appear on Napavale’s Balance Sheet; I discuss the construction of the Balance Sheet in Chapter 7.

The calculation of Napavale’s fixed assets net of depreciation incorporates two elements: Napavale’s cumulative capital expenditures and accumulated depreciation over the time horizon of the financial model. Figure 6.17 offers a view of this calculation from the Capital Budget worksheet. Note that I have also added a calculation to determine any difference between Napavale’s capital expenditure expenses and disbursements for capital expenditures. This calculation will influence the Balance Sheet in Chapter 7.

Figure 6.18 exposes the contents of the worksheet cells for this calculation from the Capital Budget worksheet. The calculation of fixed assets net of depreciation for each time period is equal to: the running total of Napavale’s capital expenditures – the running total of Napavale’s depreciation. Note that several of the columns in the worksheet shown in Figure 6.18 are not displayed due to the length of the formulas underlying the cells in the worksheet. The evolving list of names in the Depreciation Budget worksheet is shown in Figure 6.19.
### FIGURE 6.18 Alternative View of the Capital Budget

### FIGURE 6.19 Names of the Input and Output Cells in the Depreciation Budget
As indicated in Chapter 5, I now present an updated view of Napavale’s Income Statement, which now includes the line for depreciation expense. The only remaining line item that requires completion is that of “interest expense,” which will be covered later in this chapter. Figure 6.20 offers a view of Napavale’s updated Income Statement.

For the sake of reference, Figure 6.21 offers an alternative view of Napavale’s updated Income Statement in which the values and formulas
underlying each cell are exposed and visible. The names underlying the Income Statement worksheet are shown in Figure 6.22.

**STEP 8: CASH BUDGET**

The Cash Budget, which tracks Napavale’s cash balance at the beginning and ending of each accounting period, is an important component of the Master Budget. As is often said in finance, “cash is king,” and it is essential to maintain a detailed view of a company’s cash balance.

The Cash Budget draws on information from several schedules, including the Income Statement and the Assumptions and Dashboard worksheet. Figure 6.23 presents several input variables from the Assumptions and Dashboard worksheet that I have not yet covered for Napavale; these variables will affect the Cash Budget.

As the Cash Budget consists of several sections, I will cover each section separately. Figure 6.24 shows the first section of the Cash Budget, which includes Napavale’s beginning cash balance and cash collections for each period. Figure 6.25 offers another view of the Cash Budget in which the values of the worksheet’s cells are exposed. The names underlying the input
FIGURE 6.23  Assumptions and Dashboard Worksheet

FIGURE 6.24  First Section of the Cash Budget
and output cells in the Assumptions and Dashboard worksheet are shown in Figure 6.26. Figure 6.27 highlights the names of the input and output cells from the Cash Budget itself.

The next section of the Cash Budget is presented in Figure 6.28. This section identifies Napavale’s cash disbursements for each period and calculates the excess or deficiency of total cash available compared to the total cash required by the business (as stated on the Assumptions and Dashboard worksheet) before any financing takes place. Note that the “minimum cash balance” desired may be influenced by loan covenants if a company borrows money. Figure 6.29 offers an alternative view of the evolving Cash Budget in which the values and formulas in the worksheet cells are exposed and visible.

Note the formulas underlying the calculation of “total cash needed” and “excess (deficiency) of total cash available over total cash needed before financing.” These calculations draw from both Napavale’s projected cash receipts and cash disbursements as well as from the assumption underlying the “minimum cash balance desired.” The evolving lists of names of the input and output cells in the Cash Budget are shown in Figure 6.30.

A final calculation to determine the “loan value used for interest calculations” in the Assumptions and Dashboard worksheet is shown in Figure 6.31. This calculation is used to simplify the calculation of periodic interest expenses associated with Napavale’s borrowings (if any) for the Cash
FIGURE 6.26  Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet

FIGURE 6.27  Names of the Input and Output Cells in the Cash Budget
THE MASTER BUDGET

FIGURE 6.28  Next Section of the Cash Budget

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASH BUDGET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beginning cash balance</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>Cash receipts</td>
<td>$866,667</td>
<td>$1,881,333</td>
<td>$1,866,400</td>
<td>$2,441,600</td>
<td>$6,556,000</td>
</tr>
<tr>
<td>Collections from customers</td>
<td>$294,489</td>
<td>$356,400</td>
<td>$439,133</td>
<td>$1,275,467</td>
<td></td>
</tr>
<tr>
<td>Total cash available, before financing</td>
<td>$1,134,156</td>
<td>$2,237,833</td>
<td>$3,185,533</td>
<td>$4,680,067</td>
<td></td>
</tr>
<tr>
<td>Cash disbursements</td>
<td>$174,444</td>
<td>$294,489</td>
<td>$356,400</td>
<td>$439,133</td>
<td>$1,275,467</td>
</tr>
<tr>
<td>Operating expenses</td>
<td>$890,450</td>
<td>$834,400</td>
<td>$896,120</td>
<td>$984,400</td>
<td>$3,115,320</td>
</tr>
<tr>
<td>Tax expense</td>
<td>$72,551</td>
<td>$178,491</td>
<td>$229,300</td>
<td>$369,023</td>
<td>$849,364</td>
</tr>
<tr>
<td>Capital expenditures</td>
<td>$45,000</td>
<td>$45,000</td>
<td>$45,000</td>
<td>$45,000</td>
<td>$180,000</td>
</tr>
<tr>
<td>Total disbursements</td>
<td>$884,395</td>
<td>$1,102,380</td>
<td>$1,535,820</td>
<td>$1,847,556</td>
<td>$5,420,151</td>
</tr>
<tr>
<td>Minimum cash balance desired</td>
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<td>$250,000</td>
<td>$250,000</td>
<td>$250,000</td>
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<tr>
<td>Total cash needed</td>
<td>$1,134,395</td>
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<tr>
<td>Excess (deficiency) of total cash available over</td>
<td>$87,728</td>
<td>$21,047</td>
<td>$80,560</td>
<td>$344,044</td>
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</tr>
<tr>
<td>Total cash needed before financing</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Financing</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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</tr>
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<td>Equity investment</td>
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<td>N/A</td>
<td>N/A</td>
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<tr>
<td>Borrowing</td>
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<td>N/A</td>
<td>N/A</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Interest</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Total cash increase (decrease) from financing</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Ending cash balance</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

FIGURE 6.29  Alternative View of the Next Section of the Cash Budget
FIGURE 6.30  Names of the Input and Output Cells in the Cash Budget

![Image of Cash Budget Table]

FIGURE 6.31  Assumptions and Dashboard Worksheet

![Image of Assumptions and Dashboard Worksheet]
The Master Budget. An alternative view of the Assumptions and Dashboard worksheet is presented in Figure 6.32 to highlight the calculations underlying the periodic interest expense figures mentioned in Figure 6.31.

The final section of the Cash Budget is presented in Figure 6.33. This section incorporates assumptions regarding the equity investments into Napavale, Napavale’s borrowings, repayments, and interest payments. This section also calculates the change in Napavale’s cash balance due to financing (including equity and debt activity) as well as Napavale’s ending cash balance for each period.

Please note that for the calculation of interest on borrowings, Napavale’s financial model calculates interest only if there is at least one period separating a borrowing and a repayment. If money is borrowed in one period and repaid in the subsequent period, one period of interest is computed for that borrowing. There are many ways to calculate interest on borrowings; my approach is simple and straightforward.

The ending cash balance is a very important figure that flows directly into Napavale’s Balance Sheet, covered in Chapter 7. Figure 6.34 offers an alternative view of the Cash Budget in which the values and formulas contained within the cells in the worksheet are exposed and visible.
Financial Budget—Capital Budget and Cash Budget

FIGURE 6.33 Final Section of the Cash Budget

FIGURE 6.34 Alternative View of the Final Section of the Cash Budget
Figure 6.35 offers a view of the names of the input and output cells from the Assumptions and Dashboard worksheet. The final list of the names of the input and output cells from the Cash Budget is presented in Figure 6.36.

Now that I have calculated Napavale’s periodic interest expenses, the last step in this chapter is to present the completed Income Statement. Figure 6.37 presents a view of the completed Income Statement, which now includes projections for interest expense.
I named the cells associated with the periodic interest expense figures using the Cash Budget worksheet—these projections flow into the completed Income Statement. Take careful note of the fact that the “named” interest expense figures are negative values, so I have to place a negative sign in front of the referenced value in the Income Statement. Figure 6.38 presents a view of the Cash Budget worksheet with the names of the cells indicated.
An alternative view of the completed Income Statement is presented in Figure 6.39 in which the values and formulas underlying the worksheet cells are exposed and visible.

QUESTIONS

Each of the questions for this chapter relate to a hypothetical company named Company JKL. Company JKL sells rain jackets to consumers. As such, Company JKL is a product-oriented (as opposed to a service-oriented) business. The questions for this chapter will address fiscal year X4 on a quarterly basis (four specific quarters, 1Q–4Q for year X4).

The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to build the schedules discussed in this chapter for Company JKL.

To prepare you for this chapter’s questions, several figures provide background information related to Company JKL’s operations. Figure Q6.1 offers a view of a portion of Company JKL’s Assumptions and Dashboard worksheet. Note that there are three cost-of-goods-sold components for Company JKL’s rain jackets: (1) exterior, (2) interior, and (3) assembly and labor.

Figure Q6.2 presents a view of Company JKL’s Unit Sales and Price Budget, Sales Composition Budget, Cash Collections from Customers Budget, and Accounts Receivable Budget. Company JKL’s Cost-of-Goods-Sold Budget is shown in Figure Q6.3. Figure Q6.4 presents a view of Company JKL’s Inventory Budget, Purchases Budget, Disbursements for Purchases Budget,
**Figure Q6.1** Company JKL’s Assumptions and Dashboard Worksheet

**Figure Q6.2** Company JKL’s Unit Sales and Price Budget
FIGURE Q6.3 Company JKL’s Cost-of-Goods-Sold Budget

and Accounts Payable Budget. Company JKL’s Headcount Overview worksheet is shown in Figure Q6.5. Company JKL’s Headcount Cost worksheet is shown in Figure Q6.6. Figure Q6.7 offers a view of Company JKL’s Operating Expenses Budget and Disbursements for Operating Expenses Budget. Figure Q6.8 presents a view of Company JKL’s Income Statement (except for the depreciation and interest expense calculations, both of which will be covered later in the questions for this chapter).

FIGURE Q6.4 Company JKL’s Inventory Budget, Purchases Budget, Disbursements for Purchases Budget, and Accounts Payable Budget
### FIGURE Q6.5  Company JKL’s Headcount Overview Worksheet

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEADCOUNT BUDGET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headcount Budget</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of employees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chief Executive Officer</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Chief Financial Officer</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>VP. Engineering</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>VP. Sales &amp; Marketing</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>VP. Business Development</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Controller/Accountant</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Administrative Assistant</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>12</td>
<td>16</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Periodic base salaries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chief Executive Officer</td>
<td>$47,500</td>
<td>$47,500</td>
<td>$47,500</td>
<td>$47,500</td>
<td>$190,000</td>
</tr>
<tr>
<td>Chief Financial Officer</td>
<td>$42,500</td>
<td>$42,500</td>
<td>$42,500</td>
<td>$42,500</td>
<td>$170,000</td>
</tr>
<tr>
<td>VP. Engineering</td>
<td>$42,500</td>
<td>$42,500</td>
<td>$42,500</td>
<td>$42,500</td>
<td>$170,000</td>
</tr>
<tr>
<td>VP. Sales &amp; Marketing</td>
<td>$36,250</td>
<td>$36,250</td>
<td>$36,250</td>
<td>$36,250</td>
<td>$145,000</td>
</tr>
<tr>
<td>VP. Business Development</td>
<td>$32,500</td>
<td>$32,500</td>
<td>$32,500</td>
<td>$32,500</td>
<td>$130,000</td>
</tr>
<tr>
<td>Salesperson</td>
<td>$27,500</td>
<td>$27,500</td>
<td>$27,500</td>
<td>$27,500</td>
<td>$110,000</td>
</tr>
<tr>
<td>Hardware Engineer</td>
<td>$25,000</td>
<td>$25,000</td>
<td>$25,000</td>
<td>$25,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Controller/Accountant</td>
<td>$12,500</td>
<td>$12,500</td>
<td>$12,500</td>
<td>$12,500</td>
<td>$50,000</td>
</tr>
<tr>
<td>Administrative Assistant</td>
<td>$8,125</td>
<td>$8,125</td>
<td>$8,125</td>
<td>$8,125</td>
<td>$32,500</td>
</tr>
<tr>
<td>Total</td>
<td>$274,375</td>
<td>$274,375</td>
<td>$274,375</td>
<td>$274,375</td>
<td>$1,097,500</td>
</tr>
</tbody>
</table>

### FIGURE Q6.6  Company JKL’s Headcount Cost Worksheet

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEADCOUNT BUDGET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headcount Budget</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Periodic salary expense (base)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chief Executive Officer</td>
<td>$47,500</td>
<td>$47,500</td>
<td>$47,500</td>
<td>$47,500</td>
<td>$190,000</td>
</tr>
<tr>
<td>Chief Financial Officer</td>
<td>$42,500</td>
<td>$42,500</td>
<td>$42,500</td>
<td>$42,500</td>
<td>$170,000</td>
</tr>
<tr>
<td>VP. Engineering</td>
<td>$42,500</td>
<td>$42,500</td>
<td>$42,500</td>
<td>$42,500</td>
<td>$170,000</td>
</tr>
<tr>
<td>VP. Sales &amp; Marketing</td>
<td>$36,250</td>
<td>$36,250</td>
<td>$36,250</td>
<td>$36,250</td>
<td>$145,000</td>
</tr>
<tr>
<td>VP. Business Development</td>
<td>$32,500</td>
<td>$32,500</td>
<td>$32,500</td>
<td>$32,500</td>
<td>$130,000</td>
</tr>
<tr>
<td>Salesperson</td>
<td>$27,500</td>
<td>$27,500</td>
<td>$27,500</td>
<td>$27,500</td>
<td>$110,000</td>
</tr>
<tr>
<td>Hardware Engineer</td>
<td>$25,000</td>
<td>$25,000</td>
<td>$25,000</td>
<td>$25,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Controller/Accountant</td>
<td>$12,500</td>
<td>$12,500</td>
<td>$12,500</td>
<td>$12,500</td>
<td>$50,000</td>
</tr>
<tr>
<td>Administrative Assistant</td>
<td>$8,125</td>
<td>$8,125</td>
<td>$8,125</td>
<td>$8,125</td>
<td>$32,500</td>
</tr>
<tr>
<td>Total</td>
<td>$351,875</td>
<td>$351,875</td>
<td>$432,500</td>
<td>$460,000</td>
<td>$1,596,250</td>
</tr>
<tr>
<td>Total (with benefits)</td>
<td>$399,378</td>
<td>$399,378</td>
<td>$490,888</td>
<td>$522,100</td>
<td>$1,811,744</td>
</tr>
</tbody>
</table>
FIGURE Q6.7  Company JKL’s Operating Expenses Budget and Disbursements for Operating Expenses Budget

FIGURE Q6.8  Company JKL’s Income Statement
1. Given the information regarding Company JKL, build the Capital Expenditures Budget for Company JKL. Note that this Capital Budget should include projections for three separate items: equipment, furniture, and fixtures.

2. Based on your work in Question 1 and the information presented, build a Disbursements for Capital Expenditures for Company JKL. Use the “percentage paid for a given period” approach as described in this chapter to project the disbursements associated with capital expenditures. The relevant assumptions related to these percentage assumptions are shown in Company JKL’s Assumptions and Dashboard worksheet (Figure Q6.1).

3. Build a Depreciation Budget for Company JKL based on the information presented and your work in Questions 1 and 2. Use the same approach outlined in this chapter (using depreciation multipliers) to build the Depreciation Budget for Company JKL. Include a calculation of Company JKL’s fixed assets, net of depreciation for each accounting period (quarter) in the Depreciation Budget.

4. Based on your work in Questions 1–3 and the information presented, build the first section of Company JKL’s Cash Budget, which should include the beginning cash balance and cash collections for each accounting period (quarter) for Company JKL.

5. Build an updated Cash Budget for Company JKL in which the cash disbursements for each accounting period (quarter) and the excess or deficiency of total cash available compared to the total cash required before any financing takes place are calculated for Company JKL.

6. Build an updated Cash Budget for Company JKL in which the projections regarding equity investments, borrowings, repayment of borrowings, and interest expenses are included. Be sure to calculate the ending cash balance for Company JKL for each accounting period (quarter) as well.

7. Complete Company JKL’s Income Statement by adding in the depreciation and interest expense projections for each accounting period (quarter).
This chapter covers the construction of Napavale’s Balance Sheet. Building the Balance Sheet, which provides a view of Napavale’s sources and uses of funds, represents the final step in the Master Budget framework. Figure 7.1 highlights the Budgeted Balance Sheet and its relative position in the Master Budget hierarchy.

STEP 9: BUDGETED BALANCE SHEET

The budgeted Balance Sheet incorporates components from several different schedules, including the Cash Budget, Accounts Receivable Budget, Inventory Budget, and Income Statement, among several others. While it is not a specific line item or account on the Balance Sheet, I also introduce and discuss the concept of “net working capital” later in this chapter. Net working capital calculations flow directly into the calculation of free cash flows, discussed in Chapter 9.

It is worth noting that a balance sheet offers a tangible representation of the central accounting identity: Assets = Liabilities + Owners’ Equity. This equation will always balance; if it does not, there is an error in a calculation underlying the Balance Sheet. In general terms, there are two potential sources of funds for a business: Liabilities or Owners’ Equity. Also in general terms, there is one use of funds for a business: Assets. While this book is not intended to cover (and does not cover) accounting concepts, I will try to point out major concepts at the appropriate points, such as the central accounting identity mentioned above.

As in previous chapters, I make frequent references to alternative views of worksheets in which the values and formulas contained within each cell are exposed for viewing and to the names of the input and output cells across
FIGURE 7.1 Budgeted Balance Sheet and the Master Budget
various worksheets. In so doing, it should be easier to follow the extensive references and linkages between worksheets.

The first step in building the Balance Sheet is to identify and paste the elements of the Asset side (also called the “left-hand side,” as Assets are often shown to the left of the Liabilities and Owners’ Equity accounts of a balance sheet) of the Balance Sheet into a worksheet. In Napavale’s case, I am including the following accounts in Assets: cash, accounts receivable, inventory, and fixed Assets, net. Depending on the nature of your business, the components of your Assets (and Liabilities and Owners’ Equity for that matter) may vary. Figure 7.2 presents the Asset components of Napavale’s Balance Sheet.

Figure 7.3 offers an alternative view of the asset components of the Balance Sheet in which the values and formulas in the worksheet cells are exposed and visible. I have calculated a total for the Asset components of the Balance Sheet in Figures 7.2 and 7.3. The names of the input and output cells underlying the Balance Sheet are shown in Figure 7.4.

![Figure 7.2 Asset Components of the Balance Sheet](image-url)
FIGURE 7.3  Alternative View of the Asset Components of the Balance Sheet

FIGURE 7.4  Names of the Input and Output Cells in the Balance Sheet
Figure 7.5 Liabilities Components of the Balance Sheet

Note the various sources associated with each component of the Assets identified in Napavale’s Balance Sheet: cash (Cash Budget), accounts receivable (Accounts Receivable Budget), inventory (Inventory Budget), and fixed Assets, net (Depreciation Budget).

Identifying and pasting the elements of the Liabilities section of the Balance Sheet represents the next step in building Napavale’s Balance Sheet. The following Liabilities are included in Napavale’s Balance Sheet: accounts payable, payables from Capital Budget, and loan payable. Figure 7.5 presents a view of the Balance Sheet with the addition of the components of the Liabilities section.

Figure 7.6 highlights the values and formulas underlying the worksheet cells by exposing the cell contents for viewing. A total for the Liabilities components of the Balance Sheet is calculated in Figures 7.5 and 7.6. The names of the input and output cells underlying the evolving Balance Sheet are shown in Figure 7.7.

Note the sources of each of the accounts in the Liabilities section of Napavale’s Balance Sheet: accounts payable (Accounts Payable Budget),
FIGURE 7.6  Alternative View of the Liabilities Components of the Balance Sheet

FIGURE 7.7  Names of the Input and Output Cells in the Balance Sheet
payables from capital budget (Capital Budget), and loan payable (Assumptions and Dashboard Worksheet).

The final step in building Napavale’s Balance Sheet is to identify and paste the elements of the Owners’ Equity section of the Balance Sheet into the Balance Sheet worksheet. I have included a common stock and a retained earnings account in the Owners’ Equity section of Napavale’s Balance Sheet. The common stock account represents equity investments into Napavale and the retained earnings account represents, broadly speaking, a “running total” of Napavale’s net income over time.

Figure 7.8 shows Napavale’s Balance Sheet with the inclusion of the Owners’ Equity section. Calculations for total Owners’ Equity as well as a total for Liabilities + Owners’ Equity are included in Figure 7.8 as well. Remember that in a “balanced” Balance Sheet, Assets = Liabilities + Owners’ Equity. An alternative view of Napavale’s completed Balance Sheet, in which the values and formulas contained within the worksheet cells are exposed for viewing, is presented in Figure 7.9. Figure 7.10 presents a view of the names of the input and output cells underlying the evolving Balance Sheet for Napavale.

![Figure 7.8 Balance Sheet](image-url)
Financial Budget—Balance Sheet

**FIGURE 7.9** Alternative View of the Balance Sheet

**FIGURE 7.10** Names of the Input and Output Cells in the Balance Sheet
Now that the Balance Sheet is completed, I will calculate an item known as “net working capital.” Net working capital, which is defined as: current Assets – current Liabilities, represents a company’s surplus (or deficiency) of current Assets as compared to current Liabilities. Broadly speaking, current Assets and current Liabilities are defined as those Assets and Liabilities that will come due within the accounting period in which they are classified as current. Net working capital is an important metric that will come into play in Chapter 9 when I cover free cash flows.

The first step in calculating net working capital is to identify Napavale’s current Assets and current Liabilities. For Napavale, I am defining accounts receivable and inventory as current Assets and accounts payable as current Liabilities. Note that I am not including “payables from capital budget” as a component of current Liabilities. My assumption is that any payables associated with capital purchases would represent longer-term liabilities, which typically are not included in net working capital calculations.

In addition, I am not considering the loan payable as a source of required funding for Napavale’s day-to-day operations. Loan payable, therefore, is not included in the calculation of net working capital.

Different users often include different accounts in the calculation of net working capital. Many people often include the cash account in current Assets; I am not doing so here as Napavale is a recently formed business and its cash balance is a direct result of the formation capital that was invested into the business. For more stable and established businesses, including cash in a calculation of net working capital may indeed make sense.

Figure 7.11 presents a worksheet in which the components of net working capital are identified and net working capital itself is calculated as current Assets – current Liabilities. Note that net working capital can be either a positive or a negative number.

Figure 7.12 offers an alternative view of the worksheet presented in Figure 7.11 by exposing the values and formulas underlying the worksheet cells. The names of the input and output cells underlying the components of net working capital are presented in Figure 7.13.

As will be explained in Chapter 9 in the coverage of free cash flows, it is the change in net working capital across accounting periods that is of particular interest. As such, the change in net working capital across accounting periods is presented in Figure 7.14. An alternative view of the change in net working capital calculation, in which the values and formulas underlying the worksheet cells are exposed, is presented in Figure 7.15. Figure 7.16 offers a view of the names of the input and output cells underlying the calculation of the change in net working capital.
FIGURE 7.11 Calculation of Net Working Capital

FIGURE 7.12 Alternative View of the Calculation of Net Working Capital
### FIGURE 7.13  Names of the Input and Output Cells
Underlying the Calculation of Net Working Capital

<table>
<thead>
<tr>
<th>Period</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Q X4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2Q X4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Q X4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4Q X4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>X4</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

### FIGURE 7.14  Calculation of the Change in Net Working Capital

<table>
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<tr>
<th>Period</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
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<tr>
<td>1Q X4</td>
<td>$982,272</td>
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<td>$1,541,236</td>
<td>$2,135,280</td>
<td>$2,135,280</td>
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<td></td>
</tr>
<tr>
<td>2Q X4</td>
<td>$1,280,656</td>
<td>$1,541,236</td>
<td>$2,135,280</td>
<td>$2,135,280</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Q X4</td>
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<td>$2,135,280</td>
<td>$2,135,280</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4Q X4</td>
<td>$2,135,280</td>
<td>$2,135,280</td>
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<td></td>
</tr>
<tr>
<td>X4</td>
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<td>$2,135,280</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Period</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>2Q X4</td>
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</tr>
<tr>
<td>3Q X4</td>
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</tr>
<tr>
<td>4Q X4</td>
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</tr>
<tr>
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<td></td>
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</tbody>
</table>
**FIGURE 7.15** Alternative View of the Calculation of the Change in Net Working Capital

**FIGURE 7.16** Names of the Input and Output Cells Underlying the Calculation of the Change in Net Working Capital
QUESTIONS

Each of the questions for this chapter relates to a hypothetical company named Company MNO. Company MNO sells coffee machines to businesses. As such, Company MNO is a product-oriented (as opposed to a service-oriented) business. The questions for this chapter will address fiscal year X4 on a quarterly basis (four specific quarters, 1Q–4Q for year X4).

The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to build the schedules discussed in this chapter for Company MNO.

To prepare you for this chapter’s questions, several figures provide background information related to Company MNO’s operations. Figure Q7.1 offers a view of a portion of Company MNO’s Assumptions and Dashboard worksheet. Note that there are three cost-of-goods-sold

![Figure Q7.1 Company MNO’s Assumptions and Dashboard Worksheet](image-url)
components for Company MNO’s coffee machines: (1) exterior, (2) interior, and (3) assembly and labor.

Figure Q7.2 presents a view of Company MNO’s Unit Sales and Price Budget, Sales Composition Budget, Cash Collections from Customers Budget, and Accounts Receivable Budget. Company MNO’s Cost-of-Goods-Sold Budget is shown in Figure Q7.3. Figure Q7.4 presents a view of Company MNO’s Inventory Budget, Purchases Budget, Disbursements for Purchases Budget, and Accounts Payable Budget. Company MNO’s Headcount Overview worksheet is shown in Figure Q7.5. Company MNO’s Headcount Cost worksheet is shown in Figure Q7.6. Figure Q7.7 offers a view of Company MNO’s Operating Expenses Budget and Disbursements for Operating Expenses Budget. Figure Q7.8 presents a view of Company MNO’s Income Statement. Company MNO’s Capital Expenditures Budget, Disbursements for Capital Expenditures Budget, and Depreciation Budget are shown in Figure Q7.9. Figure Q7.10 offers a view of Company MNO’s Cash Budget.

FIGURE Q7.2  Company MNO’s Unit Sales and Price Budget, Sales Composition Budget, Cash Collections from Customers Budget, and Accounts Receivable Budget
FIGURE Q7.3  Company MNO’s Cost-of-Goods-Sold Budget

FIGURE Q7.4  Company MNO’s Inventory Budget, Purchases Budget, Disbursements for Purchases Budget, and Accounts Payable Budget
### FIGURE Q7.5  Company MNO’s Headcount Overview Worksheet

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Department</strong></td>
<td><strong>13</strong></td>
<td><strong>14</strong></td>
<td><strong>14</strong></td>
<td><strong>17</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Chief Executive Officer</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Chief Financial Officer</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>VP, Engineering</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>VP, Sales &amp; Marketing</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>VP, Business Development</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Salesperson</strong></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td><strong>Hardware Engineer</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Controller/Accountant</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Administrative Assistant</strong></td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

### FIGURE Q7.6  Company MNO’s Headcount Cost Worksheet

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Headcount Budget</strong></td>
<td><strong>$203,750</strong></td>
<td><strong>$203,750</strong></td>
<td><strong>$203,750</strong></td>
<td><strong>$203,750</strong></td>
<td><strong>$815,000</strong></td>
</tr>
<tr>
<td><strong>Chief Executive Officer</strong></td>
<td>$37,500</td>
<td>$37,500</td>
<td>$37,500</td>
<td>$37,500</td>
<td>$150,000</td>
</tr>
<tr>
<td><strong>Chief Financial Officer</strong></td>
<td>$31,250</td>
<td>$31,250</td>
<td>$31,250</td>
<td>$31,250</td>
<td>$125,000</td>
</tr>
<tr>
<td><strong>VP, Engineering</strong></td>
<td>$27,500</td>
<td>$27,500</td>
<td>$27,500</td>
<td>$27,500</td>
<td>$110,000</td>
</tr>
<tr>
<td><strong>VP, Sales &amp; Marketing</strong></td>
<td>$25,000</td>
<td>$25,000</td>
<td>$25,000</td>
<td>$25,000</td>
<td>$100,000</td>
</tr>
<tr>
<td><strong>VP, Business Development</strong></td>
<td>$22,500</td>
<td>$22,500</td>
<td>$22,500</td>
<td>$22,500</td>
<td>$90,000</td>
</tr>
<tr>
<td><strong>Salesperson</strong></td>
<td>$22,500</td>
<td>$22,500</td>
<td>$22,500</td>
<td>$22,500</td>
<td>$90,000</td>
</tr>
<tr>
<td><strong>Hardware Engineer</strong></td>
<td>$17,500</td>
<td>$17,500</td>
<td>$17,500</td>
<td>$17,500</td>
<td>$70,000</td>
</tr>
<tr>
<td><strong>Controller/Accountant</strong></td>
<td>$11,250</td>
<td>$11,250</td>
<td>$11,250</td>
<td>$11,250</td>
<td>$45,000</td>
</tr>
<tr>
<td><strong>Administrative Assistant</strong></td>
<td>$8,750</td>
<td>$8,750</td>
<td>$8,750</td>
<td>$8,750</td>
<td>$35,000</td>
</tr>
</tbody>
</table>

| Total | $203,750 | $203,750 | $203,750 | $203,750 | $815,000 |
| Total (with benefits) | $336,344 | $346,363 | $346,363 | $417,925 | $1,446,994 |

### FIGURE Q7.7  Company MNO’s Benefits Worksheet
FIGURE Q7.7  Company MNO’s Operating Expenses Budget and Disbursements for Operating Expenses Budget

FIGURE Q7.8  Company MNO’s Income Statement
FIGURE Q7.9  Company MNO’s Capital Expenditures Budget, Disbursements for Capital Expenditures Budget, and Depreciation Budget

FIGURE Q7.10  Company MNO’s Cash Budget
1. Given the information presented, build the Asset components of Company MNO’s Balance Sheet.
2. Build the Liabilities components of Company MNO’s Balance Sheet given the information provided.
3. Build the Owners’ Equity components of Company MNO’s Balance Sheet given the information provided.
4. Calculate the change in Company MNO’s Net Working Capital using the information provided and your answers to Questions 1–3.
PART Two

Financial Statements and Free Cash Flows
This chapter covers Napavale’s consolidated financial statements: the Balance Sheet, the Income Statement, and Statement of Cash Flows. Many readers may be familiar with these financial statements as they are widely used to assess a business’s financial condition and the SEC (U.S. Securities and Exchange Commission) requires publicly traded companies to file these financial statements on a regular basis.

As I covered the Balance Sheet in Chapter 7 and the Income Statement in Chapter 5, the majority of this chapter will be focused on the Statement of Cash Flows. I will, however, provide a review of the source of each line item in Napavale’s Balance Sheet and Income Statement. By identifying the budget from which values flow into the Balance Sheet and Income Statement, I hope to provide some perspective on the interrelated nature of financial statements (and financial models in general).

**BALANCE SHEET**

The Balance Sheet, as noted in Chapter 7, presents a business’s Assets, Liabilities, and Owners’ Equity accounts. To be correct, a Balance Sheet must always “balance”—in other words, the value of a business’s Assets must be equal to the value of that business’s Liabilities plus its Owners’ Equity. This, as you may remember, is also referred to as the central accounting identity (Assets = Liabilities + Owners’ Equity). Figure 8.1 offers a view of Napavale’s Balance Sheet as of the end of Chapter 7.

Figure 8.2 presents another view of Napavale’s Balance Sheet, in this case with the source of each line item labeled. More specifically, the budgets from which each element of the Balance Sheet comes are listed next to each of these elements in Figure 8.2.
INCOME STATEMENT

The Income Statement, discussed in Chapter 5, represents the difference between a business’s revenues and a business’s expenses. The “bottom line,” or final output of the Income Statement, is the metric known as Net Income. As covered in Chapter 7, Net Income affects the Retained Earnings account in Napavale’s Balance Sheet. The Income Statement also affects the Statement of Cash Flows. I will discuss the relationship between Napavale’s Income Statement, Balance Sheet, and Statement of Cash Flows later in this chapter. Figure 8.3 offers a view of Napavale’s Income Statement as of the end of Chapter 7. A view of Napavale’s Income Statement in which the source of each line item is identified by budget is presented in Figure 8.4.
FIGURE 8.2  Source of Each Line Item in the Balance Sheet

FIGURE 8.3  Income Statement
FINANCIAL STATEMENTS AND FREE CASH FLOWS

FIGURE 8.4  Source of Each Line Item in the Income Statement

STATEMENT OF CASH FLOWS

The Statement of Cash Flows, which is based on information contained in the Balance Sheet, Income Statement, and various other budgets and financial schedules, is an important financial statement. The goal of the Statement of Cash Flows is to reconcile Net Income, an accrual-based figure, with a business’s changes in cash position.

The Statement of Cash Flows is divided into three sections: Cash Flows from Operating Activities, Cash Flows from Investing Activities, and Cash Flows from Financing Activities. This division of the Statement of Cash Flows into three separate sections identifies the sources and uses of cash across a variety of functions (operating activities, investing activities, and financing activities). I will cover the contents of each of these sections over the course of this chapter.

It is worth noting that there are two approaches to presenting a business’s Statement of Cash Flows: the indirect method and the direct method. These methods are identical in structure for the Cash Flows from Investing Activities and Cash Flows from Financing Activities sections, but differ in the Cash Flows from Operating Activities section. The indirect method begins the Cash Flows from Operating Activities section with Net Income while the direct method compares “sources of cash” and “uses of cash” in the Cash Flows from Operating Activities section. I will use the indirect
method throughout this book—this method is often used by publicly traded companies in their financial statements as filed with the SEC.

I will now walk through the process of building each of the three sections (Cash Flows from Operating Activities, Cash Flows from Investing Activities, and Cash Flows from Financing Activities) for Napavale. As in earlier chapters, I will make frequent references to alternative views of worksheets in which the values and formulas contained within each cell are exposed for viewing and to the names of the input and output cells across various worksheets. This should make it easier to follow the extensive references and linkages between worksheets.

**Cash Flows from Operating Activities**

The first section of the Statement of Cash Flows, Cash Flows from Operating Activities, reconciles Net Income to cash provided by operating activities. “Operating activities” include, in this context, those activities undertaken in the normal course of business operations. In the case of Napavale, these activities are captured through several Income Statement accounts and several Balance Sheet accounts.

As the Statement of Cash Flows is based on information found in other budgets and schedules, I will not present views of Napavale’s Assumptions and Dashboard worksheet in this Chapter. I will instead focus on (1) views of the Statement of Cash Flows, (2) alternative views of the Statement of Cash Flows in which the values and formulas underlying the worksheet cells are exposed and visible, and (3) views of the Statement of Cash Flows in which the names of the worksheet cells are shown.

Figure 8.5 presents a view of the Statement of Cash Flows in which the Net Income and depreciation values are shown. As the calculations associated with values that underly the remainder of the Cash Flows from Operating Activities section are more involved, I will discuss these accounts later in this section of the chapter. An alternative view of the Statement of Cash Flows is shown in Figure 8.6 in which the values and formulas underlying the worksheet are exposed and visible.

To calculate the increase or decrease in several Balance Sheet accounts for the Cash Flows from Operating Activities section of the Statement of Cash Flows, I am going to build an additional section in the Statement of Cash Flows. This section will paste the periodic (quarterly) values for each of the relevant accounts from the Balance Sheet into the Statement of Cash Flows. I will then calculate the increase or decrease in each of these accounts for use in the Cash Flows from Operating Activities section of the Statement of Cash Flows. Figure 8.7 presents a view of these calculations related to the relevant Balance Sheet accounts.
FIGURE 8.5  Statement of Cash Flows

FIGURE 8.6  Alternative View of the Statement of Cash Flows
FIGURE 8.7 Calculations Related to Balance Sheet Accounts

Note that “payables from capital budget” are not included in these calculations; as mentioned in Chapter 7, I am not including this account as a component of current liabilities. Also note that I am including changes in loan payable in cash flows from Operating Activities. I am assuming these cash flows are a part of Napavale’s normal business operations. Changes in loan payable could alternatively be considered a part of financing cash flows.

An alternative view of the worksheet shown in Figure 8.7 (in which the values and formulas underlying the worksheet cells are exposed and visible) is presented in Figure 8.8. Figure 8.9 offers a view of the names of the input and output cells underlying the calculations associated with the increase in loan payable.
or decrease in the Balance Sheet accounts related to the Cash Flows from Operating Activities section of the Statement of Cash Flows.

As I added a set of names to several worksheet cells in the Inventory and Purchases Budget worksheet, Figure 8.10 presents an updated view of the names underlying the Inventory and Purchases worksheet. The completed
Cash Flows from Operating Activities section of the Statement of Cash Flows is shown in Figure 8.11. A view of the values and formulas underlying the Cash Flows from Operating Activities section is presented in Figure 8.12. To summarize the Cash Flows from Operating Activities, a view of the names underlying the input and output cells in this section is shown in Figure 8.13.

**Cash Flows from Investing Activities**

The second section of the Statement of Cash Flows, Cash Flows from Investing Activities, reflects Napavale’s disbursements for and/or proceeds from capital assets. Capital assets include, in this context, large-value purchases such as furniture or equipment that are capitalized as opposed to expensed. This topic of capitalizing versus expensing was discussed in Chapter 6. Napavale’s disbursements for capital expenditures are captured through the Disbursements for Capital Expenditures Budget.
FIGURE 8.12  Alternative View of the Cash Flows from Operating Activities

FIGURE 8.13  Names of the Input and Output Cells in the Cash Flows from Operating Activities
Cash Flows from Investing Activities

Figure 8.14 presents a view of Napavale’s Cash Flows from Investing Activities section of the Statement of Cash Flows. An alternative view of Napavale’s Cash Flows from Investing Activities in which the values and formulas underlying the worksheet cells are exposed and visible is presented in Figure 8.15. The names of the input and output worksheet cells for the Cash Flows from Investing Activities are shown in Figure 8.16.

Cash Flows from Financing Activities

The third (and final) section of the Statement of Cash Flows, Cash Flows from Financing Activities, tracks Napavale’s issuance(s) of common stock and borrowing and repayment of any short-term borrowings. Note that this section of the Statement of Cash Flows may include different and/or additional accounts for other companies. Specifically, some companies may issue several types of equity (stock) and/or debt (borrowings), in which case each class of equity and/or debt may be accounted for separately in the Cash Flows from Financing Activities section.
FIGURE 8.15 Alternative View of the Cash Flows from Investing Activities

FIGURE 8.16 Names of the Input and Output Cells in the Cash Flows from Investing Activities
FIGURE 8.17 Cash Flows from Financing Activities and Completed Statement of Cash Flows

The values relevant to the Cash Flows from Financing Activities are captured in the Cash Budget (based directly on inputs from the Assumptions and Dashboard worksheet). Figure 8.17 presents a view of the Cash Flows from Financing Activities section for Napavale; as this is the final section of the Statement of Cash Flows, Figure 8.17 also represents a completed view of the Statement of Cash Flows. Note the calculation related to Napavale’s net increase or decrease in cash for each period in Figure 8.17.

Napavale’s Balance Sheet value for cash for each accounting period (quarter) must be equal to the “cash, end of period” value as calculated in Figure 8.17. If these values are not equal, there is an error in the financial model.

Figure 8.18 presents an alternative view of the completed Statement of Cash Flows (including the Cash Flows from Financing section) in which the values and formulas underlying the worksheet cells are exposed and visible. Finally, the names of the input and output cells in the completed Statement of Cash Flows (including the Cash Flows from Financing section) are shown in Figure 8.19.
### FIGURE 8.18 Alternative View of the Cash Flows from Financing Activities and Completed Statement of Cash Flows

![Excel spreadsheet for cash flows](image)

### FIGURE 8.19 Names of the Input and Output Cells in the Cash Flows from Financing Activities and Completed Statement of Cash Flows

![Excel spreadsheet with cell names](image)
QUESTIONS

Each of the questions for this chapter relates to a hypothetical company named Company PQR. Company PQR sells camping tents to consumers. As such, Company PQR is a product-oriented (as opposed to a service-oriented) business. The questions for this chapter will address fiscal year X4 on a quarterly basis (four specific quarters, 1Q–4Q for year X4).

The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to build Company PQR’s Statement of Cash Flows.

To prepare you for this chapter’s questions, several figures provide background information related to Company PQR’s operations. Figure Q8.1 offers a view of Company PQR’s Income Statement. Note that there are three cost-of-goods-sold components for Company PQR’s camping tents: (1) fabric, (2) frame, and (3) assembly and labor.

Figure Q8.2 presents a view of Company PQR’s Balance Sheet. Company PQR’s Sales and Collections worksheet is presented in Figure Q8.3. Figure Q8.4 offers a view of Company PQR’s Inventory and Purchases worksheet. A portion of Company PQR’s Assumptions and Dashboard worksheet is presented in Figure Q8.5. The Capital Budget worksheet for Company PQR is shown in Figure Q8.6.

FIGURE Q8.1 Company PQR’s Income Statement
FIGURE Q8.2  Company PQR’s Balance Sheet

FIGURE Q8.3  Company PQR’s Sales and Collections Worksheet
\begin{figure}
\centering
\includegraphics[width=\textwidth]{figQ8.4.png}
\caption{Company PQR’s Inventory and Purchases Worksheet}
\end{figure}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figQ8.5.png}
\caption{Company PQR’s Assumptions and Dashboard Worksheet}
\end{figure}
1. Given the information presented, build the Cash Flows from Operating Activities section of Company PQR’s Statement of Cash Flows.

2. Given the information presented, build the Cash Flows from Investing Activities section of Company PQR’s Statement of Cash Flows.

CHAPTER 9

Free Cash Flows and Dashboard

While Chapters 2 through 8 covered the creation of Napavale’s Master Budget, Operating Budget, Financial Budget, and Consolidated Financial Statements (Balance Sheet, Income Statement, and Statement of Cash Flows), this chapter is focused on Napavale’s free cash flows and the Dashboard section of the Assumptions and Dashboard worksheet. The calculation of Napavale’s projected free cash flows represents the final stage in building all of the components required for the analysis and evaluation of Napavale as a business. As such, after calculating Napavale’s free cash flows, I will build the first Dashboard section of Napavale’s Assumptions and Dashboard worksheet in which various outputs of the financial model are checked for consistency.

As mentioned briefly in Chapter 1, free cash flows represent the funds available to “all providers of capital”—a group that includes a company’s equity (stock) owners and debt holders. The concept of free cash flows, which is a key component of traditional MBA finance classes, is central to the modeling and analysis of any company’s operations. In essence, free cash flows represent the cash left over after all of a company’s required expenses and obligations have been paid and fulfilled. I will revisit the concept of free cash flows later in the book when I cover the concept of valuation in Chapter 13.

The calculation and analysis of Napavale’s free cash flows represent one way to assess and evaluate Napavale as a business. Note that the calculation of free cash flows is based largely on information that I have already calculated in previous chapters. I will present updated views of Napavale’s Assumptions and Dashboard worksheet when new assumptions are introduced over the course of this chapter.

You may remember from Chapter 2 that the Dashboard offers a sense of a financial model’s condition and “state of health.” A Dashboard can provide both a synopsis of a financial model’s key outputs, such as revenues and net income, and can also indicate, for example, whether the Balance Sheet is balanced. I will cover the synopsis of key outputs from the financial
model in Chapter 10 and the indication of the financial model’s accuracy and consistency later in this chapter.

**CALCULATION OF FREE CASH FLOWS**

There are several different ways to calculate free cash flows and the actual definition of free cash flows (and the components of free cash flows) can vary from person to person and from company to company. The definition and calculation of free cash flows that I present in this chapter are widely used in both academia and in industry. Do not be surprised, however, if you come across a different way of defining or calculating free cash flows as compared to the discussion of free cash flows in this book. The important thing to remember is the core meaning of free cash flows—namely, the funds available to all providers of capital after all required expenses have been paid.

The first step in calculating Napavale’s free cash flows is to determine a metric known as EBIT (Earnings Before Interest and Taxes). In Napavale’s case, EBIT is equivalent to “income from operations” on the Income Statement. For the sake of reference, Figure 9.1 presents a view of Napavale’s Income Statement with the names of the worksheet cells indicated.

**FIGURE 9.1** Names of the Input and Output Cells in the Income Statement
The next step in calculating Napavale’s free cash flows is to adjust EBIT for any taxes that are paid. Taxes are expenses that must be paid to the tax authorities; interest payments are not removed from the EBIT figure because free cash flows represent the funds available to all providers of capital (including those providing debt, to whom interest payments are made). Figure 9.2 offers a view of the first section of Napavale’s free cash flows worksheet in which “after-tax EBIT” is calculated. An alternative view of Napavale’s free cash flows worksheet in which the values and formulas underlying the worksheet cells are exposed and visible is shown in Figure 9.3. The names of the input and output worksheet cells in Napavale’s free cash flows worksheet are presented in Figure 9.4.

After calculating Napavale’s “after-tax EBIT,” several additional adjustments are required to determine the free cash flow projections for Napavale. Each of these adjustments reconciles the after-tax EBIT figure to a cash-based value. I will highlight each of these adjustments in the order in which I have included them in Napavale’s free cash flows worksheet.
FIGURE 9.3  Alternative View of the First Section of the Free Cash Flows Worksheet

FIGURE 9.4  Names of the Input and Output Cells in the First Section of the Free Cash Flows Worksheet
The first adjustment to after-tax EBIT is to add the depreciation expense for each accounting period (quarter) back into the after-tax EBIT. Depreciation is a non-cash expense and thus does not represent an outflow of cash from Napavale. Depreciation expense is a line item in Napavale’s Income Statement; the names of the worksheet cells in Napavale’s Income Statement are shown in Figure 9.1.

The second adjustment to after-tax EBIT is to subtract disbursements for capital expenditures for each accounting period (quarter) out of the after-tax EBIT. Capital expenditures do not appear directly as a component of EBIT (depreciation expenses related to capital expenditures, however, do show up in EBIT), so these disbursements must be accounted for as they represent cash outflows for Napavale. For the sake of reference, Figure 9.5 presents a view of Napavale’s Statement of Cash Flows with the names of the worksheet cells indicated.

The final adjustment to after-tax EBIT is to subtract any positive changes in Napavale’s net working capital for each accounting period (quarter) out of after-tax EBIT. The concept of net working capital and the calculations underlying the changes in Napavale’s net working capital were covered in Chapter 7. An increase in net working capital represents a cash outflow for Napavale (and vice-versa), so any increase in net working capital must be
accounted for as a cash outflow in the calculation of Napavale’s free cash flows. For the sake of reference, Figure 9.6 presents a view of Napavale’s Balance Sheet with the names of the worksheet cells indicated.

Napavale’s free cash flows worksheet is shown in Figure 9.7. Note that I have calculated the free cash flows for each accounting period (quarter) in Figure 9.7.

Napavale’s free cash flows worksheet now includes adjustments for depreciation, capital expenditures, and changes in net working capital. An alternative view of Napavale’s free cash flows worksheet in which the values and formulas underlying the worksheet cells are exposed and visible is presented in Figure 9.8. Figure 9.9 highlights the names of the input and output worksheet cells underlying Napavale’s free cash flows worksheet.
### FIGURE 9.7  Free Cash Flows Worksheet

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT</td>
<td>207,288</td>
<td>509,975</td>
<td>655,143</td>
<td>1,054,350</td>
<td>2,428,755</td>
</tr>
<tr>
<td>Effective tax rate</td>
<td>35.0%</td>
<td>35.0%</td>
<td>35.0%</td>
<td>35.0%</td>
<td></td>
</tr>
<tr>
<td>EBIT * (1 - t)</td>
<td>134,737</td>
<td>331,484</td>
<td>425,843</td>
<td>685,328</td>
<td>1,577,391</td>
</tr>
<tr>
<td>+ Depreciation</td>
<td>2,313</td>
<td>4,625</td>
<td>6,930</td>
<td>9,260</td>
<td>23,125</td>
</tr>
<tr>
<td>- CAPEX</td>
<td>45,000</td>
<td>45,000</td>
<td>45,000</td>
<td>45,000</td>
<td>180,000</td>
</tr>
<tr>
<td>Changes in NWC</td>
<td>109,778</td>
<td>62,156</td>
<td>57,200</td>
<td>55,533</td>
<td>284,667</td>
</tr>
<tr>
<td>Terminal value</td>
<td>(17,728)</td>
<td>228,953</td>
<td>330,580</td>
<td>594,044</td>
<td>1,135,849</td>
</tr>
<tr>
<td>Present value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WACC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g (to perpetuity)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### FIGURE 9.8  Alternative View of the Free Cash Flows Worksheet
Now that I have calculated Napavale’s projected free cash flows, I will build the first section of the Dashboard portion of the Assumptions and Dashboard worksheet. This section of the Dashboard, as mentioned at the beginning of this chapter, will give a sense of the accuracy and consistency of the internal workings of Napavale’s financial model. Note that this will not give any indication of the reasonableness of the assumptions underlying Napavale’s financial model. The Dashboard is simply meant to indicate whether the financial model is working properly.

The key indicators that I will use to determine if Napavale’s financial model is working properly are (1) whether the Balance Sheet balances and (2) whether the “cash” values from the Balance Sheet equal the “cash, end of period” values from the Statement of Cash Flows. These two key indicators give a quick and good view into the inner workings of the financial model.
While you can always look at the Balance Sheet and/or the Statement of Cash Flows after any changes are made to a financial model to make sure the financial model is working properly, using a Dashboard makes this process more efficient and potentially less error-prone.

**Balance Sheet Status**

To determine whether the Balance Sheet balances, I must first add a calculation to the Balance Sheet itself. Remember that a Balance Sheet must always “balance” if it is working properly; in other words, a business’s Assets must always equal its Liabilities + Owners’ Equity. As such, I will calculate the differences between Napavale’s Assets and Napavale’s Liabilities and Owners’ Equity. If this difference is any value other than zero, the model is not functioning properly. Figure 9.10 presents an updated view of

![Balance Sheet](image-url)

**FIGURE 9.10** Balance Sheet
Napavale’s Balance Sheet in which the calculation that checks if the Balance Sheet balances is included.

An alternative view of Napavale’s updated Balance Sheet in which the values and formulas underlying the worksheet cells are exposed and visible is presented in Figure 9.11. Figure 9.12 presents a view of the names of the worksheet cells in Napavale’s updated Balance Sheet.

I now need to include an indicator in Napavale’s Dashboard that displays the “status” of the Balance Sheet. Specifically, the Dashboard must display whether the Balance Sheet is balanced. To do so, I will reference the calculation highlighted in Figures 9.10 through 9.12 and I will use a function known as the “IF” function in Excel. Figure 9.13 presents a view of the Dashboard from Napavale’s Assumptions and Dashboard worksheet.
### FIGURE 9.12 Names of the Input and Output Cells in the Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>Cash</th>
<th>Accounts Receivable</th>
<th>Inventory</th>
<th>Fixed Assets, net</th>
<th>Total Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1Q X4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2Q X4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3Q X4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4Q X4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liabilities</th>
<th>Accounts Payable</th>
<th>Payables from Capital Budget</th>
<th>Loan Payable</th>
<th>Total Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PayCapB1Q</td>
<td>PayCapB2Q</td>
<td>PayCapB3Q</td>
<td>PayCapB4Q</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PayCapB6X4</td>
<td>PayCapB6X4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Owners' Equity</th>
<th>Common Stock</th>
<th>Retained Earnings</th>
<th>Total Owners' Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CS1Q</td>
<td>RE1Q</td>
<td>TotOE1Q</td>
</tr>
<tr>
<td></td>
<td>CS2Q</td>
<td>RE2Q</td>
<td>TotOE2Q</td>
</tr>
<tr>
<td></td>
<td>CS3Q</td>
<td>RE3Q</td>
<td>TotOE3Q</td>
</tr>
<tr>
<td></td>
<td>CS4Q</td>
<td>RE4Q</td>
<td>TotOE4Q</td>
</tr>
<tr>
<td></td>
<td>CSX4</td>
<td></td>
<td>TotOE4X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Liabilities and Owners' Equity</th>
<th>Total LOE1Q</th>
<th>Total LOE2Q</th>
<th>Total LOE3Q</th>
<th>Total LOE4Q</th>
<th>Total LOE4X</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Balance Sheet calculation check</th>
<th>BCheck1Q</th>
<th>BCheck2Q</th>
<th>BCheck3Q</th>
<th>BCheck4Q</th>
<th>BCheckX4</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Net Working Capital (NWC)</th>
<th>Current assets</th>
<th>Current liabilities</th>
<th>= Net working capital</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CA1Q</td>
<td>CL1Q</td>
<td>NWClQ</td>
</tr>
<tr>
<td></td>
<td>CA2Q</td>
<td>CL2Q</td>
<td>NWClQ</td>
</tr>
<tr>
<td></td>
<td>CA3Q</td>
<td>CL3Q</td>
<td>NWClQ</td>
</tr>
<tr>
<td></td>
<td>CA4Q</td>
<td>CL4Q</td>
<td>NWClQ</td>
</tr>
<tr>
<td></td>
<td>CLX4</td>
<td></td>
<td>NWClQ</td>
</tr>
</tbody>
</table>

### FIGURE 9.13 Dashboard

[Dashboard Diagram]

[Dashboard Diagram]
Note that the Balance Sheet status output cell contains the word “Yes.” This is a result of the IF function, which I will discuss later in this section. Figure 9.14 presents an alternative view of Napavale’s Assumptions and Dashboard worksheet in which the values and formulas underlying the worksheet cells are exposed and visible. The names of the input and output cells in Napavale’s Assumptions and Dashboard worksheet are shown in Figure 9.15.

The IF function shown in Figure 9.14 evaluates a condition, such as whether a variable is equal to a specified value, and then returns a result based on the evaluation of that condition. The specific syntax of the IF function is as follows: = IF (Condition, True, False). “Condition” represents the condition to be evaluated, “true” represents the output of this function if the condition is true, and “false” represents the output of this function if the condition is false.

The IF function has many uses in financial modeling. In the context of Figures 9.13 through 9.15, the IF function determines if the absolute value (indicated by the use of the ABS, or absolute value, function) of the sum
of the differences between Napavale’s Assets and Napavale’s Liabilities + Owners’ Equity is less than 1 (I used “less than 1” instead of 0 here to account for any minor rounding errors). If the absolute value sum of these differences is greater than 1, Napavale’s Balance Sheet is not balanced in some period (or periods).

The output of the IF function used in the Balance Sheet Status section of Napavale’s Dashboard thus displays “Yes” if the Balance Sheet balances across all accounting periods (quarters) and “No” if the Balance Sheet is not balanced in one or more accounting periods (quarter(s)).

**Statement of Cash Flows Status**

To determine whether the “cash” values from the Balance Sheet equal the “cash, end of period” values from the Statement of Cash Flows, I will compare the cash values from the Balance Sheet with the cash values from the Statement of Cash Flows. This comparison of the cash figures from the Balance Sheet and the Statement of Cash Flows is meant to serve as a check on the internal consistency of Napavale’s financial model. If the difference in cash values across these worksheets is any value other than zero, the model is not functioning properly.

Figure 9.16 presents an updated view of Napavale’s Statement of Cash Flows in which the calculation that checks if the cash values are equal in both the Balance Sheet and the Statement of Cash Flows is included. An alternative view of Napavale’s updated Statement of Cash Flows in which the values and formulas underlying the worksheet cells are exposed and visible is presented in Figure 9.17. Figure 9.18 presents a view of the names of the worksheet cells in Napavale’s updated Statement of Cash Flows.

I now need to include an indicator in Napavale’s Dashboard that displays the “status” of the Statement of Cash Flows. Specifically, the Dashboard must display whether the cash values in the Statement of Cash Flows are equal to the cash values in the Balance Sheet. To do so, I will reference the calculation highlighted in Figures 9.16 through 9.18 and I will use an IF function as I did in the Balance Sheet Status section of this chapter. Figure 9.19 presents a view of the Dashboard from Napavale’s Assumptions and Dashboard worksheet.

Note that the Statement of Cash Flows Status output cell contains the word “Yes.” This is a result of the IF function, which is covered in the Balance Sheet Status section of this chapter. Figure 9.20 presents an alternative view of Napavale’s Assumptions and Dashboard worksheet in which the values and formulas underlying the worksheet cells are exposed and visible. The names of the input and output cells in Napavale’s Assumptions and Dashboard worksheet are shown in Figure 9.21.
FINANCIAL STATEMENTS AND FREE CASH FLOWS

FIGURE 9.16  Statement of Cash Flows

In the context of Figures 9.19 through 9.21, the IF function determines if the absolute value of the sum of the differences between Napavale’s cash values from the Statement of Cash Flows and the Balance Sheet is greater than 1 (I used 1 instead of 0 here to account for any minor rounding errors). If the absolute value of the sum of these differences is greater than 1, there is an error somewhere in Napavale’s financial model.

The output of the IF function used in the Statement of Cash Flows Status section of Napavale’s Dashboard thus displays “Yes” if the cash values are equal between the Statement of Cash Flows and the Balance Sheet across all accounting periods (quarters) and “No” if the cash values are not equal in one or more accounting periods (quarter(s)).
### FIGURE 9.17 Alternative View of the Statement of Cash Flows

![Image of Alternative View of the Statement of Cash Flows]

### FIGURE 9.18 Names of the Input and Output Cells in the Statement of Cash Flows

![Image of Names of the Input and Output Cells in the Statement of Cash Flows]
FIGURE 9.19  Dashboard

FIGURE 9.20  Alternative View of the Assumptions and Dashboard Worksheet

FIGURE 9.21  Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet
QUESTIONS

Each of the questions for this chapter relates to a hypothetical company named Company STU. Company STU sells satellite radios to consumers. As such, Company STU is a product-oriented (as opposed to a service-oriented) business. The questions for this chapter will address fiscal year X4 on a quarterly basis (four specific quarters, 1Q–4Q for year X4).

The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to calculate Company STU’s free cash flows.

To prepare you for this chapter’s questions, several figures provide background information related to Company STU’s operations. Figure Q9.1 presents a view of Company STU’s Income Statement. Note that there are three cost-of-goods-sold components for Company STU’s satellite radios: (1) electronics, (2) casing, and (3) assembly and labor.

Figure Q9.2 presents a view of Company STU’s Statement of Cash Flows. Company STU’s Balance Sheet is shown in Figure Q9.3.
FIGURE Q9.2  Company STU’s Statement of Cash Flows

FIGURE Q9.3  Company STU’s Balance Sheet
1. Given the information presented, build a free cash flows worksheet for Company STU.
2. Given the information presented, build a Balance Sheet status indicator in Company STU’s Assumptions and Dashboard worksheet.
3. Given the information presented, build a Statement of Cash Flows status indicator in Company STU’s Assumptions and Dashboard worksheet.
PART Three

Analysis of a Financial Model
CHAPTER 10
Sensitivity Analysis

After working through all of the steps in Chapters 2 through 9, I now have a financial model for Napavale that will generate consolidated projected financial statements (Balance Sheet, Income Statement, and Statement of Cash Flows) and free cash flows based on a series of assumptions and inputs (found in Napavale’s Assumptions and Dashboard worksheet). Chapters 10 through 14 will cover ways in which I can evaluate and analyze Napavale as a business.

This chapter addresses an analytical technique known as “sensitivity analysis” in which I will evaluate the extent to which changes in assumptions and inputs affect various outputs of interest, such as revenues, net income, and free cash flows. In other words, a sensitivity analysis determines how sensitive an output variable is (or output variables are) to an input variable (or input variables). I will use the term “revenues” in place of “sales” (in dollars—not unit sales) throughout this chapter and Chapter 11 to avoid confusion. While revenues and sales may represent different meanings in some cases, I will use these terms interchangeably.

While there are a variety of ways to build sensitivity analyses in Microsoft Excel, one of the more efficient techniques is through the use of a tool known as a “data table.” Data tables are well-suited to sensitivity analyses in that they enable the direct evaluation of how different values for an input variable would affect values for an output variable. To build data tables, however, I need to consolidate some information in Napavale’s growing financial model into one Excel worksheet. I will consolidate this information in the Dashboard component of Napavale’s Assumptions and Dashboard worksheet.

DASHBOARD

As I mentioned in Chapter 9, a Dashboard can provide a synopsis of a financial model’s key outputs, such as revenues and net income, and can also
ANALYSIS OF A FINANCIAL MODEL

FIGURE 10.1 Dashboard

indicate the accuracy and consistency of a financial model, such as whether the Balance Sheet is balanced. While I covered the use of the Dashboard to determine the accuracy and consistency of a financial model in Chapter 9, I discuss the synopsis of key outputs from the financial model in this chapter.

I am going to summarize several of Napavale’s key financial metrics in the Dashboard section of the Assumptions and Dashboard worksheet. Specifically, I am going to consolidate Napavale’s projected revenues, net income, and free cash flows for each accounting period (quarter). It is a matter of preference and relevance when it comes to choosing which financial metrics to include (if any) in the Dashboard. I chose these three metrics (revenues, net income, and free cash flows) for Napavale because I believe they are important determinants of the business’s operational performance and because I am going to run sensitivity analyses on each of these metrics.

Figure 10.1 presents a view of the Dashboard section of Napavale’s Assumptions and Dashboard worksheet. The Dashboard shown in Figure 10.1 now includes summary projections for revenues, net income, and free cash flows. An alternative view of the Dashboard in which the values and formulas underlying the worksheet cells are exposed is shown in Figure 10.2.

Figure 10.3 presents a view of the names of the worksheet cells in the Dashboard section of the Assumptions and Dashboard worksheet. Note that I am naming cells in the Dashboard that refer directly to other named cells (from the Income Statement and Free Cash Flows worksheets) so that the data tables presented later in this chapter are easier to understand.

The projections for Napavale’s revenues and net income are drawn from the Income Statement. For the sake of reference, the names of the worksheet cells in the Income Statement are shown in Figure 10.4. Napavale’s projected free cash flows figures are drawn from the Free Cash Flows worksheet, so the names of the cells in the Free Cash Flows worksheet are presented in Figure 10.5.
FIGURE 10.2  Alternative View of the Dashboard

FIGURE 10.3  Names of the Input and Output Cells in the Assumptions and Dashboard Worksheet

FIGURE 10.4  Names of the Input and Output Cells in the Income Statement
Now that I have incorporated the projections for Napavale’s revenues, net income, and free cash flows into the Dashboard, I will run sensitivity analyses on each of these metrics through the use of data tables. Given the large number of variables involved in Napavale’s financial model, there are many different types of sensitivity analyses that I could undertake. I am, however, going to focus on the sensitivity of one output variable (revenues for 1Q X4, for example) to one input variable (unit sales for 1Q X4, for example).

I hope to make the process of running sensitivity analyses using data tables as straightforward as possible by limiting the scope of input and output variables. If you build a financial model on your own, you may want to run sensitivity analyses on a wide array of input and output variables.
It is possible to build both one-variable and two-variable data tables in Microsoft Excel. One-variable data tables measure the change in one output variable based on a change in one input variable. Two-variable data tables measure the change in one output variable based on changes in two input variables. To keep things as simple as possible, I am going to discuss only one-variable data tables in this book. I will provide an overview of how to build data tables using revenues, net income, and free cash flows as separate output metrics of interest.

**Revenues Data Table**

To determine the sensitivity of Napavale’s projected revenues to input variables in the financial model, I am going to vary the projected unit sales for 1Q X4 and measure the corresponding changes in revenues for 1Q X4. The first step in building a data table is to properly arrange both the output formula of interest (revenues for 1Q X4 in this case) and the various alternative values for the input variable of interest (unit sales for 1Q X4 in this case). While this may sound complex, it is actually fairly straightforward. Figure 10.6 presents a view of the properly arranged revenues data table for Napavale.

![Figure 10.6 Revenues Data Table](image)
Note that I have arranged the data table in Figure 10.6 with the input values listed in a single column. It is also possible to list the input values in a single row. It is a matter of preference as to which format to use when building data tables. I will use “downward” formatted data tables in which the input values are listed in a single column throughout this chapter.

I hardcoded, or entered directly, the input values in Figure 10.6. You are free to choose whatever values may be of interest and you can even change these values after you have built a complete data table. I chose the specific input values in Figure 10.6 to get a sense of how moderate changes in Napavale’s projected 1Q X4 unit sales will affect revenues for 1Q X4.

The next step in building a data table is to select all of the input values and the formula of interest in Microsoft Excel. The selection of the appropriate cells for Napavale’s revenues data table is shown in Figure 10.7.

After I select the appropriate cells in Excel, the next step is to select the “Data” tab on the Excel ribbon, click on the “What-If Analysis” drop-down button (usually an icon labeled “What-If Analysis” with a grid and question mark next to the label) in the “Data Tools” section of the ribbon, and choose the “Data Table...” option from the drop-down menu.

**FIGURE 10.7** Revenues Data Table
Sensitivity Analysis

FIGURE 10.8  Data Table Dialog Box and the Assumptions and Dashboard Worksheet

This will bring up a “Data Table” dialog box, into which I will enter the worksheet cell reference for the input variable (in the “Column input cell” field) that I would like to vary in the data table. Figure 10.8 presents a view of the Table dialog box along with the properly referenced input cell in front of the Assumptions and Dashboard worksheet.

After entering the proper cell reference into the Table dialog box, I will click “OK.” Napavale’s revenue data table is now complete. It is important to press the F9 key on the keyboard after the data table is complete—this ensures that the values in the data table are current and up to date. (The F9 function key initiates a recalculation of all worksheet cells in an open workbook.) Napavale’s completed revenues data table is shown in Figure 10.9.

The way in which a data table is to be interpreted is as follows: Reading across from the input variables (assuming you are using a column layout as I am in this chapter) into the data table itself, you will see how the output variable of interest (1Q X4 revenues in this case) would change for the various values of the input variable. The data table presents a tabular arrangement of what-if scenarios. In this case, the revenues data table shows...
what Napavale’s 1Q X4 revenues would equal if the unit sales for 1Q X4 were changed to a different value.

Figure 10.10 presents an alternative view of the revenues data table from the Assumptions and Dashboard worksheet in which the values and formulas underlying the worksheet cells are exposed. Note the “TABLE” references in the revenues data table—this indicates that a data table has been used in Excel.

**Net Income Data Table**

To determine the sensitivity of Napavale’s projected net income to input variables in the financial model, I am going to vary the projected price per unit for 1Q X4 and measure the corresponding changes in net income for 1Q X4. As with the revenues data table, the first step in building the net income data table is to properly arrange both the output formula of interest (net income for 1Q X4 in this case) and the various alternative values for the input variable of interest (price per unit for 1Q X4 in this case). Figure 10.11 presents a view of the properly arranged net income data table for Napavale.
FIGURE 10.10  Alternative View of the Revenues Data Table

FIGURE 10.11  Net Income Data Table
FIGURE 10.12 Net Income Data Table

The subsequent steps involved in building the net income data table for Napavale are the same as those involved in building the revenues data table as outlined earlier in this chapter. Napavale’s completed net income data table is presented in Figure 10.12.

In terms of interpreting Napavale’s net income data table, the net income data table shows what Napavale’s 1Q X4 net income would equal if the price per unit for 1Q X4 was changed to a different value. An alternative view of Napavale's net income data table, in which the values and formulas underlying the worksheet cells are exposed, is presented in Figure 10.13.

Free Cash Flows Data Table

To determine the sensitivity of Napavale’s projected free cash flows to input variables in the financial model, I am going to vary the projected monitor screen: cost per unit for 1Q X4, and measure the corresponding changes in free cash flows for 1Q X4. As with the revenues data table and the net income data table, the first step in building the free cash flows data table is to properly arrange both the output formula of interest (free cash flows for 1Q X4 in this case) and the various alternative values for the input variable of interest (monitor screen: cost per unit for 1Q X4 in this case). Figure 10.14 presents a view of the properly arranged free cash flows data table for Napavale.
Sensitivity Analysis

**FIGURE 10.13** Alternative View of the Net Income Data Table

**FIGURE 10.14** Free Cash Flows Data Table
The subsequent steps involved in building the free cash flows data table for Napavale are the same as those involved in building the revenues data table and the net income data table as outlined earlier in this chapter. Napavale’s completed free cash flows data table is presented in Figure 10.15.

In terms of interpreting Napavale’s free cash flows data table, the free cash flows data table shows what Napavale’s 1Q X4 free cash flows would equal if the monitor screen: cost per unit for 1Q X4 were changed to a different value. An alternative view of Napavale’s free cash flows data table, in which the values and formulas underlying the worksheet cells are exposed, is presented in Figure 10.16.
QUESTIONS

Each of the questions for this chapter relates to a hypothetical company named Company VWX. Company VWX sells laser printers to consumers. As such, Company VWX is a product-oriented (as opposed to a service-oriented) business. Note that there are three cost-of-goods-sold components for Company VWX’s laser printers: (1) electronics, (2) casing, and (3) assembly and labor.

The questions for this chapter will address fiscal year X4 on a quarterly basis (four specific quarters, 1Q–4Q for year X4). The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to build sensitivity analyses related to revenues, net income, and free cash flows, in the form of data tables, for Company VWX. To prepare you for this chapter’s questions, Figure Q10.1 offers a view of a portion of Company VWX’s Assumptions and Dashboard.
FIGURE Q10.1 Company VWX’s Assumptions and Dashboard Worksheet

worksheet to provide some background information related to Company VWX’s operations.

1. Given the information presented, build a revenues data table for 1Q X4 for Company VWX.
2. Given the information presented, build a net income data table for 1Q X4 for Company VWX.
3. Given the information presented, build a free cash flows data table for 1Q X4 for Company VWX.
This chapter addresses an analytical metric known as “contribution margin.” As noted in Chapter 1, contribution margin is defined as the extent to which each unit sale contributes to a business’s fixed cost base. In other words, a business’s contribution margin is equal to: unit price – variable costs per unit. Calculating a business’s contribution margin enables the calculation of several important metrics such as operating leverage (fixed costs/total costs), breakeven value in units, and breakeven value in dollars. I will calculate each of these metrics for Napavale over the course of this chapter.

Using Napavale’s financial model, I will cover the concept of fixed versus variable costs and I will calculate these costs for Napavale. After delineating Napavale’s cost base between variable and fixed costs, I will then discuss the calculation of Napavale’s contribution margin, operating leverage, and breakeven point in both units and dollars.

**Fixed and Variable Costs**

In order to calculate Napavale’s contribution margin, I must first determine which of Napavale’s costs are fixed and which are variable. Fixed costs are defined as costs that are incurred regardless of anything else that may be happening at a company. Fixed costs are, in other words, fixed—they do not vary based on other factors. Examples of fixed costs may include salaries and rent.

Variable costs are defined as costs that vary in magnitude based on other factors, such as a company’s level of revenues. Examples of variable costs may include cost of goods sold and miscellaneous expenses. There is an old
saying, “In the long run, all costs are variable.” While a company ultimately can vary all of its costs, fixed costs typically represent those costs that will not change based on other factors (such as the level of revenues) and variable costs typically represent those costs whose values depend on other factors (such as unit sales).

Figure 11.1 presents a view of Napavale’s Contribution Margin worksheet in which I have identified Napavale’s variable costs. An alternative view of the Contribution Margin worksheet in which the values and formulas underlying the worksheet cells are exposed and visible is presented in Figure 11.2. The names of the input and output cells in the Contribution Margin worksheet are shown in Figure 11.3. Napavale’s fixed costs are identified and shown in the Contribution Margin worksheet in Figure 11.4. The values and formulas underlying the worksheet cells in the Contribution Margin worksheet are shown in Figure 11.5. Figure 11.6 presents a view of the names of the input and output cells underlying Napavale’s Contribution Margin worksheet.
### FIGURE 11.2  Alternative View of the Contribution Margin Worksheet

### FIGURE 11.3  Names of the Input and Output Cells in the Contribution Margin Worksheet
### FIGURE 11.4 Contribution Margin Worksheet with Fixed Costs Identified

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable Costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitor screen</td>
<td>75,000</td>
<td>106,000</td>
<td>136,500</td>
<td>186,000</td>
<td>487,500</td>
</tr>
<tr>
<td>Monitor casing</td>
<td>76,000</td>
<td>108,000</td>
<td>136,500</td>
<td>186,000</td>
<td>487,500</td>
</tr>
<tr>
<td>Assembly labor</td>
<td>50,000</td>
<td>75,000</td>
<td>100,800</td>
<td>126,000</td>
<td>351,900</td>
</tr>
<tr>
<td>Miscellaneous expenses</td>
<td>30,000</td>
<td>43,200</td>
<td>57,960</td>
<td>75,600</td>
<td>206,760</td>
</tr>
<tr>
<td>Research and development</td>
<td>70,000</td>
<td>100,800</td>
<td>154,560</td>
<td>201,660</td>
<td>526,960</td>
</tr>
<tr>
<td>Total variable costs</td>
<td>300,000</td>
<td>435,000</td>
<td>586,320</td>
<td>739,200</td>
<td>2,060,520</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Costs</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries</td>
<td>470,400</td>
<td>470,400</td>
<td>663,500</td>
<td>697,200</td>
<td>2,301,500</td>
</tr>
<tr>
<td>Rent</td>
<td>20,000</td>
<td>20,000</td>
<td>20,000</td>
<td>20,000</td>
<td>80,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>2,313</td>
<td>4,625</td>
<td>6,938</td>
<td>9,260</td>
<td>23,125</td>
</tr>
<tr>
<td>Total fixed costs</td>
<td>492,713</td>
<td>495,025</td>
<td>690,538</td>
<td>726,450</td>
<td>2,404,725</td>
</tr>
</tbody>
</table>

### FIGURE 11.5 Alternative View of the Contribution Margin Worksheet
Contribution Margin Analysis

FIGURE 11.6 Names of the Input and Output Cells in the Contribution Margin Worksheet

CONTRIBUTION MARGIN

Napavale’s contribution margin, which represents the amount that each unit sale contributes to the business’s fixed cost base, is equal to: unit price – variable costs per unit. I am going to calculate Napavale’s contribution margin at the “company” level as opposed to the unit level, so I calculate contribution margin as: sales (in dollars) – total variable costs (in dollars). The calculation of Napavale’s contribution margin is presented in Figure 11.7.

An alternative view of the calculation of Napavale’s contribution margin, in which the values and formulas underlying the worksheet cells are exposed and visible, is shown in Figure 11.8. The names of the input and output cells in Napavale’s Contribution Margin worksheet are shown in Figure 11.9.
FIGURE 11.7  Calculation of the Contribution Margin

FIGURE 11.8  Alternative View of the Calculation of the Contribution Margin
Contribution Margin Analysis

FIGURE 11.9 Names of the Input and Output Cells in the Contribution Margin Worksheet

For the sake of reference, I reconcile Napavale’s contribution margin with the business’s net income. Napavale’s operating cost base is made up of two different types of costs: fixed costs and variable costs. In addition to operating costs, Napavale is also projected to incur interest and tax expenses in the future. As such, if I subtract out fixed costs, variable costs, and interest and tax expenses from Napavale’s total sales, I will have calculated net income. This calculation is presented in Figure 11.10. Figure 11.11 presents an alternative view of the Contribution Margin worksheet in which the values and formulas underlying the worksheet cells are exposed and visible.

As no new names have been added to the Contribution Margin worksheet since the calculation of Napavale’s contribution margin, I will not present another view of the names of the input and output cells underlying Napavale’s Contribution Margin worksheet at this point.
FIGURE 11.10  Reconciliation of Contribution Margin with Net Income

FIGURE 11.11  Alternative View of the Reconciliation of Contribution Margin with Net Income
OPERATING LEVERAGE

Operating leverage is defined as the ratio of a company’s fixed costs to its overall costs. A company’s level of operating leverage indicates what percentage of its total cost base is represented by fixed costs. Operating leverage is an important metric that indicates how leveraged a company is operationally. The calculation of Napavale’s operating leverage is shown in Figure 11.12. The values and formulas underlying the worksheet cells related to the calculation of Napavale’s operating leverage are shown in Figure 11.13. The names of the input and output cells associated with the calculation of Napavale’s operating leverage are shown in Figure 11.14.

Note that I am not including interest expenses or taxes in my calculation of Napavale’s total costs to determine the company’s operating leverage. I am utilizing this approach so that I might focus on and assess the operational dynamics (as opposed to the operational and financial dynamics) of Napavale as a business.

FIGURE 11.12 Calculation of Operating Leverage
FIGURE 11.13  Alternative View of the Calculation of Operating Leverage

FIGURE 11.14  Names of the Input and Output Cells Underlying the Calculation of Operating Leverage
BREAKEVEN POINTS IN UNITS

A company’s breakeven point is the point at which its revenues cover all of its costs. Breakeven point is an important metric that indicates how many units a company must sell, or the dollar value of revenues a company must generate, to cover all of its costs (both fixed and variable). A company’s breakeven point in units is calculated as: (total fixed costs)/(contribution margin per unit). Note that I am calculating Napavale’s breakeven point on an operating profit basis. In other words, I am not including interest expenses or taxes in my calculation of Napavale’s breakeven point. This is because I am interested in assessing the operational dynamics of Napavale as a business; you may find it useful to include interest and tax expenses in your calculation of breakeven point. If you do decide to include such expenses in your calculation of a breakeven point, be sure to clearly note this fact in your calculation.

The calculations of Napavale’s contribution margin per unit and breakeven point in units are shown in Figure 11.15. Note that Napavale’s contribution margin per unit, and breakeven point, varies across accounting periods (quarters) due to the fluctuation in fixed costs, variable costs, and revenues over each of the accounting periods.

The breakeven points shown for each accounting period (quarter) apply to each accounting period separately; they are not cumulative in nature.

An alternative view of Figure 11.15 in which the values and formulas underlying the worksheet cells are visible is shown in Figure 11.16. Figure 11.17 presents the names of the input and output cells associated with the calculation of Napavale’s breakeven point in units.
FIGURE 11.16  Alternative View of the Calculation of the Breakeven Point in Units

FIGURE 11.17  Names of the Input and Output Cells Underlying the Calculation of the Breakeven Point in Units
BREAKEVEN POINT IN DOLLARS

Another way to calculate a company’s breakeven point is in terms of dollars of revenues. Calculating Napavale’s breakeven point in dollars of revenues does not change the breakeven point; it simply offers another metric (in addition to breakeven in units) by which Napavale may be analyzed and assessed. A company’s breakeven point in dollars of revenues is equal to:

\[(\text{breakeven point in units}) \times \text{(price per unit)}.\]

The price per unit used in this case is the average selling price per unit over each accounting period (quarter). This is the same price-per-unit approach as utilized in Chapter 2. As with the breakeven point in units, the breakeven points shown for each accounting period (quarter) apply to each accounting period separately; they are not cumulative in nature.

The calculation of Napavale’s breakeven point in dollars of revenue is presented in Figure 11.18. The values and formulas underlying the calculation of Napavale’s breakeven point in dollars of revenue are shown in Figure 11.19. Figure 11.20 presents a view of the names of the input and output cells underlying the calculation of Napavale’s breakeven point in dollars of revenues.

![Figure 11.18](image)

**FIGURE 11.18** Calculation of the Breakeven Point in Dollars of Revenue
FIGURE 11.19  Alternative View of the Calculation of the Breakeven Point in Dollars of Revenue

FIGURE 11.20  Names of the Input and Output Cells Underlying the Calculation of the Breakeven Point in Dollars of Revenue
QUESTIONs

Each of the questions for this chapter relates to a hypothetical company named Company 123. Company 123 sells GPS navigation systems to consumers. As such, Company 123 is a product-oriented (as opposed to a service-oriented) business. Note that there are three cost-of-goods-sold components for Company 123’s GPS navigation systems: (1) electronics, (2) casing, and (3) assembly and labor.

The questions for this chapter will address fiscal year X4 on a quarterly basis (four specific quarters, 1Q–4Q for year X4). The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to identify the fixed and variable costs, calculate the contribution margin, calculate the operating leverage, and calculate the breakeven point (in terms of both units and dollars) for Company 123.

To prepare you for this chapter’s questions, Figure Q11.1 offers a view of Company 123’s Cost-of-Goods-Sold Budget worksheet to provide some background information related to Company 123’s operations. Figure Q11.2 provides a view of Company 123’s Operating Expenses Budget. Company 123’s Headcount Cost worksheet is shown in Figure Q11.3. Figure Q11.4 provides a view of a portion of Company 123’s Assumptions and Dashboard worksheet. Company 123’s Capital Budget worksheet is shown in Figure Q11.5. Company 123’s Sales Budget is shown in Figure Q11.6. Figure Q11.7 provides a view of Company 123’s Cash Budget. Figure Q11.8 provides a view of Company 123’s Income Statement.

Note that I am assuming Company 123 generates a negative income tax expense in 1Q X4 and 2Q X4 to simplify these questions. While this does
FIGURE Q11.2  Company 123’s Operating Expenses Budget

FIGURE Q11.3  Company 123’s Headcount Cost Worksheet
Contribution Margin Analysis
FIGURE Q11.6  Company 123’s Sales Budget

FIGURE Q11.7  Company 123’s Cash Budget
FIGURE Q11.8  Company 123’s Income Statement

not represent a real-world scenario, it should help to make these exercises easier to follow.

1. Given the information presented, identify Company 123’s variable costs.
2. Using the information presented, identify Company 123’s fixed costs.
3. Given the information presented, calculate Company 123’s contribution margin and reconcile Company 123’s contribution margin with its Net Income.
4. Calculate, using the information presented, Company 123’s operating leverage.
5. Given the information presented, calculate Company 123’s breakeven point in terms of units.
6. Calculate, using the information presented, Company 123’s breakeven point in terms of dollars of revenues.
CHAPTER 12

Financial Ratios Analysis

This chapter covers the use of financial ratios to analyze and assess Na- pavale’s operations. Financial ratios are metrics that compare various elements of a business’s operations; one example would include Gross Mar- gin, which is calculated as: (Gross Profit)/(Sales). Financial ratios are used in several productive ways: They enable the comparison of ratios for a specific company across various accounting periods and they enable the comparison of a specific company to competitors and/or a broad set of companies, such as those included in an index such as the S&P 500 (Standard & Poor’s 500, which is an index used to track a set of companies), among other uses.

Using Napavale’s financial model, I will calculate three sets of financial ratios: profit margins, investment returns and management efficiency. The ratios covered in this chapter represent a small subset of the range of ratios used in the financial community. Depending on the nature of your own financial model, you may find it useful to use different or additional ratios to analyze and assess the operations of your own company. Regardless of the ratios you use, the process described in this chapter should apply to a wide array of financial ratios calculations.

PROFIT MARGINS—FINANCIAL RATIOS

The first set of financial ratios that I cover in this chapter, those related to profit margins, measure Napavale’s relative profitability in several different ways. The first ratio, Gross Margin, compares Napavale’s Gross Profit (which is equal to Sales – Cost of Goods Sold) to Sales. Gross Margin is calculated as: (Gross Profit)/(Sales).

Figure 12.1 presents a view of the calculation of Napavale’s Gross Mar- gin. An alternative view of the calculation of Napavale’s Gross Margin in which the values and formulas underlying the worksheet cells are revealed is shown in Figure 12.2. The names of the input and output cells underlying
FIGURE 12.1  Calculation of Gross Margin

FIGURE 12.2  Alternative View of the Calculation of Gross Margin
FIGURE 12.3 Names of the Input and Output Cells Underlying the Calculation of Gross Margin

the calculation of Napavale’s Gross Margin are presented in Figure 12.3. For the sake of reference, Figure 12.4 presents a view of the names of the input and output cells from Napavale’s Income Statement.

Also for the sake of reference, Figure 12.5 presents a view of the names of the input and output cells from Napavale’s Sales and Collections worksheet. Note the source of the inputs into the Gross Margin calculation—Sales values are drawn from the Sales and Collections worksheet and Gross Profit values are drawn from the Income Statement.

The next profit margin ratio, Pre-Tax Margin, compares Napavale’s pre-tax income (also referred to as “Taxable Income”) to Sales. I calculated Napavale’s Taxable Income in Chapter 5—another way to think of Taxable Income is “Net Income + Tax Expense.” In other words, the only difference between Taxable Income and Net Income is that Net Income incorporates the deduction of any tax expenses. As such, Pre-Tax Margin is
FIGURE 12.4  Names of the Input and Output Cells Underlying the Income Statement

FIGURE 12.5  Names of the Input and Output Cells Underlying the Sales and Collections Worksheet
ANALYSIS OF A FINANCIAL MODEL

FIGURE 12.6 Calculation of Pre-Tax Margin

calculated as: \( \frac{\text{Taxable Income}}{\text{Sales}} \). Figure 12.6 presents a view of the calculation of NapaVal’s Pre-Tax Margin. Figure 12.7 presents a view of the values and formulas underlying the calculation of NapaVal’s Pre-Tax Margin.

The names of the input and output cells associated with the calculation of NapaVal’s Pre-Tax Margin are shown in Figure 12.8. Note the source of the input values in this calculation—Taxable Income values are drawn from the Income Statement and Sales values are drawn from the Sales and Collections worksheet.

Net Profit Margin, the third profit margin ratio, compares NapaVal’s Net Income to Sales. This is a widely used financial ratio that is also referred to as “Net Margin” or “Net Income Margin,” among other names. Net Profit Margin is calculated as: \( \frac{\text{Net Income}}{\text{Sales}} \). Figure 12.9 presents a view of the calculation of NapaVal’s Net Profit Margin.

A view of the values and formulas underlying the calculation of NapaVal’s Net Profit Margin is shown in Figure 12.10. Figure 12.11 presents
FIGURE 12.7  Alternative View of the Calculation of Pre-Tax Margin

FIGURE 12.8  Names of the Input and Output Cells Underlying the Calculation of Pre-Tax Margin
FIGURE 12.9  Calculation of Net Profit Margin

FIGURE 12.10  Alternative View of the Calculation of Net Profit Margin
FIGURE 12.11  Names of the Input and Output Cells Underlying the Calculation of Net Profit Margin

a view of the names of the input and output cells associated with the calculation of Napavale’s Net Profit Margin. The Net Income values are drawn from Napavale’s Income Statement and the Sales values are drawn from the Sales and Collections worksheet.

**INVESTMENT RETURNS—FINANCIAL RATIOS**

Financial ratios related to investment returns measure how efficiently a business uses (or used) its financial resources. In this context, financial resources may include equity, debt, or assets (remember that assets represent the use of funds and equity and debt represent the source of funds for a business). Investment returns ratios typically relate an Income Statement account, such as Net Income, to a Balance Sheet account, such as Owners’ Equity.
The first investment returns ratio, Return on Equity, compares Napavale’s Net Income to its Owners’ Equity account. Return on Equity provides a measure of how effectively Napavale used its equity base in terms of generating profits (or Net Income). Return on Equity is calculated as: (Net Income)/(Owners’ Equity). Figure 12.12 presents the calculation of Napavale’s Return on Equity. Note that I am “annualizing” each quarter’s investment returns ratio (for each of the three investment returns covered in this section) by multiplying the ratio by four (as there are four quarters in each year). I am interested in measuring Napavale’s investment returns, such as Return on Equity, on an annual basis. As such, I need to adjust the quarterly calculations to reflect my focus on annualized figures.

The values and formulas underlying the worksheet cells associated with the calculation of Napavale’s Return on Equity are shown in Figure 12.13. Figure 12.14 presents a view of the names of the input and output cells related to the calculation of Napavale’s Return on Equity.
FIGURE 12.13  Alternative View of the Calculation of Return on Equity

FIGURE 12.14  Names of the Input and Output Cells Underlying the Calculation of Return on Equity
ANALYSIS OF A FINANCIAL MODEL

FIGURE 12.15 Names of the Input and Output Cells Underlying the Balance Sheet

Note that the Net Income values are drawn from the Income Statement and the Owners’ Equity values are drawn from the Balance Sheet. A view of the names of the input and output worksheet cells from Napavale’s Balance Sheet is presented in Figure 12.15 for the sake of reference.

The next investment returns ratio, Return on Assets, compares Napavale’s Net Income to its Assets. Return on Assets provides an indication of how effectively Napavale utilized its Assets in generating Net Income. Return on Assets is calculated as: (Net Income)/(Assets). Figure 12.16 presents a view of the calculation of Napavale’s Return on Assets. An alternative view of the calculation of Napavale’s Return on Assets in which the values and formulas underlying the worksheet cells are exposed and visible is
FIGURE 12.16 Calculation of Return on Assets

presented in Figure 12.17. The names of the input and output cells related to the calculation of Napavale’s Return on Assets are shown in Figure 12.18. The Net Income values are drawn from Napavale’s Income Statement and the Assets values are drawn from Napavale’s Balance Sheet.

Return on Capital, the third investment returns ratio, measures how effectively Napavale utilized its Capital (defined as equity + debt in this case) in generating Net Income. As Capital includes both equity and debt in this context, a specific company’s Return on Equity may be very similar to or very different from its Return on Capital depending upon how much debt that company has in its capital structure. Return on Capital is calculated as: (Net Income)/(Owners’ Equity + Debt). The calculation of Napavale’s Return on Capital is shown in Figure 12.19. Figure 12.20 presents a view of the calculation of Napavale’s Return on Capital in which the values and formulas underlying the calculation are visible. The names of the input and
ANALYSIS OF A FINANCIAL MODEL

FIGURE 12.17  Alternative View of the Calculation of Return on Assets

FIGURE 12.18  Names of the Input and Output Cells Underlying the Calculation of Return on Assets
FIGURE 12.19  Calculation of Return on Capital

FIGURE 12.20  Alternative View of the Calculation of Return on Capital
Names of the Input and Output Cells Underlying the Calculation of Return on Capital

Output cells related to the calculation of Napavale’s Return on Capital are shown in Figure 12.21. Note that the Net Income values are drawn from Napavale’s Income Statement and the values underlying the calculation of Napavale’s Capital are drawn from the Balance Sheet.

Management Efficiency—Financial Ratios

Financial ratios related to management efficiency measure how efficiently a business has been managed. While a wide array of management efficiency ratios are used, I focus on two types of ratios for Napavale: “per-employee” ratios and “turnover” ratios. Per-employee ratios compare operating metrics and measures such as Net Income and Sales to the number of employees at Napavale. Turnover ratios compare various Balance Sheet accounts, such as
Financial Ratios Analysis

Accounts Receivable and Inventory, to Sales or Cost of Goods Sold (Income Statement accounts).

As I did with the investment returns, I will annualize each of the quarterly calculations by multiplying the quarterly results by four (as there are four quarters in a year). Also, while some of these management efficiency ratios technically call for the use of an average value, such as the average number of employees over a given period of time (such as a year), I am going to use period-end figures for the sake of simplicity.

The two per-employee management efficiency ratios that I cover for Napavale are Income/Employee and Revenue/Employee. Income/Employee compares Napavale’s Income (or Net Income) to the number of employees at Napavale—this ratio is calculated as: (Net Income)/(Number of Employees). Revenue/Employee compares Napavale’s Revenue (or Sales) to the number of employees at Napavale—this ratio is calculated as (Sales)/(Number of Employees). Figure 12.22 presents a view of the calculation of Napavale’s Income/Employee and Revenue/Employee.

![Figure 12.22 Calculation of Income/Employee and Revenue/Employee](image)
A view of the values and formulas underlying the worksheet cells associated with the calculation of Napavale’s Income/Employee and Revenue/Employee is presented in Figure 12.23. Figure 12.24 offers a view of the input and output worksheet cells related to the calculation of Napavale’s Income/Employee and Revenue/Employee.

Note that the Net Income values are drawn from Napavale’s Income Statement, the Sales values are drawn from Napavale’s Sales and Collections worksheet, and the Number of Employees values are drawn from Napavale’s Assumptions and Dashboard worksheet. For the sake of reference, Figure 12.25 presents a view of the names of the worksheet cells underlying the Assumptions and Dashboard worksheet.

The three turnover management efficiency ratios that I cover for Napavale are Receivable Turnover, Inventory Turnover, and Asset Turnover. Receivable Turnover, which compares Napavale’s Sales to its Accounts Receivable, is calculated as: (Sales)/(Accounts Receivable). Inventory Turnover, which compares Napavale’s Cost of Goods Sold to its
FIGURE 12.24  Names of the Input and Output Cells Underlying the Calculation of Income/Employee and Revenue/Employee

FIGURE 12.25  Names of the Input and Output Cells Underlying the Assumptions and Dashboard Worksheet
Inventory, is calculated as: \((\text{Cost of Goods Sold})/(\text{Inventory})\). The third turnover management efficiency ratio, Asset Turnover, compares Napavale’s Sales to its Assets and is calculated as: \((\text{Sales})/(\text{Assets})\).

Figure 12.26 presents a view of the calculation of Napavale’s Receivable Turnover, Inventory Turnover, and Asset Turnover. A view of the values and formulas underlying the calculation of Napavale’s Receivable Turnover, Inventory Turnover, and Asset Turnover is presented in Figure 12.27. Figure 12.28 offers a view of the names of the input and output cells underlying the calculation of Napavale’s Receivable Turnover, Inventory Turnover, and Asset Turnover.

**Figure 12.26** Calculation of Receivables Turnover, Inventory Turnover, and Asset Turnover
FIGURE 12.27  Alternative View of the Calculation of Receivables Turnover, Inventory Turnover, and Asset Turnover

FIGURE 12.28  Names of the Input and Output Cells Underlying the Calculation of Receivables Turnover, Inventory Turnover, and Asset Turnover
QUESTIONS

Each of the questions for this chapter relates to a hypothetical company named Company 456. Company 456 sells display monitors to physicians. As such, Company 456 is a product-oriented (as opposed to a service-oriented) business. Note that there are three cost-of-goods-sold components for Company 456’s display monitors: (1) monitor screen, (2) monitor casing, and (3) assembly and labor.

The questions for this chapter will address fiscal year X4 on a quarterly basis (four specific quarters, 1Q–4Q for year X4). The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to calculate a set of financial ratios for Company 456.

To prepare you for this chapter’s questions, Figure Q12.1 offers a view of Company 456’s Income Statement to provide some background information related to Company 456’s operations. Company 456’s Sales and Collections worksheet is shown in Figure Q12.2. Figure Q12.3 offers a view of Company 456’s Balance Sheet. A section of Company 456’s Assumptions and Dashboard worksheet is shown in Figure Q12.4. Company 456’s Cost-of-Goods Sold worksheet is shown in Figure Q12.5. Figure Q12.6 provides a view of Company 456’s Inventory and Purchases worksheet.

FIGURE Q12.1 Company 456’s Income Statement
FIGURE Q12.2  Company 456’s Sales and Collections Worksheet

FIGURE Q12.3  Company 456’s Balance Sheet
FIGURE Q12.4  Company 456’s Assumptions and Dashboard Worksheet

FIGURE Q12.5  Company 456’s Cost-of-Goods-Sold Worksheet
FIGURE Q12.6  Company 456’s Inventory and Purchases Worksheet

1. Given the information presented, calculate Company 456’s Gross Margin, Pre-Tax Margin, and Net Profit Margin.
2. Given the information presented, calculate Company 456’s Return on Equity, Return on Assets, and Return on Capital.
3. Given the information presented, calculate Company 456’s Income per Employee, Revenue per Employee, Receivable Turnover, Inventory Turnover, and Asset Turnover.
This chapter covers the topic of valuation, or the practice of placing a value on a business. Valuation is a vast and complex topic—many books have been written on this subject alone. My goal in this chapter is to introduce several of the most commonly used valuation approaches, including discounted cash flow, public company comparables, and mergers and acquisitions comparables.

Beyond the coverage of specific valuation methodologies, a core concept of valuation is this: The best valuation approach is often a combination of approaches. In other words, it is often best to use several valuation techniques to assess the value of a business. In so doing, it is possible to triangulate on the value of a business by weighting various valuation approaches. I address the valuation of Napavale in this chapter by triangulating on the value of Napavale—by using and weighing several valuation methodologies.

I cover the discounted cash flow, public company comparables, and mergers and acquisitions comparables valuation methodologies separately and then discuss the concept of triangulation and weighing these various approaches at the end of the chapter.

**DISCOUNTED CASH FLOW**

The discounted cash flow (DCF) valuation approach is widely used and is covered in many undergraduate and graduate-level finance classes in the United States. In essence, the general premise of the DCF approach is this: The value of a business is equal to the present value of the cash flows generated by that business in the future. There are two key concepts in this definition—“present value” and “cash flows.”

While various interpretations of the meaning of “cash flows” exist, I will use Napavale’s free cash flows (as covered in Chapter 9) as the proxy for “cash flows” in this context. Using free cash flows in a DCF approach is
a common practice and it builds on my work in Chapter 9 on the Free Cash Flows worksheet.

The concept of present value, which I have not yet covered in this book, is central to the discipline of finance. Present value and the related concept of future value both deal with the value of something at a particular point in time. While present value may seem like a simple concept, it is actually deceptively complex.

One way to think about the concept of present value is in terms of the value of a dollar now and the value of that same dollar in the future. Generally speaking, a dollar today is worth more than a dollar tomorrow. Please note, this is a broad and sweeping statement that incorporates a variety of assumptions and complex economic theories. My intent here is only to convey the essence of the concept of present value—nothing more.

In an inflationary economic environment (meaning, among other things, one in which prices increase), a dollar’s buying power will decrease over time. As such, if a dollar’s buying power decreases over time, it is worth more today than it is in the future.

The equation that defines the relationship between present value and future value quantifies this concept of the changing value of a dollar (or any other good or service) over time. This equation is:

\[
\text{Present Value} = \frac{\text{Future Value}}{(1 + \text{Discount Rate})^{\text{Time Period}}}
\]

Using this equation, it is possible to determine the present value of an asset given the following: its future value, a discount rate, and the time period (such as the number of years into the future) associated with the future value. The use of this equation should become clear as I walk through the DCF approach for Napavale.

The first step in building a DCF model for Napavale is to calculate the free cash flows for each of the accounting periods (quarters) covered in Napavale’s financial model. I calculated the free cash flows in Chapter 9 and Figure 13.1 presents a view of the Free Cash Flows worksheet as I left it in Chapter 9.

Figure 13.2 presents a view of the values and formulas underlying the worksheet cells in Napavale’s Free Cash Flows worksheet. The names of the input and output worksheet cells in Napavale’s Free Cash Flows worksheet are shown in Figure 13.3. Please refer to the coverage of free cash flows in Chapter 9 if you need to review the elements of the Free Cash Flows worksheet.

Calculating something known as a “terminal value” for Napavale is the next step in building the DCF model. A terminal value represents the present value of all of a company’s future free cash flows (until perpetuity,
FIGURE 13.1  Free Cash Flows Worksheet

FIGURE 13.2  Alternative View of the Free Cash Flows Worksheet
or the end of time) at some point in the future. Since I cannot build a financial model out indefinitely into time, a terminal value encapsulates assumptions regarding future free cash flows (beyond the timeframe covered by the financial model) in a single number. The terminal value is calculated for the final accounting period covered by the financial model. In essence, the terminal value represents the present value of Napavale’s free cash flows into perpetuity at some point in the future.

I have calculated Napavale’s terminal value using the following formula:

\[
\text{Terminal Value} = \frac{(\text{Free Cash Flow for X4}) \times (1 + \text{Growth Rate to Perpetuity})}{\text{Discount Rate} - \text{Growth Rate to Perpetuity}}
\]

This is a well-known formula, but many different approaches may be used to calculate a terminal value. Please note that I am using free cash flow for X4 in this calculation. Technically speaking, this terminal value calculation is meant to project out free cash flow for the time period subsequent to the final period (typically a particular year) covered in the financial model. As such, I have based my terminal value calculation on the free cash flow that is generated in all of X4.
When you build your own financial models, it is important to be clear on how you are calculating free cash flow projections in your terminal value calculation. Generally speaking, the free cash flow value used in this terminal value calculation relates to a year time period.

Figure 13.4 presents a view of the Assumptions and Dashboard worksheet with the addition of the assumptions related to Napavale’s discount rate and growth rate to perpetuity. Napavale’s updated Free Cash Flows worksheet is presented in Figure 13.5. Note that I have calculated Napavale’s total free cash flows by adding the terminal value to the free cash flows calculated in Chapter 9. An alternative view of the Free Cash Flows worksheet in which the values and formulas underlying the worksheet cells are exposed is presented in Figure 13.6. The names of the input and output worksheet cells in Napavale’s Free Cash Flows worksheet are shown in Figure 13.7. Figure 13.8 offers a view of the names of the input cells in the Assumptions and Dashboard worksheet.

The final step in building Napavale’s DCF model is to calculate and add the present values for each accounting period (quarter) based on the “total free cash flows” that incorporate the terminal value. The present value of each of Napavale’s free cash flows is calculated using the present value formula described earlier in this chapter:

\[
\text{Present Value} = \frac{\text{Future Value}}{(1 + \text{Discount Rate})^{\text{Time Period}}}
\]

FIGURE 13.4 Assumptions and Dashboard Worksheet
Using the assumption that today is the first day of 1Q X4 and each accounting period (quarter) represents one quarter (0.25) of a year, Figure 13.9 presents Napavale’s updated Free Cash Flows worksheet in which the present value of each accounting period’s (quarter’s) free cash flow is calculated. Note that Napavale’s NPV—in other words, Napavale’s

**FIGURE 13.5** Updated Free Cash Flows Worksheet

**FIGURE 13.8** Alternative View of the Free Cash Flows Worksheet
FIGURE 13.7  Names of the Input and Output Cells Underlying the Free Cash Flows Worksheet

FIGURE 13.8  Names of the Input and Output Cells Underlying the Assumptions and Dashboard Worksheet
“value” as determined by the DCF model—is equal to the sum of all of the present values of each of the accounting period’s (quarter’s) free cash flows.

Please note that I am not incorporating the equity investment of $1 million into the discounted cash flow valuation of Napavale. I am calculating the “post-money” valuation here—in other words, this discounted cash flow approach values Napavale assuming the $1 million has already been invested into the company.

As with many valuation techniques, you can include the equity investment into the valuation, but you must take such an investment into consideration when you create and calculate the capitalization chart and ownership percentages of the company. (These topics are discussed in Chapter 14.)

My approach with regard to the equity investment is one way to value Napavale. While there are other ways to run such a valuation, remember to be clear about how investments into a company are accounted for when valuing the company.

Figure 13.10 presents a view of Napavale’s updated Free Cash Flows worksheet in which the values and formulas underlying the worksheet cells are visible. The names of the input and output worksheet cells in Napavale’s updated Free Cash Flows worksheet are shown in Figure 13.11.
### Figure 13.10  Alternative View of the Updated Free Cash Flows Worksheet

![Alternative View of the Updated Free Cash Flows Worksheet](image1.png)

### Figure 13.11  Names of the Input and Output Cells Underlying the Updated Free Cash Flows Worksheet

![Names of the Input and Output Cells Underlying the Updated Free Cash Flows Worksheet](image2.png)
PUBLIC COMPANY COMPARABLES

The public company comparables valuation approach is a comparative methodology in which the values of publicly traded companies are used as proxies for Napavale’s valuation. More specifically, the manner in which publicly traded companies’ valuations are related to certain measures and metrics, such as sales, net income, or free cash flows, is used to estimate a value for Napavale as a company.

I am going to use fictitious companies and numbers in this analysis, but the methodology outlined in this section of the book may be easily applied to the use of actual market-based numbers as well. I will use two types of fictitious public companies for the public company comparables approach: direct competitors to Napavale and companies included in a fictitious index similar to the S&P 500. Using direct competitors should give a sense of how investors value companies in Napavale’s industry and using an index of stocks should provide some perspective on how investors value the market as a whole.

The first step in building a public companies comparables analysis is to collect relevant data for the public companies against which Napavale will be compared. I am going to collect data on companies’ valuations, sales, net income, and free cash flows. Note that this data will represent projections for each of these companies’ next 12 months (four quarters) of operations. Using this data will allow a more direct comparison of Napavale with the competitors and the stock index. Figure 13.12 provides a view of this data.

FIGURE 13.12 Data for Fictitious Companies and Fictitious Index of Stocks
ANALYSIS OF A FINANCIAL MODEL

FIGURE 13.13 Calculations of Multiples of Various Operational Measures

for the fictitious companies and the fictitious index of stocks that I use in my valuation of Napavale.

The next step involved in building a public company comparables valuation model is to calculate the “multiples” for each of these operational measures (sales, net income, and free cash flows) as represented by each of the competitor company’s and stock index’s valuation. Figure 13.13 provides a view of these calculations.

Note that I have also included a calculation of the median for each of the respective multiple calculations—I will use these median figures to value Napavale using the public company comparables methodology later in this chapter. I ordered companies in descending order by valuation (price).

A view of the values and formulas underlying the worksheet cells associated with the multiple calculations is shown in Figure 13.14. Figure 13.15 provides a view of the names of the input and output cells associated with the calculation of the “multiple” values.

FIGURE 13.14 Alternative View of the Calculations of Multiples of Various Operational Measures
The final step in the public company comparables valuation approach is to apply the appropriate multiples of chosen measures and metrics (sales, net income, and free cash flows in this case) to Napavale. I use the median multiples that I calculated for Napavale’s competitors and the value that I calculated for the stock index to value Napavale using the public comparables valuation approach. Figure 13.16 shows the completed public company comparables valuation worksheet. The values and formulas underlying the worksheet cells in the public company comparables valuation worksheet are shown in Figure 13.17. Figure 13.18 offers a view of the names underlying the public company comparables valuation worksheet.
FIGURE 13.17  Alternative View of the Completed Public Company Comparables Valuation Worksheet

FIGURE 13.18  Names of the Input and Output Cells Underlying the Completed Public Company Comparables Valuation Worksheet
Valuation

Note that when I triangulate on a value for Napavale later in this chapter, I use the value derived for Napavale’s direct competitors using the public company comparables valuation approach and not the value derived for the stock index. I believe Napavale’s direct competitors provide a better sense of how the market would value Napavale than does the stock index value—I calculated the stock index value for the sake of reference only.

MERGERS AND ACQUISITIONS COMPARABLES

The mergers and acquisitions comparables valuation approach, like the public company comparables valuation approach, is a comparative methodology. In the case of the mergers and acquisitions valuation approach, data from recent mergers and acquisitions in Napavale’s market is used to estimate a value for Napavale as a company. The term “mergers and acquisitions” refers to the combination or acquisition of businesses.

As with the public company comparables approach, I am going to use fictitious companies and numbers in this analysis, but the methodology outlined in this section of the book may be easily applied to the use of actual market-based numbers as well. I will use data related to fictitious mergers and acquisitions within Napavale’s market (also called “industry”).

The first step in building a mergers and acquisitions comparables analysis is to collect relevant data for mergers and acquisitions transactions in Napavale’s market. I am going to collect data on companies’ valuations (as determined by mergers and acquisitions “prices”), sales, net income, and asset values. Note that this data will represent projections for each of these companies’ next 12 months (four quarters) of operations. Using this data will allow a more direct comparison of Napavale with its competitors. Figure 13.19 provides a view of this data for the fictitious mergers and acquisitions transactions that I use in my valuation of Napavale.

The second step involved in building a mergers and acquisitions comparables valuation model is to calculate the multiple for each of these operational measures (sales, net income, and asset values) as represented by each of the transactions’ prices (which is the same idea as their valuations). Figure 13.20 provides a view of these calculations.

Note that I have also included a calculation of the median for each of the respective multiple calculations—I will use these median figures to value Napavale using the mergers and acquisitions comparables methodology
later in this chapter. I ordered companies in descending order by valuation (price).

A view of the values and formulas underlying the worksheet cells associated with the multiple calculations is shown in Figure 13.21. Figure 13.22 provides a view of the names of the input and output cells associated with the calculation of the multiple values.
The final step in the mergers and acquisitions comparables valuation approach is to apply the appropriate multiples of chosen measures/metrics (sales, net income, and asset values in this case) to Napavale. I use the median multiples that I calculated for the mergers and acquisitions transactions to value Napavale in this case. Figure 13.23 shows the completed mergers and acquisitions comparables valuation worksheet.

The values and formulas underlying the worksheet cells in the mergers and acquisitions comparables valuation worksheet are shown in Figure 13.24. Figure 13.25 offers a view of the names underlying the mergers and acquisitions comparables valuation worksheet.
**FIGURE 13.23** Completed Mergers and Acquisitions Comparables Valuation Worksheet

<table>
<thead>
<tr>
<th>Merger/并购公司</th>
<th>Value ($)</th>
<th>Projected Next 4 Quarters</th>
<th>Multiple of Projected Next 4 Quarters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Company</td>
<td>100,000,000</td>
<td>120,000,000</td>
<td>1.20</td>
</tr>
<tr>
<td>Company 1</td>
<td>125,000,000</td>
<td>150,000,000</td>
<td>1.20</td>
</tr>
<tr>
<td>Company 2</td>
<td>150,000,000</td>
<td>175,000,000</td>
<td>1.15</td>
</tr>
<tr>
<td>Median</td>
<td>127,500,000</td>
<td>152,500,000</td>
<td>1.18</td>
</tr>
</tbody>
</table>

**FIGURE 13.24** Alternative View of the Completed Mergers and Acquisitions Comparables Valuation Worksheet

**FIGURE 13.25** Names of the Input and Output Cells Underlying the Completed Mergers and Acquisitions Comparables Valuation Worksheet
WEIGHTED VALUATION

Now that I have calculated Napavale’s estimated valuation using the discounted cash flow technique, public company comparables approach, and mergers and acquisitions comparables approach, I apply a relative weight to each of these valuation methodologies to triangulate on an overall valuation for Napavale. Determining the appropriate weighting for each of these valuation methodologies is a matter of judgment—the weightings that I apply to the methodologies reflect my bias as to the relative importance of each valuation approach. You should use whatever relative weightings seem most appropriate for your own company.

Figure 13.26 presents a view of Napavale’s Valuation worksheet in which the valuation results of each of the three valuation approaches covered in this chapter are shown. I have chosen to use the Price to Sales median multiple value for Napavale’s direct competitors for the “public company comparables” valuation and the Price to Sales median multiple value for the “mergers and acquisitions comparables” valuation. This is only a matter of preference and you are free to choose which multiples to use in the valuations of your own companies. I have also included relative weights and “weighted valuations” for each of these valuation approaches. The weighted valuations are calculated as: (Weighted Valuation) = (Valuation) * (Relative Weight). Note that I have also totaled the weighted valuation figures to determine a total or final valuation for Napavale as a business.

The values and formulas underlying Napavale’s Valuation worksheet are exposed in Figure 13.27. Figure 13.28 offers a view of the names of the worksheet cells underlying Napavale’s Valuation worksheet.

FIGURE 13.26 Valuation Worksheet
FIGURE 13.27  Alternative View of the Valuation Worksheet

FIGURE 13.28  Names of the Input and Output Cells Underlying the Valuation Worksheet

Please note that the “total” valuation shown in Figure 13.26 represents my estimate of Napavale’s valuation. This value represents a weighted total of the three valuation approaches (discounted cash flow, public company comparables, and mergers and acquisitions comparables) covered in this chapter.

QUESTIONS

Each of the questions for this chapter relates to the hypothetical company named Company 456—this company was used in the Questions section of Chapter 12. To review, Company 456 sells display monitors to physicians. As such, Company 456 is a product-oriented (as opposed to a service-oriented) business.
The questions for this chapter will address fiscal year X4 on a quarterly basis (four specific quarters, 1Q–4Q for year X4). The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to triangulate on a valuation for Company 456 using discounted cash flow, public company comparables, and mergers and acquisitions valuation methodologies.

To prepare you for this chapter’s questions, Figure Q13.1 offers a view of Company 456’s Free Cash Flows worksheet to provide some background information related to Company 456’s operations. A portion of Company 456’s Assumptions and Dashboard worksheet is shown in Figure Q13.2. Figure Q13.3 presents a view of the data associated with fictitious companies and a fictitious stock index that will be used in the public company comparables valuation for Company 456. Data associated with fictitious mergers and acquisitions transactions that will be used in the mergers and acquisitions comparables valuation for Company 456 is presented in Figure Q13.4. The relative weightings to be used in Chapter 13’s questions for each of the valuation approaches are shown in Figure Q13.5.

### Figure Q13.1
Company 456’s Free Cash Flows Worksheet

<table>
<thead>
<tr>
<th>Period</th>
<th>EBIT (Q X4)</th>
<th>Effective tax rate</th>
<th>EBIT * (1 - t)</th>
<th>CAPEX</th>
<th>Changes in NWC</th>
<th>Free cash flow</th>
<th>Present value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Q X4</td>
<td>$2,071,250</td>
<td>35.0%</td>
<td>$1,346,313</td>
<td>1,950</td>
<td>38,000</td>
<td>776,759</td>
<td>$533,503</td>
</tr>
<tr>
<td>2Q X4</td>
<td>$2,357,050</td>
<td>35.0%</td>
<td>$1,532,083</td>
<td>4,150</td>
<td>43,000</td>
<td>637,694</td>
<td>$866,538</td>
</tr>
<tr>
<td>3Q X4</td>
<td>$2,240,200</td>
<td>35.0%</td>
<td>$1,456,130</td>
<td>6,150</td>
<td>39,000</td>
<td>70,157</td>
<td>$1,383,123</td>
</tr>
<tr>
<td>4Q X4</td>
<td>$1,991,500</td>
<td>35.0%</td>
<td>$1,294,475</td>
<td>8,200</td>
<td>40,000</td>
<td>46,978</td>
<td>$1,309,853</td>
</tr>
<tr>
<td>X4</td>
<td>$8,660,000</td>
<td>36.0%</td>
<td>$5,629,000</td>
<td>20,450</td>
<td>160,000</td>
<td>1,437,633</td>
<td>$4,061,817</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>NPV</th>
<th>WACC</th>
<th>g (to perpetuity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td></td>
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<td></td>
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<td>A3</td>
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<td>A4</td>
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<td></td>
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<td>A5</td>
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<td></td>
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<td>A6</td>
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<td>A7</td>
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<td></td>
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<td>A8</td>
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<td>A9</td>
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<td>A10</td>
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<td>A11</td>
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<td>A12</td>
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<td>A16</td>
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<td></td>
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<tr>
<td>A20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A21</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FIGURE Q13.1** Company 456’s Free Cash Flows Worksheet
FIGURE Q13.2  Company 456’s Assumptions and Dashboard Worksheet

FIGURE Q13.3  Data for Fictitious Companies and Fictitious Index of Stocks
FIGURE Q13.4  Data for Fictitious Mergers and Acquisitions Transactions

FIGURE Q13.5  Relative Weightings for Each Valuation Approach
1. Given the information presented, calculate Company 456’s total free
cash flows.
2. Given the information presented, calculate Company 456’s net present
value.
3. Calculate, using the information presented, the multiple of (i) sales,
(ii) Net Income, and (iii) free cash flows for each of the comparable
public companies and the stock index. Also calculate the median value
for the multiples of the public company comparables as a group.
4. Apply the median multiple and the stock index multiple as calculated
in Question 3 to Company 456 to derive a public company comparable
valuation for Company 456.
5. Calculate, using the information presented, the multiple of (i) sales,
(ii) Net Income, and (iii) Asset values for each of the mergers and acqui-
sitions transactions. Also calculate the median value for the multiples of
the mergers and acquisitions transactions as a group.
6. Apply the median multiples as calculated in Question 5 to Company 456
to derive a mergers and acquisitions comparable valuation for Company
456.
7. Calculate the weighted valuations and total valuation for Company
456 using the DCF valuation, the public company comparables valua-
tion (multiple of sales for competitors method), and the mergers and
acquisitions valuation (multiple of sales for competitors method).
CHAPTER 14

Capitalization Chart

This chapter covers the topic of a Capitalization Chart, which is a schedule that tracks the ownership structure of a company. A Capitalization Chart (also referred to as a “Cap Chart”) is an important, and deceptively complex, schedule that has traditionally received little attention in finance-oriented books and textbooks. As such, I will cover this subject using the financial and valuation models developed over the course of this book.

I address the following specific issues related to Napavale’s Cap Chart in this chapter: the “founding” Cap Chart, the effect of an equity investment into Napavale on the Cap Chart and the effect of issuing stock options to employees on Napavale’s Cap Chart.

FOUNDING CAPITALIZATION CHART

As discussed in Chapter 2, Napavale was founded and began operations in the first accounting period (1Q X4) covered by the financial model used in this book. Upon its formation, the founders of Napavale determined their initial ownership percentages in Napavale. This initial ownership structure is captured and described in the founding Cap Chart.

I am assuming that Napavale was founded by three individuals and that each of these individuals received an identical allocation of stock in Napavale upon its formation. As such, each of the three founders received 33.3 percent of Napavale’s equity upon the formation of the company. I am also assuming that there was an initial pool of 100,000 shares of “founder’s stock.” Thus, each of the three founders received 33,333 shares of stock in Napavale. Napavale’s founding Cap Chart is shown in Figure 14.1.

Figure 14.2 offers a view of the values and formulas underlying Napavale’s founding Cap Chart. Note that I have included a section in
FIGURE 14.1  Founding Cap Chart

the founding Cap Chart to account for any issued and outstanding stock options. While no stock options were issued upon Napavale’s formation, the inclusion of stock options in Napavale’s capital structure will be covered later in this chapter. The names of the input and output cells associated with Napavale’s founding Cap Chart are shown in Figure 14.3.

FIGURE 14.2  Alternative View of the Founding Cap Chart
EQUITY INVESTMENT’S EFFECT ON CAPITALIZATION CHART

Now that Napavale’s founding Cap Chart is complete, I will cover the effect of an equity investment into Napavale on Napavale’s Cap Chart. You may remember that I covered an equity investment into Napavale in Chapter 6 while discussing Napavale’s Cash Budget. Specifically, $1 million was invested into Napavale in 1Q X4. Figure 14.4 provides a view of Napavale’s Cash Budget for the sake of reference.

When an equity investment is made into a company, the ownership structure (and the Cap Chart) changes as well. In order to determine how Napavale’s Cap Chart will change after the projected equity investment of $1 million in 1Q X4, I must calculate how much of Napavale as a company was “sold” to the investor providing this $1 million of equity capital. To do this, I must know Napavale’s value when this investor will make this equity investment into Napavale.

Napavale’s value was determined in Chapter 13; Figure 14.5 offers a view of Napavale’s Valuation worksheet for the sake of reference.

The valuation of Napavale as covered in Chapter 13 incorporated the assumption that a $1 million investment was made into the company. As such, the value of Napavale as shown in Figure 14.5 represents what is...
known as the “post-money valuation.” In other words, the valuation of Napavale as covered in Chapter 13 includes the value of the $1 million equity investment.

Thus, the percentage of Napavale purchased by the $1 million equity investment is calculated by answering the following question: What percentage of Napavale’s post-money valuation does $1 million represent? This
calculation, in addition to a related calculation that yields the number of shares issued to the equity investor and Napavale’s updated Cap Chart, are all shown in Figure 14.6. The values and formulas underlying the calculation shown in Figure 14.6 are revealed in Figure 14.7. Figure 14.8 offers a view of the names of the input and output cells underlying the calculation shown in Figure 14.6.

An algebraic representation of the calculation of the number of shares issued to the equity investor is:

\[
\begin{align*}
    v & = \text{post-money valuation} \\
    i & = \text{equity investment by investors} \\
    f & = \text{shares of founder’s stock} \\
    p & = \text{percent of company owned by investors} \\
    s & = \text{shares issued to investor} \\
    t & = \text{total shares outstanding}
\end{align*}
\]

\[
\begin{align*}
    p & = \frac{i}{v} \\
    f & = (1 - p) \times t
\end{align*}
\]
FIGURE 14.7 Alternative View of the Calculation Related to Post-Money Valuation

FIGURE 14.8 Names of the Input and Output Cells Underlying the Calculation Related to Post-Money Valuation
Capitalization Chart

\[
t = \frac{f}{(1 - p)}
\]

\[
s = t - f
\]

\[
s = \left[ \frac{f}{(1 - p)} \right] - f
\]

STOCK OPTIONS’ EFFECT ON CAPITALIZATION CHART

The final step in building Napavale’s Cap Chart is to track and reflect the effect of issuing stock options to employees on Napavale’s Cap Chart. Stock options, a popular form of equity-based compensation in many companies, represent financial instruments that give the holder the right, but not the obligation, to purchase the stock of a company at a given price during a specified period of time.

Stock options are often “granted,” or given to employees, at an exercise price equal to the then-market value of the underlying stock. In other words, when stock options are given to employees, the price at which the recipient may eventually purchase stock of the company is often equal to the then-current market price of the underlying stock. Accounting for stock options is a complex and somewhat controversial topic. This book is not meant to cover any of the issues surrounding the accounting for stock options and this section of the book does not affect any other sections of Napavale’s financial model (except for the Cap Chart).

Many stock options “vest” over time, which means they are not “exercisable” until some point in the future. This is another way of saying that option holders may not exercise their options until a specified period of time has elapsed since they were granted the options (often 2 to 3 years from the date of option grant). As such, while stock options may be issued and outstanding, generally speaking, stock options do not count toward a company’s number of shares outstanding and thus do not affect a company’s Cap Chart using “issued and outstanding” stock as a basis for measuring the ownership structure of a company.

To account for this issue of stock options and a company’s ownership, I have measured Napavale’s ownership on both an undiluted and a diluted basis. Undiluted means the ownership of Napavale taking into account only issued and outstanding stock in the company. Diluted ownership means the ownership of Napavale taking into account outstanding future potential claims on equity of the company (such as stock options).
Figure 14.9 presents a view of Napavale’s updated Cap Chart that incorporates the assumption that 20,000 stock options have been issued to employees. The values and formulas underlying Napavale’s updated Cap Chart are shown in Figure 14.10. Figure 14.11 presents a view of the names of the input and output cells underlying Napavale’s updated Cap Chart.
FIGURE 14.11  Names of the Input and Output Cells Underlying the Updated Cap Chart

QUESTIONS

Each of the questions for this chapter relates to the hypothetical company named Company 456—this company was used in the Questions section of Chapters 12 and 13. To review, Company 456 sells display monitors to physicians. As such, Company 456 is a product-oriented (as opposed to a service-oriented) business.

The questions for this chapter address fiscal year X4 on a quarterly basis (four specific quarters, 1Q–4Q for year X4). The following questions will test your knowledge of the material covered in this chapter in an applied manner—specifically, you will be asked to build a founding Capitalization Chart for Company 456, calculate the effect of an equity investment into Company 456 on Company 456’s Capitalization Chart, and calculate the effect of the issuance of stock options on Company 456’s Capitalization Chart.

To prepare you for this chapter’s questions, please assume that Company 456 was founded by three individuals and that (1) the first founder received 50 percent of the founding equity and (2) the second and third founders each received 25 percent of the founding equity in Company 456.
More specifically, please assume that (1) the first founder received 500,000 shares of stock and (2) the second and third founders each received 250,000 shares of stock upon Company 456’s founding.

In terms of stock options, please assume that 200,000 stock options (all of which are unvested) are issued to employees at Company 456 following the equity investment of $250,000 into Company 456 in Q1 X4. This equity investment is shown in Figure Q14.1, Company 456’s Assumptions and
Dashboard worksheet. Figure Q14.2 offers a view of Company 456’s Cash Budget. Company 456’s Valuation worksheet is shown in Figure Q14.3.

1. Given the information presented, build a founding Capitalization Chart for Company 456.
2. Given the information presented, build a Capitalization Chart for Company 456 to reflect the equity investment into Company 456 in 1Q X4 based on the valuation shown in Figure Q14.3.
3. Given the information presented, build a Capitalization Chart for Company 456 to reflect the issuance of stock options to employees of Company 456.
Answers to Chapter Questions

CHAPTER 1  Overview of Budgets and Financial Models

1. The main goal of all budgets is to provide a tangible and quantifiable estimate of the receipt and allocation of resources. A budget represents a core element of a financial model.
2. The two main components of a Master Budget are an Operating Budget and a Financial Budget.
3. A financial model is a quantitative representation of a company’s past, present, and future business operations.
4. The three components of standard consolidated financial statements are the Balance Sheet, the Income Statement, and the Statement of Cash Flows.
5. Free cash flows represent the cash available to all providers of capital (providers of both debt and equity)—in other words, the amount of cash a business generates (or, conversely, consumes) over a given timeframe after paying all of its “required” costs for that period.
6. A business should use sensitivity analyses to model the effect of changing input variables on some output of interest, such as net income. Contribution margin analyses should be used to determine a business’s operating leverage and breakeven point (both in terms of units and in terms of dollars). A business should use financial analyses to assess financial performance using metrics such as gross margin, net profit margin, and return on equity, among others.
7. Valuation is the process of determining how much a company is worth.
8. A capitalization chart represents, or tabulates, the ownership structure of a business.

CHAPTER 2  Operating Budget—Assumptions, Sales, and Collections

1. The first portion of an Assumptions and Dashboard worksheet for Company XYZ is shown in Figure A2.1.
2. A Unit Sales and Price Budget for Company XYZ is shown in Figure A2.2.
3. The updated Assumptions and Dashboard worksheet for Company XYZ is shown in Figure A2.3.
4. The Sales Composition Budget for Company XYZ is shown in Figure A2.4.
ANSWERS TO CHAPTER QUESTIONS

**FIGURE A2.1** Assumptions and Dashboard Worksheet for Company XYZ

**FIGURE A2.2** Unit Sales and Price Budget for Company XYZ

**FIGURE A2.3** Updated Assumptions and Dashboard Worksheet for Company XYZ
5. The updated Assumptions and Dashboard worksheet for Company XYZ is shown in Figure A2.5.

6. The Cash Collections from Customers Budget for Company XYZ is shown in Figure A2.6.

7. The Accounts Receivable Budget and updated Cash Collections from Customers Budget for Company XYZ is shown in Figure A2.7.
FIGURE A2.6  Cash Collections from Customers Budget for Company XYZ

FIGURE A2.7  Accounts Receivable Budget and Updated Cash Collections from Customers Budget for Company XYZ
CHAPTER 3  Operating Budget—Cost of Goods Sold, Inventory, and Purchases

1. The Cost-of-Goods-Sold Budget for Company ABC is shown in Figure A3.1.
2. The Inventory Budget for Company ABC is shown in Figure A3.2.
3. The Purchases Budget for Company ABC is shown in Figure A3.3.

FIGURE A3.1  Cost-of-Goods-Sold Budget for Company ABC

FIGURE A3.2  Inventory Budget for Company ABC
### FIGURE A3.3  Purchases Budget for Company ABC

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X6</th>
<th>2Q X6</th>
<th>3Q X6</th>
<th>4Q X6</th>
<th>X6</th>
</tr>
</thead>
<tbody>
<tr>
<td>INVENTORY BUDGET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desired ending inventory</td>
<td>$478,979</td>
<td>$548,014</td>
<td>$655,579</td>
<td>$655,579</td>
<td>N/A</td>
</tr>
<tr>
<td>Cost of goods sold</td>
<td>$2,800,000</td>
<td>$2,873,875</td>
<td>$2,901,250</td>
<td>$3,105,375</td>
<td>11,680,500</td>
</tr>
<tr>
<td>Total inventory needed</td>
<td>$3,278,979</td>
<td>$3,421,889</td>
<td>$3,556,829</td>
<td>$3,760,954</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### FIGURE A3.4  Accounts Payable Budget for Company ABC

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X6</th>
<th>2Q X6</th>
<th>3Q X6</th>
<th>4Q X6</th>
<th>X6</th>
</tr>
</thead>
<tbody>
<tr>
<td>INVENTORY BUDGET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desired ending inventory</td>
<td>$478,979</td>
<td>$548,014</td>
<td>$655,579</td>
<td>$655,579</td>
<td>N/A</td>
</tr>
<tr>
<td>Cost of goods sold</td>
<td>$2,800,000</td>
<td>$2,873,875</td>
<td>$2,901,250</td>
<td>$3,105,375</td>
<td>11,680,500</td>
</tr>
<tr>
<td>Total inventory needed</td>
<td>$3,278,979</td>
<td>$3,421,889</td>
<td>$3,556,829</td>
<td>$3,760,954</td>
<td>N/A</td>
</tr>
<tr>
<td>Purchases Budget</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total inventory needed</td>
<td>$3,278,979</td>
<td>$3,421,889</td>
<td>$3,556,829</td>
<td>$3,760,954</td>
<td>N/A</td>
</tr>
<tr>
<td>Total disbursements for purchases</td>
<td>$3,278,979</td>
<td>$2,942,910</td>
<td>$3,008,815</td>
<td>$3,105,375</td>
<td>N/A</td>
</tr>
<tr>
<td>Accounts Payable (A/P) Budget</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beginning A/P balance</td>
<td>$874,394</td>
<td>$1,046,368</td>
<td>$1,036,370</td>
<td>$1,036,370</td>
<td>4,061,265</td>
</tr>
<tr>
<td>Subtractions from A/P</td>
<td>$874,394</td>
<td>$1,046,368</td>
<td>$1,036,370</td>
<td>$1,036,370</td>
<td>2,957,132</td>
</tr>
<tr>
<td>Ending A/P</td>
<td>$874,394</td>
<td>$1,046,368</td>
<td>$1,036,370</td>
<td>$1,036,370</td>
<td>1,104,133</td>
</tr>
</tbody>
</table>
Answers to Chapter Questions

FIGURE A3.5 Disbursements for Purchases Budget for Company ABC

4. The Accounts Payable Budget for Company ABC is shown in Figure A3.4.
5. The Disbursements for Purchases Budget for Company ABC is shown in Figure A3.5.

CHAPTER 4 Operating Budget—Operating Expenses

1. The Headcount Overview worksheet for Company DEF is shown in Figure A4.1.
2. The Headcount Cost worksheet for Company DEF is shown in Figure A4.2.
3. The Operating Expenses Budget for Company DEF is shown in Figure A4.3.
4. The Disbursements for Operating Expenses Budget for Company DEF is shown in Figure A4.4.
FIGURE A4.1  Headcount Overview Worksheet for Company DEF

FIGURE A4.2  Headcount Cost Worksheet for Company DEF
FIGURE A4.3  Operating Expenses Budget for Company DEF

FIGURE A4.4  Disbursements for Operating Expenses Budget for Company DEF
CHAPTER 5 Operating Budget—Income Statement

1. The first section of the Income Statement for Company GHI is shown in Figure A5.1.
2. The updated Income Statement for Company GHI is shown in Figure A5.2.
3. The updated Income Statement for Company GHI is shown in Figure A5.3.
4. The updated Income Statement for Company GHI is shown in Figure A5.4.

FIGURE A5.1 First Section of the Income Statement for Company GHI

FIGURE A5.2 Updated Income Statement for Company GHI
FIGURE A5.3 Updated Income Statement for Company GHI

FIGURE A5.4 Updated Income Statement for Company GHI
CHAPTER 6  Financial Budget—Capital Budget and Cash Budget

1. The Capital Expenditures Budget for Company JKL is shown in Figure A6.1.
2. The Disbursements for Capital Expenditures Budget for Company JKL is shown in Figure A6.2.
3. The Depreciation Budget for Company JKL is shown in Figure A6.3.
4. The first section of Company JKL’s Cash Budget is shown in Figure A6.4.
5. The updated Cash Budget for Company JKL is shown in Figure A6.5.
6. The updated Cash Budget for Company JKL is shown in Figure A6.6.
7. The completed Income Statement for Company JKL is shown in Figure A6.7.

FIGURE A6.1  Capital Expenditures Budget for Company JKL
### Figure A6.2
Disbursements for Capital Expenditures Budget for Company JKL

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAPITAL BUDGET</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td>$9,000</td>
<td>$5,000</td>
<td>$3,000</td>
<td>$3,000</td>
<td>$20,000</td>
</tr>
<tr>
<td><strong>Furniture</strong></td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,000</td>
<td>$9,500</td>
</tr>
<tr>
<td><strong>Fixtures</strong></td>
<td>$1,500</td>
<td>$1,500</td>
<td>$1,500</td>
<td>$1,500</td>
<td>$6,000</td>
</tr>
<tr>
<td><strong>Total capital expenditures</strong></td>
<td>$13,000</td>
<td>$9,000</td>
<td>$7,000</td>
<td>$6,500</td>
<td>$35,500</td>
</tr>
</tbody>
</table>

### Figure A6.3
Depreciation Budget for Company JKL

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAPITAL BUDGET</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td>$9,000</td>
<td>$5,000</td>
<td>$3,000</td>
<td>$3,000</td>
<td>$20,000</td>
</tr>
<tr>
<td><strong>Furniture</strong></td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,000</td>
<td>$9,500</td>
</tr>
<tr>
<td><strong>Fixtures</strong></td>
<td>$1,500</td>
<td>$1,500</td>
<td>$1,500</td>
<td>$1,500</td>
<td>$6,000</td>
</tr>
<tr>
<td><strong>Total capital expenditures</strong></td>
<td>$13,000</td>
<td>$9,000</td>
<td>$7,000</td>
<td>$6,500</td>
<td>$35,500</td>
</tr>
</tbody>
</table>

**Depreciation Budget**

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equipment</strong></td>
<td>$75</td>
<td>$250</td>
<td>$375</td>
<td>$475</td>
<td>$1,225</td>
</tr>
<tr>
<td><strong>Furniture</strong></td>
<td>$75</td>
<td>$150</td>
<td>$225</td>
<td>$300</td>
<td>$750</td>
</tr>
<tr>
<td><strong>Fixtures</strong></td>
<td>$575</td>
<td>$983</td>
<td>$1,306</td>
<td>$1,869</td>
<td>$4,475</td>
</tr>
<tr>
<td><strong>Total depreciation</strong></td>
<td>$13,000</td>
<td>$22,000</td>
<td>$29,000</td>
<td>$35,500</td>
<td>$12,425</td>
</tr>
</tbody>
</table>

**Depreciation Costs**

- **Fixed assets, net of depreciation**
ANSWERS TO CHAPTER QUESTIONS

**FIGURE A6.4** First Section of Company JKL’s Cash Budget

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CASH BUDGET</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Beginning cash balance</strong></td>
<td>$ -</td>
<td>$ 244,444</td>
<td>$ 134,356</td>
<td>$ 780,097</td>
<td>$ -</td>
</tr>
<tr>
<td><strong>Cash receipts</strong></td>
<td>$ 2,444,444</td>
<td>$ 2,770,356</td>
<td>$ 2,926,289</td>
<td>$ 2,881,378</td>
<td>$ 11,021,467</td>
</tr>
<tr>
<td><strong>Collections from customers</strong></td>
<td>$ 2,444,444</td>
<td>$ 3,015,344</td>
<td>$ 3,059,444</td>
<td>$ 3,291,475</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Total cash available, before financing</strong></td>
<td>$ 2,444,444</td>
<td>$ 3,015,344</td>
<td>$ 3,059,444</td>
<td>$ 3,291,475</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Cash disbursements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Purchases disbursements</strong></td>
<td>$ 1,559,578</td>
<td>$ 2,217,431</td>
<td>$ 1,926,070</td>
<td>$ 1,810,772</td>
<td>$ 7,503,059</td>
</tr>
<tr>
<td><strong>Operating expenses</strong></td>
<td>$ 635,678</td>
<td>$ 654,558</td>
<td>$ 748,278</td>
<td>$ 783,010</td>
<td>$ 2,922,524</td>
</tr>
<tr>
<td><strong>Capital expenditures</strong></td>
<td>$ 13,000</td>
<td>$ 9,000</td>
<td>$ 7,000</td>
<td>$ 5,500</td>
<td>$ 35,500</td>
</tr>
<tr>
<td><strong>Total disbursements</strong></td>
<td>$ 2,199,656</td>
<td>$ 2,981,189</td>
<td>$ 2,679,347</td>
<td>$ 2,661,162</td>
<td>$ 10,361,174</td>
</tr>
<tr>
<td><strong>Minimum cash balance desired</strong></td>
<td>$ 100,000</td>
<td>$ 100,000</td>
<td>$ 100,000</td>
<td>$ 100,000</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Excess (deficiency) of total cash available over total cash needed before financing</strong></td>
<td>$ 144,989</td>
<td>$ 34,315</td>
<td>$ 218,097</td>
<td>$ 560,293</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Total cash increase (decrease) from financing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ending cash balance</strong></td>
<td>$ 244,444</td>
<td>$ 134,356</td>
<td>$ 309,007</td>
<td>$ 660,293</td>
<td>$ 660,293</td>
</tr>
</tbody>
</table>

**FIGURE A6.5** Updated Cash Budget for Company JKL
FIGURE A6.6 Updated Cash Budget for Company JKL Including Projections Regarding Equity Investments, Borrowings, Repayment of Borrowings, and Interest Expenses

FIGURE A6.7 Completed Income Statement for Company JKL
CHAPTER 7  Financial Budget—Balance Sheet

1. The Asset components of Company MNO’s Balance Sheet are shown in Figure A7.1.
2. The Liabilities components of Company MNO’s Balance Sheet are shown in Figure A7.2.
3. The Owners’ Equity components of Company MNO’s Balance Sheet are shown in Figure A7.3.
4. The changes in Company MNO’s Net Working Capital are shown in Figure A7.4.

![Figure A7.1 Asset Components of Company MNO’s Balance Sheet](image-url)
### FIGURE A7.2  Liabilities Components of Company MNO’s Balance Sheet

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q</th>
<th>2Q</th>
<th>3Q</th>
<th>4Q</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$110,520</td>
<td>$726,552</td>
<td>$1,441,311</td>
<td>$2,154,556</td>
<td></td>
</tr>
<tr>
<td>Accounts Receivable</td>
<td>$1,036,000</td>
<td>$922,360</td>
<td>$900,000</td>
<td>$780,111</td>
<td></td>
</tr>
<tr>
<td>Inventory</td>
<td>$461,370</td>
<td>$478,133</td>
<td>$468,331</td>
<td>$468,331</td>
<td></td>
</tr>
<tr>
<td>Total Assets</td>
<td>$1,613,005</td>
<td>$2,155,054</td>
<td>$2,847,671</td>
<td>$3,449,458</td>
<td></td>
</tr>
<tr>
<td>Liabilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts Payable</td>
<td>$852,111</td>
<td>$775,449</td>
<td>$821,728</td>
<td>$851,611</td>
<td></td>
</tr>
<tr>
<td>Payables from Capital Budget</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Loan Payable</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Total Liabilities</td>
<td>$852,111</td>
<td>$775,449</td>
<td>$821,728</td>
<td>$851,611</td>
<td></td>
</tr>
</tbody>
</table>

### FIGURE A7.3  Owners’ Equity Components of Company MNO’s Balance Sheet

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q</th>
<th>2Q</th>
<th>3Q</th>
<th>4Q</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$110,520</td>
<td>$726,552</td>
<td>$1,441,311</td>
<td>$2,154,556</td>
<td></td>
</tr>
<tr>
<td>Accounts Receivable</td>
<td>$1,036,000</td>
<td>$922,360</td>
<td>$900,000</td>
<td>$780,111</td>
<td></td>
</tr>
<tr>
<td>Inventory</td>
<td>$461,370</td>
<td>$478,133</td>
<td>$468,331</td>
<td>$468,331</td>
<td></td>
</tr>
<tr>
<td>Total Assets</td>
<td>$1,613,005</td>
<td>$2,155,054</td>
<td>$2,847,671</td>
<td>$3,449,458</td>
<td></td>
</tr>
<tr>
<td>Liabilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts Payable</td>
<td>$852,111</td>
<td>$775,449</td>
<td>$821,728</td>
<td>$851,611</td>
<td></td>
</tr>
<tr>
<td>Payables from Capital Budget</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Loan Payable</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Total Liabilities</td>
<td>$852,111</td>
<td>$775,449</td>
<td>$821,728</td>
<td>$851,611</td>
<td></td>
</tr>
</tbody>
</table>

| Total Liabilities and Owners’ Equity | $852,111 | $775,449 | $821,728 | $851,611 |

| Net Working Capital (NWC) |
| Current assets | -Net working capital |
| Beginning NWC | $200,000 | $200,000 | $200,000 | $200,000 |
| Retained Earnings | - | - | - | - |
| Ending NWC | $2,025,943 | $2,025,943 | $2,025,943 | $2,025,943 |
| Change in NWC | $2,025,943 | $2,025,943 | $2,025,943 | $2,025,943 |
### FIGURE A7.4 Changes in Company MNO’s Net Working Capital

<table>
<thead>
<tr>
<th>Period</th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$110,522</td>
<td>$726,552</td>
<td>$1,441,311</td>
<td>$2,164,566</td>
<td>$2,164,566</td>
</tr>
<tr>
<td>Accounts Receivable</td>
<td>$1,055,000</td>
<td>$922,350</td>
<td>$900,000</td>
<td>$780,111</td>
<td>$780,111</td>
</tr>
<tr>
<td>Inventory</td>
<td>$461,370</td>
<td>$478,133</td>
<td>$468,331</td>
<td>$468,331</td>
<td>$468,331</td>
</tr>
<tr>
<td>Fixed Assets, net</td>
<td>$16,113</td>
<td>$28,019</td>
<td>$38,028</td>
<td>$46,450</td>
<td>$46,450</td>
</tr>
<tr>
<td><strong>Total Assets</strong></td>
<td>$1,623,006</td>
<td>$2,155,054</td>
<td>$2,847,671</td>
<td>$3,449,458</td>
<td>$3,449,458</td>
</tr>
<tr>
<td><strong>Liabilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts Payable</td>
<td>$952,111</td>
<td>$775,469</td>
<td>$821,726</td>
<td>$851,511</td>
<td>$851,511</td>
</tr>
<tr>
<td>Payables from Capital Budget</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Loan Payable</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total Liabilities</strong></td>
<td>$952,111</td>
<td>$775,469</td>
<td>$821,726</td>
<td>$851,511</td>
<td>$851,511</td>
</tr>
<tr>
<td><strong>Owners’ Equity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common Stock</td>
<td>$200,000</td>
<td>$200,000</td>
<td>$200,000</td>
<td>$200,000</td>
<td>$200,000</td>
</tr>
<tr>
<td>Retained Earnings</td>
<td>$570,894</td>
<td>$1,179,585</td>
<td>$1,825,943</td>
<td>$2,397,947</td>
<td>$2,397,947</td>
</tr>
<tr>
<td><strong>Total Owners’ Equity</strong></td>
<td>$770,894</td>
<td>$1,379,585</td>
<td>$2,025,943</td>
<td>$2,597,947</td>
<td>$2,597,947</td>
</tr>
<tr>
<td><strong>Total Liabilities and Owners’ Equity</strong></td>
<td>$1,623,006</td>
<td>$2,155,054</td>
<td>$2,847,671</td>
<td>$3,449,458</td>
<td>$3,449,458</td>
</tr>
</tbody>
</table>

**Net Working Capital (NWC)**

| Current assets | $1,496,370 | $1,400,483 | $1,368,331 | $1,248,442 | N/A |
| Current liabilities | $852,111 | $775,469 | $821,726 | $851,511 | N/A |
| Net working capital | $644,259 | $625,014 | $546,603 | $396,931 | N/A |

**Beginning NWC | $644,259 | $625,014 | $546,603 | $396,931 | N/A**

**Ending NWC | $644,259 | $625,014 | $546,603 | $396,931 | N/A**

**Change in NWC | $644,259 | $625,014 | $546,603 | $396,931 | N/A**
CHAPTER 8 Consolidated Financial Statements

1. The Cash Flows from Operating Activities in Company PQR’s Statement of Cash Flows are shown in Figure A8.1.
2. The Cash Flows from Investing Activities in Company PQR’s Statement of Cash Flows are shown in Figure A8.2.
3. The Cash Flows from Financing Activities in Company PQR’s Statement of Cash Flows are shown in Figure A8.3.

FIGURE A8.1 Cash Flows from Operating Activities in Company PQR’s Statement of Cash Flows
FIGURE A8.2  Cash Flows from Investing Activities in Company PQR’s Statement of Cash Flows

FIGURE A8.3  Cash Flows from Financing Activities in Company PQR’s Statement of Cash Flows
CHAPTER 9 Free Cash Flows and Dashboard

1. Company STU’s free cash flows worksheet is shown in Figure A9.1.
2. The Balance Sheet status indicator in Company STU’s Assumptions and Dashboard worksheet is shown in Figure A9.2.
3. The Statement of Cash Flows status indicator in Company STU’s Assumptions and Dashboard worksheet is shown in Figure A9.3.

**FIGURE A9.1** Company STU’s Free Cash Flows Worksheet
FIGURE A9.2  Balance Sheet Status Indicator in Company STU’s Assumptions and Dashboard Worksheet

FIGURE A9.3  Statement of Cash Flows Status Indicator in Company STU’s Assumptions and Dashboard Worksheet
CHAPTER 10  Sensitivity Analysis

1. The Revenues data table for Company VWX is shown in Figure A10.1.
2. The Net Income data table for Company VWX is shown in Figure A10.2.
3. The Free Cash Flows data table for Company VWX is shown in Figure A10.3.

FIGURE A10.1  Revenues Data Table for Company VWX
FIGURE A10.2 Net Income Data Table for Company VWX

FIGURE A10.3 Free Cash Flows Data Table for Company VWX
CHAPTER 11  Contribution Margin Analysis

1. Company 123’s variable costs are identified in Figure A11.1.
2. Company 123’s fixed costs are identified in Figure A11.2.
3. Company 123’s contribution margin is calculated and reconciled with Company 123’s Net Income in Figure A11.3.
4. Company 123’s operating leverage is calculated in Figure A11.4.
5. Company 123’s breakeven point in terms of units is calculated in Figure A11.5.
6. Company 123’s breakeven point in terms of dollars of revenue is calculated in Figure A11.6.

FIGURE A11.1  Company 123’s Variable Costs

FIGURE A11.2  Company 123’s Fixed Costs
### FIGURE A11.3  Company 123’s Contribution Margin and Reconciliation with Net Income

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Period</strong></td>
<td>1Q X4</td>
<td>2Q X4</td>
<td>3Q X4</td>
<td>4Q X4</td>
<td>X4</td>
</tr>
<tr>
<td><strong>Variable Costs</strong></td>
<td>$60,000</td>
<td>$90,000</td>
<td>$121,800</td>
<td>$159,600</td>
<td>$431,400</td>
</tr>
<tr>
<td>Electronics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casing</td>
<td>$60,000</td>
<td>$88,500</td>
<td>$115,500</td>
<td>$148,400</td>
<td>$412,400</td>
</tr>
<tr>
<td>Assembly labor</td>
<td>$40,000</td>
<td>$60,000</td>
<td>$79,800</td>
<td>$103,600</td>
<td>$283,400</td>
</tr>
<tr>
<td>Miscellaneous expenses</td>
<td>$20,000</td>
<td>$30,000</td>
<td>$39,900</td>
<td>$51,520</td>
<td>$141,420</td>
</tr>
<tr>
<td>Research and development</td>
<td>$25,000</td>
<td>$37,500</td>
<td>$49,875</td>
<td>$64,400</td>
<td>$176,775</td>
</tr>
<tr>
<td><strong>Total variable costs</strong></td>
<td>$205,000</td>
<td>$306,000</td>
<td>$406,875</td>
<td>$527,520</td>
<td>$1,445,395</td>
</tr>
<tr>
<td><strong>Fixed Costs</strong></td>
<td>$447,063</td>
<td>$461,438</td>
<td>$526,125</td>
<td>$526,125</td>
<td>$1,960,750</td>
</tr>
<tr>
<td>Salaries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rent</td>
<td>$18,000</td>
<td>$18,000</td>
<td>$18,000</td>
<td>$18,000</td>
<td>$72,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>1,375</td>
<td>3,000</td>
<td>4,575</td>
<td>5,950</td>
<td>$14,900</td>
</tr>
<tr>
<td><strong>Total fixed costs</strong></td>
<td>$466,438</td>
<td>$482,438</td>
<td>$548,700</td>
<td>$550,075</td>
<td>$2,047,660</td>
</tr>
<tr>
<td><strong>Contribution Margin</strong></td>
<td>$500,000</td>
<td>$750,000</td>
<td>$997,500</td>
<td>$1,288,000</td>
<td>$3,535,500</td>
</tr>
<tr>
<td>Sales</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable costs</td>
<td>$295,000</td>
<td>$444,000</td>
<td>$590,625</td>
<td>$760,480</td>
<td>$2,090,105</td>
</tr>
<tr>
<td>= Contribution margin</td>
<td>$205,000</td>
<td>$306,000</td>
<td>$406,875</td>
<td>$527,520</td>
<td>$1,445,395</td>
</tr>
<tr>
<td>Fixed costs</td>
<td>$466,438</td>
<td>$482,438</td>
<td>$548,700</td>
<td>$550,075</td>
<td>$2,047,660</td>
</tr>
<tr>
<td>= Interest expense</td>
<td>$813</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxes</td>
<td>$(51,675)</td>
<td>$(11,531)</td>
<td>$14,674</td>
<td>$73,642</td>
<td>$25,109</td>
</tr>
<tr>
<td>= Net income</td>
<td>$(120,575)</td>
<td>$(26,906)</td>
<td>$27,251</td>
<td>$136,763</td>
<td>$16,533</td>
</tr>
</tbody>
</table>

### FIGURE A11.4  Company 123’s Operating Leverage
FIGURE A11.5  Company 123’s Breakeven Point in Terms of Units

FIGURE A11.6  Company 123’s Breakeven Point in Terms of Dollars of Revenue
CHAPTER 12 Financial Ratios Analysis

1. Company 456’s Gross Margin, Pre-Tax Margin, and Net Profit Margin are calculated in Figure A12.1.
2. Company 456’s Return on Equity, Return on Assets, and Return on Capital are calculated in Figure A12.2.
3. Company 456’s Income per Employee, Revenue per Employee, Receivable Turnover, Inventory Turnover, and Asset Turnover are calculated in Figure A12.3.

![Figure A12.1](image)

Company 456’s Gross Margin, Pre-Tax Margin, and Net Profit Margin
FIGURE A12.2  Company 456’s Return on Equity, Return on Assets, and Return on Capital
### Figure A12.3

Company 456’s Income Per Employee, Revenue Per Employee, Receivables Turnover, Inventory Turnover, and Asset Turnover

<table>
<thead>
<tr>
<th></th>
<th>1Q X4</th>
<th>2Q X4</th>
<th>3Q X4</th>
<th>4Q X4</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Profit Margin</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Gross Margin</td>
<td>51.3%</td>
<td>52.1%</td>
<td>52.9%</td>
<td>51.2%</td>
<td>51.9%</td>
</tr>
<tr>
<td>5 Pre-Tax Margin</td>
<td>27.6%</td>
<td>28.6%</td>
<td>26.0%</td>
<td>23.3%</td>
<td>26.3%</td>
</tr>
<tr>
<td>6 Net Profit Margin</td>
<td>18.0%</td>
<td>18.6%</td>
<td>16.9%</td>
<td>15.1%</td>
<td>17.1%</td>
</tr>
<tr>
<td><strong>Investment Returns</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Return on Equity</td>
<td>337.4%</td>
<td>195.9%</td>
<td>127.0%</td>
<td>88.1%</td>
<td>95.7%</td>
</tr>
<tr>
<td>10 Return on Assets</td>
<td>141.6%</td>
<td>125.0%</td>
<td>90.9%</td>
<td>67.0%</td>
<td>72.8%</td>
</tr>
<tr>
<td>11 Return on Capital</td>
<td>337.4%</td>
<td>196.9%</td>
<td>127.0%</td>
<td>88.1%</td>
<td>95.7%</td>
</tr>
<tr>
<td><strong>Management Efficiency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Income/Employee</td>
<td>$207,125</td>
<td>$235,705</td>
<td>$161,792</td>
<td>$136,261</td>
<td>$148,132</td>
</tr>
<tr>
<td>15 Revenue/Employee</td>
<td>$1,153,846</td>
<td>$1,269,231</td>
<td>$953,333</td>
<td>$900,526</td>
<td>$868,579</td>
</tr>
<tr>
<td>16 Receivable Turnover</td>
<td>10.0%</td>
<td>10.0%</td>
<td>10.0%</td>
<td>10.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td>17 Inventory Turnover</td>
<td>11.1%</td>
<td>11.7%</td>
<td>11.7%</td>
<td>12.0%</td>
<td>11.4%</td>
</tr>
<tr>
<td>18 Asset Turnover</td>
<td>7.9%</td>
<td>6.7%</td>
<td>5.4%</td>
<td>4.4%</td>
<td>4.3%</td>
</tr>
</tbody>
</table>

**Values Used for the Above Calculations**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>23 Gross profit</td>
<td>$3,850,000</td>
<td>$4,295,600</td>
<td>$4,569,760</td>
<td>$4,383,700</td>
<td>$17,068,960</td>
</tr>
<tr>
<td>24 Sales</td>
<td>7,500,000</td>
<td>8,250,000</td>
<td>8,625,000</td>
<td>8,556,000</td>
<td>32,930,000</td>
</tr>
<tr>
<td>25 Taxable income</td>
<td>2,071,250</td>
<td>2,357,050</td>
<td>2,240,200</td>
<td>1,991,500</td>
<td>8,660,000</td>
</tr>
<tr>
<td>26 Net income</td>
<td>1,346,313</td>
<td>1,532,083</td>
<td>1,456,130</td>
<td>1,294,475</td>
<td>5,629,000</td>
</tr>
<tr>
<td>27 Owners’ Equity</td>
<td>1,596,313</td>
<td>3,128,395</td>
<td>4,584,525</td>
<td>5,879,000</td>
<td>5,879,000</td>
</tr>
<tr>
<td>28 Assets</td>
<td>3,804,387</td>
<td>4,592,358</td>
<td>6,407,014</td>
<td>7,322,911</td>
<td>7,322,911</td>
</tr>
<tr>
<td>29 Capital</td>
<td>1,596,313</td>
<td>3,128,395</td>
<td>4,584,525</td>
<td>5,879,000</td>
<td>5,879,000</td>
</tr>
<tr>
<td>30 Employees</td>
<td>25</td>
<td>26</td>
<td>36</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>31 Accounts Receivable</td>
<td>1,666,667</td>
<td>1,833,333</td>
<td>1,916,667</td>
<td>1,901,111</td>
<td>1,901,111</td>
</tr>
<tr>
<td>32 Cost of goods sold</td>
<td>3,650,000</td>
<td>3,954,500</td>
<td>4,065,250</td>
<td>4,171,300</td>
<td>15,841,050</td>
</tr>
<tr>
<td>33 Inventory</td>
<td>1,318,167</td>
<td>1,355,083</td>
<td>1,390,433</td>
<td>1,390,433</td>
<td>1,390,433</td>
</tr>
</tbody>
</table>
Answers to Chapter Questions

CHAPTER 13  Valuation

1. Company 456’s total free cash flows are calculated in Figure A13.1.
2. Company 456’s Net Present Value is calculated in Figure A13.2.
3. The multiples of (i) sales, (ii) Net Income, and (iii) free cash flows for each of the comparable public companies, along with a calculation for median values associated with these measures/metrics, and the fictitious stock index, are calculated in Figure A13.3.
4. Company 456’s public company comparable valuation is calculated in Figure A13.4.
5. The multiples of (i) sales, (ii) Net Income, and (iii) Asset values for each of the mergers and acquisitions transactions, along with a calculation for median values associated with these measures/metrics, are calculated in Figure A13.5.
6. Company 456’s mergers and acquisitions comparable valuation is calculated in Figure A13.6.
7. Company 456’s weighted valuations and total valuation are calculated in Figure A13.7.

FIGURE A13.1  Company 456’s Total Free Cash Flows
FIGURE A13.2  Company 456’s Net Present Value

FIGURE A13.3  Multiple and Median Calculations For Public Company Comparables
FIGURE A13.4  Company 456’s Public Company Comparable Valuation

FIGURE A13.5  Multiple and Median Calculations for Mergers and Acquisitions
**FIGURE A13.6**  Company 456’s Mergers and Acquisitions Comparable Valuation

<table>
<thead>
<tr>
<th>Target Companies</th>
<th>Valuation (Price)</th>
<th>Projected (Next 4 Quarters)</th>
<th>Multiple of Projected (Next 4 Quarters)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sales</td>
<td>Income</td>
<td>Assets</td>
</tr>
<tr>
<td>Company 1</td>
<td>$75,000,000</td>
<td>$80,000,000</td>
<td>$8,000,000</td>
</tr>
<tr>
<td>Company 2</td>
<td>$60,000,000</td>
<td>$71,000,000</td>
<td>$7,500,000</td>
</tr>
<tr>
<td>Company 3</td>
<td>$55,000,000</td>
<td>$62,000,000</td>
<td>$7,000,000</td>
</tr>
<tr>
<td>Median</td>
<td>$50,000,000</td>
<td>$71,000,000</td>
<td>$7,500,000</td>
</tr>
</tbody>
</table>

**FIGURE A13.7**  Company 456’s Weighted Valuations and Total Valuation
CHAPTER 14  Capitalization Chart

1. Company 456’s founding Capitalization Chart is shown in Figure A14.1.
2. Company 456’s post-equity investment Capitalization Chart is shown in Figure A14.2.
3. Company 456’s post-stock options issuance Capitalization Chart is shown in Figure A14.3.

FIGURE A14.1  Company 456’s Founding Capitalization Chart
### FIGURE A14.2  Company 456’s Post–Equity Investment Capitalization Chart

<table>
<thead>
<tr>
<th></th>
<th>Undiluted</th>
<th>Diluted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shares</td>
<td>% Ownership</td>
</tr>
<tr>
<td>Founder 1</td>
<td>500,000</td>
<td>49.5%</td>
</tr>
<tr>
<td>Founder 2</td>
<td>250,000</td>
<td>24.7%</td>
</tr>
<tr>
<td>Founder 3</td>
<td>250,000</td>
<td>24.7%</td>
</tr>
<tr>
<td>Investor</td>
<td>10,627</td>
<td>1.1%</td>
</tr>
<tr>
<td>Employees</td>
<td>-</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total</td>
<td>1,010,627</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

#### Investor’s Ownership Calculation

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-money valuation</td>
<td>$23,776,399</td>
</tr>
<tr>
<td>Equity investment</td>
<td>$250,000</td>
</tr>
</tbody>
</table>

### FIGURE A14.3  Company 456’s Post–Stock Options Issuance Capitalization Chart

<table>
<thead>
<tr>
<th></th>
<th>Undiluted</th>
<th>Diluted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shares</td>
<td>% Ownership</td>
</tr>
<tr>
<td>Founder 1</td>
<td>500,000</td>
<td>49.5%</td>
</tr>
<tr>
<td>Founder 2</td>
<td>250,000</td>
<td>24.7%</td>
</tr>
<tr>
<td>Founder 3</td>
<td>250,000</td>
<td>24.7%</td>
</tr>
<tr>
<td>Investor</td>
<td>10,627</td>
<td>1.1%</td>
</tr>
<tr>
<td>Employees</td>
<td>-</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total</td>
<td>1,010,627</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

#### Investor’s Ownership Calculation

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Post-money valuation</td>
<td>$23,776,399</td>
</tr>
<tr>
<td>Equity investment</td>
<td>$250,000</td>
</tr>
</tbody>
</table>

### FIGURE A14.3  Company 456’s Post–Stock Options Issuance Capitalization Chart
This appendix provides a targeted overview of Microsoft Excel 2007 features and functionality related to building financial models. While many full-length books on the market today cover each feature of Microsoft Excel in detail, this appendix covers the most frequently used features of Excel at a general level. As this book assumes a basic level of understanding of Microsoft Excel, this appendix should serve as a reference and/or starting point from which you can delve more deeply into the vast capabilities of Excel.

This appendix is divided into four sections:

1. Basic Functionality
2. Formatting
3. Formulas and Functions
4. Advanced Features

Note that this appendix applies to Microsoft Excel 2007, which differs from earlier versions of Excel in a number of significant ways.

**Basic Functionality**

Microsoft Excel files are also referred to as “workbooks.” These files, which end with the “.xlsx” extension, store and organize information. Microsoft Excel’s basic functionality includes creating, modifying, viewing, and saving information.
Keyboard Shortcuts

Microsoft Excel offers many keyboard shortcuts to execute certain tasks. Navigating menus and executing commands using these shortcuts can save you time and effort as you build financial models in Excel.

Accessing menus through keyboard commands requires you to first press the “ALT” button on your keyboard. Pressing “ALT” in Excel 2007 causes letters and/or numbers to appear on top of the Excel ribbon. The specific letters and/or numbers that appear in Excel when you press “ALT” will depend on a number of factors, such as the configuration of your version of Excel and the version of your operating system (among other factors). Figure AP.1 shows the menu bar for Microsoft Excel 2007 running in Microsoft Windows Vista Home Premium Edition.

Each of the letters and numbers in Figure AP.1 provides access to different features and functionality. By clicking on the “ALT” key on your keyboard and then clicking on a letter or number for the area of interest (e.g., clicking on “ALT” + “P” for the “Page Layout” tab of the Excel ribbon), a drop-down menu will appear. Figure AP.2 presents a view of the Excel ribbon after clicking “ALT” + “P” to access the Page Layout tab of the Excel ribbon. Note that additional letters and/or numbers may still show on the Excel ribbon after a keyboard shortcut has been executed.

Each of the available options that appear after clicking the “ALT” key will have a letter or number highlighted. You may simply press the letter or

![Menu Bar for Excel 2007](image)
number of interest and that option will execute. Using the “Page Layout” tab above, for example, once the Page Layout tab is activated, you can click on the letter “M” on your keyboard to access the “Margins” drop-down menu (because the “Margins” drop-down menu appears as “M” on the “Page Layout” tab on the Excel ribbon once that tab has been activated using the ALT + “P” keyboard shortcut).

**New, Open, Close, and Save**

Once the Microsoft Excel application is open on your computer, you may (among many other tasks) create a new workbook, open an existing workbook, close any open workbooks, and save any open workbooks. Each of these tasks may be accomplished using the “Office” button (the round button [usually] in the upper left of the Excel window with the blue, red, yellow, and green logo on it).

Click on the “Office” button and then select the option of interest. Selecting “New” allows you to start a new workbook. Selecting “Open” allows you to open an existing workbook—a dialog box will appear after you select “Open” through which you can navigate to the file of interest. If you select “Close,” the workbook on which you are working will close. Be sure to save any desired changes to your workbook before closing the file.
Selecting “Save” from the “Office” drop-down menu will save the workbook on which you are working. If you have not saved the workbook previously, a dialog box will appear asking you to name the file and select the location in which you would like to save the file. You may also select “Save As” from the “Office” drop-down menu—this allows you to save your workbook in another format or in another location.

**Viewing Information**

Excel allows you to “zoom,” or change the size/magnification, into or out of workbooks. Given the wide range of monitor resolutions that people use today, it is often helpful to change the zoom settings of a workbook. To change the zoom settings within Excel, select the “View” tab on the Excel ribbon and press the “Zoom” button in the “Zoom” section of the ribbon. A dialog box will appear listing a variety of zoom settings; choose the setting that best suits your preferences. Figure AP.3 shows a typical zoom dialog box (with 75% selected for the magnification).

**Entering Information into Cells**

Each cell in an Excel workbook represents a unique location, or place, in which information is stored. Excel workbooks contain at least one
worksheet. Figure AP.4 shows the three worksheets (named Sheet1, Sheet2, and Sheet3) contained in this workbook.

Each cell in each worksheet is identified by a column and row “address,” such as cell A1. The address of the active (or selected) cell appears in the “name box,” which in Figure AP.4 is shown directly above the column A identifier and appears as “A1.” This indicates that cell A1 is active and selected.

Cells may contain, among other things, numeric values, text, formulas, functions, or hyperlinks, or they may be empty. Entering information into cells is an important and straightforward task. Information is entered into cells by first selecting the cell of interest (by clicking on that cell). You may then either type the information directly into the active cell, or you may first click in the “formula bar,” which is shown in Figure AP.4 as the empty white box directly to the right of “fx.”

How you enter information in a cell is determined by the type of information that you are entering. To enter a number, you may enter the number directly—for example, to enter the number 211, you may type “211” directly into a cell. You may also type text directly into cells. Entering formulas and functions requires that you first type in the “=” sign. Additional information regarding the use of formulas and functions is provided later in this Appendix.
Copy, Cut, and Paste

Copying, cutting, and pasting information in Excel are common tasks. Copying information leaves the source data intact while cutting information removes the source data. You may access all of these features through the “Home” tab on the Excel ribbon, or you can use several well-known keyboard shortcuts. The shortcuts are:

- Copy = “CTRL” + “C”
- Cut = “CTRL” + “X”
- Paste = “CTRL” + “V”

CTRL stands for the “Control” key on your keyboard and the “+” indicates that you should press the CTRL key and the subsequent letter in the last examples while holding down the CTRL key.

Undo and Redo

It is easy to make mistakes in Microsoft Excel. Thankfully, the application offers “undo” and “redo” functions to deal with mistakes. If you make a mistake, simply click on the left-pointing arrow on the Quick Access Toolbar (assuming your version of Excel is configured to display the “undo” button as such). If you decide that you do not want to undo a certain action, click on the right-pointing arrow on the Quick Access Toolbar (assuming your version of Excel is configured to display the “redo” button as such).

Insert, Remove, and Move Columns and Rows

You may insert, remove, and move columns and rows in Microsoft Excel. To insert a column or row, right-click in the worksheet area, choose “Insert” from the pop-up menu, and then select what you would like to insert, such as a row or column, from the pop-up menu.

To remove or move columns or rows, you must first select the column or row of interest. To do so, click on the column or row header of interest. Figure AP.5 shows row 3 as “selected”; this is evident as the entire row is highlighted. Click on the row letter itself (“3” in Figure AP.5) to select an entire row (and click on a column number to select an entire column).

You may also select several columns or several rows at the same time by clicking on the first column or row and then, while holding the left mouse button down, dragging the cursor over the other columns or rows of interest. You can select non-contiguous columns or rows simultaneously by clicking on the first column or row of interest and then, while holding down
the CTRL key, selecting the other columns or rows of interest. Holding down the SHIFT key while doing this selects all of the columns or rows between the last column or row selected and the column or row on which you subsequently click.

**Naming Worksheets**

It is often helpful to name the worksheets in a workbook. To do so, double-click on the worksheet tab at the bottom of the Excel window. This will highlight the current name of the selected worksheet. You may then type in a new name for the worksheet. The three worksheets in Figure AP.6 have been renamed “Monday,” “Tuesday,” and “Wednesday.”

**Naming Cells and Cell Ranges**

The ability to name cells and cell ranges is a useful and powerful feature embedded in Excel. Cell references (discussed later in this Appendix) are used regularly when building financial models—the use of names instead of obscure cell references, such as $AC165, makes it easier to build and modify models.

The easiest way to name a cell or a range of cells is to use the Name Box in Excel. The Name Box typically is found directly above the label for Column A in the worksheet.
To name a cell or a range of cells, select the cell or range of cells that you would like to name and then click on the Name Box in your worksheet. Next, simply type in your desired name for the cell or range of cells. Note that you may not use any spaces in this name. Figure AP.7 shows that cell

FIGURE AP.6 Three Named Worksheets

FIGURE AP.7 Named Worksheet Cell
A1 has now been named “Home”—you can see the name “Home” in the name box.

You may also name cells and ranges of cells by first selecting the cell or range of cells of interest and then clicking on the “Formulas” tab on the Excel ribbon. Next, choose the “Define Name” button (usually an icon labeled “Define Name” with a white tag on a string next to the label) in the “Defined Names” section of the ribbon. Finally, simply type your desired name for the cell or range of cells into the “Name” field of the dialog box that appears after you click on the “Define Name” button. Note that you may not use any spaces in this name.

**FORMATTING**

Excel offers a wide range of formatting options for worksheets and for information within cells.

**Cell Height and Width**

You may change the height and width of any cell within Excel. To change the height of a cell, you can either (i) click and drag the line separating the row numbers at the left side of the worksheet or (ii) right-click on the row(s) of interest, click on the “Row Height...” selection, and then enter your desired height setting into the dialog box that appears. To “auto-fit” a row to include all of the contents in the row, double-click on the bottom of the line separating the row of interest from the subsequent row (click beneath the row number label).

To change the width of a cell, you can either (i) click and drag the line separating the column letters on the top of the worksheet or (ii) right-click on the column(s) of interest, click on the “Column Width...” selection, and then enter your desired width setting into the dialog box that appears. To “auto-fit” a column to include all of the contents in the column, double-click on the line to the right of the column of interest (click to the right of the column letter label).

**Alignment**

You can align the contents of a cell in many different ways. To see the alignment options for a cell, select the “Home” tab on the Excel ribbon and click on the “expand” button at the bottom right of the Alignment section of the ribbon. Next, click on the “Alignment” tab in the dialog box that appears. Figure AP.8 shows the alignment options.
FIGURE AP.8 Alignment Options

As Figure AP.8 indicates, you have the ability to control, among other features:

1. The horizontal alignment of the cell’s contents
2. The vertical alignment of the cell’s contents
3. The orientation (e.g. horizontal versus vertical) of the cell’s contents
4. Text control options

Number Format

The ability to alter the numerical format of a cell’s contents is one of Excel’s more powerful formatting features. This feature allows you to specify if, for example, a cell contains a date, a percentage, a dollar figure, or a basic number, among several other formats.

To see the number formatting options for a cell, select the “Home” tab of the Excel ribbon and click on the “expand” button at the bottom right of the “Number” section of the ribbon. Next, click on the “Number” tab in the dialog box that appears. Figure AP.9 shows the number format options.
Appendix: General Overview of Microsoft Excel 2007

FIGURE AP.9 Format Options

The available number formats are listed in the “Category:” section of this dialog box. You can see the formatting choices available within each of these categories by selecting a specific category. Figure AP.10 highlights the “sub-options” available for formatting a number in “Currency” format.

Font Format

Excel also provides for a wide range of font formatting options. These options control how the font within a selected cell (or selected cells) appears. To see the font formatting options for a cell, select the “Home” tab on the Excel ribbon and click on the “expand” button at the bottom right of the “Font” section of the ribbon. Next, click on the “Font” tab in the dialog box that appears. Figure AP.11 shows the font formatting dialog box.

The “Font” dialog box provides a way for you to change the font, style, size, and color of the selected cell or cells. You can also control the underline options and special effects such as super- and subscripts in this dialog box.
FIGURE AP.10 “Sub-Option” Formatting Options

FIGURE AP.11 Font Formatting Options
Figure AP.12  Border Formatting Options

Border Format

Each cell in a workbook has four sides, or “borders.” You can change the format of all of these borders in Excel. To see the border formatting options for a cell, select the “Home” tab on the Excel ribbon and click on the “expand” button at the bottom right of the “Font” section of the ribbon. Next, click on the “Border” tab in the dialog box that appears. Figure AP.12 shows the border formatting options.

To format a cell’s borders, first select the line style on the left side of the above dialog box and then click on the border or borders that you would like to modify in the “Border” section of the dialog box. You can also change the color of borders using the “Color” drop-down menu shown in Figure AP.12.

Fill Format

The ability to change the shading, or fill, color of cells is another powerful formatting feature offered by Excel. Using this feature, you can, for example, make several cells of interest yellow in color while leaving the rest of a worksheet’s cells clear (or without any special colors).
To see the fill formatting options for a cell, select the “Home” tab on the Excel ribbon and click on the “expand” button at the bottom right of the “Font” section of the ribbon. Next, click on the “Fill” tab in the dialog box that appears. Figure AP.13 shows the “Fill” dialog box.

To change the shading of a cell (or cells), click on the color of your choice as shown in Figure AP.13. This action will alter the color of the cell or cells that were selected in Excel before you opened this dialog box.

**Copy Formatting**

It is possible to copy the format of a cell (or group of cells) in Excel. This feature is quite helpful when, for instance, you would like one column in a financial model to look like another column from that same model.

To copy formatting, select the cell or cells whose format you would like to copy. Click “CTRL” + “C”, or select the “Home” tab on the Excel ribbon and choose “Copy” from the “Clipboard” section of the ribbon. Next, select the cell or cells whose format you would like to change to match the format of the cell or cells that you copied above.
Select the “Home” tab of the Excel ribbon again and press the “Paste” drop-down button in the “Clipboard” section of the ribbon. Select “Paste Special...” from the drop-down list. A dialog box offering several options will then appear—choose the “Formats” option in the “Paste” section and then click OK. A screen shot of the “Paste Special” dialog box is shown in Figure AP.14.

Using the “Paste Special” dialog box as shown in Figure AP.14 allows you to copy the format of one cell (or set of cells) and paste this formatting to a new cell (or set of cells).

**FORMULAS AND FUNCTIONS**

Microsoft Excel’s powerful formulas and functions make it an ideal tool for building financial models.

**Formulas**

Formulas are statements, or equations, that perform operations on information in your worksheets. A formula, which always begins with an
equals (=) sign in a cell in Excel, can contain any or all of the following:

1. Functions
2. References
3. Operators
4. Constants

Functions, which are described in more detail next, are predefined formulas. References identify a cell or group of cells into which Excel should look to find a value (or values). As such, references are essentially “pointers” to other cells that hold values of interest. Operators specify that a particular type of calculation should be performed on the elements of a formula. Excel has a set and predefined order in which operators are evaluated (or used) in a formula. Operators include + (add), – (subtract), * (multiply), and / (divide), among others.

**Functions**

Functions are predefined formulas that perform calculations by using arguments, which are specific values, in a particular order. Excel offers many useful built-in functions. An easy way to view the available functions for a cell is to press SHIFT + “F3” (the key marked “F3” at the top of your keyboard, as applicable). Alternatively, you can click on the “fx” button, which typically appears directly above the column headings in your worksheet.

In terms of structure, functions begin with an equals (=) sign, followed by the function name (e.g., SUM), an opening parenthesis, the arguments for the function separating by commas, and a closing parenthesis. Figure AP.15 shows a “Function Arguments” dialog box for the SUM function (which adds a series of values together).

You can always click on the “Help on this function” hyperlink in the dialog box for additional help, but the tips shown in the dialog box usually do a good job of indicating how to use a particular function.

When you are entering arguments for the function into the “Function Arguments” dialog box, you can click on the small worksheet icons at the right edge of the input cells for the arguments (i.e., Number1 and Number2 in Figure AP.15). Doing so will collapse the dialog box so that you can see more of the workbook on which you are working. Simply click on the same worksheet icon again to expand the dialog box to its original size and format.

**Referencing Other Cells**

When using formulas and functions in Excel, it is common to refer to, or reference, other cells. Using cell (and cell range) references offers a great deal
of flexibility when building financial models. By using a “dashboard,” or master input sheet, for a financial model, you can change one assumption on that one dashboard sheet and the rest of the financial model (e.g., Balance Sheet, Income Statement, and/or Statement of Cash Flows) automatically will reflect the effects of such a change.

A reference identifies a cell or a range of cells and tells Excel where to look for the data that you want to use in a formula. References to cells in other worksheets are called “links.” The three key types of references are called “relative references,” “absolute references,” and “mixed references.”

Relative references are based on the relative position of the cell in which the formula resides and the cell to which the reference refers. If the position of the cell containing the formula changes, the reference changes as well. If you copy the formula across rows or down columns, the reference automatically adjusts. In Excel, new formulas typically use relative references by default (depending, in part, on the configuration of your version of Excel). Relative cell references take the form of “A1.”

Absolute references always refer to a cell in a specific location. If the position of the cell containing the formula changes, the absolute reference
remains the same. If you copy the formula across rows or down columns, the reference does not adjust. Absolute cell references take the form of “$A$1.”

Mixed cell references have either absolute columns and relative rows or relative columns and absolute rows. An absolute column reference takes the form of “$A1” or “$B1” and an absolute row reference takes the form of “A$1” or “B$1.” If the position of the cell containing the formula changes, the absolute reference remains the same and the relative reference changes. If you copy the formula across rows or down columns, the absolute reference does not adjust but the relative reference automatically adjusts.

Another important feature of Excel is the ability to reference information in other worksheets using formulas. An easy way to refer to information in another worksheet is to create a new formula (this can be as simple as entering “=” and then click on another worksheet of interest. Next, click on the cell or range of cells in this worksheet of interest and hit the “Enter” or “Return” key on your keyboard. Figure AP.16 shows a reference to another worksheet (in this case, cell A1 in Sheet3).

Please note that relative, absolute, and mixed references apply when referencing other worksheets; Figure AP.16 shows a relative reference, as it

![Reference to Another Worksheet](image-url)
is in the form of “A1.” You can also reference separate Excel files, but this can become complicated if you do not have access to all of the referenced files when sharing workbooks.

**ADVANCED FEATURES**

Among the many advanced features offered by Microsoft Excel, one in particular is worth noting as it relates to building financial models: data tables. This feature is useful in building and analyzing business case scenarios.

**Data Tables**

The data tables feature in Excel is especially useful when running sensitivity analyses. Specifically, if you are interested in evaluating the impact of one or more variables on an output of interest, such as free cash flow, data tables make this task quite manageable.

It is possible to build both one-variable and two-variable data tables in Excel. While a one-variable data table allows you to vary one independent variable, a two-variable data table allows you to evaluate the impact of changing two variables on an outcome of interest.

For the sake of simplicity, the next example discusses a one-variable data table. To build a data table, first identify your output of interest. This output must be found in a single cell—in other words, you want to see how a single output is affected by changing an input variable. Figure AP.17 shows a properly arranged data table; its components will be described later in this appendix.

The output of interest in Figure AP.17 is “Z.” “Z” is equal to “X” plus “Y.” The data table in this screen shot calculates what happens to “Z” if “Y” is changed. To build this data table, first reference the output cell of the calculation (cell B3 in Figure AP.17); this reference is placed in cell C7 in Figure AP.17. Next, enter in potential values of “Y” that you would like to evaluate; this must be done one column to the left of and one row down from the referenced cell. These potential values of “Y” are found in cells B8 to B12 in Figure AP.17. Figure AP.18 highlights the reference to the output of interest (cell B3, which has been named “Z”).

Next, highlight the referenced cell (cell C7 in Figures AP.17 and AP.18) and the cells containing the input values that you would like to evaluate. In this case, you would highlight cells B7 to C12 as shown in Figure AP.19.

Next, select the “Data” tab on the Excel ribbon, click on the “What-If Analysis” drop-down button (usually an icon labeled “What-If Analysis” with a grid and question mark next to the label) in the “Data Tools” section
FIGURE AP.17  Completed Data Table

FIGURE AP.18  Reference to Output of Interest (Cell B3)
FIGURE AP.19  Highlighted Cells

FIGURE AP.20  Dialog Box
FIGURE AP.21  Cell Reference

FIGURE AP.22  Data Table
of the ribbon, and choose the “Data Table...” option from the drop-down menu. Figure AP.20 shows the dialog box that will appear.

Since we have entered in the input values that we would like to evaluate in a column, click in the “Column input cell” data input box and refer to cell $B$2, as shown in Figure AP.21.

Cell $B$2 contains the initial value of the “Y” variable. By selecting cell $B$2 as the column input cell, the data table feature will build a table that evaluates the “Z” variable under different “Y” values. Figure AP.22 shows the resultant data table.

As suggested by the annotations in Figure AP.22, this data table may be used to evaluate “Z” under varying conditions of “Y.” For example, referring to Figure AP.22, we can see that “Z” will equal 19 if Y equals 14.
About the CD-ROM

INTRODUCTION

This CD contains each of the Excel worksheets that are presented as figures in *Building Financial Models with Microsoft Excel*. These worksheets are provided for your reference so that you may track the course of the book using Microsoft Excel and so that you may build financial models of your own using these worksheets as templates. When opening a file on this CD, the worksheet corresponding to the relevant figure in the book will appear. Note that each file on this CD, however, typically contains additional information in different worksheets within that file.

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MINIMUM SYSTEM REQUIREMENTS

Make sure that your computer meets the minimum system requirements listed in this section. If your computer doesn’t match up to most of these requirements, you may have a problem using the contents of the CD.

CDA

For Windows:
- Windows Vista or later
- CD drive
- Microsoft Office Excel 2007 or later (for the Windows Operating System)

For Macintosh:
- Mac OS X 10.5.6 or later
- CD drive
- Microsoft Excel 2008 for Mac or later (for the Macintosh Operating System)

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To use the files on the CD, follow these steps:

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1. Click Start and select Run.
2. In the dialog box that appears, type d: assuming d is the letter of your CD-ROM drive. This brings up the autorun window described in the preceding set of steps.

**USING THE CD WITH THE MAC OS**

To use the items from the CD to your hard drive, follow these steps:

1. Insert the CD into your CD-ROM drive.
2. Double-click the icon for the CD after it appears on the desktop.

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If you have difficulty installing or using any of the materials on the companion CD, try the following solutions:

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- **Close all running programs.** The more programs you’re running, the less memory is available to other programs. Installers also typically update files and programs; if you keep other programs running, installation may not work properly.
- **Reference the ReadMe.** Please refer to the ReadMe file located at the root of the CD-ROM directory for the latest product information at the time of publication.

**USING THE SOFTWARE**

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