

Accounting for Management: Concepts and Tools

Accounting for Management: Concepts and Tools

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Course Description

A primer on the basic theoretical concepts and the practical procedures of financial record keeping and reporting, and the use of financial and cost data in managerial decision making. It provides an understanding and working knowledge of the fundamentals of financial and managerial accounting that can be put to practical application in day-to-day jobs of managers. It also concentrates on providing a working vocabulary for communication. Topics include accounting principles and reporting trends, accounting conventions and systems, interpretation and analysis of financial statements; cast flow statement; break-even analysis; activity-based costing (ABC); responsibility accounting; budget for profit planning; short-term and long-term investment decision making. A list of computer software for accounting, ABC, and budgeting is presented.

Field of Study	Accounting
Level of Knowledge	Basic to Intermediate
Prerequisite	None
Advanced Preparation	None

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PREFACE

Accounting for Management is a basic survey course specifically designed for managers and business owners. Each accounting subject is presented in a clear and concise manner that enables a beginning learner to quickly grasp and understand the topic under discussion. This course provides students with their first practical exposure to such accounting topics as fundamental accounting concepts and tools, financial statements, and managerial use of accounting information. The goals of the course are threefold:

1. It provides an understanding and working knowledge of the fundamentals of financial and managerial accounting that can be put to practical application in day-to-day jobs of managers.
2. It also concentrates on providing a working vocabulary for communication.
3. It uses the solved problems approach, with emphasis on the practical application of accounting concepts, tools, and methodology.

Chapter 1:

Introduction to Accounting

Learning Objectives:

After completing this section, you should be able to:

- Recognize the primary statements used and the key areas of accounting.
 - Recognize major accounting rule-making organizations.
 - Identify the global focus in financial reporting.
 - Define the basic accounting principles.
 - Identify the different types of business entities.
-

The basic objective of financial accounting is to provide information about economic entities to interested parties. Interested parties include investors, creditors, managers, unions, and government agencies. Financial information typically takes the form of financial statement. It also includes prospectuses, internal control certifications, valuations, budgets, and forecasts. Management accounting, on the other hand, is concerned primarily with providing information to internal managers who are charged with planning and controlling the operations of the firm and making a variety of management decisions.

Nature and Scope of Accounting

Financial statements, which consist of a balance sheet, an income statement, a statement of cash flows, and a statement of owner's/or stockholder's equity, are used to evaluate the financial condition of an enterprise. Financial reporting and analysis is of particular interest to creditors, potential and current stockholders, management, government agencies, customers, and labor. Creditors are primarily interested in the ability of the company to meet its current and long-term debts. Stockholders are more

interested in the present and future profitability of the enterprise. Management usually focuses on the trend in net earnings and makes decisions concerning possible changes in the existing capital structure in an attempt to maximize profits. The Internal Revenue Service might use the financial statements to determine whether the enterprise is paying its fair share of taxes, while other branches of the government use the information to study economic trends in the industry. Customers are concerned that the company will be financially able to maintain a steady source of supply and meet all of its commitments. Finally, labor might use the statements to formulate realistic (or unrealistic) wage proposals.

Accounting: The Basis for Decision Making

Accounting provides the information required to make business decisions to accomplish the entity's financial goals. If a business is to be successful, it must generate earnings that are sufficient to meet the objectives of profitability and liquidity. Management may also have other goals such as product improvement and the expansion of operations. To accomplish these objectives, management must select among various alternatives and must also study their consequences. The information generated by the accounting records, together with analysis of such data, is the basis on which virtually all business decisions are made.

The Major Areas of Accounting

The major areas of accounting are private, public, and governmental accounting.

Private Accounting

Private accounting deals with the private sector. The accountant working in private industry is employed by a single enterprise. An accountant may be employed as a controller or chief financial officer. Job responsibilities may include preparing budgets and departmental reports, and reviewing the work of the accounting staff. The accountant may also have other functions, such as running the business, hiring managers, setting financial objectives, and ensuring that company policies are followed.

Public Accounting

Public accounting refers to work performed by independent certified public accounting firms. Some accountants keep books and records of organizations that are too small to employ their own accounting department. Others perform the function of auditing-the independent review of the financial records of

a business. Public accountants may also be called upon to design accounting systems and prepare tax returns for their clients. An accountant must pass a rigorous professional examination and satisfy working experience requirements to obtain a license to practice as a certified public accountant (CPA).

Governmental Accounting

Governmental accounting refers to the functions performed by accountants for federal, state, and local agencies. However, accounting for governmental activities requires a somewhat different approach because the profit motive is absent from most governmental agencies. Other nonprofit entities, such as universities, hospitals, and churches, also follow a system of accounting procedures that are similar to governmental accounting.

Major Accounting Rule-Making Organizations

Accounting theory provides the framework for the practice of accounting. Generally, accepted accounting principles (GAAP) constitute the framework for acceptable accounting practice at a given period of time. These standards are continually revised as business conditions change. A number of organizations are instrumental in developing accounting standards in the United States.

American Institute of CPAs

The American Institute of Certified Public Accountants (AICPA) is the national accounting organization composed of practicing Certified Public Accountants, government officials who are CPAs, and college professors. In 1959, the AICPA created the Accounting Principles Board (APB), which sought to promote proper accounting principles and to resolve inconsistencies in virtually all areas of accounting practice. The board issued thirty-one accounting opinions, some of which are still in use today in the accounting profession. Upon the APB's dissolution in 1973, the Financial Accounting Standards Board (FASB) was created. The AICPA also issues Statements on Auditing Standards, which set forth the requirements to be followed by independent CPAs when conducting audits of their clients' financial statements.

Financial Accounting Standards Board (FASB)

The Financial Accounting Standards Board (FASB) is the most important body for developing rules on accounting practice. This independent body has been designated by the Securities and Exchange Commission to issue the *Statements of Financial Accounting Standards*. The FASB organizes these statements including any amendments, interpretations, or other references to them into a topical U.S. GAAP compendium called an American Standard Codification (ASC). This codification, which is available

through the FASB website, makes it easy to find all references to a particular topic, such as revenues, in one place.

Securities and Exchange Commission (SEC)

The Securities and Exchange Commission (SEC) is an independent regulatory agency of the United States government created to administer the Securities Act of 1933, the Securities Exchange Act of 1934, and several other regulatory Acts. The SEC issues Accounting Series Releases, which contain the requirements regarding the content of financial statements and the reporting standards to be followed. All corporations that offer securities for sale to the public must file audited financial statements annually with the SEC.

The International Accounting Standards Board (IASB)

The International Accounting Standards Board (IASB), which issues international financial reporting standards (IFRS), is becoming increasingly important because of the acceptance of its standards in many financial markets throughout the world. The SEC now allows foreign companies to use these standards in the United States rather than having to convert their statements to U.S. GAAP. The SEC is also presently considering allowing U.S. public companies to use IFRS.

Public Company Accounting Oversight Board (PCAOB)

The Public Company Accounting Oversight Board (PCAOB), a governmental body created by the Sarbanes-Oxley Act, regulates the accounting profession and has wide powers to determine the standards that auditors must follow and to discipline them if they do not. The PCAOB regulates audits of public companies registered with the SEC.

Governmental Accounting Standards Board (GASB)

The mission of the Governmental Accounting Standards Board is to establish and improve standards of state and local governmental accounting and financial reporting that will result in useful information for users of financial reports and guide and educate the public, including issuers, auditors, and users of those financial reports.

Other Organizations

The Internal Revenue Service (IRS), which derives its authority from the Internal Revenue Code, exerts a very strong influence on accounting practice. Note that good accounting procedures are not necessarily good tax practice. Since tax considerations are an integral part of the managerial decision process, the CPA must reconcile sound financial reporting requirements (financial accounting) with Internal Revenue Code regulations (tax accounting). Other influential bodies that encourage research and development of

sound accounting practices include the American Institute of Certified Public Accountants (AICPA), the American Accounting Association (AAA), the Institute of Management Accounting (IMA), and the various state societies of certified public accountants.

The Global Trends and Developments in Financial Reporting

The SEC is considering measures that could lead to retiring US GAAP and adopting International Financial Reporting Standards (IFRS) for large US companies by 2010 and by 2016 for all US companies. Further, across the world the focus is changing. The accounting may provide security; the reporting provides the information. Users may not be as interested in the financial reporting or accounting conventions toward which the world is in the process of now converging. That is because users may not use the traditional financial statements themselves, preferring instead to put much greater weight on the non-financial information that will be part of a new business reporting model, or to generate their own financial reports

New Financial Reporting Focus

- Accounting has become overly complex.
- Companies lose faith.
- Investors need clearer information.
- Reporting needs to become clearer.
- Greater weight on the non-financial data.
- Internal drivers favored.
- Upturn in narrative information.

The Basic Accounting Principles

To understand financial statements, one must understand generally accepted accounting principles. The purpose of these standards is to guide accountants in measuring and reporting the financial events that make up the life of the business. The information must be relevant, reliable, and comparable. The accounting standards and concepts used in the preparation of financial statements are as follows:

Historical Cost

Assets acquired, as well as liabilities incurred by an enterprise, must be recorded at their cost. When costs benefit more than one period, they must be allocated over the period benefited.

Conservatism

Conservatism means that an accountant should anticipate no profits, but anticipate all losses. Where use of the most appropriate accounting treatment is uncertain, or in making estimates, the favored accounting treatment should be that which understates rather than overstates income or net assets (assets minus liabilities).

Consistency

The usefulness of accounting information is increased when the information is presented in a manner consistent with that used in prior periods. To achieve consistency over a period of reporting years, companies must follow the same accounting practices from period to period. The application of consistent accounting principles also prevents income manipulation by management.

Comparability

The comparability principle requires that financial information be measured and reported in a comparable manner from company to company and from period to period. If there is an absence of comparability, it should be disclosed.

Going Concern

It is assumed that an entity is a going concern and will continue indefinitely unless there is evidence to the contrary. Under this assumption, accountants must record assets at their original cost and not at what they would be sold for if the company were to go out of business.

Matching

For income to be stated fairly, all expenses incurred in generating the income must be recorded in that same period as revenues. For example, the sale of merchandise must be offset by the actual cost of the goods sold.

Realization

A business should record at the time services are rendered to customers or goods are sold or delivered to customers. Thus, revenue is to be recorded when earned and not when the cash payment is actually received.

Accrual

A business recognizes revenue in the period in which it is earned and deducts expenses in the same period the expenses are incurred in generating this revenue. Revenue is not necessarily recognized when cash is received and expense is not necessary incurred when cash is paid.

Materiality

An item is material if its inclusion in the financial statements would influence or change the judgment of a reasonable person. If the information would have no impact on the decision-maker, it is not deemed material. The issue is one of relative size and importance. The basis for a materiality judgment is generally not sufficient unless the nature of the item, the circumstances in which the judgment has to be made, and the magnitude of the item are all considered.

Disclosure

Financial statements should be presented in a manner that will reasonably assure a complete understanding of all relevant accounting information useful for decision making. Financial information that would influence a reader's judgment should be disclosed in the body of the financial statements, the footnotes, or supplementary schedules included as part of the financial statements.

Objectivity

Accounting data should be both (a) objectively determined, and (b) verifiable. This means that the accounting data may be confirmed by any outside independent observer. The statements should also be neutral in that the accounting data has not been manipulated to favor one interested user over another.

Timeliness

The financial information derived from the accounting system should be received promptly after the end of the reporting period to be useful in making business decisions. In some cases, the timeliness

requirement may require the accountant to prepare reports on a prearranged schedule such as on a daily, weekly, or monthly basis.

Relevant

To be relevant, the financial statements must contain information that would make a difference in the user's decision-making process. If the information found in the financial statements has no bearing on the decision of the interested party, it is irrelevant to that decision. Relevant information helps investors, bankers, and creditors make decisions about the past, present, and future performance of the enterprise.

Stable Dollar

In the United States, accountants have chosen to ignore the effects of inflation and deflation by adopting the assumption that the dollar remains reasonably stable. Therefore, historical cost is used to record the cost of assets purchased and liabilities assumed.

Accounting Period

This assumption acknowledges the necessity of providing accounting information on a periodic and timely basis so that it is useful in decision making. Financial statements may be prepared on a monthly, quarterly (interim), or annual basis.

Entity

The business entity concept assumes that a business enterprise is separated and distinct from its owners or shareholders and from other businesses. This distinction exists regardless of the legal form of the enterprise.

The Concept of the Business Entity

The business entity concept treats all businesses as separate and distinct economic units. These entities may be organized as sole proprietorships, partnerships, or corporations.

Sole Proprietorship

A sole proprietorship is an unincorporated business owned by one individual. This person is entitled to all profits, absorbs all losses, and is personally liable for the debts of the business. This form of

enterprise is common to small retail shops, service enterprises, and professional practices in medicine, law, and public accounting.

Partnership

A partnership is an organization consisting of two or more individuals who contractually agree to participate on a joint venture and to share profits and losses in a predetermined ratio (usually equally). All partners are also personally liable for the debts of the partnership. Many CPA firms are organized as partnerships. Decreases in the capital accounts of either sole proprietorships or partnerships are caused by withdrawals by owners or operating losses.

Corporation

A corporation is organized in accordance with state or federal statutes and is a separate legal entity from its shareholders or owners. Each shareholder is personally liable only to the extent of his or her investment (stock) in the corporation. Distributions of profits from a corporation are called dividends. The important role of the corporation in our economy is based upon such advantages as the ability to raise large amounts of capital, the free transferability of shares of ownership, and the limited personal liability enjoyed by the shareholders. Although sole proprietorships are the most common form of doing business, corporations are the dominant economic form in terms of revenue earned.

Presenting Accounting Information through Financial Statements

Balance Sheet

The balance sheet is a detailed statement of the accounting equation. It summarizes the assets, liabilities, and owner's equity of a business at a specific time. To be of maximum value to creditors, analysts, and investors, a balance sheet should be classified. This means that balance sheet items must be organized so as to communicate the relevant information to the user. The financial position of a company can be determined from a listing of the assets (economic resources), liabilities (obligations owed to creditors), and capital (owners' equity).

The accounting equation

The accounting equation may be presented as follows:

$$\text{Assets} = \text{Liabilities} + \text{Owners' Equity}$$

The two sides of the equation must always be in balance.

Owners' Equity

The form of a business organization determines the manner of reporting owners' equity on the balance sheet.

Sole Proprietorship. The equity section of a balance sheet for a sole proprietorship might appear as follows:

Owner's Equity:

Jason Bean, Capital	\$44,000
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Partnership. If the reporting entity is a partnership, the owners' equity on the balance sheet for each partner would appear as follows:

Partners' Equity:

Jason Bean, Capital	\$22,000
Elroy Kirk, Capital	<u>22,000</u>
Total Partners' Equity	<u>\$44,000</u>

Corporation. If the reporting entity is a corporation, the corporation would have multiple owners or shareholders who are issued shares of stock that represent ownership. Both preferred and common stock can be issued to all shareholders. The term retained earnings is used to describe corporate profits that have not yet been distributed to the shareholders in the form of dividends. The owners' equity of a corporation might appear as follows:

Stockholders' Equity:

Common Stock	\$10,000
Retained Earnings	<u>34,000</u>
Total Stockholders' Equity	<u>\$44,000</u>

Income Statement

During the period in which the business entity conducts operations, it may sell goods or services to obtain revenue. Expenses may also be incurred. When the revenues for the operating period exceed expenses, net income (profit) is earned. If the expenses are more than the revenues, the entity is said to be operating at a loss. A summary of the operations of the business entity is shown on a financial statement called an income statement.

A profit will cause owners' equity to increase, while an operating loss for the period will cause a decrease. An owner may also wish either to invest additional funds into the business or to withdraw

money for personal reasons. To show the increase or decrease in owners' capital resulting from operations, and to reflect the fact that the owners have made additional investments and withdrawals from the business, a statement of owners' equity is also prepared. Both the income statement and statement of owners' equity show the result of operations for a given period of time, while the balance sheet does not.

Statement of Cash Flows

A statement of cash flows is also required every time a company prepares an income statement. The primary purpose of the statement of cash flows is to provide information about a company's cash receipts and cash payments during an accounting period. A secondary purpose of the statement is to provide information about the company's operating, investing, and financing activities.

Chapter 1 Review Questions

1. The basic financial statements include a balance sheet, income statement, and statement of activities. True or False?

2. The primary purpose of the balance sheet is to reflect
 - A. The fair value of the firm's assets at some moment in time.
 - B. Assets, liabilities, and equity.
 - C. The status of the firm's assets in case of forced liquidation of the firm.
 - D. The firm's potential for growth in stock values in the stock market.

3. The primary current source of generally accepted accounting principles for nongovernmental U.S. entities is the American Institute of Certified Public Accountants (AICPAs).

4. The fundamental goal of _____ is the development of uniform financial reporting standards across the world.
 - A. Securities and Exchange Commission (SEC)
 - B. International Accounting Standards Committee (IASC)
 - C. Governmental Accounting Standards Board (GASB)
 - D. American Institute of CPAs

5. The best indication of an enterprise's present and continuing ability to generate favorable cash flows is information about enterprise earnings based on cash basis of accounting. True or False?

6. Materiality is one of the pervasive concepts in financial reporting. Which of the following statements is true with regard to materiality?

- A. Materiality judgments generally may be based solely on the magnitude of the item.
- B. The nature and magnitude of an item as well as the circumstances in which the judgment has to be made are integral aspects of a materiality judgment.
- C. Relevant items are always material.
- D. Materiality judgments generally may be made without consideration of the magnitude of the item involved.

7. Continuation of an accounting entity in the absence of evidence to the contrary is an example of the basic concept of

- A. Accounting entity.
- B. Consistency.
- C. Going concern.
- D. Substance over form.

8. In which legal form of business organization do the owners of the business enjoy limited liability?

- A. Partnership.
- B. Corporation.
- C. Sole proprietorship.
- D. Oligopoly.

9. An objective of financial reporting is

- A. Providing information useful to investors, creditors, management, labor, and government agencies, and other users for decision making.
- B. Assessing the adequacy of internal control.
- C. Evaluating management results compared with standards.
- D. Providing information on compliance with established procedures.

10. Which of the following is NOT considered to be an advantage of organizing a business as a sole proprietorship?

- A. Is easy and inexpensive to organize.
- B. Allows freedom of action for the entrepreneur.
- C. Provides strong incentives to manage the business efficiently.
- D. Allows the proprietor to carry out all basic management functions.

Chapter 2:

Understanding the Financial Statements

Learning Objectives:

After completing this section, you should be able to:

- Recognize the primary purpose and use of different accounting financial statements.
 - Identify the format of the income statement.
-

Managers should have a good understanding of the company in order to make an informed judgment on the financial position and operating performance of the entity. The balance sheet, the income statement, and the statement of cash flows are the primary documents analyzed to determine the company's financial condition. The balance sheets gives the company's position in terms of its assets, liabilities, and equity or net worth, while the income statement gives the company's sources of revenue, expenses, and net income. The statement of cash flows allows you to analyze the company's sources and uses of cash. These financial statements are included in the annual report.

A business entity is an economic unit that enters into business transactions that must be recorded, summarized, and reported. Each business must have a separate set of accounting records and a separate set of financial statements. The financial statements are the means of conveying to management and to interested outsiders a concise picture of the value and profitability of the business for a given period of time. An examination of what can be gained from these statements, and wherein the pitfalls lie, is useful in setting up a program or strategy for planning and controlling profits.

The Income Statement and Balance Sheet

The income statement measures operating performance for a specified time period (like for the year ended December 31, 2X12). The income statement shows the revenue, expenses, and net income (or loss) for a period of definition of each element as follows.

Revenue

Revenue arises from the sale of merchandise (as by retail business), or the performance of services for a customer or a client (as by a lawyer). Revenue from sales of merchandise or sales of services are often identified merely as *sales*. Other terms used to identify sources of revenue include professional fees, commission revenue, and fares earned. When revenue is earned it results in an increase in either Cash or Accounts Receivable.

Expenses

Expenses result from performing those functions necessary to generate revenue. The amount of an expense is either equal to the cost of goods sold, the value of the services received (e.g., salary expense), or the expenditures necessary for conducting business operations (e.g. rent expense), during the period.

Net Income (Loss)

Net Income, also called *profits* or *earnings*, is the amount by which total revenue exceeds total expenses for the reporting period. It should be noted that revenue does not necessarily mean receipt of cash and expense does not automatically imply a cash payment. Note that net income and net cash flow (cash receipts less cash payments) are different. For example, taking out a bank loan will generate cash but this is not revenue since merchandise has not been sold nor have services been provided. Further, capital has not been altered because of the loan.

EXAMPLE 1

Joan Biehl is a self-employed consultant. For the month of May 2X12, she earned income of \$10,000 from services rendered. Her business expenses were: telephone \$1,000, electricity \$500, rent \$2,000, secretarial salary \$300, and office supplies used \$400. Her income statement for the period is as follows:

Joan Biehl		
INCOME STATEMENT		
For the Month Ended May 31, 2X12		
Revenue from professional services		\$10,000
Less: Operating Expenses		
Telephone	\$1,000	
Electricity	500	
Rent	2,000	
Secretarial Salary	300	
Office Supplies	<u>400</u>	
Total Operating Expenses		<u>4,200</u>
Net Income		<u>\$ 5,800</u>

Note that each revenue and expense item has its own account. This specifically enables one to better evaluate and control revenue and expense sources and to examine relationships among account categories. For instance, the ratio of telephone expenses to revenue is 10 percent (\$1,000/\$10,000). If in the previous month the relationship was 3 percent, Joan Biehl would, no doubt, attempt to determine the cause for this significant increase.

The balance sheet, on the other hand, portrays the financial position of the company at a particular point in time. It shows what is owned (assets), how much is owed (liabilities), and what is left (assets minus liabilities, known as stockholders' equity or net worth). With the balance sheet, you cut the point, freeze the action, and want to know about the company's financial position as of a certain date (like 12/31/2X12, the end of the reporting year). It is a snapshot, while the income statement is a motion picture.

Assets

Assets are economic resources that are controlled by an organization and are expected to benefit future operations. Assets may have definite physical form such as buildings, machinery, or supplies. On the other

hand, some assets exist not in physical or tangible form, but in the form of valuable legal claims or rights, such as *accounts receivables* from customers and *notes receivables* from debtors.

Assets which will be converted into cash within one year are classified as *current*. Examples of current assets are cash, accounts receivable, inventory, and prepaid expenses. Prepaid expenses include supplies on hand and advance payments of expenses such as insurance and property taxes.

Assets having a life exceeding one year are classified as *noncurrent*. Examples are long-term investments, property, plant, and equipment. Property, plant, and equipment are often called *plant assets* or *fixed assets*.

Liabilities

Liabilities are debts owed to outsiders (creditors) and are frequently described on the balance sheet by titles that include the word "payable." The liability arising from the purchase of goods or services on credit (on time) is called an *account payable*. The form of the liability when money is borrowed is usually a *note payable*, a formal written promise to pay a certain amount of money, plus interest, at a definite future time. *Accounts payable*, as contrasted with a *note payable*, does not involve the issuance of a formal promise written to the creditor, and it does not require payment of interest. Other examples of liabilities include various accrued expenses.

Liabilities payable within one year are classified as *current*, such as accounts payable, notes payable, and taxes payable. Obligations payable in a period longer than one year, for example, bonds payable and long-term debt are termed *long-term liabilities*.

Equity

Equity is a residual claim against the assets of the business after the total liabilities are deducted. Capital is the term applied to the owner's equity in the business. Other commonly used terms for capital are *owner's equity* and *net worth*. In a sole proprietorship, there is only one capital account since there is only one owner. In a partnership, a capital account exists for each owner. In a corporation, capital represents the *stockholders' equity*, which equals the capital stock issued plus the accumulated earnings of the business (called retained earnings). There are two types of capital stock--common stock and preferred stock. Common stock entitles its owners to voting rights, while preferred stock does not. Preferred stock entitles its owners to priority in the receipt of dividends and in repayment of capital in the event of corporate dissolution.

EXAMPLE 2

The equity of the owners of the business is quite similar to the equity commonly referred to with respect to home ownership. If you were to buy a house for \$150,000 by putting down 20 percent, i.e., \$30,000 of your own money and borrowing \$120,000 from a bank, you would say that your equity in the \$150,000 house was \$30,000.

The balance sheet may be prepared either in report form or account form. In the report form, assets, liabilities, and capital are listed vertically. In the account form, assets are listed on the left side and liabilities and capital on the right side.

From the examples given, it is evident that there is a tie-in between the income statement and the balance sheet. Biehl's net income of \$5,800 (last item in her income statement from Example 1) is added to capital in her balance sheet in the above example. In effect, the income statement serves as the bridge between two consecutive balance sheets. Further, the net balance of the income statement accounts is used to adjust the Capital Account.

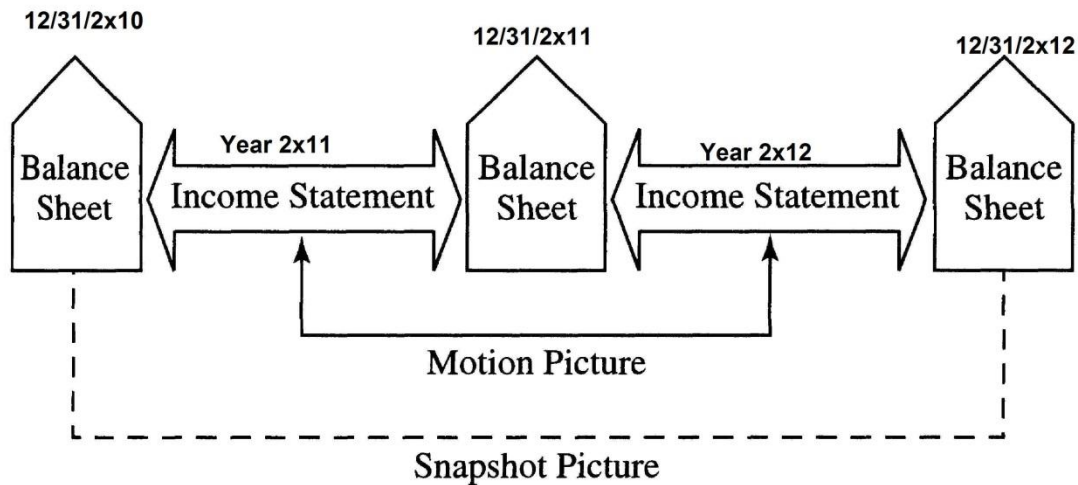
Figure 1 shows the relationship between the income statement and the balance sheet. In fact, the income statement serves as a bridge between the two consecutive balance sheets.

EXAMPLE 3 (Report Form)

Joan Biehl
Balance Sheet
December 31, 2X12

ASSETS		
Cash		\$10,000
Accounts Receivable		20,000
Office Supplies		10,500
Office Equipment		<u>30,000</u>
Total Assets		<u>\$71,000</u>
LIABILITIES AND CAPITAL		
Liabilities		
Accounts Payable		\$30,000
Capital		
Balance, May 1, 20x7	\$35,600	
Net Income for May	\$5,800	
Less withdrawals	<u>400</u>	
Increase in Capital	<u>5,400</u>	
Total Capital		<u>\$41,000</u>
Total Liabilities and Capital		<u>\$71,000</u>

FIGURE 1
BALANCE SHEET AND INCOME STATEMENT RELATIONSHIP



EXAMPLE 4 (Account Form)

Joan Biehl Balance Sheet December 31, 2X12			
ASSETS		LIABILITIES AND CAPITAL	
Cash	\$10,000	Liabilities	
Accounts Receivable	20,000	Accounts Payable	\$30,000
Office Supplies	10,500	Capital	
Office Equipment	30,000	Balance, May 1, 20x7	\$35,600
		Net Income for May	\$5,800
		Less: Withdrawals	400
		Increase in Capital	5,400
		Total Capital	<u>41,000</u>
Total Assets	<u>\$71,000</u>	Total Liabilities & Capital	<u>\$71,000</u>

Note: Simply put, with the balance sheet you are asking "how wealthy or poor is the company?," while with the income statement you are asking "how did the company do last year?" and "did it make money and then how much." Neither one is good enough to tell you about the financial health of the company. For example, the fact that the company made a big profit does not necessarily mean it is wealthy, and vice versa. In order to get the total picture, you need both statements to complement each other.

Unfortunately, you still have problems. You would like to know more about the company's financial shape (such as the cash position of the company). However, neither the balance sheet nor the income statement provides the information of the flow of cash during the period. The statement of cash flows provides this information, which will be discussed below.

The Statement of Cash Flows

The statement of cash flows shows the sources and uses of cash, which is a basis for cash flow analysis for managers. The statement aids you in answering vital questions like "where was money obtained?" and "where was money put and for what purpose?." The following provides a list of more specific questions that can be answered by the statement of cash flows and cash flow analysis:

1. Is the company growing or just maintaining its competitive position?
2. Will the company be able to meet its financial obligations?
3. Where did the company obtain funds?
4. What use was made of net income?
5. How much of the required capital has been generated internally?
6. How was the expansion in plant and equipment financed?
7. Is the business expanding faster than it can generate funds?
8. Is the company's dividend policy in balance with its operating policy?
9. Is the company's cash position sound and what effect will it have on the market price of stock?

Cash is vital to the operation of every business. How management utilizes the flow of cash can determine a firm's success or failure. Financial managers must control their company's cash flow so that bills can be paid on time and extra dollars can be put into the purchase of inventory and new equipment or invested to generate additional earnings.

FASB Requirements

Management and external interested parties have always recognized the need for a cash flow statement. Therefore, in recognition of the fact that cash flow information is an integral part of both investment and credit decisions, the *Financial Accounting Standards Board (FASB)* has issued ASC 230, *Statement of Cash Flows* (FAS-95, *Statement of Cash Flows*). A statement of cash flows is required as part of a full set of financial statements of all business entities (both publicly held) and not-for-profit organizations. A statement of cash flows reports the cash receipts, payments, and net change in cash on hand resulting from

the *operating, investing, and financing* activities of an enterprise during a given period. The presentation reconciles beginning and ending cash balances.

Accrual Basis of Accounting

Under *Generally Accepted Accounting Principles (GAAP)*, most companies use the accrual basis of accounting. This method requires that revenue be recorded when earned and that expenses be recorded when incurred. Revenue may include credit sales that have not yet been collected in cash and expenses incurred that may not have been paid in cash. Thus, under the accrual basis of accounting, net income will generally not indicate the net cash flow from operating activities. To arrive at net cash flow from operating activities, it is necessary to report revenues and expenses on a cash basis. This is accomplished by eliminating those transactions that did not result in a corresponding increase or decrease in cash on hand.

EXAMPLE 5

During 20x7, the Eastern Electric Supply Corporation earned \$2,100,000 in credit sales, of which \$100,000 remained uncollected as of the end of the calendar year. Cash that was actually collected by the corporation in 20x7 can be calculated as follows:

Credit sales	\$2,100,000
Less: Credit sales uncollected at year end	<u>100,000</u>
Actual cash collected	<u>\$2,000,000</u>

A statement of cash flows focuses only on transactions involving the cash receipts and disbursements of a company. As previously stated, the statement of cash flows classifies cash receipts and cash payments into operating, investing, and financing activities.

Operating Activities

Operating activities include all transactions that are not investing or financing activities. They relate to income statement items and the cash effects of transactions that make up the income statement. Thus cash received from the sale of goods or services, including the collection or sale of trade accounts and notes receivable from customers, interest received on loans, and dividend income are to be treated as cash from operating activities. Cash paid to acquire materials for the manufacture of goods for resale, rental payments to landlords, payments to employees as compensation, and interest paid to creditors are classified as cash outflows for operating activities.

Investing Activities

Investing activities include cash inflows from the sale of property, plant, and equipment used in the production of goods and services, debt instruments or equity of other entities, and the collection of

principal on loans made to other enterprises. Cash outflows under this category may result from the purchase of plant and equipment and other productive assets, debt instruments or equity of other entities, and the making of loans to other enterprises.

Financing Activities

The financing activities of an enterprise involve the sale of a company's own preferred and common stock, bonds, mortgages, notes, and other short- or long-term borrowings. Cash outflows classified as financing activities include the repayment of short- and long-term debt, the reacquisition of treasury stock, and the payment of cash dividends.

EXAMPLE 6

The following information pertains to Liverpool Sugar Corporation during 2X12

1. The company had \$1,004,000 in cash receipts from the sale of goods. Cash payments to acquire materials for the manufacture of goods totaled \$469,000, its payments on accounts and notes payable amounted to \$12,000, and it paid \$136,000 in federal and state taxes.
2. The company sold all of its stock investment in Redondo Food Corporation, an unrelated entity, for \$100,000. It then bought a new plant and equipment for \$676,000.
3. In 2X12, the company sold \$300,000 of its 10%, ten-year bonds. It also issued another \$50,000,000 in preferred stock in return for land and buildings. The company paid a cash dividend of \$36,000.
4. The company had a \$198,000 cash balance at the beginning of the year.

The statement cash flows for the company would be presented as follows:

Liverpool Sugar Corporation
Statement of Cash Flows
for the Year Ended December 31, 2X12

Cash flows from operating activities:	
Cash received from customers	\$1,004,000
Cash payment for acquisition of materials	(469,000)
Cash payment for interest and dividends	(12,000)
Cash payment for taxes	<u>(136,000)</u>
Net cash provided by operating activities	<u>\$ 387,000</u>
 Cash flows from investing activities:	
Cash paid to purchase plant and equipment	\$(676,000)
Sale of long-term investment	<u>100,000</u>
Net cash provided by investing activities	<u>(576,000)</u>
 Cash flows from financing activities:	
Sale of bonds	\$ 300,000
Cash paid for dividends	<u>(36,000)</u>
Net cash used in financing activities	<u>264,000</u>
 Net increase in cash and cash equivalents\$	75,000
 Cash and cash equivalents at the beginning of the year.	<u>198,000</u>
Cash and cash equivalents at the end of the year	<u>\$273,000</u>

Note that the issuance of the preferred stock in exchange for the land and buildings is a noncash transaction that would be disclosed in supplementary form at the end of the statement of cash flows.

Notes to Financial Statements

Accounting numbers do not always tell the entire story. For a variety of reasons these three financial statements reported in an annual report tend to be inadequate to fully convey the results of operations and the financial position of the firm.

The annual report often contains this statement: "The accompanying footnotes are an integral part of the financial statements." This is because the financial statements themselves are concise and condensed. Hence, any explanatory information that cannot be readily abbreviated is provided for in greater detail in the footnotes.

Footnotes provide detailed information regarding financial statement figures, accounting policies, explanatory data such as mergers and stock options, and furnish any additional necessary disclosure. Examples of footnote disclosures, as required by GAAP, are accounting methods and estimates such as inventory pricing, pension fund and profit sharing arrangements, terms of characteristics of long-term debt, particulars of lease agreements, contingencies, and tax matters.

The footnotes appear at the end of the financial statements and *explain* the figures in those statements. Footnote information may be in both *quantitative* and *qualitative* terms. An example of quantitative information is the fair market value of pension plan assets. An example of a qualitative disclosure is a lawsuit against the company. It is essential that the reader carefully evaluate footnote information to derive an informed opinion about the company's financial health and operating performance.

Summary

The traditional accounting statements--balance sheet, income statement and the newly required statement of cash flows--have been and will continue to be the most important tools for both management and outsiders for use in gauging the financial condition of a business. As a later chapter will show, additional insights in the performance of the business can be gained by using ratio analysis. Importance in cash flow cannot be emphasized enough and much of the chapter was devoted to this topic.

In viewing the various figures on financial statements, the footnotes to a statement must be considered an integral part of the statement. Failure to consider the additional facts set forth by footnotes may lead to erroneous conclusions.

Chapter 2 Review Questions

1. A statement of cash flows is to be presented in general purpose external financial statements by all business enterprises and not-for-profit organizations. True or False?

2. A statement of cash flows is intended to help users of financial statements
 - A. Evaluate a firm's liquidity, solvency, and financial flexibility.
 - B. Evaluate a firm's economic resources and obligations.
 - C. Determine a firm's components of income from operations.
 - D. Determine whether insiders have sold or purchased the firm's stock.

3. A financial statement includes all of the following items: net income, depreciation, operating activities, and financial activities. What financial statement is this?
 - A. Balance sheet.
 - B. Income statement.
 - C. Statement of cash flows.
 - D. Statement of shareholders' equity.

4. What is the purpose of information presented in notes to the financial statements?
 - A. To provide disclosures required by generally accepted accounting principles.
 - B. To correct improper presentation in the financial statements.
 - C. To provide recognition of amounts not included in the totals of the financial statements.
 - D. To present management's responses to auditor comments.

Chapter 3:

Recording Financial Information and Accounting Conventions

Learning Objectives:

After completing this section, you should be able to:

- Understand the double entry system and the accounting equation.
 - Recognize the system of debits and credits.
 - Identify different depreciation methods and calculate depreciation rates.
-

Financial decisions are usually formulated on the basis of information generated by the accounting system of the firm. Proper interpretation of the data requires an understanding of the concepts and rules underlying such systems, the convention adopted in recording information, and the limitation inherent in the information presented.

The transactions of most businesses are numerous and complex, affecting many different items appearing on the financial statements. Therefore, a formal system of classification and recording is required for timely financial reporting and managerial needs. The aim of this chapter is to introduce the formal classification system of financial information commonly called double-entry accounting. By acquiring background information about this system, you will be able to more clearly understand the basic structure of the financial statements that were discussed in the previous chapter.

Double Entry and the Accounting Equation

Double entry accounting is a system in which each business transaction affects and is recorded in two or more accounts with equal debits and credits.

The Accounting Equation

An entity's financial position is reflected by the relationship between its assets and its liabilities and equity.

The accounting equation reflects these elements by expressing the equality of assets to creditors' claims and owners' equity as follows:

$$\text{ASSETS (A)} = \text{LIABILITIES (L)} + \text{EQUITY (E)}$$

The equation in effect says that a company's assets are subject to the rights of debt holders and owners.

The accounting equation is the basis for double entry accounting, which means that each transaction has a dual effect. A transaction affects either both sides of the equation by the same amount or one side of the equation only, by increasing and decreasing it by identical amounts and thus netting zero.

EXAMPLE 1

Foster Architectural Company has assets of \$700,000, and obligations of \$300,000, and owner's equity of \$400,000. The accounting equation is

$$\begin{array}{rcl} \text{ASSETS} & = & \text{LIABILITIES} + \text{EQUITY} \\ \$700,000 & = & \$300,000 + \$400,000 \end{array}$$

If at the end of the reporting period, the firm derived net income of \$80,000, the accounting equation becomes

$$\begin{array}{rcl} \text{ASSETS} & = & \text{LIABILITIES} + \text{EQUITY} \\ \$780,000 & = & \$300,000 + \$480,000 \end{array}$$

If \$60,000 was then used to pay creditors, the accounting equation becomes

$$\begin{array}{rcl} \text{ASSETS} & = & \text{LIABILITIES} + \text{EQUITY} \\ \$720,000 & = & \$240,000 + \$480,000 \end{array}$$

In the next example, we will illustrate how the transactions of a business are recorded and what effect they have on the accounting equation.

EXAMPLE 2

Lloyd Thomas, a consultant, experienced the following events in the month of January 20x7:

1. Started his consulting practice with a cash investment of \$10,000 and office equipment worth \$5,000
2. Purchased office supplies of \$800 by paying cash
3. Bought a printer for \$500 on account from Lexmark
4. Paid \$400 in salary to his staff
5. Received an electric bill for \$300
6. Earned professional fees of \$20,000, of which \$8,000 was owed
7. Paid \$300 to Lexmark
8. Withdrew \$100 from the firm for personal use
9. Received \$1,000 from one of the clients who owed him money

The transactions will now be analyzed.

Transaction 1. Thomas started his engineer consulting practice by investing \$10,000 in cash and \$5,000 in office equipment. The *assets* Cash and Office Equipment are increased, and the *equity* is also increased for the total investment of the owner.

Asset)		=	Liabilities	+	Equity
Cash	Office Equipment (OE)				L. Thomas Equity (E)
\$10,000	\$5,000				\$15,000

Transaction 2. Acquired office supplies for cash, \$800.

The asset Office Supplies goes up by \$800 with a corresponding reduction in the asset Cash. This is an example of one asset being used to acquire another one.

Assets			=	Liabilities	+	Equity
Cash	(OE)	Office Supplies (OS)				
\$10,000	\$5,000					\$15,000
<u>-800</u>		<u>+800</u>				
\$9,200	\$5,000	\$800				\$15,000

Transaction 3. Purchased a printer on account, \$500.

An *asset*, Office Equipment, is being acquired on credit, thereby creating a *liability* for future payment called Accounts Payable. Accounts Payable is defined as the amount owed to suppliers.

Assets			=	Liabilities	+	Equity
Cash	OE	OS		Accounts Payable (AP)		
\$9,200	\$5,000	\$800				\$15,000
	<u>+500</u>			<u>+500</u>		
\$9,200	\$5,500	\$800		\$500		\$15,000

Transaction 4. Paid salary, \$400.

Cash and equity are both being reduced because of the wage expense. Equity is reduced because expenses of the business decrease the equity of the owner.

Assets			=	Liabilities	+	Equity
Cash	OE	OS		AP		
\$9,200	\$5,500	\$800		\$500		\$15,000
<u>-400</u>						<u>-400</u>
\$8,800	\$5,500	\$800		\$500		\$14,600

Transaction 5. Received an electric bill for \$300 (not paid). Liabilities are increased by \$300 since the firm owes the utility money for electricity supplied. Equity is reduced for the *expense*.

Assets			=	Liabilities	+	Equity
Cash	OE	OS		AP		
\$8,800	\$5,500	\$800		500		\$14,600
				<u>+300</u>		<u>-300</u>
\$8,800	\$5,500	\$800		\$800		\$14,300

Transaction 6. Earned fees of \$20,000, of which \$12,000 was received in cash and \$8,000 was owed by clients.

Cash goes up by \$12,000 and the Accounts Receivable (amounts owed to the business from customers) is created. Professional fees earned is *revenue* to the business and hence increases the owner's equity. Thus, equity is increased by \$20,000.

Assets				=	Liabilities	+	Equity
Cash	OE	OS	AR		AP		
\$8,800	\$5,500	\$800			\$800		\$14,300
<u>+12,000</u>			<u>+\$8,000</u>				<u>+20,000</u>
\$20,800	\$5,500	\$800	\$8,000		\$800		\$34,300

Transaction 7. Paid \$300 to Dell (in partial payment of the amount owed to them).

The payment lowers the asset Cash and reduces the liability Accounts Payable.

Assets				=	Liabilities	+	Equity
Cash	OE	OS	AR		AP		
\$20,800	\$5,500	\$800	\$8,000		\$800		\$34,300
<u>-300</u>					<u>-300</u>		
\$20,500	\$5,500	\$800	\$8,000		\$500		\$34,300

Transaction 8. Withdrew \$100 for personal use.

Cash is reduced and so is equity. The personal withdrawal is, in effect, a disinvestment in the business and hence reduces equity. It is not an expense in running the business.

Assets				=	Liabilities	+	Equity
Cash	OE	OS	AR		AP		
\$20,500	\$5,500	\$800	\$8,000		\$500		\$34,300
<u>-100</u>							<u>-100</u>
\$20,400	\$5,500	\$800	\$8,000		\$500		\$34,200

Transaction 9. Received \$1,000 from clients who owed him money.

This increases Cash and reduces Accounts Receivable since the client now owes the business less money. One asset is being substituted for another one.

Assets				=	Liabilities	+	Equity
Cash	OE	OS	AR		AP		
\$20,400	\$5,500	\$800	\$8,000		\$500		\$34,200
<u>+1,000</u>			<u>-1,000</u>				
\$21,400	\$5,500	\$800	\$7,000		\$500		\$34,200

Transaction 10. Worth (determined by an inventory count) of office supplies on hand at month's end, \$600.

Since the worth of office supplies originally acquired was \$800 and \$600 is left on hand, the business used \$200 in supplies. This reduces the asset Office Supplies and correspondingly reduces equity. The supplies used up represent office supplies expense.

Assets				=	Liabilities	+	Equity
Cash	OE	OS	AR		AP		
\$21,400	\$5,500	\$800	\$7,000		\$500		\$34,200
		<u>-200</u>					<u>-200</u>
\$21,400	\$5,500	\$600	\$7,000		\$500		\$34,000

SUMMARY OF TRANSACTIONS

January 20x7

Assets				=	L	+	Equity
Cash	OE	OS	AR		AP		
\$10,000	\$5,000						\$15,000
<u>-800</u>		<u>+800</u>					
9,200	5,000	800					15,000
	<u>+500</u>				<u>+\$500</u>		
9,200	5,500	800			500		15,000
<u>-400</u>							<u>-400</u> Wage Expense
8,800	5,500	800			500		14,600
					<u>+300</u>		<u>-300</u> Utility Expense.
8,800	5,500	800			800		14,300
<u>+12,000</u>			<u>\$8,000</u>			<u>+20,000</u>	Prof. Fee Revenue
20,800	5,500	800	8,000		800		34,300
<u>-300</u>					<u>-300</u>		
20,500	5,500	800	8,000		500		34,300
<u>-100</u>							<u>-100</u> Drawing
20,400	5,500	800	8,000		500		34,200
<u>+1,000</u>			<u>-1,000</u>				
21,400	5,500		7,000		500		34,200
		<u>-200</u>					<u>-200</u> Off. Supplies Exp.
<u>21,400</u>	<u>5,500</u>	<u>\$600</u>	<u>\$7,000</u>	=	<u>500</u>		<u>34,000</u>
	<u>\$34,500</u>			=			<u>\$34,500</u>

The Account

To prepare an equation Assets = Liabilities + Stockholders' Equity for each transaction would be extremely time consuming. Further, information about a specific item (e.g., accounts receivable) would be lost through this process. Rather, there should be an *account* established for each type of item. At the end of the reporting period, the financial statements can then be prepared based upon the balances in these accounts.

The basic component of the formal accounting system is the *account*. A separate account (or set of accounts) exists for each item shown on the financial statements. Thus, balance sheet accounts consist of assets, liabilities, and equity. Income statement accounts are either expenses or revenue. The increases, decreases, and balance are shown for each account.

In other words, the purpose of the account is to provide a capsule summary of all transactions which have caused an increase or decrease and to reflect the account balance at any given point in time.

Ledger

All accounts are maintained in a book called the *ledger*. The ledger of a firm, for example, would be the group of accounts which summarize the financial operations of the company and is the basis for the preparation of the balance sheet and income statement. General ledgers serve to classify accounting data, while a subsidiary ledger is a listing of the components of account balances. It is also useful for decision making since it provides the manager with the balance in a given account at a particular time. *Note:* most ledgers are now computer based.

A Chart of Accounts

The ledger is usually accompanied by a table of contents called a *chart of accounts*. The chart of accounts is a listing of the titles and numbers of all accounts in the ledger. Listed first are the balance sheet accounts -- assets, liabilities, and stockholders' equity, in that order. The income statement accounts -- revenue and expenses -- follow. Its numbering system permits easy reference to accounts.

The account numbering system as it pertains to a typical company is as follows:

Series	Account Classification
001-199	Asset
200-299	Liabilities
300-399	Stockholders' Equities
400-499	Revenue
500-599	Expenses

Particular accounts can then be given unique, identifying account numbers within the series, as in the following examples from the Assets Series:

Account No	Assets
001	Cash on hand
002	Marketable securities
003	Accounts receivable
004	Inventories
005	Investments
006	Land
007	Buildings
008	Equipment

Accounts may take many forms, but the simplest is called a T-account. The reason for this name is obvious as shown below:

Account Title	
debit (left side)	credit (right side)

Every account has three major parts:

1. A title, which is the name of the item recorded in the account
2. A space for recording increases in the amount of the item
3. A space for recording decreases in the amount of the item.

The left and right sides of the account are called *debit* and *credit*, respectively (often abbreviated as "Dr" for debit and "Cr" for credit). Amounts entered on the left side of an account, regardless of the account title, are called *debits* to the account, and the account is said to be *debited*. Amounts entered on the right side of an account are called *credits*, and the account is said to be *credited*. You must note that the items debit and credit are *not* synonymous with the words increase and decrease. The system of debits and credits as related to increases and decreases in each of the five categories of accounts, assets, liabilities, revenue, expenses, and equity is explained later in the chapter.

To illustrate the account, we'll look at the Cash account (within the Asset classification), where receipts of cash during a period of time have been listed vertically on the debit side and the cash payments for the same period have been listed similarly on the credit side of the account. A memorandum total of the cash receipts for the period to date, \$55,000 in the illustration, may be noted below the last debit whenever the information is desired.

Cash	
10,000	25,000
<u>45,000</u>	21,000
	<u>7,500</u>
<u>55,000</u>	<u>53,500</u>
<u>1,500</u>	

The total of the cash payments, \$53,500 in the illustration, may be noted on the credit side in a similar manner. Subtraction of the smaller sum from the larger, \$55,000 - \$53,500, yields the amount of cash on hand, which is called the balance of the account. The cash account in the illustration has a *balance* of \$1,500, (which may be inserted as shown), which identifies it as a *debit balance*.

The System of Debits and Credits

In this section we will briefly explain how accounts are increased or decreased through the use of debits and credits, the basic foundation of *double-entry* accounting where at least two entries, a debit and a credit, are made for each transaction.

The following guide shows how to increase or decrease accounts using debits and credits.

Asset		Liabilities	
+	-	-	+
Debit for increase	Credit for decrease	Debit for decrease	Credit for increase

Revenue		Expenses	
-	+	+	-
Debit for decrease	Credit for increase	Debit for increase	Credit for decrease

Equity	
-	+
Debit for decrease	Credit for increase

These same relationships are illustrated below:

Type of Account	Normal Balance	To Increase	To Decrease
Asset	Debit	Debit	Credit
Liability	Credit	Credit	Debit
Revenue	Credit	Credit	Debit
Expenses	Debit	Debit	Credit
Equity	Credit	Credit	Debit

The illustrated system of debits and credits is the standard method followed by persons keeping records on the double-entry system. The system of rules is analogous to a set of traffic rules whereby everyone (at least everyone in this country) agrees to drive on the right side of the road. Obviously, the system would work if we reversed everything. However, you will see shortly that there is a very logical and unique system in the present structure.

The "How and Why" of Debits and Credits

Recall the fundamental accounting equation:

$$\text{ASSETS (A)} = \text{LIABILITIES (L)} + \text{EQUITY (E)}$$

In addition to this equation there is another fundamental accounting concept or rule:

Debits must always equal Credits

This means that whenever a financial transaction is recorded in the accounting record one account (or accounts) must be debited and another account (or accounts) must be credited to obtain an equal amount. It was noted earlier that all accounts have two sides, a debit side and a credit side. The purpose is to record increases on one side and decreases on the other.

Journals

For simplicity, the entries used in the previous section were made directly in the general ledger accounts. However, this process does not furnish the data required about a given transaction nor is listing of transactions in chronological order possible on T-accounts. These deficiencies are overcome through the use of a *journal*. The journal is the book of original entry in which transactions are entered on a daily basis in chronological order. This process is called *journalizing*.

The data are then transferred from the journal to the ledger by debiting and crediting the particular accounts involved. This process is called *posting*. The P.R. (Posting Reference) column is used for the ledger account number after the posting from the journal to the ledger takes place. This provides a cross reference between journal and ledger. There exist different types of journals that may be grouped into the categories of (1) general journals and (2) specialized journals. The latter is used when there are many repetitive transactions (e.g., sales or payroll).

Types of Depreciation Methods

Depreciation is an important issue in accounting policy and financial management. It requires an explicit discussion since its treatment has a considerable bearing on cash, reported earnings, tax liabilities incurred, and facilities investment decisions.

Depreciation is the decline in economic potential of fixed assets (with the exception of land) originating from wear and tear, deterioration, and obsolescence. Accounting for depreciation involves the process of spreading the cost of an asset over its useful life.

Among the commonly used depreciation methods are straight-line and accelerated methods. The two major accelerated methods are sum-of-the-years'-digits (SYD) and double-declining-balance (DDB). Each of these methods is explained below.

Straight-Line Method

This is the easiest and most popular method of calculating depreciation. It results in equal periodic depreciation charges. The method is most appropriate when an asset's usage is uniform from period to period, as is the case with furniture. The annual depreciation expense is calculated by using the following formula:

$$\text{Depreciation expense} = \frac{\text{Cost} - \text{salvage value}}{\text{Number of years of useful life}}$$

EXAMPLE 3

An auto is purchased for \$20,000 and has an expected salvage value of \$2,000. The auto's estimated life is 8 years. Its annual depreciation is calculated as follows:

$$\text{Depreciation expense} = \frac{\text{Cost} - \text{salvage value}}{\text{Number of years of useful life}}$$

$$= \frac{\$20,000 - \$2,000}{8 \text{ years}} = \$2,250/\text{year}$$

An alternative means of computation is to multiply the *depreciable* cost (\$18,000) by the annual depreciation rate, which is 12.5 percent in this example. The annual rate is calculated by dividing the number of years of useful life into one ($1/8 = 12.5\%$). The result is the same: $\$18,000 \times 12.5\% = \$2,250$.

Sum-of-the-Years'-Digits (SYD) Method

In this method, the number of years of life expectancy is enumerated in reverse order in the numerator, and the denominator is the sum of the digits. For example, if the life expectancy of a machine is 8 years, write the numbers in reverse order: 8, 7, 6, 5, 4, 3, 2, 1. The sum of these digits is 36, or $(8 + 7 + 6 + 5 + 4 + 3 + 2 + 1)$. Thus, the fraction for the first year is $8/36$, while the fraction for the last year is $1/36$. The sum of the eight fractions equals $36/36$, or 1. Therefore, at the end of 8 years, the machine is completely written down to its salvage value.

The following formula may be used to quickly find the sum-of-the-years' digits (S):

$$S = \frac{(N)(N + 1)}{2}$$

where N represents the number of years of expected life.

EXAMPLE 4

In Example 3, the *depreciable* cost is \$18,000 (\$20,000 - \$2,000). Using the SYD method, the computation for each year's depreciation expense is

$$S = \frac{(N)(N + 1)}{2} = \frac{8(9)}{2} = 72/2 = 36$$

Year	Fraction	x	Depreciation Amount (\$)	=	Depreciation Expense
1	8/36		\$18,000		\$4,000
2	7/36		18,000		3,500
3	6/36		18,000		3,000
4	5/36		18,000		2,500
5	4/36		18,000		2,000
6	3/36		18,000		1,500
7	2/36		18,000		1,000
8	1/36		18,000		<u>500</u>
			Total		<u>\$18,000</u>

Double-Declining-Balance (DDB) Method

Under this method, depreciation expense is highest in the earlier years and lower in the later years. First, a depreciation rate is determined by doubling the straight-line rate. For example, if an asset has a life of 10 years, the straight-line rate is 1/10 or 10 percent, and the double-declining rate is 20 percent. Second, depreciation expense is computed by multiplying the rate by the book value of the asset at the beginning of each year. Since book value declines over time, the depreciation expense decreases each successive period.

This method *ignores* salvage value in the computation. However, the book value of the fixed asset at the end of its useful life cannot be below its salvage value.

EXAMPLE 5

Assume the data in Example 3. Since the straight-line rate is 12.5 percent (1/8), the double-declining-balance rate is 25 percent (2 x 12.5%). The depreciation expense is computed as follows:

<i>Year</i>	<i>Book Value at Beginning of Year</i>	<i>x</i>	<i>Rate (%)</i>	<i>=</i>	<i>Depreciation Expense</i>	<i>Year-end Book Value</i>
1	\$20,000		25%		\$5,000	\$15,000
2	15,000		25		3,750	11,250
3	11,250		25		2,813	8,437
4	8,437		25		2,109	6,328
5	6,328		25		1,582	4,746
6	4,746		25		1,187	3,559
7	3,559		25		890	2,669
8	2,669		25		667	2,002

Note: If the original estimated salvage value had been \$2,100 instead of \$2,000, the depreciation expense for the eighth year would have been \$569 (\$2,669 - \$2,100) rather than \$667, since the asset cannot be depreciated below its salvage value.

Units of Production Method

The units-of-production depreciation method allocates asset cost based on the level of production. As production varies, so will the credit to accumulated depreciation. Each unit is charged with a constant amount of depreciation equal to the cost of the asset minus salvage value, divided by the total units expected to be produced.

$$\text{Depreciation per unit} = \frac{\text{Cost} - \text{salvage value}}{\text{Estimated total units that can be produced in the asset's lifetime}}$$

$$\text{Depreciation} = \text{units of output for year} \times \text{depreciation per unit}$$

EXAMPLE 6

The cost of a machine is \$11,000 with a salvage value of \$1,000. The estimated total units are 5,000. The units produced in the first year are 400.

$$\text{Depreciation per unit} = \frac{\$11,000 - \$1,000}{5,000} = \$2 \text{ per unit}$$

$$\text{Depreciation in year 1} = 400 \text{ units} \times \$2 = \$800$$

Which Method to Use

1. Of course, over the life of the fixed asset, the total depreciation charge will be the same no matter what depreciation method is used; only the timing of the tax savings will differ.
2. The depreciation method used for financial reporting purposes should be realistic for that type of fixed asset. For example, depreciation on an automobile may be based on mileage.
3. The accelerated methods such as SYD and DDB are advantageous for tax purposes since higher depreciation charges in the earlier years result in less income and thus less tax. The tax savings may then be invested for a return.

Summary

Financial decisions are usually based on the basis of accounting information generated by the accounting system. The chapter introduced a formal classification system, known as double entry accounting. To facilitate a basic understanding of this system, various accounting tools and concepts were covered with numerical examples. The depreciation policies adopted by an entity have significant implications for reported earnings, tax liabilities, cash positions, and capital investment decisions.

Chapter 3 Review Questions

1. The term "double-entry system" refers to
 - A. The use of real and nominal accounts.
 - B. The recording of each transaction in two parts.
 - C. The use of two journals.
 - D. The use of a journal and a ledger.

2. A chart of accounts is
 - A. A flowchart of all transactions.
 - B. An accounting procedures manual.
 - C. A journal.
 - D. A list of names of all account titles.

3. What function do general ledgers serve in the accounting process?
 - A. Reporting.
 - B. Summarizing.
 - C. Classifying.
 - D. Recording.

4. A subsidiary ledger is
 - A. A listing of the components of account balances.
 - B. A backup system to protect against record destruction.
 - C. A listing of account balances just before closing entries are prepared.
 - D. All accounts of a subsidiary.

5. What factor must be present to use the units-of-production method of depreciation?

- A. Total units to be produced can be estimated.
- B. Production is constant over the life of the asset.
- C. Repair costs increase with use.
- D. Obsolescence is expected.

Chapter 4:

Analysis of the Financial Statements

Learning Objectives:

After completing this section, you should be able to:

- Recognize the benefits of financial statement analysis, and how key ratios are applied.
 - Distinguish among trend analysis, vertical analysis, and horizontal analysis.
 - Recognize various ratios used in financial analysis.
-

Accounting can be thought of as the art of creating scorecards for business operations. It translates raw data into a set of objective numbers integrated into financial statements that provide information about the firm's profits, performance, problems and future prospects. Financial analysis is the study of the relationships among these financial numbers; it helps users to identify the major strengths and weaknesses of a business enterprise.

Who Uses Financial Analysis?

The techniques of financial analysis are important to two groups: *internal users* and *external users*, such as investors and banks.

Internal Managers

Internal managers analyze the financial statements to determine whether the company is earning an adequate return on its assets. They also use financial ratios as "flags" to indicate potential areas of strength or weakness. Many financial analysts use rule-of-thumb measurements for key financial ratios. For example, most analysts feel that a current ratio (current assets divided by current liabilities) of two

to one is acceptable for most businesses. However, while a company may meet or even surpass this ratio, the financial statements might indicate that an increasing proportion of the current assets consist of accounts receivable that have been outstanding for more than 30 days. Slow payments might require management to change its credit policy by shortening the credit period or by implementing a more effective cash-collection policy. Internal management also uses this “number-crunching” process to decide how much inventory is to be held at any one time or whether to merge with or acquire another company.

External Users

External users include investors, creditors, unions, and prospective employees. Investors might use the financial statements to study whether there is an adequate profit margin or a favorable return on assets. The financial health of the company, as perceived by investors, will affect the market price of the company’s stock, cost of financing, and bond rating. For creditors, financial statements indicate a company’s ability to repay a loan. A union will study the financial statements to evaluate their wage and pension demands when their old contract with management expires. Finally, students and other job seekers might analyze a company’s financial statements to determine career opportunities.

Horizontal and Vertical Analysis

Financial statement analysis includes horizontal analysis (percentage change over the years) and vertical analysis (percentage relationship within one year). Sources of financial information include a company’s annual financial report, SEC filings, financial reference books put out by such firms as Dun & Bradstreet, trade publications, and financial newspapers such as the *Wall Street Journal*.

An analyst also studies industry norms. This measurement indicates how a company is performing in comparison with other companies in the same industry. Unfortunately, there are limitations to the use of this method. First, one company in the same industry might be involved in manufacturing and selling a product in large quantities at the wholesale level, while another enterprise might only sell at the retail level to the public. Second, each enterprise might use a different accounting method for financial reporting purposes. For example, one company might value its ending inventory according to the FIFO method, while a competitor might use LIFO. In addition, the two companies might use a different accounting method for recording depreciation. The cumulative effect of the use of different accounting methods might make a comparison of net income and fixed-asset valuation of little importance.

Financial Statement Analysis

The financial community uses several methods for evaluating the financial health of an enterprise. These methods include trend analysis, horizontal and vertical analysis, and ratio analysis.

Trend Analysis

Trend analysis indicates in which direction a company is headed. Trend percentages are computed by taking a base year and assigning its figures as a value of 100. Figures generated in subsequent years are expressed as percentages of base-year numbers.

EXAMPLE 1

The Hotspot Appliance Corporation showed the following figures for a five-year period:

	<u>2X12</u>	<u>2X11</u>	<u>2X10</u>	<u>2X09</u>	<u>2X08</u>
Net Sales	\$ 910	\$ 875	\$ 830	\$ 760	\$ 775
Cost of goods sold	573	510	483	441	460
Gross profit	\$ 337	\$ 365	\$ 347	\$ 319	\$ 315

A schedule showing trend percentages is as follows:

	<u>2X12</u>	<u>2X11</u>	<u>2X10</u>	<u>2X09</u>	<u>2X08</u>
Net Sales	117	113	107	98	100
Cost of goods sold	125	111	105	96	100
Gross profit	107	116	110	101	100

With 2X08 taken as the base year, its numbers are divided into those from subsequent years to yield comparative percentages. For example, net sales in 2X08 (\$775,000) is divided into 2X12's net-sales figure (\$910,000).

Net sales shows an upward trend after a downturn in 2X09. Cost of goods sold shows a sharp increase between 2X11 and 2X12 after a small drop in costs between 2X08 and 2X09. There appears to be a substantial drop in gross profit between 2X11 and 2X12 which is attributable to the increased cost of goods sold.

Trend percentages show horizontally the degree of increase or decrease, but they do not indicate the reason for the changes. They do serve to indicate unfavorable developments that will require further investigation and analysis. A significant change may have been caused by a change in the application of an accounting principle or by controllable internal conditions, such as a decrease in operating efficiency.

Horizontal Analysis

Horizontal analysis improves an analyst's ability to use dollar amounts when evaluating financial statements. It is more useful to know that sales have increased 25% than to know that sales increased by \$50,000. Horizontal analysis requires that you: (1) compute the change in dollars from the earlier base year, and (2) divide the dollar amount of the change by the base period amount.

EXAMPLE 2

The comparative income statement of the Ogel Supply Corporation as of December 31, 2X12, appears as follows:

	<u>2X12</u>	<u>2X11</u>
Net Sales	\$ 990,000	\$ 884,000
Cost of goods sold	<u>574,000</u>	<u>503,000</u>
Gross profit	<u>\$ 416,000</u>	<u>\$ 381,000</u>
Operating expenses:		
Selling expenses	\$ 130,000	\$ 117,500
General expenses	<u>122,500</u>	<u>120,500</u>

Total operating expenses	<u>\$ 252,500</u>	<u>\$ 238,000</u>
Income from operations	163,000	143,000
Interest expense	<u>24,000</u>	<u>26,000</u>
Income before income taxes	\$ 139,500	\$ 117,000
Income tax expense	<u>36,360</u>	<u>28,030</u>
Net income	<u>\$ 103,140</u>	<u>\$ 88,970</u>

A detailed horizontal analysis statement follows.

	<u>2X12</u>	<u>2X11</u>	Increase (Decrease) Amount	Percent
Net Sales	\$ 990,000	\$ 884,000	106,000	12.0
Cost of goods sold	<u>574,000</u>	<u>503,000</u>	<u>71,000</u>	14.1
Gross profit	<u>416,000</u>	<u>381,000</u>	<u>35,000</u>	9.2
Operating expenses:				
Selling expenses	130,000	117,500	12,500	10.6
General expenses	<u>122,500</u>	<u>120,500</u>	<u>2,000</u>	1.7
Total operating expenses	<u>252,500</u>	<u>238,000</u>	<u>14,500</u>	6.1
Income from operation	163,500	143,000	20,500	14.3
Interest expense	24,000	26,000	(2,000)	(7.7)
Income before income taxes	139,500	117,000	22,500	19.2
Income tax expense	<u>36,360</u>	<u>28,030</u>	<u>8,330</u>	29.7
Net income	<u>\$ 103,140</u>	<u>\$ 88,970</u>	<u>\$ 14,170</u>	15.9

EXAMPLE 3

The comparative balance sheet of the Ogel Supply Corporation as of December 31, 2X12, appears as follows:

	<u>2X12</u>	<u>2X11</u>
ASSETS		
Current Assets:		
Cash	\$ 60,000	\$ 30,000
Account receivable, net	113,000	79,000
Inventories	107,100	106,900
Prepaid expenses	<u>5,700</u>	<u>6,100</u>
Total current assets	\$ 285,800	\$ 222,000
Property, plant, and equipment, net	<u>660,000</u>	<u>665,000</u>
Total assets	<u>\$ 945,800</u>	<u>\$ 887,000</u>
LIABILITIES		
Current liabilities:		
Notes payable	40,000	\$ 33,000
Accounts payable	100,600	57,500
Total current liabilities	140,600	\$ 90,500
Long-term debt	<u>400,000</u>	<u>410,000</u>
Total liabilities	<u>\$ 540,600</u>	<u>\$ 500,500</u>
STOCKHOLDERS' EQUITY		
Common stock, no-par	\$ 200,000	\$200,000
Retaining earnings	<u>205,200</u>	<u>186,500</u>
Total stockholders' equity	<u>\$ 405,200</u>	<u>\$386,500</u>
Total liabilities and stockholders' equity	<u>\$ 945,800</u>	<u>\$ 887,000</u>

A detailed horizontal analysis statement is given below.

	<u>2X12</u>	<u>2X11</u>	<u>Amount</u>	<u>Percent</u>
ASSETS				
Current Assets:				
Cash	\$ 60,000	\$ 30,000	\$ 30,000	100.0
Account receivable, net	113,000	79,000	34,000	43.0
Inventories	107,100	106,900	200	0.0

Prepaid expenses	<u>5,700</u>	<u>6,100</u>	<u>(400)</u>	<u>(7.0)</u>
Total current assets	\$ 285,800	\$ 222,000	\$ 63,800	28.7
Property, plant, and equipment, net	<u>660,000</u>	<u>665,000</u>	<u>(5,000)</u>	<u>(0.1)</u>
Total assets	<u>\$ 945,800</u>	<u>\$ 887,000</u>	<u>\$ 58,800</u>	<u>6.6</u>
LIABILITIES				
Current liabilities:				
Notes payable	40,000	\$ 33,000	\$ 7,000	21.2
Accounts payable	100,600	57,500	43,100	75.0
Total current liabilities	140,600	\$ 90,500	\$ 50,100	55.4
Long-term debt	<u>400,000</u>	<u>410,000</u>	<u>(10,000)</u>	<u>(2.4)</u>
Total liabilities	<u>\$ 540,600</u>	<u>\$ 500,500</u>	<u>40,100</u>	<u>8.1</u>
STOCKHOLDERS' EQUITY				
Common stock, no-par	\$ 200,000	\$200,000	-	0.0
Retaining earnings	<u>205,200</u>	<u>186,500</u>	<u>18,700</u>	<u>10.0</u>
Total stockholders' equity	<u>\$ 405,200</u>	<u>\$386,500</u>	<u>\$ 18,700</u>	<u>5.0</u>
Total liabilities and stockholders' equity	<u>\$ 945,800</u>	<u>\$ 887,000</u>	<u>\$ 58,800</u>	<u>6.6</u>

Vertical Analysis

Vertical analysis shows the percentage relationship of each item on the financial statement to a total figure representing 100 percent. Each income statement account is compared to net sales. For example, if net sales is \$100,000 and net income after taxes is \$8,000, then the company's net income is \$8,000 divided by \$100,000, or 8% of the net sales figure.

Vertical analysis also reveals the internal structure of the business. This means that if total assets are \$750,000 and cash shows a year-end balance of \$75,000, then cash represents 10% of the total assets of the business at year-end. Vertical analysis shows the mix of assets that generate the income as well as the sources of capital provided by either current or noncurrent liabilities, or by the sale of preferred and common stock.

A company's vertical percentages should be compared to those of its competitors or to industry averages to determine the company's relative position in the marketplace. Like horizontal analysis, vertical analysis is not the end of the process. The analyst must be prepared to examine problem areas indicated by horizontal and vertical analysis.

EXAMPLE 4

Using the comparative income statement of the Ogel Supply Corporation at December 31, 2X12 given in Example 3, a detailed vertical analysis statement is shown below.

	<u>2X12</u>		<u>2X11</u>	
	<u>Amount</u>	<u>Percent</u>	<u>Amount</u>	<u>Percent</u>
Net Sales	\$ 990,000	100.0	\$ 884,000	100.0
Cost of goods sold	<u>574,000</u>	<u>58.0</u>	<u>503,000</u>	<u>57.0</u>
Gross profit	<u>416,000</u>	42.0	<u>381,000</u>	43.0
Operating expenses:				
Selling expenses	130,000	13.1	117,500	13.3
General expenses	<u>122,500</u>	<u>12.4</u>	<u>120,500</u>	<u>13.6</u>
Total operating expenses	<u>252,500</u>	<u>25.5</u>	<u>238,000</u>	<u>26.9</u>
Income from operation	163,500	16.5	143,000	<u>16.1</u>
Interest expense	24,000	<u>2.4</u>	26,000	<u>2.9</u>
Income before income taxes	139,500	14.1	117,000	13.2
Income tax expense	<u>36,360</u>	<u>3.7</u>	<u>28,030</u>	3.2
Net income	<u>\$ 103,140</u>	<u>10.4</u>	<u>\$ 88,970</u>	<u>10.0</u>

EXAMPLE 5

Using the comparative balance sheet of the Ogel Supply Corporation at December 31, 2X12, a detailed vertical analysis statement is given below.

	<u>2X12</u>	<u>Percent</u>	<u>2X11</u>	<u>Percent</u>
ASSETS				
Current Assets:				

Cash	\$ 60,000	6.3	\$ 30,000	3.6
Account receivable, net	113,000	11.9	79,000	8.9
Inventories	107,100	11.3	106,900	12.1
Prepaid expenses	<u>5,700</u>	<u>0.6</u>	<u>6,100</u>	<u>.7</u>
Total current assets	\$ 285,800	30.1	\$ 222,000	25.3
Property, plant, and equipment, net	<u>660,000</u>	<u>69.9</u>	<u>665,000</u>	<u>74.9</u>
Total assets	<u>\$ 945,800</u>	<u>100.0</u>	<u>\$ 887,000</u>	<u>100.0</u>
LIABILITIES				
Current liabilities:				
Notes payable	40,000	4.2	\$ 33,000	3.7
Accounts payable	<u>100,600</u>	<u>10.6</u>	<u>57,500</u>	<u>6.5</u>
Total current liabilities	140,600	14.8	\$ 90,500	10.2
Long-term debt	<u>400,000</u>	<u>42.3</u>	<u>410,000</u>	<u>46.2</u>
Total liabilities	<u>\$ 540,600</u>	<u>57.1</u>	<u>\$ 500,500</u>	<u>56.4</u>
STOCKHOLDERS' EQUITY				
Common stock, no-par	\$ 200,000	21.1	\$200,000	22.6
Retaining earnings	<u>205,200</u>	<u>21.7</u>	<u>186,500</u>	<u>21.0</u>
Total stockholders' equity	<u>\$ 405,200</u>	<u>42.8</u>	<u>\$386,500</u>	<u>43.6</u>
Total liabilities and stockholders' equity	<u>\$ 945,800</u>	<u>100.0</u>	<u>\$ 887,000</u>	<u>100.0</u>

After completing the statement analysis, the financial analyst will consult with management to discuss problem areas, possible solutions, and the company's prospects for the future.

RATIO ANALYSIS

Ratios provide a convenient and useful way of expressing a relationship between numbers. For example, management is always interested in its ability to pay its current liabilities as they become due.

Liquidity Analysis

Ratios used to determine the debt-paying ability of the company include the *current ratio* and the *acid-test* or *quick ratio*.

Current Ratio

The current ratio is a valuable indicator of a company's ability to meet its current obligations as they become due. The ratio is computed by using the following formula:

Current Assets

Current Liabilities

EXAMPLE 6

Assume that in Example 5 the Ogel Supply Corporation showed the following current assets and current liabilities for the years ended December 31, 2X12, and December 31, 2X11:

	<u>2X12</u>	<u>2X11</u>
ASSETS		
Current Assets:		
Cash	\$ 60,000	\$ 30,000
Account receivable, net	113,000	79,000
Inventories	107,100	106,900
Prepaid expenses	<u>5,700</u>	<u>6,100</u>
Total current assets	<u>\$ 285,800</u>	<u>\$ 222,000</u>
LIABILITIES		
Current liabilities:		
Notes payable	40,000	\$ 33,000
Accounts payable	<u>100,600</u>	<u>57,500</u>
Total current liabilities	<u>140,600</u>	<u>\$ 90,500</u>

	<u>2X12</u>	<u>2X11</u>
<u>Total current assets</u>	<u>\$285,800</u>	<u>\$222,000</u>
Total current liabilities	$\$140,600 \div \$90,500 = 2.0$	

The change from 2.5 to 2.0 indicates that Ogel has a diminished ability to pay its current liabilities as they mature. However, a current ratio of 2.0 to 1 is still considered a "secure" indicator of a company's ability to meet its current obligations incurred in operating the business.

Acid-Test or Quick Ratio

Unlike the current ratio, the acid-test or quick ratio places emphasis on the relative convertibility of the current assets into cash. The ratio places greater emphasis on receivables than on inventory, since the inventory may not be readily convertible into cash. This method also assumes that prepaid expenses have minimal resale value. The ratio is computed by using the following formula:

$$\frac{\text{Cash + Short-Term Investments + Accounts Receivable, Net}}{\text{Current Liabilities}}$$

EXAMPLE 7

In Example 6, the acid-test or quick ratio for 2X12 and 2X11 is calculated as follows.

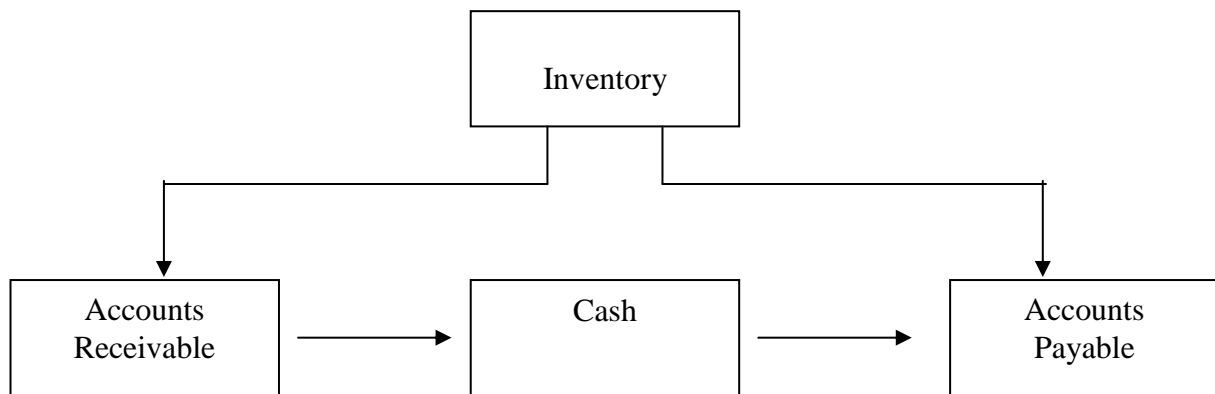
	<u>2X12</u>	<u>2X11</u>
<u>Total acid-test assets</u>	<u>\$173,000</u>	<u>\$109,000</u>
Total current liabilities	\$140,600 =1.2	\$90,500 = 1.2

The ratios are unchanged. This shows that, despite a significant increase in both the acid-test or quick assets and current liabilities, Ogel still maintains the same ability to meet its current obligations as they mature.

Working Capital

Working capital is the excess of current assets over current liabilities.

Working capital items are those that are flowing through the business in a regular pattern and may be diagrammed as follows:



EXAMPLE 8

In Example 6, working capital for 2X12 and 2X11 is:

SOLUTION 8

(a)

	<u>2X12</u>	<u>2X11</u>
Total currents assets	\$285,800	\$222,000
Total current liabilities	<u>\$140,600</u>	<u>\$ 90,500</u>
Working capital	<u>\$145,200</u>	<u>\$131,500</u>

(b) The change from \$131,500 to \$145,200 indicates that Ogel has increased its working capital, which Ogel must now decide whether it is making effective use of. For example, should any excess working capital be used to purchase short-term income-producing investments?

Accounts-Receivable Ratios

Accounts-receivable ratios are composed of the accounts receivable turnover and the collection period, which is the number of days the receivables are held.

Accounts-Receivable Turnover

The accounts-receivable turnover is the number of times accounts receivable are collected during the year. The turnover equals net credit sales (if not available, then total sales) divided by the average accounts receivable. Average accounts receivable is usually determined by adding the beginning accounts receivable to the ending accounts receivable and dividing by two. However, average accounts receivable may be arrived at with greater accuracy on a quarterly or monthly basis, particularly for a seasonal business. Unfortunately, this information is typically known only to management. Using data for the shortest time period will provide the most reliable ratio.

The higher the accounts-receivable turnover, the more successfully the business collects cash. However, an excessively high ratio may signal an excessively stringent credit policy, with management not taking advantage of the potential profit by selling to customers with greater risk. Note that here, too, before changing its credit policy, management has to consider the profit potential versus the inherent risk in selling to more marginal customers. For example, bad debt losses will increase when credit policies are liberalized to include riskier customers.

The formula for determining the accounts-receivable turnover is expressed as follows:

$$\frac{\text{Net Credit Sales}}{\text{Average Net Accounts Receivable}}$$

EXAMPLE 9

The Ogel Supply Corporation showed the following accounts-receivable totals for the years ended December 31, 2X12, and December 31, 2X11:

	<u>2X12</u>	<u>2X11</u>
Current assets:		
Accounts receivable, net	113,000	79,000

Assume sales of \$990,000 for 2X12. Calculating the accounts-receivable turnover for 2X12 yields:

$$\text{Average accounts receivable} = (\$113,000 + \$79,000) / 2 = \$96,000$$

$$\frac{\text{Sales}}{\text{Average accounts receivable}} = \frac{\$990,000}{\$96,000} = 10.3$$

Days-Sales-in-Receivables

The days-sales-in-receivables determines how many days' sales remain in accounts receivable. It is also called the receivables collection period. The determination is a two-step process. First, divide the net sales by 365 days to determine the sales amount for an average day. Then divide this figure into the average net accounts receivable.

EXAMPLE 10

The days-sales-in-receivables the Ogel Supply Corporation is computed as follows.

Step one:

$$\frac{\text{Net sales}}{365 \text{ days}} = \frac{\$990,000}{365} = \$2,712$$

Step two:

$$\frac{\text{Average net accounts receivable}}{\text{One day's sales}} = \frac{\$96,000}{\$2,712} = 35.4 \text{ days}$$

Inventory Ratios

A company with excess inventory is tying up funds that could be invested elsewhere for a return. Inventory turnover is a measure of the number of times a company sells its average level of inventory during the year. A high turnover indicates an ability to sell the inventory, while a low number indicates an inability. A low inventory turnover may lead to inventory obsolescence and high storage and insurance costs. The formula for determining inventory turnover is:

$$\frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

EXAMPLE 11

The Ogel Supply Corporation showed the following inventory amounts for the years ended December 31, 2X12, and December 31, 2X11:

	<u>2X12</u>	<u>2X11</u>
Current assets:		
Inventories	107,100	106,900

If cost of goods sold is \$574,000 for 2X12, the inventory turnover for 2X12 is calculated as follows.

$$\text{Average inventories} = (\$107,100 + \$106,900) / 2 = \$107,000$$

$$\frac{\text{Cost of goods sold}}{\text{Average inventories}} = \frac{\$574,000}{\$107,000} = 5.4$$

Interrelationship of Liquidity and Activity to Earnings

There is a trade-off between liquidity risk and return. Liquidity risk is reduced by holding more current assets than noncurrent assets. There will be less of a return, however, because the return rate on current assets (i.e., marketable securities) is usually less than the return rate on productive fixed assets. Further, excessive liquidity may mean that management has not been aggressive enough in finding attractive capital-investment opportunities. There should be a balance between liquidity and return.

High profitability does not automatically mean a strong cash flow. Cash problems may exist even with a high net income due to maturing debt and the need for asset replacement, among other reasons. For instance, it is possible that a growth business may have a decline in liquidity because cash is needed to finance an expanded sales base.

Measuring a Company's Ability to Pay Its Long-Term Debt

A corporation with a large amount of debt runs a greater risk of insolvency than one with a large amount of preferred or common stock outstanding. The reason is that payment of interest is mandatory, while the payment of dividends is discretionary with the corporation's board of directors. Individuals and banks that purchase the long-term notes and bonds issued by an enterprise take a special interest in a business's ability to repay its debt plus interest. Two key methods used to measure a company's ability to pay its legal obligations (solvency) as they become due are the debt ratio and the times-interest-earned ratio.

Debt Ratio

The debt ratio indicates how much of the company's assets were obtained by the issuance of debt. If the ratio is 1, it means that all of the firm's assets were financed by the issuance of debt. If the ratio is 0.6, it means that 60% of the company's assets were financed by debt. The formula for the debt ratio is:

$$\frac{\text{Total Liabilities}}{\text{Total Assets}}$$

EXAMPLE 12

The Ogel Supply Corporation showed the following assets and liabilities for the years ended December 31, 2X12, and December 31, 2X11:

	<u>2X12</u>	<u>2X11</u>
ASSETS		
Current Assets:		
Cash	\$ 60,000	\$ 30,000
Account receivable, net	113,000	79,000
Inventories	107,100	106,900
Prepaid expenses	<u>5,700</u>	<u>6,100</u>
Total current assets	\$ 285,800	\$ 222,000
Property, plant, and equipment, net	<u>660,000</u>	<u>665,000</u>
Total assets	<u>\$ 945,800</u>	<u>\$ 887,000</u>
LIABILITIES		
Current liabilities:		
Notes payable	40,000	\$ 33,000
Accounts payable	100,600	57,500
Total current liabilities	140,600	\$ 90,500
Long-term debt	<u>400,000</u>	<u>410,000</u>
Total liabilities	<u>\$ 540,600</u>	<u>\$ 500,500</u>
STOCKHOLDERS' EQUITY		
Common stock, no-par	\$ 200,000	\$200,000
Retaining earnings	<u>205,200</u>	<u>186,500</u>
Total stockholders' equity	<u>\$ 405,200</u>	<u>\$386,500</u>
Total liabilities and stockholders' equity	<u>\$ 945,800</u>	<u>\$ 887,000</u>

We can calculate the debt ratio for 2X12 and 2X11 as follows.

	<u>2X12</u>	<u>2X11</u>
<u>Total liabilities</u>	<u>\$540,600</u>	<u>\$500,500</u>
Total assets	\$945,800 = 0.57	\$887,000 = 0.56

Times-Interest-Earned Ratio

The times-interest-earned ratio measures a company's ability to pay its interest obligations. For example, a times-interest-earned ratio of 5 means that the company earned enough to pay its annual interest obligation five times. The formula is:

$$\frac{\text{Income from operations}}{\text{Interest expense}}$$

EXAMPLE 13

The Ogel Supply Corporation showed the following income from operations and interest expense for the years ended December 31, 2X12, and December 31, 2X11:

	<u>2X12</u>	<u>2X11</u>
Interest expense	\$ 24,000	\$ 26,000
Income from operations	163,500	143,000

We can calculate the times-interest-earned ratio for 2X12 and 2X11 as follows.

	<u>2X12</u>	<u>2X11</u>
<u>Income from operations</u>	<u>\$163,500</u>	<u>\$143,000</u>
Interest expense	\$ 24,000 = 6.8	\$ 26,000 = 5.5

The ratios indicate that Ogel will have little difficulty paying its interest obligations. Ogel might even consider borrowing more money.

Profitability Ratios

These ratios measure the profitability of the company. The primary ratios are rate of return on net sales, rate of return on total assets, and rate of return on common stockholders' equity.

Rate of Return on Net Sales

The formula for calculating the rate of return on net sales is as follows:

$$\frac{\text{Net Income}}{\text{Net Sales}}$$

This ratio reveals the profit margin of the business. It tells how much earnings are associated with each sales dollar.

EXAMPLE 14

The Ogel Supply Corporation showed the following net income and net sales figures for the years ended December 31, 2X12, and December 31, 2X11:

	<u>2X12</u>	<u>2X11</u>
Net sales	\$990,000	\$884,000
Net income	103,140	88,970

The rate of return on net sales for 2X12 and 2X11 is:

	<u>2X12</u>	<u>2X11</u>
<u>Net income</u>	<u>\$103,140</u>	<u>\$ 88,970</u>
Net sales	\$990,000 = 10.4%	\$884,000 = 10.1%

The increase in the rate of return indicates that the company is more profitable on each sales dollar obtained.

Rate of Return on Total Assets

The rate of return measures the ability of the company to earn a profit on its total assets. In making the calculation, interest expense must be added back to the net income, since both creditors and investors have financed the company's operations. The formula is:

$$\frac{\text{Net Income} + \text{Interest Expense}}{\text{Average Total Assets}}$$

where average total assets = [total assets (beginning) + total assets (ending)] / 2

EXAMPLE 15

The Ogel Supply Corporation showed the following net income and net sales figures for the years ended December 31, 2X12, and December 31, 2X11:

	<u>2X12</u>	<u>2X11</u>
Net income	\$103,140	\$ 88,970
Interest expense	24,000	26,000
Total assets	945,800	887,000

Calculate the rate of return on total assets for 2X12.

$$\text{Average total assets} = \frac{\$103,140 + \$24,000}{(\$945,800 + \$887,000) / 2} = \frac{\$127,140}{\$916,400} = 13.9\%$$

Rate of Return on Common Stockholders' Equity

The rate of return on common stock shows the relationship between net income and the common stockholders' investment in the company. To compute this rate, preferred dividends must be subtracted from net income. This leaves net income available to the common shareholders. The formula for computing the rate of return on common stock is:

$$\frac{\text{Net Income} - \text{Preferred Dividends}}{\text{Average Common Stockholders' Equity}}$$

EXAMPLE 16

The Ogel Supply Corporation showed the following net income for 2X12, and total stockholders' equity for the years ended December 31, 2X12, and December 31, 2X11:

	<u>2X12</u>	<u>2X11</u>
Net income	\$103,140	\$ 88,970
Preferred stock dividends	0	0
Total stockholders' equity	405,200	386,500

Calculate the rate of return on total common stockholders' equity for 2X12.

$$\text{Average common stockholders' equity} = (\$405,200 + \$386,500) / 2 = \$395,850$$

$$\frac{\text{Net income} - \text{preferred stock dividends}}{\text{Average common stockholders' equity}} = \frac{\$103,140 - 0}{\$395,850} = 26.1\%$$

The return on the common stockholders' equity is 26.1%, which is 12.2% higher than the return on assets, which is 13.9%. The company is borrowing at a lower rate to earn a higher rate. The practice is called trading on equity, or *leverage*, and is directly related to the debt ratio. If a company is profitable and is effectively using leverage, common stockholders benefit. However, should revenues drop, the interest on debt must still be paid. Thus, in times of operating losses, excessive debt can hurt profitability.

Earnings per Share

Earnings per share (EPS) is computed by dividing net income less the preferred dividends by the number of common shares outstanding. The preferred-share dividend must be subtracted because it represents a prior claim to dividends that must be paid before any payments of dividends can be made to the common shareholders. If there is no preferred stock, earnings per share equals net income divided by common shares outstanding.

EXAMPLE 17

The Ogel Supply Corporation showed the following net income for 2X12 and 2X11, and that 10,000 common shares were outstanding for the years ended December 31, 2X12, and December 31, 2X11:

	<u>2X12</u>	<u>2X11</u>
Net income	\$103,140	\$ 88,970

Calculate the earnings per share for 2X12 and 2X11.

	<u>2X12</u>		<u>2X11</u>	
<u>Net income</u>	<u>\$103,140 - 0</u>		<u>\$88,970 - 0</u>	
Common shares outstanding	10,000	= \$10.31	10,000	= \$8.90

Evaluating Stock as an Investment

Investors purchase stock to earn a return on their investment. This return consists of both gains from the sale of appreciated stock and from dividends. Two ratios used to analyze the value of a stock include the *price-earnings ratio* and the *book value per share* of stock.

Price-Earnings Ratio

The price-earnings ratio equals the market price per share divided by the earnings per share. A high price-earnings ratio is generally favorable because it indicates that the investing public looks at the company in a positive light. It represents an indication of investors' expectations concerning a firm's growth potential. However, too high a price-earnings ratio could mean a poor investment because the stock may be overvalued, while a low price-earnings ratio stock could be a good investment if it's a case of the stock being undervalued. The formula is:

$$\frac{\text{Market price per share}}{\text{Earnings per share of common stock}}$$

EXAMPLE 18

For the years 2X12 and 2X11 the market price per share of common stock for Ogel Corporation was as follows:

	<u>2X12</u>	<u>2X11</u>
Market price per share	\$130.00	\$95.00

Using the earnings per share of \$10.31 for 2X12 (from Example 17) and \$8.90 for 2X11, we can calculate the price/earnings ratio for each year as follows

	<u>2X12</u>	<u>2X11</u>
<u>Market price per share</u>	<u>\$130.00</u>	<u>\$95.00</u>
Earnings per share of common stock	\$10.31 = 12.6	\$8.9 = 10.7

The increase in the price-earnings multiple indicates that the stock market had a higher opinion of the business in 2X12, possibly due to the company's increased profitability.

Book Value per Share

The book value per share equals the net assets available to common stockholders divided by the shares outstanding. Net assets equals stockholders' equity minus preferred stock. The comparison of book value per share to market price per share provides a clue as to how investors regard the firm. The formula for calculating book value per share is as follows:

$$\frac{\text{Total Stockholders' Equity} - \text{Preferred Equity}}{\text{Number of Shares of Common Stock Outstanding}}$$

Book value of the net assets of a company may have little or no significant relationship to their market value. It was once used as a proxy for a company's intrinsic value. Especially, with the new economy, book value is a less relevant measure for a company's fair value for investors. For example, many new economy companies have assets that do not register significantly on their balance sheet, such as intellectual property, employees, strong brand, and market share. Book value per share of a stock per is a company's books based on historical cost. It may differ significantly from current market price per share. (as illustrated below). Book value per share of common stock equals common stockholders' equity divided by outstanding common shares.

Book Value and Market Value for Selected Companies

(IN BILLIONS) (NOVEMBER 11, 2013)

<i>Company</i>	<i>Book Value</i>	<i>Market Value</i>
Microsoft (MSFT)	9.78	\$311.96
IBM (IBM)	18.31	198.97
Wal-Mart Stores (WMT)	22.09	255.28
Apple (AAPL)	137.32	468.78
General Electric (GE)	12.13	271.8

Source: MSN Money Central Investor (<http://moneycentral.msn.com/investor/home.asp>)

EXAMPLE 19

For the years 2X12 and 2X11 the stockholders' equity of Ogel Corporation was as follows:

	<u>2X12</u>	<u>2X11</u>
Total stockholders' equity	\$405,200	\$386,500

If there are 10,000 shares of common stock outstanding at December 31 of each year, book value per share for each year is:

	<u>2X12</u>	<u>2X11</u>
<u>Total stockholders' equity</u>	<u>\$405,200</u>	<u>\$386,500</u>
Common shares outstanding	10,000 = \$40.52	10,000 = \$38.65

Limitations of Ratio Analysis

Some of the limitations of ratio analysis are as follows:

- (1) Many large businesses are involved with multiple lines of business, making it difficult to identify the industry to which a specific company belongs. A comparison of its ratios with other corporations may thus be meaningless.

- (2) Accounting and operating practices differ among companies, which can distort the ratios and make comparisons meaningless. For example, the use of different inventory-valuation methods would affect inventory and asset-turnover ratios.
- (3) Industry averages published by financial advisory services are only approximations. Therefore the company may have to look at the ratios of its major competitors if such ratios are available.
- (4) Financial statements are based on historical costs and do not consider inflation.
- (5) Management may hedge or exaggerate its financial figures. Hence, certain ratios will not be accurate indicators.
- (6) A ratio does not describe the quality of its components. For example, the current ratio may be high but inventory may consist of obsolete merchandise.
- (7) Ratios are static and do not take into account future trends.

Summary

Financial statement analysis is an attempt to work with reported financial figures in order to determine a company's financial strengths and weaknesses. Most analysts favor certain ratios and ignore others. Each ratio should be compared to industry norms and analyzed in light of past trends. Financial analysis also calls for an awareness of the impact of inflation and deflation on reported income. Management must also recognize that alternate methods of financial reporting may allow firms with equal performance to report different results.

Chapter 4 Review Questions

1. What type of ratio is rate of return on net sales?

- A. Profitability ratio.
- B. Activity ratio.
- C. Liquidity ratio.
- D. Leverage ratio.

2. Book value per share represents the amount of shareholders' equity assigned to each outstanding share of common stock. Which one of the following statements about book value per common share is correct?

- A. Market price per common share usually approximates book value per common share.
- B. Book value per common share can be misleading because it is based on historical cost.
- C. A market price per common share that is greater than book value per common share is an indication of an overvalued stock.
- D. Book value per common share is the amount that would be paid to shareholders if the company were sold to another company.

3. Which one of the following statements about the price-earnings (P-E) ratio is correct?

- A. A company with high growth opportunities ordinarily has a high P-E ratio.
- B. A P-E ratio has more meaning when a firm has losses than when it has profits.
- C. A P-E ratio has more meaning when a firm has abnormally low profits in relation to its asset base.
- D. A P-E ratio expresses the relationship between a firm's market price and its net sales.

4. Financial ratio analysis has no limitation when it comes to comparing financial fitness among firms. True or False?

5. In computing inventory turnover, the preferred base to use is the sales base because it is more likely to reflect a change in trend. True or False?

6. The times-interest-earned ratio is primarily an indication of

- A. Debt-paying capacity (Solvency).
- B. Liquidity.
- C. Asset management.
- D. Profitability.

7. A firm's receivables collection period is equal to

- A. The inventory conversion period.
- B. The cash conversion cycle.
- C. The day's-sales-in-receivables (day's sales outstanding).
- D. The inventory divided by average daily sales.

8. A company has 100,000 outstanding common shares with a market value of \$20 per share. Dividends of 2 per share were paid in the current year, and the enterprise has a dividend-payout ratio of 40%. The price-to-earnings ratio of the company is

- A. 2.5
- B. 4
- C. 10
- D. 50

Chapter 5:

What Is Management Accounting?

Learning Objectives:

After completing this section, you should be able to:

- Recognize the benefits of and applications of management accounting and different management systems.
 - Identify how to classify different costs in management accounting.
-

Management accounting, as defined by the Institute of Management Accountants (IMA), is the process of identification, measurement, accumulation, analysis, preparation, interpretation, and communication of financial information, which is used by management to plan, evaluate, control, and make decisions within an organization. It ensures the appropriate use of and accountability for an organization's resources.

Financial Accounting versus Management Accounting

Financial accounting is mainly concerned with the historical aspects of external reporting; that is, providing financial information to outside parties such as investors, creditors, and governments. To protect those outside parties from being misled, financial accounting is governed by what are called *generally accepted accounting principles (GAAP)*.

Management accounting, on the other hand, is concerned primarily with providing information to internal managers who are charged with planning and controlling the operations of the firm and making a variety of management decisions. Due to its internal use within a company, management accounting is not subject to **generally accepted accounting principles (GAAP)**. As defined by the *Financial Accounting Standards Board (FASB)*, GAAP is the conventions, rules, and procedures necessary to define accounting practice for external reporting at a particular time.

The differences between financial and management accounting are summarized below:

<i>Financial Accounting</i>	<i>Management Accounting</i>
(1) External users of financial information	(1) Internal users of financial information
(2) Must comply with GAAP	(2) Need not comply with GAAP
(3) Must generate accurate and timely data	(3) Emphasizes relevance and flexibility of data
(4) Past orientation	(4) Future orientation
(5) Financial information	(5) Nonfinancial (e.g., speed of delivery, customer complaints) as well as financial information
(6) Looks at the business as a whole	(6) Focuses on parts as well as on the whole of a business
(7) Summary reports	(7) Detailed reports by products, departments, or other segments
(8) Primarily stands by itself	(8) Draws heavily from other disciplines such as finance, economics, information systems, marketing, operations/production management, and quantitative methods

The Work of Management

In general, the work that management performs can be classified as (a) planning, (b) coordinating, (c) controlling, and (d) decision making.

Planning: The planning function of management involves selecting long- and short-term objectives and drawing up strategic plans to achieve those objectives.

Coordinating: In performing the coordination function, management must decide how best to put together the firm's resources in order to carry out established plans.

Controlling: Controlling entails implementing a decision method and using feedback so that the firm's goals and specific strategic plans are optimally obtained.

Decision making: Decision making is the purposeful selection from a set of alternatives in light of a given objective.

Management-accounting information is important in performing all of these functions.

Cost Accounting versus Management Accounting

The difference between cost accounting and management accounting is a subtle one. The Institute of Management Accountants (IMA) defines cost accounting as "a systematic set of procedures for recording and reporting measurements of the cost of manufacturing goods and performing services in the aggregate and in detail. It includes methods for recognizing, classifying, allocating, aggregating and reporting such costs and comparing them with standard costs."

Management accounting as defined by the IMA is a profession that involves partnering in management decision making, devising planning and performance management systems, and providing expertise in financial reporting and control to assist management in the formulation and implementation of an organization's strategy." Simply stated, management accounting is the accounting used for the planning, control, decision-making, and strategic management activities of an organization.

From this definition of cost accounting and the IMA's definition of management accounting, one thing is clear: the major function of cost accounting is cost accumulation for inventory valuation and income determination. Management accounting, however, emphasizes the use of the financial and cost data for planning, control, decision-making, and strategic management purposes.

EXAMPLE 1

Management accounting typically does not deal with the details of how costs are accumulated and how unit costs are computed for inventory valuation and income determination. Although unit cost data are used for pricing and other managerial decisions, the method of computation itself is not a major topic of management accounting but rather for cost accounting.

Controllership

The chief management accountant or the chief accounting executive of an organization is called the *controller* (often called *comptroller*, especially in the government sector). The controller is in charge of the accounting department. The controller's authority is basically staff authority in that the controller's office gives advice and service to other departments. But at the same time, the controller has line authority over members of his or her department such as internal auditors, bookkeepers, budget analysts, etc. (See Figure 1 for an organization chart of a controllership situation).

In a large firm, the financial responsibilities are carried out by the treasurer, controller, and financial vice president, often called a *chief financial officer (CFO)*. The financial vice president is involved with financial policymaking and planning. He or she supervises all phases of financial activity and serves as the financial advisor to the board of directors.

Figure 1 shows an organization chart of the finance structure within a company. Note that the controller and treasurer report to the vice president of finance. The treasurer is responsible for managing corporate assets and liabilities, planning the finances, budgeting capital, financing the business, formulating credit policy, and managing the investment portfolio. The controller is basically concerned with *internal* matters, namely financial and cost accounting, taxes, budgeting, and control functions. Figure 2 presents the controller's functions.

FIGURE 1

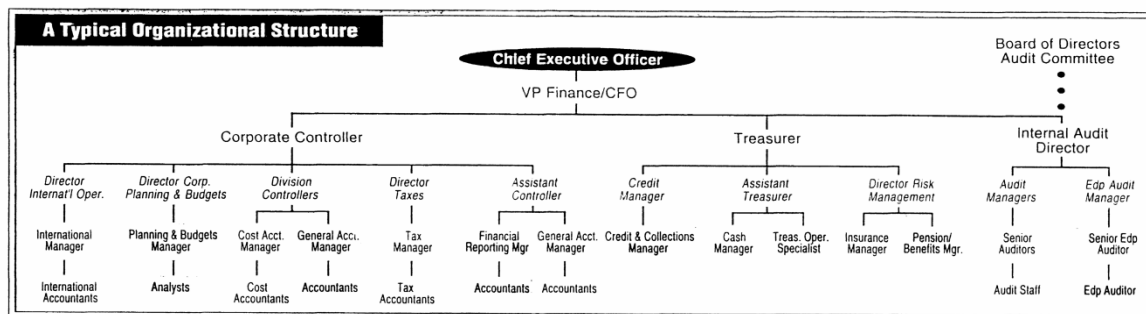
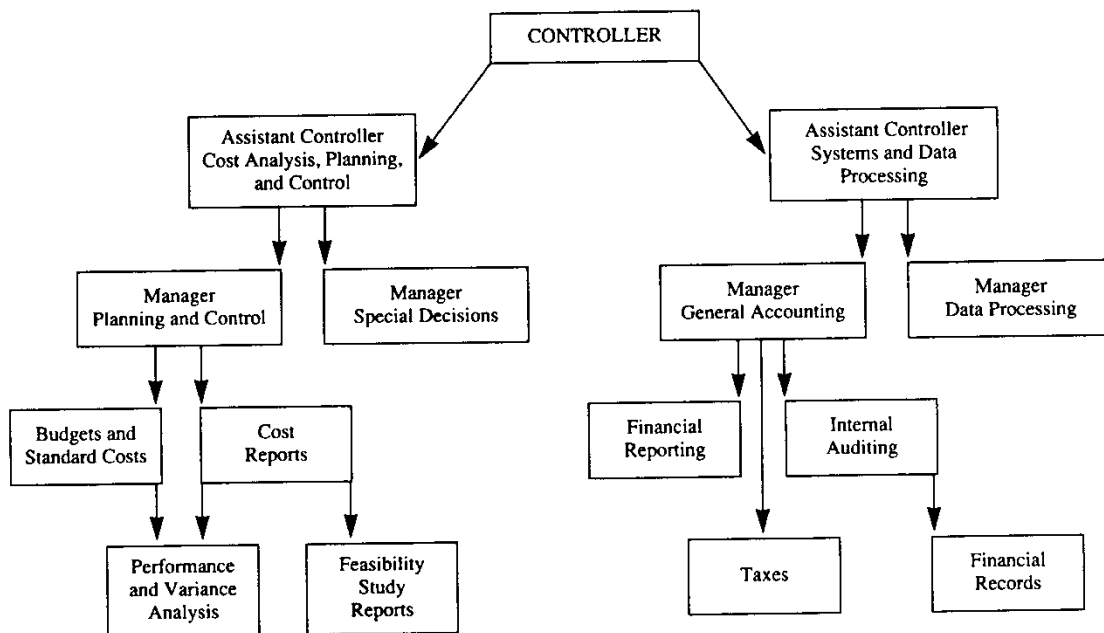


FIGURE 2
THE CONTROLLER'S FUNCTIONS



The effective, competent, and timely handling of controllership and treasury functions will ensure corporate financial success. The Financial Executive Institute, an association of corporate controllers and treasurers, distinguishes their functions as shown in Table 1.

TABLE 1
FUNCTIONS OF CONTROLLER AND TREASURER

Controller	Treasurer
Accounting	Obtaining Financing
Reporting of financial information	Banking relationship
Custody of records	Investment of funds
Interpretation of financial data	Investor relations
Budgeting	Cash management
Controlling operations	Insuring assets
Appraisal of results and making recommendations	Credit appraisal and collecting funds
Preparation of taxes	Deciding on the financing mix
Managing assets	Dividend disbursement
Internal auditing	Pension management
Protection of assets	Fostering relationship with creditors and investors
Reporting to the government	
Payroll	

It is important to note that there is no universally accepted, precise distinction between the two jobs and the functions may differ slightly between organizations because of size, personality and company policy.

Managerial Accounting in the New Production Environment

Over the past two decades, new technologies and management philosophies have changed the face of managerial accounting. Following are the key developments that have reshaped the discipline. We will discuss these at length in future chapters. For example, where automation and computer-assisted manufacturing methods have replaced the workforce, labor costs have shrunk from between 30 and 50 percent of product and service costs to around 5 percent. Cost accounting in traditional settings required more work to keep track of labor costs than do present systems. On the other hand, in highly automated environments, cost accountants have had to become more sophisticated in finding causes of costs because labor no longer drives many cost transactions.

Total Quality Management and Quality Costs

In order to be globally competitive in today's world-class manufacturing environment, firms place an increased emphasis on quality and productivity. Total quality management (TQM) is an effort in this direction. Simply put, it is a system for creating competitive advantage by focusing the organization on what is important to the customer.

Total quality management can be broken down into: *Total*: the whole organization is involved and understands that customer satisfaction is everyone's job. *Quality*: the extent to which products and services satisfy the requirements of internal and external customers. *Management*: the leadership, infrastructure and resources that support employees as they meet the needs of those customers. Market shares of many U.S. firms have eroded because foreign firms have been able to sell higher-quality products at lower prices. Under TQM, performance measures are likely to include product reliability and service delivery, as well as such traditional measures as profitability.

In order to be competitive, U.S. firms have placed an increased emphasis on quality and productivity in order to:

1. Produce savings such as reducing rework costs, and
2. Improve product quality.

Quality costs are classified into three broad categories: prevention, appraisal, and failure costs. Quality

cost reports can be used to point out the strengths and weaknesses of a quality system. Improvement teams can use them to describe the monetary benefits and ramifications of proposed changes.

Continuous Improvement (CI) and Benchmarking

Continuous improvement (CI), based on a Japanese concept called *Kaizen*, is a management philosophy that seeks endless pursuit of improvement of machinery, materials, labor utilization, and production methods through application of suggestions and ideas of team members. The CI utilizes many different approaches, including: *statistical process control (SPC)* using traditional statistical control charts and *benchmarking* examining excellent performers outside the industry and seeing how you can use their best practices. Benchmarking typically involves the following steps:

1. Identify those practices needing improvement.
2. Identify a company that is the world leader in performing the process.
3. Interview the managers of the company and analyze data obtained.

Continuous improvement and benchmarking is often called "the race with no finish" because managers and employees are not satisfied with a particular performance level but seek ongoing improvement.

Business Process Reengineering (BPR)

TQM seeks evolutionary changes in the processes while the practice called *business process reengineering (BPR)* seeks to make revolutionary changes. BPR does this by taking a fresh look at what the firm is trying to do in all its processes, and then eliminating nonvalue-added steps and streamlining the remaining ones to achieve the desired outcome.

Just-in-Time and Lean Production

The inventory control problem occurs in almost every type of organization. It exists whenever products are held to meet some expected future demand. In most industries, cost of inventory represents the largest liquid asset under the control of management. Therefore, it is very important to develop a production and inventory planning system that will minimize both purchasing and carrying costs. Material cost, as a proportion of total product cost, has continued to rise significantly during the last few years and hence, is a primary concern of top management.

Just-in-Time (JIT) is a demand-pull system. Demand for customer output (not plans for using input resources) triggers production. Production activities are "pulled", not "pushed," into action. JIT production, in its purest sense, is buying and producing in very small quantities just in time for use. JIT production is part of a "lean production" philosophy that has been credited for the success of many Japanese companies. Lean production eliminates inventory between production departments, making the quality and efficiency of production the highest priority. Lean production requires the flexibility to change quickly from one product to another. It emphasizes employee training and participation in decision-making. The development of just-in-time production and purchasing methods also affects cost-

accounting systems. Firms using just-in-time methods keep inventories to a minimum. If inventories are low, accountants can spend less time on inventory valuation for external reporting.

Theory of Constraints (TOC) and Bottlenecks Management

The theory of constraints (TOC) views a business as a linked sequence of processes that transforms inputs into salable outputs, like a chain. To improve the strength of the chain, a TOC company identifies the weakest link, which is the constraint. TOC exploits constraints so that throughput is maximized and inventories and operating costs are minimized. It then develops a specific approach to manage constraints to support the objective of *continuous improvement*.

Bottlenecks occur whenever demand (at least temporarily) exceeds capacity. For example, although a legal secretary has enough total time to do all her wordprocessing, she may be given several jobs in quick succession, so that a queue (waiting line) builds up. This is a bottleneck, which delays the other activities waiting for the wordprocessing to be finished. TOC seeks to maximize “throughput” by

1. Larger lot sizes at bottleneck work stations, to avoid time lost on changeovers;
2. Small transfer batches—forwarding a small batch of work to the next work station, so that the next operation can begin before the entire lot is finished at the preceding work station; and
3. Rules for inserting buffer stock before or after certain bottlenecks.

Cost Classifications and Profit Concepts

In financial accounting, the term *cost* is defined as a measurement, in monetary terms, of the amount of resources used for some purpose. In managerial accounting, the term *cost* is used in many different ways. That is, there are different types of costs used for different purposes. Some costs are useful and required for inventory valuation and income determination. Some costs are useful for planning, budgeting, and cost control. Still others are useful for making short-term and long-term decisions. A profit concept, *contribution margin*, which is extremely useful to managers, is also introduced.

Costs can be classified into various categories, according to:

1. Their management functions
 - a. Manufacturing costs
 - Direct materials
 - Direct labor
 - Factory overhead
 - b. Nonmanufacturing (operating) costs
 - Selling costs
 - General and administrative costs

2. Their timing of charges against sales revenue
 - a. Product costs
 - b. Period costs
3. Their ease of traceability
 - a. Direct costs
 - b. Indirect costs
4. Their behavior in accordance with changes in activity
 - a. Variable costs
 - b. Fixed costs
 - c. Mixed (semivariable) costs
5. Their degree of averaging
 - a. Total costs
 - b. Unit (average) costs
6. Their relevance to planning, control and decision making
 - a. Sunk costs
 - b. Incremental costs
 - c. Relevant costs
 - d. Out-of-pocket costs
 - e. Opportunity costs
 - f. Controllable and noncontrollable costs
 - g. Standard costs

We will discuss each of the cost categories in the remainder of this chapter.

Costs by Management Function

In a manufacturing firm, costs are divided into two major categories, by the functional activities they are associated with: (1) manufacturing costs and (2) nonmanufacturing costs, also called operating expenses.

MANUFACTURING COSTS. **Manufacturing costs** are those costs associated with the manufacturing activities of the company. Manufacturing costs are subdivided into three categories: direct materials, direct labor, and factory overhead. **Direct materials** (also called *raw materials*) are all materials that become an integral part of the finished product. Examples are the steel used to make an automobile and the wood to make furniture. Glues, nails, and other minor items are called indirect materials (or supplies) and are classified as part of factory overhead, which is explained below.

Direct labor is the labor directly involved in making the product. Examples of direct labor costs are the wages of assembly workers on an assembly line and the wages of machine tool operators in a machine shop. **Indirect labor**, such as wages of supervisory personnel and janitors, is classified as part of factory

overhead. **Factory overhead** can be defined as including all costs of manufacturing except direct materials and direct labor. Some of the many examples include depreciation, rent, property taxes, insurance, fringe benefits, payroll taxes, waste control costs, quality costs, engineering, workmen's compensation, and cost of idle time. Factory overhead is also called *manufacturing overhead*, *indirect manufacturing expenses*, *factory expense*, and *factory burden*.

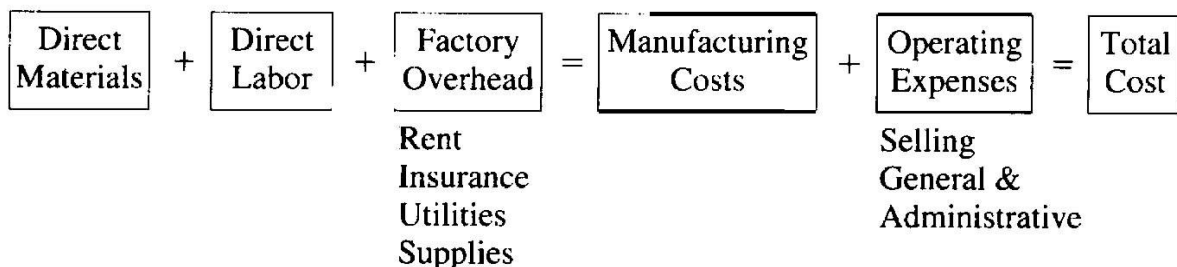
Many costs overlap within their categories. For example, direct materials and direct labor when combined are called **prime costs**. Direct labor and factory overhead when combined are termed **conversion costs** (or *processing costs*).

One important category of factory overhead is that of **quality costs**. Quality costs are costs that occur because poor quality may exist or actually does exist. These costs are significant in amount, often totaling 20 to 25 percent of sales. The subcategories of quality costs are prevention, appraisal, and failure costs. *Prevention costs* are those incurred to prevent defects. Amounts spent on quality training programs, researching customer needs, quality circles, and improved production equipment are considered in prevention costs. Expenditures made for prevention will minimize the costs that will be incurred for appraisal and failure. *Appraisal costs* are costs incurred for monitoring or inspection; these costs compensate for mistakes not eliminated through prevention. *Failure costs* may be internal (such as scrap and rework costs and reinspection) or external (such as product returns or recalls due to quality problems, warranty costs, and lost sales due to poor product performance).

NONMANUFACTURING COSTS. **Nonmanufacturing costs** (also called operating expenses) are subdivided into selling expenses, general and administrative expenses, and research and development costs. **Selling expenses** (also called marketing costs) are those associated with obtaining sales and the delivery of the product. Examples are advertising and sales commissions. **General and administrative expenses (G & A)** include those incurred to perform general and administrative activities. Examples are executives' salaries and legal expenses.

Figure 3 shows costs by management function.

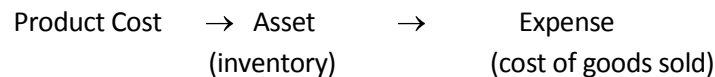
FIGURE 3
COSTS BY MANAGEMENT FUNCTION



Product Costs and Period Costs

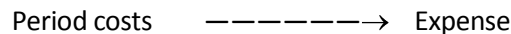
By their timing of charges against revenue or by whether they are inventoriable, costs are classified into: (a) product costs and (b) period costs.

Product costs are inventoriable costs, identified as part of inventory on hand. They are treated as an asset until the goods they are assigned to are sold. At that time they become the expense, cost of goods sold. All manufacturing costs are product costs.



GAAP and income tax regulations require that firms treat all manufacturing costs as product costs for external financial reporting using full absorption costing (also called absorption costing). Using *full absorption costing*, the firm assigns a unit's variable manufacturing cost plus a share of fixed manufacturing costs to each unit produced. Thus the total of units manufactured "fully absorbs" manufacturing costs. (The variable-fixed classification of costs is explained later).

Period costs are all expired costs that are not necessary for production and hence are charged against sales revenues in the period in which the revenue is earned. Firms treat all nonmanufacturing costs--selling, general and administrative expenses, and research and development costs--as period costs.



Direct Costs and Indirect Costs

Costs may be viewed as either direct or indirect in terms of the extent that they are *traceable* to a particular cost object. A **cost object** is any item for which the manager wishes to measure cost. Jobs, product lines, departments, divisions, sales territories, or units produced are typical cost objects. **Direct costs** can be directly traceable to the costing object. For example, if the object of costing under consideration is a product line, then the materials and labor involved in the manufacture of the line would both be direct costs.

Factory overhead items are all indirect costs since they are not directly identifiable to any particular product line. Costs shared by different departments, products, or jobs, called *common costs* or *joint costs*, are also **indirect costs**. National advertising that benefits more than one product and sales territory is an example of

an indirect cost. Accountants may *allocate* them on some *arbitrary* basis to specific products or departments.

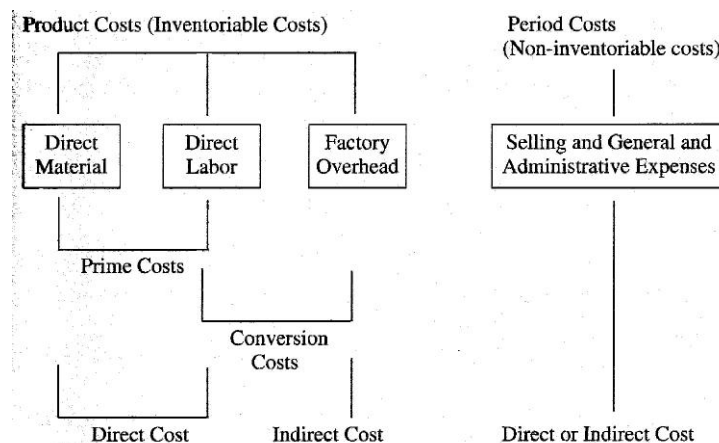
Direct Costs of Nonmanufacturing Firms

The following examples illustrate a cost object and its related direct costs for nonmanufacturing firms.

- In a *retail firm*, such as a department store, costs can be traced to a department. For example, the direct costs of the shoe department include the costs of shoes and the wages of employees working in that department. Indirect costs include the costs of utilities, insurance, property taxes, storage, and handling.
- In a *service organization*, such as an accounting firm, costs can be traced to a specific service, such as tax return preparation. Direct costs for tax return preparation services include the costs of tax return forms, computer usage, and labor to prepare the return. Indirect costs include the costs of office rental, utilities, secretarial labor, telephone expenses and depreciation of office furniture.

Figure 4 shows the relationship of product and period costs and other cost classifications presented thus far.

FIGURE 4
VARIOUS CLASSIFICATIONS OF COSTS



Variable Costs, Fixed Costs, and Mixed Costs

From a planning and control standpoint, perhaps the most important way to classify costs is by how they behave in accordance with changes in volume or some measure of activity. By behavior, costs can be classified into the following three basic categories:

Variable costs are costs that vary in total in direct proportion to changes in activity. Examples are direct materials and gasoline expense based on mileage driven. **Fixed costs** are costs that remain constant in total regardless of changes in activity. Examples are rent, insurance, and taxes.

Mixed (or semi-variable) costs are costs that vary with changes in volume but, unlike variable costs, do not vary in direct proportion. In other words, these costs contain both a variable component and a fixed component. Examples are the rental of a delivery truck, where a fixed rental fee plus a variable charge based on mileage is made; and power costs, where the expense consists of a fixed amount plus a variable charge based on consumption.

Costs by behavior will be examined further in a later chapter. The breakdown of costs into their variable components and their fixed components is important in many areas of management accounting, such as flexible budgeting, break-even analysis, and short-term decision making.

Unit Costs and Total Costs

For external reporting and pricing purposes, accountants are frequently interested in determining the unit (average) cost per unit of product or service. The **unit cost** is simply the average cost, which is the total costs divided by the total volume in units. Alternatively, the unit cost is the sum of (a) the variable cost per unit, and (b) the fixed cost per unit. It is important to realize that the unit cost declines as volume increases since the total fixed costs that are constant over a range of activity are being spread over a larger number of units.

EXAMPLE 2

Fixed costs are \$1,000 per period and variable costs are \$.10 per unit. The total and unit (average) costs at various production levels are as follows:

Volume in units	Total Fixed Costs	Total Variable Costs	Total Costs (b)+(c)	Variable Cost per unit (c)/(a)	Fixed Cost per unit (b)/(a)	Unit Average Cost (d)/(a) or (e)+(f)
(a)	(b)	(c)	= (d)	= (e)	= (f)	(e)+(f)
1,000	\$1,000	\$ 100	\$1,100	\$.10	\$1.00	\$1.10
5,000	1,000	500	1,500	.10	.20	.30
10,000	1,000	1,000	2,000	.10	.10	.20

Behavior as Volume Changes from 5,000 to 10,000		
	Total	Per Unit
Variable Cost	Change (\$500 to \$1,000)	No change (\$.10)
Fixed Cost	No change (\$1,000)	Change (\$.20 to \$.10)

Costs for Planning, Control, and Decision Making

SUNK COSTS. Sunk costs are the costs of resources that have already been incurred whose total will not be affected by any decision made now or in the future. Sunk costs are considered irrelevant to future decisions since they are *past or historical* costs. For example, the acquisition cost of machinery is irrelevant to a decision of whether to scrap the machinery.

EXAMPLE 3

Suppose you acquired an asset for \$50,000 three years ago which is now listed at a book value of \$20,000. The \$20,000 book value is a sunk cost which does not affect a future decision.

INCREMENTAL (OR DIFFERENTIAL) COSTS. The incremental cost is the difference in costs between two or more alternatives. Incremental costs are increases or decreases in total costs; or changes in specific elements of cost (e.g., direct labor cost), that result from any variation in operations. Incremental costs will be incurred (or saved) if a decision is made to go ahead with (or to stop) some activity, but not otherwise.

EXAMPLE 4

Consider the two alternatives A and B whose costs are as follows:

	<i>A</i>	<i>B</i>	<i>Difference (B - A)</i>
Direct materials	\$10,000	\$10,000	\$ 0
Direct labor	10,000	15,000	5,000

The incremental costs are simply B-A (or A - B) as shown in the last column. The incremental costs are relevant to future decisions, which will be taken up in detail in Chapter 11.

RELEVANT COSTS. Relevant costs are *expected future* costs that will differ between alternatives. This concept is a key to short- and long-term decisions and discussed in detail in Chapter 11.

EXAMPLE 5

The incremental cost is said to be relevant to the future decision. The sunk cost is considered irrelevant.

OUT-OF-POCKET COSTS. Out-of-pocket costs, also known as *outlay costs* or *cash costs*, are costs that require future expenditures of cash or other resources. Non-cash charges such as depreciation and amortization are *not* out-of-pocket costs. These are *book costs*. Out-of-pocket costs are usually relevant to a particular decision.

EXAMPLE 6

A capital investment project requires \$120,000 in cash outlays. \$120,000 is an out-of-pocket cost.

OPPORTUNITY COSTS. An opportunity cost is the net benefit foregone by using a resource for one purpose instead of for another. There is always an opportunity cost involved in making a choice decision. It is a cost incurred relative to the *best* alternative given up.

EXAMPLE 7

Suppose a company has a choice of using its capacity to produce an extra 10,000 units or renting it out for \$20,000. The opportunity cost of using the capacity is \$20,000.

CONTROLLABLE AND NONCONTROLLABLE COSTS. A cost is said to be controllable when the amount of the cost is assigned to the head of a department and the level of the cost is significantly under the manager's influence. For example, marketing executives control advertising costs. Noncontrollable costs are those costs not subject to influence at a given level of managerial supervision.

EXAMPLE 8

All variable costs such as direct materials, direct labor, and variable overhead are usually considered controllable by the department head. On the other hand, fixed costs such as depreciation of factory equipment would not be controllable by the department head, since he/she would have no power to authorize the purchase of the equipment.

STANDARD COSTS. Standard costs are the costs established in advance to serve as goals, norms or yardsticks to be achieved and, after the fact, to determine how well those goals were met. They are based on the quantities and prices of the various inputs (e.g., direct materials, direct labor, and factory overhead) needed to produce output efficiently. Standard costs can also be set for service businesses.

EXAMPLE 9

The standard cost of materials per pound is obtained by multiplying standard price per pound by standard quantity per unit of output in pounds. For example, the standard price and quantity of material might be determined as follows:

Purchase price	\$3.00
Freight	0.12
Receiving and handling	0.02
Less: Purchase discounts	<u>(0.04)</u>
Standard price per pound	<u>\$3.10</u>
Per bill of materials in pounds	1.2
Allowance for waste and spoilage in lbs.	0.1

Allowance for rejects in lbs.	<u>0.1</u>
Standard quantity per unit of output	<u>1.4</u> lbs.

Once the price and quantity standards have been set, the standard cost of material per unit of finished goods can be computed, as follows:

$$1.4 \text{ pounds} \times \$3.10 = \$4.34 \text{ per unit.}$$

Merchandising vs Manufacturing Organizations

Merchandising firms and manufacturing companies prepare income statements and balance sheets for owners, creditors, and other outside parties. Both types of companies maintain levels of inventory and calculate gross margin using sales and cost of goods sold information. However, merchandising firms are less complex than manufacturing firms.

Merchandising

- Purchase products that are ready for resale
- Maintain only one inventory account on the balance sheet
- Include the cost of purchases in the calculation of cost of goods sold

Manufacturing organizations

- Design and manufacture products for sale
- Reflect three inventory accounts (materials, work in process, and finished goods) on the balance sheet
- Determine the cost of goods manufactured to include in the calculation of cost of goods sold

Merchandising organizations, such as Wal-Mart, Rite Aid, and Office Depot, purchase products that are ready for resale. These organizations maintain one inventory account, called Merchandise Inventory, which reflects the costs of products held for resale. To calculate the cost of goods sold for a merchandising organization, the equation used is:

(Cost of Goods Sold) =

(Beg Merchandise Inventory) + (Net Cost of Purchases) – (Ending Merchandise Inventory)

For example, Allison Candy Store had a balance of \$3,000 in the Merchandise Inventory account on January 1, 20x0. During the year, the store purchased candy products totaling \$23,000 (adjusted for purchase discounts, purchases returns and allowances, and freight-in). At December 31, 20x0, the Merchandise Inventory balance was \$4,500. The cost of goods sold is thus \$21,500.

$$\text{Cost of Goods Sold} = \$3,000 + \$23,000 - \$4,500 = \$21,500$$

Manufacturing firms, such as Nokia, GM, and IBM, use materials, labor, and manufacturing overhead to manufacture products for sale. Materials are purchased and used in the production process. The Materials Inventory account shows the balance of the cost of unused materials. During the production process, the costs of manufacturing the product are accumulated in the Work in Process Inventory account. The balance of the Work in Process Inventory account represents the costs of unfinished product.

Once the product is complete and ready for sale, the cost of the goods manufactured is reflected in the Finished Goods Inventory account. The balance in the Finished Goods Inventory account is the cost of unsold completed product. When the product is sold, the manufacturing organization calculates the cost of goods sold using the following equation:

(Cost of Goods Sold) =

(Beg Finished Goods Inventory) + (Cost of Goods Manufactured) – (Ending Finished Goods Inventory)

Income Statements and Balance Sheets - Manufacturer

Figure 5 illustrates the income statement of a manufacturer. An important characteristic of the income statement is that it is supported by a schedule of cost of goods manufactured (see Figure 6).

This schedule shows the specific costs (i.e., direct materials, direct labor, and factory overhead) that have gone into the goods completed during the period. The two most important figures on the cost of goods manufactured statement are (1) the total manufacturing costs and (2) the cost of goods manufactured. Be sure not to confuse the terms *total manufacturing costs* and *cost of goods manufactured*. **Total manufacturing cost** includes the costs of all *resources* put into production during the period.

Cost of goods manufactured consists of the total costs of all goods completed during the period and includes “total manufacturing cost” *plus* the beginning work in process inventory *minus* the ending work in process inventory. This adjustment process is necessary because total manufacturing cost could include the goods unfinished (work in process), which need to be taken out.

Since the manufacturer carries three types of inventory (direct materials, work-in-process, and finished goods) all three items must be incorporated into the computation of the cost of goods sold. These inventory accounts also appear on the balance sheet for a manufacturer, as shown in Figure 5.

FIGURE 5
MANUFACTURER'S CURRENT ASSET SECTION OF BALANCE SHEET
 December 31, 20X0

Current Assets:		
Cash		\$ 25,000
Accounts Receivable		78,000
Inventories:		
Raw Materials	\$ 7,800	
Work-in-Process	2,000	
Finished Goods	<u>21,000</u>	<u>30,800</u>
Total		<u>\$133,800</u>

FIGURE 5
MANUFACTURER'S INCOME STATEMENT
 For the Year Ended December 31, 20X0

Sales		\$460,000
Cost of goods sold:		
Beginning finished goods inventory	\$ 18,000	
Add: Cost of goods manufactured (see Schedule, Figure 6)	<u>261,000</u>	
Cost of goods available for sale	\$279,000	
Less: Ending finished goods inventory	<u>(21,000)</u>	<u>\$258,000</u>
Gross margin		\$202,000
Less: Operating expenses		
Selling and administrative expenses		<u>(70,000)</u>
Net Income before taxes		<u>\$132,000</u>

FIGURE 6
MANUFACTURER'S
SCHEDULE OF COST GOODS MANUFACTURED

Direct materials:		
Beginning inventory	\$ 23,000	
Add: Purchases	<u>64,000</u>	
Direct materials available for use	\$87,000	
Less: Ending inventory	<u>(7,800)</u>	
Direct materials used		\$ 79,200
Direct labor		45,000
Factory overhead:		
Indirect labor	\$13,000	
Indirect material	12,000	
Factory utilities	10,500	
Factory depreciation	10,800	
Factory rent	12,000	
Miscellaneous	<u>71,500</u>	
		<u>129,800</u>
Total manufacturing costs incurred during 20x0		\$254,000
Add: Beginning work-in-process inventory		<u>9,000</u>
Manufacturing costs to account for		\$263,000
Less: Ending work-in-process inventory		<u>(2,000)</u>
Cost of goods manufactured (to income statement, Figure 5)		<u>\$261,000</u>

The Contribution Income Statement

The traditional income statement for external reporting shows the functional classification of costs, that is, manufacturing costs vs. non-manufacturing expenses (or operating expenses). An alternative format of income statement, known as the *contribution income statement*, organizes the costs by behavior rather than by function. It shows the relationship of variable costs and fixed costs a given cost item is associated with, regardless of the functions.

The contribution approach to income determination provides data that are useful for managerial planning and decision making. For example, the contribution approach is useful:

1. For break-even and cost-volume-profit analysis,
2. In evaluating the performance of the division and its manager, and
3. For short-term and non-routine decisions.

The contribution income statement is not acceptable, however, for income tax or external reporting purposes (as per GAAP) because it ignores fixed overhead as a product cost. The statement highlights the concept of contribution margin, which is the difference between sales and variable costs. The traditional format, on the other hand, emphasizes the concept of gross margin, which is the difference between sales and cost of goods sold.

These two concepts are independent and have nothing to do with each other. Gross margin is available to cover non-manufacturing expenses, whereas contribution margin is available to cover fixed costs. The concept of contribution margin has numerous applications for internal management, which will be taken up in Chapter 7.

A comparison is made between the traditional format and the contribution format below.

TRADITIONAL FORMAT

Sales		\$15,000
Less: Cost of Goods Sold		<u>7,000</u>
Gross Margin		8,000
Less: Operating Expenses		
Selling	\$2,100	
Administrative	<u>1,500</u>	<u>3,600</u>
Net Income		<u>\$4,400</u>

CONTRIBUTION FORMAT

Sales		\$15,000
Less: Variable Expenses		
Manufacturing	\$4,000	
Selling	1,600	
Administrative	<u>500</u>	<u>6,100</u>
Contribution Margin		8,900
Less: Fixed Expenses		
Manufacturing	\$3,000	
Selling	500	
Administrative	<u>1,000</u>	<u>4,500</u>
Net Income		<u>\$4,400</u>

Chapter 5 Review Questions

1. The primary reason for adopting total quality management (TQM) is to achieve

- A. Greater customer satisfaction.
- B. Reduced delivery time.
- C. Reduced delivery charges.
- D. Greater employee participation.

2. Companies that adopt just-in-time (JIT) purchasing systems often experience

- A. A reduction in the number of suppliers.
- B. Fewer deliveries from suppliers.
- C. A greater need for inspection of goods as the goods arrive.
- D. Less need for linkage with a vendor's computerized order entry system.

3. Controllers are ordinarily NOT concerned with

- A. Preparation of tax returns.
- B. Reporting to government.
- C. Protection of assets.
- D. Investor relations.

4. Treasurers are usually NOT concerned with

- A. Financial reporting.
- B. Short-term financing.
- C. Cash custody and banking.
- D. Credit extension and collection of bad debts.

5. Incremental cost is

- A. The difference in total costs those results from selecting one choice instead of another.
- B. The profit forgone by selecting one choice instead of another.
- C. A cost that continues to be incurred in the absence of activity.
- D. A cost common to all choices in question and not clearly or feasibly allocable to any of them.

6. In cost terminology, conversion costs consist of

- A. Direct and indirect labor.
- B. Direct labor and direct materials.
- C. Direct labor and factory overhead.
- D. Indirect labor and variable factory overhead.

7. In a retailing enterprise, the income statement includes cost of goods sold (CGS). Cost of goods sold is, in effect, purchases adjusted for changes in inventory. In a manufacturing company, the purchases account is replaced by which account?

- A. Inventory.
- B. Cost of goods manufactured (CGM).
- C. Finished goods.
- D. Cost of goods sold.

8. The difference between the sales price and total variable costs is

- A. Gross operating profit.
- B. Net profit.
- C. The breakeven point.
- D. The contribution margin.

Chapter 6:

Product Costing Methods: Job Order Costing, Process Costing, And Activity-Based Costing

Learning Objectives:

After completing this section, you should be able to:

- Recognize basic assumptions and uses of different cost systems.
-

A cost accumulation system is a product costing system. This process accumulates manufacturing costs such as materials, labor and factory overhead and assigns them to cost objectives, such as finished goods and work-in-process. Product costing is necessary not only for inventory valuation and income determination but also for establishing the unit sales price.

We will discuss the essentials of the cost accumulation system that is used to measure the manufacturing costs of products. This is essentially a two-step process: (1) the measurement of costs that are applicable to manufacturing operations during a given accounting period and (2) the assignment of these costs to products. There are two basic approaches to cost accounting and accumulation: (1) Job order costing and (2) Process costing

Using the traditional methods of assigning overhead costs to products, using a single predetermined overhead rate based on any single activity measure, can produce distorted product costs. Activity-based costing (ABC) attempts to get around this problem. An ABC system assigns costs to products based on the product's use of activities, not product volume. It has proved to produce more accurate product costing results in an environment where there is diversity in product line and services coming out of the same shop.

Job Order Costing and Process Costing Compared

The distinction between job order costing and process costing centers largely around how product costing is accomplished. With job order costing, the focus is to apply costs to specific jobs or batches, which may consist of either a single physical unit or a few like units.

Under process costing, accounting data are accumulated by the production department (or cost center) and averaged over all of the production that occurred in the department. Here there is mass production of like units which are manufactured on a continuous basis through a series of uniform production steps known as *processes*. Figure 1 summarizes the basic differences between these two methods. (For more on process costing, refer to a cost management or cost accounting course).

FIGURE 1

DIFFERENCES BETWEEN JOB ORDER COSTING AND PROCESS COSTING		
	<u>Job Order Costing</u>	<u>Process Costing</u>
1. Cost unit	Job, order, or contract	Physical unit
2. Costs are accumulated	By jobs	By departments
3. Subsidiary record	Job cost sheet	Cost of production report
4. Used by	Custom manufacturers	Processing industries
5. Permits computation of	(a) A unit cost for inventory costing purposes (b) A profit or loss on each job	A unit cost to be used to compute the costs of goods completed and work in process

Job Order Costing

Job order costing is the cost accumulation system under which costs are accumulated by jobs, contracts, or orders. This costing method is appropriate when the products are manufactured in identifiable lots or batches or when the products are manufactured to customer specifications. Job order costing is widely used by custom manufacturers such as printing, aircraft, and construction companies. It may also be used by

service businesses such as auto repair shops and professional services. Job order costing keeps track of costs as follows: direct material and direct labor are traced to a particular job. Costs not directly traceable -factory overhead- are applied to individual jobs using a predetermined overhead (application) rate.

Job Cost Records

A *job cost sheet* is used to record various production costs for work-in-process inventory. A separate cost sheet is kept for each identifiable job, accumulating the direct materials, direct labor, and factory overhead assigned to that job as it moves through production. The form varies according to the needs of the company. Figure 2 presents the basic records or source documents used for job costing. These include:

1. *The job cost sheet.* This is the key document in the system. It summarizes all of the manufacturing costs --direct materials, direct labor, and applied factory overhead (to be discussed in detail later)--of producing a given job or batch of products. One sheet is maintained for each job, and the file of job cost sheets for unfinished jobs is the subsidiary record for the Work in Process Inventory account. When the jobs are completed and transferred, the job order sheets are transferred to a completed jobs file and the number of units and their unit costs are recorded on inventory cards supporting the Finished Goods Inventory account.
2. *The materials requisition form.* This form shows the types, quantities and prices of each type of material issued for production.
3. *The work ticket.* It shows who worked on what job for how many hours and at what wage rate. This is also called the time ticket and illustrated in Figure 2.
4. *The factory overhead cost sheet.* It summarizes the various factory overhead costs incurred.
5. *The memo for applied factory overhead.* This is a memorandum that shows how the factory overhead applied rate has been developed.
6. *The finished goods record.* This is a record maintained for each type of product manufactured and sold. Each record contains a running record of units and costs of products received, sold, and on hand.

The general flow of costs through a job cost system is shown in Figure 3.

FIGURE 2
BASIC RECORDS IN A JOB COST SYSTEM

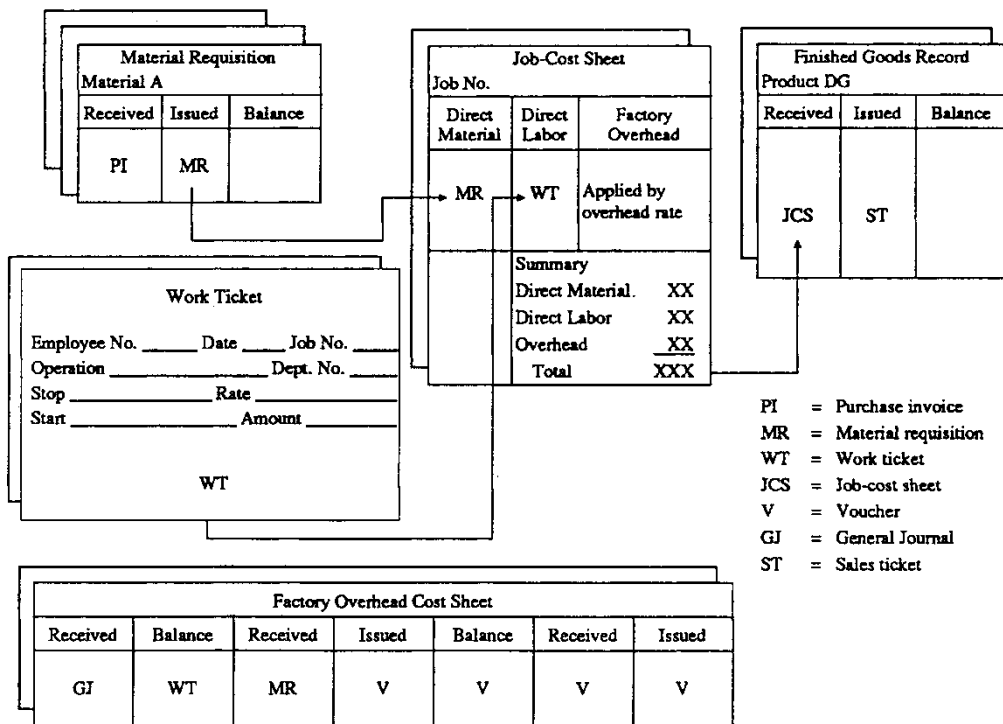
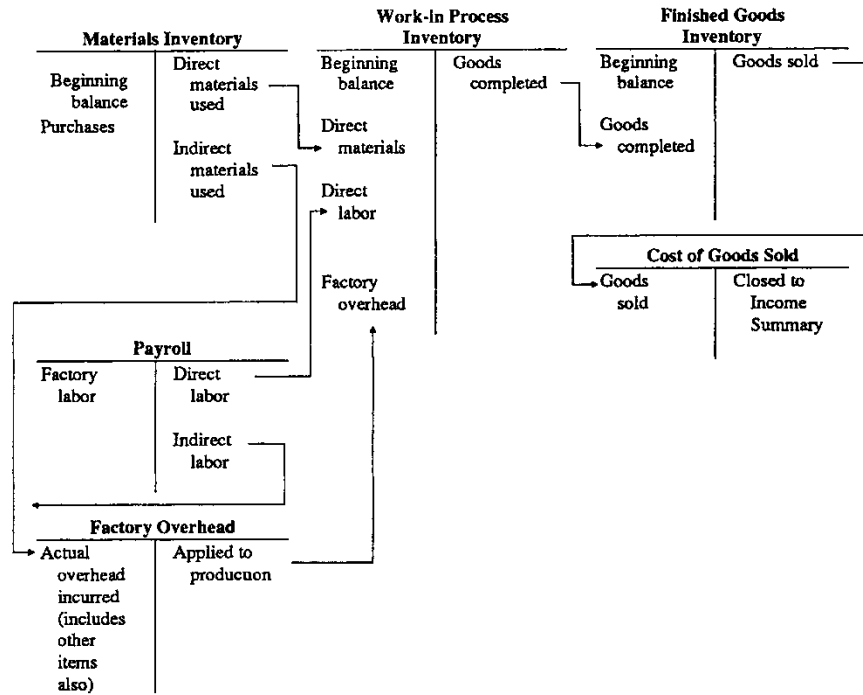


FIGURE 3

JOB COST SYSTEM - FLOW CHART OF LEDGER RELATIONSHIPS



EXAMPLE 1

Chiphard Works collects its cost data by the job order cost system. For Job 123, the following data are available:

<u>Direct Materials</u>		<u>Direct Labor</u>	
7/14 Issued	\$1,200	Week of July 20	180 hrs. @\$6.50
7/20 Issued	650	Week of July 26	140 hrs. @ 7.25
7/25 Issued	<u>350</u>		
	<u>\$2,200</u>		

Factory overhead is applied at the rate of \$4.50 per direct labor hour.

We will compute (a) the cost of Job 123 and (b) the sales price of the job, assuming that it was contracted with a markup of 40% of cost.

(a) The cost of job is:

Direct material		\$2,200
Direct labor:		
180 hrs. x \$6.50	\$1,170	
140 hrs. x \$7.25	<u>1,015</u>	2,185
Factory overhead applied:		
320 hrs. x \$4.50		<u>1,440</u>
Cost of Job 123		<u>\$5,825</u>

(b) The sales price of the job is:

$$\$5,825 + 40\% (\$5,825) = \$5,825 + \$2,330 = \$8,155$$

Factory Overhead Application

Many items of factory overhead cost are incurred for the entire factory and for the entire accounting period and cannot be specifically identified with particular jobs. Furthermore, the amount of actual factory overhead costs incurred is not usually available until the end of the accounting period. But it is often critical to make cost data available for pricing purposes as each job is completed. Therefore, in order for job costs to be available on a timely basis, it is customary to apply factory overhead by using a *predetermined factory overhead rate*.

Note: Although an actual rate is simple to compute, the results are misleading because overhead rates may fluctuate significantly from month to month. When these fluctuations occur, similar jobs completed in different months will have overhead costs and total costs that differ.

Predetermined Factory Overhead Rate

Regardless of the cost accumulation system used (i.e., job order or process), factory overhead is applied to a job or process. Companies use *predicted* levels of activity and cost rather than *actual* levels. The successful assignment of factory overhead costs depends on a careful estimate the total overhead costs and a good forecast of the activity used as the cost driver.

The predetermined overhead rate is determined as follows:

$$\text{Predetermined overhead rate} = \frac{\text{Budgeted annual factory overhead costs}}{\text{Budgeted annual activity units (direct labor hours, machine hours, etc.)}}$$

Budgeted activity units used in the denominator of the formula, more often called the *denominator activity* level or *cost driver*, are measured in

1. direct labor hours
2. machine hours
3. direct labor costs
4. direct material dollars or
5. production units.

Disposition of Under- and Over-Applied Overhead

Inevitably, actual overhead cost incurred during a period and factory overhead costs applied will differ. Conventionally, at the end of the year, the difference between actual overhead and applied overhead is closed to cost of goods sold if it is immaterial. On the other hand, if a material difference exists, work-in-process, finished goods, and cost of goods sold are adjusted on a proportionate basis based on units or dollars at year-end for the deviation between actual and applied overhead. Underapplied overhead and overapplied overhead results as follows:

Underapplied overhead = Applied overhead < Actual overhead

Overapplied overhead = Applied overhead > Actual overhead

EXAMPLE 2

Two companies have prepared the following budgeted data for the year 2X12:

	<u>Company X</u>	<u>Company Y</u>
Predetermined rate based on	Machine hours	Direct labor cost
Budgeted overhead	\$200,000 (1)	\$240,000 (1)
Budgeted machine-hours	100,000 (2)	
Budgeted direct labor cost		\$160,000 (2)
Predetermined overhead rate (1)/(2)	\$2 per machine hour	150% of direct labor cost

Now assume that actual overhead costs and the actual level of activity for 2X12 for each firm are shown as follows:

	<u>Company X</u>	<u>Company Y</u>
Actual overhead costs	\$198,000	\$256,000
Actual machine hours	96,000	
Actual direct labor cost		\$176,000

Note that for each company, the actual cost and activity data differ from the budgeted figures used in calculating the predetermined overhead rate. The computation of the resulting underapplied and overapplied overhead for each company is provided below:

	<u>Company X</u>	<u>Company Y</u>
Actual overhead costs	\$198,000	\$256,000
Factory overhead applied to Work-in-Process during 2X12:		
96,000 actual machine-hours x \$2	192,000	
\$176,000 actual direct labor cost x 150%		264,000
Underapplied (overapplied) factory overhead	\$ 6,000	(\$ 8,000)

Plantwide versus Departmental Overhead Rates

As the degree of aggregation increases from simply combining related cost pools to combining all factory overhead, information may become more distorted. The following information is used to provide a simple example of the differing results obtained between using a departmental and plantwide overhead rate.

EXAMPLE 3

Allison Company has two departments: assembly and finishing. Assembly work is performed by robots, and a large portion of this department's overhead cost consists of depreciation and electricity charges. Finishing work is performed manually by skilled laborers, and most charges in this department are for labor, fringe benefits, indirect materials, and supplies.

The company makes two products: A and B. Product A requires five machine hours in assembly and one direct labor hour in finishing; Product B requires two machine hours in assembly and three direct labor hours in finishing.

Figure 4 provides information about estimated overhead costs and activity measures and shows the computations of departmental and plantwide overhead rates. Product overhead application amounts for A and B are also given.

Note the significant difference in the overhead applied to each product using departmental versus plantwide rates. If departmental rates are used, product cost more clearly reflects the different amounts and types of machine/labor work performed on the two products. If a plantwide rate is used, essentially, each product only absorbs overhead from a single department--from Assembly if machine hours are used and from Finishing if direct labor hours are used. Use of a plantwide rate ignores the dissimilarity of work performed in the departments.

Figure 4
Plantwide versus Departmental Overhead Rates

	<u>Assembly</u>	<u>Finishing</u>	<u>Total</u>
Estimated annual overhead	\$300,200	\$99,800	\$400,000
Estimated annual direct labor hours (DLH)	5,000	20,000	25,000
Estimate annual machine hours (MH)	38,000	2,000	40,000

- (1) Total plantwide overhead = $\$300,200 + \$99,800 = \$400,000$
Plantwide overhead rate using DLH $(\$400,000/25000 = \$16.00)$

- (2) Departmental overhead rates:
Assembly (automated) $\$300,200/38,000 = \7.90 per MH
Finishing (manual) $\$99,800/20,000 = \4.99 per DLH

- | | <u>To Product A</u> | <u>To Product B</u> |
|-----------------------|---------------------|---------------------|
| (1) Overhead assigned | | |

	using plantwide rate: based on DLH	1(\$16.00) = <u>\$16.00</u>	3(\$16.00) = <u>\$48.00</u>
(2)	Overhead assigned using departmental rates:		
	Assembly	5(\$7.90) = \$39.50	2(\$7.90) = \$15.80
	Finishing	1(\$4.99) = <u>4.99</u>	3(\$4.99) = <u>14.97</u>
	Total	<u>\$44.49</u>	<u>\$30.77</u>

Use of plantwide overhead rates rather than departmental rates may also contribute to problems in product pricing. While selling prices must be reflective of market conditions, management typically uses cost as a starting point for setting prices. If plantwide rates distort the true cost of a product, selling prices might be set too low or too high, causing management to make incorrect decisions.

EXAMPLE 4

Assume in the case of Allison Company that direct materials and direct labor costs for product A are \$5 and \$35, respectively. Adding the various overhead amounts to these prime costs gives the total product cost under each method. Figure 4 shows these product costs and the profits or loss that would be indicated if Product A has a normal market selling price of \$105.

Use of the product costs developed from plantwide rates could cause Allison management to make erroneous decisions about Product A. If the cost figure developed from a plantwide direct labor hour basis is used, management may think that Product A is significantly more successful than it actually is. Such a decision could cause resources to be diverted from other products. If the cost containing overhead based on the plantwide machine hour allocation is used, management may believe that Product A should not be produced, because it appears not to be generating a very substantial gross profit, as shown in Figure 5.

In either instance, assuming that machine hours and direct labor hours are the best possible allocation bases for assembly and finishing, respectively, the only cost that gives management the necessary information upon which to make resource allocation and product development/elimination decisions is the one produced by using the departmental overhead rates.

FIGURE 5
TOTAL PRODUCT COSTS AND PROFITS

	<i>Departmental Rates</i>	<i>Plantwide Rate (DLH)</i>
Direct materials	\$ 5.00	\$ 5.00
Direct labor	35.00	35.00
Overhead	<u>44.49</u>	<u>16.00</u>
Total Cost	<u>\$ 84.49</u>	<u>\$ 56.00</u>
 Selling Price	 \$105.00	 \$105.00
 Gross profit (margin)	 \$ 20.51	 \$ 49.00
Profit margin	19.5%	46.7%

Activity-Based Costing

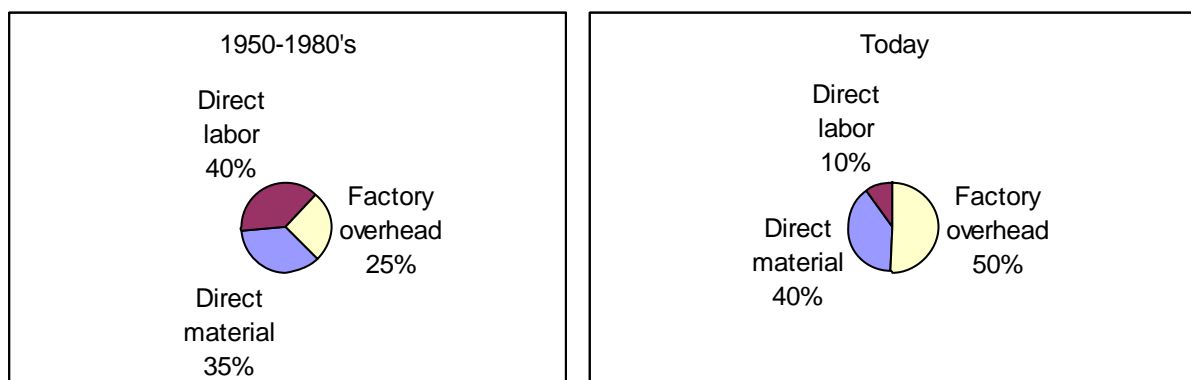
Many companies use a traditional cost system such as job-order costing or process costing, or some hybrid of the two. This traditional system may provide distorted product cost information. In fact, companies selling multiple products are making critical decisions about product pricing, making bids, or product mix, based on inaccurate cost data. In all likelihood, the problem is not with assigning the costs of direct labor or direct materials. These prime costs are traceable to individual products, and most conventional cost systems are designed to ensure that this tracing takes place.

However, the assignment of overhead costs to individual products is another matter. Using the traditional methods of assigning overhead costs to products, using a single predetermined overhead rate based on any single activity measure, can produce distorted product costs. The growth in the automation of manufacturing (such as increased use of robotics, high-tech machinery, and other computer-driven processes) has changed the nature of manufacturing and the composition of total product cost. The significance of direct labor cost has diminished and overhead costs have increased. In this environment, overhead application rates based on direct labor or any other volume-based cost driver may not provide accurate overhead charges since they no longer represent cause and effect relationships between output and overhead costs.

Activity-based costing (ABC) attempts to get around this problem. An ABC system assigns costs to products based on the product's use of activities, not product volume. It has proved to produce more accurate product costing results in an environment where there is diversity in product line and services coming out of the same shop. A recent survey by the Institute of Management Accounting shows that over 30 percent of the companies responded are using ABC systems to replace their existing traditional cost systems.

Composition of Product Cost

Technology and automation of the 1990s have produced entirely new patterns of product costs. The three elements of product cost are still direct materials, direct labor, and factory (manufacturing) overhead. However, the percentage that each element contributes to the total cost of a product has changed. Prior to 1980s, direct labor was the dominant cost element, making up over 40 percent of total product cost. Direct materials contributed 35 percent and manufacturing overhead around 25 percent of total cost. Seventy-five percent of total product cost was a direct cost, traceable to the product. Improved production technology caused a dramatic shift in the three products cost elements. Labor was replaced by machines, and direct labor was reduced significantly. Today, only 50 percent of the cost of a product is directly traceable to the product; the other 50 percent is manufacturing overhead, an indirect cost.



An activity-based cost system is one which first traces costs to activities and then to products. Traditional product costing also involves two stages, but in the first stage costs are traced to departments, not to activities. In both traditional and activity-based costing, the second stage consists of tracing costs to the product.

The principal difference between the two methods is the number of cost drivers used. Activity-based costing uses a much larger number of cost drivers than the one or two volume-based cost drivers typical in a conventional system. In fact, the approach separates overhead costs into overhead cost pools, where each cost pool is associated with a different cost driver. Then a predetermined overhead rate is computed for each cost pool and each cost driver. In consequence, this method has enhanced accuracy.

Activity-based costing (ABC) is not an alternative costing system to job costing or process costing. It focuses on activities as the principal cost objects. ABC is a method of assigning costs to goods and services that assumes all costs are caused by the activities used to produce those goods and services. This method provides more insight into the causes of costs than conventional costing methods. Conventional costing methods divide the total costs by the number of units to compute a unit cost. In contrast, activity-based costing starts with the detailed activities required to produce a product or service and computes a product's cost using the following *four* steps:

1. Identify the activities that consume resources, and assign costs to those activities. Inspection would be an activity, for example.
2. Identify the cost driver(s) associated with each activity or group of activities, known as a cost pool. A cost driver is a factor that causes, or "drives," an activity's costs. The number of inspections would be a cost driver. So could the number of times a new drawing is needed because a product has been redesigned.
3. Calculate an applied rate for each activity pool. The pool rate could be the cost per purchase order.
4. Assign costs to products by multiplying the cost pool rate by the number of cost driver units consumed by the product. For example, the cost per inspection times the number of inspections required for Product X for the month of March would measure the cost of inspection activity for Product X for March.

Note: ABC is also applicable to service, merchandising, and nonprofit sectors as well as manufacturing companies.

First-Stage Procedure

In the first stage of activity-based costing, overhead costs are divided into homogeneous cost pools. A *homogeneous* cost pool is a collection of overhead costs for which cost variations can be explained by a single cost driver. Overhead activities are homogeneous whenever they have the same consumption ratios for all products.

Once a cost pool is defined, the cost per unit of the cost driver is computed for that pool. This is referred to as the *pool rate*. Computation of the pool rate completes the first stage. Thus, the first stage produces two outcomes: (1) a set of homogeneous cost pools and (2) a pool rate.

Second-Stage Procedure

In the second stage, the costs of each overhead pool are traced to products. This is done using the pool rate computed in the first stage and the measure of the amount of resources consumed by each product. This measure is simply the quantity of the cost driver used by each product. In our example, that would be the number of production runs and machine hours used by each product. Thus, the overhead assigned from each cost pool to each product is computed as follows:

$$\text{Applied overhead} = \text{Pool rate} \times \text{Cost driver units used}$$

The total overhead cost per unit of product is obtained by first tracing the overhead costs from the pools to the individual products. This total is then divided by the number of units produced. The result is the unit overhead cost. Adding the per-unit overhead cost to the per-unit prime cost yields the manufacturing cost per unit.

A list of potential cost drivers is given in Figure 6.

FIGURE 6
COST DRIVERS

MANUFACTURING:

Machine hour	Miles driven
Direct labor hour or dollars	Computer time
Number of setups	Square footage
Weight of materials handled	Number of vendors
Number of units reworked	Asset value
Number of orders placed	Number of labor transactions
Number of orders received	Number of units scrapped
Number of inspections	Number of parts
Number of material handling operations	Replacement cost
Number of orders shipped	Design time
Hours of testing time	

NON-MANUFACTURING:

Number of hospital beds occupied
Number of surgeries
Number of take-offs and landings for an airline
Flight hours
Number of rooms occupied in a hotel

Cost drivers that indirectly measure the consumption of an activity usually measure the number of transactions associated with that activity. It is possible to replace a cost driver that directly measures consumption with one that only indirectly measures it without loss of accuracy provided that the quantities of activity consumed per transaction are stable for each product. In such a case, the indirect cost driver has a high correlation and can be used.

The fundamental differences in the traditional and ABC cost systems are summarized in Figure 7.

FIGURE 7
COST SYSTEM COMPARISON

	<i>Traditional</i>	<i>ABC</i>
Cost pools:	One or a limited number	Many to reflect different activities
Applied rate:	Volume-based, Financial	Activity-based, Nonfinancial
Suited for:	Labor-intensive, Low-overhead companies	Capital-intensive, Product-diverse, High Overhead companies
Benefits:	Simple, Inexpensive	Accurate product costing, possible elimination of nonvalue-added activities

EXAMPLE 5

Global Metals, Inc. has established the following overhead cost pools and cost drivers for their product:

<i>Overhead Cost Pool</i>	<i>Budgeted Overhead Cost</i>	<i>Cost Driver</i>	<i>Predicted Level for Cost Driver</i>	<i>Predetermined Overhead Rate</i>
Machine Set-ups	\$100,000	Number of set-ups	100	\$1,000 per set-up
Material Handling	\$100,000	Weight of raw material	50,000 pounds	\$2.00 per pound
Waste Control	\$50,000	Weight of hazardous chemical used	10,000 pounds	\$5.00 per pound
Inspection	\$75,000	Number of inspections	1,000	\$75 per inspections
Other Overhead Costs	<u>\$200,000</u>	Machine Hours	20,000	\$10 per machine hour
	<u>\$525,000</u>			

Job No. 107 consists of 2,000 special purpose machine tools with the following requirements:

Machine set-ups	2 set-ups
Raw material required	10,000 pounds
Waste material required	2,000 pounds
Inspections	10 inspections
Machine hours	500 machine hours

The overhead assigned to Job No. 107 is computed below:

<i>Overhead Cost Pool</i>	<i>Predetermined Overhead Rate</i>	<i>Level of Cost Driver</i>	<i>Assigned Overhead Cost</i>
Machine set-ups	\$1,000 per set-up	2 set-ups	\$2,000
Material handling	\$2.00 per pound	10,000 pounds	20,000
Waste control	\$5.00 per pound	2,000 pounds	10,000
Inspection	\$75 per inspection	10 inspections	750
Other overhead cost	\$10 per machine hour	500 machine hour	<u>5,000</u>
Total			<u>\$37,750</u>

The total overhead cost assigned to Job No. 107 is \$37,750, or \$18.88 per tool (\$37,750/2,000).

Compare this with the overhead cost that is assigned to the job if the firm uses a single predetermined overhead rate based on machine hours:

$$\begin{aligned}
 &\text{Total budgeted overhead cost / Total predicted machine hours} \\
 &= \$525,000 / 20,000 \\
 &= \$26.25 \text{ per machine hour}
 \end{aligned}$$

Under this approach, the total overhead cost assigned to Job No. 107 is \$13,125 (\$26.25 per machine hour x 500 machine hours). This is only \$6.56 per tool (\$13,125/2,000), which is about 1/3 of the overhead cost per tool computed when multiple cost drivers are used.

To summarize,

	<i>ABC</i>	<i>Traditional</i>
Total factory overhead assigned	\$37,750	\$13,125
Per tool	\$18.88	\$6.56

The reason for this wide discrepancy is that these special purpose tools require a relatively large number of machine set-ups, a sizable amount of waste materials, and several inspections. Thus, they are relatively costly in terms of driving overhead costs. Use of a single predetermined overhead rate obscures that fact.

Inaccurately calculating the overhead cost per unit to the extent illustrated above can have serious adverse consequences for the firm. For example, it can lead to poor decisions about pricing, product mix, or contract bidding.

Note: The cost accountant needs to weigh carefully such considerations in designing a product costing system. A costing system using multiple cost drivers is more costly to implement and use, but it may save millions through improved decisions.

Note: An ABC approach is expensive to implement and keep. Companies considering ABC should perform a cost-benefit test. The benefits are most significant when a company has

- (1) different products or services that make different demands on resources
- (2) stiff competition where knowledge of costs and cost control is critical.

ABC forces management to think in terms of simplifying operations (activities). Once activities that are consumed by a product are identified, the process can be evaluated with a view to cut costs.

Using Activity-Based Costing To Make Marketing Decisions

Marketing cost analysis provides relevant data for managerial decisions to add or drop territories and products. Applying principles of activity-based costing to marketing activities helps marketing managers make decisions about product line or territory profitability. For example, suppose the Nike shoe company considers opening a territory in Russia. The first step is to determine what activities would be required to market shoes in Russia. These activities would include selling, warehousing, order filling, providing credit and collecting on accounts receivable, and shipping, in addition to advertising and promotion. The second step is to identify measures of the activities. Some examples of activity measures are shown in Figure 9. The next step is to estimate the cost of each activity. Finally, management would estimate the number of activities required to open the sales territory in Russia which, multiplied by the cost per activity, would provide an estimate of the cost of marketing in the new territory.

FIGURE 9
ACTIVITY COST DRIVERS

<i>Activity</i>	<i>Measures</i>
Selling	Number of sales calls Number of orders obtained Volume of sales
Warehousing	Number of items stored Volume of items stored
Credit and collection	Number of customer orders Dollar amount of customer orders on account

A List of Activity-Based Costing (ABC) Software

Numerous PC/network software packages are available for implementing ABC analysis. The following is a list.

ABM Tools and ABC Management Budget

Decimal Technologies

www.decimal.ca

Acorn System Cost Analyzer

Acorn Systems, Inc.

www.acornsys.com

Activity Analyzer

Lead Software, Inc.

www.leadsoftware.com

Prodacapo ABC/M

Prodacapo

www.prodacapo.com

SAS

SAS Institute

www.sas.com

Chapter 6 Review Questions

1. Companies characterized by the production of heterogeneous products will most likely use which of the following methods for the purpose of averaging costs and providing management with unit cost data?

- A. Process costing.
- B. Job-order costing.
- C. Direct costing.
- D. Absorption costing.

2. Companies characterized by the production of basically homogeneous products will most likely use which of the following methods for the purpose of averaging costs and providing management with unit-cost data?

- A. Process costing.
- B. Job-order costing.
- C. Variable costing.
- D. Absorption costing.

3. An accounting system that collects financial and operating data on the basis of the underlying nature and extent of the cost drivers is

- A. Activity-based costing.
- B. Target costing.
- C. Delivery cycle time costing.
- D. Variable costing.

Chapter 7:

Cost Behavior and Cost-Volume-Profit Analysis

Learning Objectives:

After completing this section, you should be able to:

- Identify the benefits of developing a cost-volume profit analysis.
 - Compute the sales necessary to break even or to achieve a target income.
 - Perform a variety of "what-if" analyses using the contribution approach.
-

Not all costs behave in the same way. There are certain costs that vary in proportion to changes in volume or activity, such as labor hours and machine hours. There are other costs that do not change even though volume changes. An understanding of cost behavior is helpful:

1. For break-even and cost-volume-profit analysis.
2. To appraise divisional performance.
3. For flexible budgeting.
4. To make short-term choice decisions
5. To make transfer decisions

Cost-volume-profit (CVP) analysis, together with cost behavior information, helps managerial accountants perform many useful analyses. CVP analysis deals with how profit and costs change with a change in volume. More specifically, it looks at the effects on profits of changes in such factors as variable costs, fixed costs, selling prices, volume, and mix of products sold. By studying the relationships of costs, sales, and net income, management is better able to cope with many planning decisions.

Break-even analysis, a branch of CVP analysis, determines the break-even sales. Break-even point, the financial crossover point when revenues exactly match costs, does not show up in corporate earnings reports, but managerial accountants find it an extremely useful measurement in a variety of ways.

A Further Look at Costs by Behavior

As was discussed in the previous chapter, depending on how a cost will react or respond to changes in the level of activity, costs may be viewed as variable, fixed, or mixed (semi-variable). This classification is made within a specified range of activity, called the relevant range. The relevant range is the volume zone within which the behavior of variable costs, fixed costs, and selling prices can be predicted with reasonable accuracy.

VARIABLE COSTS. Variable costs, also known as *engineered costs*, vary in total with changes in volume or level of activity. Examples of variable costs include the costs of direct materials, direct labor, and sales commissions. The following factory overhead items fall in the variable cost category:

Variable Factory Overhead

Supplies	Receiving Costs
Fuel and Power	Overtime Premium
Spoilage and Defective Work	

FIXED COSTS. Fixed costs do not change in total regardless of the volume or level of activity. Examples include advertising expense, salaries, and depreciation. The following factory overhead items fall in the fixed cost category:

Fixed Factory Overhead

Property Taxes	Rent on Factory Building
Depreciation*	Indirect labor
Insurance	Patent Amortization

*Depreciation can be variable if it is based on units of production.

MIXED (SEMI-VARIABLE) COSTS. As previously discussed, mixed costs contain both a fixed element and a variable one. Salespersons' compensation including salary and commission is an example. The following factory overhead items may be considered mixed costs:

Mixed Factory Overhead

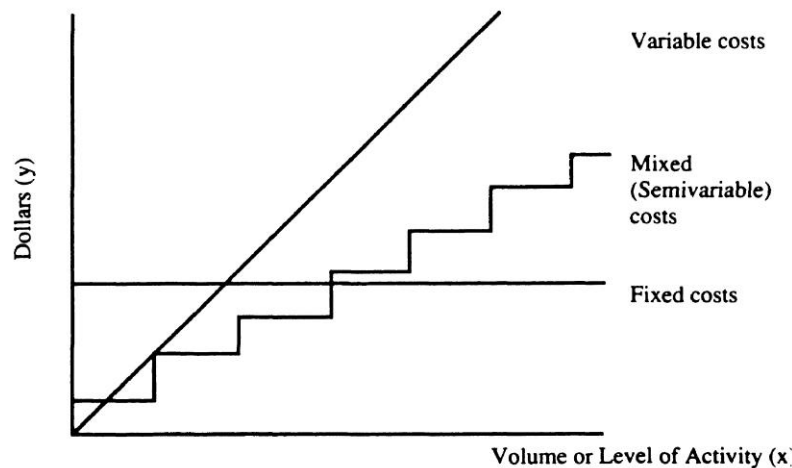
Supervision	Maintenance and Repairs
Inspection	Workmen's Compensation Insurance
Service Department costs	Employer's Payroll Taxes
Utilities	Rental of Delivery Truck

Fringe Benefits
Cleanup costs

Quality Costs

Note that factory overhead, taken as a whole, would be a perfect example of mixed costs. Figure 1 displays how each of these three types of costs varies with changes in volume.

FIGURE 1
COST BEHAVIOR PATTERNS



Types of Fixed Costs - Committed or Discretionary

Strictly speaking, there is no such thing as a fixed cost. In the long run, all costs are variable. In the short run, however, some fixed costs, called *discretionary* (or *managed* or *programmed*) fixed costs, will change. It is important to note that these costs change because of managerial decisions, not because of changes in volume. Examples of discretionary types of fixed costs are advertising, training, and research and development.

Another type of fixed costs, called *committed* (or *capacity*) fixed costs, are those costs that do not change and are the results of commitments previously made. Fixed costs such as rent, depreciation,

insurance, and executive salaries are committed types of fixed costs since management has committed itself for a long period of time regarding the company's production facilities and manpower requirements.

Analysis of Mixed (Semi-variable) Costs

For planning, control, and decision making purposes, mixed costs need to be separated into their variable and fixed components. Since the mixed costs contain both fixed and variable elements, the analysis takes the following mathematical form, which is called a cost-volume formula (*flexible budget formula* or *cost function*):

$$y = a + bx$$

where y = the mixed cost to be broken up.

x = any given measure of activity (cost driver) such as direct labor hours, machine hours, or production volume.

a = the fixed cost component.

b = the variable rate per unit of x .

Relevant Range

Management quite often use the notion of relevant range in estimating cost behavior. The relevant range is the range of activity over which the company expects a set of cost behaviors to be consistent (or linear). For example, if the relevant range of activity is between 10,000 and 20,000 units of cars, the auto maker assumes that certain costs are fixed and while others are variable within that range.

Separating the mixed cost into its fixed and variable components is the same thing as estimating the parameter values a and b in the cost-volume formula. There are several methods available to be used for this purpose including engineering analysis, account analysis and the high-low method. They are discussed below.

Engineering Analysis

Engineering analysis measures cost behavior according to what costs *should be*, not by what costs *have been*. It entails a systematic review of materials, labor, support services, and facilities needed for product and services. Engineers use time and motion studies and similar engineering methods to estimate what costs should be from engineers' specifications of the inputs required to manufacture a unit of output or to perform a particular service. This can be used for existing products or for new products similar to what has been produced before. Disadvantages of this method are that it is prohibitively costly and often not timely. Further it is difficult to estimate indirect costs. The engineering method is most useful when costs involved are variable costs, where there is a clear input/output relation.

Account Analysis

Account analysis selects a volume-related cost driver, and classifies each account from the accounting records as a variable or fixed cost. The cost accountant then looks at each cost account balance and estimates either the variable cost per unit of cost driver activity or the periodic fixed cost. Account analysis requires a detailed examination of the data, presumably by cost accountants and managers who are familiar with the activities of the company, and the way the company's activities affect costs. Because account analysis is judgmental, different analysts are likely to provide different estimates of cost behavior.

EXAMPLE 1

The cafeteria department of Los Al Health Center reported the following costs for October 2X12:

<i>Monthly Cost</i>	<i>October 2X12 Amount</i>
Food and beverages	\$9,350
Hourly wages and benefits	18,900
Supervisor's salary	4,000
Equipment depreciation and rental	6,105

Supplies	<u>2,760</u>
Total cafeteria costs	<u>\$41,115</u>

The cafeteria served 11,520 meals during the month. Using an account analysis to classify costs, we can determine the cost function. Note that in this example, the supervisor's salary (\$4,000 per month) and the equipment depreciation and rental (\$6,105 per month) are fixed while the remainder (\$31,010) varies with the cost driver, i.e., the number of meals served. Dividing the variable costs by the number of meals served yields \$2.692 and the department's cost-volume formula is

$$\$10,105 + \$2.692 \text{ per meal.}$$

The High-Low Method

The high-low method, as the name indicates, uses two extreme data points to determine the values of a (the fixed cost portion) and b (the variable rate) in the equation $Y = a + bX$. The extreme data points are the highest representative X-Y pair and the lowest representative X-Y pair. The activity level X, rather than the mixed cost item y, governs their selection.

The high-low method is explained, step by step, as follows:

Step 1 Select the highest pair and the lowest pair

Step 2 Compute the variable rate, b, using the formula:

$$\text{Variable rate} = (\text{Difference in cost } Y) / (\text{Difference in activity } X)$$

Step 3 Compute the fixed cost portion as:

$$\text{Fixed cost portion} = \text{Total mixed cost} - \text{Variable cost (or } a = Y - bX)$$

EXAMPLE 2

Flexible Manufacturing Company decided to relate total factory overhead costs to direct labor hours (DLH) to develop a cost-volume formula in the form of $Y = a + bX$. Twelve monthly observations were collected. They are given in Table 1 and plotted as shown in Figure 2.

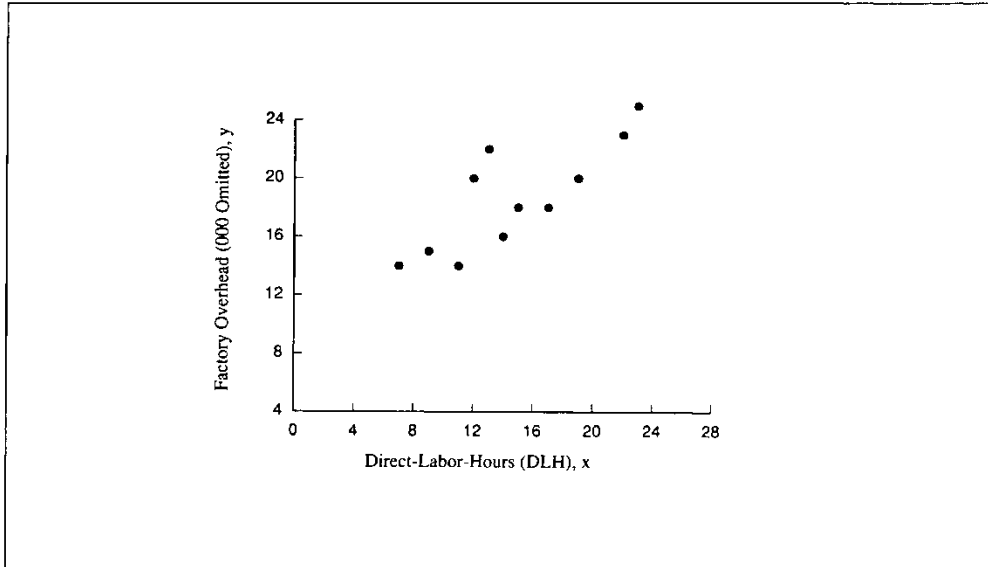
TABLE 1

<i>Month</i>	<i>Direct Labor Hours (X)</i> <i>(000 omitted)</i>	<i>Factory Overhead (Y)</i> <i>(000 omitted)</i>
January	9 hours	\$15
February	19	20
March	11	14
April	14	16
May	23	25
June	12	20
July	12	20
August	22	23
September	7	14
October	13	22
November	15	18
December	<u>17</u>	<u>18</u>
Total	<u>174</u> hours	<u>\$225</u>

The high-low points selected from the monthly observations are

	X	Y
High	23 hours	\$25 (May pair)
Low	<u>7</u>	<u>14</u> (September pair)
Difference	<u>16</u> hours	<u>\$11</u>

FIGURE 2
SCATTER DIAGRAM



Thus

$$\text{Variable rate } b = (\text{Difference in } Y) / (\text{Difference in } X) = \$11 / 16 \text{ hours} = \$0.6875 \text{ per DLH}$$

The fixed cost portion is computed as:

	<i>High</i>	<i>Low</i>
Factory overhead (y)	\$25	\$14
Variable expense(\$0.6875 per DLH)	<u>(15.8125)*</u>	<u>(4.8125)*</u>
	<u>9.1875</u>	<u>9.1875</u>

$$*\$0.6875 \times 23 \text{ hours} = \$15.8125; \$0.6875 \times 7 \text{ hours} = \$4.8125$$

Therefore, the cost-volume formula for factory overhead is

$$\$9.1875 \text{ fixed plus } \$0.6875 \text{ per DLH.}$$

The high-low method is simple and easy to use. It has the disadvantage, however, of using two extreme data points, which may not be representative of normal conditions. The method may yield unreliable estimates of a and b in our formula. In such a case, it would be wise to drop them and choose two other points that are more representative of normal situations. Be sure to check the scatter diagram for this possibility.

Note: The analyst must plot the observed data on a scatter diagram (also called a scattergraph or scatterplot). The reason is that the relationship between y and x shows a *linear* pattern in order to justify the use of the linear form $y = a + bx$.

Especially for the high-low method, with a scatter diagram (1) it is easier to locate the highest and lowest pairs on the diagram than on the table and (2) it allows the analyst to ensure that the two points chosen are not extreme outliers (i.e., they must be representative of the normal behavior).

Questions Answered by CVP Analysis

CVP analysis tries to answer the following questions:

- (a) What sales volume is required to break even?
- (b) What sales volume is necessary to earn a desired profit?
- (c) What profit can be expected on a given sales volume?
- (d) How would changes in selling price, variable costs, fixed costs, and output affect profits?
- (e) How would a change in the mix of products sold affect the break-even and target income volume and profit potential?

Contribution Margin (CM)

For accurate CVP analysis, a distinction must be made between costs as being either variable or fixed. Mixed costs must be separated into their variable and fixed components.

In order to compute the break-even point and perform various CVP analyses, note the following important concepts.

CONTRIBUTION MARGIN (CM). The contribution margin is the excess of sales (S) over the variable costs (VC) of the product or service. It is the amount of money available to cover fixed costs (FC) and to generate profit. Symbolically, $CM = S - VC$.

UNIT CM. The unit CM is the excess of the unit selling price (p) less the unit variable cost (v). Symbolically, $\text{Unit CM} = p - v$.

CM RATIO. The CM ratio is the contribution margin as a percentage of sales, i.e.,

$$\text{CM Ratio} = \frac{\text{CM}}{S} = \frac{(S - \text{VC})}{S} = 1 - \frac{\text{VC}}{S}$$

The CM ratio can also be computed using per-unit data as follows:

$$\text{CM Ratio} = \frac{\text{Unit CM}}{p} = \frac{(p - v)}{p} = 1 - \frac{v}{p}$$

Note that the CM ratio is 1 minus the variable cost ratio. For example, if variable costs are 40% of sales, then the variable cost ratio is 40% and the CM ratio is 60%.

EXAMPLE 3

To illustrate the various concepts of CM, consider the following data for Porter Toy Store:

	Total	Per Unit	Percentage
Sales (1,500 units)	\$37,500	\$25	100%
Less: Variable costs	<u>15,000</u>	<u>10</u>	<u>40</u>
Contribution margin	\$22,500	<u>\$15</u>	<u>60%</u>
Less: Fixed costs	<u>15,000</u>		
Net income	<u>\$7,500</u>		

From the data listed above, CM, unit CM, and the CM ratio are computed as:

$$\text{CM} = S - \text{VC} = \$37,500 - \$15,000 = \$22,500$$

$$\text{Unit CM} = p - v = \$25 - \$10 = \$15$$

$$\text{CM Ratio} = \text{CM} / S = \$22,500 / \$37,500 = 1 - (\$15,000 / \$37,500) = 1 - 0.4 = 0.6 = 60\%$$

$$\text{or} = \text{Unit CM} / p = \$15 / \$25 = 0.6 = 60\%$$

Break-Even Analysis

The break-even point represents the level of sales revenue that equals the total of the variable and fixed costs for a given volume of output at a particular capacity use rate. For example, you might want to ask the break-even occupancy rate (or vacancy rate) for a hotel or the break-even load rate for an airliner.

Generally, the lower the break-even point, the higher the profit and the less the operating risk, other things being equal. The break-even point also provides managerial accountants with insights into profit planning.

It can be computed using the following formula:

$$x = \frac{FC}{(p - v)} = \frac{\text{Fixed Costs}}{\text{Unit CM}}$$

$$\text{Or Break-even point in dollars (\$)} = \frac{\text{Fixed Costs}}{\text{CM Ratio}}$$

EXAMPLE 4

Using the same data given in Example 3, where unit CM = \$25 - \$10 = \$15 and CM ratio = 60%, we get:

$$\text{Break-even point in units} = \$15,000 / \$15 = 1,000 \text{ units}$$

$$\text{Break-even point in dollars} = 1,000 \text{ units} \times \$25 = \$25,000$$

$$\text{Or, alternatively, } \$15,000 / 0.6 = \$25,000$$

Graphical Approach

The graphical approach to obtaining the break-even point is based on the so-called *break-even (B-E) chart* as shown in Figure 2. Sales revenue, variable costs, and fixed costs are plotted on the vertical axis while volume, x , is plotted on the horizontal axis. The break-even point is the point where the total sales revenue line intersects the total cost line. The chart can also effectively report profit potentials over a wide range of activity and therefore be used as a tool for discussion and presentation.

The *profit-volume (P-V) chart* as shown in Figure 3, focuses directly on how profits vary with changes in volume. Profits are plotted on the vertical axis while units of output are shown on the horizontal axis. The P-V chart provides a quick condensed comparison of how alternatives on pricing, variable costs, or fixed costs may affect net income as volume changes. The P-V chart can be easily constructed from the B-E chart. Note that the slope of the chart is the unit CM.

Determination of Target Income Volume

Besides determining the break-even point, CVP analysis determines the sales required to attain a particular income level or target net income.

As a specific dollar amount, the formula is:

$$\text{Target income sales volume} = \frac{\text{Fixed Costs} + \text{Target Income}}{\text{Unit CM}}$$

EXAMPLE 5

Using the same data given in Example 3, assume that Porter Toy Store wishes to attain a target income of \$15,000 before tax.

The target income volume would be:

$$(\$15,000 + \$15,000) / (\$25 - \$10) = \$30,000 / \$15 = 2,000 \text{ Units}$$

Impact of Income Taxes

If target income (expressed as a specific dollar amount) is given on an after-tax basis, an adjustment is necessary before we use the previous formula. The reason is that the profit target is expressed in before-tax terms. Therefore, the after-tax target income must be first converted to a before-tax target, as follows:

$$\text{Before-tax target income} = \frac{\text{After - tax Target Income}}{(1 - \text{Tax Rate})}$$

EXAMPLE 6

Assume in Example 3 that Porter Toy Store wants to achieve an after-tax income of \$6,000. The tax rate is 40 percent. Then, the first step is:

$$\frac{\$6,000}{(1 - 0.4)} = \$10,000$$

The second step is to plug this figure into our regular formula as follows:

$$\text{Target income volume} = (\$15,000 + \$10,000) / 15 = 1,667 \text{ Units}$$

Margin of Safety

The margin of safety is a measure of difference between the actual sales and the break-even sales. It is the amount by which sales revenue may drop before losses begin, and is expressed as a percentage of expected sales:

$$\text{Margin of Safety} = \frac{(\text{Expected Sales} - \text{Breakeven Sales})}{\text{Expected Sales}}$$

The margin of safety is used as a measure of operating risk. The larger the ratio, the safer the situation since there is less risk of reaching the break-even point.

EXAMPLE 7

Assume Porter Toy Store projects sales of \$35,000 with a break-even sales level of \$25,000. The projected margin of safety is:

$$(\$35,000 - \$25,000) / \$35,000 = 28.57\%$$

FIGURE 2

BREAK-EVEN CHART

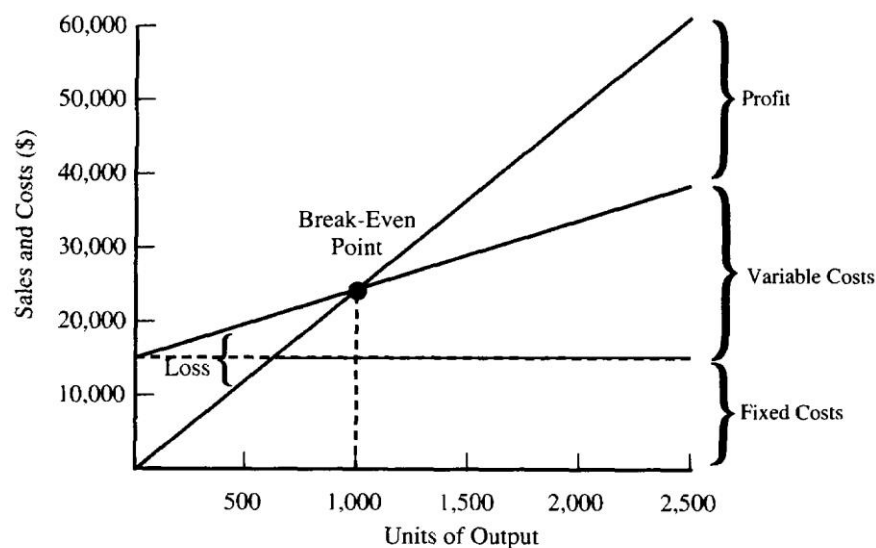
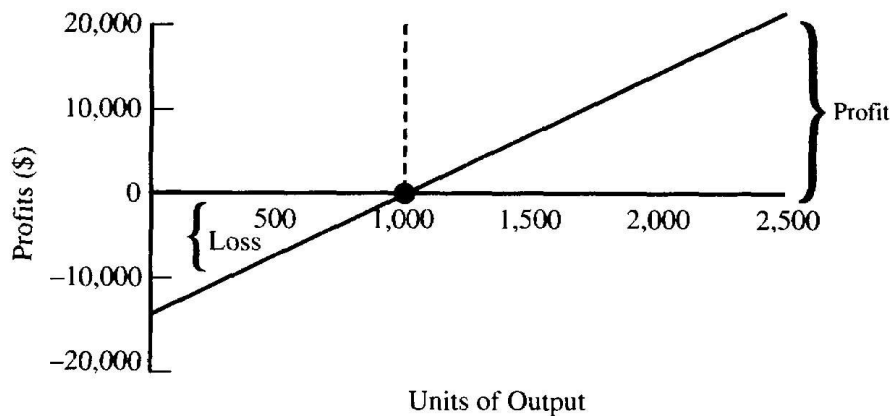


FIGURE 3

PROFIT-VOLUME (P-V) CHART



SOME APPLICATIONS OF CVP ANALYSIS AND WHAT-IF ANALYSIS

The concepts of contribution margin and the contribution income statement have many applications in profit planning and short-term decision making. Many "what-if" scenarios can be evaluated using them as planning tools, especially utilizing a spreadsheet program such as *Excel*.

EXAMPLE 8

Porter Toy Store is considering increasing the advertising budget by \$5,000, which would increase sales revenue by \$8,000. Should the advertising budget be increased?

The answer is no, since the increase in the CM is less than the increased cost:

Increase in CM: \$8,000 X 60%	\$4,800
Increase in advertising	<u>5,000</u>
Decrease in net income	<u><u>\$ (200)</u></u>

EXAMPLE 7

Consider the original data. Assume again that Porter Toy Store is currently selling 1,500 units per period. In an effort to increase sales, management is considering cutting its unit price by \$5 and increasing the advertising budget by \$1,000.

If these two steps are taken, management feels that unit sales will go up by 60 percent. Should the two steps be taken?

A \$5 reduction in the selling price will cause the unit CM to decrease from \$15 to \$10. Thus,

Proposed CM: 2,400 units X \$10	\$24,000
Present CM: 1,500 units X \$15	<u>22,500</u>
Increase in CM	\$1,500
Increase in advertising outlay	<u>1,000</u>
Increase in net income	<u>\$500</u>

The answer, therefore, is yes. Alternatively, the same answer can be obtained by developing comparative income statements in a contribution format:

	(A) <i>Present</i> (1,500 units)	(B) <i>Proposed</i> (2,400 units)	(B - A) <i>Difference</i>
Sales	\$37,500 (@\$25)	\$48,000 (@\$20)	\$10,500
Less: Variable cost	15,000 (@\$10)	24,000 (@\$10)	9,000
CM	\$22,500	\$24,000	\$1,500
Less: Fixed costs	15,000	16,000	1,000
Net income	<u>\$ 7,500</u>	<u>\$ 8,000</u>	<u>\$500</u>

Sales Mix Analysis

Break-even and cost-volume-profit analysis requires some additional computations and assumptions when a company produces and sells more than one product. In multi-product firms, sales mix is an important factor in calculating an overall company break-even point.

Different selling prices and different variable costs result in different unit CM and CM ratios. As a result, the break-even points and cost-volume-profit relationships vary with the relative proportions of the products sold, called the *sales mix*.

EXAMPLE 10

Assume that Knibex, Inc. produces cutlery sets out of high-quality wood and steel. The company makes a deluxe cutlery set and a standard set that have the following unit CM data:

	<i>Deluxe</i>	<i>Standard</i>
Selling price	\$15	\$10
Variable cost per unit	<u>12</u>	<u>5</u>
Unit CM	<u>\$3</u>	<u>\$5</u>
Sales mix	3	2
	(based on sales volume)	
Fixed costs	\$76,000	

The way to find the break-even point is to build a package containing 3 deluxe models and 2 standard models (3:2 ratio). By defining the product as a package, the multiple-product problem is converted into a single-product one. Then use the following three steps as follows:

Step 1: Computer the package CM as follows:

	<u>Deluxe</u>	<u>Standard</u>	
Unit CM	<u>\$3</u>	<u>\$5</u>	
Sales mix	3	2	
Package CM	\$9	\$10	= \$19 package total

Step 2: Determine the number of packages that need to be sold to break even, as follows:

$$\$76,000 / \$19 \text{ per package} = 4,000 \text{ packages}$$

Step 3: Multiply this number by their respective mix units:

Deluxe:	4,000	packages x 3 units =	12,000 units
Standard:	4,000	packages x 2 units =	<u>8,000</u> units
			<u>20,000</u> units

Chapter 7 Review Questions

1. The relevant range in cost accounting is the range over which
 - A. Costs may fluctuate.
 - B. Cost relationships are valid.
 - C. Production may vary.
 - D. Relevant costs are incurred.

2. Mat Co. estimated its materials handling costs at two high and low activity levels as follows: High level = 80,000 kilos with a material handling cost = \$160,000; Low level = 60,000 kilos with a material handling cost = \$132,000. What is Mat's estimated cost for handling 75,000 kilos?
 - A. \$150,000.
 - B. \$153,000.
 - C. \$157,500.
 - D. \$165,000.

3. Which of the following will result in raising the breakeven point (BEP)?
 - A. A decrease in the variable cost per unit.
 - B. An increase in the fixed cost per unit.
 - C. An increase in the contribution margin (CM) per unit.
 - D. A decrease in income tax rates.

4. In using cost-volume-profit analysis to calculate expected unit sales, which of the following should be added to fixed costs in the numerator?
 - A. Predicted operating loss.
 - B. Target income (TI).
 - C. Unit contribution margin (CM).
 - D. Variable costs.

Chapter 8:

Budgeting and Standard Cost Systems

Learning Objectives:

After completing this section, you should be able to:

- Identify the different budgets used in an organization and their purpose.
 - Recognize characteristics of a standard costing system and different cost variances.
-

A comprehensive (master) budget is a formal statement of management's expectation regarding sales, expenses, volume, and other financial transactions of an organization for the coming period. Simply put, a budget is a set of pro forma (projected or planned) financial statements. It consists basically of a pro forma income statement, pro forma balance sheet and cash budget.

A budget is a tool for both planning and control. At the beginning of the period, the budget is a plan or standard; at the end of the period it serves as a control device to help management measure its performance against the plan so that future performance may be improved.

One of the most important phases of responsibility accounting (to be discussed in more detail in the following chapter) is establishing standard costs and evaluating performance by comparing actual costs with the standard costs. The difference between the actual costs and the standard costs is called the variance and is calculated for individual cost centers. Variance analysis is a key tool for measuring performance of a cost center.

Types of Budgets

The budget is classified broadly into two categories:

1. Operating budget, reflecting the results of operating decisions.
2. Financial budget, reflecting the financial decisions of the firm.

The operating budget consists of:

- Sales budget
- Production budget
- Direct materials budget
- Direct labor budget
- Factory overhead budget
- Selling and administrative expense budget
- Pro forma income statement

The financial budget consists of:

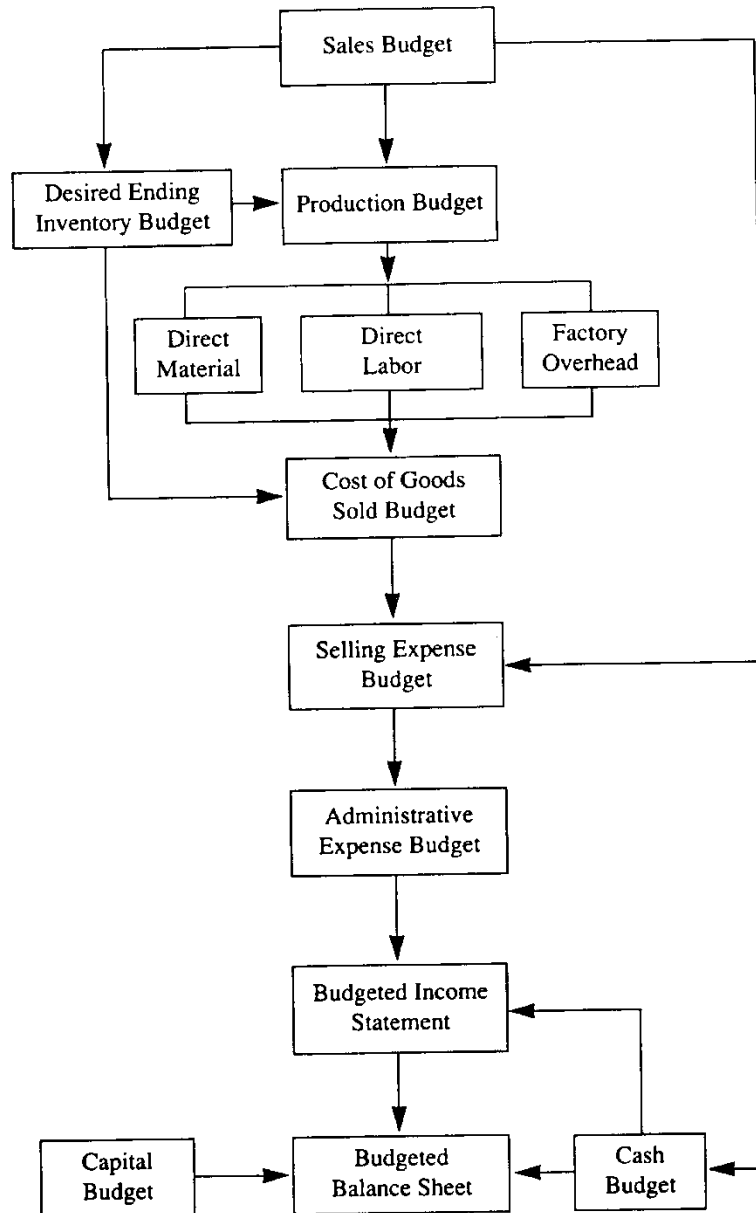
- Cash budget
- Pro forma balance sheet
- Capital budget (to be discussed in Chapter 9)

The major steps in preparing the budget are:

1. Prepare a sales forecast.
2. Determine expected production volume.
3. Estimate manufacturing costs and operating expenses.
4. Determine cash flow and other financial effects.
5. Formulate projected financial statements.

Figure 1 shows a simplified diagram of the various parts of the comprehensive (master) budget, the master plan of the company.

FIGURE 1
COMPREHENSIVE (MASTER) BUDGET



The Sales Budget

The sales budget is the starting point in preparing the master budget, since estimated sales volume influences nearly all other items appearing throughout the master budget. The sales budget should show total sales in quantity and value. The expected total sales can be break-even or target income sales or projected sales. It may be analyzed further by product, by territory, by customer and, of course, by seasonal pattern of expected sales.

Generally, the sales budget includes a computation of expected cash collections from credit sales, which will be used later for cash budgeting.

EXAMPLE 1

THE PUTNAM COMPANY Sales Budget

For the Year Ended December 31, 20B

	QUARTER				Year as a Whole
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	
Expected sales in units*	1,000	1,800	2,000	1,200	6,000
Unit sales price*	<u>x \$150</u>	<u>x \$150</u>	<u>x \$150</u>	<u>x \$150</u>	<u>x \$150</u>
Total sales	<u>\$150,000</u>	<u>\$270,000</u>	<u>\$300,000</u>	<u>\$180,000</u>	<u>\$900,000</u>

*Given.

Monthly Cash Collections from Customers

Frequently, there are time lags between monthly sales made *on account* and their related monthly cash collections. For example, in any month, credit sales are collected as follows: 15% in month of sale, 60% in the following month, 24% in the month after, and the remaining 1 percent are uncollectible.

	<i>April-Actual</i>	<i>May-Actual</i>	<i>June-Budgeted</i>	<i>July-Budgeted</i>
Credit sales	\$320	200	300	280

The budgeted cash receipts for June and July are computed as follows:

For June:

From April sales	\$320 x .24	\$ 76.80
From May sales	200 x .6	120.00

From June sales	300 x .15	45.00
Total budgeted collections in June		<u>\$241.80</u>

For July:

From May sales	\$200 x .24	\$ 48
From June sales	300 x .6	180
From July sales	280 x .15	42
Total budgeted collections in July		<u>\$270</u>

The Production Budget

After sales are budgeted, the production budget can be determined. The production budget is a statement of the output by product and is generally expressed in units. It should take into account the sales budget, plant capacity, whether stocks are to be increased or decreased and outside purchases. The number of units expected to be manufactured to meet budgeted sales and inventory requirements is set forth in the production budget.

$$\begin{array}{l} \text{Expected} \\ \text{Production} \\ \text{Volume} \end{array} = \begin{array}{l} \text{Planned sales} \\ + \end{array} \begin{array}{l} \text{Desired} \\ \text{ending} \\ \text{inventory} \end{array} - \begin{array}{l} \text{Beginning inventory} \end{array}$$

The production budget is illustrated as follows:

EXAMPLE 2

THE PUTNAM COMPANY

Production Budget

For the Year Ended December 31, 20B

	QUARTER				Year as a Whole
	1	2	3	4	
Planned sales (Schedule 1)	1,000	1,800	2,000	1,200	6,000
Desired ending inventory*	<u>180</u>	<u>200</u>	<u>120</u>	<u>300</u> **	<u>300</u>
Total Needs	1,180	2,000	2,120	1,500	6,300
Less: Beginning inventory	<u>200</u> **	<u>180</u> ***	<u>200</u>	<u>120</u>	<u>200</u>
Units to be produced	<u>980</u>	<u>1,820</u>	<u>1,920</u>	<u>1,380</u>	<u>6,100</u>

* 10 percent of the next quarter's sales. (For example, 180 = 10% x 1,800).

** Given.

*** The same as the previous quarter's ending inventory.

Inventory Purchases – Merchandising Firm

Putnam Company is a manufacturing firm, so it prepares a production budget, as shown in Example 2. If it were a *merchandising* (retailing or wholesaling) firm, then instead of a production budget, it would develop a *merchandise purchase budget* showing the amount of goods to be purchased from its suppliers during the period. The merchandise purchases budget is in the same basic format as the production budget, except that it shows *goods to be purchased* rather than goods to be produced, as shown below:

Budgeted cost of goods sold (in units or dollars)	\$500,000
Add: Desired ending merchandise inventory	120,000
Total needs	\$620,000
Less: Beginning merchandise inventory	(90,000)
Required purchases (in units or in dollars)	<u>\$530,000</u>

The Cash Budget

The cash budget is prepared for the purpose of cash planning and control. It presents the expected cash inflow and outflow for a designated time period. The cash budget helps management keep cash balances in reasonable relationship to its needs. It aids in avoiding unnecessary idle cash and possible cash shortages. The cash budget consists typically of four major sections:

1. The *cash receipts* section, which are cash collections from customers and other cash receipts such as royalty income and investment income.
2. The *cash disbursements* section, which comprises all cash payments made by purpose.
3. The *cash surplus* or *deficit* section, which simply shows the difference between the total cash available and the total cash needed including a *minimum cash balance* if required. If there is surplus cash, loans may be repaid or temporary investments made.
4. The *financing* section, which provides a detailed account of the borrowings, repayments, and interest payments expected during the budgeting period.

The following a sample case budget.

EXAMPLE 3

	QUARTER				Year as
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>a Whole</u>
Cash balance, beginning	\$19,000	10,675	10,000	10,350	19,000
Add: Receipts:					
Collections from customers	<u>160,000</u>	<u>198,000</u>	<u>282,000</u>	<u>252,000</u>	<u>892,000</u>
Total cash available	<u>179,000</u>	<u>208,675</u>	<u>292,000</u>	<u>262,350</u>	<u>911,000</u>
Less: Disbursements:					
Direct materials	12,225	15,175	18,150	15,400	60,950
Direct labor	49,000	91,000	96,000	69,000	305,000
Factory overhead	24,100	32,500	33,500	28,100	118,200
Selling and Admin.	63,000	78,000	66,000	71,000	278,000
Equipment purchase	30,000	12,000	0	0	42,000
Dividends	5,000	5,000	5,000	5,000	20,000
Income tax	<u>15,000</u>	<u>15,000</u>	<u>15,000</u>	<u>15,000</u>	<u>60,000</u>
Total disbursements	198,325	248,675	233,650	203,500	884,150
Minimum cash balance	<u>10,000</u>	<u>10,000</u>	<u>10,000</u>	<u>10,000</u>	<u>10,000</u>
Total cash needed	<u>208,325</u>	<u>258,675</u>	<u>243,650</u>	<u>213,500</u>	<u>894,150</u>
Cash surplus (deficit)	<u>(29,325)</u>	<u>(50,000)</u>	<u>48,350</u>	<u>48,850</u>	<u>16,850</u>
Financing:					
Borrowing	30,000	50,000	0	0	80,000
Repayment	0	0	(45,000)	(35,000)	(80,000)
Interest	<u>0</u>	<u>0</u>	<u>(3,000)</u>	<u>(2,625)</u>	<u>(5,625)</u>
Total effects of financing	<u>30,000</u>	<u>50,000</u>	<u>(48,000)</u>	<u>(37,625)</u>	<u>(5,625)</u>
	<u>\$10,675</u>	<u>10,000</u>	<u>10,350</u>	<u>21,225</u>	<u>\$21,225</u>

The Budgeted Income Statement

The budgeted income statement summarizes the various component projections of revenue and expenses for the budgeting period. However, for control purposes the budget can be divided into quarters or even months depending on the need.

Example 4

Sales (6,000 units @ \$150)		\$900,000
Less: Cost of goods sold		
Beginning finished goods inventory	\$ 16,400	
Add: Cost of goods manufactured		
(6,100 units @\$82)	500,200	
Cost of goods available for sale	516,600	
Less: Ending finished goods inventory	(24,600)	
		\$492,000
Gross margin		\$408,000
Less: Selling and administrative expense		278,000
Operating income		130,000
Less: Interest expense		5,625
Net income before taxes		124,375
Less: Income taxes		60,000
Net income after taxes		\$64,375

The Budgeted Balance Sheet

The budgeted balance sheet is developed by beginning with the balance sheet for the year just ended and adjusting it, using all the activities that are expected to take place during the budgeting period. Some of the reasons why the budgeted balance sheet must be prepared are:

- It could disclose some unfavorable financial conditions that management might want to avoid.
- It serves as a final check on the mathematical accuracy of all the other schedules.

- It helps management perform a variety of ratio calculations.
- It highlights future resources and obligations.

Financial Modeling: Computer-Based and Spreadsheet Models for Budgeting

More and more companies are developing computer-based models for financial planning and budgeting, using powerful, yet easy-to-use, financial modeling languages such as *Up Your Cash Flow*. The models help not only build a budget for profit planning but answer a variety of “what-if” scenarios. The resultant calculations provide a basis for choice among alternatives under conditions of uncertainty. Furthermore, budget modeling can also be accomplished using spreadsheet programs such as Microsoft’s *Excel*.

Standard Costs and Variance Analysis

A standard cost system differentiates the expected cost from the actual cost, thus identifying deviations from expected (attainable) results on a routine basis. One of the purposes of standard costs is to simplify costing procedures and expedite cost reports. *Standard costs* are costs that are established in advance to serve as targets to be met and after the fact, to determine how well those targets were actually met. The standard cost is based on physical and dollar measures: it is determined by multiplying the standard quantity of an input by its standard price.

The difference between the actual costs and the standard costs, called the variance, is calculated for individual cost centers. Variance analysis is a key tool for measuring performance of a cost center.

The *performance reports* based on the analysis of variances must be prepared for each cost center, addressing the following questions:

1. Is it favorable (F) or unfavorable (U)?
2. If it is unfavorable, is it significant enough for further investigation? For example, a 5% over the standard is a redflag. The decision to investigate is based on the company’s policy in terms of the standard plus or minus an allowable control limit. Current practice sets the control limits

subjectively, based on judgment and past experience rather than any formal identification of limits. About 45 to 47 percent of the firms surveyed used dollar or percentage control limits.

3. If it is significant, is it controllable? For example, it may be due to a strike on the part of the supplier. A material shortage and the ensuing price hike may not be within the control of the production manager.
4. If it is controllable, then who is responsible for what portion of the total variance?
5. What are the causes for an unfavorable variance?
6. What is the remedial action to take?

The whole purpose of variance analysis is to determine what happened, what the causes are, and make sure the same thing does not happen again. The report is useful in two ways: (1) in focusing attention on situations in need of management action and (2) in increasing the precision of planning and control of costs. The report should be produced as part of the overall standard costing and responsibility accounting system.

General Model for Variance Analysis

Two general types of variances can be calculated for most cost items: a *price* (rate, spending) variance and a *quantity* (usage, efficiency) variance.

The price variance is calculated as follows:

$$\begin{aligned}\text{Price Variance} &= \text{Actual Quantity} * (\text{Actual price} - \text{Standard price}) \\ &= \text{AQ} * (\text{AP} - \text{SP}) \\ &= (\text{AQ} * \text{AP}) - (\text{AQ} * \text{SP}) \\ &\quad (1) \qquad (2)\end{aligned}$$

The quantity variance is calculated as follows:

$$\begin{aligned}\text{Quantity} &\quad \text{Actual} \quad \text{Standard} \quad \text{Standard} \\ \text{Variance} &= (\text{Quantity} - \text{Quantity}) * \text{Price} \\ &= (\text{AQ} - \text{SQ}) * \text{SP} \\ &= (\text{AQ} * \text{SP}) - (\text{SQ} * \text{SP}) \\ &\quad (2) \qquad (3)\end{aligned}$$

Materials Variances

A materials purchase price variance is isolated at the time of purchase of the material. It is computed based on the actual quantity purchased. The purchasing department is responsible for any materials price variance that might occur. The materials quantity (usage) variance is computed based on the actual quantity used. The production department is responsible for any materials quantity variance.

Unfavorable price variances may be caused by: inaccurate standard prices, inflationary cost increases, scarcity in raw material supplies resulting in higher prices, and purchasing department inefficiencies. Unfavorable material quantity variances may be explained by poorly trained workers, by improperly adjusted machines, or by outright waste on the production line.

EXAMPLE 5

Mighty Kings Corporation uses a standard cost system. The standard variable costs for product J are as follows:

Materials: 2 pounds per unit at \$3 per pound (\$6 per unit of Product J)

Labor: 1 hour per unit at \$5 per hour (\$5 per unit of Product J)

Variable overhead: 1 hour per unit at \$3 per hour (\$3 per unit of Product J)

During March, 25,000 pounds of material were purchased for \$74,750 and 20,750 pounds of material were used in producing 10,000 units of finished product. Direct labor costs incurred were \$49,896 (10,080 direct labor hours) and variable overhead costs incurred were \$34,776.

We can compute the materials variances as follows:

$$\begin{aligned}\text{Materials purchase price variance} &= \text{AQ} (\text{AP} - \text{SP}) \\ &= (\text{AQ} * \text{AP}) - (\text{AQ} * \text{SP}) \\ &= (25,000 \text{ pounds}) (\$2.99 - \$3.00) \\ &= \$74,750 - \$75,000 \\ &= \$250 (\text{F})\end{aligned}$$

$$\begin{aligned}\text{Materials quantity (usage) variance} &= (\text{AQ} - \text{SQ}) \text{SP} \\ &= (20,750 \text{ pounds} - 20,000 \text{ pounds}) (\$3.00) \\ &= \$62,250 - \$60,000 \\ &= \$2,250 (\text{U})\end{aligned}$$

Labor Variances

Labor variances are isolated when labor is used for production. They are computed in a manner similar to the materials variances, except that in the 3-column model the terms efficiency and rate are used in place of the terms quantity and price. The production department is responsible for both the prices paid for labor services and the quantity of labor services used. Therefore, the production department must explain why any labor variances occur.

Unfavorable rate variances may be explained by an increase in wages, or the use of labor commanding higher wage rates than contemplated. Unfavorable efficiency variances may be explained by poor supervision, poor quality workers, poor quality of materials requiring more labor time, machine breakdowns, and employee unrest.

EXAMPLE 6

Using the same data given in Example 5, the labor variances can be calculated as shown below.

We can calculate the labor variances as follows:

- Labor rate variance = $AH (AR - SR)$
= $(AH * AR) - (AH * SR)$
= (10,080 hours) (\$4.95 - \$5.00)
= \$49,896 - \$50,400
= \$504 (F)
- Labor efficiency variance = $(AH - SH) SR$
= (10,080 hours - 10,000 hours) * \$5.00
= \$50,400 - \$50,000
= \$400 (U)

Variable Overhead Variances

The variable overhead variances are computed in a way very similar to the labor variances. The production department is usually responsible for any variable overhead variance.

Unfavorable variable overhead spending variances may be caused by a large number of factors: acquiring supplies for a price different from the standard, using more supplies than expected, waste, and theft of supplies. Unfavorable variable overhead efficiency variances might be caused by such factors as: poorly trained workers, poor-quality materials, faulty equipment, work interruptions, poor production scheduling, poor supervision, employee unrest, and so on.

When variable overhead is applied using direct labor hours, the efficiency variance will be caused by the same factors that cause the labor efficiency variance. However, when variable overhead is applied using machine hours, inefficiency in machinery will cause a variable overhead efficiency variance.

EXAMPLE 7

Using the same data given in Example 5, the variable overhead variances can be computed as shown below.

We can compute the variable overhead variances as follows:

$$\begin{aligned}\text{Variable overhead spending variance} &= \text{AH} (\text{AR} - \text{SR}) \\ &= (\text{AH} * \text{AR}) - (\text{AH} * \text{SR}) \\ &= (10,080 \text{ hours}) (\$3.45 - \$3.00) \\ &= \$34,776 - \$30,240 \\ &= \$4,536 \text{ (U)}\end{aligned}$$

$$\begin{aligned}\text{Variable overhead efficiency variance} &= (\text{AH} - \text{SH}) \text{SR} \\ &= (10,080 \text{ hours} - 10,000 \text{ hours}) * \$3.00 \\ &= \$30,240 - \$30,000 \\ &= \$240 \text{ (U)}\end{aligned}$$

Nonfinancial Performance Measures

Standard costs are widely used in manufacturing, service, and not-for-profit organizations. The list of companies using standards as a method for controlling costs and measuring performance continues to grow. For a firm to improve, managers should encompass nonfinancial (or operational) measures as well as financial measures, especially those that track factors required for world-class status. In an automated environment, labor is a smaller proportion of product cost, often less than 5%. Thus, traditional labor variances are of little value to management. Also, the manufacturing process is more reliable in an automated environment, and the traditional variances tend to be minimal.

The new performance measures tend to be nonfinancial and more subjective than standard costs. Table 1 presents five sets of *nonfinancial performance measures*. They include statistics for activities such as quality control, on-time delivery, inventory, machine downtime, and material waste. Measures such as *quality control and delivery performance*, are customer oriented. These are useful performance measures in all organizations, particularly service organizations in which the focus is on services, not

goods. A general model for measuring the relative success of an activity compares number of successes with total activity volume. For example, delivery performance could be measured as follows.

$$\frac{\text{Number of on-time deliveries}}{\text{Total deliveries made}} = \text{delivery success rate}$$

The percentage of external failures may be monitored for quality control.

Others may be production oriented. Reducing *material waste, inventory, and machine downtime* have been shown to improve quality and efficiency. These nonfinancial performance measures and measures of performance using standard costs are not mutually exclusive. Reducing materials waste would eliminate an unfavorable materials usage variance, for example. Measures such as inventory turnover and days of inventory can be used, however. Table 1 illustrates nonfinancial performance measures.

TABLE 1
NONFINANCIAL PERFORMANCE MEASURES

<i>Task</i>	<i>Objective</i>
Inventory:	
Inventory levels	Decrease inventory levels
Number of inventoried items	Curtail number of different items
Quality control:	
Number of customer complaints	Reduce complaints
Number of defects	Reduce defects
Delivery performance:	
Delivery success rate	Increase on-time deliveries
Materials waste:	
Scrap and waste as a percentage of total cost	Decrease scrap and waste
Machine downtime:	
Percentage of machine downtime	Reduce downtime

Budgeting and Planning Software

There are a variety of computer software designed specifically for budgeting software. Some are *stand-alone* packages, others are *templates*, and still others are spreadsheet *add-ins*.

Budget Maestro

Budget Maestro (www.centage.com) is cash flow forecasting software which provides managers with "what-if" capabilities to model and test alternative budgeting or financing scenarios. Managers can create limitless "what-if" scenarios to gauge the impact of projected changes of their operation on cash flow, balance sheet and income statements. Managers can utilize rolling forecasts, monthly or several years out, to predict the impact on their operations and cash flow based on changing variables.

BusinessObjects Budgeting

BusinessObjects Budgeting XI (www.BusinessObjects.com) leverage the power of Microsoft Excel embedded in an enterprise application to create detailed - yet flexible - plans and budgets. Improve accountability, reduce cycle time, and make top-down adjustments easily.

Chapter 8 Review Questions

1. The master budget

- A. Shows the forecasted and actual results.
- B. Reflects controllable costs only.
- C. Can be used to determine manufacturing cost variances.
- D. Contains the operating budget.

2. One of the purposes of standard costs is to

- A. Simplify costing procedures and expedite cost reports.
- B. Replace budgets and budgeting.
- C. Serve as a basis for product costing for external reporting purposes.
- D. Eliminate accounting for under- or overapplied factory overhead at the end of the period.

3. If a company follows a practice of isolating variances as soon as possible, the appropriate time to isolate and recognize a direct materials price variance is when

- A. Materials are issued.
- B. Materials are purchased.
- C. Materials are used in production.
- D. The purchase order originates.

4. The master budget process usually begins with the

- A. Production budget.
- B. Operating budget.
- C. Sales budget.
- D. Cash budget.

5. The cash receipts budget includes

- A. Funded depreciation.
- B. Cash collections from customers.
- C. Operating supplies.
- D. Extinguishment of debt.

6. The sales budget is normally included in the financial budget of a firm. True or False?

Chapter 9:

Responsibility Accounting

Learning Objectives:

After completing this section, you should be able to:

- Identify uses and attributes of a contribution margin approach.
 - Recognize and compute return on investment (ROI) by means of the Du Pont formula.
 - Identify how ROI and Residual Income (RI) measures affect the division's investment decision.
-

Responsibility accounting is the system for collecting and reporting revenue and cost information by areas of responsibility. It operates on the premise that managers should be held responsible for their performance, the performance of their subordinates, and all activities within their responsibility center. Responsibility accounting, also called profitability accounting and activity accounting, has the following advantages:

- It facilitates delegation of decision making.
- It helps management promote the concept of management by objective. In management by objective, managers agree on a set of goals. The manager's performance is then evaluated based on his or her attainment of these goals.
- It provides a guide to the evaluation of performance and helps to establish standards of performance which are then used for comparison purposes.
- It permits effective use of the concept of management by exception, which means that the manager's attention is concentrated on the important deviations from standards and budgets.

Responsibility Accounting and Responsibility Center

For an effective responsibility accounting system, the following three basic conditions are necessary:

1. The organization structure must be well defined. Management responsibility and authority must go hand in hand at all levels and must be clearly established and understood.
2. Standards of performance in revenues, costs, and investments must be properly determined and well defined.
3. The responsibility accounting reports (or performance reports) should include only items that are controllable by the manager of the responsibility center. Also, they should highlight items calling for managerial attention.

A well-designed responsibility accounting system establishes responsibility centers within the organization. A responsibility center is defined as a unit in the organization which has control over costs, revenues, and/or investment funds. Responsibility centers can be one of the following types:

Cost center. A cost center is the unit within the organization which is responsible only for costs. Examples include production and maintenance departments of a manufacturing company.

Variance analysis based on standard costs would be a typical performance measure of a cost center. Variance analysis was discussed in the previous chapter.

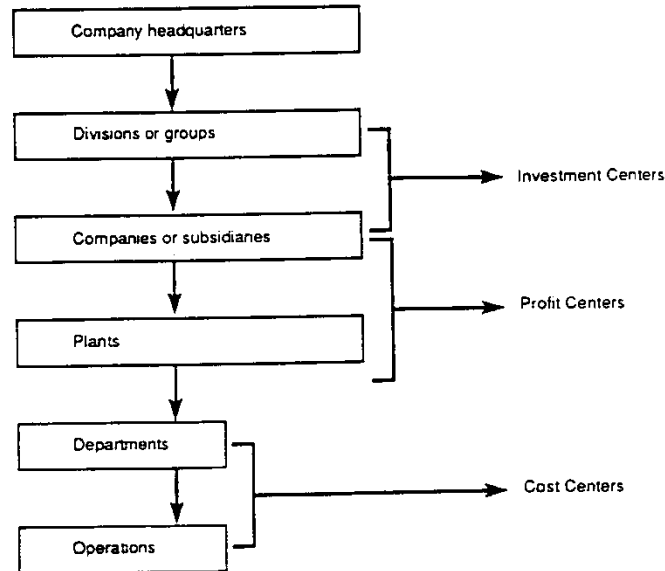
Profit center. A profit center is the unit which is held responsible for the revenues earned and costs incurred in that center. Examples might include a sales office of a publishing company, and appliance department in a retail store, and an auto repair center in a department store. The contribution approach to cost allocation is widely used to measure the performance of a profit center.

Investment center. An investment center is the unit within the organization which is held responsible for the costs, revenues, and related investments made in that center. The corporate headquarters or division in a large decentralized organization would be an example of an investment center.

Figure 1 illustrates the manners in which responsibility accounting can be used within an organization and highlights profit and cost centers. This chapter discusses in detail how the performance of both profit and investment centers are evaluated.

FIGURE 1

Responsibility Centers Within a Company



Control of Profit Centers

Segmented reporting is the process of reporting activities of profit centers such as divisions, product lines, or sales territories. The contribution approach is widely used for segmented reporting because it emphasizes the cost behavior patterns and the controllability of costs that are generally useful for profitability analysis of various segments of an organization.

Segmental Reporting for Profit Centers

The contribution approach is based on the thesis that:

1. Fixed costs are much less controllable than variable costs.
2. Direct fixed costs and common fixed costs must be clearly distinguished. Direct fixed costs are those fixed which can be identified directly with a particular segment of an organization, whereas common fixed costs are those costs that cannot be identified directly with the segment.
3. Common fixed costs should be clearly identified as unallocated in the contribution income statement by segments. Any attempt to allocate these types of costs, on some arbitrary basis, to the segments of the organization can destroy the value of responsibility accounting. It would lead to unfair evaluation of performance and misleading managerial decisions.

The following concepts are highlighted in the contribution approach:

1. Contribution margin: Sales minus variable costs
2. Segment margin: Contribution margin minus direct (traceable) fixed costs. Direct fixed costs include discretionary fixed costs such as certain advertising, R & D, sales promotion, and engineering and traceable and committed fixed costs such as depreciation, property taxes, insurance and the segment managers' salaries.
3. Net income: Segment margin less unallocated common fixed costs.

Segmental reporting can be made by:

- Division.
- Product or product line.
- Sales territory.
- Service center.
- Sales person.
- Store or branch office.
- Domestic or foreign operations.

EXAMPLE 1

Figure 2 illustrates two levels of segmental reporting:

1. By segments defined as divisions.
2. By segments defined as product lines of a division.

FIGURE 2 SEGMENTAL INCOME STATEMENT

(1) Segments Defined as Divisions:

	<i>SEGMENTS</i>		
	<i>Total Company</i>	<i>Division 1</i>	<i>Division 2</i>
Sales	<u>\$150,000</u>	<u>\$90,000</u>	<u>\$60,000</u>
Less: Variable costs:			
Manufacturing	40,000	30,000	10,000
Selling and admin.	20,000	14,000	6,000
Total variable costs	<u>60,000</u>	<u>44,000</u>	<u>16,000</u>
Contribution margin	\$90,000	\$46,000	\$44,000
Less: Direct fixed costs	<u>70,000</u>	<u>43,000</u>	<u>27,000</u>
Divisional segment margin	\$20,000	<u>\$3,000</u>	<u>\$17,000</u>
Less: Unallocated common fixed costs	<u>\$10,000</u>		
Net income	<u>\$10,000</u>		

(2) Segments Defined as Product Lines of Division 2

	<i>SEGMENTS</i>		
	<i>Division 2</i>	<i>Deluxe Model</i>	<i>Regular Model</i>
Sales	<u>\$60,000</u>	<u>\$20,000</u>	<u>\$40,000</u>
Less: Variable costs			
Manufacturing	10,000	5,000	5,000
Selling and administrative	6,000	2,000	4,000
Total variable costs	<u>16,000</u>	<u>7,000</u>	<u>9,000</u>
Contribution margin	<u>\$44,000</u>	<u>\$13,000</u>	<u>\$31,000</u>
Less: Direct fixed cost	<u>26,500</u>	<u>9,500</u>	<u>17,000</u>
Product line margin	<u>\$17,500</u>	<u>\$3,500</u>	<u>\$14,000</u>
Less: Unallocated common fixed costs	<u>\$500</u>		
Divisional segment margin	<u>\$17,000</u>		

The segment margin is the best measure of the profitability of a segment. Unallocated fixed costs are common to the segments being evaluated and should be left unallocated in order not to distort the performance results of segments.

Control of Investment Centers

The ability to measure divisional performance is essential in developing management incentives and controlling the operation toward the achievement of organizational goals. A typical decentralized subunit is an investment center which is responsible for an organization's invested capital (operating assets) and the related operating income. There are two widely used measurements of performance for the investment center: the rate of return on investment (ROI) and residual income (RI).

Rate of Return on Investment (ROI)

ROI relates net income to invested capital. Specifically,

$$\text{ROI} = \frac{\text{Operating income}}{\text{Operating assets}}$$

EXAMPLE 2

Consider the following financial data for a division:

Operating assets	\$100,000
Operating income	\$18,000

$$\text{ROI} = \$18,000 / \$100,000 = 18\%$$

The problem with this formula is that it only indicates how a division did and how well it fared in the company. Other than that, it has very little value from the standpoint of profit planning.

Note: ROI is subject to the numerous possible manipulations of the income and investment amounts. For example, a manager may choose not to invest in a project that will yield less than the desired rate of return, or (s)he may defer necessary expenses.

The Breakdown of ROI -- Du Pont Formula

In the past, managers have tended to focus only on the margin earned and have ignored the turnover of assets. It is important to realize that excessive funds tied up in assets can be just as much of a drag on profitability as excessive expenses.

The Du Pont Corporation was the first major company to recognize the importance of looking at both margin and asset turnover in assessing the performance of an investment center. The ROI breakdown, known as the *Du Pont formula*, is expressed as a product of these two factors, as shown below.

$$\begin{aligned} \text{ROI} &= \frac{\text{Operating income}}{\text{Operating assets}} = \frac{\text{Operating income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Operating assets}} \\ &= \text{Profit margin} \times \text{Asset turnover} \end{aligned}$$

The Du Pont formula combines the income statement and balance sheet into this otherwise static measure of performance. Profit margin is a measure of profitability or operating efficiency. It is the percentage of profit earned on sales. This percentage shows how many cents attach to each dollar of sales. On the other hand, asset turnover measures how well a division manages its assets. It is the number of times by which the investment in assets turns over each year to generate sales.

The breakdown of ROI is based on the thesis that the profitability of a firm is directly related to management's ability to manage assets efficiently and to control expenses effectively.

EXAMPLE 3

Assume the same data as in Example 2. Also assume sales of \$200,000.

$$\begin{array}{rcl} & \text{Operating income} & \$18,000 \\ \text{Then, ROI} = & \frac{\quad}{\quad} = & \frac{\quad}{\quad} = 18\% \\ & \text{Operating assets} & \$100,000 \end{array}$$

Alternatively,

$$\begin{array}{rcl} & \text{Operating income} & \$18,000 \\ \text{Margin} = & \frac{\quad}{\quad} = & \frac{\quad}{\quad} = 9\% \\ & \text{Sales} & \$200,000 \end{array}$$

$$\begin{array}{rcl} & \text{Sales} & \$200,000 \\ \text{Turnover} = & \frac{\quad}{\quad} = & \frac{\quad}{\quad} = 2 \text{ times} \\ & \text{Operating assets} & \$100,000 \end{array}$$

Therefore,

$$\text{ROI} = \text{Margin} \times \text{Turnover} = 9\% \times 2 \text{ times}$$

The breakdown provides a lot of insights to division managers on how to improve profitability of the investment center.

Specifically, it has several advantages over the original formula for profit planning. They are:

1. Focusing on the breakdown of ROI provides the basis for integrating many of the management concerns that influence a division's overall performance. This will help managers gain an advantage in the competitive environment.
2. The importance of turnover, as a key to overall return on investment, is emphasized in the breakdown. In fact, turnover is just as important as profit margin in enhancing overall return.
3. The importance of sales is explicitly recognized, which is not there in the original formula.
4. The breakdown stresses the possibility of trading one off for the other in an attempt to improve the overall performance of a company. The margin and turnover complement each other. In other words, a low turnover can be made up for by a high margin; and vice versa.

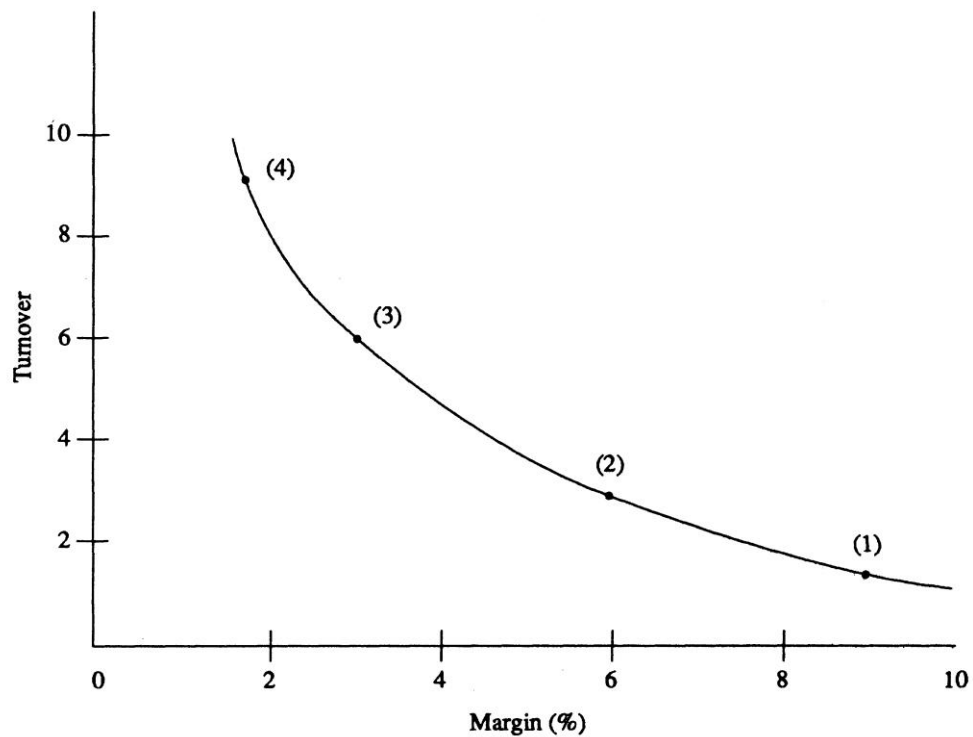
EXAMPLE 4

The breakdown of ROI into its two components shows that a number of combinations of margin and turnover can yield the same rate of return, as shown below:

The turnover-margin relationship and its resulting ROI are depicted in Figure 3.

<i>Margin</i>	<i>x</i>	<i>Turnover</i>	<i>= ROI</i>
(1) 9%	x	2 times	= 18%
(2) 6	x	3	= 18
(3) 3	x	6	= 18
(4) 2	x	9	= 18

FIGURE 3
THE MARGIN-TURNOVER RELATIONSHIP



ROI and Profit Planning

The breakdown of ROI into margin and turnover gives divisional managers insight into planning for profit improvement by revealing where weaknesses exist: margin or turnover, or both. Various actions can be taken to enhance ROI. Generally, they can:

1. Improve margin

2. Improve turnover
3. Improve both

Alternative 1 demonstrates a popular way of improving performance. Margins may be increased by reducing expenses, raising selling prices, or increasing sales faster than expenses. Some of the ways to reduce expenses are:

- Use less costly inputs of materials.
- Automate processes as much as possible to increase labor productivity.
- Bring the discretionary fixed costs under scrutiny, with various programs either curtailed or eliminated. Discretionary fixed costs arise from annual budgeting decisions by management. Examples include advertising, research and development, and management development programs. The cost-benefit analysis is called for in order to justify the budgeted amount of each discretionary program.

A division with pricing power can raise selling prices and retain profitability without losing business. Pricing power is the ability to raise prices even in poor economic times when unit sales volume may be flat and capacity may not be fully utilized. It is also the ability to pass on cost increases to consumers without attracting domestic and import competition, political opposition, regulation, new entrants, or threats of product substitution. The division with pricing power must have a unique economic position. Divisions that offer unique, high-quality goods and services (where the service is more important than the cost) have this economic position.

Alternative 2 may be achieved by increasing sales while holding the investment in assets relatively constant, or by reducing assets. Some of the strategies to reduce assets are:

- Dispose of obsolete and redundant inventory. The computer has been extremely helpful in this regard, making perpetual inventory methods more feasible for inventory control.
- Devise various methods of speeding up the collection of receivables and also evaluate credit terms and policies.
- See if there are unused fixed assets.
- Use the converted assets obtained from the use of the previous methods to repay outstanding debts or repurchase outstanding issues of stock. The division may release them elsewhere to get more profit, which will improve margin as well as turnover.

Alternative 3 may be achieved by increasing sales or by any combinations of alternatives 1 and 2.

EXAMPLE 5

Assume that management sets a 20 percent ROI as a profit target. It is currently making an 18 percent return on its investment.

$$\text{ROI} = \frac{\text{Operating income}}{\text{Operating assets}} = \frac{\text{Operating income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Operating assets}}$$

Present situation:

$$18\% = \frac{18,000}{200,000} \times \frac{200,000}{100,000}$$

The following are illustrative of the strategies which might be used (each strategy is independent of the other).

Alternative 1: Increase the margin while holding turnover constant. Pursuing this strategy would involve leaving selling prices as they are and making every effort to increase efficiency so as to reduce expenses. By doing so, expenses might be reduced by \$2,000 without affecting sales and investment to yield a 20% target ROI, as follows:

$$20\% = \frac{20,000}{200,000} \times \frac{200,000}{100,000}$$

Alternative 2: Increase turnover by reducing investment in assets while holding net profit and sales constant. Working capital might be reduced or some land might be sold, reducing investment in assets by \$10,000 without affecting sales and net income to yield the 20% target ROI as follows:

$$20\% = \frac{18,000}{200,000} \times \frac{200,000}{90,000}$$

Alternative 3: Increase both margin and turnover by disposing of obsolete and redundant inventories or through an active advertising campaign. For example, trimming down \$5,000 worth of investment in inventories would also reduce the inventory holding charge by \$1,000. This strategy would increase ROI to 20%.

$$20\% = \frac{19,000}{200,000} \times \frac{200,000}{95,000}$$

Excessive investment in assets is just as much of a drag on profitability as excessive expenses. In this case, cutting unnecessary inventories also helps cut down expenses of carrying those inventories, so that both margin and turnover are improved at the same time. In practice, alternative 3 is much more common than alternative 1 or 2.

Residual Income (RI)

Another approach to measuring performance in an investment center is residual income (RI). RI is the operating income, which an investment center is able to earn above some minimum rate of return on its operating assets. RI, unlike ROI, is an absolute amount of income rather than a specific rate of return. When RI is used to evaluate divisional performance, the objective is to maximize the total amount of residual income, not to maximize the overall ROI figure.

$$RI = \text{Operating income} - (\text{Minimum required rate of return} \times \text{Operating assets})$$

EXAMPLE 6

In Example 2, assume the minimum required rate of return is 13 percent. Then the residual income of the division is

$$\$18,000 - (13\% \times \$100,000) = \$18,000 - \$13,000 = \$5,000$$

RI is regarded as a better measure of performance than ROI because it encourages investment in projects that would be rejected under ROI, as explained in the next section. A major disadvantage of RI, however, is that it cannot be used to compare divisions of different sizes. RI tends to favor the larger divisions due to the larger amount of dollars involved.

Residual Income and Economic Value Added

Residual income is better known as *economic value added* (EVA). Many firms are addressing the issue of aligning division managers' incentives with those of the firm by using EVA as a measure of performance. EVA encourages managers to focus on increasing the value of the company to shareholders, because EVA is the value created by a company in excess of the cost of capital for the investment base. Improving EVA can be achieved in three ways:

- (a) Invest capital in high-performing projects.
- (b) Use less capital.
- (c) Increase profit without using more capital.

Investment Decisions under ROI and RI

The decision whether to use ROI or RI as a measure of divisional performance affects financial managers' investment decisions. Under the ROI method, division managers tend to accept only the investments whose returns exceed the division's ROI; otherwise, the division's overall ROI would decrease. Under the RI method, on the other hand, division managers would accept an investment as long as it earns a rate in excess of the minimum required rate of return. The addition of such an investment will increase the division's overall RI.

EXAMPLE 7

Consider the same data given in Examples 2 and 6:

Operating assets	\$100,000
Operating income	\$18,000
Minimum required rate of return	13%

ROI = 18% and RI = \$5,000

Assume that the division is presented with a project that would yield 15 percent on a \$10,000 investment. The division manager would not accept this project under the ROI approach since the division is already earning 18 percent. Acquiring this project will bring down the present ROI to 17.73 percent, as shown below:

	<i>Present</i>	<i>New Project</i>	<i>Overall</i>
Operating assets (a)	\$100,000	\$10,000	\$110,000
Operating income (b)	18,000	1,500*	19,500
ROI (b / a)	18%	15%	17.73%

*\$10,000 x 15% = \$1,500

Under the RI approach, the manager would accept the new project since it provides a higher rate than the minimum required rate of return (15 percent vs. 13 percent). Accepting the new project will increase the overall residual income to \$5,200, as shown below:

	<i>Present</i>	<i>New Project</i>	<i>Overall</i>
Operating assets (a)	\$100,000	\$10,000	\$110,000
Operating income (b)	18,000	1,500	19,500

Minimum required income at 13%(c)	<u>13,000</u>	<u>1,300*</u>	<u>14,300</u>
RI (b-c)	<u>\$5,000</u>	<u>\$200</u>	<u>\$5,200</u>

*\$10,000 x 13% = \$1,300

Chapter 9 Review Questions

1. Responsibility accounting defines an operating center that is responsible for revenue and costs as a(n)

- A. Profit center.
- B. Revenue center.
- C. Division.
- D. Operating unit.

2. Decentralized firms can delegate authority and yet retain control and monitor managers' performance by structuring the organization into responsibility centers. Which one of the following organizational segments is most like an independent business?

- A. Revenue center.
- B. Profit center.
- C. Cost center.
- D. Investment center.

3. Which one of the following statements pertaining to the return on investment (ROI) as a performance measurement is incorrect?

- A. When the average age of assets differs substantially across segments of a business, the use of ROI may not be appropriate.
- B. ROI relies on financial measures that are capable of being independently verified, while other forms of performance measures are subject to manipulation.
- C. The use of ROI may lead managers to reject capital investment projects that can be justified by using discounted cash flow models.
- D. The use of ROI can make it undesirable for a skillful manager to take on trouble-shooting assignments such as those involving turning around unprofitable divisions.

4. Return on investment (ROI) would be the best for evaluating the management performance of a department that is operated at a cost center. True or False?

5. Residual income (RI) is a performance evaluation that is used in conjunction with, or instead of, return on investment (ROI). In many cases, RI is preferred to ROI because

- A. Residual income is a measure over time, while ROI represents the results for one period.
- B. Residual income concentrates on maximizing absolute dollars of income rather than a percentage return as with ROI.
- C. The imputed interest rate used in calculating residual income is more easily derived than the target rate that is compared to the calculated ROI.
- D. Average investment is employed with residual income while year-end investment is employed with ROI.

Chapter 10:

Relevant Costs and Short-Term Decisions

Learning Objectives:

After completing this section, you should be able to:

- Identify the costs that are relevant for different financial decisions.
 - Recognize factors used in making a short-term profit maximization decision.
-

When performing the manufacturing and selling functions, management is constantly faced with the problem of choosing between alternative courses of action. Typical questions to be answered include: What to make? How to make it? Where to sell the product? and What price should be charged? In the short run, management is faced with many short-term, nonroutine decisions. In a short-term situation, fixed costs are generally irrelevant to the decision at hand. Managerial accountants must recognize as a major decision tool, the two important concepts: relevant costs and contribution margin.

Relevant Costs Defined

In each of the above situations, the ultimate management decision rests on cost data analysis. Cost data are important in many decisions, since they are the basis for profit calculations. Cost data are classified by function, behavior patterns, and other criteria, as discussed previously.

However, not all costs are of equal importance in decision making, and managers must identify the costs that are relevant to a decision. Such costs are called *relevant costs*. The relevant costs are the expected future costs (and also revenues) which differ between the decision alternatives. Therefore, the sunk costs (past and historical costs) are not considered relevant in the decision at hand. What is relevant are the incremental or differential costs.

Pricing a Special Order

A company often receives a short-term, special order for its products at lower prices than usual. In normal times, the company may refuse such an order since it will not yield a satisfactory profit. If the company has *idle* (excess) capacity or times are bad, however, such an order should be accepted if the incremental revenue obtained from it exceeds the incremental costs. The company is better off to receive some revenue, above its incremental costs, than to receive nothing at all. *Note:* Granting a lower-than-normal price for a special order has potential ramifications for regular sales because other customers may demand the same price. Further, the firm must make sure that the products or services involved are sufficiently different from its regular counterparts to avoid violating federal price discrimination laws.

Such a price, one lower than the regular price, is called a *contribution price*. This approach to pricing is often called the contribution approach to pricing or the variable pricing model.

This approach is most appropriate under the following conditions:

- When there is idle capacity,
- When operating in a distress situation, and
- When faced with sharp competition or in a competitive bidding situation.

EXAMPLE 1

Assume that a company with 100,000-unit capacity is currently producing and selling only 90,000 units of product each year at a regular price of \$2, indicating that the company has idle capacity. If the variable cost per unit is \$1 and the annual fixed cost is \$45,000, the income statement looks as follows:

Sales (90,000 units)	\$180,000	\$2.00
Less: Variable Cost (90,000 units)	<u>90,000</u>	<u>1.00</u>
Contribution Margin	\$90,000	\$1.00
Less: Fixed Cost	<u>45,000</u>	<u>0.50</u>
Net Income	<u>\$45,000</u>	<u>\$0.50</u>

The company has just received an order that calls for 10,000 units @ \$1.20, for a total of \$12,000. The acceptance of this order will not affect regular sales. The company's president is reluctant to accept the order, however, because the \$1.20 price is below the \$1.50 factory unit cost (\$1.50 = \$1.00 + \$0.50). Should the company accept the order?

The answer is yes. The company can add to total profits by accepting this special order even though the price offered is below the unit factory cost. At a price of \$1.20, the order will contribute \$0.20 per unit (CM per unit = \$1.20 - \$1.00 = \$0.20) toward fixed cost, and profit will increase by \$2,000 (10,000 units x \$0.20).

Using the contribution approach to pricing, the variable cost of \$1 will be a better guide than the full unit cost of \$1.50. Note that the fixed costs do not change because of the presence of idle capacity.

The same result can be seen as follows:

	<i>Per Unit</i>	<i>Without Special Order (90,000 units)</i>	<i>With Special Order (100,000 units)</i>	<i>Difference</i>
Sales	\$2.00	\$180,000	\$192,000	\$12,000
Less: Variable Costs	<u>1.00</u>	<u>90,000</u>	<u>100,000</u>	<u>10,000</u>
CM	1.00	\$ 90,000	\$ 92,000	\$ 2,000
Less: Fixed Cost	0.50	45,000	45,000	0
Net Income	<u>\$0.50</u>	<u>\$ 45,000</u>	<u>\$ 47,000</u>	<u>\$ 2,000</u>

Outsourcing: The Make or Buy Decision

Often companies purchase subcomponents used to make their products instead of making them in their in-house manufacturing facilities. Buying services, products, or components of products from outside vendors instead of producing them is called **outsourcing**. The decision whether to produce a subcomponent in-house or to buy it externally from an outside vendor is called a "make-or-buy (outsource)" decision. Examples include:

1. Payroll processing in-house or outsource it to an outside service bureau
2. Developing a training program in-house or sending employees outside for training
3. Providing data processing and network services internally or buying them (Benefits: access to technology and cost savings)

Other strong candidates for outsourcing include: managing fleets of vehicles, sales and marketing, and custodial services.

This decision involves both quantitative and qualitative factors. The qualitative factors include ensuring product quality and the necessity for long-run business relationships with the supplier. The quantitative factors deal with cost. Outsourcing leads to substantial cost savings, allows them to focus on their core competencies, and ultimately increases shareholder value. The quantitative effects of the make-or-buy decision are best seen through the relevant cost approach.

EXAMPLE 2

Assume that a firm has prepared the following cost estimates for the manufacture of a subassembly component based on an annual production of 8,000 units:

	<u>Per Unit</u>	<u>Total</u>
Direct Materials	\$5	\$40,000
Direct Labor	4	32,000
Variable Factory Overhead Applied	4	32,000
Fixed Factory Overhead Applied (150% of direct labor cost)	<u>6</u>	<u>48,000</u>
Total Cost	<u>\$19</u>	<u>152,000</u>

The supplier has offered to provide the subassembly at a price of \$16 each. Two-thirds of fixed factory overhead, which represents executive salaries, rent, depreciation, and taxes, continue regardless of the decision. Should the company buy or make the product?

The key to the decision lies in the investigation of those relevant costs that change between the make-or-buy alternatives. Assuming that the productive capacity will be idle if not used to produce the subassembly, the analysis takes the following form:

	<i>Per Unit</i>		<i>Total of 8,000 Unit</i>	
	<i>Make</i>	<i>Buy</i>	<i>Make</i>	<i>Buy</i>
Purchase Price		\$16		\$128,000
Direct Materials	\$5		\$40,000	
Direct Labor	4		32,000	
Variable overhead	4		32,000	
Fixed Overhead that can be avoided by Not Making	<u>2</u>		<u>16,000</u>	
Total Relevant Costs	<u>\$15</u>	<u>\$16</u>	<u>\$120,000</u>	<u>\$128,000</u>
Difference in Favor of Making		<u>\$1</u>		<u>\$8,000</u>

The make-or-buy decision must be investigated, along with the broader perspective of considering how best to utilize available facilities. The alternatives are:

1. Leaving facilities idle.
2. Buying the parts and renting out idle facilities.
3. Buying the parts and using idle facilities for other products.

The Sell-Or-Process-Further Decision

When two or more products are produced simultaneously from the same input by a joint process, these products are called joint products. The term joint costs is used to describe all the manufacturing costs incurred prior to the point where the joint products are identified as individual products, referred to as the split-off point. At the split-off point some of the joint products are in final form and saleable to the consumer, whereas others require additional processing.

In many cases, however, the company might have an option: it can sell the goods at the split-off point or process them further in the hope of obtaining additional revenue. In connection with this type of decision, called the "sell-or-process-further" decision, joint costs are considered irrelevant, since the joint costs have already been incurred at the time of the decision, and therefore represent sunk costs. The decision will rely exclusively on additional revenue compared to the additional costs incurred due to further processing.

EXAMPLE 3

The Bailey Company produces three products, A, B, and C from a joint process. Joint production costs for the year were \$120,000. Product A may be sold at the split-off point or processed further. The additional processing requires no special facilities and all additional processing costs are variable. Sales values and cost needed to evaluate the company's production policy regarding product A follow:

<u>Units Produced</u>	<u>Sales Value at Split-Off</u>	<u>Additional Cost & Sales Value after Further Processing</u>	
		<u>Sales</u>	<u>Costs</u>
3,000	\$60,000	\$90,000	\$25,000

Should product A be sold at the split-off point or processed further?

Incremental sales revenue	\$30,000
Incremental costs (variable), additional processing	<u>25,000</u>
Incremental gain (CM)	<u>\$5,000</u>

In summary, product A should be processed as shown above. Keep in mind that the joint production cost of \$120,000 is not included in the analysis, since it is a sunk cost and, therefore, irrelevant to the decision.

Keeping or Dropping a Product Line

Another type of nonrecurring decisions managers must face is whether to keep or drop unprofitable segments, such as product lines, services, sales territories, divisions, or departments. The goal of this decision analysis, known as *segment profitability analysis*, is to identify the segments that have a negative segment margin. A *segment margin* is a segment's sales revenue minus its direct costs (variables costs and direct fixed costs identified with the segment).

The decision whether to drop an old product line or add a new one must take into account both qualitative and quantitative factors. However, any final decision should be based primarily on the impact the decision will have on the company's overall contribution margin or net income.

EXAMPLE 4

Alpha-Omega Grocery Store has three major product lines: produce, meats, and canned food. The store is considering the decision to drop the meat line because the income statement shows it is being sold at a loss. Note the income statement for these product lines below:

	<i>Canned Produce</i>	<i>Meats</i>	<i>Food</i>	<i>Total</i>
Sales	\$10,000	\$15,000	\$25,000	\$50,000
Less: Variable Costs	<u>6,000</u>	<u>8,000</u>	<u>12,000</u>	<u>26,000</u>
CM	<u>\$4,000</u>	<u>7,000</u>	<u>13,000</u>	<u>\$24,000</u>
Less: Fixed costs				
Direct	\$2,000	\$6,500	\$4,000	\$12,500
Allocated	<u>1,000</u>	<u>1,500</u>	<u>2,500</u>	<u>5,000</u>
Total	<u>\$3,000</u>	<u>\$8,000</u>	<u>\$6,500</u>	<u>\$17,500</u>
Net Income	<u>\$1,000</u>	<u>\$(1,000)</u>	<u>\$6,500</u>	<u>\$6,500</u>

In this example, direct fixed costs are those costs that are identified directly with each of the product lines, whereas allocated fixed costs are the amount of common fixed costs allocated to the product lines using some base such as space occupied. The amount of common fixed costs typically continues regardless of the decision and thus cannot be saved by dropping the product line to which it is distributed.

The comparative approach showing the effects on the company as a whole with and without the meat line is shown below:

	<i>Keep Meats</i>	<i>Drop Meats</i>	<i>Difference</i>
Sales	\$50,000	\$35,000	\$(15,000)
Less: Variable cost	<u>26,000</u>	<u>18,000</u>	<u>(8,000)</u>
CM	<u>\$24,000</u>	<u>\$17,000</u>	<u>\$(7,000)</u>
Less: Fixed cost			
Direct	\$12,500	\$6,000	\$(6,500)
Allocated	<u>5,000</u>	<u>5,000</u>	<u>0</u>
Total	<u>\$17,500</u>	<u>\$11,000</u>	<u>\$(6,500)</u>
Net Income	<u>\$6,500</u>	<u>\$6,000</u>	<u>\$(500)</u>

Alternatively, the incremental approach would show the following:

	<u>If Meats Dropped</u>
CM lost	\$7,000
Gains: Direct fixed costs avoided	<u>6,500</u>
Increase (decrease) in net income	<u><u>\$ (500)</u></u>

From either of the two methods, we see that by dropping meats the store will lose an additional \$500. Therefore, the meat product line should be kept. One of the great dangers in allocating common fixed costs is that such allocations can make a product line look less profitable than it really is. Because of such an allocation, the meat line showed a loss of \$1,000, but it in effect contributes \$500 (\$7,000 - \$6,500) to the recovery of the store's common fixed costs.

Product Mix Decisions in the Presence of Limited Resources

In general, the emphasis on products with higher contribution margin maximizes a firm's total net income, even though total sales may decrease. This is not true, however, where there are constraining factors and scarce resources. The constraining factor may be machine hours, labor hours, or cubic feet of warehouse space.

In the presence of these constraining factors, maximizing total profits depends on getting the highest contribution margin per unit of the factor (rather than the highest contribution margin per unit of product output).

EXAMPLE 5

Assume that a company produces two products, A and B, with the following contribution margins per unit.

	<u>A</u>	<u>B</u>
Sales	\$8	\$24
Variable costs	<u>6</u>	<u>20</u>
CM	<u><u>\$2</u></u>	<u><u>\$4</u></u>
Annual fixed costs	\$42,000	

As is indicated by CM per unit, B is more profitable than A since it contributes more to the company's total profits than A (\$4 vs. \$2). But let us assume that the firm has a limited capacity of 10,000 labor hours. Further, assume that A requires two labor hours to produce and B requires five labor hours. One way to express this limited capacity is to determine the contribution margin per labor hour.

	<u>A</u>	<u>B</u>
CM/unit	\$2.00	\$4.00
Labor hours required per unit	<u>2</u>	<u>5</u>
CM per labor hour	<u>\$1.00</u>	<u>\$0.80</u>

Since A returns the higher CM per labor hour, it should be produced and B should be dropped. Another way to look at the problem is to calculate total CM for each product.

	<u>A</u>	<u>B</u>
Maximum possible production	5,000 units*	2,000 units**
CM per unit	<u>\$2</u>	<u>\$4</u>
Total CM	<u>\$10,000</u>	<u>\$8,000</u>

* (10,000 hours / 2 hours)

** (10,000 hours / 5 hours)

Again, product A should be produced since it contributes more than B (\$10,000 vs. \$8,000).

Note: The presence of only one limited resource is unrealistic. Virtually all firms encounter multiple constraints: restrictions on materials, labor inputs, demand for each product, warehouse space, display space, and so on. The solution of the product mix problem with multiple constraints is considerably more complex and requires a technique known as *linear programming*.

Theory of Constraints

A binding constraint can limit a company's profitability. For example, a manufacturing company may have a *bottleneck operation*, through which every unit of a product must pass before moving on to other operations. The *theory of constraints (TOC)* calls for identifying such limiting constraints and seeking ways to relax them. Also referred to as *managing constraints*, this management approach can significantly improve an organization's level of goal attainment. Among the ways that management can relax a constraint by expanding the capacity of a bottleneck operation are the following:

- *Outsourcing* (subcontracting) all or part of the bottle neck operation.
- Investing in additional production equipment and employing *parallel processing*, in which multiple product units undergo the same production operation simultaneously.
- Working *overtime* at the bottleneck operation.
- *Retraining* employees and shifting them to the bottleneck.
- Eliminating any *non-value-added activities* at the bottleneck operation.

You Should Remember

Identification of the relevant costs and benefits is an important step in making any economic decision. Nonetheless, one often overlooks relevant costs or incorrectly includes irrelevant data. Keep in mind four common mistakes to avoid in decision making.

1. **Sunk costs.** The book value of an asset, defined as its acquisition cost less the accumulated depreciation, is a sunk cost. Sunk costs cannot be changed by any current or future course of action, so they are *irrelevant* in decision making. Nevertheless, a common behavioral tendency is to give undue importance to book values in decisions that involve replacing an asset or disposing of obsolete inventory. Managers often seek to justify their past decisions by refusing to dispose of an asset, if a better alternative has been identified. *Ignore sunk costs.*
2. **Unitized fixed costs.** For product-costing purposes, fixed costs are *unitized* (divided by some activity measure) and assigned to individual units of product. The result is to make fixed cost appear *variable*. While there are legitimate reasons for this practice, from a *product-costing* perspective, it can create confusion in *decision making*. Therefore, in a decision analysis it is usually wise to include a fixed cost in its total amount, rather than as a per-unit cost. *Beware of unitized fixed costs in decision making.*
3. **Allocated fixed costs.** It is also common to allocate fixed costs across divisions, departments, or product lines. A possible result is that a product or department may appear unprofitable when in reality it does make a contribution toward covering fixed costs and profit. Before deciding to eliminate a department, be sure to ask which costs will be *avoided* if a particular alternative is selected. *Beware of allocated fixed costs; identify the avoidable costs.*
4. **Opportunity costs.** Managers tend to overlook opportunity costs, or to treat such costs as less important than out-of-pocket costs. Yet opportunity costs are just as real and important to making a correct decision, as are out-of-pocket costs. *Pay special attention to identifying and including opportunity costs in a decision analysis.*

Chapter 10 Review Questions

1. Relevant costs are

- A. All fixed and variable costs.
- B. Costs that would be incurred within the relevant range of production.
- C. Past costs that are expected to be different in the future.
- D. Anticipated future costs that will differ among various alternatives.

2. Which one of the following costs would be relevant in short-term decision making?

- A. Expected future costs that differ among alternatives.
- B. All costs of inventory.
- C. Total variable costs that are the same in the considered alternatives.
- D. Costs of fixed assets to be used in the alternatives.

3. _____ are the costs that cannot be changed by any present or future decision, so they are *irrelevant* to a future decision.

- A. Net realizable value.
- B. Relevant costs.
- C. Sunk costs.
- D. Incremental cost.

4. A decision-making concept, described as "the contribution to income that is forgone by not using a limited resource for its best alternative use," is called

- A. Marginal cost.
- B. Incremental cost.
- C. Potential cost.
- D. Opportunity cost.

5. Which of the following qualitative factors favors the buy choice in an insourcing vs. outsourcing (make or buy) decision?

- A. Maintaining a long-run relationship with suppliers is desirable.

- B. Quality control is critical.
- C. Not idle capacity.
- D. Cost savings is not pressing.

6. When only differential manufacturing costs are taken into account for special-order pricing, an essential assumption is that

- A. Manufacturing fixed and variable costs are linear.
- B. Selling and administrative fixed and variable costs are linear.
- C. Acceptance of the order will not affect regular sales.
- D. Acceptance of the order will not cause unit selling and administrative variable costs to increase.

Chapter 11:

Capital Budgeting Decisions

Learning Objectives:

After completing this section, you should be able to:

- Identify different attributes and ratios used in capital budgeting decisions.
 - Calculate payback period for capital expenditures.
-

Capital budgeting is the process of making long-term planning decisions for alternative investment opportunities. There are many investment decisions that the company may have to make in order to grow. Examples of capital budgeting applications are product line selection, keep or sell a business segment, lease or buy, and which asset to invest in.

There are typically two types of long-term investment decisions:

1. Selection decisions in terms of obtaining new facilities or expanding existing ones: Examples include:

- Investments in property, plant, and equipment as well as other types of assets.
- Resource commitments in the form of new product development, market research, introduction of information technology (IT), refunding of long-term debt, and so on.
- Mergers and acquisitions in the form of buying another company to add a new product line.

2. Replacement decisions in terms of replacing existing facilities with new ones. Examples include replacing an old machine with a high-tech machine.

What Are the Features of Investment Projects?

Long-term investments have three important features:

1. They typically involve a large amount of initial cash outlays which tend to have a long-term impact on the firm's future profitability. Therefore, this initial cash outlay needs to be justified on a cost-benefit basis.
2. There are expected recurring cash inflows (for example, increased revenues, savings in cash operating expenses, etc.) over the life of the investment project. This frequently requires considering the *time value of money*.
3. Income taxes could make a difference in the accept or reject decision. Therefore, income tax factors must be taken into account in every capital budgeting decision.

Understanding the Concept of Time Value of Money

The *time value of money*, a measure of *financial opportunity costs*, is the cost of money that is borrowed or lent. It is based on the fact that a dollar received today is worth more than a dollar to be received one year from today. This statement sums up an important principle: money has a time value. The truth of this principle is not that inflation might make the dollar received at a later time worth less in buying power. The reason is that you could invest the dollar now and have more than a dollar at the specified later date.

Time value of money is a critical consideration in financial and investment decisions. It has two major components: future value and present value. *Future value*, which may be referred to as *compounding* is future sums of money resulting from an investment. *Present value*, which is calculated through a process called *discounting*, is inversely related to compounding and used to evaluate the future cash flow associated with capital budgeting projects. There are numerous applications of the time value of money in accounting and finance.

What Is Present Value - How Much Money Is Worth Now?

Present value is the present worth of future sums of money. The process of calculating present values, or discounting, is actually the opposite of finding the compounded future value. In connection with present value

calculations, the interest rate “i” is called the *discount rate*. The discount rate we use is more commonly called the *cost of capital*, which is the minimum rate of return required by the investor.

The present value of \$1 is given in Table 1.

EXAMPLE 1

You have been given an opportunity to receive \$20,000 6 years from now. If you can earn 10 percent on your investments, what is the most you should pay for this opportunity? To answer this question, you must compute the present value of \$20,000 to be received 6 years from now at a 10 percent rate of discount.

$$\$20,000(0.564) = \$11,280$$

This means that you can earn 10 percent on your investment, and you would be indifferent to receiving \$11,280 now or \$20,000 6 years from today since the amounts are time equivalent. In other words, you could invest \$11,300 today at 10 percent and have \$20,000 in 6 years.

Present Value of Mixed Streams of Cash Flows

The present value of a series of mixed payments (or receipts) is the sum of the present value of each individual payment. We know that the present value of each individual payment is the payment times the appropriate T1 value.

EXAMPLE 2

You are thinking of starting a new product line that initially costs \$32,000. Your annual projected cash inflows are:

- 1 \$10,000
- 2 \$20,000
- 3 \$5,000

If you must earn a minimum of 10 percent on your investment, should you undertake this new product line?

The present value of this series of mixed streams of cash inflows is calculated as follows:

<i>Year</i>	<i>Cash inflows</i>	<i>x T1(10%, n)</i>	<i>Present Value</i>
1	\$10,000	0.909	\$9,090
2	\$20,000	0.826	\$16,520
3	\$5,000	0.751	<u>\$3,755</u>
			<u>\$29,365</u>

Since the present value of your projected cash inflows is less than the initial investment, you should not undertake this project.

Present Value of an Annuity

Interest received from bonds, pension funds, and insurance obligations all involve annuities. To compare these financial instruments, we need to know the present value of each. The present value of an annuity can be found by using Table 2.

EXAMPLE 3

Assume that the cash inflows in Example 6 form an annuity of \$10,000 for 3 years. Then the present value is

$$\$10,000 T_2(10\%, 3 \text{ years}) = \$10,000 (2.487) = \$24,870$$

How Do You Measure Investment Worth?

Several methods of evaluating investment projects are as follows:

1. Payback period
2. Accounting rate of return (ARR)
3. Internal rate of return (IRR)
4. Net present value (NPV)

The NPV method and the IRR method are called *discounted cash flow (DCF) methods*. Each of these methods is discussed below.

Payback Period

The payback period measures the length of time required to recover the amount of initial investment. It is computed by dividing the initial investment by the cash inflows through increased revenues or cost savings.

$$\text{Payback period} = \frac{\text{Initial investment}}{\text{Annual Cash Inflows}}$$

EXAMPLE 4

Assume:

Cost of investment = \$18,000

Annual cash savings = \$3,000

Then, the payback period is:

$$\text{Payback period} = \frac{\text{Initial investment}}{\text{Cost savings}} = \frac{\$18,000}{\$3,000} = 6 \text{ years}$$

Decision rule: Choose the project with the shorter payback period. The rationale behind this choice is: The shorter the payback period, the less risky the project, and the greater the liquidity.

The advantages of using the payback period method of evaluating an investment project are that (1) it is simple to compute and easy to understand, and (2) it handles investment risk effectively.

The shortcomings of this method are that (1) it does not recognize the time value of money, and (2) it ignores the impact of cash inflows received after the payback period; essentially, cash flows after the payback period determine profitability of an investment.

Accounting Rate of Return

Accounting rate of return (ARR), also called *simple* or *unadjusted rate of return*, measures profitability from the conventional accounting standpoint by relating the required initial investment (I) -- or sometimes the average investment--to the future average annual income.

$$\text{ARR} = \frac{\text{Project's Average Annual Income}}{\text{Initial (or Average) Investment}}$$

Decision rule: Under the ARR method, choose the project with the higher rate of return.

EXAMPLE 5

Consider the following investment:

Initial investment (I)	\$6,500
Estimated life	20 years
Cash inflows per year	\$1,000
Depreciation per year (using straight line)	\$325
Salvage value	0

The accounting rate of return for this project is:

$$\text{ARR} = \frac{\text{Average income}}{\text{Investment}} = \frac{\$1,000 - \$325}{\$6,500} = 10.4\%$$

If average investment is used, then:

$$\text{ARR} = \frac{\$1,000 - \$325}{\$6,500/2} = \frac{\$675}{\$3,250} = 20.8\%$$

The advantages of this method are that it is easily understood, simple to compute, and recognizes the profitability factor.

The shortcomings of this method are that it fails to recognize the time value of money, and it uses accounting data instead of cash flow data.

Internal Rate of Return

Internal rate of return (IRR), also called *time adjusted rate of return*, is defined as the rate of interest that equates I with the PV of future cash inflows.

In other words,

$$\text{at IRR, } I = PV$$

$$(\text{or } NPV = 0)$$

Decision rule: Accept the project if the IRR exceeds the cost of capital. Otherwise, reject it.

EXAMPLE 6

Consider the following investment:

Initial investment	\$12,950
Estimated life	10 years
Annual cash inflows	\$3,000
Cost of capital (minimum required rate of return)	12%

We set the following equality ($I = PV$):

$$\$12,950 = \$3,000 \times T2(i, 10 \text{ years})$$

$$T2(i, 10 \text{ years}) = \frac{\$12,950}{\$3,000} = 4.317$$

which stands somewhere between 18 percent and 20 percent in the 10-year line of Table 2.

Since the IRR of the investment is greater than the cost of capital (12 percent), accept the project.

The advantage of using the IRR method is that it does consider the time value of money and, therefore, is more exact and realistic than the ARR method.

The shortcomings of this method are that (1) it is time-consuming to compute, especially when the cash inflows are not even, although most financial calculators and PCs have a key to calculate IRR, and (2) it fails to recognize the varying sizes of investment in competing projects.

Net Present Value

Net present value (NPV) is the difference between the present value (PV) of the cash inflows and the initial investment (I) associated with a project:

$$NPV = PV - I$$

The present value of future cash flows is computed using the so-called *cost of capital* (or *minimum required rate of return*) as the discount rate. When cash inflows are uniform, the present value would be

$$PV = A \times T2(I, n)$$

where A is the amount of the annuity. The value of T2 is found in Table 2.

Decision rule: If NPV is positive, accept the project. Otherwise reject it.

EXAMPLE 7

Assume the same data given in Example 6, and the net present value of the cash inflows is:

PV = A x T2 (i,n)	
= \$3,000 x T2 (12%,10 years)	
= \$3,000 (5.650)	\$16,950
Initial investment (I)	<u>12,950</u>
Net present value (NPV = PV - I)	<u>\$4,000</u>

Since the NPV of the investment is positive, the investment should be accepted.

The advantages of the NPV method are that it obviously recognizes the time value of money and it is easy to compute whether the cash flows form an annuity or vary from period to period.

NPV versus IRR: Mutually Exclusive Projects

Because NPV consistently selects the wealth-maximizing alternative and IRR does not, NPV is generally preferred to IRR for choosing among competing projects.

There are two major differences between these two approaches:

1. NPV assumes cash inflows are reinvested at the required rate of return, whereas the IRR method assumes that the inflows are reinvested at the internal rate of return.
2. NPV measures the profitability of a project in absolute dollars, whereas the IRR method measures it as a percentage.

Chapter 11 Review Questions

1. The internal rate of return (IRR) is the

- A. Hurdle rate.
- B. Rate of interest for which the net present value is greater than 1.0.
- C. Rate of interest for which the net present value is equal to zero.
- D. Accounting rate of return.

2. Which one of the following statements about the payback method of investment analysis is correct? The payback method

- A. Does not consider the time value of money.
- B. Considers cash flows after the payback has been reached.
- C. Uses discounted cash flow techniques.
- D. Is rarely used in practice.

Glossary

Accounting equation: $\text{Assets} - \text{Liabilities} = \text{Owner Equity}$.

Accounting periods: Time intervals of equal length spanning the life of a business.

Accounting principles: Broadly defined rules adopted by the accounting profession for use as guides in recording and reporting the affairs and activities of a business.

Accounting system: The business papers, records, reports, and procedures that are utilized in recording and reporting transactions.

Accounts receivable turnover: A calculation of the speed with which accounts receivable are collected (credit sales divided by the average receivable balance).

Accrual basis of accounting: Revenues are assigned to the period in which they are earned, and expenses are assigned to the period in which they are incurred.

Acid-test ratio: A calculation of a firm's liquidity position, that is, the ratio of its "quick" assets (readily convertible to cash) to current liabilities.

Book value per share: A measure of the equity of a share of stock in the assets of the issuing corporation.

Break-even point: The point where total revenue received is exactly equal to the sum of the fixed and variable costs at that particular level of activity.

Budget: A managerial plan of proposed operations to accomplish financial objectives.

Capital budgeting: The process of making long-term planning decisions for capital investments.

Cash basis: A method of revenue realization in which revenue is not recognized until cash is actually collected and expenses are recognized as cash is paid.

Cash budget: A budget for cash planning and control that presents anticipated cash inflow and cash outflow for a specified time period. The cash budget helps the owner keep cash balances in reasonable relationship to needs. It assists in avoiding idle cash and possible cash shortages. The cash budget shows beginning cash, cash receipts, cash payments, and ending cash.

Cash flow: Relates to the inflow and outflow of cash only. The receipt and disbursement of cash.

Common-size comparative statements: The total assets, liabilities, and stockholders equity, or net income (for a comparative income statement), are assigned a value of 100 percent; and each individual item is shown as a percentage of 100 percent. Changes in proportions may then be shown and emphasized.

Common stock: Stock issued by a corporation, giving the stockholder specific rights granted by the corporations charter. When only one type of stock is issued it is known as common stock.

Controllable costs: Those costs over which the department's manager has some influence or control.

Contribution margin per unit: The amount that the sale of one unit contributes toward payment of fixed expenses. The difference between the selling price and the variable cost per unit of product.

Contribution margin ratio: The contribution margin of a product expressed as a percentage of the sales price.

Cost center: A unit or activity for which costs are collected.

Cost-volume-profit (CVP) analysis: An analysis that deals with how profits and costs change with a change in volume. It looks at the effects on profits of changes in such factors as variable costs, fixed costs, selling prices, volume, and mix of products sold.

Current ratio: A measure of a firm's debt-paying ability. Current assets divided by current liabilities.

Direct expenses: Expenses of a department which are incurred for the direct benefit of that specific department.

Direct labor: The cost of labor which is chargeable directly to the product(s) manufactured.

Direct materials: Materials that are chargeable directly to and become a part of the product or products manufactured.

Double entry bookkeeping: A method of accounting that recognizes the duality of a transaction such that any a change in one account also causes a change in another account.

Earnings per share: A measure of a firm's ability to earn a return for its stockholders, calculated by dividing net income by the number of shares outstanding.

Factory overhead: All costs related to manufacturing other than for direct materials and direct labor.

Financial Accounting Standards Board (FASB): The seven-member board which currently has the authority to formulate and issue pronouncements of *generally accepted accounting principles*.

Fixed budget: A budget in which all plans are based on one "fixed" level of activity.

Flexible budget: A budget that provides cost and expense estimates for each of the several production levels that may be experienced.

Generally Accepted Accounting Principles (GAAP): Rules, regulations, standards, conventions, and pronouncements used as a basis for financial reporting, and in the preparation of financial statements.

Gross income: All income from whatever source derived, unless expressly excluded by law.

Indirect expenses: Expenses that are incurred for the joint benefit of more~ than one department, such as heat, rent, power, etc.

Inventory turnover: The number of times a firm's average inventory is sold during an accounting period.

Job cost sheets: Comprise the *Job Cost Ledger* and are used to accumulate costs by jobs.

Job order cost system: A system in which costs are assembled in terms of jobs or job lots of product.

Joint cost: A single cost incurred to secure two or more essentially different products.

Journal: A book in which all business transactions are recorded in chronological order.

Just-In-Time (JIT): A demand-pull system where demand for customer output (not plans for using input resources) triggers production. Production activities are "pulled", not "pushed," into action.

Market value per share: The price at which a share can be sold.

Out-of-pocket cost: A cost requiring the current or future outlay of funds.

Overapplied overhead: When the Overhead Cost account has a credit balance (actual overhead less than overhead applied).

Payback period: The period required to recover the investment in an asset. A method utilized by management to evaluate the profitability of alternative investment proposals.

Predetermined overhead application rate: In a job cost system, a predetermined rate of overhead that is applied to jobs as they are completed.

Process cost system: A system in which costs are assembled in terms of processes or manufacturing steps.

Rate on investment: The annual earnings from an investment divided by the average investment. A method utilized by management to evaluate the profitability of alternative investment proposals.

Relevant cost: The expected future cost that will differ between the alternatives being considered.

Residual income (RI): The operating income which an investment center is able to earn above some minimum return on its assets. It equals operating income less the minimum rate of return times total assets.

Responsibility accounting: The collection, summarization, and reporting of financial information about various decision centers (responsibility centers) throughout an organization; also called activity accounting or profitability accounting.

Responsibility center: A unit in the organization which has control over costs, revenues, or investment funds. For accounting purposes, responsibility centers are classified as cost centers, revenue centers, profit centers, and investment centers, depending on what each center is responsible for.

Return on stockholders' equity: $\text{Net income} / \text{Average Stockholders' Equity}$. A measure of the profit the firm earns for its common shareholders.

Segmented reporting: The process of reporting activities of various segments of an organization such as divisions, departments, product lines, services, sales territories, or customers.

Sunk cost: A cost caused by a past irrevocable decision.

The Du Pont formula : The breakdown of return on investment (ROI) into profit margin and asset turnover.

Time value of money: The value of money at different time periods. As a rule, one dollar today is worth more than one dollar tomorrow. The time value of money is a critical consideration in financial decisions.

Total Quality Management (TOM) : The use of high-quality materials, components, and labor in the manufacturing process.

Underapplied overhead: When the Overhead Cost account has a debit balance (actual overhead incurred greater than overhead applied).

Variance: The difference between actual costs and standard costs.

Working capital: The excess of current assets over current liabilities.

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Appendix

TABLE 1

PRESENT VALUE OF \$1 = $T1(i,n)$

PERIODS	4%	6%	8%	10%	12%	14%	16%	18%	20%	22%	24%	26%	28%	30%	40%
1	.962	.943	.926	.909	.893	.877	.862	.847	.833	.820	.806	.794	.781	.769	.714
2	.925	.890	.857	.826	.797	.769	.743	.718	.694	.672	.650	.630	.610	.592	.510
3	.889	.840	.794	.751	.712	.675	.641	.609	.579	.551	.524	.500	.477	.455	.364
4	.855	.792	.735	.683	.636	.592	.552	.516	.482	.451	.423	.397	.373	.350	.260
5	.822	.744	.681	.621	.567	.519	.476	.437	.402	.370	.341	.315	.291	.269	.186
6	.790	.705	.630	.564	.507	.456	.410	.370	.335	.303	.275	.250	.227	.207	.133
7	.760	.665	.583	.513	.452	.400	.354	.314	.279	.249	.222	.198	.178	.159	.095
8	.731	.627	.540	.467	.404	.351	.305	.266	.233	.204	.179	.157	.139	.123	.068
9	.703	.592	.500	.424	.361	.308	.263	.225	.194	.167	.144	.125	.108	.094	.048
10	.676	.558	.463	.386	.322	.270	.227	.191	.162	.137	.116	.099	.085	.073	.035
11	.650	.527	.429	.350	.287	.237	.195	.162	.135	.112	.094	.079	.066	.056	.025
12	.625	.497	.397	.319	.257	.208	.168	.137	.112	.092	.076	.062	.052	.043	.018
13	.601	.469	.368	.290	.229	.182	.145	.116	.093	.075	.061	.050	.040	.033	.013
14	.577	.442	.340	.263	.205	.160	.125	.099	.078	.062	.049	.039	.032	.025	.009
15	.555	.417	.315	.239	.183	.140	.108	.084	.065	.051	.040	.031	.025	.020	.006
16	.534	.394	.292	.218	.163	.123	.093	.071	.054	.042	.032	.025	.019	.015	.005
17	.513	.371	.270	.198	.146	.108	.080	.060	.045	.034	.026	.020	.015	.012	.003
18	.494	.350	.250	.180	.130	.095	.069	.051	.038	.028	.021	.016	.012	.009	.002
19	.475	.331	.232	.164	.116	.083	.060	.043	.031	.023	.017	.012	.009	.007	.002
20	.456	.312	.215	.149	.104	.073	.051	.037	.026	.019	.014	.010	.007	.005	.001
21	.439	.294	.199	.135	.093	.064	.044	.031	.022	.015	.011	.008	.006	.004	.001
22	.422	.278	.184	.123	.083	.056	.038	.026	.018	.013	.009	.006	.004	.003	.001
23	.406	.262	.170	.112	.074	.049	.033	.022	.015	.010	.007	.005	.003	.002	
24	.390	.247	.158	.102	.066	.043	.028	.019	.013	.008	.006	.004	.003	.002	
25	.375	.233	.146	.092	.059	.038	.024	.016	.010	.007	.005	.003	.002	.001	
26	.361	.220	.135	.084	.053	.033	.021	.014	.009	.006	.004	.002	.002	.001	
27	.347	.209	.125	.076	.047	.029	.018	.011	.007	.005	.003	.002	.001	.001	
28	.333	.196	.116	.069	.042	.026	.016	.010	.006	.004	.002	.002	.001	.001	
29	.321	.185	.107	.063	.037	.022	.014	.008	.005	.003	.002	.001	.001	.001	
30	.308	.174	.099	.057	.033	.020	.012	.007	.004	.003	.002	.001	.001		
40	.208	.097	.046	.022	.011	.005	.003	.001	.001						

TABLE 2

PRESENT VALUE OF AN ANNUITY OF \$1 = $T_2(i, n)$

PERIODS	4%	6%	8%	10%	12%	14%	16%	18%	20%	22%	24%	25%	26%	28%	30%	40%
1	0.962	0.943	0.926	0.909	0.893	0.877	0.862	0.847	0.833	0.820	0.806	0.800	0.794	0.781	0.769	0.714
2	1.886	1.833	1.783	1.736	1.690	1.647	1.605	1.566	1.528	1.492	1.457	1.440	1.424	1.392	1.361	1.224
3	2.775	2.673	2.577	2.487	2.402	2.322	2.246	2.174	2.106	2.042	1.981	1.952	1.923	1.868	1.816	1.589
4	3.630	3.465	3.312	3.170	3.037	2.914	2.798	2.690	2.589	2.494	2.404	2.362	2.320	2.241	2.166	1.849
5	4.452	4.212	3.993	3.791	3.605	3.433	3.274	3.127	2.991	2.864	2.745	2.689	2.635	2.532	2.436	2.035
6	5.242	4.917	4.623	4.355	4.111	3.889	3.685	3.498	3.326	3.167	3.020	2.951	2.885	2.759	2.643	2.168
7	6.002	5.582	5.206	4.868	4.564	4.288	4.039	3.812	3.605	3.416	3.242	3.161	3.083	2.937	2.802	2.263
8	6.733	6.210	5.747	5.335	4.968	4.639	4.344	4.078	3.837	3.619	3.421	3.329	3.241	3.076	2.925	2.331
9	7.435	6.802	6.247	5.759	5.328	4.946	4.607	4.303	4.031	3.786	3.566	3.463	3.366	3.184	3.019	2.379
10	8.111	7.360	6.710	6.145	5.650	5.216	4.833	4.494	4.192	3.923	3.682	3.571	3.465	3.269	3.092	2.414
11	8.760	7.887	7.139	6.495	5.938	5.453	5.029	4.656	4.327	4.035	3.776	3.656	3.544	3.335	3.147	2.438
12	9.385	8.384	7.536	6.814	6.194	5.660	5.197	4.793	4.439	4.127	3.851	3.725	3.606	3.387	3.190	2.456
13	9.986	8.853	7.904	7.103	6.424	5.842	5.342	4.910	4.533	4.203	3.912	3.780	3.656	3.427	3.223	2.468
14	10.563	9.295	8.244	7.367	6.628	6.002	5.468	5.008	4.611	4.265	3.962	3.824	3.695	3.459	3.249	2.477
15	11.118	9.712	8.559	7.606	6.811	6.142	5.575	5.092	4.675	4.315	4.001	3.859	3.726	3.483	3.268	2.484
16	11.652	10.106	8.851	7.824	6.974	6.265	5.669	5.162	4.730	4.357	4.033	3.887	3.751	3.503	3.283	2.489
17	12.166	10.477	9.122	8.022	7.120	6.373	5.749	5.222	4.775	4.391	4.059	3.910	3.771	3.518	3.295	2.492
18	12.659	10.828	9.372	8.201	7.250	6.467	5.818	5.273	4.812	4.419	4.080	3.928	3.786	3.529	3.304	2.494
19	13.134	11.158	9.604	8.365	7.366	6.550	5.877	5.316	4.844	4.442	4.097	3.942	3.799	3.539	3.311	2.496
20	13.590	11.470	9.818	8.514	7.469	6.623	5.929	5.353	4.870	4.460	4.110	3.954	3.803	3.546	3.316	2.497
21	14.029	11.764	10.017	8.649	7.562	6.687	5.973	5.384	4.891	4.476	4.121	3.963	3.816	3.551	3.320	2.498
22	14.451	12.042	10.201	8.772	7.645	6.743	6.011	5.410	4.909	4.488	4.130	3.970	3.822	3.556	3.323	2.498
23	14.857	12.303	10.371	8.883	7.718	6.792	6.044	5.432	4.925	4.499	4.137	3.976	3.827	3.559	3.325	2.499
24	15.247	12.550	10.529	8.985	7.784	6.835	6.073	5.451	4.937	4.507	4.143	3.981	3.831	3.562	3.327	2.499
25	15.622	12.783	10.675	9.077	7.843	6.873	6.097	5.467	4.948	4.514	4.147	3.985	3.834	3.564	3.329	2.499
26	15.983	13.003	10.810	9.161	7.896	6.908	6.118	5.480	4.956	4.520	4.151	3.988	3.837	3.566	3.330	2.500
27	16.330	13.211	10.935	9.237	7.943	6.935	6.136	5.492	4.964	4.524	4.154	3.990	3.839	3.567	3.331	2.500
28	16.663	13.406	11.051	9.307	7.984	6.961	6.152	5.502	4.970	4.528	4.157	3.992	3.840	3.568	3.331	2.500
29	16.984	13.591	11.158	9.370	8.022	6.983	6.166	5.510	4.975	4.531	4.159	3.994	3.841	3.569	3.332	2.500
30	17.292	13.765	11.258	9.427	8.055	7.003	6.177	5.517	4.979	4.534	4.160	3.995	3.842	3.569	3.332	2.500
40	19.793	15.046	11.925	9.779	8.244	7.105	6.234	5.548	4.997	4.544	4.166	3.999	3.846	3.571	3.333	2.500

* Payments (or receipts) at the end of each period.

Review Question Answers

Chapter 1 Review Questions

1. The basic financial statements include a balance sheet, income statement, and statement of activities. True or False?

True is incorrect. The basic statements are the balance sheet, income statement, and statement of cash flows.

False is correct. Under GAAP, the basic required statements are the balance sheet, income statement, and statement of cash flows. A statement of cash flows is now a required part of a full set of financial statements of all business entities (both publicly held and privately held).

2. The primary purpose of the balance sheet is to reflect

- A. Incorrect. The measurement attributes of assets include but are not limited to fair value.
- B. **Correct.** The balance sheet presents three major financial accounting elements: assets, liabilities, and equity. Assets are probable future economic benefits resulting from past transactions or events. Liabilities are probable future sacrifices of economic benefits arising from present obligations as a result of past transactions or events. Equity is the residual interest in the assets after deduction of liabilities.
- C. Incorrect. Financial statements reflect the going concern assumption. Hence, they usually do not report forced liquidation values.
- D. Incorrect. The future value of a company's stock is more dependent upon future operations and investors' expectations than on the data found in the balance sheet.

3. The primary current source of generally accepted accounting principles for nongovernmental U.S. entities is the American Institute of Certified Public Accountants (AICPAs).

True is incorrect. In 1973, the Financial Accounting Standards Board was created as a seven-member, full-time autonomous board with the responsibility of establishing financial accounting standards. The Board is charged to be responsive to the needs and viewpoints of the entire

economic community, not just the public accounting profession, and it operates in full view of the public through a due process system.

False is correct. While this body is influential in the establishment of generally accepted accounting principles, it is not the primary source.

4. The fundamental goal of _____ is the development of uniform financial reporting standards across the world.

- A. Incorrect. The SEC is an independent regulatory agency of the United States government created to oversee the requirements regarding the content of financial statements and the reporting standards to be followed. All corporations that offer securities for sale to the public must file audited financial statements annually with the SEC.
- B. **Correct.** IASC's fundamental goal is the development of international financial reporting standards (IFRS). It is currently working on a project, in consultation with the FASB, to develop worldwide standards for all corporations to facilitate multi-listing of foreign corporations on various stock exchanges.
- C. **Correct.** The mission of the GASB is to establish and improve standards of state and local governmental accounting and financial reporting that will result in useful information for users of financial reports and guide and educate the public, including issuers, auditors, and users of those financial reports.
- D. Incorrect. The AICPA is the national accounting organization composed of practicing Certified Public Accountants.

5. The best indication of an enterprise's present and continuing ability to generate favorable cash flows is information about enterprise earnings based on cash basis of accounting. True or False?

True is incorrect. The accrual basis best indicates an enterprise's ability to generate favorable cash flows. It matches revenues earned with the expenses incurred to earn those revenues for the period.

False is correct. Information about enterprise earnings based on accrual accounting generally provides a better indication of the enterprise's present and continuing ability to generate favorable cash flows than would information limited to the financial effects of cash receipts and payments. Accrual accounting attempts to record the financial effects on an enterprise of transactions and other events and circumstances that have cash consequences in the periods in which those transactions, events, and circumstances occur, rather than only in the periods in

which cash is received or paid by the enterprise.

6. Materiality is one of the pervasive concepts in financial reporting. Which of the following statements is true with regard to materiality?

- A. Incorrect. The magnitude of the item is only one aspect of a materiality judgment.
- B. **Correct.** The basis for a materiality judgment is generally not sufficient unless the nature of the item, the circumstances in which the judgment has to be made, and the magnitude of the item are all considered.
- C. Incorrect. Materiality is a pervasive concept that relates to the qualitative characteristic of relevance. Information may be relevant because it can make a difference in a single investment decision, but it may be too small (immaterial) to make that difference matter over an accounting period.
- D. Incorrect. The magnitude of the item is only one aspect of a materiality judgment. Others include the nature of the item and the circumstances in which the judgment has to be made.

7. Continuation of an accounting entity in the absence of evidence to the contrary is an example of the basic concept of

- A. Incorrect. The accounting entity concept refers to the business enterprise, which may or may not be synonymous with the legal entity. The emphasis is also on the separation of the entity from its ownership.
- B. Incorrect. The consistency principle requires that similar events be accounted for similarly in succeeding accounting periods to facilitate comparability between periods.
- C. **Correct.** A basic feature of financial accounting is that the business entity is assumed to be a going concern in the absence of evidence to the contrary. The going concern concept is based on the empirical observation that many enterprises have an indefinite life.
- D. Incorrect. The concept of substance over form requires accounting treatment to be based upon the economic substance of events rather than upon the legal form.

8. In which legal form of business organization do the owners of the business enjoy limited liability?

- A. Incorrect. General partners share profits and losses of the venture.

- B. **Correct.** Shareholders of a corporation own an equity interest in the underlying net assets of the corporation and is entitled to share in its profits. Unlike a sole proprietor or a general partner, the shareholder is not subject to liability beyond his/her investment.
- C. Incorrect. A sole proprietorship is owned by one person. The sole proprietor is personally liable for all debts. Debts of a partnership are ultimately the debts of the individual general partners.
- D. Incorrect. An oligopoly is not a legal form of business organization.

9. An objective of financial reporting is

- A. **Correct.** Financial reporting and analysis is of particular interest to creditors, potential and current stockholders, management, government agencies, customers, and labor. An objective of financial reporting is to provide information that (1) is useful to those making investment and credit decisions, assuming that those individuals have a reasonable understanding of business and economic activities; (2) is helpful to current and potential investors and creditors and other users such as labor and government agencies in assessing the amount, timing, and uncertainty of future cash flows; and (3) discloses economic resources, claims to those resources, and the changes therein.
- B. Incorrect. Assessing the adequacy of internal control is a function of internal auditing, not financial reporting.
- C. Incorrect. Evaluating management results compared with standards is a function of managerial and cost accounting.
- D. Incorrect. Providing information on compliance with established procedures is a function of internal auditing, not financial reporting.

10. Which of the following is NOT considered to be an advantage of organizing a business as a sole proprietorship?

- A. Incorrect. The easy and inexpensive organization is one of the most appealing characteristics of sole proprietorships.
- B. Incorrect. Sole proprietors make all management decisions and have the rights to all profits as well as the right to sell the business. Thus, the entrepreneur has freedom of action.
- C. Incorrect. As the sole owner and profit sharer, a sole proprietor has a strong incentive to manage the business efficiently so as to earn more profits.
- D. **Correct.** The sole proprietor does not enjoy the benefits of specialization. (S)he must perform all management functions, including all decisions relating to buying and selling; the acquisition and

maintenance of personnel; and the technical aspects of production, advertising, and distribution.

Chapter 2 Review Questions

1. A statement of cash flows is to be presented in general purpose external financial statements by all business enterprises and not-for-profit organizations. True or False?

True is correct. A statement of cash flows is required as part of a full set of financial statements of all business entities (both publicly held) and not-for-profit organizations.

False is incorrect. Under GAAP, all business organizations—commercial and nonprofit— are required to present a statement of cash flows.

2. A statement of cash flows is intended to help users of financial statements

- A. **Correct.** The statement of cash flows shows the sources and uses of cash, which is a basis for cash flow analysis for managers. The statement aids you in answering vital questions like "where was money obtained?" and "where was money put and for what purpose?" If sued with information in the other financial statements, the statement of cash flows should help users to assess the entity's ability to generate positive future net cash flows (liquidity), its ability to meet obligations (solvency) and pay dividends, the need for external financing, the reasons for differences between income and cash receipt sand payments, and the cash and noncash aspects of the investing and financing activities.
- B. Incorrect. The statement of cash flows deals with only one resource-cash.
- C. Incorrect. The income statement shows the components of income from operations.
- D. Incorrect. The identity of stock buyers and sellers is not shown.

3. A financial statement includes all of the following items: net income, depreciation, operating activities, and financial activities. What financial statement is this?

- A. Incorrect. The balance sheet does not include periodic net income or depreciation expense.
- B. Incorrect. The income statement does not have captions for operating and financing activities.

- C. **Correct.** A statement of cash flows is a required financial statement. Its primary purpose is to provide information about cash receipts and payments by reporting the cash effects of an enterprise's operating, investing, and financing activities. Because the statement or a separate schedule reconciles net income and net operating cash flow, depreciation, a noncash expense, is included in the presentation.
- D. Incorrect. Shareholders' equity does not include captions for operating and investing activities, depreciation, and net income.

4. What is the purpose of information presented in notes to the financial statements?

- A. **Correct.** Notes are an integral part of the basic financial statements. Notes provide information essential to understanding the financial statements, including disclosures required by GAAP.
- B. Incorrect. Notes may not be used to rectify an improper presentation.
- C. Incorrect. Disclosure in notes is not a substitute for recognition in financial statements for items that meet recognition criteria.
- D. Incorrect. Management's responses to auditor comments are not an appropriate subject of financial reporting.

Chapter 3 Review Questions

1. The term "double-entry system" refers to

- A. Incorrect. The distinction between real and nominal accounts is based on the relative permanence of accounts rather than the double entry, self-balancing attribute of accounting systems.
- B. **Correct.** In the double-entry system, each transaction is composed of two parts, debits and credits. The debits must equal the credits, and the sum of all debits for all transactions in a double entry system must equal the sum of all credits.
- C. Incorrect. Many journals may be used, e.g., general journal, sales journal, cash receipts journal, and cash payments journal.
- D. Incorrect. Even though journals and ledgers are parts of all double entry systems, they have nothing to do with the term "double entry."

2. A chart of accounts is

- A. Incorrect. Actual transactions are not flowcharted. Flowcharts of accounting procedures are developed by auditors and systems analysts (but are not called charts of accounts).
- B. Incorrect. An accounting procedures manual explains how to use the chart of accounts, e.g., whether to make adjusting entries, reversing entries, etc.
- C. Incorrect. A journal contains the initial recording of the transactions that affect the accounts contained in the chart of accounts.
- D. **Correct.** A chart of accounts is a listing of all account titles used within an accounting system. Business transactions affecting these accounts are initially recorded by journal entries and then posted to the individual accounts maintained in the ledger.

3. What function do general ledgers serve in the accounting process?

- A. Incorrect. Accounting data are reported in the financial statements.
- B. Incorrect. Data are summarized during the adjusting and closing process.
- C. **Correct.** General ledgers serve to classify accounting data. Transactions that have been recorded in the journals are posted to the general ledger accounts where they are classified as to the accounts that have been affected.
- D. Incorrect. Transactions are recorded in the journals.

4. A subsidiary ledger is

- A. **Correct.** A general or controlling ledger contains the balance for each asset, liability, and equity account. A subsidiary ledger consists of the detail of a general ledger account, e.g., the individual receivables making up accounts receivable in the aggregate.
- B. Incorrect. A subsidiary ledger is not a supplementary accounting system.
- C. Incorrect. A listing of account balances just before closing entries are prepared is a trial balance.
- D. Incorrect. The term "subsidiary ledger" relates to a specific general ledger account, not the accounting systems of a subsidiary company.

5. What factor must be present to use the units-of-production method of depreciation?

- A. **Correct.** The units-of-production depreciation method allocates asset cost based on the level of production. As production varies, so will the credit to accumulated depreciation. Each unit is charged with a constant amount of depreciation equal to the cost of the asset minus salvage value, divided by the total units expected to be produced.
- B. Incorrect. An advantage of the units-of-production method is that depreciation can vary with production.
- C. Incorrect. Repairs do not affect depreciation.
- D. Incorrect. Obsolescence need not be expected. The units-of-production method treats obsolescence in the same way as other depreciation methods.

Chapter 4 Review Questions

1. What type of ratio is rate of return on net sales?

- A. **Correct.** The rate of return on net sales is a profitability ratio. This ratio reveals the profit margin of the business.
- B. Incorrect. Activity ratios measure management's efficiency in using specific resources.
- C. Incorrect. Liquidity ratios indicate the ability of a company to meet short-term obligations.
- D. Incorrect. Leverage or equity ratios concern the relationship of debt to equity ratios concern the relationship of debt to equity and measure the impact of the debt on profitability and risk.

2. Book value per share represents the amount of shareholders' equity assigned to each outstanding share of common stock. Which one of the following statements about book value per common share is correct?

- A. Incorrect. Market price may be more or less than book value.
- B. **Correct.** Book value is based on the financial statements, which are stated in terms of historical cost and nominal dollars. The figure can be misleading because fair market values may differ substantially from book figures.
- C. Incorrect. Fair market value may be more accurate than the carrying values if the historical cost figures are out of date.
- D. Incorrect. The amount another company would pay would be based on fair market values, not book values.

3. Which one of the following statements about the price-earnings (P-E) ratio is correct?

- A. **Correct.** A company with high growth opportunities typically has a high P-E ratio because investors are willing to pay a price for the stock higher than that justified by current earnings. In effect, they are trading current earnings for potential future earnings.
- B. Incorrect. A P-E ratio cannot be computed when a firm has losses.
- C. Incorrect. A firm with abnormally low profits could have an extremely high, and thus meaningless, P-E ratio.
- D. Incorrect. The P-E ratio expresses the relationship between market price and a firm's EPS.

4. Financial ratio analysis has no limitation when it comes to comparing financial fitness among firms. True or False?

True is incorrect. Financial ratios, calculated based on different sources of information, can lead to misleading interpretations.

False is correct. Ratio analysis provides useful information regarding the efficiency of operations and the stability of financial condition. Nevertheless, it has several inherent limitations, such as firms using different accounting and operating policies, multiple lines of businesses, and different sources of information. Each of these factors impairs the comparability of financial statement amounts and the ratios derived from them.

5. In computing inventory turnover, the preferred base to use is the sales base because it is more likely to reflect a change in trend. True or False?

True is correct. Inventory turnover is measured by dividing the cost of sales by average inventories. Cost of sales is used rather than sales because the cost of sales base eliminates any changes caused solely by sales price changes. Furthermore, using sales in the numerator is inconsistent with valuing inventories at cost in the denominator.

False is correct. Using a sales base involves comparing a retail amount with a cost amount (inventory).

6. The times-interest-earned ratio is primarily an indication of

- A. **Correct.** The times-interest-earned ratio equals (Income from operations) / (Interest expense).
- B. It measures the extent to which operating profit can decline before the enterprise is unable to meet its annual interest cost. Thus, it is a measure of debt-paying capacity (solvency).
- C. Incorrect. Liquidity ratios, e.g., the current ratio, indicate the relationship of current assets to current liabilities.
- D. Incorrect. Asset management ratios indicate how effectively the enterprise is using its assets.
- E. Incorrect. Profitability ratios measure operating results.

7. A firm's receivables collection period is equal to

- A. Incorrect. The inventory conversion period (days of inventory) is the average time required to convert materials into finished goods and then to sell them. This process typically occurs before the receivables collection period, and the amount of time in one period does not necessarily bear any relationship to the other.
- B. Incorrect. The cash conversion cycle equals the inventory conversion period, plus the receivables collection period, minus the payables deferral period (average time between resource purchases and payment of cash for them). It estimates the time between when the enterprise makes payments and when it receives cash inflows.
- C. **Correct.** The days-sales-in-receivables (day's sales outstanding) may be stated as the accounts receivable balance divided by average credit sales per day or as days in the year divided by the receivables turnover. It is the average time required to convert the enterprise's receivables into cash. Thus, it is also called the receivables collection period.
- D. Incorrect. The inventory divided by the sales per day is the inventory conversion period (days of inventory).

8. A company has 100,000 outstanding common shares with a market value of \$20 per share. Dividends of 2 per share were paid in the current year, and the enterprise has a dividend-payout ratio of 40%. The price-to-earnings ratio of the company is

- A. Incorrect. 2.5 equals EPS divided-by dividends per share.
- B. **Correct.** The P-E ratio equals the share price divided by EPS. If the dividends per share equaled 2 and the dividend-payout ratio was 40%, EPS must have been 5 ($2/0.4$). Accordingly, the P-E ratio is 4 ($20 \text{ share price}/5 \text{ EPS}$).
- C. Incorrect. 10 equals share price divided by dividends per share.
- D. Incorrect. 50 equals price per share divided by the dividend-payout percentage.

Chapter 5 Review Questions

1. The primary reason for adopting total quality management (TQM) is to achieve

- A. **Correct.** TQM is an integrated system that identifies internal and external customers and establishes their requirements. The ultimate (external) customer is best served when internal customers are also well served.
- B. Incorrect. Reduced delivery time is one of many potential activities that need improvement. Speed of delivery is known to be a driver for customer satisfaction.
- C. Incorrect. Reduced delivery charges is one of many potential activities that need improvement. Free shipping, for example, has been quite successful for online ecommerce strategy.
- D. Incorrect. Increased employee participation is necessary to achieve TQM, but it is not the primary purpose for establishing the program.

2. Companies that adopt just-in-time (JIT) purchasing systems often experience

- A. **Correct.** The objective of JIT is to reduce carrying costs by eliminating inventories and increasing the deliveries made by suppliers. Ideally, shipments of raw materials are received just in time to be incorporated into the manufacturing process. The focus of quality control under JIT is the prevention of quality problems. Quality control is shifted to the supplier. JIT companies typically do not inspect incoming goods; the assumption is that receipts are of perfect quality. Suppliers are limited to those who guarantee perfect quality and prompt delivery.
- B. Incorrect. More deliveries are needed. Each shipment is smaller.
- C. Incorrect. In a JIT system, materials are delivered directly to the production line ready for insertion in the finished product.
- D. Incorrect. The need for communication with the vendor is greater. Orders and deliveries must be made on short notice, sometimes several times a day.

3. Controllers are ordinarily NOT concerned with

- A. Incorrect. The preparation of tax returns is a typical responsibility of the controller.
- B. Incorrect. External reporting is a function of the controller.
- C. Incorrect. The accounting system helps to safeguard assets.
- D. **Correct.** Controllers are usually in charge of budgets, accounting, accounting reports, and related controls. Treasurers are most often involved with control over cash, receivables, short-

term investments, financing, and insurance. Thus, treasurers rather than controllers are concerned with investor relations.

4. Treasurers are usually NOT concerned with

- A. **Correct.** Treasurers are usually concerned with investing cash and near-cash assets, the provision of capital, investor relations, insurance, etc. Controllers, on the other hand, are responsible for the reporting and accounting activities of an organization, including financial reporting.
- B. Incorrect. Short-term financing lies within the normal range of a treasurer's functions.
- C. Incorrect. The treasurer has custody of assets.
- D. Incorrect. Credit operations are often within the treasurer's purview.

5. Incremental cost is

- A. **Correct.** Incremental cost is the difference in total cost between two courses of action. Incremental cost is also referred to as differential cost.
- B. Incorrect. Opportunity cost is the profit forgone by selecting one choice instead of another.
- C. Incorrect. A fixed cost is incurred even though no output is produced.
- D. Incorrect. Common or joint costs are not allocable among the possible choices.

6. In cost terminology, conversion costs consist of

- A. Incorrect. All factory overhead is included in conversion costs, not just indirect labor.
- B. Incorrect. Direct materials are not an element of conversion costs; they are a component of prime costs.
- C. **Correct.** Conversion costs, also called processing costs, consist of direct labor and factory overhead. These are the costs of converting raw materials into a finished product.
- D. Incorrect. Direct labor and fixed factory overhead are also an element of conversion costs.

7. In a retailing enterprise, the income statement includes cost of goods sold (CGS). Cost of goods sold is, in effect, purchases adjusted for changes in inventory. In a manufacturing company, the purchases account is replaced by which account?

- A. Incorrect. Both manufacturing and retailing companies have inventory accounts.
- B. **Correct.** Instead of purchasing goods and services for resale, a manufacturing company manufactures goods and services for sale. Accordingly, the CGM account is similar to the purchases account.
- C. Incorrect. The finished goods account of a manufacturer is akin to the merchandise inventory (goods held for resale) of a retailer.
- D. Incorrect. CGS is purchases or CGM adjusted for changes in inventory.

8. The difference between the sales price and total variable costs is

- A. Incorrect. Gross operating profit results from deducting all manufacturing costs from sales.
- B. Incorrect. Net profit is the remainder after deducting all costs from revenue.
- C. Incorrect. The breakeven point is the level of sales that equals the sum of fixed and variable costs.
- D. **Correct.** Contribution margin equals sales revenue minus all variable costs. It is the portion of sales available for covering fixed costs and profit.

Chapter 6 Review Questions

1. Companies characterized by the production of heterogeneous products will most likely use which of the following methods for the purpose of averaging costs and providing management with unit cost data?

- A. Incorrect. Process costing accounts for continuous processing of homogeneous products.
- B. **Correct.** The job-order cost system of accounting is appropriate when products have varied characteristics and/or when identifiable groupings are possible, e.g., batches of certain styles or types of furniture. The unique aspect of job-order costing is the identification of costs to specific units or a particular job.
- C. Incorrect. Direct costing includes only variable manufacturing costs in unit cost. This costing method is useful for managerial planning and decision making.
- D. Incorrect. Absorption costing includes all manufacturing costs in unit cost. It is required for inventory valuation under GAAP.

2. Companies characterized by the production of basically homogeneous products will most likely use which of the following methods for the purpose of averaging costs and providing management with unit-cost data?

- A. **Correct.** Like products that are mass produced should be accounted for using process costing to assign costs to products. Costs are accumulated by processes rather than by jobs, work-in-process is stated in terms of equivalent units, and unit costs are established. Process costing is an averaging process that calculates the average cost of all units.
- B. Incorrect. Job-order costing is employed when manufacturing involves different (heterogeneous) products.
- C. Incorrect. Variable costing may be used whether products are homogeneous or heterogeneous and with either process or job-order costing.
- D. Incorrect. Absorption costing may be used whether products are homogeneous or heterogeneous and with either process or job-order costing.

3. An accounting system that collects financial and operating data on the basis of the underlying nature and extent of the cost drivers is

- A. **Correct.** An activity-based costing (ABC) system identifies the causal relationship between the incurrence of costs and activities, determines the driver for each activity, and applies costs to products or services on the basis of resources (drivers) consumed.
- B. Incorrect. Target costing determines the maximum allowable cost of a product or service before it is designed or produced; it deducts an acceptable profit margin from a forecasted selling price.
- C. Incorrect. Delivery cycle time is the period from the time a customer places an order to the time that product or service is delivered.
- D. Incorrect. Variable costing expenses fixed overhead as incurred.

Chapter 7 Review Questions

1. The relevant range in cost accounting is the range over which

- A. Incorrect. Total cost fluctuates both within and outside the relevant range because variable costs vary.

- B. **Correct.** The relevant range is the range of activity (production volume) within which variable unit costs are constant and fixed costs are constant in total. In this range, the incremental cost of one additional unit of production, i.e., the unit variable cost does not vary.
- C. Incorrect. Production levels may be above or below the relevant range; they are not confined to the relevant range.
- D. Incorrect. Relevant costs are incurred at any level, not just within the relevant range.

2. Mat Co. estimated its materials handling costs at two high and low activity levels as follows: High level = 80,000 kilos with a material handling cost = \$160,000; Low level = 60,000 kilos with a material handling cost = \$132,000. What is Mat's estimated cost for handling 75,000 kilos?

- A. Incorrect. \$150,000 assumes that all handling costs are variable and that the unit cost is \$2 (\$160,000 / 80,000 kilos).
- B. **Correct.** The high-low method estimates variable cost by dividing the difference in costs incurred at the highest and lowest observed levels of activity by the difference in activity. Once the variable cost is found, the fixed portion is determinable. Hence, unit variable handling cost is \$1.40 $[(\$160,000 - \$132,000) / (80,000 \text{ kilos} - 60,000 \text{ kilos})]$, the fixed cost is \$48,000 $[\$132,000 - (\$1.40 \times 60,000 \text{ kilos})]$, and the cost of handling 75,000 kilos is \$153,000 $[\$48,000 + (\$1.40 \times 75,000 \text{ kilos})]$.
- C. Incorrect. \$157,500 assumes that all handling costs are variable and that the unit cost is \$2.10.
- D. Incorrect. The cost of handling 75,000 kilos must be less than the cost of handling 80,000 kilos.

3. Which of the following will result in raising the breakeven point (BEP)?

- A. Incorrect. If other factors are constant, an increase in sales price or a decrease in unit variable cost increases the CM and lowers the BEP.
- B. **Correct.** The break-even point (BEP) equals fixed cost divided by the unit CM (selling price - unit variable cost). An increase in fixed costs increases fixed costs and/or variable costs. An increase in either will raise the BEP. If fixed costs increase, more units must be sold, assuming the same unit CM, to cover the greater fixed costs. If variable costs increase, the unit CM will decrease and again more units must be sold to cover the fixed costs.
- C. Incorrect. An increase in the CM decreases the BEP.
- D. Incorrect. If income taxes are taken into account, they are treated as variable costs. A decrease in variable costs lowers the BEP.

4. In using cost-volume-profit analysis to calculate expected unit sales, which of the following should be added to fixed costs in the numerator?

- A. Incorrect. Predicted operating loss would be subtracted from fixed costs, not added.
- B. **Correct.** When a targeted income (TI) is desired, it is treated as a fixed cost (FC). Consequently, target income sales units = $(FC + TI) / \text{Unit CM}$.
- C. Incorrect. The unit CM is the denominator.
- D. Incorrect. Variable costs are a component of unit CM.

Chapter 8 Review Questions

1. The master budget

- A. Incorrect. The master budget does not contain actual results.
- B. Incorrect. The master budget reflects all applicable expected costs, whether or not controllable by individual managers.
- C. Incorrect. The master is not structured to allow determination of manufacturing cost variances, which requires using the flexible budget and actual results.
- D. **Correct.** All other budgets are subsets of the master budget. Thus, quantified estimates by the management from all functional areas are contained in the master budget. These results are then combined in a formal quantitative model recognizing the organization's objectives, inputs, and outputs.

2. One of the purposes of standard costs is to

- A. **Correct.** A standard cost system differentiates the expected cost from the actual cost, thus identifying deviations from expected (attainable) results on a routine basis. One of the purposes of standard costs is to simplify costing procedures and expedite cost reports.
- B. Incorrect. Standard costs are used to prepare budgets.
- C. Incorrect. Standard costs cannot be used for external reporting if material variances exist.
- D. Incorrect. Standard costs help measure over- and underapplied overhead.

3. If a company follows a practice of isolating variances as soon as possible, the appropriate time to isolate and recognize a direct materials price variance is when

- A. Incorrect. Time elapses between purchase and issuance of materials; thus, the earliest time to isolate price variances is upon purchase.
- B. **Correct.** The time of purchase is the most appropriate moment to isolate and recognize a price variance. Analysis at that time permits the earliest possible examination of variances.
- C. Incorrect. A materials price variance must be recognized at purchase.
- D. Incorrect. The transaction has not yet been consummated when the purchase order originates. The proper time to isolate and recognize a direct materials price variance is when materials are purchased.

4. The master budget process usually begins with the

- A. Incorrect. The production budget normally cannot be prepared until the expected sales are known. The number of units expected to be manufactured to meet budgeted sales and inventory requirements is set forth in the production budget.
- B. Incorrect. The operating budget is the budget reflecting the results of operating decisions. It cannot be prepared until after the sales budget is prepared.
- C. **Correct.** The sales budget is the starting point in preparing the master budget, since estimated sales volume influences nearly all other items appearing in the master budget. The sales budget, which ordinarily indicates the quantity of each product expected to be sold, allows all departments to plan their needs. Once a firm can estimate sales, the next step is to decide how much to produce or purchase.
- D. Incorrect. Preparation of the cash budget is the last step in the overall budgeting process. The cash budget is determined after the operating budgets such as the sales and production budgets are prepared.

5. The cash receipts budget includes

- A. Incorrect. Funded depreciation involves cash outlays.
- B. **Correct.** A cash budget may be prepared monthly or even weekly to facilitate cash planning and control. The purpose is to anticipate cash needs while minimizing the amount of idle cash. The cash receipts section of the budget includes all sources of cash. One such source is the cash collections from customers.
- C. Incorrect. Purchases of supplies involve cash outlays.
- D. Incorrect. The extinguishment of debt involves cash outlays.

6. The sales budget is normally included in the financial budget of a firm. True or False?

True is incorrect. The financial budget normally includes the cash budget and the pro forma balance sheet.

False is correct. The sales budget is included in the operating budget because sales is an operating activity.

Chapter 9 Review Questions

1. Responsibility accounting defines an operating center that is responsible for revenue and costs as a(n)

- A. **Correct.** A profit center is responsible for both revenues and costs, whereas a cost center is responsible only for costs.
- B. Incorrect. A revenue center is responsible only for revenues, not costs.
- C. Incorrect. A division can be any type of responsibility center.
- D. Incorrect. An operating unit can be organized as any type of center.

2. Decentralized firms can delegate authority and yet retain control and monitor managers' performance by structuring the organization into responsibility centers. Which one of the following organizational segments is most like an independent business?

- A. Incorrect. A revenue center is responsible only for revenue generation, not for costs or capital investment.
- B. Incorrect. A profit center is responsible for revenues and costs but not for invested capital.
- C. Incorrect. A cost center is evaluated only on the basis of costs incurred. It is not responsible for revenues or invested capital.
- D. **Correct.** An investment center is the organizational type most like an independent business because it is responsible for its own revenues, costs incurred, and capital invested. The other types of centers do not incorporate all three elements.

3. Which one of the following statements pertaining to the return on investment (ROI) as a performance measurement is incorrect?

- A. Incorrect. ROI can be misleading when the quality of the investment base differs among segments.
- B. **Correct.** Return on investment (ROI) is the key performance measure in an investment center. ROI is a rate computed by dividing a segment's income by the invested capital. ROI is therefore subject to the numerous possible manipulations of the income and investment amounts. For example, a manager may choose not to invest in a project that will yield less than the desired rate of return, or (s)he may defer necessary expenses.
- C. Incorrect. Managers may reject projects that are profitable (a return greater than the cost of capital) but would decrease ROI. For example, a segment with a 15% ROI may not want to invest in a new project with a 10% ROI, even though the cost of capital might be only 8%.
- D. Incorrect. The use of ROI does not reflect the relative difficulty of tasks undertaken by managers.

4. Return on investment (ROI) would be the best for evaluating the management performance of a department that is operated at a cost center. True or False?

True is incorrect. A cost center is a responsibility center that is responsible for costs only. Of the alternative given, variance analysis is the only one that can be used in a cost center. Variance analysis involves comparing actual costs with predicted or standard costs.

False is correct. Return on investment cannot be computed for a cost center. The manager is not responsible for revenue (return) or the assets available.

5. Residual income (RI) is a performance evaluation that is used in conjunction with, or instead of, return on investment (ROI). In many cases, RI is preferred to ROI because

- A. Incorrect. Both measures represent the results for a single period.
- B. **Correct.** Residual income equals earnings in excess of a minimum desired return. Thus, it is measured in dollars. If performance is evaluated using ROI, a manager may reject a project that exceeds the minimum return if the project will decrease overall ROI. For example, given a target rate of 20%, a project with an ROI of 22% might be rejected if the current ROI is 25%.
- C. Incorrect. The target rate for ROI is the same as the imputed interest rate used in the residual income calculation.
- D. Incorrect. The same investment base should be employed by both methods.

Chapter 10 Review Questions

1. Relevant costs are

- A. Incorrect. Both fixed and variable costs can be either relevant or irrelevant depending upon the circumstances. Fixed costs are usually irrelevant to a future decision.
- B. Incorrect. Relevant costs are expected future costs that differ among decision choices.
- C. Incorrect. Past costs are sunk costs. Because they cannot be changed by management action, they are not relevant.
- D. **Correct.** Relevant costs are anticipated costs that will vary among the choices available. In other words, if two courses of action share some costs, those costs are not relevant because they will be incurred regardless of the decision made.

2. Which one of the following costs would be relevant in short-term decision making?

- A. **Correct.** Not all costs are of equal importance in decision making, and managers must identify the costs that are relevant to a decision. Such costs are called relevant costs. The relevant costs are the expected future costs (and also revenues) which differ between the decision alternatives.
- B. Incorrect. Inventory costs may not always differ among options. So they may not be relevant.
- C. Incorrect. By definition, costs that do not vary are not relevant to the decision process.
- D. Incorrect. The costs of fixed assets are usually irrelevant in the short run. It is just a matter of how much---in its entirety or the portion that continue regardless the choice.

3. _____ are the costs that cannot be changed by any present or future decision, so they are *irrelevant* to a future decision.

- A. Incorrect. Net realizable value is the value of an asset net of any disposal costs.
- B. Incorrect. Relevant costs are expected future costs that differ among alternatives.
- C. **Correct.** The book value of an asset, defined as its acquisition cost less the accumulated depreciation, is a sunk cost. Sunk costs cannot be changed by any current or future course of action, so they are irrelevant in decision making.
- D. Incorrect. An incremental cost is the additional cost of selecting one option rather than another. It is relevant to a future decision.

4. A decision-making concept, described as "the contribution to income that is forgone by not using a limited resource for its best alternative use," is called

- A. Incorrect. Marginal cost is the incremental cost of producing one additional unit.
- B. Incorrect. Incremental cost is the increase in costs between one option and another.
- C. Incorrect. Potential cost is the cost that may be incurred in the future.
- D. **Correct.** Opportunity cost is defined as the profit forgone by selecting one choice instead of another. It is the benefit provided by the best alternative use of a scarce resource.

5. Which of the following qualitative factors favors the buy choice in an insourcing vs. outsourcing (make or buy) decision?

- A. **Correct.** The maintenance of long-run relationships with suppliers may become paramount in a make-or-buy decision. Abandoning long-run supplier relationships may cause difficulty in obtaining needed parts when terminated suppliers find it advantageous not to supply parts in the future.
- B. Incorrect. If quality is important, one can ordinarily control it better in one's own plant.
- C. Incorrect. The availability of idle capacity more likely favors the decision to make. With idle capacity, you can make it cheaper.
- D. Incorrect. Companies claim that outsourcing leads to substantial cost savings, allows them to focus on their core competencies, and ultimately increases shareholder value.

6. When only differential manufacturing costs are taken into account for special-order pricing, an essential assumption is that

- A. Incorrect. The differential analysis of a special order considers total incremental costs. Thus, unit variable costs and total fixed costs need not be constant, and any changes need not be in direct proportion to the measure of activity.
- B. Incorrect. The assumption is that selling and administrative costs remain the same and hence are not relevant.
- C. **Correct.** Granting a lower-than-normal price for a special order has potential ramifications for regular sales because other customers may demand the same price. Thus, the decision to consider differential manufacturing costs only should be based on a determination that all other costs are not relevant, that is, that these other costs do not vary with the option chosen.
- D. Incorrect. The assumption is that acceptance of the order will not cause total selling and administrative costs to change. The costs that do not change are irrelevant to a special-order decision.

Chapter 11 Review Questions

1. The internal rate of return (IRR) is the

- A. Incorrect. The hurdle rate is the rate used to calculate the NPV; it is determined by management prior to the analysis.
- B. Incorrect. The IRR is the rate at which the NPV is zero. Internal rate of return (IRR) is defined as the rate of interest that equates the initial investment (I) with the PV of future cash inflows. In other words, at IRR, $I = PV$ (or $NPV = 0$)
- C. **Correct.** The IRR is the interest rate at which the PV of the expected future cash inflows is equal to the initial investment for a project. Thus, the IRR is the interest rate that will produce the NPV equal to zero.
- D. Incorrect. The accounting rate of return does not incorporate the time value of money.

2. Which one of the following statements about the payback method of investment analysis is correct? The payback method

- A. **Correct.** The payback method calculates the amount of time required for an investment to recoup the original investment. Although the payback method is easy to use, it has inherent problems. The time value of money and returns after the payback period are not considered.
- B. Incorrect. The payback method ignores cash flows after payback, which means it does not take into account returns after the payback period.
- C. Incorrect. The payback method does not use discounted cash flow techniques, because it does not consider the time value of money.
- D. Incorrect. The payback method is often used, given its simplicity and effectiveness in risk management and cash conservation.