



**CFA Institute®**  
CFA Program

# FINANCIAL STATEMENT ANALYSIS

CFA® Program Curriculum  
**2024 • LEVEL PREREQUISITE READING • VOLUME 3**

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# How to Use the CFA Program Curriculum

The CFA® Program assumes basic knowledge of Economics, Quantitative Methods, and Financial Statements as presented in introductory university-level courses in Statistics, Economics, and Accounting. CFA Level I candidates who do not have a basic understanding of these concepts or would like to review these concepts can study from any of the three prerequisite reading volumes as follows:

- Prerequisite reading volume 1: Quantitative Methods
- Prerequisite reading volume 2: Economics
- Prerequisite reading volume 3: Financial Statement Analysis

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## ERRATA

The curriculum development process is rigorous and includes multiple rounds of reviews by content experts. Despite our efforts to produce a curriculum that is free of errors, there are instances where we must make corrections. Curriculum errata are periodically updated and posted by exam level and test date online on the Curriculum Errata webpage ([www.cfainstitute.org/en/programs/submit-errata](http://www.cfainstitute.org/en/programs/submit-errata)). If you believe you have found an error in the curriculum, you can submit your concerns through our curriculum errata reporting process found at the bottom of the Curriculum Errata webpage.





# **Financial Statement Analysis**



## LEARNING MODULE

# 1

## Introduction to Financial Reporting

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### LEARNING OUTCOMES

<i>Mastery</i>	<i>The candidate should be able to:</i>
<input type="checkbox"/>	describe the objective of financial reporting and the importance of financial reporting standards in security analysis and valuation
<input type="checkbox"/>	describe the roles of financial reporting standard-setting bodies and regulatory authorities in establishing and enforcing reporting standards
<input type="checkbox"/>	describe the International Accounting Standards Board's conceptual framework, including qualitative characteristics of financial reports, constraints on financial reports, and required reporting elements
<input type="checkbox"/>	describe general requirements for financial statements under International Financial Reporting Standards (IFRS)
<input type="checkbox"/>	describe the roles of the statement of financial position, statement of comprehensive income, statement of changes in equity, and statement of cash flows in evaluating a company's performance and financial position

**Note:** Changes in accounting standards as well as new rulings and/or pronouncements issued after the publication of the readings on financial reporting and analysis may cause some of the information in these readings to become dated. Candidates are *not* responsible for anything that occurs after the readings were published. In addition, candidates are expected to be familiar with the analytical frameworks contained in the readings, as well as the implications of alternative accounting methods for financial analysis and valuation discussed in the readings. Candidates are also responsible for the content of accounting standards, but not for the actual reference numbers. Finally, candidates should be aware that certain ratios may be defined and calculated differently. When alternative ratio definitions exist and no specific definition is given, candidates should use the ratio definitions emphasized in the readings.

## 1

## INTRODUCTION

Financial reporting standards provide principles for preparing financial reports and determine the types and amounts of information that must be provided to users of financial statements, including investors and creditors, so that they may make informed decisions. An understanding of the underlying framework of financial reporting standards, which is broader than knowledge of specific accounting rules, will allow an analyst to assess the valuation implications of financial statement elements and transactions—including transactions, such as those that represent new developments, which are not specifically addressed by the standards.

This learning module discusses the objective of financial reporting and the importance of financial reporting standards in security analysis and valuation, describes the roles of financial reporting standard-setting bodies and regulatory authorities and several of the financial reporting standard-setting bodies and regulatory authorities, and describes the International Financial Reporting Standards (IFRS) reporting framework<sup>1</sup> and general requirements for financial statements. It also discusses the elements of financial statements and the general requirements for financial statements.

## 2

## THE OBJECTIVE OF FINANCIAL REPORTING



describe the objective of financial reporting and the importance of financial reporting standards in security analysis and valuation

The financial reports of a company include financial statements and other supplemental disclosures necessary to assess a company's financial position and periodic financial performance. Financial reporting is based on a simple premise. The International Accounting Standards Board (IASB), which sets financial reporting standards that have been adopted in many countries, said in its *Conceptual Framework for Financial Reporting* (*Conceptual Framework*) that the objective of financial reporting is to provide financial information that is useful to users in making decisions about providing resources to the reporting entity, where those decisions relate to equity and debt instruments, or loans or other forms of credit, and in influencing management's actions that affect the use of the entity's economic resources.<sup>2</sup>

A fully articulated framework is an essential first step to guide the development of a set of standards. Before the establishment and broad adoption of IFRS, financial reporting standards were primarily developed independently by each country's standard-setting body. This independent standard setting process created a wide range of standards, some of which were quite comprehensive and complex (rules-based standards), and others that were more general (principles-based standards). The globalization of capital flows and various accounting scandals increased awareness of the need for more uniform, high quality global financial reporting standards and provided the impetus for stronger coordination among the major standard-setting bodies. Such coordination is also a natural outgrowth of the increased globalization of capital markets.

<sup>1</sup> The body of standards issued by the International Accounting Standards Board (IASB) is referred to as International Financial Reporting Standards.

<sup>2</sup> In March 2018, the IASB updated the *Conceptual Framework for Financial Reporting* originally adopted in 2010.

Developing financial reporting standards is complicated because the underlying economic activities are complicated and dynamic. The financial transactions and financial position that companies present in their financial reports are also complex. Furthermore, uncertainty about various aspects of transactions often results in the need for accruals and estimates, both of which necessitate judgment. Judgment varies from one preparer to the next. Accordingly, standards are needed to achieve some amount of consistency in these judgments. Even with such standards, there usually will be no single correct answer to the question of how to reflect economic activity in financial reports. Nevertheless, financial reporting standards try to limit the range of acceptable answers to increase consistency in financial reports.

The IASB and the US-based Financial Accounting Standards Board (FASB) have developed similar financial reporting frameworks which specify the overall objective and qualities of information to be provided. Financial reports are intended to provide information to many users, including investors, creditors, employees, customers, and others. As a result, financial reports are *not* designed solely with asset valuation in mind. However, financial reports provide important inputs into the process of valuing a company or the securities a company issues. Understanding the financial reporting framework—including how and when judgements, estimates, and management policy decisions can affect the numbers reported—enables an analyst to evaluate the information reported and to use the information appropriately when assessing a company's financial performance. Clearly, such an understanding is also important in assessing the financial impact of business decisions by, and in making comparisons across, entities.

## ACCOUNTING STANDARDS BOARDS

### 3

- ☐ describe the objective of financial reporting and the importance of financial reporting standards in security analysis and valuation
- ☐ describe the roles of financial reporting standard-setting bodies and regulatory authorities in establishing and enforcing reporting standards

A distinction must be made between standard-setting bodies and regulatory authorities. Standard-setting bodies, such as the IASB and FASB, are typically private sector, self-regulated organizations with board members who are experienced accountants, auditors, users of financial statements, and academics. The requirement to prepare financial reports in accordance with specified accounting standards is the responsibility of regulatory authorities. Regulatory authorities, such as the Accounting and Corporate Regulatory Authority in Singapore, the Securities and Exchange Commission (SEC) in the United States, and the Securities and Exchange Commission of Brazil, have the legal authority to enforce financial reporting requirements and exert other controls over entities that participate in the capital markets within their jurisdiction.

In other words, *generally*, standard-setting bodies set the standards and regulatory authorities recognise and enforce the standards. Without the recognition of the standards by the regulatory authorities, the private sector standard-setting bodies would have no authority. Note, however, that regulators often retain the legal authority to establish financial reporting standards in their jurisdiction and can overrule the private sector standard-setting bodies.

## Accounting Standards Boards

While accounting standards boards exist in virtually every national market, the IASB and FASB are the two most influential because the vast majority of issuers in global financial markets prepare their financial statements under IFRS or US GAAP.

### *International Accounting Standards Board*

The IASB is the independent standard-setting body of the IFRS Foundation, an independent, not-for-profit private sector organization. The Trustees of the IFRS Foundation reflect a diversity of geographical and professional backgrounds. The Trustees appoint the members of the IASB and are accountable to a monitoring board composed of public authorities that include representatives from the European Commission, IOSCO, the Japan Financial Services Agency, and the US SEC, with the chairman of the Basel Committee on Banking Supervision as an observer.

The Trustees of the IFRS Foundation are committed to act in the public interest. The principle objectives of the IFRS Foundation are to develop and promote the use and adoption of a single set of high quality financial standards; to ensure the standards result in transparent, comparable, and decision-useful information while taking into account the needs of a range of sizes and types of entities in diverse economic settings; and to promote the convergence of national accounting standards and IFRS. The Trustees are responsible for ensuring that the IASB acts and is perceived to act independently and in the best interests of users of the financial statements.

The members of the IASB are appointed by the Trustees on the basis of professional competence and practical experience and reflect a diversity of geographical and professional backgrounds. The members deliberate, develop, and issue international financial reporting standards,<sup>3</sup> assisted by advice on the standards, and their application, from advisory bodies whose members represent a wide range of organizations and individuals that are affected by and interested in international financial reporting.

The IASB has a formal, structured process that it goes through when deliberating, developing, and issuing international financial reporting standards. A simplified version of the typical process is as follows. An issue is identified as a priority for consideration and placed on the IASB's agenda. After considering an issue, which may include soliciting advice from others including national standard-setters, the IASB may publish an exposure draft for public comment. After reviewing the comments and input of others, the IASB may issue a new or revised financial reporting standard. These standards are authoritative to the extent that they are recognised and adopted by regulatory authorities.

### *Financial Accounting Standards Board*

The FASB and its predecessor organizations have been issuing financial reporting standards in the United States since the 1930s. The FASB operates within a structure similar to that of the IASB. The Financial Accounting Foundation oversees, administers, and finances the organization. The Foundation ensures the independence of the standard-setting process and appoints members to the FASB and related advisory entities.

The FASB issues new and revised standards to improve standards of financial reporting so that decision-useful information is provided to users of financial reports. This is done through a thorough and independent process that seeks input from stakeholders

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<sup>3</sup> Although the name of the IASB incorporates "Accounting Standards" and early standards were titled International Accounting Standards (IAS), the term "International Financial Reporting Standards" (IFRS) is being used for new standards. The use of the words "financial reporting" recognizes the importance of disclosures outside of the core financial statements, such as management discussion of the business, risks, and future plans.

and is overseen by the Financial Accounting Foundation. The steps in the process are similar to those described for the IASB. The outputs of the standard-setting process are contained in the FASB Accounting Standards Codification™ (Codification).<sup>4</sup> The Codification, organized by topic, is the source of authoritative US generally accepted accounting principles to be applied to non-governmental entities.

US GAAP, as established by the FASB, is officially recognized as authoritative by the SEC; however the SEC retains the authority to establish accounting standards and financial reporting requirements.<sup>5</sup> Although it has rarely overruled the FASB, the SEC does issue authoritative financial reporting guidance including Staff Accounting Bulletins. These bulletins reflect the SEC's views regarding accounting-related disclosure practices and can be found on the SEC website. Certain portions—but not all portions—of the SEC regulations, releases, interpretations, and guidance are included for reference in the FASB Codification.

## THE INTERNATIONAL FINANCIAL REPORTING STANDARDS FRAMEWORK

# 4

- ☐ describe the objective of financial reporting and the importance of financial reporting standards in security analysis and valuation
- ☐ describe the International Accounting Standards Board's conceptual framework, including qualitative characteristics of financial reports, constraints on financial reports, and required reporting elements

The IASB's *Conceptual Framework for Financial Reporting* sets forth the concepts that underlie the preparation and presentation of financial statements for external users.<sup>6</sup> The framework is designed to: assist standard setters in developing and reviewing standards; assist preparers of financial statements in applying standards and in dealing with issues not specifically covered by existing standards; assist auditors in forming an opinion on financial statements; and assist users in interpreting financial statement information. The objective of financial reporting is to provide financial information that is useful to current and potential economic resource providers in making decisions, and all other aspects of the framework flow from that central objective.

4 The Codification combines literature issued by various standard setters, including the FASB, the Emerging Issues Task Force (EITF), the Derivative Implementation Group (DIG), and the American Institute of Certified Public Accountants (AICPA).

5 The FASB has a similar conceptual framework which it describes on its website as follows: "The Conceptual Framework (or 'Concepts Statements') is a body of interrelated objectives and fundamentals. The objectives identify the goals and purposes of financial reporting and the fundamentals are the underlying concepts that help achieve those objectives. Those concepts provide guidance in selecting transactions, events and circumstances to be accounted for, how they should be recognized and measured, and how they should be summarized and reported." Note that under IFRS, the conceptual framework is considered authoritative guidance, but under US GAAP, the conceptual framework is not authoritative.

6 The FASB has a similar conceptual framework which it describes on its website as follows: "The Conceptual Framework (or 'Concepts Statements') is a body of interrelated objectives and fundamentals. The objectives identify the goals and purposes of financial reporting and the fundamentals are the underlying concepts that help achieve those objectives. Those concepts provide guidance in selecting transactions, events and circumstances to be accounted for, how they should be recognized and measured, and how they should be summarized and reported." Note that under IFRS, the conceptual framework is considered authoritative guidance, but under US GAAP, the conceptual framework is not authoritative.

The primary users of financial reports include investors, lenders, and other creditors. Other users may also find the financial information useful for making economic decisions. The types of economic decisions differ by users, so the specific information needed differs as well. However, although users may have unique information needs, some information needs are common across all users. For example, users need information about a company's a) financial position, including its resources and its financial obligations; b) financial performance, including how and why the company's financial position changed in the past, which can be useful in evaluating potential changes in the future; and c) cash position, including how the company obtained cash (by selling its products and services, borrowing, and other methods) and how it used cash (by paying expenses, investing in new equipment, paying dividends, and other methods).

Information that is helpful to users in assessing future net cash inflows to the entity includes information about the economic resources of (assets) and claims against (liabilities and equity) the entity, and about how well company management and the governing board utilized the resources of the entity. Financial reports are useful in estimating the economic value of an entity.

## Qualitative Characteristics of Financial Reports

Flowing from the central objective of providing information that is *useful* to providers of resources, the *Conceptual Framework* identifies two fundamental qualitative characteristics that make financial information useful: relevance and faithful representation.<sup>7</sup> The concept of materiality is discussed within the context of relevance.

1. **Relevance:** Information is relevant if it would potentially affect or make a difference in users' decisions. The information can have predictive value (useful in making forecasts), confirmatory value (useful to evaluate past decisions or forecasts), or both. In other words, relevant information helps users of financial information to evaluate past, present, and future events, or to confirm or correct their past evaluations in a decision-making context.  
**Materiality:** Information is considered to be material if omission or misstatement of the information could influence users' decisions. Materiality is a function of the nature and/or magnitude of the information.
2. **Faithful representation:** Information that faithfully represents an economic phenomenon that it purports to represent is ideally complete, neutral, and free from error. Complete means that all information necessary to understand the phenomenon is depicted. Neutral means that information is selected and presented without bias. In other words, the information is not presented in such a manner as to bias the users' decisions. Free from error means that there are no errors of commission or omission in the description of the economic phenomenon, and that an appropriate process to arrive at the reported information was selected and was adhered to without error. Faithful representation maximizes the qualities of complete, neutral, and free from error to the extent possible. Faithful representation is sometimes referred to as "reliability."

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<sup>7</sup> *Conceptual Framework for Financial Reporting*.



Relevance and faithful representation are the fundamental, most critical characteristics of useful financial information. In addition the *Conceptual Framework* identifies four enhancing qualitative characteristics: comparability, verifiability, timeliness, and understandability.

1. *Comparability*: Comparability allows users “to identify and understand similarities and differences of items.” Information presented in a consistent manner over time and across entities enables users to make comparisons more easily than information with variations in how similar economic phenomena are represented.
2. *Verifiability*: Verifiability means that different knowledgeable and independent observers would agree that the information presented faithfully represents the economic phenomena it purports to represent.
3. *Timeliness*: Timely information is available to decision makers prior to their making a decision.
4. *Understandability*: Clear and concise presentation of information enhances understandability. Information should be prepared for and be understandable by users who have a reasonable knowledge of business and economic activities, and who are willing to study the information with diligence. Information that is useful should not be excluded simply because it is difficult to understand, and it may be necessary for users to seek assistance to understand information about complex economic phenomena.

Financial information exhibiting these qualitative characteristics—fundamental and enhancing—should be useful for making economic decisions.

## Constraints on Financial Reports

Although it would be ideal for financial statements to exhibit all of these qualitative characteristics and thus achieve maximum usefulness, it may be necessary to make tradeoffs across the enhancing characteristics. The application of the enhancing characteristics follows no set order of priority and each enhancing characteristic may take priority over the others. The aim is an appropriate balance among the enhancing characteristics.

A pervasive constraint on useful financial reporting is the cost of providing and using this information. Optimally, benefits derived from information should exceed the costs of providing and using it. Again, the aim is a balance between costs and benefits.

A limitation of financial reporting involves information that is not included. Financial statements, by necessity, omit information that is non-quantifiable. For example, the creativity, innovation, and competence of a company’s work force are not directly captured in the financial statements. Similarly, customer loyalty, a positive corporate culture, environmental responsibility, and many other aspects about a company may not be directly reflected in the financial statements. Of course, to the extent that these items result in superior financial performance, a company’s financial reports should reflect the results.

### EXAMPLE 1

#### Balancing Qualitative Characteristics of Useful Information

A tradeoff between enhancing qualitative characteristics often occurs. For example, when a company records sales revenue, it is required to simultaneously estimate and record an expense for potential bad debts (uncollectible accounts)

if the sale is made on credit. Including this estimated expense is considered to represent the economic event faithfully and to provide relevant information about the net profits for the accounting period. The information is timely and understandable; but because bad debts may not be known with certainty until a later period, inclusion of this estimated expense involves a sacrifice of verifiability. The bad debt expense is simply an estimate. Accordingly, it is apparent that it is not always possible to simultaneously fulfill all qualitative characteristics.

## 5

## THE ELEMENTS OF FINANCIAL STATEMENTS

- ☐ describe the International Accounting Standards Board's conceptual framework, including qualitative characteristics of financial reports, constraints on financial reports, and required reporting elements
- ☐ describe general requirements for financial statements under International Financial Reporting Standards (IFRS)

Financial statements portray the financial effects of transactions and other events by grouping them into broad classes (elements) according to their economic characteristics. Three elements of financial statements are directly related to the measurement of financial position: assets, liabilities, and equity.

- **Assets:** A present economic resource controlled by the entity as a result of past events. An economic resource is a right that has the potential to produce economic benefits. Assets are what a company owns (e.g., inventory and equipment).
- **Liabilities:** A present obligation of the entity to transfer an economic resource as a result of past events. An obligation is a duty or responsibility that the entity has no practical ability to avoid. Liabilities are what a company owes (e.g., bank borrowings).
- **Equity:** Assets less liabilities. Equity is the residual interest in the assets after subtracting the liabilities.

The elements of financial statements directly related to the measurement of performance (profit and related measures) are income and expenses.

- **Income:** Increases in assets, or decreases in liabilities, that result in increases in equity, other than those relating to contributions from holders of equity claims. Income includes both revenues and gains. Revenues represent income from the ordinary operating activities of the enterprise (e.g., the sale of products or provision of services). Gains may result from ordinary activities or other activities (the sale of surplus equipment).
- **Expenses:** Decreases in assets, or increases in liabilities, that result in decreases in equity, other than those relating to distributions to holders of equity claims. Expenses include cost of goods sold (which may include wages and rent) and selling and administrative expenses. Losses are also considered expenses and can result from the sale of assets at less than their carrying values, impairments of asset values and a variety of other items.

## Underlying Assumptions in Financial Statements

Two important assumptions underlie financial statements: accrual accounting and going concern. These assumptions determine how financial statement elements are recognized and measured.

The use of “accrual accounting” assumes that financial statements should reflect transactions in the period when they actually occur, not necessarily when cash movements occur. For example, a company reports revenues *when they are earned (when the performance obligations have been satisfied)*, regardless of whether the company received cash before or after delivering the product, at the time of delivery. Accrual accounting helps ensure related revenues and expenses are recognized in the same reporting period, resulting in a more meaningful measure of net income.

“Going concern” refers to the assumption that the company will continue in business for the foreseeable future. To illustrate, consider the value of a company’s inventory if it is assumed that the inventory can be sold over a normal period of time versus the value of that same inventory if it is assumed that the inventory must all be sold in a day (or a week). Companies with the intent to liquidate or materially curtail operations would require different information for a fair presentation.

## Recognition of Financial Statement Elements

Recognition means that an item is included in the balance sheet or income statement. Recognition occurs if the item meets the definition of an element and satisfies the criteria for recognition. Recognition is appropriate if it results in both relevant information about assets, liabilities, equity, income and expenses and a faithful representation of those items, because the aim is to provide information that is useful to investors, lenders and other creditors.

## Measurement of Financial Statement Elements

Measurement is the process of determining the monetary amount at which the elements of the financial statements are recognized and carried in the balance sheet and income statement. The following alternative bases of measurement are used to different degrees and in varying combinations to measure assets and liabilities:

- **Historical cost:** Historical cost is simply the amount of cash or cash equivalents paid to purchase an asset, including any costs of acquisition and/or preparation, such as transportation expense or sales tax. If the asset was not bought for cash, historical cost is the fair value of whatever was given in order to buy the asset. When referring to liabilities, historical cost means the amount of proceeds received in exchange for the obligation.
- **Amortised cost:** Historical cost adjusted for amortisation, depreciation, or depletion and/or impairment.
- **Current cost:** In reference to assets, current cost is the amount of cash or cash equivalents that would have to be paid to buy the same or an equivalent asset today (i.e., replacement cost). In reference to liabilities, the current cost basis of measurement means the undiscounted amount of cash or cash equivalents that would be required to settle the obligation today.
- **Realizable (settlement) value:** In reference to assets, realizable value is the amount of cash or cash equivalents that could currently be obtained by selling the asset in an orderly disposal. For liabilities, the equivalent to realizable value is called “settlement value”—that is, settlement value is the undiscounted amount of cash or cash equivalents expected to be paid to satisfy the liabilities in the normal course of business.

- **Present value (PV):** For assets, present value is the net present value of the future expected cash inflows that the asset is expected to generate in the normal course of business, discounted at an appropriate interest rate. For liabilities, present value is the present value of the future net cash outflows that are expected to be required to settle the liabilities in the normal course of business, discounted at an appropriate interest rate.
- **Fair value:** Fair value is defined as an exit price, the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. This may involve either market measures or present value measures depending on the availability of information.

## 6

## MAJOR FINANCIAL STATEMENTS



describe the roles of the statement of financial position, statement of comprehensive income, statement of changes in equity, and statement of cash flows in evaluating a company's performance and financial position

In performing an equity or credit analysis of a company, an analyst collects a great deal of information. The nature of the information collected will vary on the basis of the individual decision to be made (or the specific purpose of the analysis) but will typically include information about the economy, industry, and company, as well as information about comparable peer companies. Information from outside the company will likely include economic statistics, industry reports, trade publications, and databases containing information on competitors. The company itself provides core information for analysis on its website and in its financial reports, press releases, investor conference calls, and webcasts.

Companies prepare financial reports at regular intervals (annually, semiannually, and/or quarterly depending on the applicable regulatory requirements). Financial reports include financial statements along with supplemental disclosures necessary to assess the company's financial position and periodic performance.

Financial statements are the result of an accounting process that records a company's economic transactions, following the applicable accounting standards and principles. These statements summarize the accounting information, mainly for users outside the company (such as investors, creditors, analysts, and others) because insiders have direct access to the underlying financial data summarized in the financial statements and to other information that is not included in the financial reporting process.

Financial statements of public companies and large, privately owned companies are typically audited by independent public accountants, who provide an opinion on whether the financial statements present fairly the company's performance and financial position, in accordance with a specified, applicable set of accounting standards and principles.

## Financial Statements and Supplementary Information

A complete set of financial statements includes a statement of financial position (i.e., a balance sheet), a statement of comprehensive income (i.e., a single statement of comprehensive income or an income statement and a statement of comprehensive income), a statement of changes in equity, and a statement of cash flows.

The balance sheet portrays the company's financial position at a given point in time. The statement of comprehensive income and statement of cash flows present different aspects of a company's performance over a period of time. The statement of changes in equity provides additional information regarding the changes in a company's financial position over a period of time. In addition, the accompanying required notes, or footnotes, are an integral part of a complete set of financial statements. The financial statements are reported on a consolidated basis, meaning that they include the relevant account balances of subsidiary companies under the control of the parent (reporting) company.

Along with the required financial statements, a company typically provides additional information in its financial reports. In many jurisdictions, some or all of this additional information is mandated by regulators or accounting standards boards. The additional information provided may include a letter from the chairman of the company, a report from management discussing the results (typically called management discussion and analysis [MD&A]), an external auditor's report providing assurances that the financial statements comply with applicable accounting standards and that internal controls over financial reporting are functioning, a governance report describing the structure of the company's board of directors, and a corporate responsibility report. As part of his or her analysis, the financial analyst should read and assess this additional information along with the financial statements. The following sections describe and illustrate each financial statement and some of the additional information.

## BALANCE SHEET (STATEMENT OF FINANCIAL POSITION)

7



describe the roles of the statement of financial position, statement of comprehensive income, statement of changes in equity, and statement of cash flows in evaluating a company's performance and financial position

The **balance sheet** (also called the **statement of financial position** or **statement of financial condition**) presents a company's financial position by disclosing the resources the company controls (assets) and its obligations to lenders and other creditors (liabilities) at a specific point in time. **Owners' equity** (sometimes called "net assets") represents the excess of assets over liabilities. This amount is attributable to the company's owners or shareholders. Owners' equity is the owners' residual interest in (i.e., residual claim on) the company's assets after deducting its liabilities. The total amount of owner's equity is also known as the "book value" of a company.

The relationship among the three parts of the balance sheet (assets, liabilities, and owners' equity) can be expressed in the following equation form:  $\text{Assets} = \text{Liabilities} + \text{Owners' equity}$ . This equation (sometimes called the accounting equation or the balance sheet equation) shows that the total amount of assets must equal or *balance* with the combined total amounts of liabilities and owners' equity. Alternatively, the equation may be rearranged as follows:  $\text{Assets} - \text{Liabilities} = \text{Owners' equity}$ . This

formulation emphasizes the residual claim aspect of owners' equity. Depending on the form of the organization, owners' equity may be referred to as "partners' capital" or "shareholders' equity" or "shareholders' funds."

Exhibit 1 presents the balance sheet of the Volkswagen Group from its Annual Report 2017.

### Exhibit 1: Balance Sheet of the Volkswagen Group (Excerpt)

€ million	31 Dec. 2017	31 Dec. 2016
<b>Assets</b>		
<b>Noncurrent assets</b>		
Intangible assets	63,419	62,599
Property, plant and equipment	55,243	54,033
Lease assets	39,254	38,439
Investment property	468	512
Equity-accounted investments	8,205	8,616
Other equity investments	1,318	996
Financial services receivables	73,249	68,402
Other financial assets	8,455	8,256
Other receivables	2,252	2,009
Tax receivables	407	392
Deferred tax assets	9,810	9,756
	<b>262,081</b>	<b>254,010</b>
<b>Current assets</b>		
Inventories	40,415	38,978
Trade receivables	13,357	12,187
Financial services receivables	53,145	49,673
Other financial assets	11,998	11,844
Other receivables	5,346	5,130
Tax receivables	1,339	1,126
Marketable securities	15,939	17,520
Cash, cash equivalents and time deposits	18,457	19,265
Assets held for sale	115	—
	<b>160,112</b>	<b>155,722</b>
<b>Total assets</b>	<b>422,193</b>	<b>409,732</b>
<b>Equity and Liabilities</b>		
<b>Equity</b>		
Subscribed capital	1,283	1,283
Capital reserves	14,551	14,551
Retained earnings	81,367	70,446
Other reserves	560	(1,158)
Equity attributable to Volkswagen AG hybrid capital investors	11,088	7,567
Equity attributable to Volkswagen AG shareholders and hybrid capital investors	108,849	92,689

**Balance Sheet (Statement of Financial Position)**

€ million	31 Dec. 2017	31 Dec. 2016
Noncontrolling interests	229	221
	<b>109,077</b>	<b>92,910</b>
<b>Noncurrent liabilities</b>		
Financial liabilities	81,628	66,358
Other financial liabilities	2,665	4,488
Other liabilities	6,199	5,664
Deferred tax liabilities	5,636	4,745
Provisions for pensions	32,730	33,012
Provisions for taxes	3,030	3,556
Other provisions	20,839	21,482
	<b>152,726</b>	<b>139,306</b>
<b>Current liabilities</b>		
Put options and compensation rights granted to noncontrolling interest shareholders	3,795	3,849
Financial liabilities	81,844	88,461
Trade payables	23,046	22,794
Tax payables	430	500
Other financial liabilities	8,570	9,438
Other liabilities	15,961	15,461
Provisions for taxes	1,397	1,301
Other provisions	25,347	35,711
	<b>160,389</b>	<b>177,515</b>
<b>Total equity and liabilities</b>	<b>422,193</b>	<b>409,732</b>

*Note:* Numbers are as shown in the annual report and may not precisely add because of rounding.

*Source:* Volkswagen 2017 annual report

In Exhibit 1, the balance sheet is presented with the most recent year in the left column and the immediately preceeding year in the right column. Although this is a common presentation, analysts should be careful when reading financial statements. In some cases, the ordering may be reversed, with the earlier year(s) on the left and the most recent year on the far right.

At 31 December 2017, Volkswagen's total resources or assets were €422 billion. This number is the sum of non-current assets of €262 billion and current assets of €160 billion.<sup>8</sup> Total equity was €109 billion. Although Volkswagen does not give a total amount for all the balance sheet liabilities, it can be determined by adding the non-current and current liabilities, €153 billion + €160 billion = €313 billion.<sup>9</sup>

<sup>8</sup> Current assets are defined, in general, as those assets that are cash or cash equivalents; are held for trading; or are expected to be converted to cash (realized), sold, or consumed within 12 months or the company's normal operating cycle. All other assets are classified as non-current.

<sup>9</sup> Current liabilities are defined, in general, as those that are expected to be settled within 12 months or the company's normal operating cycle. All other liabilities are classified as non-current.

Referring back to the basic accounting equation,  $\text{Assets} = \text{Liabilities} + \text{Equity}$ , we have €422 billion = €313 billion + €109 billion. In other words, Volkswagen has assets of €422 billion, owes €313 billion, and thus has equity of €109 billion. Using the balance sheet and analyzing the financial statements and the changes in reported account balances, the analyst can answer such questions as

- Has the company's liquidity (ability to meet short-term obligations) improved?
- Is the company solvent (does it have sufficient resources to cover its obligations)?
- What is the company's financial position relative to other companies in the industry?

Volkswagen, a German-based automobile manufacturer, prepares its financial statements in accordance with International Financial Reporting Standards (IFRS). IFRS require companies to present balance sheets that show current and non-current assets and current and non-current liabilities as separate classifications. However, IFRS do not prescribe a particular ordering or format, and the order in which companies present their balance sheet items is largely a function of tradition.

As shown, Volkswagen presents non-current assets before current assets, owners' equity before liabilities, and non-current liabilities before current liabilities. This method generally reflects a presentation from least liquid to most liquid. In other countries, the typical order of presentation may differ. For example, in the United States, Australia, and Canada, companies usually present their assets and liabilities from most liquid to least liquid. Accordingly, "Cash" or "Cash and Equivalents" is typically the first asset shown, and equity is presented after liabilities.

As a basis for comparison, Exhibit 2 presents the balance sheet of Walmart, Inc. (Walmart) from its 2018 annual report, with a fiscal year end of 31 January, which is prepared in accordance with US GAAP.

#### Exhibit 2: Walmart Consolidated Balance Sheet

	As of 31 January	
(Amounts in \$ millions)	2018	2017
<b>ASSETS</b>		
<b>Current assets:</b>		
Cash and cash equivalents	6,756	6,867
Receivables, net	5,614	5,835
Inventories	43,783	43,046
Prepaid expenses and other	3,511	1,941
Total current assets	59,664	57,689
<b>Property and equipment:</b>		
Property and equipment	185,154	179,492
Less accumulated depreciation	(77,479)	(71,782)
Property and equipment, net	107,675	107,710
<b>Property under capital lease and financing obligations:</b>		
Property under capital lease and financing obligations	12,703	11,637
Less accumulated amortization	(5,560)	(5,169)
Property under capital lease and financing obligations, net	7,143	6,468



**Statement of Comprehensive Income**

(Amounts in \$ millions)	As of 31 January	
	2018	2017
Goodwill	18,242	17,037
Other assets and deferred charges	11,798	9,921
<b>Total assets</b>	<b>204,522</b>	<b>198,825</b>
<b>LIABILITIES AND EQUITY</b>		
<b>Current liabilities:</b>		
Short-term borrowings	5,257	1,099
Accounts payable	46,092	41,433
Accrued liabilities	22,122	20,654
Accrued income taxes	645	921
Long-term debt due within one year	3,738	2,256
Capital lease and financing obligations due within one year	667	565
<b>Total current liabilities</b>	<b>78,521</b>	<b>66,928</b>
Long-term debt	30,045	36,015
Long-term capital lease and financing obligations	6,780	6,003
Deferred income taxes and other	8,354	9,344
Commitments and contingencies		
<b>Equity:</b>		
Common stock	295	305
Capital in excess of par value	2,648	2,371
Retained earnings	85,107	89,354
Accumulated other comprehensive loss	(10,181)	(14,232)
Total Walmart shareholders' equity	77,869	77,798
Noncontrolling interest	2,953	2,737
Total equity	80,822	80,535
<b>Total liabilities and equity</b>	<b>204,522</b>	<b>198,825</b>

Source: Walmart 2018 annual report.

As of 31 January 2018, Walmart has total assets of \$205 billion. Liabilities and other non-equity claims total \$124 billion, and equity is \$81 billion.

**STATEMENT OF COMPREHENSIVE INCOME****8**

describe the roles of the statement of financial position, statement of comprehensive income, statement of changes in equity, and statement of cash flows in evaluating a company's performance and financial position

The statement of comprehensive income can be presented as a single statement of comprehensive income or as two statements, (1) an income statement and (2) a statement of comprehensive income that begins with profit or loss from the income statement.

## Income Statement

The income statement presents information on the financial performance of a company's business activities over a period of time. It communicates how much **revenue** and other income the company generated during a period and the expenses it incurred to generate that revenue and other income. Revenue typically refers to amounts charged for the delivery of goods or services in the ordinary activities of a business. Other income typically includes gains or losses that do not arise from the ordinary activities of the business, such as profit on a business disposal. **Expenses** reflect outflows, depletions of assets, and incurrences of liabilities that decrease equity. Expenses typically include such items as cost of sales (cost of goods sold), selling and administrative expenses, and income tax expenses and may be defined to include losses. Net income (revenue plus other income minus expenses) on the income statement is often referred to as the "bottom line" because of its proximity to the bottom of the income statement. Net income may also be referred to as "net earnings," "net profit," and "profit or loss." In the event that expenses exceed revenues and other income, the result is referred to as "net loss."

The income statement is sometimes referred to as a **statement of operations** or **profit and loss (P&L) statement**. The basic format of the income statement is Revenue – Expenses = Net income.

In general terms, when one company (the parent) controls another company (the subsidiary), the parent presents its own financial statement information consolidated with that of the subsidiary. (When a parent company owns more than 50 percent of the voting shares of a subsidiary company, it is presumed to control the subsidiary and thus presents consolidated financial statements.) Each line item of the consolidated income statement includes the entire amount from the relevant line item on the subsidiary's income statement (after removing any intercompany transactions). However, if the parent does not own 100 percent of the subsidiary, it is necessary for the parent to present an allocation of net income to the minority interests. Minority interests, also called non-controlling interests, refer to owners of the remaining shares of the subsidiary that are not owned by the parent. The share of consolidated net income attributable to minority interests is shown at the bottom of the income statement along with the net income attributable to shareholders of the parent company. Exhibit 3 presents the income statements of the Volkswagen Group from its 2017 annual report.

### Exhibit 3: Income Statement of the Volkswagen Group (Excerpt)

€ million	2017	2016
Sales revenue	230,682	217,267
Cost of sales	(188,140)	(176,270)
<b>Gross result</b>	<b>42,542</b>	<b>40,997</b>
Distribution expenses	(22,710)	(22,700)
Administrative expenses	(8,254)	(7,336)
Other operating income	14,500	13,049
Other operating expenses	(12,259)	(16,907)
<b>Operating result</b>	<b>13,818</b>	<b>7,103</b>

## Statement of Comprehensive Income

€ million	2017	2016
Share of the result of equity-accounted investments	3,482	3,497
Interest income	951	1,285
Interest expenses	(2,317)	(2,955)
Other financial result	(2,022)	(1,638)
<b>Financial result</b>	<b>94</b>	<b>189</b>
<b>Earnings before tax</b>	<b>13,913</b>	<b>7,292</b>
Income tax income/expense	(2,275)	(1,912)
Current	(3,205)	(3,273)
Deferred	930	1,361
<b>Earnings after tax</b>	<b>11,638</b>	<b>5,379</b>
of which attributable to		
Noncontrolling interests	10	10
Volkswagen AG hybrid capital investors	274	225
Volkswagen AG shareholders	11,354	5,144
<b>Basic earnings per ordinary share in €</b>	<b>22.63</b>	<b>10.24</b>
<b>Diluted earnings per preferred share in €</b>	<b>22.69</b>	<b>10.30</b>

*Note:* The numbers are as shown in the annual report and may not add because of rounding.

*Source:* 2017 Volkswagen annual report.

Exhibit 3 shows that Volkswagen's sales revenue for the year ended 31 December 2017 was €231 billion. Subtracting cost of sales from revenue gives gross profit (called "gross results" by Volkswagen and "gross margin" by other companies) of €43 billion. After subtracting operating costs and expenses and adding other operating income, the company's operating profit (called "operating result" by Volkswagen) totals €14 billion. Operating profit represents the results of the company's usual business activities before deducting interest expense or taxes. Operating profit (also called operating income in addition to operating result) is thus often referred to as earnings before interest and taxes (EBIT).

Next, operating profit is increased by Volkswagen's share of the profits generated by certain of its investments (€3.5 billion) plus interest income of €1.0 billion, and decreased by losses from its other financial activities (€2.0 billion) and by interest expense of €2.3 billion, resulting in profit (earnings) before tax of €13.9 billion. Total income tax expense for 2017 was €2.3 billion, resulting in profit after tax (net income) of €11.6 billion. After allocating the profits attributable to minority interest ownership in Volkswagen subsidiary companies, the profit attributable to shareholders of Volkswagen for 2017 was €11.4 billion.

Companies present both basic and diluted earnings per share on the face of the income statement. Earnings per share numbers represent net income attributable to the class of shareholders divided by the relevant number of shares outstanding during the period. Basic earnings per share is calculated using the weighted-average number of common (ordinary) shares that were actually outstanding during the period and the profit or loss attributable to the common shareowners. Diluted earnings per share uses **diluted shares**—the number of shares that would hypothetically be outstanding if potentially dilutive claims on common shares (e.g., stock options or convertible bonds) were exercised or converted by their holders—and an appropriately adjusted profit or loss attributable to the common shareowners.

Volkswagen has two types of shareholders, ordinary and preferred, and presents earnings per share information for both, although there is no requirement to present earnings per share information for preferred shareowners. Volkswagen's basic earnings per ordinary share was €22.63. A note to the company's financial statements explains that this number was calculated as follows: €11.4 billion profit attributable to shareholders of Volkswagen, of which €6.8 billion is attributable to ordinary shareholders and the balance is attributable to preferred shareholders. The €6.8 billion attributable to ordinary shareholders divided by the weighted-average number of ordinary shares of 0.295 billion shares equals basic earnings per share of €22.63. Similar detail is provided in the notes for each of the earnings per share numbers.

An analyst examining the income statement might note that Volkswagen was profitable in both years. The company's profits increased substantially in 2017, primarily because of higher sales and lower other operating expenses (footnotes reveal this was largely due to \$4 billion less in litigation expenses in 2017). The analyst might formulate questions related to profitability, such as the following:

- Is the change in revenue related to an increase in units sold, an increase in prices, or some combination?
- If the company has multiple business segments (for example, Volkswagen's segments include passenger cars, light commercial vehicles, and financial services, among others), how are the segments' revenue and profits changing?
- How does the company compare with other companies in the industry?

Answering such questions requires the analyst to gather, analyze, and interpret information from a number of sources, including, but not limited to, the income statement, corresponding notes and the management's discussion and analysis.

## Other Comprehensive Income

Comprehensive income includes all items that impact owners' equity but which are not the result of transactions with shareowners. Some of these items are included in the calculation of net income, and some are included in other comprehensive income (OCI). When comprehensive income is presented in two statements, the statement of comprehensive income begins with the profit or loss from the income statement and then presents the components of OCI.

Exhibit 4 presents an excerpt from the statement of comprehensive income of the Volkswagen Group from its 2017 annual report.

### Exhibit 4: Statement of Comprehensive Income of the Volkswagen Group (Excerpt)

€ million	Fiscal Year Ended 31 December 2017
<b>Earnings after tax</b>	<b>11,638</b>
Pension plan remeasurements recognized in other comprehensive income	
Pension plan remeasurements recognized in other comprehensive income, before tax	785
Deferred taxes relating to pension plan remeasurements recognized in other comprehensive income	(198)
Pension plan remeasurements recognized in other comprehensive income, net of tax	588
Share of other comprehensive income of equity-accounted investments that will not be reclassified to profit or loss, net of tax	96

€ million	Fiscal Year Ended 31 December 2017
<b>Items that will not be reclassified to profit or loss</b>	<b>683</b>
Exchange differences on translating foreign operations	
Unrealized currency translation gains/losses	(2,095)
Transferred to profit or loss	(4)
Exchange differences on translating foreign operations, before tax	(2,099)
Deferred taxes relating to exchange differences on translating foreign operations	(8)
Exchange differences on translating foreign operations, net of tax	(2,107)
Cash flow hedges	
Fair value changes recognized in other comprehensive income	6,137
Transferred to profit or loss	(558)
Cash flow hedges, before tax	5,579
Deferred taxes relating to cash flow hedges	(1,597)
Cash flow hedges, net of tax	3,982
Available-for-sale financial assets	
Fair value changes recognized in other comprehensive income	56
Transferred to profit or loss	62
Available-for-sale financial assets, before tax	118
Deferred taxes relating to available-for-sale financial assets	(25)
Available-for-sale financial assets, net of tax	93
Share of other comprehensive income of equity-accounted investments that may be reclassified subsequently to profit or loss, net of tax	(346)
<b>Items that may be reclassified subsequently to profit or loss</b>	<b>1,622</b>
Other comprehensive income, before tax	4,133
Deferred taxes relating to other comprehensive income	(1,828)
<b>Other comprehensive income, net of tax</b>	<b>2,305</b>
<b>Total comprehensive income</b>	<b>13,943</b>

Source: Volkswagen 2017 annual report.

Exhibit 4 shows total comprehensive income for 2017 was €13.9 billion, which is the sum of earnings after tax of €11.6 billion, reported on the income statement, and other comprehensive income of €2.3 billion. The items in OCI reflect changes in the company's equity that are not considered to be profit or loss, some of which may be reclassified as such in the future such as unrealized currency translation gains and losses.

## 9

STATEMENT OF CHANGES IN EQUITY AND CASH  
FLOW STATEMENT

describe the roles of the statement of financial position, statement of comprehensive income, statement of changes in equity, and statement of cash flows in evaluating a company's performance and financial position

The statement of changes in equity, sometimes called the “statement of changes in owners’ equity” or “statement of changes in shareholders’ equity,” primarily serves to report changes in the owners’ investment in the business over time. The basic components of owners’ equity are paid-in capital and retained earnings. Retained earnings include the cumulative amount of the company’s profits that have been retained in the company. In addition, non-controlling or minority interests and reserves that represent accumulated OCI items are included in equity. The latter items may be shown separately or included in retained earnings. Volkswagen includes reserves as components of retained earnings.

The statement of changes in equity is organized to present, for each component of equity, the beginning balance, any increases during the period, any decreases during the period, and the ending balance. For paid-in capital, an example of an increase is a new issuance of equity and an example of a decrease is a repurchase of previously issued stock. For retained earnings, income (both net income as reported on the income statement and OCI) is the most common increase and a dividend payment is the most common decrease.

Volkswagen’s balance sheet in Exhibit 3 shows that equity at the end of 2017 totaled €109 billion, compared with €93 billion at the end of 2016. The company’s statement of changes in equity presents additional detail on the change in each line item. Exhibit 5 presents an excerpt of the statement of changes in equity of the Volkswagen Group from its 2017 annual report. For purposes of brevity, several interim columns were excluded from the presentation.

**Exhibit 5: Statement of Changes in Equity of the Volkswagen Group (Excerpt)**

€ million	Subscribed capital	Capital reserves	Retained earnings	Total equity
Balance at 1 January 2017	1,283	14,551	70,446	92,910
Earnings after tax	—	—	11,354	11,638
Other comprehensive income, net of tax	—	—	586	2,305
Total comprehensive income	—	—	11,940	13,943
Capital increases	—	—	—	3,481
Dividends payment	—	—	–1,015	–1,332
Capital transactions involving a change in ownership interest	—	—	—	—
Other changes	—	—	–4	75
Balance at 31 December 2017	1,283	14,551	81,367	109,077

*Note:* Numbers are as shown in the annual report and may not add and cross-add because of the exclusion of columns and due to rounding.

In Exhibit 5, as shown in the far right column, total equity is increased during the year by total comprehensive income of €13.9 billion and by capital infusions of €3.5 billion; it is decreased by dividends of €1.3 billion and finally, slightly increased by €75 million of other changes. Explanatory notes on equity are included in the notes to the consolidated financial statements.

## Cash Flow Statement

Although the income statement and balance sheet provide measures of a company's success in terms of performance and financial position, cash flow is also vital to a company's long-term success. Net income may be influenced by accrual accounting and policy choices management makes in preparing its financial statements. However, the cash flow statements show how a company's cash balance changed over the course of the reporting period. Disclosing the sources and uses of cash helps creditors, investors, and other statement users evaluate the company's liquidity, solvency, and financial flexibility. **Financial flexibility** is the ability of the company to react and adapt to financial adversity and opportunities.

The cash flow statement classifies all cash flows of the company into three categories: operating, investing, and financing. Cash flows from **operating activities** generally involve the cash effects of transactions involved in the determination of net income and, hence, comprise the day-to-day operations of the company. Cash flows from **investing activities** are associated with the acquisition and disposal of long-term assets, such as property and equipment. Cash flows from **financing activities** relate to obtaining or repaying capital to be used in the business. IFRS permit more flexibility than US generally accepted accounting principles (GAAP) in classifying dividend and interest receipts and payments within these categories.

Exhibit 6 presents Volkswagen's statement of cash flows for the fiscal years ended 31 December 2017 and 2016.

### Exhibit 6: Cash Flow Statement of the Volkswagen Group: 1 January to 31 December

€ million	2017	2016
<b>Cash and cash equivalents at beginning of period</b>	<b>18,833</b>	<b>20,462</b>
Earnings before tax	13,913	7,292
Income taxes paid	(3,664)	(3,315)
Depreciation and amortization of, and impairment losses on, intangible assets, property, plant and equipment, and investment property	10,562	10,100
Amortization of and impairment losses on capitalized development costs	3,734	3,586
Impairment losses on equity investments	136	130
Depreciation of and impairment losses on lease assets	7,734	7,107
Gain/loss on disposal of noncurrent assets and equity investments	(25)	(222)
Share of the result of equity-accounted investments	274	377
Other noncash expense/income	(480)	716
Change in inventories	(4,198)	(3,637)
Change in receivables (excluding financial services)	(1,660)	(2,155)
Change in liabilities (excluding financial liabilities)	5,302	5,048
Change in provisions	(9,443)	5,966
Change in lease assets	(11,478)	(12,074)
Change in financial services receivables	(11,891)	(9,490)

€ million	2017	2016
<b>Cash flows from operating activities</b>	<b>(1,185)</b>	<b>9,430</b>
Investments in intangible assets (excluding development costs), property, plant and equipment, and investment property	(13,052)	(13,152)
Additions to capitalized development costs	(5,260)	(5,750)
Acquisition of subsidiaries	(277)	(119)
Acquisition of other equity investments	(561)	(309)
Disposal of subsidiaries	496	(7)
Disposal of other equity investments	24	2,190
Proceeds from disposal of intangible assets, property, plant and equipment, and investment property	411	351
Change in investments in securities	1,376	(1,245)
Change in loans and time deposits	335	(2,638)
<b>Cash flows from investing activities</b>	<b>(16,508)</b>	<b>(20,679)</b>
Capital contributions	3,473	—
Dividends paid	(1,332)	(364)
Capital transactions with noncontrolling interest shareholders	—	(3)
Proceeds from issuance of bonds	30,279	14,262
Repayments of bonds	(17,877)	(23,601)
Changes in other financial liabilities	3,109	19,455
Lease payments	(28)	(36)
<b>Cash flows from financing activities</b>	<b>17,625</b>	<b>9,712</b>
Effect of exchange rate changes on cash and cash equivalents	(727)	(91)
<b>Net change in cash and cash equivalents</b>	<b>(796)</b>	<b>(1,628)</b>
<b>Cash and cash equivalents at end of period</b>	<b>18,038</b>	<b>18,833</b>

After showing the beginning cash balance, the operating activities section starts with profit before tax,<sup>10</sup> €13.9 billion for 2017, subtracts actual income tax payments, and then adjusts for the effects of non-cash transactions, accruals and deferrals, and transactions of an investing and financing nature to arrive at the amount of cash generated from operating activities: negative €1.2 billion (a net use of cash). This approach to reporting cash flow from operating activities is termed the indirect method. The direct method of reporting cash flows from operating activities discloses major classes of gross cash receipts and gross cash payments. Examples are cash received from customers and cash paid to suppliers and employees. However, very few companies use the direct method when reporting their cash flow statement.

The indirect method emphasizes the different perspectives of the income statement and cash flow statement. On the income statement, income is reported when earned, not necessarily when cash is received, and expenses are reported when incurred, not necessarily when paid. The cash flow statement presents another aspect of performance: the ability of a company to generate cash flow from running its business. Ideally, for an established company, the analyst would like to see that the primary source of cash flow is from operating activities as opposed to investing or financing activities.

<sup>10</sup> Other companies may choose to begin with net income.



The sum of the net cash flows from operating, investing, and financing activities and the effect of exchange rates on cash equals the net change in cash during the fiscal year. For Volkswagen, the sum of these four items was negative €796 million in 2017, decreasing the company's cash and cash equivalents from €18.8 billion at the beginning of the period to €18.0 billion at the end of the period.

## SUMMARY

An awareness of financial reporting and underlying financial reporting standards can assist in security valuation and other financial analysis. This module describes the conceptual objectives of financial reporting standards, the parties involved in standard-setting processes, and the implication for analysts in monitoring developments in reporting standards.

Key points of this module are summarized below:

- The objective of financial reporting is to provide financial information about the reporting entity that is useful to existing and potential investors, lenders, and other creditors in making decisions about providing resources to the entity.
- Financial reporting requires management to make policy choices and estimates. These choices and estimates require judgment, which can vary from one preparer to the next. Accordingly, standards are needed to ensure increased consistency in these judgments.
- Private sector standard setting bodies and regulatory authorities play significant but different roles in the standard setting process. In general, standard setting bodies make the rules, and regulatory authorities enforce the rules. However, regulators typically retain legal authority to establish financial reporting standards in their jurisdiction.
- The IFRS framework sets forth the concepts that underlie the preparation and presentation of financial statements for external users.
- The objective of fair presentation of useful information is the center of the IASB's *Conceptual Framework*. The qualitative characteristics of useful information include fundamental and enhancing characteristics. Information must exhibit the fundamental characteristics of relevance and faithful representation to be useful. The enhancing characteristics identified are comparability, verifiability, timeliness, and understandability.
- *IFRS Financial Statements*: A complete set of financial statements includes a statement of financial position (balance sheet), a statement of comprehensive income (either two statements—one for net income and one for comprehensive income—or a single statement combining both net income and comprehensive income), a statement of changes in equity, a cash flow statement, and notes. The notes include a summary of significant accounting policies and other explanatory information.
- Financial statements need to reflect certain basic features: fair presentation, going concern, accrual basis, materiality and aggregation, and no offsetting.
- Financial statements must be prepared at least annually, must include comparative information from the previous period, and must be consistent.
- Financial statements must follow certain presentation requirements including a classified statement of financial position (balance sheet) and minimum information on both the face of the financial statements and in the notes.

- The primary purpose of financial reports is to provide information and data about a company's financial position and performance, including profitability and cash flows. The information presented in the reports—including the financial statements and notes and management's commentary or management's discussion and analysis—allows the financial analyst to assess a company's financial position and performance and trends in that performance.
- The primary financial statements are the statement of financial position (i.e., the balance sheet), the statement of comprehensive income (or two statements consisting of an income statement and a statement of comprehensive income), the statement of changes in equity, and the statement of cash flows.
- The balance sheet discloses what resources a company controls (assets) and what it owes (liabilities) at a specific point in time. Owners' equity represents the net assets of the company; it is the owners' residual interest in, or residual claim on, the company's assets after deducting its liabilities. The relationship among the three parts of the balance sheet (assets, liabilities, and owners' equity) may be shown in equation form as follows:  $\text{Assets} = \text{Liabilities} + \text{Owners' equity}$ .
- The income statement presents information on the financial results of a company's business activities over a period of time. The income statement communicates how much revenue and other income the company generated during a period and what expenses, including losses, it incurred in connection with generating that revenue and other income. The basic equation underlying the income statement is  $\text{Revenue} + \text{Other income} - \text{Expenses} = \text{Net income}$ .
- The statement of comprehensive income includes all items that change owners' equity except transactions with owners. Some of these items are included as part of net income, and some are reported as other comprehensive income (OCI).
- The statement of changes in equity provides information about increases or decreases in the various components of owners' equity.
- Although the income statement and balance sheet provide measures of a company's success, cash and cash flow are also vital to a company's long-term success. Disclosing the sources and uses of cash helps creditors, investors, and other statement users evaluate the company's liquidity, solvency, and financial flexibility.

## PRACTICE PROBLEMS

1. Which of the following is *most likely* not an objective of financial statements?
  - A. To provide information about the performance of an entity
  - B. To provide information about the financial position of an entity
  - C. To provide information about the users of an entity's financial statements
2. According to the *Conceptual Framework for Financial Reporting*, which of the following is *not* an enhancing qualitative characteristic of information in financial statements?
  - A. Accuracy.
  - B. Timeliness.
  - C. Comparability.
3. Which of the following is *not* a constraint on the financial statements according to the *Conceptual Framework*?
  - A. Understandability.
  - B. Benefit versus cost.
  - C. Balancing of qualitative characteristics.
4. The assumption that an entity will continue to operate for the foreseeable future is called:
  - A. accrual basis.
  - B. comparability.
  - C. going concern.
5. The assumption that the effects of transactions and other events are recognized when they occur, not when the cash flows occur, is called:
  - A. relevance.
  - B. accrual basis.
  - C. going concern.
6. Neutrality of information in the financial statements most closely contributes to which qualitative characteristic?
  - A. Relevance.
  - B. Understandability.
  - C. Faithful representation.
7. Valuing assets at the amount of cash or equivalents paid or the fair value of the consideration given to acquire them at the time of acquisition most closely de-

scribes which measurement of financial statement elements?

- A. Current cost.
  - B. Historical cost.
  - C. Realizable value.
8. The valuation technique under which assets are recorded at the amount that would be received in an orderly disposal is:
- A. current cost.
  - B. present value.
  - C. realizable value.
9. Which of the following elements of financial statements is *most* closely related to measurement of performance?
- A. Assets.
  - B. Expenses.
  - C. Liabilities.
10. Which of the following elements of financial statements is *most* closely related to measurement of financial position?
- A. Equity.
  - B. Income.
  - C. Expenses.
11. Providing information about the performance and financial position of companies so that users can make economic decisions *best* describes the role of:
- A. auditing.
  - B. financial reporting.
  - C. financial statement analysis.
12. A company's financial position would *best* be evaluated using the:
- A. balance sheet.
  - B. income statement.
  - C. statement of cash flows.
13. A company's profitability for a period would *best* be evaluated using the:
- A. balance sheet.
  - B. income statement.
  - C. statement of cash flows.

14. The financial statement that presents a shareholder's residual claim on assets is the:
- A. balance sheet.
  - B. income statement.
  - C. cash flow statement.
15. A company's profitability over a period of time is *best* evaluated using the:
- A. balance sheet.
  - B. income statement.
  - C. cash flow statement.
16. The income statement is *best* used to evaluate a company's:
- A. financial position.
  - B. sources of cash flow.
  - C. financial results from business activities.

## SOLUTIONS

1. C is correct. Financial statements provide information, including information about the entity's financial position, performance, and changes in financial position, to users. They do not typically provide information about users.
2. A is correct. Accuracy is not an enhancing qualitative characteristic. Faithful representation, not accuracy, is a fundamental qualitative characteristic.
3. A is correct. Understandability is an enhancing qualitative characteristic of financial information—not a constraint.
4. C is correct. The *Conceptual Framework* identifies two important underlying assumptions of financial statements: accrual basis and going concern. Going concern is the assumption that the entity will continue to operate for the foreseeable future. Enterprises with the intent to liquidate or materially curtail operations would require different information for a fair presentation.
5. B is correct. Accrual basis reflects the effects of transactions and other events being recognized when they occur, not when the cash flows. These effects are recorded and reported in the financial statements of the periods to which they relate.
6. C is correct. The fundamental qualitative characteristic of faithful representation is contributed to by completeness, neutrality, and freedom from error.
7. B is correct. Historical cost is the consideration paid to acquire an asset.
8. C is correct. The amount that would be received in an orderly disposal is realizable value.
9. B is correct. The elements of financial statements related to the measure of performance are income and expenses.
10. A is correct. The elements of financial statements related to the measurement of financial position are assets, liabilities, and equity.
11. B is correct. This is the role of financial reporting. The role of financial statement analysis is to evaluate the financial reports.
12. A is correct. The balance sheet portrays the company's financial position on a specified date. The income statement and statement of cash flows present different aspects of performance during the period.
13. B is correct. Profitability is the performance aspect measured by the income statement. The balance sheet portrays the financial position. The statement of cash flows presents a different aspect of performance.
14. A is correct. Owners' equity is the owners' residual interest in (i.e., residual claim on) the company's assets after deducting its liabilities, which is information presented on the balance sheet.
15. B is correct. A company's profitability is best evaluated using the income statement. The income statement presents information on the financial results of a company's business activities over a period of time by communicating how much revenue was generated and the expenses incurred to generate that revenue.

16. C is correct. A company's revenues and expenses are presented on the income statement, which is used to evaluate a company's financial results (or profitability) from business activities over a period of time. A company's financial position is best evaluated by using the balance sheet. A company's sources of cash flow are best evaluated using the cash flow statement.





## LEARNING MODULE

# 2

### Income Statements

by Elaine Henry, PhD, CFA, and Thomas R. Robinson, PhD, CAIA, CFA.

*Elaine Henry, PhD, CFA, is at Stevens Institute of Technology (USA). Thomas R. Robinson, PhD, CAIA, CFA, is at Robinson Global Investment Management LLC (USA).*

#### LEARNING OUTCOMES

<i>Mastery</i>	<i>The candidate should be able to:</i>
<input type="checkbox"/>	describe the components of the income statement and alternative presentation formats of that statement
<input type="checkbox"/>	describe general principles of revenue recognition and accounting standards for revenue recognition
<input type="checkbox"/>	calculate revenue given information that might influence the choice of revenue recognition method
<input type="checkbox"/>	describe general principles of expense recognition, specific expense recognition applications, and implications of expense recognition choices for financial analysis
<input type="checkbox"/>	contrast operating and non-operating components of the income statement
<input type="checkbox"/>	formulate income statements into common-size income statements
<input type="checkbox"/>	evaluate a company's financial performance using common-size income statements and financial ratios based on the income statement
<input type="checkbox"/>	describe, calculate, and interpret comprehensive income
<input type="checkbox"/>	describe other comprehensive income and identify major types of items included in it

**Note:** Changes in accounting standards as well as new rulings and/or pronouncements issued after the publication of the readings on financial reporting and analysis may cause some of the information in these readings to become dated. Candidates are *not* responsible for anything that occurs after the readings were published. In addition, candidates are expected to be familiar with the analytical frameworks contained in the readings, as well as the implications of alternative accounting methods for financial analysis and valuation discussed in the readings. Candidates are also responsible for the content of accounting standards, but not for the actual reference numbers. Finally, candidates should be aware that certain ratios may be defined and calculated differently. When alternative ratio definitions exist and no specific definition is given, candidates should use the ratio definitions emphasized in the readings.

## 1

## INTRODUCTION

The income statement presents information on the financial results of a company's business activities over a period of time. The income statement communicates how much revenue the company generated during a period and what costs it incurred in connection with generating that revenue. The basic equation underlying the income statement, ignoring gains and losses, is Revenue minus Expenses equals Net income. The income statement is also sometimes referred to as the "statement of operations," "statement of earnings," or "profit and loss (P&L) statement." Under both IFRS and US GAAP, the income statement may be presented as a separate statement followed by a statement of comprehensive income that begins with the profit or loss from the income statement or as a section of a single statement of comprehensive income.<sup>1</sup> This module focuses on the income statement, and the term *income statement* will be used to describe either the separate statement that reports profit or loss used for earnings per share calculations or that section of a statement of comprehensive income that reports the same profit or loss. The module also includes a discussion of comprehensive income (profit or loss from the income statement plus other comprehensive income).

Investment analysts intensely scrutinize companies' income statements. Equity analysts are interested in them because equity markets often reward relatively high- or low-earnings growth companies with above-average or below-average valuations, respectively, and because inputs into valuation models often include estimates of earnings. Fixed-income analysts examine the components of income statements, past and projected, for information on companies' abilities to make promised payments on their debt over the course of the business cycle. Corporate financial announcements frequently emphasize information reported in income statements, particularly earnings, more than information reported in the other financial statements.

## 2

## COMPONENTS AND FORMAT OF THE INCOME STATEMENT



describe the components of the income statement and alternative presentation formats of that statement

Exhibit 1, Exhibit 2, and Exhibit 3 show the income statements for Anheuser-Busch InBev SA/NV (AB InBev), a multinational beverage company based in Belgium, Molson Coors Brewing Company (Molson Coors), a US-based multinational brewing company, and Groupe Danone (Danone), a French food manufacturer. AB InBev and Danone report under IFRS, and Molson Coors reports under US GAAP. Note that both AB InBev and Molson Coors show three years' income statements and list the years in chronological order with the most recent year listed in the left-most column. In contrast, Danone shows two years of income statements and lists the years in chronological order from left to right with the most recent year in the right-most column. Different orderings of chronological information are common.

<sup>1</sup> International Accounting Standard (IAS) 1, *Presentation of Financial Statements*, establishes the presentation and minimum content requirements of financial statements and guidelines for the structure of financial statements under IFRS. Under US GAAP, the Financial Accounting Standards Board Accounting Standards Codification ASC Section 220-10-45 [Comprehensive Income—Overall—Other Presentation Matters] discusses acceptable formats in which to present income, other comprehensive income, and comprehensive income.

On the top line of the income statement, companies typically report revenue. **Revenue** generally refers to the amount charged for the delivery of goods or services in the *ordinary activities* of a business. Revenue may also be called sales or turnover.<sup>2</sup> "Revenue" is sometimes referred to as the "top line" since it is typically the first line in a company's income statement. For the year ended 31 December 2017, AB InBev reports \$56.44 billion of revenue, Molson Coors reports \$13.47 billion of revenue (labeled "sales"), and Danone reports €24.68 billion of revenue (labeled "sales").

Revenue is reported after adjustments (e.g., for cash or volume discounts, or for other reductions), and the term **net revenue** is sometimes used to specifically indicate that the revenue has been adjusted (e.g., for estimated returns). For all three companies in Exhibit 1 through Exhibit 3, footnotes to their financial statements (not shown here) state that revenues are stated net of such items as returns, customer rebates, trade discounts, or volume-based incentive programs for customers.

In a comparative analysis, an analyst may need to reference information disclosed elsewhere in companies' annual reports—typically the notes to the financial statements and the Management Discussion and Analysis (MD&A)—to identify the appropriately comparable revenue amounts. For example, excise taxes represent a significant expenditure for brewing companies. On its income statement, Molson Coors reports \$13.47 billion of revenue (labeled "sales") and \$11.00 billion of net revenue (labeled "net sales"), which equals sales minus \$2.47 billion of excise taxes. Unlike Molson Coors, AB InBev does not show the amount of excise taxes on its income statement. However, in its disclosures, AB InBev notes that excise taxes (amounting to \$15.4 billion in 2017) have been deducted from the revenue amount shown on its income statement. Thus, the amount on AB InBev's income statement labeled "revenue" is more comparable to the amount on Molson Coors' income statement labeled "net sales."

**Exhibit 1: Anheuser-Busch InBev SA/NV Consolidated Income Statement (in Millions of US Dollars)**  
[Excerpt]

	12 Months Ended December 31		
	2017	2016	2015
Revenue	\$56,444	\$45,517	\$43,604
Cost of sales	(21,386)	(17,803)	(17,137)
Gross profit	35,058	27,715	26,467
Distribution expenses	(5,876)	(4,543)	(4,259)
Sales and marketing expenses	(8,382)	(7,745)	(6,913)
Administrative expenses	(3,841)	(2,883)	(2,560)
Other operating income/(expenses)	854	732	1,032
Restructuring	(468)	(323)	(171)
Business and asset disposal	(39)	377	524
Acquisition costs business combinations	(155)	(448)	(55)
Impairment of assets	—	—	(82)
Judicial settlement	—	—	(80)
Profit from operations	17,152	12,882	13,904
Finance cost	(6,885)	(9,216)	(3,142)

<sup>2</sup> **Sales** is sometimes understood to refer to the sale of goods, whereas *revenue* can include the sale of goods or services; however, the terms are often used interchangeably. In some countries, the term "turn-over" may be used in place of revenue.

12 Months Ended December 31			
	2017	2016	2015
Finance income	378	652	1,689
Net finance income/(cost)	(6,507)	(8,564)	(1,453)
Share of result of associates and joint ventures	430	16	10
Profit before tax	11,076	4,334	12,461
Income tax expense	(1,920)	(1,613)	(2,594)
Profit from continuing operations	9,155	2,721	9,867
Profit from discontinued operations	28	48	
Profit of the year	9,183	2,769	9,867
Profit from continuing operations attributable to:			
Equity holders of AB InBev	7,968	1,193	8,273
Non-controlling interest	1,187	1,528	1,594
Profit of the year attributable to:			
Equity holders of AB InBev	7,996	1,241	8,273
Non-controlling interest	\$1,187	\$1,528	\$1,594

*Note:* Reported total amounts may have slight discrepancies due to rounding.

### Exhibit 2: Molson Coors Brewing Company Consolidated Statement of Operations (in Millions of US Dollars) [Excerpt]

12 Months Ended			
	Dec. 31, 2017	Dec. 31, 2016	Dec. 31, 2015
Sales	\$13,471.5	\$6,597.4	\$5,127.4
Excise taxes	(2,468.7)	(1,712.4)	(1,559.9)
Net sales	11,002.8	4,885.0	3,567.5
Cost of goods sold	(6,217.2)	(2,987.5)	(2,131.6)
Gross profit	4,785.6	1,897.5	1,435.9
Marketing, general and administrative expenses	(3,032.4)	(1,589.8)	(1,038.3)
Special items, net	(28.1)	2,522.4	(346.7)
Equity Income in MillerCoors	0	500.9	516.3
Operating income (loss)	1,725.1	3,331.0	567.2
<b>Other income (expense), net</b>			
Interest expense	(349.3)	(271.6)	(120.3)
Interest income	6.0	27.2	8.3
Other income (expense), net	(0.1)	(29.7)	0.9
Total other income (expense), net	(343.4)	(274.1)	(111.1)
Income (loss) from continuing operations before income taxes	1,381.7	3,056.9	456.1
Income tax benefit (expense)	53.2	(1,055.2)	(61.5)
Net income (loss) from continuing operations	1,434.9	2,001.7	394.6
Income (loss) from discontinued operations, net of tax	1.5	(2.8)	3.9
Net income (loss) including noncontrolling interests	1,436.4	1,998.9	398.5

	12 Months Ended		
	Dec. 31, 2017	Dec. 31, 2016	Dec. 31, 2015
Net (income) loss attributable to noncontrolling interests	(22.2)	(5.9)	(3.3)
Net income (loss) attributable to Molson Coors Brewing Company	\$1,414.2	\$1,993.0	\$395.2

**Exhibit 3: Groupe Danone Consolidated Income Statement (in Millions of Euros) [Excerpt]**

	Year Ended 31 December	
	2016	2017
<b>Sales</b>	21,944	24,677
Cost of goods sold	(10,744)	(12,459)
Selling expense	(5,562)	(5,890)
General and administrative expense	(2,004)	(2,225)
Research and development expense	(333)	(342)
Other income (expense)	(278)	(219)
<b>Recurring operating income</b>	<b>3,022</b>	<b>3,543</b>
Other operating income (expense)	(99)	192
<b>Operating income</b>	<b>2,923</b>	<b>3,734</b>
Interest income on cash equivalents and short-term investments	130	151
Interest expense	(276)	(414)
Cost of net debt	(146)	(263)
Other financial income	67	137
Other financial expense	(214)	(312)
<b>Income before tax</b>	<b>2,630</b>	<b>3,296</b>
Income tax expense	(804)	(842)
<b>Net income from fully consolidated companies</b>	<b>1,826</b>	<b>2,454</b>
Share of profit of associates	1	109
Net income	1,827	2,563
<b>Net income – Group share</b>	<b>1,720</b>	<b>2,453</b>
Net income – Non-controlling interests	107	110

Differences in presentations of items, such as expenses, are also common. **Expenses** reflect outflows, depletions of assets, and incurrences of liabilities in the course of the activities of a business. Expenses may be grouped and reported in different formats, subject to some specific requirements.

At the bottom of the income statement, companies report net income (companies may use other terms such as “net earnings” or “profit or loss”). For 2017, AB InBev reports \$9,183 million “Profit of the year”, Molson Coors reports \$1,436.4 million of net income including noncontrolling interests, and Danone reports €2,563 million of net income. Net income is often referred to as the “bottom line.” The basis for this expression is that net income is the final—or bottom—line item in an income statement.

Because net income is often viewed as the single most relevant number to describe a company's performance over a period of time, the term "bottom line" sometimes is used in business to refer to any final or most relevant result.

Despite this customary terminology, note that each company presents additional items below net income: information about how much of that net income is attributable to the company itself and how much of that income is attributable to noncontrolling interests, also known as minority interests. The companies consolidate subsidiaries over which they have control. Consolidation means that they include all of the revenues and expenses of the subsidiaries even if they own less than 100 percent. Noncontrolling interest represents the portion of income that "belongs" to the minority shareholders of the consolidated subsidiaries, as opposed to the parent company itself. For AB InBev, \$7,996 million of the total profit is attributable to the shareholders of AB InBev, and \$1,187 million is attributable to noncontrolling interests. For Molson Coors, \$1,414.2 million is attributable to the shareholders of Molson Coors, and \$22.2 million is attributable to noncontrolling interests. For Danone, €2,453 million of the net income amount is attributable to shareholders of Groupe Danone and €110 million is attributable to noncontrolling interests.

Net income also includes **gains** and **losses**, which are increases and decreases in economic benefits, respectively, which typically do not arise in the ordinary activities of the business. For example, when a manufacturing company sells its products, these transactions are reported as revenue, and the costs incurred to generate these revenues are expenses and are presented separately. However, if a manufacturing company sells surplus land that is not needed, the transaction is reported as a gain or a loss. The amount of the gain or loss is the difference between the carrying value of the land and the price at which the land is sold. For example, in Exhibit 1, AB InBev reports a loss (proceeds, net of carrying value) of \$39 million on disposals of businesses and assets in fiscal 2017, and gains of \$377 million and \$524 million in 2016 and 2015, respectively. Details on these gains and losses can typically be found in the companies' disclosures. For example, AB InBev discloses that the \$377 million gain in 2016 was mainly from selling one of its breweries in Mexico.

In addition to presenting the net income, income statements also present items, including subtotals, which are significant to users of financial statements. Some of the items are specified by IFRS but other items are not specified.<sup>3</sup> Certain items, such as revenue, finance costs, and tax expense, are required to be presented separately on the face of the income statement. IFRS additionally require that line items, headings, and subtotals relevant to understanding the entity's financial performance should be presented even if not specified. Expenses may be grouped together either by their nature or function. Grouping together expenses such as depreciation on manufacturing equipment and depreciation on administrative facilities into a single line item called "depreciation" is an example of a **grouping by nature** of the expense. An example of **grouping by function** would be grouping together expenses into a category such as cost of goods sold, which may include labour and material costs, depreciation, some salaries (e.g., salespeople's), and other direct sales related expenses.<sup>4</sup> All three companies in Exhibit 1 through Exhibit 3 present their expenses by function, which is sometimes referred to as the "cost of sales" method.

One subtotal often shown in an income statement is **gross profit** or **gross margin** (that is, revenue less cost of sales). When an income statement shows a gross profit subtotal, it is said to use a **multi-step format** rather than a **single-step format**. The AB InBev and Molson Coors income statements are examples of the multi-step format, whereas the Groupe Danone income statement is in a single-step format. For manufacturing and merchandising companies, gross profit is a relevant item and is

<sup>3</sup> Requirements are presented in IAS 1, *Presentation of Financial Statements*.

<sup>4</sup> Later readings will provide additional information about alternative methods to calculate cost of goods sold.

calculated as revenue minus the cost of the goods that were sold. For service companies, gross profit is calculated as revenue minus the cost of services that were provided. In summary, gross profit is the amount of revenue available after subtracting the costs of delivering goods or services. Other expenses related to running the business are subtracted after gross profit.

Another important subtotal which may be shown on the income statement is **operating profit** (or, synonymously, operating income). Operating profit results from deducting operating expenses such as selling, general, administrative, and research and development expenses from gross profit. Operating profit reflects a company's profits on its business activities before deducting taxes, and for non-financial companies, before deducting interest expense. For financial companies, interest expense would be included in operating expenses and subtracted in arriving at operating profit because it relates to the operating activities for such companies. For some companies composed of a number of separate business segments, operating profit can be useful in evaluating the performance of the individual business segments, because interest and tax expenses may be more relevant at the level of the overall company rather than an individual segment level. The specific calculations of gross profit and operating profit may vary by company, and a reader of financial statements can consult the notes to the statements to identify significant variations across companies.

Operating profit is sometimes referred to as EBIT (earnings before interest and taxes). However, operating profit and EBIT are not necessarily the same. Note that in Exhibit 1 through Exhibit 3, interest and taxes do not represent the only differences between earnings (net income, net earnings) and operating income. For example, AB InBev separately reports its share of associates' and joint ventures' income and Molson Coors separately reports some income from discontinued operations.

Exhibit 4 shows an excerpt from the income statement of CRA International, a company providing management consulting services. Accordingly, CRA deducts cost of services (rather than cost of goods) from revenues to derive gross profit. CRA's fiscal year ends on the Saturday nearest December 31st. Because of this fiscal year timeframe, CRA's fiscal year occasionally comprises 53 weeks rather than 52 weeks. Although the extra week is likely immaterial in computing year-to-year growth rates, it may have a material impact on a quarter containing the extra week. In general, an analyst should be alert to the effect of an extra week when making historical comparisons and forecasting future performance.

#### Exhibit 4: CRA International Inc. Consolidated Statements of Operations (Excerpt) (in Thousands of Dollars)

	Fiscal Year Ended		
	Dec. 30, 2017	Dec. 31, 2016	Jan. 02, 2016
Revenues	\$370,075	\$324,779	\$303,559
Costs of services (exclusive of depreciation and amortization)	258,829	227,380	207,650
Selling, general and administrative expenses	86,537	70,584	72,439
Depreciation and amortization	8,945	7,896	6,552
GNU goodwill impairment	—	—	4,524
Income from operations	15,764	18,919	12,394

*Note:* Remaining items omitted

Exhibit 1 through Exhibit 4 illustrate basic points about the income statement, including variations across the statements—some of which depend on the industry and/or country, and some of which reflect differences in accounting policies and practices of

a particular company. In addition, some differences within an industry are primarily differences in terminology, whereas others are more fundamental accounting differences. Notes to the financial statements are helpful in identifying such differences.

Having introduced the components and format of an income statement, the next objective is to understand the actual reported numbers in it. To accurately interpret reported numbers, the analyst needs to be familiar with the principles of revenue and expense recognition—that is, how revenue and expenses are measured and attributed to a given accounting reporting period.

### 3

## REVENUE RECOGNITION

- ☐ describe general principles of revenue recognition and accounting standards for revenue recognition
- ☐ calculate revenue given information that might influence the choice of revenue recognition method

Accounting standards for revenue recognition (which we discuss later in this section) are nearly identical under IFRS and US GAAP. The revenue recognition standards for IFRS and US GAAP (IFRS 15 and ASC Topic 606, respectively) were issued in 2014 and resulted from an effort to achieve convergence, consistency, and transparency in revenue recognition globally.

A first task is to explain some relevant accounting terminology. The terms revenue, sales, gains, losses, and net income (profit, net earnings) have been briefly defined. The IASB *Conceptual Framework for Financial Reporting*, referred to hereafter as the *Conceptual Framework*, further defines and discusses these income statement items. The *Conceptual Framework* explains that profit is a frequently used measure of performance and is composed of income and expenses.<sup>5</sup> It defines **income** as follows:

Income is increases in economic benefits during the accounting period in the form of inflows or enhancements of assets or decreases of liabilities that result in increases in equity, other than those relating to contributions from equity participants.<sup>6</sup>

Under IFRS, the term “income” includes revenue and gains. Gains are similar to revenue, but they typically arise from secondary or peripheral activities rather than from a company’s primary business activities. For example, for a restaurant, the sale of surplus restaurant equipment for more than its carrying value is referred to as a gain rather than as revenue. Similarly, a loss typically arises from secondary activities. Gains and losses may be considered part of operating activities (e.g., a loss due to a decline in the value of inventory) or may be considered part of non-operating activities (e.g., the sale of non-trading investments).

In the following simple hypothetical scenario, revenue recognition is straightforward: a company sells goods to a buyer for cash and does not allow returns, so the company recognizes revenue when the exchange of goods for cash takes place and

<sup>5</sup> *Conceptual Framework*, paragraph 4.24. The text on the elements of financial statements and their recognition and measurement is the same in the IASB *Conceptual Framework for Financial Reporting* and the IASB *Framework for the Preparation and Presentation of Financial Statements*.

<sup>6</sup> *Ibid.*, paragraph 4.25(a).



measures revenue at the amount of cash received. In practice, however, determining when revenue should be recognized and at what amount is considerably more complex for reasons discussed in the following sections.

## General Principles

An important aspect of revenue recognition is that it can occur independently of cash movements. For example, assume a company sells goods to a buyer on credit, so does not actually receive cash until some later time. A fundamental principle of accrual accounting is that revenue is recognized (reported on the income statement) when it is earned, so the company's financial records reflect revenue from the sale when the risk and reward of ownership are transferred; this is often when the company delivers the goods or services. If the delivery was on credit, a related asset, such as trade or accounts receivable, is created. Later, when cash changes hands, the company's financial records simply reflect that cash has been received to settle an account receivable. Similarly, there are situations when a company receives cash in advance and actually delivers the product or service later, perhaps over a period of time. In this case, the company would record a liability for unearned revenue when the cash is initially received, and revenue would be recognized as being earned over time as products and services are delivered. An example would be a subscription payment received for a publication that is to be delivered periodically over time.

## Accounting Standards for Revenue Recognition

The converged accounting standards issued by the IASB and FASB in May 2014 introduced some changes to the basic principles of revenue recognition and should enhance comparability.<sup>7</sup> The content of the two standards is nearly identical, and this discussion pertains to both, unless specified otherwise. The converged standard aims to provide a principles-based approach to revenue recognition that can be applied to many types of revenue-generating activities.

The core principle of the converged standard is that revenue should be recognized to “depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in an exchange for those goods or services.” To achieve the core principle, the standard describes the application of five steps in recognizing revenue:

1. Identify the contract(s) with a customer
2. Identify the separate or distinct performance obligations in the contract
3. Determine the transaction price
4. Allocate the transaction price to the performance obligations in the contract
5. Recognize revenue when (or as) the entity satisfies a performance obligation

According to the standard, a contract is an agreement and commitment, with commercial substance, between the contracting parties. It establishes each party's *obligations* and *rights*, including payment terms. In addition, a contract exists only if collectability is probable. Each standard uses the same wording, but the threshold for probable collectability differs. Under IFRS, probable means more likely than not, and under US GAAP, it means likely to occur. As a result, economically similar contracts may be treated differently under IFRS and US GAAP.

<sup>7</sup> IFRS 15 *Revenue from Contracts with Customers* and FASB ASC Topic 606 (Revenue from Contracts with Customers).

The performance obligations within a contract represent promises to transfer distinct good(s) or service(s). A good or service is distinct if the customer can benefit from it on its own or in combination with readily available resources and if the promise to transfer it can be separated from other promises in the contract. Each identified performance obligation is accounted for separately.

The transaction price is what the seller estimates will be received in exchange for transferring the good(s) or service(s) identified in the contract. The transaction price is then allocated to each identified performance obligation. Revenue is recognized when a performance obligation is fulfilled. Steps 3 and 4 address amount, and step 5 addresses timing of recognition. The amount recognized reflects expectations about collectability and (if applicable) an allocation to multiple obligations within the same contract. Revenue is recognized when the obligation-satisfying transfer is made.

Revenue should only be recognized when it is highly probable that it will not be subsequently reversed. This may result in the recording of a minimal amount of revenue upon sale when an estimate of total revenue is not reliable. The balance sheet will be required to reflect the entire refund obligation as a liability and will include an asset for the “right to returned goods” based on the carrying amount of inventory less costs of recovery.

When revenue is recognized, a contract asset is presented on the balance sheet. It is only at the point when all performance obligations have been met except for payment that a receivable appears on the seller’s balance sheet. If consideration is received in advance of transferring good(s) or service(s), the seller presents a contract liability.

The entity will recognize revenue when it is able to satisfy the performance obligation by transferring control to the customer. The following are factors to consider when assessing whether the customer has obtained control of an asset at a point in time:

- entity has a present right to payment,
- customer has legal title,
- customer has physical possession,
- customer has the significant risks and rewards of ownership, and
- customer has accepted the asset.

For a simple contract with only one deliverable at a single point in time, completing the five steps is straightforward. For more complex contracts—such as when the performance obligations are satisfied over time, when the terms of the multi-period contracts change, when the performance obligation includes various components of goods and services, or when the compensation is “variable”—accounting choices can be less obvious. The steps in the standards are intended to provide guidance that can be generalized to most situations.

In addition, the standard provides many specific examples. These examples are intended to provide guidance as to how to approach more complex contracts. Some of these examples are summarized in Exhibit 5. Note that the end result for many examples may not differ substantially from that under revenue recognition standards that were in effect prior to the adoption of the converged standard; instead, it is the conceptual approach and, in some cases, the terminology that will differ.

#### **Exhibit 5: Applying the Converged Revenue Recognition Standard**

The references in this exhibit are to Examples in IFRS 15 *Revenue from Contracts with Customers* (and ASU 2014-09 [FASB ASC Topic 606]), on which these summaries are based.

### Part 1 (ref. Example 10)

Builder Co. enters into a contract with Customer Co. to construct a commercial building. Builder Co. identifies various goods and services to be provided, such as pre-construction engineering, construction of the building's individual components, plumbing, electrical wiring, and interior finishes. With respect to "Identifying the Performance Obligation," should Builder Co. treat each specific item as a separate performance obligation to which revenue should be allocated?

The standard provides two criteria, which must be met, to determine whether a good or service is distinct for purposes of identifying performance obligations. First, the customer can benefit from the good or service either on its own or together with other readily available resources. Second, the seller's "promise to transfer the good or service to the customer is separately identifiable from other promises in the contract." In this example, the second criterion is not met because it is the building for which the customer has contracted, not the separate goods and services. The seller will integrate all the goods and services into a combined output and each specific item should not be treated as a distinct good or service but accounted for together as a single performance obligation.

### Part 2 (ref. Example 8)

Builder Co.'s contract with Customer Co. to construct the commercial building specifies consideration of \$1 million. Builder Co.'s expected total costs are \$700,000. Builder incurs \$420,000 in costs in the first year. Assuming that costs incurred provide an appropriate measure of progress toward completing the contract, how much revenue should Builder Co. recognize for the first year?

The standard states that for performance obligations satisfied over time (e.g., where there is a long-term contract), revenue is recognized over time by measuring progress toward satisfying the obligation. In this case, Builder has incurred 60% of the total expected costs (\$420,000/\$700,000) and will thus recognize \$600,000 (60% × \$1 million) in revenue for the first year.

This is the same amount of revenue that would be recognized using the "percentage-of-completion" method under previous accounting standards, but that term is not used in the converged standard. Instead, the standard refers to performance obligations satisfied over time and requires that progress toward complete satisfaction of the performance obligation be measured based on an input method, such as the one illustrated here (recognizing revenue based on the proportion of total costs that have been incurred in the period), or an output method (recognizing revenue based on units produced or milestones achieved).

### Part 3 (ref. Example 8)

Assume that Builder Co.'s contract with Customer Co. to construct the commercial building specifies consideration of \$1 million *plus* a bonus of \$200,000 if the building is completed within two years. Builder Co. has only limited experience with similar types of contracts and knows that many factors outside its control (e.g., weather, regulatory requirements) could cause delay. Builder Co.'s expected total costs are \$700,000. Builder incurs \$420,000 in costs in the first year. Assuming that costs incurred provide an appropriate measure of progress toward completing the contract, how much revenue should Builder Co. recognize for the first year?

The standard addresses so-called "variable consideration" as part of determining the transaction price. A company is only allowed to recognize variable consideration if it can conclude that it will not have to reverse the cumulative revenue in the future. In this case, Builder Co. does not recognize any of the

bonus in year one because it cannot reach the nonreversible conclusion given its limited experience with similar contracts and potential delays from factors outside its control.

### Part 4 (ref. Example 8)

Assume all facts from Part 3. In the beginning of year two, Builder Co. and Customer Co. agree to change the building floor plan and modify the contract. As a result, the consideration will increase by \$150,000, and the allowable time for achieving the bonus is extended by 6 months. Builder expects its costs will increase by \$120,000. Also, given the additional six months to earn the completion bonus, Builder concludes that it now meets the criteria for including the \$200,000 bonus in revenue. How should Builder account for this change in the contract?

Note that previous standards did not provide a general framework for contract modifications. The converged standard provides guidance on whether a change in a contract is a new contract or a modification of an existing contract. To be considered a new contract, the change would need to involve goods and services that are distinct from the goods and services already transferred.

In this case, the change does not meet the criteria of a new contract and is therefore considered a modification of the existing contract, which requires the company to reflect the impact on a cumulative catch-up basis. Therefore, the company must update its transaction price and measure of progress. Builder's total revenue on the transaction (transaction price) is now \$1.35 million (\$1 million original plus the \$150,000 new consideration plus \$200,000 for the completion bonus). Builder Co.'s progress toward completion is now 51.2% (\$420,000 costs incurred divided by total expected costs of \$820,000). Based on the changes in the contract, the amount of additional revenue to be recognized is \$91,200, calculated as  $(51.2\% \times \$1.35 \text{ million})$  minus the \$600,000 already recognized. The additional \$91,200 of revenue would be recognized as a "cumulative catch-up adjustment" on the date of the contract modification.

### Part 5 (ref. Example 45)

Assume a Company operates a website that enables customers to purchase goods from various suppliers. The customers pay the Company in advance, and orders are nonrefundable. The *suppliers* deliver the goods directly to the customer, and the Company receives a 10% commission. Should the Company report total revenues equal to 100% of the sales amount (gross) or total revenues equal to 10% of the sales amount (net)? Revenues are reported gross if the Company is acting as a principal and net if the Company is acting as an agent.

In this example, the Company is an agent because it isn't primarily responsible for fulfilling the contract, doesn't take any inventory risk or credit risk, doesn't have discretion in setting the price, and receives compensation in the form of a commission. Because the Company is acting as an agent, it should report only the amount of commission as its revenue.

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Some related costs require specific accounting treatment under the new standards. In particular, incremental costs of obtaining a contract and certain costs incurred to fulfill a contract must be capitalized under the new standards (i.e., reported as an asset on the balance sheet rather than as an expense on the income statement). If a company had previously expensed these incremental costs in the years prior to adopting the converged standard, all else equal, its profitability will initially appear higher under the converged standards.

The disclosure requirements are quite extensive. Companies are required at year-end to disclose information about contracts with customers disaggregated into different categories of contracts.<sup>8</sup> The categories might be based on the type of product, the geographic region, the type of customer or sales channel, the type of contract pricing terms, the contract duration, or the timing of transfers. Companies are also required to disclose balances of any contract-related assets and liabilities and significant changes in those balances, remaining performance obligations and transaction price allocated to those obligations, and any significant judgments and changes in judgments related to revenue recognition. Significant judgments are those used in determining timing and amounts of revenue to be recognized.

## ISSUES IN EXPENSE RECOGNITION: DOUBTFUL ACCOUNTS, WARRANTIES

# 4



describe general principles of expense recognition, specific expense recognition applications, and implications of expense recognition choices for financial analysis

The IFRS Conceptual Framework defines expenses as “decreases in assets, or increases in liabilities, that result in decreases in equity, other than those relating to distributions to holders of equity claims” (IFRS Conceptual Framework, paragraph 4.68).<sup>8</sup> The FASB Conceptual Framework provides a more detailed definition: “Expenses are outflows or other use of assets, or incurrences of liabilities (or a combination of both) from an entity delivering or producing goods, rendering services, or carrying out other activities consistent with the entity’s ongoing major or central operations. Expenses represent actual or expected cash outflows that have occurred or will eventually occur as a result of the entity’s ongoing major or central operations” (see FASB Concepts Statement 6, paragraphs 80-81).

### Doubtful Accounts

When a company sells its products or services on credit, it is likely that some customers will ultimately default on their obligations (i.e., fail to pay). At the time of the sale, it is not known which customer will default. (If it were known that a particular customer would ultimately default, presumably a company would not sell on credit to that customer.) One possible approach to recognizing credit losses on customer receivables would be for the company to wait until such time as a customer defaulted and only then recognize the loss (**direct write-off method**). Such an approach would usually not be consistent with generally accepted accounting principles.

Under the matching principle, at the time revenue is recognized on a sale, a company is required to record an estimate of how much of the revenue will ultimately be uncollectible. Companies make such estimates primarily based on previous experience with uncollectible accounts. Such estimates may be expressed as a proportion of the overall amount of sales, the overall amount of receivables, or the amount of

<sup>8</sup> Interim period disclosures are required under both IFRS and US GAAP but differ between them.

receivables overdue by a specific amount of time. The company records its estimate of uncollectible amounts as an expense on the income statement, not as a direct reduction of revenues.

## Warranties

At times, companies offer warranties on the products they sell. If the product proves deficient in some respect that is covered under the terms of the warranty, the company will incur an expense to repair or replace the product. At the time of sale, the company does not know the amount of future expenses it will incur in connection with its warranties. One possible approach would be for a company to wait until actual expenses are incurred under the warranty and to reflect the expense at that time. However, this would not result in a matching of the expense with the associated revenue.

Under the matching principle, a company is required to estimate the amount of future expenses resulting from its warranties, to recognize an estimated warranty expense in the period of the sale, and to adjust the expense based on actual experience over the life of the warranty.

# 5

## ISSUES IN EXPENSE RECOGNITION: DEPRECIATION AND AMORTIZATION



describe general principles of expense recognition, specific expense recognition applications, and implications of expense recognition choices for financial analysis

Companies commonly incur costs to obtain long-lived assets. **Long-lived assets** are assets expected to provide economic benefits over a future period of time greater than one year. Examples are land (property), plant, equipment, and **intangible assets** (assets lacking physical substance) such as trademarks. The costs of most long-lived assets are allocated over the period of time during which they provide economic benefits. The two main types of long-lived assets whose costs are *not* allocated over time are land and those intangible assets with indefinite useful lives.

**Depreciation** is the process of systematically allocating costs of long-lived assets over the period during which the assets are expected to provide economic benefits. “Depreciation” is the term commonly applied to this process for physical long-lived assets such as plant and equipment (land is not depreciated), and **amortisation** is the term commonly applied to this process for intangible long-lived assets with a finite useful life.<sup>9</sup> Examples of intangible long-lived assets with a finite useful life include an acquired mailing list, an acquired patent with a set expiration date, and an acquired copyright with a set legal life. The term “amortisation” is also commonly applied to the systematic allocation of a premium or discount relative to the face value of a fixed-income security over the life of the security.

<sup>9</sup> Intangible assets with indefinite life are not amortised. Instead, they are reviewed each period as to the reasonableness of continuing to assume an indefinite useful life and are tested at least annually for impairment (i.e., if the recoverable or fair value of an intangible asset is materially lower than its value in the company’s books, the value of the asset is considered to be impaired and its value must be decreased). IAS 38, *Intangible Assets* and FASB ASC Topic 350 [Intangibles—Goodwill and Other].

IFRS allow two alternative models for valuing property, plant, and equipment: the cost model and the revaluation model.<sup>10</sup> Under the cost model, the depreciable amount of that asset (cost less residual value) is allocated on a systematic basis over the remaining useful life of the asset. Under the cost model, the asset is reported at its cost less any accumulated depreciation. Under the revaluation model, the asset is reported at its fair value. The revaluation model is not permitted under US GAAP. Although the revaluation model is permitted under IFRS, as noted earlier, it is not widely used and thus we focus on the cost model here. There are two other differences between IFRS and US GAAP to note: IFRS require each component of an asset to be depreciated separately and US GAAP do not require component depreciation; and IFRS require an annual review of residual value and useful life, and US GAAP do not explicitly require such a review.

The method used to compute depreciation should reflect the pattern over which the economic benefits of the asset are expected to be consumed. Neither IFRS or US GAAP prescribe a particular method for computing depreciation but note that several methods are commonly used, such as the straight-line method, diminishing balance method (accelerated depreciation), and the units of production method (depreciation varies depending upon production or usage).

The **straight-line method** allocates evenly the cost of long-lived assets less estimated residual value over the estimated useful life of an asset. (The term “straight line” derives from the fact that the annual depreciation expense, if represented as a line graph over time, would be a straight line. In addition, a plot of the cost of the asset minus the cumulative amount of annual depreciation expense, if represented as a line graph over time, would be a straight line with a negative downward slope.) Calculating depreciation and amortisation requires two significant estimates: the estimated useful life of an asset and the estimated residual value (also known as “salvage value”) of an asset. Under IFRS, the residual value is the amount that the company expects to receive upon sale of the asset at the end of its useful life. Example 1 assumes that an item of equipment is depreciated using the straight-line method and illustrates how the annual depreciation expense varies under different estimates of the useful life and estimated residual value of an asset. As shown, annual depreciation expense is sensitive to both the estimated useful life and to the estimated residual value.

#### EXAMPLE 1

##### Sensitivity of Annual Depreciation Expense to Varying Estimates of Useful Life and Residual Value

Using the straight-line method of depreciation, annual depreciation expense is calculated as:

$$\frac{\text{Cost} - \text{Residual value}}{\text{Estimated useful life}}$$

Assume the cost of an asset is \$10,000. If, for example, the residual value of the asset is estimated to be \$0 and its useful life is estimated to be 5 years, the annual depreciation expense under the straight-line method would be  $(\$10,000 - \$0)/5 \text{ years} = \$2,000$ . In contrast, holding the estimated useful life of the asset constant at 5 years but increasing the estimated residual value of the asset to \$4,000 would result in annual depreciation expense of only \$1,200 [calculated as  $(\$10,000 - \$4,000)/5 \text{ years}$ ]. Alternatively, holding the estimated residual value at \$0 but increasing the estimated useful life of the asset to 10 years would result

<sup>10</sup> IAS No. 16, *Property, Plant, and Equipment*.

in annual depreciation expense of only \$1,000 [calculated as  $(\$10,000 - \$0)/10$  years]. Exhibit 6 shows annual depreciation expense for various combinations of estimated useful life and residual value.

#### Exhibit 6: Annual Depreciation Expense (in Dollars)

Estimated Useful Life (Years)	Estimated Residual Value					
	0	1,000	2,000	3,000	4,000	5,000
2	5,000	4,500	4,000	3,500	3,000	2,500
4	2,500	2,250	2,000	1,750	1,500	1,250
5	2,000	1,800	1,600	1,400	1,200	1,000
8	1,250	1,125	1,000	875	750	625
10	1,000	900	800	700	600	500

Generally, alternatives to the straight-line method of depreciation are called **accelerated methods** of depreciation because they accelerate (i.e., speed up) the timing of depreciation. Accelerated depreciation methods allocate a greater proportion of the cost to the early years of an asset's useful life. These methods are appropriate if the plant or equipment is expected to be used up faster in the early years (e.g., an automobile). A commonly used accelerated method is the **diminishing balance method**, (also known as the declining balance method). The diminishing balance method is demonstrated in Example 2.

#### EXAMPLE 2

##### An Illustration of Diminishing Balance Depreciation

Assume the cost of computer equipment was \$11,000, the estimated residual value is \$1,000, and the estimated useful life is five years. Under the diminishing or declining balance method, the first step is to determine the straight-line rate, the rate at which the asset would be depreciated under the straight-line method. This rate is measured as 100 percent divided by the useful life or 20 percent for a five-year useful life. Under the straight-line method, 1/5 or 20 percent of the depreciable cost of the asset (here,  $\$11,000 - \$1,000 = \$10,000$ ) would be expensed each year for five years: The depreciation expense would be \$2,000 per year.

The next step is to determine an acceleration factor that approximates the pattern of the asset's wear. Common acceleration factors are 150 percent and 200 percent. The latter is known as **double declining balance depreciation** because it depreciates the asset at double the straight-line rate. Using the 200 percent acceleration factor, the diminishing balance rate would be 40 percent (20 percent  $\times$  2.0). This rate is then applied to the remaining undepreciated balance of the asset each period (known as the **net book value**).

At the beginning of the first year, the net book value is \$11,000. Depreciation expense for the first full year of use of the asset would be 40 percent of \$11,000, or \$4,400. Under this method, the residual value, if any, is generally not used in the computation of the depreciation each period (the 40 percent is applied to \$11,000 rather than to \$11,000 minus residual value). However, the company will stop taking depreciation when the salvage value is reached.



At the beginning of Year 2, the net book value is measured as

Asset cost	\$11,000
Less: Accumulated depreciation	(4,400)
Net book value	<u>\$6,600</u>

For the second full year, depreciation expense would be  $\$6,600 \times 40$  percent, or \$2,640. At the end of the second year (i.e., beginning of the third year), a total of \$7,040 ( $\$4,400 + \$2,640$ ) of depreciation would have been recorded. So, the remaining net book value at the beginning of the third year would be

Asset cost	\$11,000
Less: Accumulated depreciation	(7,040)
Net book value	<u>\$3,960</u>

For the third full year, depreciation would be  $\$3,960 \times 40$  percent, or \$1,584. At the end of the third year, a total of \$8,624 ( $\$4,400 + \$2,640 + \$1,584$ ) of depreciation would have been recorded. So, the remaining net book value at the beginning of the fourth year would be

Asset cost	\$11,000
Less: Accumulated depreciation	(8,624)
Net book value	<u>\$2,376</u>

For the fourth full year, depreciation would be  $\$2,376 \times 40$  percent, or \$950. At the end of the fourth year, a total of \$9,574 ( $\$4,400 + \$2,640 + \$1,584 + \$950$ ) of depreciation would have been recorded. So, the remaining net book value at the beginning of the fifth year would be

Asset cost	\$11,000
Less: Accumulated depreciation	(9,574)
Net book value	<u>\$1,426</u>

For the fifth year, if depreciation were determined as in previous years, it would amount to \$570 ( $\$1,426 \times 40$  percent). However, this would result in a remaining net book value of the asset below its estimated residual value of \$1,000. So, instead, only \$426 would be depreciated, leaving a \$1,000 net book value at the end of the fifth year.

Asset cost	\$11,000
Less: Accumulated depreciation	(10,000)
Net book value	<u>\$1,000</u>

Companies often use a zero or small residual value, which creates problems for diminishing balance depreciation because the asset never fully depreciates. In order to fully depreciate the asset over the initially estimated useful life when a zero or small residual value is assumed, companies often adopt a depreciation policy that combines the diminishing balance and straight-line methods. An example would be a depreciation policy of using double-declining balance depreciation and switching to the straight-line method halfway through the useful life.

Under accelerated depreciation methods, there is a higher depreciation expense in early years relative to the straight-line method. This results in higher expenses and lower net income in the early depreciation years. In later years, there is a reversal with

accelerated depreciation expense lower than straight-line depreciation. Accelerated depreciation is sometimes referred to as a conservative accounting choice because it results in lower net income in the early years of asset use.

For those intangible assets that must be amortised (those with an identifiable useful life), the process is the same as for depreciation; only the name of the expense is different. IFRS state that if a pattern cannot be determined over the useful life, then the straight-line method should be used.<sup>11</sup> In most cases under IFRS and US GAAP, amortisable intangible assets are amortised using the straight-line method with no residual value. **Goodwill**<sup>12</sup> and intangible assets with indefinite life are not amortised. Instead, they are tested at least annually for impairment (i.e., if the current value of an intangible asset or goodwill is materially lower than its value in the company's books, the value of the asset is considered to be impaired and its value in the company's books must be decreased).

In summary, to calculate depreciation and amortisation, a company must choose a method, estimate the asset's useful life, and estimate residual value. Clearly, different choices have a differing effect on depreciation or amortisation expense and, therefore, on reported net income.

## 6

### NON-OPERATING ITEMS



contrast operating and non-operating components of the income statement

Non-operating items are typically reported separately from operating income because they are material and/or relevant to the understanding of the entity's financial performance. Under IFRS, there is no definition of operating activities, and companies that choose to report operating income or the results of operating activities should ensure that these represent activities that are normally regarded as operating. Under US GAAP, operating activities generally involve producing and delivering goods and providing services and include all transactions and other events that are not defined as investing or financing activities.<sup>13</sup> For example, if a non-financial service company invests in equity or debt securities issued by another company, any interest, dividends, or profits from sales of these securities will be shown as non-operating income. In general, for non-financial services companies,<sup>14</sup> non-operating income that is disclosed separately on the income statement (or in the notes) includes amounts earned through investing activities.

Among non-operating items on the income statement (or accompanying notes), non-financial service companies also disclose the interest expense on their debt securities, including amortisation of any discount or premium. The amount of interest expense is related to the amount of a company's borrowings and is generally described in the notes to the financial statements. For financial service companies, interest income and expense are likely components of operating activities. (Note that the characterization of interest and dividends as non-operating items on the income

<sup>11</sup> IAS 38, *Intangible Assets*.

<sup>12</sup> Goodwill is recorded in acquisitions and is the amount by which the price to purchase an entity exceeds the amount of net identifiable assets acquired (the total amount of identifiable assets acquired less liabilities assumed).

<sup>13</sup> FASB ASC *Master Glossary*.

<sup>14</sup> Examples of financial services companies are insurance companies, banks, brokers, dealers, and investment companies.

statement is not necessarily consistent with the classification on the statement of cash flows. Specifically, under IFRS, interest and dividends received can be shown either as operating or as investing on the statement of cash flows, while under US GAAP interest and dividends received are shown as operating cash flows. Under IFRS, interest and dividends paid can be shown either as operating or as financing on the statement of cash flows, while under US GAAP, interest paid is shown as operating and dividends paid are shown as financing.)

In practice, companies often disclose the interest expense and income separately, along with a net amount. For example, in Exhibit 1, ABN InBev's 2017 income statement shows finance cost of \$6,885 million, finance income of \$378 million, and net finance cost of \$6,507 million. Similarly, in Exhibit 3, Danone's 2017 income statement shows interest income of €130 million, interest expense of €276 million, and cost of net debt of €146 million.

For purposes of assessing a company's future performance, the amount of financing expense will depend on the company's financing policy (target capital structure) and borrowing costs. The amount of investing income will depend on the purpose and success of investing activities. For a non-financial company, a significant amount of financial income would typically warrant further exploration. What are the reasons underlying the company's investments in the securities of other companies? Is the company simply investing excess cash in short-term securities to generate income higher than cash deposits, or is the company purchasing securities issued by other companies for strategic reasons, such as access to raw material supply or research?

## COMMON-SIZE ANALYSIS OF THE INCOME STATEMENT

# 7

- ☐ formulate income statements into common-size income statements
- ☐ evaluate a company's financial performance using common-size income statements and financial ratios based on the income statement

In this section, we discuss two tools that can be used to analyze the income statement: common-size analysis and income statement ratios. The objective of this analysis is to assess a company's performance over a period of time—compared with its own past performance or the performance of another company.

### Common-Size Analysis of the Income Statement

Common-size analysis of the income statement can be performed by stating each line item on the income statement as a percentage of revenue.<sup>15</sup> Common-size statements facilitate comparison across time periods (time series analysis) and across companies (cross-sectional analysis) because the standardization of each line item removes the effect of size.

<sup>15</sup> This format can be distinguished as "vertical common-size analysis." There is another type of common-size analysis, known as "horizontal common-size analysis," that states items in relation to a selected base year value. Unless otherwise indicated, text references to "common-size analysis" refer to vertical analysis.

To illustrate, Panel A of Exhibit 7 presents an income statement for three hypothetical companies in the same industry. Company A and Company B, each with \$10 million in sales and which are larger (as measured by sales) than Company C, which has only \$2 million in sales. In addition, Companies A and B both have higher operating profit: \$2 million and \$1.5 million, respectively, compared with Company C's operating profit of only \$400,000.

How can an analyst meaningfully compare the performance of these companies? By preparing a common-size income statement, as illustrated in Panel B, an analyst can readily see that the percentages of Company C's expenses and profit relative to its sales are exactly the same as for Company A. Furthermore, although Company C's operating profit is lower than Company B's in absolute dollars, it is higher in percentage terms (20 percent for Company C compared with only 15 percent for Company B). For each \$100 of sales, Company C generates \$5 more operating profit than Company B. In other words, Company C is relatively more profitable than Company B based on this measure.

The common-size income statement also highlights differences in companies' strategies. Comparing the two larger companies, Company A reports significantly higher gross profit as a percentage of sales than does Company B (70 percent compared with 25 percent). Given that both companies operate in the same industry, why can Company A generate so much higher gross profit? One possible explanation is found by comparing the operating expenses of the two companies. Company A spends significantly more on research and development and on advertising than Company B. Expenditures on research and development likely result in products with superior technology. Expenditures on advertising likely result in greater brand awareness. So, based on these differences, it is likely that Company A is selling technologically superior products with a better brand image. Company B may be selling its products more cheaply (with a lower gross profit as a percentage of sales) but saving money by not investing in research and development or advertising. In practice, differences across companies are more subtle, but the concept is similar. An analyst, noting significant differences, would do more research and seek to understand the underlying reasons for the differences and their implications for the future performance of the companies.

### Exhibit 7

**Panel A: Income Statements for Companies A, B, and C (\$)**

	<b>A</b>	<b>B</b>	<b>C</b>
Sales	\$10,000,000	\$10,000,000	\$2,000,000
Cost of sales	3,000,000	7,500,000	600,000
Gross profit	7,000,000	2,500,000	1,400,000
Selling, general, and administrative expenses	1,000,000	1,000,000	200,000
Research and development	2,000,000	—	400,000
Advertising	2,000,000	—	400,000
Operating profit	2,000,000	1,500,000	400,000

**Panel B: Common-Size Income Statements for Companies A, B, and C (%)**

	<b>A</b>	<b>B</b>	<b>C</b>
Sales	100%	100%	100%
Cost of sales	30	75	30
Gross profit	70	25	70

**Panel B: Common-Size Income Statements for Companies A, B, and C (%)**

	<b>A</b>	<b>B</b>	<b>C</b>
Selling, general, and administrative expenses	10	10	10
Research and development	20	0	20
Advertising	20	0	20
Operating profit	20	15	20

*Note:* Each line item is expressed as a percentage of the company's sales.

For most expenses, comparison to the amount of sales is appropriate. However, in the case of taxes, it is more meaningful to compare the amount of taxes with the amount of pretax income. Using note disclosure, an analyst can then examine the causes for differences in effective tax rates. To project the companies' future net income, an analyst would project the companies' pretax income and apply an estimated effective tax rate determined in part by the historical tax rates.

Vertical common-size analysis of the income statement is particularly useful in cross-sectional analysis—comparing companies with each other for a particular time period or comparing a company with industry or sector data. The analyst could select individual peer companies for comparison, use industry data from published sources, or compile data from databases based on a selection of peer companies or broader industry data. For example, Exhibit 8 presents median common-size income statement data compiled for the components of the S&P 500 classified into the 10 S&P/ MSCI Global Industrial Classification System (GICS) sectors using 2017 data. Note that when compiling aggregate data such as this, some level of aggregation is necessary and less detail may be available than from peer company financial statements. The performance of an individual company can be compared with industry or peer company data to evaluate its relative performance.

**Exhibit 8: Median Common-Size Income Statement Statistics for the S&P 500 Classified by S&P/MSCI GICS Sector Data for 2017**

	<b>Energy</b>	<b>Materials</b>	<b>Industrials</b>	<b>Consumer Discretionary</b>	<b>Consumer Staples</b>	<b>Health Care</b>
Number of observations	34	27	69	81	34	59
Gross Margin	37.7%	33.0%	36.8%	37.6%	43.4%	59.0%
Operating Margin	6.4%	14.9%	13.5%	11.0%	17.2%	17.4%
Net Profit Margin	4.9%	9.9%	8.8%	6.0%	10.9%	7.2%

  

	<b>Financials</b>	<b>Information Technology</b>	<b>Telecommunication Services</b>	<b>Utilities</b>	<b>Real Estate</b>
Number of observations	63	64	4	29	29
Gross Margin	40.5%	62.4%	56.4%	34.3%	39.8%
Operating Margin	36.5%	21.1%	15.4%	21.7%	30.1%
Net Profit Margin	18.5%	11.3%	13.1%	10.1%	21.3%

*Source:* Based on data from Compustat. Operating margin based on EBIT (earnings before interest and taxes).

## 8

## COMPREHENSIVE INCOME

- ☐ describe, calculate, and interpret comprehensive income
- ☐ describe other comprehensive income and identify major types of items included in it

The general expression for net income is revenue minus expenses. There are, however, certain items of revenue and expense that, by accounting convention, are excluded from the net income calculation. To understand how reported shareholders' equity of one period links with reported shareholders' equity of the next period, we must understand these excluded items, known as **other comprehensive income**. Under IFRS, other comprehensive income includes items of income and expense that are "not recognized in profit or loss as required or permitted by other IFRS." **Total comprehensive income** is "the change in equity during a period resulting from transaction and other events, other than those changes resulting from transactions with owners in their capacity as owners."<sup>16</sup>

Under US GAAP, **comprehensive income** is defined as "the change in equity [net assets] of a business enterprise during a period from transactions and other events and circumstances from non-owner sources. It includes all changes in equity during a period except those resulting from investments by owners and distributions to owners."<sup>17</sup> While the wording differs, comprehensive income is conceptually the same under IFRS and US GAAP.

Comprehensive income includes both net income and realized and unrealized gains and losses that are excluded from the net income calculation (collectively referred to as Other comprehensive income), but which adjust reported values of balance sheet line items. Assume, for example, a company's beginning shareholders' equity is €110 million, its net income for the year is €10 million, its cash dividends for the year are €2 million, and there was no issuance or repurchase of common stock. If the company's actual ending shareholders' equity is €123 million, then €5 million [ $€123 - (€110 + €10 - €2)$ ] has bypassed the net income calculation by being classified as other comprehensive income. If the company had no other comprehensive income, its ending shareholders' equity would have been €118 million [ $€110 + €10 - €2$ ].

Four types of items are treated as other comprehensive income under both IFRS and US GAAP. (The specific treatment of some of these items differs between the two sets of standards, but these types of items are common to both.)

- Foreign currency translation adjustments. In consolidating the financial statements of foreign subsidiaries, the effects of translating the subsidiaries' balance sheet assets and liabilities at current exchange rates are included as other comprehensive income.
- Unrealized gains or losses on derivatives contracts accounted for as hedges. Changes in the fair value of derivatives are recorded each period, but certain changes in value are treated as other comprehensive income and thus bypass the income statement.
- Unrealized holding gains and losses on a certain category of investment securities, namely, available-for-sale debt securities under US GAAP and securities designated as "fair value through other comprehensive income"

<sup>16</sup> IAS 1, *Presentation of Financial Statements*.

<sup>17</sup> FASB ASC Section 220-10-05 [Comprehensive Income—Overall—Overview and Background].

under IFRS. (Note: IFRS, but not US GAAP, also includes a category of equity investments designated at fair value through other comprehensive income.)

- Certain costs of a company's defined benefit post-retirement plans that are not recognized in the current period.

In addition, under IFRS, other comprehensive income includes certain changes in the value of long-lived assets that are measured using the revaluation model rather than the cost model. Also, under IFRS, companies are not permitted to reclassify certain items of other comprehensive income to profit or loss, and companies must present separately the items of other comprehensive income that will and will not be reclassified subsequently to profit or loss.

The third type of item listed above is perhaps the simplest to illustrate. Holding gains on securities arise when a company owns securities over an accounting period, during which time the securities' value increases. Similarly, holding losses on securities arise when a company owns securities over a period during which time the securities' value decreases. If the company has not sold the securities (i.e., has not realized the gain or loss), its holding gain or loss is said to be unrealized. The question is: Should the company exclude unrealized gains and losses from income; reflect these unrealized holding gains and losses in its income statement (i.e., statement of profit and loss); or reflect these unrealized holding gains as other comprehensive income?

According to accounting standards, the answer depends on how the company has categorized the securities. Categorization depends on what the company intends to do with the securities (i.e., the business model for managing the asset) and on the cash flows of the security. Unrealized gains and losses are excluded from income for debt securities that the company intends to hold to maturity. These held-to-maturity debt securities are reported at their amortized cost, so no unrealized gains or losses are reported. For other securities reported at fair value, the unrealized gains or losses are reflected either in the income statement or as other comprehensive income.

Under US GAAP, unrealized gains and losses are reflected in the income statement for: (a) debt securities designated as **trading securities** and (b) all investments in equity securities (other than investments giving rise to ownership positions that confer significant influence over the investee). The trading securities category pertains to a debt security that is acquired with the intent of selling it rather than holding it to collect the interest and principal payments. Also, under US GAAP, unrealized gains and losses are reflected as other comprehensive income for debt securities designated as **available-for-sale** securities. Available-for-sale debt securities are those not designated as either held-to-maturity or trading.

Under IFRS, unrealized gains and losses are reflected in the income statement for: (a) investments in equity investments, unless the company makes an irrevocable election otherwise, and (b) debt securities, if the securities do not fall into the other measurement categories or if the company makes an irrevocable election to show gains and losses on the income statement. These debt and equity investments are referred to as being measured at *fair value through profit or loss*. Also under IFRS, unrealized gains and losses are reflected as other comprehensive income for: (a) "debt securities held within a business model whose objective is achieved both by collecting contractual cash flows and selling financial assets" and (b) equity investments for which the company makes an irrevocable election at initial recognition to show gains and losses as part of other comprehensive income. These debt and equity investments are referred to as being measured at *fair value through other comprehensive income*. Accounting for these securities is similar to accounting for US GAAP's available-for-sale debt securities.

Even where unrealized holding gains and losses are excluded from a company's net income (profit and loss), they are *included* in other comprehensive income and thus form a part of a company's comprehensive income.

**EXAMPLE 3****Other Comprehensive Income**

Assume a company's beginning shareholders' equity is €200 million, its net income for the year is €20 million, its cash dividends for the year are €3 million, and there was no issuance or repurchase of common stock. The company's actual ending shareholders' equity is €227 million.

1. What amount has bypassed the net income calculation by being classified as other comprehensive income?
  - A. €0
  - B. €7 million
  - C. €10 million

**Solution to 1:**

C is correct. If the company's actual ending shareholders' equity is €227 million, then €10 million [ $€227 - (€200 + €20 - €3)$ ] has bypassed the net income calculation by being classified as other comprehensive income.

2. Which of the following statements *best* describes other comprehensive income?
  - A. Income earned from diverse geographic and segment activities.
  - B. Income that increases stockholders' equity but is not reflected as part of net income.
  - C. Income earned from activities that are not part of the company's ordinary business activities.

**Solution to 2:**

B is correct. Answers A and C are not correct because they do not specify whether such income is reported as part of net income and shown in the income statement.

**EXAMPLE 4****Other Comprehensive Income in Analysis**

1. An analyst is looking at two comparable companies. Company A has a lower price/earnings (P/E) ratio than Company B, and the conclusion that has been suggested is that Company A is undervalued. As part of examining this conclusion, the analyst decides to explore the question: What would the company's P/E look like if total comprehensive income per share—rather than net income per share—were used as the relevant metric?

	Company A	Company B
Price	\$35	\$30
EPS	\$1.60	\$0.90
P/E ratio	21.9×	33.3×



	Company A	Company B
Other comprehensive income (loss) \$ million	(\$16.272)	(\$1.757)
Shares (millions)	22.6	25.1

**Solution:**

As shown in the following table, part of the explanation for Company A's lower P/E ratio may be that its significant losses—accounted for as other comprehensive income (OCI)—are not included in the P/E ratio.

	Company A	Company B
Price	\$35	\$30
EPS	\$1.60	\$0.90
OCI (loss) \$ million	(\$16.272)	(\$1.757)
Shares (millions)	22.6	25.1
OCI (loss) per share	(\$0.72)	(\$0.07)
Comprehensive EPS = EPS + OCI per share	\$0.88	\$0.83
Price/Comprehensive EPS ratio	39.8×	36.1×

Both IFRS and US GAAP allow companies two alternative presentations. One alternative is to present two statements—a separate income statement and a second statement additionally including other comprehensive income. The other alternative is to present a single statement of other comprehensive income.

**SUMMARY**

This module has presented the elements of income statement analysis. The income statement presents information on the financial results of a company's business activities over a period of time; it communicates how much revenue the company generated during a period and what costs it incurred in connection with generating that revenue. A company's net income and its components (e.g., gross margin, operating earnings, and pretax earnings) are critical inputs into both the equity and credit analysis processes. Equity analysts are interested in earnings because equity markets often reward relatively high- or low-earnings growth companies with above-average or below-average valuations, respectively. Fixed-income analysts examine the components of income statements, past and projected, for information on companies' abilities to make promised payments on their debt over the course of the business cycle. Corporate financial announcements frequently emphasize income statements more than the other financial statements.

Key points to this reading include the following:

- The income statement presents revenue, expenses, and net income.
- The components of the income statement include: revenue; cost of sales; sales, general, and administrative expenses; other operating expenses; non-operating income and expenses; gains and losses; non-recurring items; net income; and EPS.

- An income statement that presents a subtotal for gross profit (revenue minus cost of goods sold) is said to be presented in a multi-step format. One that does not present this subtotal is said to be presented in a single-step format.
- Revenue is recognized in the period it is earned, which may or may not be in the same period as the related cash collection. Recognition of revenue when earned is a fundamental principle of accrual accounting.
- An analyst should identify differences in companies' revenue recognition methods and adjust reported revenue where possible to facilitate comparability. Where the available information does not permit adjustment, an analyst can characterize the revenue recognition as more or less conservative and thus qualitatively assess how differences in policies might affect financial ratios and judgments about profitability.
- The core principle of the revenue recognition standards is that revenue should be recognized to "depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in an exchange for those goods or services."
- To achieve the core principle, the standard describes the application of five steps in recognizing revenue. The standard also specifies the treatment of some related contract costs and disclosure requirements.
- The general principles of expense recognition include a process to match expenses either to revenue (such as, cost of goods sold) or to the time period in which the expenditure occurs (period costs such as administrative salaries) or to the time period of expected benefits of the expenditures (such as depreciation).
- In expense recognition, choice of method (i.e., depreciation method and inventory cost method) and estimates (i.e., uncollectible accounts, warranty expenses, assets' useful life, and salvage value) affect a company's reported income. An analyst should identify differences in companies' expense recognition methods and adjust reported financial statements where possible to facilitate comparability. Where the available information does not permit adjustment, an analyst can characterize the policies and estimates as more or less conservative and thus qualitatively assess how differences in policies might affect financial ratios and judgments about companies' performance.
- To assess a company's future earnings, it is helpful to separate those prior years' items of income and expense that are likely to continue in the future from those items that are less likely to continue.
- Under IFRS, a company should present additional line items, headings, and subtotals beyond those specified when such presentation is relevant to an understanding of the entity's financial performance. Some items from prior years clearly are not expected to continue in future periods and are separately disclosed on a company's income statement. Under US GAAP, unusual and/or infrequently occurring items, which are material, are presented separately within income from continuing operations.
- Non-operating items are reported separately from operating items on the income statement. Under both IFRS and US GAAP, the income statement reports separately the effect of the disposal of a component operation as a "discontinued" operation.
- Common-size analysis of the income statement involves stating each line item on the income statement as a percentage of sales. Common-size statements facilitate comparison across time periods and across companies of different sizes.

- Two income-statement-based indicators of profitability are net profit margin and gross profit margin.
- Comprehensive income includes *both* net income and other revenue and expense items that are excluded from the net income calculation.

## PRACTICE PROBLEMS

- Expenses on the income statement may be grouped by:
  - nature, but not by function.
  - function, but not by nature.
  - either function or nature.
- An example of an expense classification by function is:
  - tax expense.
  - interest expense.
  - cost of goods sold.
- Denali Limited, a manufacturing company, had the following income statement information:

Revenue	\$4,000,000
Cost of goods sold	\$3,000,000
Other operating expenses	\$500,000
Interest expense	\$100,000
Tax expense	\$120,000

Denali's gross profit is equal to:

- \$280,000.
  - \$500,000.
  - \$1,000,000.
- Which statement is *most* accurate? A common size income statement:
    - restates each line item of the income statement as a percentage of net income.
    - allows an analyst to conduct cross-sectional analysis by removing the effect of company size.
    - standardizes each line item of the income statement but fails to help an analyst identify differences in companies' strategies.
  - Selected year-end financial statement data for Workhard are shown below.

	\$ millions
Beginning shareholders' equity	475
Ending shareholders' equity	493
Unrealized gain on available-for-sale securities	5
Unrealized loss on derivatives accounted for as hedges	-3
Foreign currency translation gain on consolidation	2

	\$ millions
Dividends paid	1
Net income	15

Workhard's comprehensive income for the year:

- A. is \$18 million.
  - B. is increased by the derivatives accounted for as hedges.
  - C. includes \$4 million in other comprehensive income.
6. When preparing an income statement, which of the following items would *most likely* be classified as other comprehensive income?
- A. A foreign currency translation adjustment
  - B. An unrealized gain on a security held for trading purposes
  - C. A realized gain on a derivative contract not accounted for as a hedge

## SOLUTIONS

1. C is correct. IAS No. 1 states that expenses may be categorized by either nature or function.
2. C is correct. Cost of goods sold is a classification by function. The other two expenses represent classifications by nature.
3. C is correct. Gross margin is revenue minus cost of goods sold. Answer A represents net income and B represents operating income.
4. B is correct. Common size income statements facilitate comparison across time periods (time-series analysis) and across companies (cross-sectional analysis) by stating each line item of the income statement as a percentage of revenue. The relative performance of different companies can be more easily assessed because scaling the numbers removes the effect of size. A common size income statement states each line item on the income statement as a percentage of revenue. The standardization of each line item makes a common size income statement useful for identifying differences in companies' strategies.
5. C is correct. Comprehensive income includes both net income and other comprehensive income.

$$\begin{aligned}
 \text{Other comprehensive income} &= \text{Unrealized gain on available-for-sale securities} \\
 &\quad - \text{Unrealized loss on derivatives accounted for} \\
 &\quad \text{as hedges} + \text{Foreign currency translation gain on} \\
 &\quad \text{consolidation} \\
 &= \$5 \text{ million} - \$3 \text{ million} + \$2 \text{ million} \\
 &= \$4 \text{ million}
 \end{aligned}$$

Alternatively,

$$\text{Comprehensive income} - \text{Net income} = \text{Other comprehensive income}$$

$$\begin{aligned}
 \text{Comprehensive income} &= (\text{Ending shareholders equity} - \text{Beginning shareholders} \\
 &\quad \text{equity}) + \text{Dividends} \\
 &= (\$493 \text{ million} - \$475 \text{ million}) + \$1 \text{ million} \\
 &= \$18 \text{ million} + \$1 \text{ million} = \$19 \text{ million}
 \end{aligned}$$

Net income is \$15 million so other comprehensive income is \$4 million.

6. A is correct. Other comprehensive income includes items that affect shareholders' equity but are not reflected in the company's income statement. In consolidating the financial statements of foreign subsidiaries, the effects of translating the subsidiaries' balance sheet assets and liabilities at current exchange rates are included as other comprehensive income.

## LEARNING MODULE

# 3

## Balance Sheets

by Elaine Henry, PhD, CFA, and Thomas R. Robinson, PhD, CAIA, CFA.

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### LEARNING OUTCOMES

<i>Mastery</i>	<i>The candidate should be able to:</i>
<input type="checkbox"/>	describe the elements of the balance sheet: assets, liabilities, and equity
<input type="checkbox"/>	describe uses and limitations of the balance sheet in financial analysis
<input type="checkbox"/>	describe alternative formats of balance sheet presentation
<input type="checkbox"/>	contrast current and non-current assets and current and non-current liabilities
<input type="checkbox"/>	describe different types of assets and liabilities and the measurement bases of each
<input type="checkbox"/>	describe the components of shareholders' equity

**Note:** Changes in accounting standards as well as new rulings and/or pronouncements issued after the publication of the readings on financial reporting and analysis may cause some of the information in these readings to become dated. Candidates are *not* responsible for anything that occurs after the readings were published. In addition, candidates are expected to be familiar with the analytical frameworks contained in the readings, as well as the implications of alternative accounting methods for financial analysis and valuation discussed in the readings. Candidates are also responsible for the content of accounting standards, but not for the actual reference numbers. Finally, candidates should be aware that certain ratios may be defined and calculated differently. When alternative ratio definitions exist and no specific definition is given, candidates should use the ratio definitions emphasized in the readings.

## 1

## INTRODUCTION AND COMPONENTS OF THE BALANCE SHEET

- ☐ describe the elements of the balance sheet: assets, liabilities, and equity
- ☐ describe uses and limitations of the balance sheet in financial analysis

The balance sheet provides information on a company's resources (assets) and its sources of capital (equity and liabilities/debt). This information helps an analyst assess a company's ability to pay for its near-term operating needs, meet future debt obligations, and make distributions to owners. The basic equation underlying the balance sheet is  $\text{Assets} = \text{Liabilities} + \text{Equity}$ .

Analysts should be aware that different types of assets and liabilities may be measured differently. For example, some items are measured at historical cost or a variation thereof and others at fair value.<sup>1</sup> An understanding of the measurement issues will facilitate analysis. The balance sheet measurement issues are, of course, closely linked to the revenue and expense recognition issues affecting the income statement. Throughout this reading, we describe and illustrate some of the linkages between the measurement issues affecting the balance sheet and the revenue and expense recognition issues affecting the income statement.

### Components and Format of the Balance Sheet

The **balance sheet** (also called the **statement of financial position** or **statement of financial condition**) discloses what an entity owns (or controls), what it owes, and what the owners' claims are at a specific point in time.<sup>2</sup>

The financial position of a company is described in terms of its basic elements (assets, liabilities, and equity):

- **Assets (A)** are what the company owns (or controls). More formally, assets are resources controlled by the company as a result of past events and from which future economic benefits are expected to flow *to* the entity.
- **Liabilities (L)** are what the company owes. More formally, liabilities represent obligations of a company arising from past events or current conditions (e.g., a constructive obligation), the settlement of which is expected to result in a future outflow of economic benefits *from* the entity.
- **Equity (E)** represents the owners' residual interest in the company's assets after deducting its liabilities. Commonly known as **shareholders' equity** or **owners' equity**, equity is determined by subtracting the liabilities from the assets of a company, giving rise to the accounting equation:  $A - L = E$  or  $A = L + E$ .

<sup>1</sup> IFRS and US GAAP define "fair value" as an exit price, i.e., the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date (IFRS 13, FASB ASC Topic 820).

<sup>2</sup> IFRS uses the term "statement of financial position" (IAS 1 *Presentation of Financial Statements*), and US GAAP uses the terms "balance sheet" and "statement of financial position" interchangeably (ASC 210-10-05 [Balance Sheet—Overall—Overview and Background]).



The equation  $A = L + E$  is sometimes summarized as follows: The left side of the equation reflects the resources controlled by the company and the right side reflects how those resources were financed. For all financial statement items, an item should only be recognized in the financial statements if it is probable that any future economic benefit associated with the item will flow to or from the entity and if the item has a cost or value that can be measured with reliability.<sup>3</sup>

The balance sheet provides important information about a company's financial condition, but the balance sheet amounts of equity (assets, net of liabilities) should not be viewed as a measure of either the market or intrinsic value of a company's equity for several reasons. First, the balance sheet under current accounting standards is a mixed model with respect to measurement. Some assets and liabilities are measured based on historical cost, sometimes with adjustments, whereas other assets and liabilities are measured based on a fair value, which represents its current value as of the balance sheet date. The measurement bases may have a significant effect on the amount reported. Second, even the items measured at current value reflect the value that was current at the end of the reporting period. The values of those items obviously can change after the balance sheet is prepared. Third, the value of a company is a function of many factors, including future cash flows expected to be generated by the company and current market conditions. Important aspects of a company's ability to generate future cash flows—for example, its reputation and management skills—are not included in its balance sheet.

## Balance Sheet Components

To illustrate the components and formats of balance sheets, we show the major subtotals from two companies' balance sheets. Exhibit 1 and Exhibit 2 are based on the balance sheets of SAP Group and Apple Inc. SAP Group is a leading business software company based in Germany and prepares its financial statements in accordance with IFRS. Apple is a technology company based in the United States and prepares its financial statements in accordance with US GAAP. For purposes of discussion, Exhibit 1 and Exhibit 2 show only the main subtotals and totals of these companies' balance sheets. Additional exhibits throughout this reading will expand on these subtotals.

**Exhibit 1: SAP Group Consolidated Statements of Financial Position  
(Excerpt) (in millions of €)**

	31 December	
<b>Assets</b>	<b>2017</b>	<b>2016*</b>
Total current assets	11,930	11,564
Total non-current assets	30,567	32,713
<b>Total assets</b>	<b>42,497</b>	<b>44,277</b>
<b>Equity and liabilities</b>		
Total current liabilities	10,210	9,675
Total non-current liabilities	6,747	8,205
<b>Total liabilities</b>	<b>16,957</b>	<b>17,880</b>
<b>Total equity</b>	<b>25,540</b>	<b>26,397</b>
<b>Equity and liabilities</b>	<b>42,497</b>	<b>44,277</b>

3 *Conceptual Framework for Financial Reporting* (2018).

Source: SAP Group 2017 annual report.

Notes: Numbers exactly from the annual report as prepared by the company, which reflects some rounding.

\* Numbers are the reclassified numbers from the SAP Group 2017 annual report.

**Exhibit 2: Apple Inc. Consolidated Balance Sheets  
(Excerpt)\* (in millions of \$)**

<b>Assets</b>	<b>30 September 2017</b>	<b>24 September 2016</b>
Total current assets	128,645	106,869
<i>[All other assets]</i>	<i>246,674</i>	<i>214,817</i>
<b>Total assets</b>	<b>375,319</b>	<b>321,686</b>
<b>Liabilities and shareholders' equity</b>		
Total current liabilities	100,814	79,006
<i>[Total non-current liabilities]</i>	<i>140,458</i>	<i>114,431</i>
<b>Total liabilities</b>	<b>241,272</b>	<b>193,437</b>
<b>Total shareholders' equity</b>	<b>134,047</b>	<b>128,249</b>
<b>Total liabilities and shareholders' equity</b>	<b>375,319</b>	<b>321,686</b>

\*Note: The italicized subtotals presented in this excerpt are not explicitly shown on the face of the financial statement as prepared by the company.

Source: Apple Inc. 2017 annual report (Form 10K).

SAP Group uses the title Statement of Financial Position and Apple uses the title Balance Sheet. Despite their different titles, both statements report the three basic elements: assets, liabilities, and equity. Both companies are reporting on a consolidated basis, i.e., including all their controlled subsidiaries. The numbers in SAP Group's balance sheet are in millions of euros, and the numbers in Apple's balance sheet are in millions of dollars.

Balance sheet information is as of a specific point in time. These exhibits are from the companies' annual financial statements, so the balance sheet information is as of the last day of their respective fiscal years. SAP Group's fiscal year is the same as the calendar year and the balance sheet information is as of 31 December. Apple's fiscal year ends on the last Saturday of September, so the actual date changes from year to year. About every six years, Apple's fiscal year will include 53 weeks rather than 52 weeks. This feature of Apple's fiscal year should be noted, but in general, the extra week is more relevant to evaluating statements spanning a period of time (the income and cash flow statements) rather than the balance sheet which captures information as of a specific point in time.

A company's ability to pay for its short term operating needs relates to the concept of **liquidity**. With respect to a company overall, liquidity refers to the availability of cash to meet those short-term needs. With respect to a particular asset or liability, liquidity refers to its "nearness to cash." A liquid asset is one that can be easily converted into cash in a short period of time at a price close to fair market value. For example, a small holding of an actively traded stock is much more liquid than an investment in an asset such as a commercial real estate property, particularly in a weak property market.

The separate presentation of current and non-current assets and liabilities facilitates analysis of a company's liquidity position (at least as of the end of the fiscal period). Both IFRS and US GAAP require that the balance sheet distinguish between current and non-current assets and between current and non-current liabilities and present

these as separate classifications. An exception to this requirement, under IFRS, is that the current and non-current classifications are not required if a liquidity-based presentation provides reliable and more relevant information.

## CURRENT AND NON-CURRENT CLASSIFICATION

# 2

- ☐ describe alternative formats of balance sheet presentation
- ☐ contrast current and non-current assets and current and non-current liabilities

Assets that are held primarily for the purpose of trading or that are expected to be sold, used up, or otherwise realized in cash within one year or one operating cycle of the business, whichever is greater, after the reporting period are classified as **current assets**. A company's operating cycle is the average amount of time that elapses between acquiring inventory and collecting the cash from sales to customers. (When the entity's normal operating cycle is not clearly identifiable, its duration is assumed to be one year.) For a manufacturer, the operating cycle is the average amount of time between acquiring raw materials and converting these into cash from a sale. Examples of companies that might be expected to have operating cycles longer than one year include those operating in the tobacco, distillery, and lumber industries. Even though these types of companies often hold inventories longer than one year, the inventory is classified as a current asset because it is expected to be sold within an operating cycle. Assets not expected to be sold or used up within one year or one operating cycle of the business, whichever is greater, are classified as **non-current assets** (long-term, long-lived assets).

Current assets are generally maintained for operating purposes, and these assets include—in addition to cash—items expected to be converted into cash (e.g., trade receivables), used up (e.g., office supplies, prepaid expenses), or sold (e.g., inventories) in the current operating cycle. Current assets provide information about the operating activities and the operating capability of the entity. For example, the item “trade receivables” or “accounts receivable” would indicate that a company provides credit to its customers. Non-current assets represent the infrastructure from which the entity operates and are not consumed or sold in the current period. Investments in such assets are made from a strategic and longer term perspective.

Similarly, liabilities expected to be settled within one year or within one operating cycle of the business, whichever is greater, after the reporting period are classified as **current liabilities**. The specific criteria for classification of a liability as current include the following:

- It is expected to be settled in the entity's normal operating cycle;
- It is held primarily for the purpose of being traded;<sup>4</sup>
- It is due to be settled within one year after the balance sheet date; or
- The entity does not have an unconditional right to defer settlement of the liability for at least one year after the balance sheet date.<sup>5</sup>

<sup>4</sup> Examples of these are financial liabilities classified as held for trading in accordance with IAS 39, which is replaced by IFRS 9 effective for periods beginning on or after 1 January 2018.

<sup>5</sup> IAS 1, *Presentation of Financial Statements*, paragraph 69.

IFRS specify that some current liabilities, such as trade payables and some accruals for employee and other operating costs, are part of the working capital used in the entity's normal operating cycle. Such operating items are classified as current liabilities even if they will be settled more than one year after the balance sheet date. All other liabilities are classified as **non-current liabilities**. Non-current liabilities include financial liabilities that provide financing on a long-term basis.

The excess of current assets over current liabilities is called **working capital**. The level of working capital provides analysts with information about the ability of an entity to meet liabilities as they fall due. Although adequate working capital is essential, excessive working capital should be avoided so that funds that could be used more productively elsewhere are not inappropriately tied up.

A balance sheet with separately classified current and non-current assets and liabilities is referred to as a **classified balance sheet**. Classification also refers generally to the grouping of accounts into subcategories. Both companies' balance sheets that are summarized in Exhibits 1 and 2 are classified balance sheets. Although both of the companies' balance sheets present current assets before non-current assets and current liabilities before non-current liabilities, IFRS does not specify the order or format in which a company presents items on a current/non-current classified balance sheet.

### 3

## LIQUIDITY-BASED PRESENTATION



describe alternative formats of balance sheet presentation

A liquidity-based presentation, rather than a current/non-current presentation, is used when such a presentation provides information that is reliable and more relevant. With a liquidity-based presentation, all assets and liabilities are presented broadly in order of liquidity.

Entities such as banks are candidates to use a liquidity-based presentation. Exhibit 3 presents the assets portion of the balance sheet of HSBC Holdings plc (HSBC), a global financial services company that reports using IFRS. HSBC's balance sheet is ordered using a liquidity-based presentation. As shown, the asset section begins with cash and balances at central banks. Less liquid items such as "Interest in associates and joint ventures" appear near the bottom of the asset listing.

**Exhibit 3: HSBC Holdings plc Consolidated Statement of Financial Position  
(Excerpt: Assets Only) as of 31 December (in millions of US \$)**

Consolidated balance sheet - USD (\$) in Millions	Dec. 31, 2017	Dec. 31, 2016
<b>Assets</b>		
Cash and balances at central banks	\$180,624	\$128,009
Items in the course of collection from other banks	6,628	5,003
Hong Kong Government certificates of indebtedness	34,186	31,228
Trading assets	287,995	235,125
Financial assets designated at fair value	29,464	24,756
Derivatives	219,818	290,872
Loans and advances to banks	90,393	88,126

Consolidated balance sheet - USD (\$) in Millions	Dec. 31, 2017	Dec. 31, 2016
Loans and advances to customers	962,964	861,504
Reverse repurchase agreements – non-trading	201,553	160,974
Financial investments	389,076	436,797
Prepayments, accrued income and other assets	67,191	63,909
Current tax assets	1,006	1,145
Interests in associates and joint ventures	22,744	20,029
Goodwill and intangible assets	23,453	21,346
Deferred tax assets	4,676	6,163
Total assets	2,521,771	2,374,986

Source: HSBC Holdings plc 2017 Annual Report and Accounts.

## CURRENT ASSETS: CASH AND CASH EQUIVALENTS, MARKETABLE SECURITIES AND TRADE RECEIVABLES

4



describe different types of assets and liabilities and the measurement bases of each

This section examines current assets and current liabilities in greater detail.

### Current Assets

Accounting standards require that certain specific line items, if they are material, must be shown on a balance sheet. Among the current assets' required line items are cash and cash equivalents, trade and other receivables, inventories, and financial assets (with short maturities). Companies present other line items as needed, consistent with the requirements to separately present each material class of similar items. As examples, Exhibit 4 and Exhibit 5 present balance sheet excerpts for SAP Group and Apple Inc. showing the line items for the companies' current assets.

#### Exhibit 4: SAP Group Consolidated Statements of Financial Position (Excerpt: Current Assets Detail) (in millions of €)

As of 31 December		
Assets	2017	2016
Cash and cash equivalents	€4,011	€3,702
Other financial assets	990	1,124
Trade and other receivables	5,899	5,924
Other non-financial assets	725	581
Tax assets	306	233
Total current assets	11,930	11,564

As of 31 December		
Assets	2017	2016
Total non-current assets	30,567	32,713
<b>Total assets</b>	<b>42,497</b>	<b>44,277</b>
Total current liabilities	10,210	9,674
Total non-current liabilities	6,747	8,205
Total liabilities	16,958	17,880
Total equity	25,540	26,397
<b>Total equity and liabilities</b>	<b>€42,497</b>	<b>€44,277</b>

Source: SAP Group 2017 annual report.

**Exhibit 5: Apple Inc. Consolidated Balance Sheet (Excerpt: Current Assets Detail) \* (in millions of \$)**

Assets	30 September, 2017	24 September, 2016
Cash and cash equivalents	\$20,289	\$20,484
Short-term marketable securities	53,892	46,671
Accounts receivable, less allowances of \$58 and \$53, respectively	17,874	15,754
Inventories	4,855	2,132
Vendor non-trade receivables	17,799	13,545
Other current assets	13,936	8,283
Total current assets	128,645	106,869
<i>[All other assets]</i>	<i>246,674</i>	<i>214,817</i>
<b>Total assets</b>	<b>375,319</b>	<b>321,686</b>
Total current liabilities	100,814	79,006
<i>[Total non-current liabilities]</i>	<i>140,458</i>	<i>114,431</i>
Total liabilities	241,272	193,437
Total shareholders' equity	134,047	128,249
<b>Total liabilities and shareholders' equity</b>	<b>\$375,319</b>	<b>\$321,686</b>

\*Note: The italicized subtotals presented in this excerpt are not explicitly shown on the face of the financial statement as prepared by the company.

Source: Apple Inc. 2017 annual report (Form 10K).

### Cash and Cash Equivalents

Cash equivalents are highly liquid, short-term investments that are so close to maturity,<sup>6</sup> the risk is minimal that their value will change significantly with changes in interest rates. Cash and cash equivalents are financial assets. Financial assets, in general, are measured and reported at either **amortised cost** or **fair value**. Amortised cost is the historical cost (initially recognised cost) of the asset adjusted for amortisation and

<sup>6</sup> Generally, three months or less.

impairment. Under IFRS and US GAAP, fair value is based on an exit price, the price received to sell an asset or paid to transfer a liability in an orderly transaction between two market participants at the measurement date.

For cash and cash equivalents, amortised cost and fair value are likely to be immaterially different. Examples of cash equivalents are demand deposits with banks and highly liquid investments (such as US Treasury bills, commercial paper, and money market funds) with original maturities of three months or less. Cash and cash equivalents excludes amounts that are restricted in use for at least 12 months. For all companies, the Statement of Cash Flows presents information about the changes in cash over a reporting period. For the fiscal year 2017, SAP Group's cash and cash equivalents increased from €3,702 million to €4,011 million, and Apple's cash and cash equivalents decreased from \$20,484 million to \$20,289 million.

### **Marketable Securities**

Marketable securities are also financial assets and include investments in debt or equity securities that are publicly traded, and whose value can be determined from price information in a public market. Examples of marketable securities include treasury bills, notes, bonds, and equity securities, such as common stocks and mutual fund shares. Companies disclose further detail in the notes to their financial statements about their holdings. For example, SAP Group discloses that its other financial assets consist of items such as time deposits, other receivables, and loans to employees and third parties. These do not fall into marketable securities and thus are more properly treated under trade receivables. Apple's short-term marketable securities, totaling \$53.9 billion and \$46.7 billion at the end of fiscal 2017 and 2016, respectively, include holdings of US treasuries, corporate securities, commercial paper, and time deposits.

### **Trade Receivables**

Trade receivables, also referred to as accounts receivable, are another type of financial asset. These are amounts owed to a company by its customers for products and services already delivered. They are typically reported at net realizable value, an approximation of fair value, based on estimates of collectability. Several aspects of accounts receivable are usually relevant to an analyst. First, the overall level of accounts receivable relative to sales (a topic to be addressed further in ratio analysis) is important because a significant increase in accounts receivable relative to sales could signal that the company is having problems collecting cash from its customers.

A second relevant aspect of accounts receivable is the allowance for doubtful accounts. The allowance for doubtful accounts reflects the company's estimate of the amount of receivables that will ultimately be uncollectible. Additions to the allowance in a particular period are reflected as bad debt expenses, and the balance of the allowance for doubtful accounts reduces the gross receivables amount to a net amount that is an estimate of net realizable value. When specific receivables are deemed to be uncollectible, they are written off by reducing accounts receivable and the allowance for doubtful accounts. The allowance for doubtful accounts is called a **contra account** because it is netted against (i.e., reduces) the balance of accounts receivable, which is an asset account. SAP Group's balance sheet, for example, reports current net trade and other receivables of €5,899 million as of 31 December 2017. The amount of the allowance for doubtful accounts (€74 million) is disclosed in the notes<sup>7</sup> to the financial statements. Apple discloses the allowance for doubtful accounts on the face of the balance sheet; as of 30 September 2017, the allowance was \$58 million. The \$17,874 million of accounts receivable on that date is net of the allowance. Apple's disclosures state that the allowance is based on "historical experience, the age of the accounts

<sup>7</sup> Note 13 SAP Group 2017 annual report.

receivable balances, credit quality of the Company's customers, current economic conditions, and other factors that may affect customers' abilities to pay." The age of an accounts receivable balance refers to the length of time the receivable has been outstanding, including how many days past the due date.

Another relevant aspect of accounts receivable is the concentration of credit risk. For example, SAP Group's annual report discloses that concentration of credit risk is limited because they have a large customer base diversified across various industries, company sizes, and countries. Similarly, Apple's annual report notes that no single customer accounted for 10 percent or more of its revenues. However, Apple's disclosures for 2017 indicate that two customers individually represented 10% or more of its total trade receivables and its cellular network carriers accounted for 59% of trade receivables. Of its vendor non-trade receivables, three vendors represent 42%, 19%, and 10% of the total.<sup>8</sup>

### EXAMPLE 1

#### Analysis of Accounts Receivable

1. Based on the balance sheet excerpt for Apple Inc. in Exhibit 5, what percentage of its total accounts receivable in 2017 and 2016 does Apple estimate will be uncollectible?

#### Solution to 1:

(Amounts in \$ millions.) The percentage of 2017 accounts receivable estimated to be uncollectible is 0.32 percent, calculated as  $\$58/(\$17,874 + \$58)$ . Note that the \$17,874 is net of the \$58 allowance, so the gross amount of accounts receivable is determined by adding the allowance to the net amount. The percentage of 2016 accounts receivable estimated to be uncollectible is 0.34 percent [ $\$53/(\$15,754 + \$53)$ ].

2. In general, how does the amount of allowance for doubtful accounts relate to bad debt expense?

#### Solution to 2:

Bad debt expense is an expense of the period, based on a company's estimate of the percentage of credit sales in the period, for which cash will ultimately not be collected. The allowance for bad debts is a contra asset account, which is netted against the asset accounts receivable.

To record the estimated bad debts, a company recognizes a bad debt expense (which affects net income) and increases the balance in the allowance for doubtful accounts by the same amount. To record the write off of a particular account receivable, a company reduces the balance in the allowance for doubtful accounts and reduces the balance in accounts receivable by the same amount.

<sup>8</sup> Page 53, Apple Inc. 2017 10-K.



3. In general, what are some factors that could cause a company's allowance for doubtful accounts to decrease?

### Solution to 3:

In general, a decrease in a company's allowance for doubtful accounts in absolute terms could be caused by a decrease in the amount of credit sales. Some factors that could cause a company's allowance for doubtful accounts to decrease as a percentage of accounts receivable include the following:

- Improvements in the credit quality of the company's existing customers (whether driven by a customer-specific improvement or by an improvement in the overall economy);
- Stricter credit policies (for example, refusing to allow less creditworthy customers to make credit purchases and instead requiring them to pay cash, to provide collateral, or to provide some additional form of financial backing); and/or
- Stricter risk management policies (for example, buying more insurance against potential defaults).

In addition to the business factors noted above, because the allowance is based on management's estimates of collectability, management can potentially bias these estimates to manipulate reported earnings. For example, a management team aiming to increase reported income could intentionally over-estimate collectability and under-estimate the bad debt expense for a period. Conversely, in a period of good earnings, management could under-estimate collectability and over-estimate the bad debt expense with the intent of reversing the bias in a period of poorer earnings.

## CURRENT LIABILITIES

## 5



describe different types of assets and liabilities and the measurement bases of each

**Current liabilities** are those liabilities that are expected to be settled in the entity's normal operating cycle, held primarily for trading, or due to be settled within 12 months after the balance sheet date. Exhibit 6 and Exhibit 7 present balance sheet excerpts for SAP Group and Apple Inc. showing the line items for the companies' current liabilities. Some of the common types of current liabilities, including trade payables, financial liabilities, accrued expenses, and deferred income, are discussed below.

### Exhibit 6: SAP Group Consolidated Statements of Financial Position (Excerpt: Current Liabilities Detail) (in millions of €)

	As of 31 December	
	2017	2016
<b>Assets</b>		
Total current assets	11,930	11,564

	As of 31 December	
	2017	2016
Total non-current assets	30,567	32,713
<b>Total assets</b>	<b>42,497</b>	<b>44,277</b>
<b>Equity and liabilities</b>		
Trade and other payables	1,151	1,281
Tax liabilities	597	316
Financial liabilities	1,561	1,813
Other non-financial liabilities	3,946	3,699
Provisions	184	183
Deferred income	2,771	2,383
Total current liabilities	10,210	9,674
Total non-current liabilities	6,747	8,205
<b>Total liabilities</b>	<b>16,958</b>	<b>17,880</b>
<b>Total equity</b>	<b>25,540</b>	<b>26,397</b>
<b>Total equity and liabilities</b>	<b>€42,497</b>	<b>€44,277</b>

Source: SAP Group 2017 annual report.

#### Exhibit 7: Apple Inc. Consolidated Balance Sheet (Excerpt: Current Liabilities Detail)\* (in millions of \$)

	30 September 2017	24 September 2016
<b>Assets</b>		
Total current assets	128,645	106,869
<i>[All other assets]</i>	<i>246,674</i>	<i>214,817</i>
<b>Total assets</b>	<b>375,319</b>	<b>321,686</b>
<b>Liabilities and shareholders' equity</b>		
Accounts payable	49,049	37,294
Accrued expenses	25,744	22,027
Deferred revenue	7,548	8,080
Commercial paper	11,977	8,105
Current portion of long-term debt	6,496	3,500
Total current liabilities	100,814	79,006
<i>[Total non-current liabilities]</i>	<i>140,458</i>	<i>114,431</i>
<b>Total liabilities</b>	<b>241,272</b>	<b>193,437</b>
<b>Total shareholders' equity</b>	<b>134,047</b>	<b>128,249</b>
<b>Total liabilities and shareholders' equity</b>	<b>375,319</b>	<b>321,686</b>

\*Note: The italicized subtotals presented in this excerpt are not explicitly shown on the face of the financial statement as prepared by the company.

Source: Apple Inc. 2017 annual report (Form 10K).

**Trade payables**, also called **accounts payable**, are amounts that a company owes its vendors for purchases of goods and services. In other words, these represent the unpaid amount as of the balance sheet date of the company's purchases on credit. An issue relevant to analysts is the trend in overall levels of trade payables relative to

purchases (a topic to be addressed further in ratio analysis). Significant changes in accounts payable relative to purchases could signal potential changes in the company's credit relationships with its suppliers. The general term "trade credit" refers to credit provided to a company by its vendors. Trade credit is a source of financing that allows the company to make purchases and then pay for those purchases at a later date.

Financial liabilities that are due within one year or the operating cycle, whichever is longer, appear in the current liability section of the balance sheet. Financial liabilities include borrowings such as bank loans, notes payable (which refer to financial liabilities owed by a company to creditors, including trade creditors and banks, through a formal loan agreement), and commercial paper. In addition, any portions of long-term liabilities that are due within one year (i.e., the current portion of long-term liabilities) are also shown in the current liability section of the balance sheet. According to its footnote disclosures, most of SAP's €1,561 million of current financial liabilities is for bonds payable due in the next year. Apple shows \$11,977 million of commercial paper borrowing (short-term promissory notes issued by companies) and \$6,496 million of long-term debt due within the next year.

**Accrued expenses** (also called accrued expenses payable, accrued liabilities, and other non-financial liabilities) are expenses that have been recognized on a company's income statement but not yet been paid as of the balance sheet date. For example, SAP's 2017 balance sheet shows €597 million of tax liabilities. In addition to income taxes payable, other common examples of accrued expenses are accrued interest payable, accrued warranty costs, and accrued employee compensation (i.e., wages payable). SAP's notes disclose that the €3,946 million line item of other non-financial liabilities in 2017, for example, includes €2,565 million of employee-related liabilities.

**Deferred income** (also called **deferred revenue** or **unearned revenue**) arises when a company receives payment in advance of delivery of the goods and services associated with the payment. The company has an obligation either to provide the goods or services or to return the cash received. Examples include lease payments received at the beginning of a lease, fees for servicing office equipment received at the beginning of the service period, and payments for magazine subscriptions received at the beginning of the subscription period. SAP's balance sheet shows deferred income of €2,771 million at the end of 2017, up slightly from €2,383 million at the end of 2016. Apple's balance sheet shows deferred revenue of \$7,548 million at the end of fiscal 2017, down slightly from \$8,080 million at the end of fiscal 2016. Example 2 presents each company's disclosures about deferred revenue and discusses some of the implications.

## EXAMPLE 2

### Analysis of Deferred Revenue

In the notes to its 2017 financial statements, SAP describes its deferred income as follows:

*Deferred income consists mainly of prepayments made by our customers for cloud subscriptions and support; software support and services; fees from multiple-element arrangements allocated to undelivered elements; and amounts ... for obligations to perform under acquired customer contracts in connection with acquisitions.*

Apple's deferred revenue also arises from sales involving multiple elements, some delivered at the time of sale and others to be delivered in the future. In addition, Apple recognizes deferred revenue in connection with sales of gift cards as well as service contracts. In the notes to its 2017 financial statements, Apple describes its deferred revenue as follows:

*The Company records deferred revenue when it receives payments in advance of the delivery of products or the performance of services. This includes amounts that have been deferred for unspecified and specified software upgrade rights and non-software services that are attached to hardware and software products. The Company sells gift cards redeemable at its retail and online stores. ... The Company records deferred revenue upon the sale of the card, which is relieved upon redemption of the card by the customer. Revenue from AppleCare service and support contracts is deferred and recognized over the service coverage periods. AppleCare service and support contracts typically include extended phone support, repair services, web-based support resources and diagnostic tools offered under the Company's standard limited warranty.*

1. In general, in the period a transaction occurs, how would a company's balance sheet reflect \$100 of deferred revenue resulting from a sale? (Assume, for simplicity, that the company receives cash for all sales, the company's income tax payable is 30 percent based on cash receipts, and the company pays cash for all relevant income tax obligations as they arise. Ignore any associated deferred costs.)

### **Solution to 1:**

In the period that deferred revenue arises, the company would record a \$100 increase in the asset Cash and a \$100 increase in the liability Deferred Revenues. In addition, because the company's income tax payable is based on cash receipts and is paid in the current period, the company would record a \$30 decrease in the asset Cash and a \$30 increase in the asset Deferred Tax Assets. Deferred tax assets increase because the company has paid taxes on revenue it has not yet recognized for accounting purposes. In effect, the company has prepaid taxes from an accounting perspective.

2. In general, how does deferred revenue impact a company's financial statements in the periods following its initial recognition?

### **Solution to 2:**

In subsequent periods, the company will recognize the deferred revenue as it is earned. When the revenue is recognized, the liability Deferred Revenue will decrease. In addition, the tax expense is recognized on the income statement as the revenue is recognized and thus the associated amounts of Deferred Tax Assets will decrease.

3. Interpret the amounts shown by SAP as deferred income and by Apple as deferred revenue.

### **Solution to 3:**

The deferred income on SAP's balance sheet and deferred revenue on Apple's balance sheet at the end of their respective 2017 fiscal years will be recognized as revenue, sales, or a similar item in income statements subsequent to the 2017 fiscal year, as the goods or services are provided or the obligation is reduced. The costs of delivering the goods or services will also be recognised.

4. Both accounts payable and deferred revenue are classified as current liabilities. Discuss the following statements:

- A. When assessing a company's liquidity, the implication of amounts in accounts payable differs from the implication of amounts in deferred revenue.
- B. Some investors monitor amounts in deferred revenue as an indicator of future revenue growth.

#### Solution to 4A:

The amount of accounts payable represents a future obligation to pay cash to suppliers. In contrast, the amount of deferred revenue represents payments that the company has already received from its customers, and the future obligation is to deliver the related services. With respect to liquidity, settling accounts payable will require cash outflows whereas settling deferred revenue obligations will not.

#### Solution to 4B:

Some investors monitor amounts in deferred revenue as an indicator of future growth because the amounts in deferred revenue will be recognized as revenue in the future. Thus, growth in the amount of deferred revenue implies future growth of that component of a company's revenue.

## NON-CURRENT ASSETS: PROPERTY, PLANT AND EQUIPMENT AND INVESTMENT PROPERTY

# 6



describe different types of assets and liabilities and the measurement bases of each

This section provides an overview of assets other than current assets, sometimes collectively referred to as non-current, long-term, or long-lived assets. The categories discussed are property, plant, and equipment; investment property; intangible assets; goodwill; financial assets; and deferred tax assets. Exhibit 8 and Exhibit 9 present balance sheet excerpts for SAP Group and Apple Inc. showing the line items for the companies' non-current assets.

**Exhibit 8: SAP Group Consolidated Statements of Financial Position  
(Excerpt: Non-Current Assets Detail) (in millions of €)**

As of 31 December		
Assets	2017	2016
Total current assets	11,930	11,564
Goodwill	21,274	23,311
Intangible assets	2,967	3,786
Property, plant and equipment	2,967	2,580

As of 31 December		
Assets	2017	2016
Other financial assets	1,155	1,358
Trade and other receivables	118	126
Other non-financial assets	621	532
Tax assets	443	450
Deferred tax assets	1,022	571
Total non-current assets	30,567	32,713
<b>Total assets</b>	<b>42,497</b>	<b>44,277</b>
Total current liabilities	10,210	9,674
Total non-current liabilities	6,747	8,205
<b>Total liabilities</b>	<b>16,958</b>	<b>17,880</b>
<b>Total equity</b>	<b>25,540</b>	<b>26,397</b>
<b>Total equity and liabilities</b>	<b>€42,497</b>	<b>€44,277</b>

Source: SAP Group 2017 annual report.

#### Exhibit 9: Apple Inc. Consolidated Balance Sheet (Excerpt: Non-Current Assets Detail)\* (in millions of \$)

Assets	30 September 2017	24 September 2016
Total current assets	128,645	106,869
Long-term marketable securities	194,714	170,430
Property, plant and equipment, net	33,783	27,010
Goodwill	5,717	5,414
Acquired intangible assets, net	2,298	3,206
Other non-current assets	10,162	8,757
<i>[All other assets]</i>	<i>246,674</i>	<i>214,817</i>
<b>Total assets</b>	<b>375,319</b>	<b>321,686</b>
<b>Liabilities and shareholders' equity</b>		
Total current liabilities	100,814	79,006
<i>[Total non-current liabilities]</i>	<i>140,458</i>	<i>114,431</i>
<b>Total liabilities</b>	<b>241,272</b>	<b>193,437</b>
<b>Total shareholders' equity</b>	<b>134,047</b>	<b>128,249</b>
<b>Total liabilities and shareholders' equity</b>	<b>375,319</b>	<b>321,686</b>

\*Note: The italicized subtotals presented in this excerpt are not explicitly shown on the face of the financial statement as prepared by the company.

Source: Apple Inc. 2017 annual report (Form 10K).

## Property, Plant, and Equipment

**Property, plant, and equipment (PPE)** are tangible assets that are used in company operations and expected to be used (provide economic benefits) over more than one fiscal period. Examples of tangible assets treated as property, plant, and equipment

include land, buildings, equipment, machinery, furniture, and natural resources such as mineral and petroleum resources. IFRS permits companies to report PPE using either a cost model or a revaluation model.<sup>9</sup> While IFRS permits companies to use the cost model for some classes of assets and the revaluation model for others, the company must apply the same model to all assets within a particular class of assets. US GAAP permits only the cost model for reporting PPE.

Under the cost model, PPE is carried at amortised cost (historical cost less any accumulated depreciation or accumulated depletion, and less any impairment losses). Historical cost generally consists of an asset's purchase price, plus its delivery cost, and any other additional costs incurred to make the asset operable (such as costs to install a machine). Depreciation and depletion refer to the process of allocating (recognizing as an expense) the cost of a long-lived asset over its useful life. Land is not depreciated. Because PPE is presented on the balance sheet net of depreciation and depreciation expense is recognised in the income statement, the choice of depreciation method and the related estimates of useful life and salvage value impact both a company's balance sheet and income statement.

Whereas depreciation is the systematic allocation of cost over an asset's useful life, impairment losses reflect an unanticipated decline in value. Impairment occurs when the asset's recoverable amount is less than its carrying amount, with terms defined as follows under IFRS:<sup>10</sup>

- Recoverable amount: The higher of an asset's fair value less cost to sell, and its value in use.
- Fair value less cost to sell: The amount obtainable in a sale of the asset in an arms-length transaction between knowledgeable willing parties, less the costs of the sale.
- Value in use: The present value of the future cash flows expected to be derived from the asset.

When an asset is considered impaired, the company recognizes the impairment loss in the income statement in the period the impairment is identified. Reversals of impairment losses are permitted under IFRS but not under US GAAP.

Under the revaluation model, the reported and carrying value for PPE is the fair value at the date of revaluation less any subsequent accumulated depreciation. Changes in the value of PPE under the revaluation model affect equity directly or profit and loss depending upon the circumstances.

In Exhibit 8 and Exhibit 9, SAP reports €2,967 million of PPE and Apple reports \$33,783 million of PPE at the end of fiscal year 2017. For SAP, PPE represents approximately 7 percent of total assets and for Apple, PPE represents approximately 9 percent of total assets. Both companies disclose in the notes that PPE is generally depreciated over their expected useful lives using the straight-line method.

## Investment Property

Some property is not used in the production of goods or services or for administrative purposes. Instead, it is used to earn rental income or capital appreciation (or both). Under IFRS, such property is considered to be **investment property**.<sup>11</sup> US GAAP does not include a specific definition for investment property. IFRS provides companies with the choice to report investment property using either a cost model or a fair value model. In general, a company must apply its chosen model (cost or fair value)

<sup>9</sup> IAS 16, *Property, Plant and Equipment*, paragraphs 29-31.

<sup>10</sup> IAS 36, *Impairment of Assets*, paragraph 6. US GAAP uses a different approach to impairment.

<sup>11</sup> IAS 40, *Investment Property*.

to all of its investment property. The cost model for investment property is identical to the cost model for PPE: In other words, investment property is carried at cost less any accumulated depreciation and any accumulated impairment losses. Under the fair value model, investment property is carried at its fair value. When a company uses the fair value model to measure the value of its investment property, any gain or loss arising from a change in the fair value of the investment property is recognized in profit and loss, i.e., on the income statement, in the period in which it arises.<sup>12</sup>

Neither SAP Group nor Apple discloses ownership of investment property. The types of companies that typically hold investment property are real estate investment companies or property management companies. Entities such as life insurance companies and endowment funds may also hold investment properties as part of their investment portfolio.

## 7

### NON-CURRENT ASSETS: DEFERRED TAX ASSETS



describe different types of assets and liabilities and the measurement bases of each

Portions of the amounts shown as **deferred tax assets** on SAP's balance sheet represent income taxes incurred prior to the time that the income tax expense will be recognized on the income statement. Deferred tax assets may result when the actual **income tax payable** based on income for tax purposes in a period exceeds the amount of income tax expense based on the reported financial statement income due to temporary timing differences. For example, a company may be required to report certain income for tax purposes in the current period but to defer recognition of that income for financial statement purposes to subsequent periods. In this case, the company will pay income tax as required by tax laws, and the difference between the taxes payable and the tax expense related to the income for which recognition was deferred on the financial statements will be reported as a deferred tax asset. When the income is subsequently recognized on the income statement, the related tax expense is also recognized which will reduce the deferred tax asset.

Also, a company may claim certain expenses for financial statement purposes that it is only allowed to claim in subsequent periods for tax purposes. In this case, as in the previous example, the financial statement income before taxes is less than taxable income. Thus, income taxes payable based on taxable income exceed income tax expense based on accounting net income before taxes. The difference is expected to reverse in the future when the income reported on the financial statements exceeds the taxable income as a deduction for the expense becomes allowed for tax purposes. Deferred tax assets may also result from carrying forward unused tax losses and credits (these are not temporary timing differences). Deferred tax assets are only to be recognized if there is an expectation that there will be taxable income in the future, against which the temporary difference or carried forward tax losses or credits can be applied to reduce taxes payable.

<sup>12</sup> IAS 40, *Investment Property*, paragraph 35.



## COMPONENTS OF EQUITY

# 8

- ☐ describe the components of shareholders' equity

**Equity** is the owners' residual claim on a company's assets after subtracting its liabilities.<sup>13</sup> It represents the claim of the owner against the company and is also referred to as the "book value" of a company. Equity includes funds directly invested in the company by the owners, as well as earnings that have been reinvested over time. Equity can also include items of gain or loss that are not recognized on the company's income statement.

### Components of Equity

Six main components typically make up total owners' equity. The first five components listed below represent equity attributable to owners of the parent company. The sixth component is the equity attributable to non-controlling interests.

1. *Capital contributed by owners* (or common stock, or issued capital). The amount contributed to the company by owners. Ownership of a corporation is evidenced through the issuance of common shares. Common shares may have a par value (or stated value) or may be issued as no par shares (depending on regulations governing the incorporation). Where par or stated value requirements exist, it must be disclosed in the equity section of the balance sheet. In addition, the number of shares authorized, issued, and outstanding must be disclosed for each class of share issued by the company. The number of authorized shares is the number of shares that may be sold by the company under its articles of incorporation. The number of issued shares refers to those shares that have been sold to investors. The number of outstanding shares consists of the issued shares less treasury shares.
2. *Preferred shares*. Classified as equity or financial liabilities based upon their characteristics rather than legal form. For example, perpetual, non-redeemable preferred shares are classified as equity. In contrast, preferred shares with mandatory redemption at a fixed amount at a future date are classified as financial liabilities. Preferred shares have rights that take precedence over the rights of common shareholders—rights that generally pertain to receipt of dividends and receipt of assets if the company is liquidated.
3. *Treasury shares* (or treasury stock or own shares repurchased). Shares in the company that have been repurchased by the company and are held as treasury shares, rather than being cancelled. The company is able to sell (reissue) these shares. A company may repurchase its shares when management considers the shares undervalued, needs shares to fulfill employees' stock options, or wants to limit the effects of dilution from various employee stock compensation plans. A repurchase of previously issued shares reduces shareholders' equity by the amount of the cost of repurchasing the shares and reduces the number of total shares outstanding. If treasury shares are subsequently reissued, a company does not recognize any gain or loss from the reissuance on the income statement. Treasury shares are non-voting and do not receive any dividends declared by the company.

<sup>13</sup> IASB *Conceptual Framework* (2018), paragraph 4.4 (c) and FASB ASC 505-10-05-3 [Equity—Overview and Background].

4. *Retained earnings.* The cumulative amount of earnings recognized in the company's income statements which have not been paid to the owners of the company as dividends.
5. *Accumulated other comprehensive income* (or other reserves). The cumulative amount of *other* comprehensive income or loss. The term comprehensive income includes both a) net income, which is recognized on the income statement and is reflected in retained earnings, and b) other comprehensive income which is not recognized as part of net income and is reflected in accumulated other comprehensive income.<sup>14</sup>
6. *Noncontrolling interest* (or minority interest). The equity interests of minority shareholders in the subsidiary companies that have been consolidated by the parent (controlling) company but that are not wholly owned by the parent company.

Exhibit 10 and Exhibit 11 present excerpts of the balance sheets of SAP Group and Apple Inc., respectively, with detailed line items for each company's equity section. SAP's balance sheet indicates that the company has €1,229 million issued capital, and the notes to the financial statements disclose that the company has issued 1,229 million shares of no-par common stock with a nominal value of €1 per share. SAP's balance sheet also indicates that the company has €1,591 million of treasury shares, and the notes to the financial statements disclose that the company holds 35 million of its shares as treasury shares. The line item share premium of €570 million includes amounts from treasury share transactions (and certain other transactions). The amount of retained earnings, €24,794 million, represents the cumulative amount of earnings that the company has recognized in its income statements, net of dividends. SAP's €508 million of "Other components of equity" includes the company's accumulated other comprehensive income. The notes disclose that this is composed of €330 million gains on exchange differences in translation, €157 million gains on remeasuring available-for-sale financial assets, and €21 million gains on cash flow hedges. The balance sheet next presents a subtotal for the amount of equity attributable to the parent company of €25,509 million followed by the amount of equity attributable to non-controlling interests of €31 million. Total equity includes both equity attributable to the parent company and equity attributable to non-controlling interests.

The equity section of Apple's balance sheet consists of only three line items: common stock, retained earnings, and accumulated other comprehensive income/(loss). Although Apple's balance sheet shows no treasury stock, the company does repurchase its own shares but cancels the repurchased shares rather than holding the shares in treasury. Apple's balance sheet shows that 5,126,201 thousand shares were issued and outstanding at the end of fiscal 2017 and 5,336,166 thousand shares were issued and outstanding at the end of fiscal 2016. Details on the change in shares outstanding is presented on the Statement of Shareholders' Equity in Exhibit 12, which shows that in 2017, Apple repurchased 246,496 thousand shares of its previously issued common stock and issued 36,531 thousand shares to employees.

<sup>14</sup> IFRS defines Total comprehensive income as "the change in equity during a period resulting from transactions and other events, other than those changes resulting from transactions with owners in their capacity as owners" (IAS 1, Presentation of Financial Statements, paragraph 7). Similarly, US GAAP defines comprehensive income as "the change in equity [net assets] of a business entity during a period from transactions and other events and circumstances from nonowner sources. It includes all changes in equity during a period except those resulting from investments by owners and distributions to owners." (FASB ASC Master Glossary).

**Exhibit 10: SAP Group Consolidated Statements of Financial Position  
(Excerpt: Equity Detail) (in millions of €)**

as of 31 December		
Assets	2017	2016
Total current assets	11,930	11,564
Total non-current assets	30,567	32,713
Total assets	42,497	44,277
Total current liabilities	10,210	9,674
Total non-current liabilities	6,747	8,205
Total liabilities	16,958	17,880
Issued capital	1,229	1,229
Share premium	570	599
Retained earnings	24,794	22,302
Other components of equity	508	3,346
Treasury shares	(1,591)	(1,099)
Equity attributable to owners of parent	25,509	26,376
Non-controlling interests	31	21
Total equity	25,540	26,397
Total equity and liabilities	€42,497	€44,277

Source: SAP Group 2017 annual report.

**Exhibit 11: Apple Inc. Consolidated Balance Sheet (Excerpt: Equity Detail)  
(in millions of \$) (Number of shares are reflected in thousands)**

Assets	30 September 2017	24 September 2016
Total current assets	128,645	106,869
[All other assets]	246,674	214,817
<b>Total assets</b>	375,319	321,686
<b>Liabilities and shareholders' equity</b>		
Total current liabilities	100,814	79,006
[Total non-current liabilities]	140,458	114,431
<b>Total liabilities</b>	241,272	193,437
Common stock and additional paid-in capital, \$0.00001 par value: 12,600,000 shares authorized; 5,126,201 and 5,336,166 shares issued and out- standing, respectively	35,867	31,251
Retained earnings	98,330	96,364
Accumulated other comprehensive income/(loss)	(150)	634
<b>Total shareholders' equity</b>	134,047	128,249
<b>Total liabilities and shareholders' equity</b>	375,319	321,686

Source: Apple Inc. 2017 annual report (10K).

## 9

## STATEMENT OF CHANGES IN EQUITY



describe the components of shareholders' equity

The **statement of changes in equity** (or statement of shareholders' equity) presents information about the increases or decreases in a company's equity over a period. IFRS requires the following information in the statement of changes in equity:

- total comprehensive income for the period;
- the effects of any accounting changes that have been retrospectively applied to previous periods;
- capital transactions with owners and distributions to owners; and
- reconciliation of the carrying amounts of each component of equity at the beginning and end of the year.<sup>15</sup>

Under US GAAP, the requirement as specified by the SEC is for companies to provide an analysis of changes in each component of stockholders' equity that is shown in the balance sheet.<sup>16</sup>

Exhibit 12 presents an excerpt from Apple's Consolidated Statements of Changes in Shareholders' Equity. The excerpt shows only one of the years presented on the actual statement. It begins with the balance as of 24 September 2016 (i.e., the beginning of fiscal 2017) and presents the analysis of changes to 30 September 2017 in each component of equity that is shown on Apple's balance sheet. As noted above, the number of shares outstanding decreased from 5,336,166 thousand to 5,126,201 thousand as the company repurchased 246,496 thousand shares of its common stock and issued 36,531 thousand new shares which reduced the dollar balance of Paid-in Capital and Retained earnings by \$913 million and \$581 million, respectively. The dollar balance in common stock also increased by \$4,909 million in connection with share-based compensation. Retained earnings increased by \$48,351 million net income, minus \$12,803 million dividends, \$33,001 million for the share repurchase and a \$581 million adjustment in connection with the stock issuance. For companies that pay dividends, the amount of dividends is shown separately as a deduction from retained earnings. The statement also provides details on the \$784 million change in Apple's Accumulated other comprehensive income. Note that the statement provides a subtotal for total comprehensive income that includes net income and each of the components of other comprehensive income.

<sup>15</sup> IAS 1, *Presentation of Financial Statements*, paragraph 106.

<sup>16</sup> FASB ASC 505-10-S99 [Equity—Overall—SEC materials] indicates that a company can present the analysis of changes in stockholders' equity either in the notes or in a separate statement.

**Exhibit 12: Excerpt from Apple Inc.'s Consolidated Statements of Changes in Shareholders' Equity (in millions, except share amounts which are reflected in thousands)**

	Common Stock and Additional Paid-In Capital		Retained Earnings	Accumulated Other Comprehensive Income/(Loss)	Total Shareholders' Equity
	Shares	Amount			
Balances as of September 24, 2016	5,336,166	31,251	96,364	634	128,249
Net income	—	—	48,351	—	48,351
Other comprehensive income/(loss)	—	—	—	(784)	(784)
Dividends and dividend equivalents declared	—	—	(12,803)	—	(12,803)
Repurchase of common stock	(246,496)	—	(33,001)	—	(33,001)
Share-based compensation	—	4,909	—	—	4,909
Common stock issued, net of shares withheld for employee taxes	36,531	(913)	(581)	—	(1,494)
Tax benefit from equity awards, including transfer pricing adjustments	—	620	—	—	620
Balances as of September 30, 2017	5,126,201	35,867	98,330	(150)	134,047

## SUMMARY

The balance sheet (also referred to as the statement of financial position) discloses what an entity owns (assets) and what it owes (liabilities) at a specific point in time. Equity is the owners' residual interest in the assets of a company, net of its liabilities. The amount of equity is increased by income earned during the year, or by the issuance of new equity. The amount of equity is decreased by losses, by dividend payments, or by share repurchases.

An understanding of the balance sheet enables an analyst to evaluate the liquidity, solvency, and overall financial position of a company.

- The balance sheet distinguishes between current and non-current assets and between current and non-current liabilities unless a presentation based on liquidity provides more relevant and reliable information.
- The concept of liquidity relates to a company's ability to pay for its near-term operating needs. With respect to a company overall, liquidity refers to the availability of cash to pay those near-term needs. With respect to a particular asset or liability, liquidity refers to its "nearness to cash."
- Some assets and liabilities are measured on the basis of fair value and some are measured at historical cost. Notes to financial statements provide information that is helpful in assessing the comparability of measurement bases across companies.

- Assets expected to be liquidated or used up within one year or one operating cycle of the business, whichever is greater, are classified as current assets. Assets not expected to be liquidated or used up within one year or one operating cycle of the business, whichever is greater, are classified as non-current assets.
- Liabilities expected to be settled or paid within one year or one operating cycle of the business, whichever is greater, are classified as current liabilities. Liabilities not expected to be settled or paid within one year or one operating cycle of the business, whichever is greater, are classified as non-current liabilities.
- Trade receivables, also referred to as accounts receivable, are amounts owed to a company by its customers for products and services already delivered. Receivables are reported net of the allowance for doubtful accounts.
- Inventories are physical products that will eventually be sold to the company's customers, either in their current form (finished goods) or as inputs into a process to manufacture a final product (raw materials and work-in-process). Inventories are reported at the lower of cost or net realizable value. If the net realizable value of a company's inventory falls below its carrying amount, the company must write down the value of the inventory and record an expense.
- Inventory cost is based on specific identification or estimated using the first-in, first-out or weighted average cost methods. Some accounting standards (including US GAAP but not IFRS) also allow last-in, first-out as an additional inventory valuation method.
- Accounts payable, also called trade payables, are amounts that a business owes its vendors for purchases of goods and services.
- Deferred revenue (also known as unearned revenue) arises when a company receives payment in advance of delivery of the goods and services associated with the payment received.
- Property, plant, and equipment (PPE) are tangible assets that are used in company operations and expected to be used over more than one fiscal period. Examples of tangible assets include land, buildings, equipment, machinery, furniture, and natural resources such as mineral and petroleum resources.
- IFRS provide companies with the choice to report PPE using either a historical cost model or a revaluation model. US GAAP permit only the historical cost model for reporting PPE.
- Depreciation is the process of recognizing the cost of a long-lived asset over its useful life. (Land is not depreciated.)
- Under IFRS, property used to earn rental income or capital appreciation is considered to be an investment property. IFRS provide companies with the choice to report an investment property using either a historical cost model or a fair value model.
- Typical long-term financial liabilities include loans (i.e., borrowings from banks) and notes or bonds payable (i.e., fixed-income securities issued to investors). Liabilities such as bonds issued by a company are usually reported at amortised cost on the balance sheet.
- Deferred tax liabilities arise from temporary timing differences between a company's income as reported for tax purposes and income as reported for financial statement purposes.

- Six potential components that make up the owners' equity section of the balance sheet are contributed capital, preferred shares, treasury shares, retained earnings, accumulated other comprehensive income, and non-controlling interest.
- The statement of changes in equity reflects information about the increases or decreases in each component of a company's equity over a period.

## PRACTICE PROBLEMS

1. Resources controlled by a company as a result of past events are:
  - A. equity.
  - B. assets.
  - C. liabilities.
2. Equity equals:
  - A. Assets – Liabilities.
  - B. Liabilities – Assets.
  - C. Assets + Liabilities.
3. Shareholders' equity reported on the balance sheet is *most likely* to differ from the market value of shareholders' equity because:
  - A. historical cost basis is used for all assets and liabilities.
  - B. some factors that affect the generation of future cash flows are excluded.
  - C. shareholders' equity reported on the balance sheet is updated continuously.
4. Distinguishing between current and non-current items on the balance sheet and presenting a subtotal for current assets and liabilities is referred to as:
  - A. a classified balance sheet.
  - B. an unclassified balance sheet.
  - C. a liquidity-based balance sheet.
5. The *most likely* company to use a liquidity-based balance sheet presentation is a:
  - A. bank.
  - B. computer manufacturer holding inventories.
  - C. software company with trade receivables and payables.
6. An example of a contra asset account is:
  - A. depreciation expense.
  - B. sales returns and allowances.
  - C. allowance for doubtful accounts.
7. Which of the following is *most likely* classified as a current liability?
  - A. Payment received for a product due to be delivered at least one year after the balance sheet date
  - B. Payments for merchandise due at least one year after the balance sheet date but still within a normal operating cycle



- C. Payment on debt due in six months for which the company has the unconditional right to defer settlement for at least one year after the balance sheet date
8. Money received from customers for products to be delivered in the future is recorded as:
- A. revenue and an asset.
  - B. an asset and a liability.
  - C. revenue and a liability.
9. Accrued expenses (accrued liabilities) are:
- A. expenses that have been paid.
  - B. created when another liability is reduced.
  - C. expenses that have been reported on the income statement but not yet paid.
10. Debt due within one year is considered:
- A. current.
  - B. preferred.
  - C. convertible.
11. The non-controlling (minority) interest in consolidated subsidiaries is presented on the balance sheet:
- A. as a long-term liability.
  - B. separately, but as a part of shareholders' equity.
  - C. as a mezzanine item between liabilities and shareholders' equity.
12. The item "retained earnings" is a component of:
- A. assets.
  - B. liabilities.
  - C. shareholders' equity.
13. When a company buys shares of its own stock to be held in treasury, it records a reduction in:
- A. both assets and liabilities.
  - B. both assets and shareholders' equity.
  - C. assets and an increase in shareholders' equity.

## SOLUTIONS

1. B is correct. Assets are resources controlled by a company as a result of past events.
2. A is correct.  $\text{Assets} = \text{Liabilities} + \text{Equity}$  and, therefore,  $\text{Assets} - \text{Liabilities} = \text{Equity}$ .
3. B is correct. The balance sheet omits important aspects of a company's ability to generate future cash flows, such as its reputation and management skills. The balance sheet measures some assets and liabilities based on historical cost and measures others based on current value. Market value of shareholders' equity is updated continuously. Shareholders' equity reported on the balance sheet is updated for reporting purposes and represents the value that was current at the end of the reporting period.
4. A is correct. A classified balance sheet is one that classifies assets and liabilities as current or non-current and provides a subtotal for current assets and current liabilities. A liquidity-based balance sheet broadly presents assets and liabilities in order of liquidity.
5. A is correct. A liquidity-based presentation, rather than a current/non-current presentation, may be used by such entities as banks if broadly presenting assets and liabilities in order of liquidity is reliable and more relevant.
6. C is correct. A contra asset account is netted against (i.e., reduces) the balance of an asset account. The allowance for doubtful accounts reduces the balance of accounts receivable. Accumulated depreciation, not depreciation expense, is a contra asset account. Sales returns and allowances create a contra account that reduces sales, not an asset.
7. B is correct. Payments due within one operating cycle of the business, even if they will be settled more than one year after the balance sheet date, are classified as current liabilities. Payment received in advance of the delivery of a good or service creates an obligation or liability. If the obligation is to be fulfilled at least one year after the balance sheet date, it is recorded as a non-current liability, such as deferred revenue or deferred income. Payments that the company has the unconditional right to defer for at least one year after the balance sheet may be classified as non-current liabilities.
8. B is correct. The cash received from customers represents an asset. The obligation to provide a product in the future is a liability called "unearned income" or "unearned revenue." As the product is delivered, revenue will be recognized and the liability will be reduced.
9. C is correct. Accrued liabilities are expenses that have been reported on a company's income statement but have not yet been paid.
10. A is correct. Current liabilities are those liabilities, including debt, due within one year. Preferred refers to a class of stock. Convertible refers to a feature of bonds (or preferred stock) allowing the holder to convert the instrument into common stock.
11. B is correct. The non-controlling interest in consolidated subsidiaries is shown separately as part of shareholders' equity.

12. C is correct. The item “retained earnings” is a component of shareholders’ equity.
13. B is correct. Share repurchases reduce the company’s cash (an asset). Shareholders’ equity is reduced because there are fewer shares outstanding and treasury stock is an offset to owners’ equity.



## LEARNING MODULE

# 4

## Cash Flow Statements

by Elaine Henry, PhD, CFA, Thomas R. Robinson, PhD, CAIA, CFA, J. Hennie van Greuning, DCom, CFA, and Michael A. Broihahn, CPA, CIA, CFA.

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### LEARNING OUTCOMES

<i>Mastery</i>	<i>The candidate should be able to:</i>
<input type="checkbox"/>	compare cash flows from operating, investing, and financing activities and classify cash flow items as relating to one of those three categories given a description of the items
<input type="checkbox"/>	describe how non-cash investing and financing activities are reported
<input type="checkbox"/>	compare and contrast the direct and indirect methods of presenting cash from operating activities and describe arguments in favor of each method
<input type="checkbox"/>	contrast cash flow statements prepared under International Financial Reporting Standards (IFRS) and US generally accepted accounting principles (US GAAP)

**Note:** Changes in accounting standards as well as new rulings and/or pronouncements issued after the publication of the readings on financial reporting and analysis may cause some of the information in these readings to become dated. Candidates are *not* responsible for anything that occurs after the readings were published. In addition, candidates are expected to be familiar with the analytical frameworks contained in the readings, as well as the implications of alternative accounting methods for financial analysis and valuation discussed in the readings. Candidates are also responsible for the content of accounting standards, but not for the actual reference numbers. Finally, candidates should be aware that certain ratios may be defined and calculated differently. When alternative ratio definitions exist and no specific definition is given, candidates should use the ratio definitions emphasized in the readings.

## 1

## INTRODUCTION

The cash flow statement provides information about a company's *cash receipts* and *cash payments* during an accounting period. The cash-based information provided by the cash flow statement contrasts with the accrual-based information from the income statement. For example, the income statement reflects revenues when earned rather than when cash is collected; in contrast, the cash flow statement reflects cash receipts when collected as opposed to when the revenue was earned. A reconciliation between reported income and cash flows from operating activities provides useful information about when, whether, and how a company is able to generate cash from its operating activities. Although income is an important measure of the results of a company's activities, cash flow is also essential. As an extreme illustration, a hypothetical company that makes all sales on account, without regard to whether it will ever collect its accounts receivable, would report healthy sales on its income statement and might well report significant income; however, with zero cash inflow, the company would not survive. The cash flow statement also provides a reconciliation of the beginning and ending cash on the balance sheet.

In addition to information about cash generated (or, alternatively, cash used) in operating activities, the cash flow statement provides information about cash provided (or used) in a company's investing and financing activities. This information allows the analyst to answer such questions as:

- Does the company generate enough cash from its operations to pay for its new investments, or is the company relying on new debt issuance to finance them?
- Does the company pay its dividends to common stockholders using cash generated from operations, from selling assets, or from issuing debt?

Answers to these questions are important because, in theory, generating cash from operations can continue indefinitely, but generating cash from selling assets, for example, is possible only as long as there are assets to sell. Similarly, generating cash from debt financing is possible only as long as lenders are willing to lend, and the lending decision depends on expectations that the company will ultimately have adequate cash to repay its obligations. In summary, information about the sources and uses of cash helps creditors, investors, and other statement users evaluate the company's liquidity, solvency, and financial flexibility.

## 2

## CLASSIFICATION OF CASH FLOWS AND NON-CASH ACTIVITIES

- ☐ compare cash flows from operating, investing, and financing activities and classify cash flow items as relating to one of those three categories given a description of the items
- ☐ describe how non-cash investing and financing activities are reported

All companies engage in operating, investing, and financing activities. These activities are the classifications used in the cash flow statement under both IFRS and US GAAP and are described as follows:<sup>1</sup>

- **Operating activities** include the company's day-to-day activities that create revenues, such as selling inventory and providing services, and other activities not classified as investing or financing. Cash inflows result from cash sales and from collection of accounts receivable. Examples include cash receipts from the provision of services and royalties, commissions, and other revenue. To generate revenue, companies undertake such activities as manufacturing inventory, purchasing inventory from suppliers, and paying employees. Cash outflows result from cash payments for inventory, salaries, taxes, and other operating-related expenses and from paying accounts payable. Additionally, operating activities include cash receipts and payments related to **dealing securities** or **trading securities** (as opposed to buying or selling securities as investments, as discussed below).
- **Investing activities** include purchasing and selling long-term assets and other investments. These long-term assets and other investments include property, plant, and equipment; intangible assets; other long-term assets; and both long-term and short-term investments in the equity and debt (bonds and loans) issued by other companies. For this purpose, investments in equity and debt securities exclude securities held for dealing or trading purposes, the purchase and sale of which are considered operating activities even for companies where this is not a primary business activity. Cash inflows in the investing category include cash receipts from the sale of non-trading securities; property, plant, and equipment; intangibles; and other long-term assets. Cash outflows include cash payments for the purchase of these assets.
- **Financing activities** include obtaining or repaying capital, such as equity and long-term debt. The two primary sources of capital are shareholders and creditors. Cash inflows in this category include cash receipts from issuing stock (common or preferred) or bonds and cash receipts from borrowing. Cash outflows include cash payments to repurchase stock (e.g., treasury stock) and to repay bonds and other borrowings. Note that indirect borrowing using accounts payable is not considered a financing activity—such borrowing is classified as an operating activity.

#### EXAMPLE 1

##### Net Cash Flow from Investing Activities

1. A company recorded the following in Year 1:

Proceeds from issuance of long-term debt	€300,000
Purchase of equipment	€200,000
Loss on sale of equipment	€70,000

<sup>1</sup> IAS 7 *Statement of Cash Flows*.

Proceeds from sale of equipment	€120,000
Equity in earnings of affiliate	€10,000

On the Year 1 statement of cash flows, the company would report net cash flow from investing activities *closest* to:

- A. (€150,000).
- B. (€80,000).
- C. €200,000.

### Solution:

B is correct. The only two items that would affect the investing section are the purchase of equipment and the proceeds from sale of equipment:  $(€200,000) + €120,000 = (€80,000)$ . The loss on sale of equipment and the equity in earnings of affiliate affect net income but are not cash flows. The issuance of debt is a financing cash flow.

IFRS provide companies with choices in reporting some items of cash flow, particularly interest and dividends. IFRS explain that although for a financial institution interest paid and received would normally be classified as operating activities, for other entities, alternative classifications may be appropriate. For this reason, under IFRS, interest received may be classified either as an operating activity or as an investing activity. Under IFRS, interest paid may be classified as either an operating activity or a financing activity. Furthermore, under IFRS, dividends received may be classified as either an operating activity or an investing activity and dividends paid may be classified as either an operating activity or a financing activity. Companies must use a consistent classification from year to year and disclose separately the amounts of interest and dividends received and paid and where the amounts are reported.

Under US GAAP, discretion is not permitted in classifying interest and dividends. Interest received and interest paid are reported as operating activities for all companies.<sup>2</sup> Under US GAAP, dividends received are always reported as operating activities and dividends paid are always reported as financing activities.

## EXAMPLE 2

### Operating versus Financing Cash Flows

- On 31 December 2018, a company issued a £30,000 180-day note at 8 percent and used the cash received to pay for inventory and issued £110,000 long-term debt at 11 percent annually and used the cash received to pay for new equipment. Which of the following *most* accurately reflects the combined effect of both transactions on the company's cash flows for the year ended 31 December 2018 under IFRS? Cash flows from:
  - A. operations are unchanged.
  - B. financing increase £110,000.
  - C. operations decrease £30,000.

<sup>2</sup> FASB ASC Topic 230 [Statement of Cash Flows].



**Solution:**

C is correct. The payment for inventory would decrease cash flows from operations. The issuance of debt (both short-term and long-term debt) is part of financing activities and would increase cash flows from financing activities by £140,000. The purchase of equipment is an investing activity. Note that the treatment under US GAAP would be the same for these transactions.

Companies may also engage in non-cash investing and financing transactions. A non-cash transaction is any transaction that does not involve an inflow or outflow of cash. For example, if a company exchanges one non-monetary asset for another non-monetary asset, no cash is involved. Similarly, no cash is involved when a company issues common stock either for dividends or in connection with conversion of a convertible bond or convertible preferred stock. Because no cash is involved in non-cash transactions (by definition), these transactions are not incorporated in the cash flow statement. However, because such transactions may affect a company's capital or asset structures, any significant non-cash transaction is required to be disclosed, either in a separate note or a supplementary schedule to the cash flow statement.

## CASH FLOW STATEMENT: DIRECT AND INDIRECT METHODS FOR REPORTING CASH FLOW FROM OPERATING ACTIVITIES

### 3



compare and contrast the direct and indirect methods of presenting cash from operating activities and describe arguments in favor of each method

There are two acceptable formats for reporting **cash flow from operating activities** (also known as **cash flow from operations** or **operating cash flow**), defined as the net amount of cash provided from operating activities: the direct and the indirect methods. The *amount* of operating cash flow is identical under both methods; only the *presentation format* of the operating cash flow section differs. The presentation format of the cash flows from investing and financing is exactly the same, regardless of which method is used to present operating cash flows.

The **direct method** shows the specific cash inflows and outflows that result in reported cash flow from operating activities. It shows each cash inflow and outflow related to a company's cash receipts and disbursements. In other words, the direct method eliminates any impact of accruals and shows only cash receipts and cash payments. The primary argument in favor of the direct method is that it provides information on the specific sources of operating cash receipts and payments. This is in contrast to the indirect method, which shows only the net result of these receipts and payments. Just as information on the specific sources of revenues and expenses is more useful than knowing only the net result—net income—the analyst gets additional information from a direct-format cash flow statement. The additional information is useful in understanding historical performance and in predicting future operating cash flows.

The **indirect method** shows how cash flow from operations can be obtained from reported net income as the result of a series of adjustments. The **indirect format** begins with net income. To reconcile net income with operating cash flow, adjustments are

made for non-cash items, for non-operating items, and for the net changes in operating accruals. The main argument for the indirect approach is that it shows the reasons for differences between net income and operating cash flows. (However, the differences between net income and operating cash flows are equally visible on an indirect-format cash flow statement and in the supplementary reconciliation required under US GAAP if the company uses the direct method.) Another argument for the indirect method is that it mirrors a forecasting approach that begins by forecasting future income and then derives cash flows by adjusting for changes in balance sheet accounts that occur because of the timing differences between accrual and cash accounting.

IFRS and US GAAP both encourage the use of the direct method but permit either method. US GAAP encourage the use of the direct method but also require companies to present a reconciliation between net income and cash flow (which is equivalent to the indirect method).<sup>3</sup> If the indirect method is chosen, no direct-format disclosures are required. The vast majority of companies, reporting under IFRS or US GAAP, present using the indirect method for operating cash flows.

Many users of financial statements prefer the **direct format**, particularly analysts and commercial lenders, because of the importance of information about operating receipts and payments in assessing a company's financing needs and capacity to repay existing obligations. Preparers argue that adjusting net income to operating cash flow, as in the indirect format, is easier and less costly than reporting gross operating cash receipts and payments, as in the direct format. With advances in accounting systems and technology, it is not clear that gathering the information required to use the direct method is difficult or costly. CFA Institute has advocated that standard setters require the use of the direct format for the main presentation of the cash flow statement, with indirect cash flows as supplementary disclosure.<sup>4</sup>

## 4

### CASH FLOW STATEMENT: INDIRECT METHOD UNDER IFRS

- ☐ compare and contrast the direct and indirect methods of presenting cash from operating activities and describe arguments in favor of each method
- ☐ contrast cash flow statements prepared under International Financial Reporting Standards (IFRS) and US generally accepted accounting principles (US GAAP)

Exhibit 1 presents the consolidated cash flow statement prepared under IFRS from Unilever Group's 2017 annual report. The statement, covering the fiscal years ended 31 December 2017, 2016, and 2015, shows the use of the indirect method. Unilever is an Anglo-Dutch consumer products company with headquarters in the United Kingdom and the Netherlands.<sup>5</sup>

<sup>3</sup> FASB ASC Section 230-10-45 [Statement of Cash Flows—Overall—Other Presentation Matters].

<sup>4</sup> *A Comprehensive Business Reporting Model: Financial Reporting for Investors*, CFA Institute Centre for Financial Market Integrity (July 2007), p. 13.

<sup>5</sup> Unilever NV and Unilever PLC have independent legal structures, but a series of agreements enables the companies to operate as a single economic entity.

**Exhibit 1: Unilever Group Consolidated Cash Flow Statement (€ millions)**

	<b>For the year ended 31 December</b>		
	<b>2017</b>	<b>2016</b>	<b>2015</b>
<b>Cash flow from operating activities</b>			
Net profit	6,486	5,547	5,259
Taxation	1,667	1,922	1,961
Share of net profit of joint ventures/associates and other income (loss) from non-current investments and associates	(173)	(231)	(198)
Net finance costs:	877	563	493
Operating profit	8,857	7,801	7,515
Depreciation, amortisation and impairment	1,538	1,464	1,370
Changes in working capital:	(68)	51	720
Inventories	(104)	190	(129)
Trade and other current receivables	(506)	142	2
Trade payables and other liabilities	542	(281)	847
Pensions and similar obligations less payments	(904)	(327)	(385)
Provisions less payments	200	65	(94)
Elimination of (profits)/losses on disposals	(298)	127	26
Non-cash charge for share-based compensation	284	198	150
Other adjustments	(153)	(81)	49
<b>Cash flow from operating activities</b>	<b>9,456</b>	<b>9,298</b>	<b>9,351</b>
Income tax paid	(2,164)	(2,251)	(2,021)
<b>Net cash flow from operating activities</b>	<b>7,292</b>	<b>7,047</b>	<b>7,330</b>
Interest received	154	105	119
Purchase of intangible assets	(158)	(232)	(334)
Purchase of property, plant and equipment	(1,509)	(1,804)	(1,867)
Disposal of property, plant and equipment	46	158	127
Acquisition of group companies, joint ventures and associates	(4,896)	(1,731)	(1,897)
Disposal of group companies, joint ventures and associates	561	30	199
Acquisition of other non-current investments	(317)	(208)	(78)
Disposal of other non-current investments	251	173	127
Dividends from joint ventures, associates and other non-current investments	138	186	176
(Purchase)/sale of financial assets	(149)	135	(111)
<b>Net cash flow (used in)/from investing activities</b>	<b>(5,879)</b>	<b>(3,188)</b>	<b>(3,539)</b>
Dividends paid on ordinary share capital	(3,916)	(3,609)	(3,331)
Interest and preference dividends paid	(470)	(472)	(579)
Net change in short-term borrowings	2,695	258	245
Additional financial liabilities	8,851	6,761	7,566
Repayment of financial liabilities	(2,604)	(5,213)	(6,270)
Capital element of finance lease rental payments	(14)	(35)	(14)

	For the year ended 31 December		
	2017	2016	2015
Buy back of preference shares	(448)	—	—
Repurchase of shares	(5,014)	—	—
Other movements on treasury stock	(204)	(257)	(276)
Other financing activities	(309)	(506)	(373)
<b>Net cash flow (used in)/from financing activities</b>	<b>(1,433)</b>	<b>(3,073)</b>	<b>(3,032)</b>
<b>Net increase/(decrease) in cash and cash equivalents</b>	<b>(20)</b>	<b>786</b>	<b>759</b>
<b>Cash and cash equivalents at the beginning of the year</b>	<b>3,198</b>	<b>2,128</b>	<b>1,910</b>
Effect of foreign exchange rate changes	(9)	284	(541)
<b>Cash and cash equivalents at the end of the year</b>	<b>3,169</b>	<b>3,198</b>	<b>2,128</b>

Beginning first at the bottom of the statement, we note that cash increased from €1,910 million at the beginning of 2015 to €3,169 million at the end of 2017, with the largest increase occurring in 2016. To understand the changes, we next examine the sections of the statement. In each year, the primary cash inflow derived from operating activities, as would be expected for a mature company in a relatively stable industry. In each year, the operating cash flow was more than the reported net profit, again, as would be expected from a mature company, with the largest differences primarily arising from the add-back of depreciation. Also, in each year, the operating cash flow was more than enough to cover the company's capital expenditures. For example, in 2017, the company generated €7,292 million in net cash from operating activities and—as shown in the investing section—spent €1,509 million on property, plant, and equipment. The operating cash flow was also sufficient to cover acquisitions of other companies.

The financing section of the statement shows that each year the company returned more than €3.3 billion to its common shareholders through dividends and around €500 million to its debt holders and preferred shareholders via interest and dividends. In 2017, the company used cash to repurchase about €5 billion in common stock and generated cash from increased borrowing. The increase in short-term borrowings (€2,695 million) and additional financial liabilities (€8,851 million) exceeded the cash repayment of liabilities (€2,604 million).

Having examined each section of the statement, we return to the operating activities section of Unilever's cash flow statement, which presents a reconciliation of net profit to net cash flow from operating activities (i.e., uses the indirect method). The following discussion of certain adjustments to reconcile net profit to operating cash flows explains some of the main reconciliation adjustments and refers to the amounts in 2017. The first adjustment adds back the €1,667 million income tax expense (labeled "Taxation") that had been recognized as an expense in the computation of net profit. A €2,164 million deduction for the (cash) income taxes paid is then shown separately, as the last item in the operating activities section, consistent with the IFRS requirement that cash flows arising from income taxes be separately disclosed. The classification of taxes on income paid should be indicated. The classification is in operating activities unless the taxes can be specifically identified with financing or investing activities.

The next adjustment "removes" from the operating cash flow section the €173 million representing Unilever's share of joint ventures' income that had been included in the computation of net profit. A €138 million inflow of (cash) dividends received from those joint ventures is then shown in the investing activities section. Similarly, an €877 million adjustment removes the net finance costs from the operating activities section. Unilever then reports its €154 million (cash) interest received in the investing activities section and its €470 million (cash) interest paid (and preference

dividends paid) in the financing activities section. The next adjustment in the operating section of this indirect-method statement adds back €1,538 million depreciation, amortisation, and impairment, all of which are expenses that had been deducted in the computation of net income but which did not involve any outflow of cash in the period. The €68 million adjustment for changes in working capital is necessary because these changes result from applying accrual accounting and thus do not necessarily correspond to the actual cash movement. These adjustments are described in greater detail in a later section.

In summary, some observations from an analysis of Unilever's cash flow statement include:

- Total cash increased from €1,910 million at the beginning of 2015 to €3,169 million at the end of 2017, with the largest increase occurring in 2016.
- In each year, the operating cash flow was more than the reported net profit, as would generally be expected from a mature company.
- In each year, the operating cash flow was more than enough to cover the company's capital expenditures.
- The company returned cash to its equity investors through dividends in each year and through share buybacks in 2017.

## CASH FLOW STATEMENT: DIRECT METHOD UNDER IFRS

5

- ☐ compare and contrast the direct and indirect methods of presenting cash from operating activities and describe arguments in favor of each method
- ☐ contrast cash flow statements prepared under International Financial Reporting Standards (IFRS) and US generally accepted accounting principles (US GAAP)

In the direct format of the cash flow statement, the cash received from customers, as well as other operating items, is clearly shown.

Exhibit 2 presents a direct-method format cash flow statement prepared under IFRS for Telefónica Group, a diversified telecommunications company based in Madrid.<sup>6</sup>

### Exhibit 2: Telefónica Group Consolidated Statement of Cash Flows (€ millions)

for the years ended 31 December	2017	2016	2015
<b>Cash flows from operating activities</b>			
Cash received from operations	63,456	63,514	67,582
Cash paid from operations	(46,929)	(47,384)	(50,833)

<sup>6</sup> This statement excludes the supplemental cash flow reconciliation provided at the bottom of the original cash flow statement by the company.

Net interest and other financial expenses net of dividends received	(1,726)	(2,143)	(2,445)
Taxes paid	(1,005)	(649)	(689)
<b>Net cash flow provided by operating activities</b>	<b>13,796</b>	<b>13,338</b>	<b>13,615</b>
<b>Cash flows from investing activities</b>			
(Payments on investments)/proceeds from the sale in property, plant and equipment and intangible assets, net	(8,992)	(9,187)	(10,256)
Proceeds on disposals of companies, net of cash and cash equivalents disposed	40	767	354
Payments on investments in companies, net of cash and cash equivalents acquired	(128)	(54)	(3,181)
Proceeds on financial investments not included under cash equivalents	296	489	1,142
Payments made on financial investments not included under cash equivalents	(1,106)	(265)	(426)
(Payments)/proceeds on placements of cash surpluses not included under cash equivalents	(357)	42	(557)
Government grants received	2	—	7
<b>Net cash used in investing activities</b>	<b>(10,245)</b>	<b>(8,208)</b>	<b>(12,917)</b>
<b>Cash flows from financing activities</b>			
Dividends paid	(2,459)	(2,906)	(2,775)
Proceeds from share capital increase	2	—	4,255
Proceeds/(payments) of treasury shares and other operations with shareholders and with minority interests	1,269	(660)	(1,772)
Operations with other equity holders	646	656	83
Proceeds on issue of debentures and bonds, and other debts	8,390	5,693	1,602
Proceeds on loans, borrowings and promissory notes	4,844	10,332	8,784
Repayments of debentures and bonds and other debts	(6,687)	(6,873)	(3,805)
Repayments of loans, borrowings and promissory notes	(6,711)	(8,506)	(9,858)
Financed operating payments and investments in property, plant and equipment and intangible assets payments	(1,046)	(1,956)	(126)
<b>Net cash flow used in financing activities</b>	<b>(1,752)</b>	<b>(4,220)</b>	<b>(3,612)</b>
Effect of changes in exchange rates	(341)	185	(1,000)
Effect of changes in consolidation methods and others	(2)	26	—
<b>Net increase (decrease) in cash and cash equivalents during the period</b>	<b>1,456</b>	<b>1,121</b>	<b>(3,914)</b>
Cash and cash equivalents at 1 January	3,736	2,615	6,529
Cash and cash equivalents at 31 December	5,192	3,736	2,615

As shown at the bottom of the statement, cash and cash equivalents decreased from €6,529 million at the beginning of 2015 to €5,192 million at the end of 2017. The largest decrease in cash occurred in 2015. Cash from operations was the primary source of cash, consistent with the profile of a mature company in a relatively stable industry. Each year, the company generated significantly more cash from operations than it required for its capital expenditures. For example, in 2017, the company generated €13.8 billion cash from operations and spent—as shown in the investing section—only €9 billion on property, plant, and equipment, net of proceeds from sales. Another notable item from the investing section is the company's limited acquisition activity in 2017 and 2016 compared with 2015. In 2015, the company made over €3

billion of acquisitions. As shown in the financing section, cash flows from financing was negative in all three years, although the components of the negative cash flows differed. In 2015, for example, the company generated cash with an equity issuance of €4.2 billion but made significant net repayments of debts resulting in negative cash from financing activities.

In summary, some observations from an analysis of Telefónica's cash flow statement include

- Total cash and cash equivalents decreased over the three-year period, with 2015 showing the biggest decrease.
- Cash from operating activities was large enough in each year to cover the company's capital expenditures.
- The amount paid for property, plant, and equipment and intangible assets was the largest investing expenditure each year.
- The company had a significant amount of acquisition activity in 2015.
- The company paid dividends each year although the amount in 2017 is somewhat lower than in prior years.

## CASH FLOW STATEMENT: DIRECT METHOD UNDER US GAAP

6

- ☐ contrast cash flow statements prepared under International Financial Reporting Standards (IFRS) and US generally accepted accounting principles (US GAAP)
- ☐ compare and contrast the direct and indirect methods of presenting cash from operating activities and describe arguments in favor of each method

Previously, we presented cash flow statements prepared under IFRS. In this section, we illustrate cash flow statements prepared under US GAAP. This section and the next present the cash flow statements of two companies, Tech Data Corporation and Walmart. Tech Data reports its operating activities using the direct method, whereas Walmart reports its operating activities using the more common indirect method.

Tech Data Corporation is a leading distributor of information technology products. Exhibit 3 presents comparative cash flow statements from the company's annual report for the fiscal years ended 31 January 2016 through 2018.

### Exhibit 3: Tech Data Corporation and Subsidiaries Consolidated Cash Flow Statements (in Thousands)

Years Ended 31 January	2018	2017	2016
Cash flows from operating activities:			
Cash received from customers	\$42,981,601	\$29,427,357	\$28,119,687
Cash paid to vendors and employees	(41,666,356)	(28,664,222)	(27,819,886)
Interest paid, net	(86,544)	(22,020)	(20,264)
Income taxes paid	(131,632)	(84,272)	(85,645)

Years Ended 31 January	2018	2017	2016
<b>Net cash provided by operating activities</b>	<b>1,097,069</b>	<b>656,843</b>	<b>193,892</b>
Cash flows from investing activities:			
Acquisition of business, net of cash acquired	(2,249,849)	(2,916)	(27,848)
Expenditures for property and equipment	(192,235)	(24,971)	(20,917)
Software and software development costs	(39,702)	(14,364)	(13,055)
Proceeds from sale of subsidiaries	0	0	20,020
<b>Net cash used in investing activities</b>	<b>(2,481,786)</b>	<b>(42,251)</b>	<b>(41,800)</b>
Cash flows from financing activities:			
Borrowings on long-term debt	1,008,148	998,405	—
Principal payments on long-term debt	(861,394)	—	(319)
Cash paid for debt issuance costs	(6,348)	(21,581)	—
Net borrowings on revolving credit loans	(16,028)	3,417	5,912
Cash paid for purchase of treasury stock	—	—	(147,003)
Payments for employee withholdings on equity awards	(6,027)	(4,479)	(4,662)
Proceeds from the reissuance of treasury stock	1,543	733	561
Acquisition of earn-out payments	—	—	(2,736)
<b>Net cash provided by (used in) financing activities</b>	<b>119,894</b>	<b>976,495</b>	<b>(148,247)</b>
Effect of exchange rate changes on cash and cash equivalents	94,860	3,335	(15,671)
Net (decrease) increase in cash and cash equivalents	(1,169,963)	1,594,422	(11,826)
Cash and cash equivalents at beginning of year	2,125,591	531,169	542,995
<b>Cash and cash equivalents at end of year</b>	<b>\$955,628</b>	<b>\$2,125,591</b>	<b>\$531,169</b>
<b>Reconciliation of net income to net cash provided by operating activities:</b>			
Net income	\$116,641	\$195,095	\$265,736
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	150,046	54,437	57,253
Provision for losses on accounts receivable	21,022	5,026	6,061
Stock-based compensation expense	29,381	13,947	14,890
Loss on disposal of subsidiaries	—	—	699
Accretion of debt discount and debt issuance costs	3,326	835	839
Deferred income taxes	(4,261)	(11,002)	2,387
Changes in operating assets and liabilities:			
Accounts receivable	(554,627)	(91,961)	(297,637)
Inventories	(502,352)	(20,838)	(219,482)
Prepaid expenses and other assets	32,963	66,027	(44,384)
Accounts payable	1,704,307	459,146	426,412
Accrued expenses and other liabilities	100,623	(13,869)	(18,882)



Years Ended 31 January	2018	2017	2016
Total adjustments	980,428	461,748	(71,844)
Net cash provided by operating activities	\$1,097,069	\$656,843	\$193,892

Tech Data Corporation prepares its cash flow statements under the direct method. The company's cash increased from \$543 million at the beginning of 2016 to \$956 million at the end of January 2018, with the biggest increase occurring in 2017. The 2017 increase was driven by changes in both operating cash flow and financing cash flow. In the cash flows from operating activities section of Tech Data's cash flow statements, the company identifies the amount of cash it received from customers, \$43 billion for 2018, and the amount of cash that it paid to suppliers and employees, \$41.7 billion for 2018. Cash receipts increased from \$29.4 billion in the prior year and cash paid also increased substantially. Net cash provided by operating activities was adequate to cover the company's investing activities in 2016 and 2017 but not in 2018, primarily because of increased amounts of cash used for acquisition of business. Related to this investing cash outflow for an acquisition, footnotes disclose that the major acquisition in 2018 accounted for the large increase in cash receipts and cash payments in the operating section. Also related to the 2018 acquisition, the financing section shows that the company borrowed more debt than it repaid in both 2017 and 2018. In 2017, borrowings on long-term debt were \$998.4 million, and net borrowings on revolving credit loans were \$3.4 million. In 2018, the company generated cash by borrowing more long-term debt than it repaid but used cash to pay down its revolving credit loans. There are no dividend payments, although in 2016, the company paid \$147 million to repurchase its common stock.

Whenever the direct method is used, US GAAP require a disclosure note and a schedule that reconciles net income with the net cash flow from operating activities. Tech Data shows this reconciliation at the bottom of its consolidated statements of cash flows. The disclosure note and reconciliation schedule are exactly the information that would have been presented in the body of the cash flow statement if the company had elected to use the indirect method rather than the direct method. For 2018, the reconciliation highlights an increase in the company's accounts receivable, inventory, and payables.

In summary, some observations from an analysis of Tech Data's cash flow statement include:

- The company's cash increased by over \$412 million over the three years ending in January 2018, with the biggest increase occurring in 2017.
- The company's operating cash was adequate to cover the company's investments in 2016 and 2017, but not in 2018 primarily because of a major acquisition.
- Related to the 2018 acquisition, the financing section shows an increase in long-term borrowings in 2017 and 2018, including a \$998 million increase in 2017.
- The company has not paid dividends in the past three years, but the financing section shows that in 2016 the company repurchased stock.

## 7

## CASH FLOW STATEMENT: INDIRECT METHOD UNDER US GAAP

- ☐ contrast cash flow statements prepared under International Financial Reporting Standards (IFRS) and US generally accepted accounting principles (US GAAP)
- ☐ compare and contrast the direct and indirect methods of presenting cash from operating activities and describe arguments in favor of each method

Walmart is a global retailer that conducts business under the names of Walmart and Sam's Club. Exhibit 4 presents the comparative cash flow statements from the company's annual report for the fiscal years ended 31 January 2018, 2017, and 2016.

**Exhibit 4: Walmart Cash Flow Statements Fiscal Years Ended 31 January (\$ millions)**

<b>Fiscal Year Ended 31 January</b>	<b>2018</b>	<b>2017</b>	<b>2016</b>
Cash flows from operating activities:			
Consolidated net income	10,523	14,293	15,080
Adjustments to reconcile income from continuing operations to net cash provided by operating activities:			
Depreciation and amortization	10,529	10,080	9,454
Deferred income taxes	(304)	761	(672)
Loss on extinguishment of debt	3,136	—	—
Other operating activities	1,210	206	1,410
Changes in certain assets and liabilities, net of effects of acquisitions:			
Receivables, net	(1,074)	(402)	(19)
Inventories	(140)	1,021	(703)
Accounts payable	4,086	3,942	2,008
Accrued liabilities	928	1,280	1,466
Accrued income taxes	(557)	492	(472)
<b>Net cash provided by operating activities</b>	<b>28,337</b>	<b>31,673</b>	<b>27,552</b>
Cash flows from investing activities:			
Payments for property and equipment	(10,051)	(10,619)	(11,477)
Proceeds from disposal of property and equipment	378	456	635
Proceeds from the disposal of certain operations	1,046	662	246
Purchase of available for sale securities	—	(1,901)	—
Investment and business acquisitions, net of cash acquired	(375)	(2,463)	—
Other investing activities	(58)	(122)	(79)
<b>Net cash used in investing activities</b>	<b>(9,060)</b>	<b>(13,987)</b>	<b>(10,675)</b>
Cash flows from financing activities:			
Net change in short-term borrowings	4,148	(1,673)	1,235
Proceeds from issuance of long-term debt	7,476	137	39

<b>Fiscal Year Ended 31 January</b>	<b>2018</b>	<b>2017</b>	<b>2016</b>
Payments of long-term debt	(13,061)	(2,055)	(4,432)
Payment for debt extinguishment or debt prepayment cost	(3,059)	—	—
Dividends paid	(6,124)	(6,216)	(6,294)
Purchase of Company stock	(8,296)	(8,298)	(4,112)
Dividends paid to noncontrolling interest	(690)	(479)	(719)
Purchase of noncontrolling interest	(8)	(90)	(1,326)
Other financing activities	(261)	(398)	(676)
<b>Net cash used in financing activities</b>	<b>(19,875)</b>	<b>(19,072)</b>	<b>(16,285)</b>
Effect of exchange rates on cash and cash equivalents	487	(452)	(1,022)
Net increase (decrease) in cash and cash equivalents	(111)	(1,838)	(430)
Cash and cash equivalents at beginning of year	6,867	8,705	9,135
Cash and cash equivalents at end of year	<b>6,756</b>	<b>6,867</b>	<b>8,705</b>
Supplemental disclosure of cash flow information			
Income taxes paid	6,179	4,507	8,111
Interest paid	2,450	2,351	2,540

Walmart's cash flow statement indicates the following:

- Cash and cash equivalents declined over the three years, from \$9.1 billion at the beginning of fiscal 2016 to \$6.8 billion at the end of fiscal 2018.
- Operating cash flow was relatively steady at \$27.6 billion, \$31.7 billion, and \$28.3 billion in fiscal 2016, 2017, and 2018, respectively. Further, operating cash flow was significantly greater than the company's expenditures on property and equipment in every year.
- Over the three years, the company used significant amounts of cash to pay dividends and to repurchase its common stock. The company also repaid borrowing, particularly in fiscal 2018.

Walmart prepares its cash flow statements under the indirect method. In the cash flows from operating activities section of Walmart's cash flow statement, the company reconciles its net income for 2018 of \$10.5 billion to net cash provided by operating activities of \$28.3 billion. The largest adjustment is for depreciation and amortization of \$10.5 billion. Depreciation and amortization expense requires an adjustment because it was a non-cash expense on the income statement. As illustrated in previous examples, depreciation is the largest or one of the largest adjustments made by many companies in the reconciliation of net income to operating cash flow.

Whenever the indirect method is used, US GAAP mandate disclosure of how much cash was paid for interest and income taxes. Note that these are line items in cash flow statements using the direct method, so disclosure does not have to be mandated. Walmart discloses the amount of cash paid for income tax (\$6.2 billion) and interest (\$2.5 billion) at the bottom of its cash flow statements.

## SUMMARY

The cash flow statement provides important information about a company's cash receipts and cash payments during an accounting period as well as information about a company's operating, investing, and financing activities. Although the income statement provides a measure of a company's success, cash and cash flow are also vital to a company's long-term success. Information on the sources and uses of cash helps creditors, investors, and other statement users evaluate the company's liquidity, solvency, and financial flexibility. Key concepts are as follows:

- Cash flow activities are classified into three categories: operating activities, investing activities, and financing activities. Significant non-cash transaction activities (if present) are reported by using a supplemental disclosure note to the cash flow statement.
- Cash flow statements under IFRS and US GAAP are similar; however, IFRS provide companies with more choices in classifying some cash flow items as operating, investing, or financing activities.
- Companies can use either the direct or the indirect method for reporting their operating cash flow:
  - The direct method discloses operating cash inflows by source (e.g., cash received from customers, cash received from investment income) and operating cash outflows by use (e.g., cash paid to suppliers, cash paid for interest) in the operating activities section of the cash flow statement.
  - The indirect method reconciles net income to operating cash flow by adjusting net income for all non-cash items and the net changes in the operating working capital accounts.
- The cash flow statement is linked to a company's income statement and comparative balance sheets and to data on those statements.
- An evaluation of a cash flow statement should involve an assessment of the sources and uses of cash and the main drivers of cash flow within each category of activities.

## PRACTICE PROBLEMS

1. The three major classifications of activities in a cash flow statement are:
  - A. inflows, outflows, and net flows.
  - B. operating, investing, and financing.
  - C. revenues, expenses, and net income.
2. The sale of a building for cash would be classified as what type of activity on the cash flow statement?
  - A. Operating
  - B. Investing
  - C. Financing
3. Under which section of a manufacturing company's cash flow statement are the following activities reported?  
  
Item 1: Purchases of securities held for trading  
Item 2: Purchases of securities held for investment
  - A. Both items are investing activities.
  - B. Only Item 1 is an operating activity.
  - C. Only Item 2 is an operating activity.
4. A conversion of a face value \$1 million convertible bond for \$1 million of common stock would most likely be:
  - A. reported as a \$1 million investing cash inflow and outflow.
  - B. reported as a \$1 million financing cash outflow and inflow.
  - C. reported as supplementary information to the cash flow statement.
5. A company recently engaged in a non-cash transaction that significantly affected its property, plant, and equipment. The transaction is:
  - A. reported under the investing section of the cash flow statement.
  - B. reported differently in cash flow from operations under the direct and indirect methods.
  - C. disclosed as a separate note or in a supplementary schedule to the cash flow statement.
6. A benefit of using the direct method rather than the indirect method when reporting operating cash flows is that the direct method:
  - A. mirrors a forecasting approach.
  - B. is easier and less costly.

- C.** provides specific information on the sources of operating cash flows.
- 7. Which of the following is *most likely* to appear in the operating section of a cash flow statement under the indirect method?
  - A.** Net income
  - B.** Cash paid to suppliers
  - C.** Cash received from customers
- 8. Which of the following components of the cash flow statement may be prepared under the indirect method under both IFRS and US GAAP?
  - A.** Operating
  - B.** Investing
  - C.** Financing

## SOLUTIONS

1. B is correct. Operating, investing, and financing are the three major classifications of activities in a cash flow statement. Revenues, expenses, and net income are elements of the income statement. Inflows, outflows, and net flows are items of information in the statement of cash flows.
2. B is correct. Purchases and sales of long-term assets are considered investing activities. Note that if the transaction had involved the exchange of a building for other than cash (for example, for another building, common stock of another company, or a long-term note receivable), it would have been considered a significant non-cash activity.
3. B is correct. The purchase and sale of securities held for trading are considered operating activities even for companies in which this activity is not a primary business activity.
4. C is correct. Non-cash transactions, if significant, are reported as supplementary information, not in the investing or financing sections of the cash flow statement.
5. C is correct. Because no cash is involved in non-cash transactions, these transactions are not incorporated in the cash flow statement. However, non-cash transactions that significantly affect capital or asset structures are required to be disclosed either in a separate note or a supplementary schedule to the cash flow statement.
6. C is correct. The primary argument in favor of the direct method is that it provides information on the specific sources of operating cash receipts and payments. Arguments for the indirect method include that it mirrors a forecasting approach and it is easier and less costly.
7. A is correct. Under the indirect method, the operating section would begin with net income and adjust it to arrive at operating cash flow. The other two items would appear in the operating section under the direct method.
8. A is correct. The operating section may be prepared under the indirect method. The other sections are always prepared under the direct method.





## LEARNING MODULE

# 5

## Inventories

by Michael A. Broihahn, CPA, CIA, CFA.

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### LEARNING OUTCOMES

<i>Mastery</i>	<i>The candidate should be able to:</i>
<input type="checkbox"/>	contrast costs included in inventories and costs recognised as expenses in the period in which they are incurred
<input type="checkbox"/>	describe different inventory valuation methods (cost formulas)
<input type="checkbox"/>	calculate and compare cost of sales, gross profit, and ending inventory using different inventory valuation methods and using perpetual and periodic inventory systems
<input type="checkbox"/>	calculate and explain how inflation and deflation of inventory costs affect the financial statements and ratios of companies that use different inventory valuation methods
<input type="checkbox"/>	explain LIFO reserve and LIFO liquidation and their effects on financial statements and ratios
<input type="checkbox"/>	demonstrate the conversion of a company's reported financial statements from LIFO to FIFO for purposes of comparison
<input type="checkbox"/>	describe the measurement of inventory at the lower of cost and net realisable value
<input type="checkbox"/>	describe implications of valuing inventory at net realisable value for financial statements and ratios
<input type="checkbox"/>	describe the financial statement presentation of and disclosures relating to inventories
<input type="checkbox"/>	explain issues that analysts should consider when examining a company's inventory disclosures and other sources of information
<input type="checkbox"/>	calculate and compare ratios of companies, including companies that use different inventory methods
<input type="checkbox"/>	analyze and compare the financial statements of companies, including companies that use different inventory methods

**Note:** Changes in accounting standards as well as new rulings and/or pronouncements issued after the publication of the readings on financial reporting and analysis may cause some of the information in these readings to become dated. Candidates are *not* responsible for anything that occurs after the readings were published. In addition, candidates are expected to be familiar with the analytical frameworks contained in the readings, as well as the implications of alternative accounting methods for financial analysis and valuation discussed in the readings. Candidates are also responsible for the content of accounting standards, but not for the actual reference numbers. Finally, candidates should be aware that certain ratios may be defined and calculated differently. When alternative ratio definitions exist and no specific definition is given, candidates should use the ratio definitions emphasized in the readings.

## 1

## INTRODUCTION

Merchandising and manufacturing companies generate revenues and profits through the sale of inventory. Further, inventory may represent a significant asset on these companies' balance sheets. Merchandisers (wholesalers and retailers) purchase inventory, ready for sale, from manufacturers and thus account for only one type of inventory—finished goods inventory. Manufacturers, however, purchase raw materials from suppliers and then add value by transforming the raw materials into finished goods. They typically classify inventory into three different categories:<sup>1</sup> raw materials, work in progress,<sup>2</sup> and finished goods. Work-in-progress inventories have started the conversion process from raw materials but are not yet finished goods ready for sale. Manufacturers may report either the separate carrying amounts of their raw materials, work-in-progress, and finished goods inventories on the balance sheet or simply the total inventory amount. If the latter approach is used, the company must then disclose the carrying amounts of its raw materials, work-in-progress, and finished goods inventories in a footnote to the financial statements.

Inventories and cost of sales (cost of goods sold)<sup>3</sup> are significant items in the financial statements of many companies. Comparing the performance of these companies is challenging because of the allowable choices for valuing inventories: Differences in the choice of inventory valuation method can result in significantly different amounts being assigned to inventory and cost of sales.

International Financial Reporting Standards (IFRS) permit the assignment of inventory costs (costs of goods available for sale) to inventories and cost of sales by three cost formulas: specific identification, first-in, first-out (FIFO), and weighted average cost.<sup>4</sup> US generally accepted accounting principles (US GAAP) allow the same three inventory valuation methods, referred to as cost flow assumptions in US GAAP, but also include a fourth method called last-in, first-out (LIFO).<sup>5</sup> The choice of inventory valuation method affects the allocation of the cost of goods available for sale to ending inventory and cost of sales. Analysts must understand the various inventory valuation methods and the related impact on financial statements and financial ratios in order to evaluate a company's performance over time and relative to industry peers. The company's financial statements and related notes provide important information that the analyst can use in assessing the impact of the choice of inventory valuation method on financial statements and financial ratios.

## 2

## COST OF INVENTORIES



contrast costs included in inventories and costs recognised as expenses in the period in which they are incurred

1 Other classifications are possible. Inventory classifications should be appropriate to the entity.

2 This category is commonly referred to as *work in process* under US GAAP.

3 Typically, *cost of sales* is IFRS terminology and *cost of goods sold* is US GAAP terminology.

4 International Accounting Standard (IAS) 2 [Inventories].

5 Financial Accounting Standards Board *Accounting Standards Codification* (FASB ASC) Topic 330 [Inventory].

Under IFRS, the costs to include in inventories are “all costs of purchase, costs of conversion, and other costs incurred in bringing the inventories to their present location and condition.”<sup>6</sup> The costs of purchase include the purchase price, import and tax-related duties, transport, insurance during transport, handling, and other costs directly attributable to the acquisition of finished goods, materials, and services. Trade discounts, rebates, and similar items reduce the price paid and the costs of purchase. The costs of conversion include costs directly related to the units produced, such as direct labour, and fixed and variable overhead costs.<sup>7</sup> Including these product-related costs in inventory (i.e., as an asset) means that they will not be recognised as an expense (i.e., as cost of sales) on the income statement until the inventory is sold. US GAAP provide a similar description of the costs to be included in inventory.<sup>8</sup>

Both IFRS and US GAAP exclude the following costs from inventory: abnormal costs incurred as a result of waste of materials, labour or other production conversion inputs, any storage costs (unless required as part of the production process), and all administrative overhead and selling costs. These excluded costs are treated as expenses and recognised on the income statement in the period in which they are incurred. Including costs in inventory defers their recognition as an expense on the income statement until the inventory is sold. Therefore, including costs in inventory that should be expensed will overstate profitability on the income statement (because of the inappropriate deferral of cost recognition) and create an overstated inventory value on the balance sheet.

#### EXAMPLE 1

##### Treatment of Inventory-Related Costs

Acme Enterprises, a hypothetical company that prepares its financial statements in accordance with IFRS, manufactures tables. In 2018, the factory produced 900,000 finished tables and scrapped 1,000 tables. For the finished tables, raw material costs were €9 million, direct labour conversion costs were €18 million, and production overhead costs were €1.8 million. The 1,000 scrapped tables (attributable to abnormal waste) had a total production cost of €30,000 (€10,000 raw material costs and €20,000 conversion costs; these costs are not included in the €9 million raw material and €19.8 million total conversion costs of the finished tables). During the year, Acme spent €1 million for freight delivery charges on raw materials and €500,000 for storing finished goods inventory. Acme does not have any work-in-progress inventory at the end of the year.

1. What costs should be included in inventory in 2018?

##### Solution to 1:

Total inventory costs for 2018 are as follows:

Raw materials	€9,000,000
Direct labour	18,000,000
Production overhead	1,800,000

<sup>6</sup> International Accounting Standard (IAS) 2 [Inventories].

<sup>7</sup> Fixed production overhead costs (depreciation, factory maintenance, and factory management and administration) represent indirect costs of production that remain relatively constant regardless of the volume of production. Variable production overhead costs are indirect production costs (indirect labour and materials) that vary with the volume of production.

<sup>8</sup> FASB Accounting Standards Codification™ (ASC) Topic 330 [Inventory].

Transportation for raw materials	1,000,000
Total inventory costs	€29,800,000

2. What costs should be expensed in 2018?

### Solution to 2:

Total costs that should be expensed (not included in inventory) are as follows:

Abnormal waste	€30,000
Storage of finished goods inventory	500,000
Total	€530,000

## 3

### INVENTORY VALUATION METHODS



describe different inventory valuation methods (cost formulas)

Generally, inventory purchase costs and manufacturing conversion costs change over time. As a result, the allocation of total inventory costs (i.e., cost of goods available for sale) between cost of sales on the income statement and inventory on the balance sheet will vary depending on the inventory valuation method used by the company. As mentioned in the introduction, inventory valuation methods are referred to as cost formulas and cost flow assumptions under IFRS and US GAAP, respectively. If the choice of method results in more cost being allocated to cost of sales and less cost being allocated to inventory than would be the case with other methods, the chosen method will cause, in the current year, reported gross profit, net income, and inventory carrying amount to be lower than if alternative methods had been used. Accounting for inventory, and consequently the allocation of costs, thus has a direct impact on financial statements and their comparability.

Both IFRS and US GAAP allow companies to use the following inventory valuation methods: specific identification; first-in, first-out (FIFO); and weighted average cost. US GAAP allow companies to use an additional method: last-in, first-out (LIFO). A company must use the same inventory valuation method for all items that have a similar nature and use. For items with a different nature or use, a different inventory valuation method can be used.<sup>9</sup> When items are sold, the carrying amount of the inventory is recognised as an expense (cost of sales) according to the cost formula (cost flow assumption) in use.

Specific identification is used for inventory items that are not ordinarily interchangeable, whereas FIFO, weighted average cost, and LIFO are typically used when there are large numbers of interchangeable items in inventory. Specific identification matches the actual historical costs of the specific inventory items to their physical flow; the costs remain in inventory until the actual identifiable inventory is sold. FIFO, weighted average cost, and LIFO are based on cost flow assumptions. Under these

<sup>9</sup> For example, if a clothing manufacturer produces both a retail line and one-of-a-kind designer garments, the retail line might be valued using FIFO and the designer garments using specific identification.

methods, companies must make certain assumptions about which goods are sold and which goods remain in ending inventory. As a result, the allocation of costs to the units sold and to the units in ending inventory can be different from the physical movement of the items.

The choice of inventory valuation method would be largely irrelevant if inventory costs remained constant or relatively constant over time. Given relatively constant prices, the allocation of costs between cost of goods sold and ending inventory would be very similar under each of the four methods. Given changing price levels, however, the choice of inventory valuation method can have a significant impact on the amount of reported cost of sales and inventory. And the reported cost of sales and inventory balances affect other items, such as gross profit, net income, current assets, and total assets.

### Specific Identification

The specific identification method is used for inventory items that are not ordinarily interchangeable and for goods that have been produced and segregated for specific projects. This method is also commonly used for expensive goods that are uniquely identifiable, such as precious gemstones. Under this method, the cost of sales and the cost of ending inventory reflect the actual costs incurred to purchase (or manufacture) the items specifically identified as sold and the items specifically identified as remaining in inventory. Therefore, this method matches the physical flow of the specific items sold and remaining in inventory to their actual cost.

### First-In, First-Out (FIFO)

FIFO assumes that the oldest goods purchased (or manufactured) are sold first and the newest goods purchased (or manufactured) remain in ending inventory. In other words, the first units included in inventory are assumed to be the first units sold from inventory. Therefore, cost of sales reflects the cost of goods in beginning inventory plus the cost of items purchased (or manufactured) earliest in the accounting period, and the value of ending inventory reflects the costs of goods purchased (or manufactured) more recently. In periods of rising prices, the costs assigned to the units in ending inventory are higher than the costs assigned to the units sold. Conversely, in periods of declining prices, the costs assigned to the units in ending inventory are lower than the costs assigned to the units sold.

### Weighted Average Cost

Weighted average cost assigns the average cost of the goods available for sale (beginning inventory plus purchase, conversion, and other costs) during the accounting period to the units that are sold as well as to the units in ending inventory. In an accounting period, the weighted average cost per unit is calculated as the total cost of the units available for sale divided by the total number of units available for sale in the period (Total cost of goods available for sale/Total units available for sale).

### Last-In, First-Out (LIFO)

LIFO is permitted only under US GAAP. This method assumes that the newest goods purchased (or manufactured) are sold first and the oldest goods purchased (or manufactured), including beginning inventory, remain in ending inventory. In other words, the last units included in inventory are assumed to be the first units sold from inventory. Therefore, cost of sales reflects the cost of goods purchased (or manufactured)

more recently, and the value of ending inventory reflects the cost of older goods. In periods of rising prices, the costs assigned to the units in ending inventory are lower than the costs assigned to the units sold. Conversely, in periods of declining prices, the costs assigned to the units in ending inventory are higher than the costs assigned to the units sold.

## 4

### CALCULATIONS OF COST OF SALES, GROSS PROFIT, AND ENDING INVENTORY



calculate and compare cost of sales, gross profit, and ending inventory using different inventory valuation methods and using perpetual and periodic inventory systems

In periods of changing prices, the allocation of total inventory costs (i.e., cost of goods available for sale) between cost of sales on the income statement and inventory on the balance sheet will vary depending on the inventory valuation method used by the company. The following example illustrates how cost of sales, gross profit, and ending inventory differ based on the choice of inventory valuation method.

#### EXAMPLE 2

##### Inventory Cost Flow Illustration for the Specific Identification, Weighted Average Cost, FIFO, and LIFO Methods

Global Sales, Inc. (GSI) is a hypothetical Dubai-based distributor of consumer products, including bars of luxury soap. The soap is sold by the kilogram. GSI began operations in 2018, during which it purchased and received initially 100,000 kg of soap at 110 dirham (AED)/kg, then 200,000 kg of soap at 100 AED/kg, and finally 300,000 kg of soap at 90 AED/kg. GSI sold 520,000 kg of soap at 240 AED/kg. GSI stores its soap in its warehouse so that soap from each shipment received is readily identifiable. During 2018, the entire 100,000 kg from the first shipment received, 180,000 kg of the second shipment received, and 240,000 kg of the final shipment received were sent to customers. Answers to the following questions should be rounded to the nearest 1,000 AED.

1. What are the reported cost of sales, gross profit, and ending inventory balances for 2018 under the specific identification method?

#### Solution to 1:

Under the specific identification method, the physical flow of the specific inventory items sold is matched to their actual cost.

$$\text{Sales} = 520,000 \times 240 = 124,800,000 \text{ AED}$$

$$\begin{aligned} \text{Cost of sales} &= (100,000 \times 110) + (180,000 \times 100) + (240,000 \times 90) \\ &= 50,600,000 \text{ AED} \end{aligned}$$

$$\text{Gross profit} = 124,800,000 - 50,600,000 = 74,200,000 \text{ AED}$$

$$\text{Ending inventory} = (20,000 \times 100) + (60,000 \times 90) = 7,400,000 \text{ AED}$$

2. What are the reported cost of sales, gross profit, and ending inventory balances for 2018 under the weighted average cost method?

### Solution to 2:

Under the weighted average cost method, costs are allocated to cost of sales and ending inventory by using a weighted average mix of the actual costs incurred for all inventory items. The weighted average cost per unit is determined by dividing the total cost of goods available for sale by the number of units available for sale.

$$\begin{aligned} \text{Weighted average cost} &= [(100,000 \times 110) + (200,000 \times 100) + (300,000 \times 90)] / 600,000 \\ &= 96.667 \text{ AED/kg} \end{aligned}$$

$$\text{Sales} = 520,000 \times 240 = 124,800,000 \text{ AED}$$

$$\text{Cost of sales} = 520,000 \times 96.667 = 50,267,000 \text{ AED}$$

$$\text{Gross profit} = 124,800,000 - 50,267,000 = 74,533,000 \text{ AED}$$

$$\text{Ending inventory} = 80,000 \times 96.667 = 7,733,360 \text{ AED}$$

3. What are the reported cost of sales, gross profit, and ending inventory balances for 2018 under the FIFO method?

### Solution to 3:

Under the FIFO method, the oldest inventory units acquired are assumed to be the first units sold. Ending inventory, therefore, is assumed to consist of those inventory units most recently acquired.

$$\text{Sales} = 520,000 \times 240 = 124,800,000 \text{ AED}$$

$$\begin{aligned} \text{Cost of sales} &= (100,000 \times 110) + (200,000 \times 100) + (220,000 \times 90) \\ &= 50,800,000 \text{ AED} \end{aligned}$$

$$\text{Gross profit} = 124,800,000 - 50,800,000 = 74,000,000 \text{ AED}$$

$$\text{Ending inventory} = 80,000 \times 90 = 7,200,000 \text{ AED}$$

4. What are the reported cost of sales, gross profit, and ending inventory balances for 2018 under the LIFO method?

### Solution to 4:

Under the LIFO method, the newest inventory units acquired are assumed to be the first units sold. Ending inventory, therefore, is assumed to consist of the oldest inventory units.

$$\text{Sales} = 520,000 \times 240 = 124,800,000 \text{ AED}$$

$$\begin{aligned} \text{Cost of sales} &= (20,000 \times 110) + (200,000 \times 100) + (300,000 \times 90) \\ &= 49,200,000 \text{ AED} \end{aligned}$$

$$\text{Gross profit} = 124,800,000 - 49,200,000 = 75,600,000 \text{ AED}$$

$$\text{Ending inventory} = 80,000 \times 110 = 8,800,000 \text{ AED}$$

The following table (in thousands of AED) summarizes the cost of sales, the ending inventory, and the cost of goods available for sale that were calculated for each of the four inventory valuation methods. Note that in the first year of operation, the total cost of goods available for sale is the same under all four methods. Subsequently, the cost of goods available for sale will typically differ because beginning inventories will differ. Also shown is the gross profit figure for each of the four methods. Because the cost of a kg of soap declined over the period, LIFO had the highest ending inventory amount, the lowest cost of sales, and the highest gross profit. FIFO had the lowest ending inventory amount, the highest cost of sales, and the lowest gross profit.

Inventory Valuation Method	Specific ID	Weighted Average Cost	FIFO	LIFO
Cost of sales	50,600	50,267	50,800	49,200
Ending inventory	7,400	7,733	7,200	8,800
Total cost of goods available for sale	58,000	58,000	58,000	58,000
Gross profit	74,200	74,533	74,000	75,600

## 5

### PERIODIC VERSUS PERPETUAL INVENTORY SYSTEMS



calculate and compare cost of sales, gross profit, and ending inventory using different inventory valuation methods and using perpetual and periodic inventory systems

Companies typically record changes to inventory using either a periodic inventory system or a perpetual inventory system. Under a periodic inventory system, inventory values and costs of sales are determined at the end of an accounting period. Purchases are recorded in a purchases account. The total of purchases and beginning inventory is the amount of goods available for sale during the period. The ending inventory amount is subtracted from the goods available for sale to arrive at the cost of sales. The quantity of goods in ending inventory is usually obtained or verified through a physical count of the units in inventory. Under a perpetual inventory system, inventory values and cost of sales are continuously updated to reflect purchases and sales.

Under either system, the allocation of goods available for sale to cost of sales and ending inventory is the same if the inventory valuation method used is either specific identification or FIFO. This is not generally true for the weighted average cost method. Under a periodic inventory system, the amount of cost of goods available for sale allocated to cost of sales and ending inventory may be quite different using the FIFO method compared to the weighted average cost method. Under a perpetual inventory system, inventory values and cost of sales are continuously updated to reflect purchases and sales. As a result, the amount of cost of goods available for sale allocated to cost



of sales and ending inventory is similar under the FIFO and weighted average cost methods. Because of lack of disclosure and the dominance of perpetual inventory systems, analysts typically do not make adjustments when comparing a company using the weighted average cost method with a company using the FIFO method.

Using the LIFO method, the periodic and perpetual inventory systems will generally result in different allocations to cost of sales and ending inventory. Under either a perpetual or periodic inventory system, the use of the LIFO method will generally result in significantly different allocations to cost of sales and ending inventory compared to other inventory valuation methods. When inventory costs are increasing and inventory unit levels are stable or increasing, using the LIFO method will result in higher cost of sales and lower inventory carrying amounts than using the FIFO method. The higher cost of sales under LIFO will result in lower gross profit, operating income, income before taxes, and net income. Income tax expense will be lower under LIFO, causing the company's net operating cash flow to be higher. On the balance sheet, the lower inventory carrying amount will result in lower reported current assets, working capital, and total assets. Analysts must carefully assess the financial statement implications of the choice of inventory valuation method when comparing companies that use the LIFO method with companies that use the FIFO method.

Example 3 illustrates the impact of the choice of system under LIFO.

### EXAMPLE 3

#### Perpetual versus Periodic Inventory Systems

1. If GSI (the company in Example 2) had used a perpetual inventory system, the timing of purchases and sales would affect the amounts of cost of sales and inventory. Below is a record of the purchases, sales, and quantity of inventory on hand after the transaction in 2018.

Date	Purchased	Sold	Inventory on Hand
5 January	100,000 kg at 110 AED/kg		100,000 kg
1 February		80,000 kg at 240 AED/kg	20,000 kg
8 March	200,000 kg at 100 AED/kg		220,000 kg
6 April		100,000 kg at 240 AED/kg	120,000 kg
23 May		60,000 kg at 240 AED/kg	60,000 kg
7 July		40,000 kg at 240 AED/kg	20,000 kg
2 August	300,000 kg at 90 AED/kg		320,000 kg
5 September		70,000 kg at 240 AED/kg	250,000 kg
17 November		90,000 kg at 240 AED/kg	160,000 kg
8 December		80,000 kg at 240 AED/kg	80,000 kg
	Total goods available for sale = 58,000,000 AED	Total sales = 124,800,000 AED	

The amounts for total goods available for sale and sales are the same under either the perpetual or periodic system in this first year of operation. The carrying amount of the ending inventory, however, may differ because the perpetual system will apply LIFO continuously throughout the year. Under the periodic system, it was assumed that the ending inventory was composed of 80,000 units of the oldest inventory, which cost 110 AED/kg.

What are the ending inventory, cost of sales, and gross profit amounts using the perpetual system and the LIFO method? How do these compare with the amounts using the periodic system and the LIFO method, as in Example 2?

### Solution:

The carrying amounts of the inventory at the different time points using the perpetual inventory system are as follows:

Date	Quantity on Hand	Quantities and Cost	Carrying Amount
5 January	100,000 kg	100,000 kg at 110 AED/kg	11,000,000 AED
1 February	20,000 kg	20,000 kg at 110 AED/kg	2,200,000 AED
8 March	220,000 kg	20,000 kg at 110 AED/kg + 200,000 kg at 100 AED/kg	22,200,000 AED
6 April	120,000 kg	20,000 kg at 110 AED/kg + 100,000 kg at 100 AED/kg	12,200,000 AED
23 May	60,000 kg	20,000 kg at 110 AED/kg + 40,000 kg at 100 AED/kg	6,200,000 AED
7 July	20,000 kg	20,000 kg at 110 AED/kg	2,200,000 AED
2 August	320,000 kg	20,000 kg at 110 AED/kg + 300,000 kg at 90 AED/kg	29,200,000 AED
5 September	250,000 kg	20,000 kg at 110 AED/kg + 230,000 kg at 90 AED/kg	22,900,000 AED
17 November	160,000 kg	20,000 kg at 110 AED/kg + 140,000 kg at 90 AED/kg	14,800,000 AED
8 December	80,000 kg	20,000 kg at 110 AED/kg + 60,000 kg at 90 AED/kg	7,600,000 AED

#### Perpetual system

$$\text{Sales} = 520,000 \times 240 = 124,800,000 \text{ AED}$$

$$\text{Cost of sales} = 58,000,000 - 7,600,000 = 50,400,000 \text{ AED}$$

$$\text{Gross profit} = 124,800,000 - 50,400,000 = 74,400,000 \text{ AED}$$

$$\text{Ending inventory} = 7,600,000 \text{ AED}$$

#### Periodic system from Example 2

$$\text{Sales} = 520,000 \times 240 = 124,800,000 \text{ AED}$$

$$\begin{aligned} \text{Cost of sales} &= (20,000 \times 110) + (200,000 \times 100) + (300,000 \times 90) \\ &= 49,200,000 \text{ AED} \end{aligned}$$

$$\text{Gross profit} = 124,800,000 - 49,200,000 = 75,600,000 \text{ AED}$$

$$\text{Ending inventory} = 80,000 \times 110 = 8,800,000 \text{ AED}$$

In this example, the ending inventory amount is lower under the perpetual system because only 20,000 kg of the oldest inventory with the highest cost is assumed to remain in inventory. The cost of sales is higher and the gross profit is lower under the perpetual system compared to the periodic system.

## COMPARISON OF INVENTORY VALUATION METHODS

## 6



calculate and explain how inflation and deflation of inventory costs affect the financial statements and ratios of companies that use different inventory valuation methods

As shown in Example 2, the allocation of the total cost of goods available for sale to cost of sales on the income statement and to ending inventory on the balance sheet varies under the different inventory valuation methods. In an environment of declining inventory unit costs and constant or increasing inventory quantities, FIFO (in comparison with weighted average cost or LIFO) will allocate a higher amount of the total cost of goods available for sale to cost of sales on the income statement and a lower amount to ending inventory on the balance sheet. Accordingly, because cost of sales will be higher under FIFO, a company's gross profit, operating profit, and income before taxes will be lower.

Conversely, in an environment of rising inventory unit costs and constant or increasing inventory quantities, FIFO (in comparison with weighted average cost or LIFO) will allocate a lower amount of the total cost of goods available for sale to cost of sales on the income statement and a higher amount to ending inventory on the balance sheet. Accordingly, because cost of sales will be lower under FIFO, a company's gross profit, operating profit, and income before taxes will be higher.

The carrying amount of inventories under FIFO will more closely reflect current replacement values because inventories are assumed to consist of the most recently purchased items. The cost of sales under LIFO will more closely reflect current replacement value. LIFO ending inventory amounts are typically not reflective of current replacement value because the ending inventory is assumed to be the oldest inventory and costs are allocated accordingly. Example 4 illustrates the different results obtained by using either the FIFO or LIFO methods to account for inventory.

**EXAMPLE 4****Impact of Inflation Using LIFO Compared to FIFO**

Company L and Company F are identical in all respects except that Company L uses the LIFO method and Company F uses the FIFO method. Each company has been in business for five years and maintains a base inventory of 2,000 units each year. Each year, except the first year, the number of units purchased equaled the number of units sold. Over the five year period, unit sales increased 10 percent each year and the unit purchase and selling prices increased at the beginning of each year to reflect inflation of 4 percent per year. In the first year, 20,000 units were sold at a price of \$15.00 per unit and the unit purchase price was \$8.00.

1. What was the end of year inventory, sales, cost of sales, and gross profit for each company for each of the five years?

**Solution to 1:**

<b>Company L using LIFO</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Ending inventory <sup>a</sup>	\$16,000	\$16,000	\$16,000	\$16,000	\$16,000
Sales <sup>b</sup>	\$300,000	\$343,200	\$392,621	\$449,158	\$513,837

<b>Company L using LIFO</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Cost of sales <sup>c</sup>	160,000	183,040	209,398	239,551	274,046
Gross profit	\$140,000	\$160,160	\$183,223	\$209,607	\$239,791

<sup>a</sup> Inventory is unchanged at \$16,000 each year (2,000 units × \$8). 2,000 of the units acquired in the first year are assumed to remain in inventory.

<sup>b</sup> Sales Year X = (20,000 × \$15)(1.10)<sup>X-1</sup>(1.04)<sup>X-1</sup>. The quantity sold increases by 10 percent each year and the selling price increases by 4 percent each year.

<sup>c</sup> Cost of sales Year X = (20,000 × \$8)(1.10)<sup>X-1</sup>(1.04)<sup>X-1</sup>. In Year 1, 20,000 units are sold with a cost of \$8. In subsequent years, the number of units purchased equals the number of units sold and the units sold are assumed to be those purchased in the year. The quantity purchased increases by 10 percent each year and the purchase price increases by 4 percent each year.

Note that if the company sold more units than it purchased in a year, inventory would decrease. This is referred to as LIFO liquidation. The cost of sales of the units sold in excess of those purchased would reflect the inventory carrying amount. In this example, each unit sold in excess of those purchased would have a cost of sales of \$8 and a higher gross profit.

<b>Company F using FIFO</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Ending inventory <sup>a</sup>	\$16,000	\$16,640	\$17,306	\$17,998	\$18,718
Sales <sup>b</sup>	\$300,000	\$343,200	\$392,621	\$449,158	\$513,837
Cost of sales <sup>c</sup>	160,000	182,400	208,732	238,859	273,326
Gross profit	\$140,000	\$160,800	\$183,889	\$210,299	\$240,511

<sup>a</sup> Ending Inventory Year X = 2,000 units × Cost in Year X = 2,000 units [\$8 × (1.04)<sup>X-1</sup>]. 2,000 units of the units acquired in Year X are assumed to remain in inventory.

<sup>b</sup> Sales Year X = (20,000 × \$15)(1.10)<sup>X-1</sup>(1.04)<sup>X-1</sup>

<sup>c</sup> Cost of sales Year 1 = \$160,000 (= 20,000 units × \$8). There was no beginning inventory.

Cost of sales Year X (where X ≠ 1) = Beginning inventory plus purchases less ending inventory

= (Inventory at Year X-1) + [(20,000 × \$8)(1.10)<sup>X-1</sup>(1.04)<sup>X-1</sup>] - (Inventory at Year X)

= 2,000(\$8)(1.04)<sup>X-2</sup> + [(20,000 × \$8)(1.10)<sup>X-1</sup>(1.04)<sup>X-1</sup>] - [2,000 (\$8)(1.04)<sup>X-1</sup>]

For example, cost of sales Year 2 = 2,000(\$8) + [(20,000 × \$8)(1.10)(1.04)] - [2,000 (\$8)(1.04)] = \$16,000 + 183,040 - 16,640 = \$182,400

2. Compare the inventory turnover ratios (based on ending inventory carrying amounts) and gross profit margins over the five year period and between companies.

### Solution to 2:

	Company L					Company F				
Year	1	2	3	4	5	1	2	3	4	5
Inventory turnover	10.0	11.4	13.1	15.0	17.1	10.0	11.0	12.1	13.3	14.6
Gross profit margin (%)	46.7	46.7	46.7	46.7	46.7	46.7	46.9	46.8	46.8	46.8

*Inventory turnover ratio* = Cost of sales ÷ Ending inventory. The inventory turnover ratio increased each year for both companies because the units sold increased, whereas the units in ending inventory remained unchanged. The increase in the inventory turnover ratio is higher for Company L because Company L's cost of sales is increasing for inflation but the inventory carrying amount is unaffected by inflation. It might appear that a company using the LIFO method manages its inventory more effectively, but this is deceptive. Both companies have identical quantities and prices of purchases and sales and only differ in the inventory valuation method used.

*Gross profit margin* = Gross profit ÷ Sales. The gross profit margin is stable under LIFO because both sales and cost of sales increase at the same rate of inflation. The gross profit margin is slightly higher under the FIFO method after the first year because a proportion of the cost of sales reflects an older purchase price.

## THE LIFO METHOD AND LIFO RESERVE

# 7

- ☐ explain LIFO reserve and LIFO liquidation and their effects on financial statements and ratios
- ☐ demonstrate the conversion of a company's reported financial statements from LIFO to FIFO for purposes of comparison

The potential income tax savings are a benefit of using the LIFO method when inventory costs are increasing. The higher cash flows due to lower income taxes may make the company more valuable because the value of a company is based on the present value of its future cash flows. Under the LIFO method, ending inventory is assumed to consist of those units that have been held the longest. This generally results in ending inventories with carrying amounts lower than current replacement costs because inventory costs typically increase over time. Cost of sales will more closely reflect current replacement costs.

If the purchase prices (purchase costs) or production costs of inventory are increasing, the income statement consequences of using the LIFO method compared to other methods will include higher cost of sales, and lower gross profit, operating profit, income tax expense, and net income. The balance sheet consequences include lower ending inventory, working capital, total assets, retained earnings, and

shareholders' equity. The lower income tax paid will result in higher net cash flow from operating activities. Some of the financial ratio effects are a lower current ratio, higher debt-to-equity ratios, and lower profitability ratios.

If the purchase prices or production costs of inventory are decreasing, it is unlikely that a company will use the LIFO method for tax purposes (and therefore for financial reporting purposes due to the LIFO conformity rule) because this will result in lower cost of sales, and higher taxable income and income taxes.<sup>10</sup> However, if the company had elected to use the LIFO method and cannot justify changing the inventory valuation method for tax and financial reporting purposes when inventory costs begin to decrease, the income statement, balance sheet, and ratio effects will be opposite to the effects during a period of increasing costs.

## LIFO Reserve

For companies using the LIFO method, US GAAP requires disclosure, in the notes to the financial statements or on the balance sheet, of the amount of the LIFO reserve. The **LIFO reserve** is the difference between the reported LIFO inventory carrying amount and the inventory amount that would have been reported if the FIFO method had been used (in other words, the FIFO inventory value less the LIFO inventory value). The disclosure provides the information that analysts need to adjust a company's cost of sales (cost of goods sold) and ending inventory balance based on the LIFO method to the FIFO method.

To compare companies using LIFO with companies not using LIFO, inventory is adjusted by adding the disclosed LIFO reserve to the inventory balance that is reported on the balance sheet. The reported inventory balance, using LIFO, plus the LIFO reserve equals the inventory that would have been reported under FIFO. Cost of sales is adjusted by subtracting the increase in the LIFO reserve during the period from the cost of sales amount that is reported on the income statement. If the LIFO reserve has declined during the period,<sup>11</sup> the decrease in the reserve is added to the cost of sales amount that is reported on the income statement. The LIFO reserve disclosure can be used to adjust the financial statements of a US company using the LIFO method to make them comparable with a similar company using the FIFO method.

# 8

## LIFO LIQUIDATIONS



explain LIFO reserve and LIFO liquidation and their effects on financial statements and ratios

In periods of rising inventory unit costs, the carrying amount of inventory under FIFO will always exceed the carrying amount of inventory under LIFO. The LIFO reserve may increase over time as the result of the increasing difference between the older costs used to value inventory under LIFO and the more recent costs used to value inventory under FIFO. Also, when the number of inventory units manufactured or

<sup>10</sup> The LIFO conformity rule says that if the LIFO cost flow assumption is used for tax purposes, it must also be used for financial reporting purposes.

<sup>11</sup> This typically results from a reduction in inventory units and is referred to as LIFO liquidation. LIFO liquidation is discussed in the next section.

purchased exceeds the number of units sold, the LIFO reserve may increase as the result of the addition of new LIFO layers (the quantity of inventory units is increasing and each increase in quantity creates a new LIFO layer).

When the number of units sold exceeds the number of units purchased or manufactured, the number of units in ending inventory is lower than the number of units in beginning inventory and a company using LIFO will experience a LIFO liquidation (some of the older units held in inventory are assumed to have been sold). If inventory unit costs have been rising from period to period and LIFO liquidation occurs, this will produce an inventory-related increase in gross profits. The increase in gross profits occurs because of the lower inventory carrying amounts of the liquidated units. The lower inventory carrying amounts are used for cost of sales and the sales are at the current prices. The gross profit on these units is higher than the gross profit that would be recognised using more current costs. These inventory profits caused by a LIFO liquidation, however, are one-time events and are not sustainable.

LIFO liquidations can occur for a variety of reasons. The reduction in inventory levels may be outside of management's control; for example, labour strikes at a supplier may force a company to reduce inventory levels to meet customer demands. In periods of economic recession or when customer demand is declining, a company may choose to reduce existing inventory levels rather than invest in new inventory. Analysts should be aware that management can potentially manipulate and inflate their company's reported gross profits and net income at critical times by intentionally reducing inventory quantities and liquidating older layers of LIFO inventory (selling some units of beginning inventory). During economic downturns, LIFO liquidation may result in higher gross profit than would otherwise be realised. If LIFO layers of inventory are temporarily depleted and not replaced by fiscal year-end, LIFO liquidation will occur resulting in unsustainable higher gross profits. Therefore, it is imperative to review the LIFO reserve footnote disclosures to determine if LIFO liquidation has occurred. A decline in the LIFO reserve from the prior period may be indicative of LIFO liquidation.

#### EXAMPLE 5

##### Inventory Conversion from LIFO to FIFO

Caterpillar Inc. (CAT), based in Peoria, Illinois, USA, is the largest maker of construction and mining equipment, diesel and natural gas engines, and industrial gas turbines in the world. Excerpts from CAT's consolidated financial statements are shown in Exhibit 1 and Exhibit 2; notes pertaining to CAT's inventories are presented in Exhibit 3. CAT's Management Discussion and Analysis (MD&A) disclosure states that effective income tax rates were 28 percent for 2017 and 36 percent for 2016.

##### Exhibit 1: Caterpillar Inc. Consolidated Results of Operation (US\$ millions)

For the years ended 31 December	2017	2016	2015
<b>Sales and revenues:</b>			
Sales of Machinery and Engines	42,676	35,773	44,147
Revenue of Financial Products	2,786	2,764	2,864
Total sales and revenues	45,462	38,537	47,011
<b>Operating costs:</b>			
Cost of goods sold	31,049	28,309	33,546

For the years ended 31 December	2017	2016	2015
⋮	⋮	⋮	⋮
Interest expense of Financial Products	646	596	587
⋮	⋮	⋮	⋮
Total operating costs	41,056	38,039	43,226
<b>Operating profit</b>	4,406	498	3,785
Interest expense excluding Financial Products	531	505	507
Other income (expense)	207	146	161
<b>Consolidated profit before taxes</b>	4,082	139	4,439
Provision for income taxes	3,339	192	916
Profit (loss) of consolidated companies	743	(53)	2,523
Equity in profit (loss) of unconsolidated affiliated companies	16	(6)	—
Profit attributable to noncontrolling interests	5	8	11
<b>Profit (loss)</b>	754	(67)	2,512

### Exhibit 2: Caterpillar Inc. Consolidated Financial Position (US\$ millions)

31 December	2017	2016	2015
<b>Assets</b>			
Current assets:			
Cash and short-term investments	8,261	7,168	6,460
⋮	⋮	⋮	⋮
Inventories	10,018	8,614	9,700
Total current assets	36,244	31,967	33,508
⋮	⋮	⋮	⋮
<b>Total assets</b>	76,962	74,704	78,342
<b>Liabilities</b>			
Total current liabilities	26,931	26,132	26,242
⋮	⋮	⋮	⋮
<b>Total liabilities</b>	63,196	61,491	63,457
<b>Stockholders' equity</b>			
Common stock of \$1.00 par value:			
Authorized shares: 2,000,000,000			
Issued shares (2017, 2016 and 2015 – 814,894,624) at paid-in amount	5,593	5,277	5,238
Treasury stock (2017 – 217,268,852 shares; 2016 – 228,408,600 shares and 2015 – 232,572,734 shares) at cost	(17,005)	(17,478)	(17,640)
Profit employed in the business	26,301	27,377	29,246
Accumulated other comprehensive income (loss)	(1,192)	(2,039)	(2,035)
Noncontrolling interests	69	76	76



31 December	2017	2016	2015
Total stockholders' equity	13,766	13,213	14,885
Total liabilities and stockholders' equity	76,962	74,704	78,342

### Exhibit 3: Caterpillar Inc. Selected Notes to Consolidated Financial Statements

#### Note 1. Operations and Summary of Significant Accounting Policies

##### D. Inventories

Inventories are stated at the lower of cost or net realizable value. Cost is principally determined using the last-in, first-out (LIFO) method. The value of inventories on the LIFO basis represented about 65% of total inventories at December 31, 2017 and about 60% of total inventories at December 31, 2016 and 2015.

If the FIFO (first-in, first-out) method had been in use, inventories would have been \$1,924 million, \$2,139 million and \$2,498 million higher than reported at December 31, 2017, 2016 and 2015, respectively.

##### Note 7. Inventories

31 December (millions of dollars)	2017	2016	2015
Raw Materials	2,802	2,102	2,467
Work-in-process	2,254	1,719	1,857
Finished goods	4,761	4,576	5,122
Supplies	201	217	254
Total inventories	10,018	8,614	9,700

We had long-term material purchase obligations of approximately \$813 million at December 31, 2017.

1. What inventory values would CAT report for 2017, 2016, and 2015 if it had used the FIFO method instead of the LIFO method?

### Solution to 1:

31 December (millions of dollars)	2017	2016	2015
Total inventories (LIFO method)	10,018	8,614	9,700
From Note 1.D (LIFO reserve)	1,924	2,139	2,498
Total inventories (FIFO method)	11,942	10,753	12,198

*Note that the decrease in the LIFO reserve from 2015–2016 and again from 2016–2017 likely indicates a LIFO liquidation for both 2016 and 2017.*

2. What amount would CAT's cost of goods sold for 2017 and 2016 be if it had used the FIFO method instead of the LIFO method?

### Solution to 2:

31 December (millions of dollars)	2017	2016
Cost of goods sold (LIFO method)	31,049	28,309
Plus: Decrease in LIFO reserve*	215	359
Cost of goods sold (FIFO method)	31,264	28,668

\* From Note 1.D, the decrease in LIFO reserve for 2017 is 215 ( $1,924 - 2,139$ ) and for 2016 is 359 ( $2,139 - 2,498$ ).

3. What net income (profit) would CAT report for 2017 and 2016 if it had used the FIFO method instead of the LIFO method?

### Solution to 3:

31 December (millions of dollars)	2017	2016
Net income (loss) (LIFO method)	754	-67
Less: Increase in cost of goods sold (decrease in operating profit)	-215	-359
Tax reduction on decreased operating profit*	60	129
Net income (loss) (FIFO method)	599	-297

\* The reduction in taxes on the decreased operating profit are 60 ( $215 \times 28\%$ ) for 2017 and 129 ( $359 \times 36\%$ ) for 2016.

4. By what amount would CAT's 2017 and 2016 net cash flow from operating activities decline if CAT used the FIFO method instead of the LIFO method?

### Solution to 4:

The effect on a company's net cash flow from operating activities is limited to the impact of the change on income taxes paid; changes in allocating inventory costs to ending inventory and cost of goods sold do not change any cash flows except income taxes. Consequently, the effect of using FIFO on CAT's net operating cash flow from operating activities would be an increase of \$60 million in 2017 and an increase of \$129 million in 2016. These are the approximate incremental decreases in income taxes that CAT would have incurred if the FIFO method were used instead of the LIFO method (see solution to 3 above).

5. What is the cumulative amount of income tax savings that CAT has generated through 2017 by using the LIFO method instead of the FIFO method?

### Solution to 5:

Using the previously mentioned effective tax rates of 28 percent for 2017 and 36 percent for 2016 (as well as for earlier years), the cumulative amount of income tax savings that CAT has generated by using the LIFO method instead of FIFO is approximately \$710 million ( $-215 \times 28\% + 2,139 \times 36\%$ ). Note 1.D indicates a LIFO reserve of \$2,139 million at the end of 2016 and

a decrease in the LIFO reserve of \$215 million in 2017. Therefore, under the FIFO method, cumulative gross profits would have been \$2,139 million higher as of the end of 2016 and \$1,924 million higher as of the end of 2017. The estimated tax savings would be higher (lower) if income tax rates were assumed to be higher (lower).

6. What amount would be added to CAT's retained earnings (profit employed in the business) at 31 December 2017 if CAT had used the FIFO method instead of the LIFO method?

### Solution to 6:

The amount that would be added to CAT's retained earnings is \$1,214 million ( $1,924 - 710$ , or  $-215 \times 72\% + 2,139 \times 64\%$ ). This represents the cumulative increase in operating profit due to the decrease in cost of goods sold (LIFO reserve of \$1,924 million) less the assumed taxes on that profit (\$710 million, see solution to 5 above). Some analysts advocate ignoring the tax consequences and suggest simply adjusting inventory and equity by the same amount. They argue that the reported equity of the firm is understated by the difference between the current value of its inventory (approximated by the value under FIFO) and its carrying value (value under LIFO).

7. What would be the change in CAT's cash balance if CAT had used the FIFO method instead of the LIFO method?

### Solution to 7:

Under the FIFO method, an additional \$710 million is assumed to have been incurred for tax expenses. If CAT switched to FIFO, it would have an additional tax liability of \$710 million as a consequence of the restatement of financial statements to the FIFO method. This illustrates the significant immediate income tax liabilities that may arise in the year of transition from the LIFO method to the FIFO method. If CAT switched to FIFO for tax purposes, there would be a cash outflow of \$710 million for the additional taxes. However, because the company is not actually converting at this point for either tax or reporting purposes, it is appropriate to reflect a deferred tax liability rather than a reduction in cash. In this case for analysis purposes, under FIFO, inventory would increase by \$1,924 million, equity by \$1,214 million, and non-current liabilities by \$710 million.

8. Calculate and compare the following for 2017 under the LIFO method and the FIFO method: inventory turnover ratio, days of inventory on hand, gross profit margin, net profit margin, return on assets, current ratio, and total liabilities-to-equity ratio.

### Solution to 8:

CAT's ratios for 2017 under the LIFO and FIFO methods are as follows:

	LIFO	FIFO
Inventory turnover	3.33	2.76
Days of inventory on hand	109.6 days	132.2 days
Gross profit margin	27.24%	26.74%
Net profit margin	1.66%	1.32%
Return on assets	0.99%	0.77%

	LIFO	FIFO
Current ratio	1.35	1.42
Total liabilities-to-equity ratio	4.59	4.27

*Inventory turnover ratio* = Cost of goods sold ÷ Average inventory

$$\text{LIFO} = 3.33 = 31,049 \div [(10,018 + 8,614) \div 2]$$

$$\text{FIFO} = 2.76 = 31,264 \div [(11,942 + 10,753) \div 2]$$

The ratio is higher under LIFO because, given rising inventory costs, cost of goods sold will be higher and inventory carrying amounts will be lower under LIFO. If an analyst made no adjustment for the difference in inventory methods, it might appear that a company using the LIFO method manages its inventory more effectively.

*Days of inventory on hand* = Number of days in period ÷ Inventory turnover ratio

$$\text{LIFO} = 109.6 \text{ days} = (365 \text{ days} \div 3.33)$$

$$\text{FIFO} = 132.2 \text{ days} = (365 \text{ days} \div 2.76)$$

Without adjustment, a company using the LIFO method might appear to manage its inventory more effectively. This is primarily the result of the lower inventory carrying amounts under LIFO.

*Gross profit margin* = Gross profit ÷ Total revenue

$$\text{LIFO} = 27.24 \text{ percent} = [(42,676 - 31,049) \div 42,676]$$

$$\text{FIFO} = 26.74 \text{ percent} = [(42,676 - 31,264) \div 42,676]$$

Revenue of financial products is excluded from the calculation of gross profit. Gross profit is sales of machinery and engines less cost of goods sold. The gross profit margin is lower under FIFO because the cost of goods sold is higher from the LIFO reserve reduction.

*Net profit margin* = Net income ÷ Total revenue

$$\text{LIFO} = 1.66 \text{ percent} = (754 \div 45,462)$$

$$\text{FIFO} = 1.32 \text{ percent} = (599 \div 45,462)$$

The net profit margin is higher under LIFO because the cost of goods sold is lower due to the LIFO liquidation. The absolute percentage difference is less than that of the gross profit margin because of lower income taxes on the decreased income reported under FIFO and because net income is divided by total revenue including sales of machinery and engines and revenue of financial products. The company appears to be more profitable under LIFO.

*Return on assets* = Net income ÷ Average total assets

$$\text{LIFO} = 0.99 \text{ percent} = 754 \div [(76,962 + 74,704) \div 2]$$

$$\text{FIFO} = 0.77 \text{ percent} = 599 \div [(76,962 + 1,924) + (74,704 + 2,139) \div 2]$$

The total assets under FIFO are the LIFO total assets increased by the LIFO reserve. The return on assets is lower under FIFO because of the lower net

income due to the higher cost of goods sold as well as higher total assets due to the LIFO reserve adjustment. The company appears to be less profitable under FIFO.

*Current ratio* = Current assets ÷ Current liabilities

$$\text{LIFO} = 1.35 = (36,244 \div 26,931)$$

$$\text{FIFO} = 1.42 = [(36,244 + 1,924) \div 26,931]$$

The current ratio is lower under LIFO primarily because of lower inventory carrying amount. The company appears to be less liquid under LIFO.

*Total liabilities-to-equity ratio* = Total liabilities ÷ Total shareholders' equity

$$\text{LIFO} = 4.59 = (63,196 \div 13,766)$$

$$\text{FIFO} = 4.27 = [(63,196 + 710) \div (13,766 + 1,214)]$$

The ratio is higher under LIFO because the addition to retained earnings under FIFO reduces the ratio. The company appears to be more highly leveraged under LIFO.

In summary, the company appears to be more profitable, less liquid, and more highly leveraged under LIFO. Yet, because a company's value is based on the present value of future cash flows, LIFO will increase the company's value because the cash flows are higher in earlier years due to lower taxes. LIFO is primarily used for the tax benefits it provides.

## EXAMPLE 6

### LIFO Liquidation Illustration

1. Reliable Fans, Inc. (RF), a hypothetical company, sells high quality fans and has been in business since 2015. Exhibit 4 provides relevant data and financial statement information about RF's inventory purchases and sales of fan inventory for the years 2015 through 2018. RF uses the LIFO method and a periodic inventory system. What amount of RF's 2018 gross profit is due to LIFO liquidation?

**Exhibit 4: RF Financial Statement Information under LIFO**

	2015	2016	2017	2018
Fans units purchased	12,000	12,000	12,000	12,000
Purchase cost per fan	\$100	\$105	\$110	\$115
Fans units sold	10,000	12,000	12,000	13,000
Sales price per fan	\$200	\$205	\$210	\$215
<b>LIFO Method</b>				
Beginning inventory	\$0	\$200,000	\$200,000	\$200,000
Purchases	1,200,000	1,260,000	1,320,000	1,380,000
Goods available for sale	1,200,000	1,460,000	1,520,000	1,580,000
Ending inventory*	(200,000)	(200,000)	(200,000)	(100,000)

	2015	2016	2017	2018
Cost of goods sold	\$1,000,000	1,260,000	\$1,320,000	\$1,480,000
<b>Income Statement</b>				
Sales	\$2,000,000	\$2,460,000	\$2,520,000	\$2,795,000
Cost of goods sold	1,000,000	1,260,000	1,320,000	1,480,000
Gross profit	\$1,000,000	\$1,200,000	\$1,200,000	\$1,315,000
<b>Balance Sheet</b>				
Inventory	\$200,000	\$200,000	\$200,000	\$100,000

\* Ending inventory 2015, 2016, and 2017 =  $(2,000 \times \$100)$ ; Ending inventory 2018 =  $(1,000 \times \$100)$ .

### Solution:

RF's reported gross profit for 2018 is \$1,315,000. RF's 2018 gross profit due to LIFO liquidation is \$15,000. If RF had purchased 13,000 fans in 2018 rather than 12,000 fans, the cost of goods sold under the LIFO method would have been \$1,495,000 (13,000 fans sold at \$115.00 purchase cost per fan), and the reported gross profit would have been \$1,300,000 (\$2,795,000 less \$1,495,000). The gross profit due to LIFO liquidation is \$15,000 (\$1,315,000 reported gross profit less the \$1,300,000 gross profit that would have been reported without the LIFO liquidation). The gross profit due to LIFO liquidation may also be determined by multiplying the number of units liquidated times the difference between the replacement cost of the units liquidated and their historical purchase cost. For RF, 1,000 units times \$15 (\$115 replacement cost per fan less the \$100 historical cost per fan) equals the \$15,000 gross profit due to LIFO liquidation.

## 9

### INVENTORY METHOD CHANGES

- ☐ describe different inventory valuation methods (cost formulas)
- ☐ demonstrate the conversion of a company's reported financial statements from LIFO to FIFO for purposes of comparison

Companies on rare occasion change inventory valuation methods. Under IFRS, a change in method is acceptable only if the change "results in the financial statements providing reliable and more relevant information about the effects of transactions, other events, or conditions on the business entity's financial position, financial performance, or cash flows."<sup>12</sup> If the change is justifiable, then it is applied retrospectively.

This means that the change is applied to comparative information for prior periods as far back as is practicable. The cumulative amount of the adjustments relating to periods prior to those presented in the current financial statements is applied to the opening balance of each affected component of equity (i.e., retained earnings or comprehensive income) of the earliest period presented. For example, if a company changes its inventory method in 2018 and it presents three years of comparative

12 IAS 8 [Accounting Policies, Changes in Accounting Estimates and Errors].

financial statements (2016, 2017, and 2018) in its annual report, it would retrospectively reflect this change as far back as possible. The change would be reflected in the three years of financial statements presented; the financial statements for 2016 and 2017 would be restated as if the new method had been used in these periods, and the cumulative effect of the change on periods prior to 2016 would be reflected in the 2016 opening balance of each affected component of equity. An exemption to the restatement applies when it is impracticable to determine either the period-specific effects or the cumulative effect of the change.

Under US GAAP, the conditions to make a change in accounting policy and the accounting for a change in inventory policy are similar to IFRS.<sup>13</sup> US GAAP, however, requires companies to thoroughly explain why the newly adopted inventory accounting method is superior and preferable to the old method. If a company decides to change from LIFO to another inventory method, US GAAP requires a retrospective restatement as described above. However, if a company decides to change to the LIFO method, it must do so on a prospective basis and retrospective adjustments are not made to the financial statements. The carrying amount of inventory under the old method becomes the initial LIFO layer in the year of LIFO adoption.

Analysts should carefully evaluate changes in inventory valuation methods. Although the stated reason for the inventory change may be to better match inventory costs with sales revenue (or some other plausible business explanation), the real underlying (and unstated) purpose may be to reduce income tax expense (if changing to LIFO from FIFO or average cost), or to increase reported profits (if changing from LIFO to FIFO or average cost). As always, the choice of inventory valuation method can have a significant impact on financial statements and the financial ratios that are derived from them. As a consequence, analysts must carefully consider the impact of the change in inventory valuation methods and the differences in inventory valuation methods when comparing a company's performance with that of its industry or its competitors.

## INVENTORY ADJUSTMENTS

# 10

- ☐ describe the measurement of inventory at the lower of cost and net realisable value
- ☐ describe implications of valuing inventory at net realisable value for financial statements and ratios

Significant financial risk can result from the holding of inventory. The cost of inventory may not be recoverable due to spoilage, obsolescence, or declines in selling prices. IFRS state that inventories shall be measured (and carried on the balance sheet) at the lower of cost and net realisable value.<sup>14</sup> **Net realisable value** is the estimated selling price in the ordinary course of business less the estimated costs necessary to make the sale and estimated costs to get the inventory in condition for sale. The assessment of net realisable value is typically done item by item or by groups of similar or related items. In the event that the value of inventory declines below the carrying amount on the balance sheet, the inventory carrying amount must be written down to its net

<sup>13</sup> FASB ASC Topic 250 [Accounting Changes and Error Corrections].

<sup>14</sup> IAS 2 paragraphs 28–33 [Inventories – Net realisable value].

realisable value<sup>15</sup> and the loss (reduction in value) recognised as an expense on the income statement. This expense may be included as part of cost of sales or reported separately.

In each subsequent period, a new assessment of net realisable value is made. Reversal (limited to the amount of the original write-down) is required for a subsequent increase in value of inventory previously written down. The reversal of any write-down of inventories is recognised as a reduction in cost of sales (reduction in the amount of inventories recognised as an expense).

Under US GAAP, inventories measured using methods other than the LIFO and retail inventory methods are measured at the lower of cost or net realisable value. For LIFO and retail inventory methods, inventories are measured at the lower of cost or market. This is broadly consistent with IFRS with one major difference: US GAAP prohibit the reversal of write-downs. For inventories measured using LIFO and retail inventory methods, market value is defined as current replacement cost subject to upper and lower limits. Market value cannot exceed net realisable value (selling price less reasonably estimated costs of completion and disposal). The lower limit of market value is net realisable value less a normal profit margin. Any write-down to market value or net realisable value reduces the value of the inventory, and the loss in value (expense) is generally reflected in the income statement in cost of goods sold.

An inventory write-down reduces both profit and the carrying amount of inventory on the balance sheet and thus has a negative effect on profitability, liquidity, and solvency ratios. However, activity ratios (for example, inventory turnover and total asset turnover) will be positively affected by a write-down because the asset base (denominator) is reduced. The negative impact on some key ratios, due to the decrease in profit, may result in the reluctance by some companies to record inventory write-downs unless there is strong evidence that the decline in the value of inventory is permanent. This is especially true under US GAAP where reversal of a write-down is prohibited.

IAS 2 [Inventories] does not apply to the inventories of producers of agricultural and forest products and minerals and mineral products, nor to commodity broker-traders. These inventories may be measured at net realisable value (fair value less costs to sell and complete) according to well-established industry practices. If an active market exists for these products, the quoted market price in that market is the appropriate basis for determining the fair value of that asset. If an active market does not exist, a company may use market determined prices or values (such as the most recent market transaction price) when available for determining fair value. Changes in the value of inventory (increase or decrease) are recognised in profit or loss in the period of the change. US GAAP is similar to IFRS in its treatment of inventories of agricultural and forest products and mineral ores. Mark-to-market inventory accounting is allowed for bullion.

#### EXAMPLE 7

### Accounting for Declines and Recoveries of Inventory Value

Hatsumei Enterprises, a hypothetical company, manufactures computers and prepares its financial statements in accordance with IFRS. In 2017, the cost of ending inventory was €5.2 million but its net realisable value was €4.9 million.

<sup>15</sup> Frequently, rather than writing inventory down directly, an inventory valuation allowance account is used. The allowance account is netted with the inventory accounts to arrive at the carrying amount that appears on the balance sheet.



The current replacement cost of the inventory is €4.7 million. This figure exceeds the net realisable value less a normal profit margin. In 2018, the net realisable value of Hatsumei's inventory was €0.5 million greater than the carrying amount.

1. What was the effect of the write-down on Hatsumei's 2017 financial statements? What was the effect of the recovery on Hatsumei's 2018 financial statements?

### **Solution to 1:**

For 2017, Hatsumei would write its inventory down to €4.9 million and record the change in value of €0.3 million as an expense on the income statement. For 2018, Hatsumei would increase the carrying amount of its inventory and reduce the cost of sales by €0.3 million (the recovery is limited to the amount of the original write-down).

2. Under US GAAP, if Hatsumei used the LIFO method, what would be the effects of the write-down on Hatsumei's 2017 financial statements and of the recovery on Hatsumei's 2018 financial statements?

### **Solution to 2:**

Under US GAAP, for 2017, Hatsumei would write its inventory down to €4.7 million and typically include the change in value of €0.5 million in cost of goods sold on the income statement. For 2018, Hatsumei would not reverse the write-down.

3. What would be the effect of the recovery on Hatsumei's 2018 financial statements if Hatsumei's inventory were agricultural products instead of computers?

### **Solution to 3:**

If Hatsumei's inventory were agricultural products instead of computers, inventory would be measured at net realisable value and Hatsumei would, therefore, increase inventory and record a gain of €0.5 million for 2018.

Analysts should consider the possibility of an inventory write-down because the impact on a company's financial ratios may be substantial. The potential for inventory write-downs can be high for companies in industries where technological obsolescence of inventories is a significant risk. Analysts should carefully evaluate prospective inventory impairments (as well as other potential asset impairments) and their potential effects on the financial ratios when debt covenants include financial ratio requirements. The breaching of debt covenants can have a significant impact on a company.

Companies that use specific identification, weighted average cost, or FIFO methods are more likely to incur inventory write-downs than companies that use the LIFO method. Under the LIFO method, the *oldest* costs are reflected in the inventory carrying amount on the balance sheet. Given increasing inventory costs, the inventory carrying amounts under the LIFO method are already conservatively presented at the oldest and lowest costs. Thus, it is far less likely that inventory write-downs will occur under LIFO—and if a write-down does occur, it is likely to be of a lesser magnitude.

**EXAMPLE 8****Effect of Inventory Write-downs on Financial Ratios**

The Volvo Group, based in Göteborg, Sweden, is a leading supplier of commercial transport products such as construction equipment, trucks, busses, and drive systems for marine and industrial applications as well as aircraft engine components.<sup>16</sup> Excerpts from Volvo's consolidated financial statements are shown in Exhibit 5 and Exhibit 6. Notes pertaining to Volvo's inventories are presented in Exhibit 7.

**Exhibit 5: Volvo Group Consolidated Income Statements (Swedish Krona in millions, except per share data)**

For the years ended 31 December	2017	2016	2015
<b>Net sales</b>	334,748	301,914	312,515
Cost of sales	(254,581)	(231,602)	(240,653)
<b>Gross income</b>	80,167	70,312	71,862
⋮	⋮	⋮	⋮
<b>Operating income</b>	30,327	20,826	23,318
Interest income and similar credits	164	240	257
Income expenses and similar charges	(1,852)	(1,847)	(2,366)
Other financial income and expenses	(386)	11	(792)
<b>Income after financial items</b>	28,254	19,230	20,418
Income taxes	(6,971)	(6,008)	(5,320)
<b>Income for the period</b>	21,283	13,223	15,099
Attributable to:			
Equity holders of the parent company	20,981	13,147	15,058
Minority interests	302	76	41
<b>Profit</b>	21,283	13,223	15,099

**Exhibit 6: Volvo Group Consolidated Balance Sheets (Swedish Krona in millions)**

31 December	2017	2016	2015
<b>Assets</b>			
Total non-current assets	213,455	218,465	203,478
Current assets:			
Inventories	52,701	48,287	44,390
⋮	⋮	⋮	⋮
Cash and cash equivalents	36,092	23,949	21,048
Total current assets	199,039	180,301	170,687
<b>Total assets</b>	412,494	398,916	374,165

**Shareholders' equity and liabilities**

<sup>16</sup> The Volvo line of automobiles has not been under the control and management of the Volvo Group since 1999.

<b>31 December</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>
Equity attributable to equity holders of the parent company	107,069	96,061	83,810
Minority interests	1,941	1,703	1,801
Total shareholders' equity	109,011	97,764	85,610
Total non-current provisions	29,147	29,744	26,704
Total non-current liabilities	96,213	104,873	91,814
Total current provisions	10,806	11,333	14,176
Total current liabilities	167,317	155,202	155,860
<b>Total shareholders' equity and liabilities</b>	<b>412,404</b>	<b>398,916</b>	<b>374,165</b>

### Exhibit 7: Volvo Group Selected Notes to Consolidated Financial Statements

#### Note 17. Inventories

##### Accounting Policy

Inventories are reported at the lower of cost and net realisable value. The cost is established using the first-in, first-out principle (FIFO) and is based on the standard cost method, including costs for all direct manufacturing expenses and the attributable share of capacity and other related manufacturing-related costs. The standard costs are tested regularly and adjustments are made based on current conditions. Costs for research and development, selling, administration and financial expenses are not included. Net realisable value is calculated as the selling price less costs attributable to the sale.

##### Sources of Estimation Uncertainty

##### Inventory obsolescence

If the net realisable value is lower than cost, a valuation allowance is established for inventory obsolescence. The total inventory value, net of inventory obsolescence allowance, was: SEK (in millions) 52,701 as of December 2017 and 48,287 as of 31 December 2016.

#### Inventory

<b>31 December (millions of Krona)</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>
Finished products	32,304	31,012	27,496
Production materials, etc.	20,397	17,275	16,894
<b>Total</b>	<b>52,701</b>	<b>48,287</b>	<b>44,390</b>

#### Increase (decrease) in allowance for inventory obsolescence

<b>31 December (millions of Krona)</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>
Opening balance	3,683	3,624	3,394
Change in allowance for inventory obsolescence charged to income	304	480	675
Scrapping	(391)	(576)	(435)

31 December (millions of Krona)	2017	2016	2015
Translation differences	(116)	177	(29)
Reclassifications, etc.	8	(23)	20
Allowance for inventory obsolescence as of 31 December	3,489	3,683	3,624

1. What inventory values would Volvo have reported for 2017, 2016, and 2015 if it had no allowance for inventory obsolescence?

### Solution to 1:

31 December (Swedish krona in millions)	2017	2016	2015
Total inventories, net	52,701	48,287	44,390
From Note 17. (Allowance for obsolescence)	3,489	3,683	3,624
Total inventories (without allowance)	56,190	51,970	48,014

2. Assuming that any changes to the allowance for inventory obsolescence are reflected in the cost of sales, what amount would Volvo's cost of sales be for 2017 and 2016 if it had not recorded inventory write-downs in 2017 and 2016?

### Solution to 2:

31 December (Swedish krona in millions)	2017	2016
Cost of sales	254,581	231,602
(Increase) decrease in allowance for obsolescence*	194	(59)
Cost of sales without allowance	254,775	231,543

\* From Note 17, the decrease in allowance for obsolescence for 2017 is 194 (3,489 – 3,683) and the increase for 2016 is 59 (3,683 – 3,624).

3. What amount would Volvo's profit (net income) be for 2017 and 2016 if it had not recorded inventory write-downs in 2017 and 2016? Volvo's effective income tax rate was reported as 25 percent for 2017 and 31 percent for 2016.

### Solution to 3:

31 December (Swedish krona in millions)	2017	2016
Profit (Net income)	21,283	13,223
Increase (reduction) in cost of sales	(194)	59
Taxes (tax reduction) on operating profit*	49	(18)
Profit (without allowance)	21,138	13,264

\* Taxes (tax reductions) on the operating profit are assumed to be 49 (194 × 25%) for 2017 and

–18 ( $-59 \times 31\%$ ) for 2016.

4. What would Volvo's 2017 profit (net income) have been if it had reversed all past inventory write-downs in 2017? This question is independent of 1, 2, and 3. The effective income tax rate was 25 percent for 2017.

#### Solution to 4:

31 December (Swedish krona in millions)	2017
Profit (Net income)	21,283
Reduction in cost of sales (increase in operating profit)	3,489
Taxes on increased operating profit*	–872
Profit (after recovery of previous write-downs)	23,900

\* Taxes on the increased operating profit are assumed to be 872 ( $3,489 \times 25\%$ ) for 2017.

5. Compare the following for 2017 based on the numbers as reported and those assuming no allowance for inventory obsolescence as in questions 1, 2, and 3: inventory turnover ratio, days of inventory on hand, gross profit margin, and net profit margin.

#### Solution to 5:

The Volvo Group's financial ratios for 2017 with the allowance for inventory obsolescence and without the allowance for inventory obsolescence are as follows:

	With Allowance (As Reported)	Without Allowance (Adjusted)
Inventory turnover ratio	5.04	4.71
Days of inventory on hand	72.4	77.5
Gross profit margin	23.95%	23.89%
Net profit margin	6.36%	6.31%

*Inventory turnover ratio* = Cost of sales ÷ Average inventory

With allowance (as reported) =  $5.04 = 254,581 \div [(52,701 + 48,287) \div 2]$

Without allowance (adjusted) =  $4.71 = 254,775 \div [(56,190 + 51,970) \div 2]$

Inventory turnover is higher based on the numbers as reported because inventory carrying amounts will be lower with an allowance for inventory obsolescence. The company might appear to manage its inventory more efficiently when it has inventory write-downs.

*Days of inventory on hand* = Number of days in period ÷ Inventory turnover ratio

With allowance (as reported) =  $72.4 \text{ days} = (365 \text{ days} \div 5.04)$

Without allowance (adjusted) =  $77.5 \text{ days} = (365 \text{ days} \div 4.71)$

Days of inventory on hand are lower based on the numbers as reported because the inventory turnover is higher. A company with inventory write-downs might appear to manage its inventory more effectively. This is primarily the result of the lower inventory carrying amounts.

*Gross profit margin* = Gross income ÷ Net sales

With allowance (as reported) = 23.95 percent =  $(80,167 \div 334,748)$

Without allowance (adjusted) = 23.89 percent =  $[(80,167 - 194) \div 334,748]$

In this instance, the gross profit margin is slightly higher with inventory write-downs because the cost of sales is lower (due to the reduction in the allowance for inventory obsolescence). This assumes that inventory write-downs (and inventory write-down recoveries) are reported as part of cost of sales.

*Net profit margin* = Profit ÷ Net sales

With allowance (as reported) = 6.36 percent =  $(21,283 \div 334,748)$

Without allowance (adjusted) = 6.31 percent =  $(21,138 \div 334,748)$

In this instance, the net profit margin is higher with inventory write-downs because the cost of sales is lower (due to the reduction in the allowance for inventory obsolescence). The absolute percentage difference is less than that of the gross profit margin because of the income tax reduction on the decreased income without write-downs.

The profitability ratios (gross profit margin and net profit margin) for Volvo Group would have been slightly lower for 2017 if the company had not recorded inventory write-downs. The activity ratio (inventory turnover ratio) would appear less attractive without the write-downs. The inventory turnover ratio is slightly better (higher) with inventory write-downs because inventory write-downs decrease the average inventory (denominator), making inventory management appear more efficient with write-downs.

6. CAT (Example 5) has no disclosures indicative of either inventory write-downs or a cumulative allowance for inventory obsolescence in its 2017 financial statements. Provide a conceptual explanation as to why Volvo incurred inventory write-downs for 2017 but CAT did not.

### Solution to 6:

CAT uses the LIFO method whereas Volvo uses the FIFO method. Given increasing inventory costs, companies that use the FIFO inventory method are far more likely to incur inventory write-downs than those companies that use the LIFO method. This is because under the LIFO method, the inventory carrying amounts reflect the *oldest* costs and therefore the *lowest* costs given increasing inventory costs. Because inventory carrying amounts under the LIFO method are already conservatively presented, it is less likely that inventory write-downs will occur.

## EVALUATION OF INVENTORY MANAGEMENT: DISCLOSURES & RATIOS

# 11

- ☐ describe the financial statement presentation of and disclosures relating to inventories
- ☐ explain issues that analysts should consider when examining a company's inventory disclosures and other sources of information

The choice of inventory valuation method impacts the financial statements. The financial statement items impacted include cost of sales, gross profit, net income, inventories, current assets, and total assets. Therefore, the choice of inventory valuation method also affects financial ratios that contain these items. Ratios such as current ratio, return on assets, gross profit margin, and inventory turnover are impacted. As a consequence, analysts must carefully consider inventory valuation method differences when evaluating a company's performance over time or when comparing its performance with the performance of the industry or industry competitors. Additionally, the financial statement items and ratios may be impacted by adjustments of inventory carrying amounts to net realisable value or current replacement cost.

### Presentation and Disclosure

Disclosures are useful when analyzing a company. IFRS require the following financial statement disclosures concerning inventory:

- a. the accounting policies adopted in measuring inventories, including the cost formula (inventory valuation method) used;
- b. the total carrying amount of inventories and the carrying amount in classifications (for example, merchandise, raw materials, production supplies, work in progress, and finished goods) appropriate to the entity;
- c. the carrying amount of inventories carried at fair value less costs to sell;
- d. the amount of inventories recognised as an expense during the period (cost of sales);
- e. the amount of any write-down of inventories recognised as an expense in the period;
- f. the amount of any reversal of any write-down that is recognised as a reduction in cost of sales in the period;
- g. the circumstances or events that led to the reversal of a write-down of inventories; and
- h. the carrying amount of inventories pledged as security for liabilities.

Inventory-related disclosures under US GAAP are very similar to the disclosures above, except that requirements (f) and (g) are not relevant because US GAAP do not permit the reversal of prior-year inventory write-downs. US GAAP also require disclosure of significant estimates applicable to inventories and of any material amount of income resulting from the liquidation of LIFO inventory.

## Inventory Ratios

Three ratios often used to evaluate the efficiency and effectiveness of inventory management are **inventory turnover**, **days of inventory on hand**, and **gross profit margin**.<sup>17</sup> These ratios are directly impacted by a company's choice of inventory valuation method. Analysts should be aware, however, that many other ratios are also affected by the choice of inventory valuation method, although less directly. These include the current ratio, because inventory is a component of current assets; the return-on-assets ratio, because cost of sales is a key component in deriving net income and inventory is a component of total assets; and even the debt-to-equity ratio, because the cumulative measured net income from the inception of a business is an aggregate component of retained earnings.

The inventory turnover ratio measures the number of times during the year a company sells (i.e., turns over) its inventory. The higher the turnover ratio, the more times that inventory is sold during the year and the lower the relative investment of resources in inventory. Days of inventory on hand can be calculated as days in the period divided by inventory turnover. Thus, inventory turnover and days of inventory on hand are inversely related. It may be that inventory turnover, however, is calculated using average inventory in the year whereas days of inventory on hand is based on the ending inventory amount. In general, inventory turnover and the number of days of inventory on hand should be benchmarked against industry norms and compared across years.

A high inventory turnover ratio and a low number of days of inventory on hand might indicate highly effective inventory management. Alternatively, a high inventory ratio and a low number of days of inventory on hand could indicate that the company does not carry an adequate amount of inventory or that the company has written down inventory values. Inventory shortages could potentially result in lost sales or production problems in the case of the raw materials inventory of a manufacturer. To assess which explanation is more likely, analysts can compare the company's inventory turnover and sales growth rate with those of the industry and review financial statement disclosures. Slower growth combined with higher inventory turnover could indicate inadequate inventory levels. Write-downs of inventory could reflect poor inventory management. Minimal write-downs and sales growth rates at or above the industry's growth rates would support the interpretation that the higher turnover reflects greater efficiency in managing inventory.

A low inventory turnover ratio and a high number of days of inventory on hand relative to industry norms could be an indicator of slow-moving or obsolete inventory. Again, comparing the company's sales growth across years and with the industry and reviewing financial statement disclosures can provide additional insight.

The gross profit margin, the ratio of gross profit to sales, indicates the percentage of sales being contributed to net income as opposed to covering the cost of sales. Firms in highly competitive industries generally have lower gross profit margins than firms in industries with fewer competitors. A company's gross profit margin may be a function of its type of product. A company selling luxury products will generally have higher gross profit margins than a company selling staple products. The inventory turnover of the company selling luxury products, however, is likely to be much lower than the inventory turnover of the company selling staple products.

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<sup>17</sup> Days of inventory on hand is also referred to as days in inventory and average inventory days outstanding.



## ILLUSTRATIONS OF INVENTORY ANALYSIS: ADJUSTING LIFO TO FIFO

12

- ☐ calculate and compare ratios of companies, including companies that use different inventory methods
- ☐ analyze and compare the financial statements of companies, including companies that use different inventory methods

IFRS and US GAAP require companies to disclose, either on the balance sheet or in the notes to the financial statements, the carrying amounts of inventories in classifications suitable to the company. For manufacturing companies, these classifications might include production supplies, raw materials, work in progress, and finished goods. For a retailer, these classifications might include significant categories of merchandise or the grouping of inventories with similar attributes. These disclosures may provide signals about a company's future sales and profits.

For example, a significant increase (attributable to increases in unit volume rather than increases in unit cost) in raw materials and/or work-in-progress inventories may signal that the company expects an increase in demand for its products. This suggests an anticipated increase in sales and profit. However, a substantial increase in finished goods inventories while raw materials and work-in-progress inventories are declining may signal a decrease in demand for the company's products and hence lower future sales and profit. This may also signal a potential future write down of finished goods inventory. Irrespective of the signal, an analyst should thoroughly investigate the underlying reasons for any significant changes in a company's raw materials, work-in-progress, and finished goods inventories.

Analysts also should compare the growth rate of a company's sales to the growth rate of its finished goods inventories, because this could also provide a signal about future sales and profits. For example, if the growth of inventories is greater than the growth of sales, this could indicate a decline in demand and a decrease in future earnings. The company may have to lower (mark down) the selling price of its products to reduce its inventory balances, or it may have to write down the value of its inventory because of obsolescence, both of which would negatively affect profits. Besides the potential for mark-downs or write-downs, having too much inventory on hand or the wrong type of inventory can have a negative financial effect on a company because it increases inventory related expenses such as insurance, storage costs, and taxes. In addition, it means that the company has less cash and working capital available to use for other purposes.

Inventory write-downs may have a substantial impact on a company's activity, profitability, liquidity, and solvency ratios. It is critical for the analyst to be aware of industry trends toward product obsolescence and to analyze the financial ratios for their sensitivity to potential inventory impairment. Companies can minimise the impact of inventory write-downs by better matching their inventory composition and growth with prospective customer demand. To obtain additional information about a company's inventory and its future sales, a variety of sources of information are available. Analysts should consider the Management Discussion and Analysis (MD&A) or similar sections of the company's financial reports, industry related news and publications, and industry economic data.

When conducting comparisons, differences in the choice of inventory valuation method can significantly affect the comparability of financial ratios between companies. A restatement from the LIFO method to the FIFO method is critical to make a

valid comparison with companies using a method other than the LIFO method such as those companies reporting under IFRS. Analysts should seek out as much information as feasible when analyzing the performance of companies.

**EXAMPLE 9****Comparative Illustration**

1. Using CAT's LIFO numbers as reported and FIFO adjusted numbers (Example 5) and Volvo's numbers as reported (Example 8), compare the following for 2017: inventory turnover ratio, days of inventory on hand, gross profit margin, net profit margin, return on assets, current ratio, total liabilities-to-equity ratio, and return on equity. For the current ratio, include current provisions as part of current liabilities. For the total liabilities-to-equity ratio, include provisions in total liabilities.

**Solution to 1:**

The comparisons between Caterpillar and Volvo for 2017 are as follows:

	CAT (LIFO)	CAT (FIFO)	Volvo
Inventory turnover ratio	3.33	2.76	5.04
Days of inventory on hand	109.6 days	132.2 days	72.4 days
Gross profit margin	27.24%	26.74%	23.95%
Net profit margin	1.66%	1.32%	6.36%
Return on assets <sup>a</sup>	0.99%	0.77%	5.25%
Current ratio <sup>b</sup>	1.35	1.42	1.12
Total liabilities-to-equity ratio <sup>c</sup>	4.59	4.27	2.78
Return on equity <sup>d</sup>	5.59%	4.05%	20.59%

*Calculations for ratios previously calculated (see Examples 5 and 8) are not shown again.*

<sup>a</sup> Return on assets = Net income ÷ Average total assets

Volvo = 5.25 percent =  $21,283 \div [(412,494 + 398,916) \div 2]$

<sup>b</sup> Current ratio = Current assets ÷ Current liabilities

Volvo = 1.12 =  $[199,039 \div (10,806 + 167,317)]$

The question indicates to include current provisions in current liabilities.

<sup>c</sup> Total liabilities-to-equity ratio = Total liabilities ÷ Total shareholders' equity

Volvo = 2.78 =  $[(29,147 + 96,213 + 10,806 + 167,317) \div 109,011]$

The question indicates to include provisions in total liabilities.

<sup>d</sup> Return on equity = Net income ÷ Average shareholders' equity

CAT (LIFO) = 5.59 percent =  $754 \div [(13,766 + 13,213) \div 2]$

CAT (FIFO) = 4.05 percent =  $599 \div \{[(13,766 + 1,924 - 710) + (13,213 + 2,139 - 770)] \div 2\}$

$$\text{Volvo} = 20.59 \text{ percent} = 21,283 \div [(109,011 + 97,764) \div 2]$$

Comparing CAT (FIFO) and Volvo, it appears that Volvo manages its inventory more effectively. It has higher inventory turnover and fewer days of inventory on hand. Volvo appears to have superior profitability based on net profit margin. A primary reason for CAT's low profitability in 2017 was a substantial increase in the provision for income taxes. An analyst would likely further investigate CAT's increase in provision for income taxes, as well as other reported numbers, rather than reaching a conclusion based on ratios alone (in other words, try to identify the underlying causes of changes or differences in ratios).

2. How much do inventories represent as a component of total assets for CAT using LIFO numbers as reported and FIFO adjusted numbers, and for Volvo using reported numbers in 2017 and 2016? Discuss any changes that would concern an analyst.

### Solution to 2:

The 2017 and 2016 inventory to total assets ratios for CAT using LIFO and adjusted to FIFO and for Volvo as reported, are as follows:

	CAT (LIFO)	CAT (FIFO)	Volvo
2017	13.02%	15.28%	12.78%
2016	11.53%	14.14%	12.10%

$$\text{CAT (LIFO) 2017} = 13.02 \text{ percent} = 10,018 \div 76,962$$

$$\text{CAT (LIFO) 2016} = 11.53 \text{ percent} = 8,614 \div 74,704$$

$$\text{CAT (FIFO) 2017} = 15.28 \text{ percent} = 11,942 \div (76,962 + 1,924 - 710)$$

$$\text{CAT (FIFO) 2016} = 14.14 \text{ percent} = 10,753 \div (74,704 + 2,139 - 770)$$

$$\text{Volvo 2017} = 12.78 \text{ percent} = 52,701 \div 412,494$$

$$\text{Volvo 2016} = 12.10 \text{ percent} = 48,287 \div 398,916$$

Based on the numbers as reported, CAT appears to have a similar percentage of assets tied up in inventory as Volvo. However, when CAT's inventory is adjusted to FIFO, it has a higher percentage of its assets tied up in inventory than Volvo.

The increase in inventory as a percentage of total assets is cause for some concern. Higher inventory typically results in higher maintenance costs (for example, storage and financing costs). A build-up of slow moving or obsolete inventories may result in future inventory write-downs. In Volvo's Note 17, the breakdown by inventory classification shows a significant increase in the inventory of production materials. Volvo may be planning on increasing production of more finished goods inventory (which has also increased). Looking at CAT's Note 7, all classifications of inventory seem to be increasing and because these are valued using the LIFO method, there is some cause for concern. The company must be increasing inventory quantities and adding new LIFO layers.

3. Using the reported numbers, compare the 2016 and 2017 growth rates of CAT and Volvo for sales, finished goods inventory, and inventories other than finished goods.

### Solution to 3:

CAT's and Volvo's 2017 and 2016 growth rates for sales ("Sales of machinery and engines" for CAT and "Net sales" for Volvo), finished goods, and inventories other than finished goods are as follows:

2017	CAT	Volvo
Sales	19.3%	10.9%
Finished goods	4.0%	4.2%
Inventories other than finished goods	30.2%	18.1%

2016	CAT	Volvo
Sales	-19.0%	-3.4%
Finished goods	-10.7%	12.8%
Inventories other than finished goods	-11.8%	2.3%

*Growth rate = (Value for year - Value for previous year)/Value for previous year*

#### 2017 CAT

$$\text{Sales} = 19.3 \text{ percent} = (42,676 - 35,773) \div 35,773$$

$$\text{Finished goods} = 4.0 \text{ percent} = (4,761 - 4,576) \div 4,576$$

$$\text{Inventories other than finished goods} = 30.2 \text{ percent} = [(2,802 + 2,254 + 201) - (2,102 + 1,719 + 217)] \div (2,102 + 1,719 + 217)$$

#### 2017 Volvo

$$\text{Sales} = 10.9 \text{ percent} = (334,748 - 301,914) \div 301,914$$

$$\text{Finished products} = 4.2 \text{ percent} = (32,304 - 31,012) \div 31,012$$

$$\text{Inventories other than finished products} = 18.1 \text{ percent} = (20,397 - 17,275) \div 17,275$$

#### 2016 CAT

$$\text{Sales} = -19.0 \text{ percent} = (35,773 - 44,147) \div 44,147$$

$$\text{Finished goods} = -10.7 \text{ percent} = (4,576 - 5,122) \div 5,122$$

$$\text{Inventories other than finished goods} = -11.8 \text{ percent} = [(2,102 + 1,719 + 217) - (2,467 + 1,857 + 254)] \div (2,467 + 1,857 + 254)$$

#### 2016 Volvo

$$\text{Sales} = -3.4 \text{ percent} = (301,914 - 312,515) \div 312,515$$

$$\text{Finished products} = 12.8 \text{ percent} = (31,012 - 27,496) \div 27,496$$

$$\text{Inventories other than finished products} = 2.3 \text{ percent} = (17,275 - 16,894) \div 16,894$$

For both companies, the growth rates in finished goods inventory exceed the growth rate in sales; this could be indicative of accumulating excess inventory. Volvo's growth rate in finished goods compared to its growth rate in sales is significantly higher but the lower growth rates in finished goods inventory for CAT is potentially a result of using the LIFO method versus the FIFO method. It appears Volvo is aware that an issue exists and is planning on cutting back production given the relatively small increase in inventories other than finished products. Regardless, an analyst should do further investigation before reaching any conclusion about a company's future prospects for sales and profit.

## ILLUSTRATIONS OF INVENTORY ANALYSIS: IMPACTS OF WRITEDOWNS

# 13

- ☐ calculate and compare ratios of companies, including companies that use different inventory methods
- ☐ analyze and compare the financial statements of companies, including companies that use different inventory methods

### EXAMPLE 10

#### Single Company Illustration

Selected excerpts from the consolidated financial statements and notes to consolidated financial statements for Jollof Inc., a hypothetical telecommunications company providing networking and communications solutions, are presented in Exhibit 8, Exhibit 9, and Exhibit 10. Exhibit 8 contains excerpts from the consolidated income statements, and Exhibit 9 contains excerpts from the consolidated balance sheets. Exhibit 10 contains excerpts from three of the notes to consolidated financial statements.

Note 1 (a) discloses that Jollof's finished goods inventories and work in progress are valued at the lower of cost or net realisable value. Note 2 (a) discloses that the impact of inventory and work in progress write-downs on Jollof's income before tax was a net reduction of €239 million in 2017, a net reduction of €156 million in 2016, and a net reduction of €65 million in 2015.<sup>18</sup> The inventory impairment loss amounts steadily increased from 2015 to 2017 and are included as a component, (additions)/reversals, of Jollof's change in valuation allowance as disclosed in Note 3 (b) from Exhibit 10. Observe also that Jollof discloses its valuation allowance at 31 December 2017, 2016, and 2015 in Note 3 (b) and details on the allocation of the allowance are included in Note 3 (a). The €549 million valuation allowance is the total of a €528 million allowance for inventories and a €21 million allowance for work in progress on construction contracts. Finally,

<sup>18</sup> This reduction is often referred to as a *charge*. An accounting charge is the recognition of a loss or expense. In this case, the charge is attributable to the impairment of assets.

observe that the €1,845 million net value for inventories (excluding construction contracts) at 31 December 2017 in Note 3 (a) reconciles with the balance sheet amount for inventories and work in progress, net, on 31 December 2017, as presented in Exhibit 9.

The inventory valuation allowance represents the total amount of inventory write-downs taken for the inventory reported on the balance sheet (which is measured at the lower of cost or net realisable value). Therefore, an analyst can determine the historical cost of the company's inventory by adding the inventory valuation allowance to the reported inventory carrying amount on the balance sheet. The valuation allowance increased in magnitude and as a percentage of gross inventory values from 2015 to 2017.

**Exhibit 8: Alcatel-Lucent Consolidated Income Statements (€ millions)**

For years ended 31 December	2017	2016	2015
Revenues	14,267	14,945	10,317
Cost of sales	(9,400)	(10,150)	(6,900)
Gross profit	4,867	4,795	3,417
Administrative and selling expenses	(2,598)	(2,908)	(1,605)
Research and development costs	(2,316)	(2,481)	(1,235)
<b>Income from operating activities before restructuring costs, impairment of assets, gain/(loss) on disposal of consolidated entities, and post-retirement benefit plan amendments</b>	<b>(47)</b>	<b>(594)</b>	<b>577</b>
Restructuring costs	(472)	(719)	(594)
Impairment of assets	(3,969)	(2,473)	(118)
Gain/(loss) on disposal of consolidated entities	(6)	—	13
Post-retirement benefit plan amendments	39	217	—
<b>Income (loss) from operating activities</b>	<b>(4,455)</b>	<b>(3,569)</b>	<b>(122)</b>
:	:	:	:
<b>Income (loss) from continuing operations</b>	<b>(4,373)</b>	<b>(3,433)</b>	<b>(184)</b>
Income (loss) from discontinued operations	28	512	133
<b>Net income (loss)</b>	<b>(4,345)</b>	<b>(2,921)</b>	<b>51</b>

**Exhibit 9: Alcatel-Lucent Consolidated Balance Sheets (€ millions)**

31 December	2017	2016	2015
:	:	:	:
<b>Total non-current assets</b>	<b>10,703</b>	<b>16,913</b>	<b>21,559</b>
Inventories and work in progress, net	1,845	1,877	1,898
Amounts due from customers on construction contracts	416	591	517
Trade receivables and related accounts, net	3,637	3,497	3,257
Advances and progress payments	83	92	73
:	:	:	:
<b>Total current assets</b>	<b>12,238</b>	<b>11,504</b>	<b>13,629</b>
<b>Total assets</b>	<b>22,941</b>	<b>28,417</b>	<b>35,188</b>
:	:	:	:

31 December	2017	2016	2015
Retained earnings, fair value, and other reserves	(7,409)	(3,210)	(2,890)
⋮	⋮	⋮	⋮
<b>Total shareholders' equity</b>	4,388	9,830	13,711
Pensions, retirement indemnities, and other post-retirement benefits	4,038	3,735	4,577
Bonds and notes issued, long-term	3,302	3,794	4,117
Other long-term debt	56	40	123
Deferred tax liabilities	968	1,593	2,170
Other non-current liabilities	372	307	232
<b>Total non-current liabilities</b>	8,736	9,471	11,219
Provisions	2,036	2,155	1,987
Current portion of long-term debt	921	406	975
Customers' deposits and advances	780	711	654
Amounts due to customers on construction contracts	158	342	229
Trade payables and related accounts	3,840	3,792	3,383
Liabilities related to disposal groups held for sale	—	—	1,349
Current income tax liabilities	155	59	55
Other current liabilities	1,926	1,651	1,625
<b>Total current liabilities</b>	9,817	9,117	10,257
<b>Total liabilities and shareholders' equity</b>	22,941	28,417	35,188

#### Exhibit 10: Jollof Inc. Selected Notes to Consolidated Financial Statements

##### Note 1. Summary of Significant Accounting Policies

###### (a) Inventories and work in progress

Inventories and work in progress are valued at the lower of cost (including indirect production costs where applicable) or net realizable value.<sup>19</sup> Net realizable value is the estimated sales revenue for a normal period of activity less expected completion and selling costs.

##### Note 2. Principal uncertainties regarding the use of estimates

###### (a) Valuation allowance for inventories and work in progress

Inventories and work in progress are measured at the lower of cost or net realizable value. Valuation allowances for inventories and work in progress are calculated based on an analysis of foreseeable changes in demand, technology, or the market, in order to determine obsolete or excess inventories and work in progress.

The valuation allowances are accounted for in cost of sales or in restructuring costs, depending on the nature of the amounts concerned.

<sup>19</sup> Cost approximates cost on a first-in, first-out basis.

	31 December		
(€ millions)	2017	2016	2015
Valuation allowance for inventories and work in progress on construction contracts	(549)	(432)	318
Impact of inventory and work in progress write-downs on income (loss) before income tax related reduction of goodwill and dis-counted operations	(239)	(156)	(65)

### Note 3. Inventories and work in progress

#### (a) Analysis of net value

(€ millions)	2017	2016	2015
Raw materials and goods	545	474	455
Work in progress excluding construction contracts	816	805	632
Finished goods	1,011	995	1,109
Gross value (excluding construction contracts)	2,373	2,274	2,196
Valuation allowance	(528)	(396)	(298)
Net value (excluding construction contracts)	1,845	1,877	1,898
Work in progress on construction contracts, gross*	184	228	291
Valuation allowance	(21)	(35)	(19)
Work in progress on construction contracts, net	163	193	272
Total, net	2,008	2,071	2,170

\* Included in the amounts due from/to construction contracts.

#### (b) Change in valuation allowance

(€ millions)	2017	2016	2015
At 1 January	(432)	(318)	(355)
(Additions)/reversals	(239)	(156)	(65)
Utilization	58	32	45
Changes in consolidation group	—	—	45
Net effect of exchange rate changes and other changes	63	10	12
At 31 December	(549)	(432)	(318)

Rounding differences may result in totals that are slightly different from the sum and from corresponding numbers in the note.

1. Calculate Jollof's inventory turnover, number of days of inventory on hand, gross profit margin, current ratio, debt-to-equity ratio, and return on total assets for 2017 and 2016 based on the numbers reported. Use an average for inventory and total asset amounts and year-end numbers for other ratio



items. For debt, include only bonds and notes issued, long-term; other long-term debt; and current portion of long-term debt.

### Solution to 1:

The financial ratios are as follows:

	2017	2016
Inventory turnover ratio	5.05	5.38
Number of days of inventory on hand	72.3 days	67.8 days
Gross profit margin	34.1%	32.1%
Current ratio	1.25	1.26
Debt-to-equity ratio	0.98	0.43
Return on total assets	-16.9%	-9.2%

Inventory turnover ratio = Cost of sales ÷ Average inventory

$$2017 \text{ inventory turnover ratio} = 5.05 = 9,400 \div [(1,845 + 1,877) \div 2]$$

$$2016 \text{ inventory turnover ratio} = 5.38 = 10,150 \div [(1,877 + 1,898) \div 2]$$

Number of days of inventory = 365 days ÷ Inventory turnover ratio

$$2017 \text{ number of days of inventory} = 72.3 \text{ days} = 365 \text{ days} \div 5.05$$

$$2016 \text{ number of days of inventory} = 67.8 \text{ days} = 365 \text{ days} \div 5.38$$

Gross profit margin = Gross profit ÷ Total revenue

$$2017 \text{ gross profit margin} = 34.1\% = 4,867 \div 14,267$$

$$2016 \text{ gross profit margin} = 32.1\% = 4,795 \div 14,945$$

Current ratio = Current assets ÷ Current liabilities

$$2017 \text{ current ratio} = 1.25 = 12,238 \div 9,817$$

$$2016 \text{ current ratio} = 1.26 = 11,504 \div 9,117$$

Debt-to-equity ratio = Total debt ÷ Total shareholders' equity

$$2017 \text{ debt-to-equity ratio} = 0.98 = (3,302 + 56 + 921) \div 4,388$$

$$2016 \text{ debt-to-equity ratio} = 0.43 = (3,794 + 40 + 406) \div 9,830$$

Return on assets = Net income ÷ Average total assets

$$2017 \text{ return on assets} = -16.9\% = -4,345 \div [(22,941 + 28,417) \div 2]$$

$$2016 \text{ return on assets} = -9.2\% = -2,921 \div [(28,417 + 35,188) \div 2]$$

2. Based on the answer to Question 1, comment on the changes from 2016 to 2017.

### Solution to 2:

From 2016 to 2017, the inventory turnover ratio declined and the number of days of inventory increased by 4.5 days. Jollof appears to be managing inventory less efficiently. The gross profit margin improved by 2.0 percent, from 32.1 percent in 2016 to 34.1 percent in 2017. The current ratio is relatively unchanged from 2016 to 2017. The debt-to-equity ratio has risen significantly in 2017 compared to 2016. Although Jollof's total debt has been relatively stable during this time period, the company's equity has been declining rapidly because of the cumulative effect of its net losses on retained earnings.

The return on assets is negative and deteriorated in 2017 compared to 2016. A larger net loss and lower total assets in 2017 resulted in a higher negative return on assets. The analyst should investigate the underlying reasons for the sharp decline in Jollof's return on assets. From Exhibit 8, it is apparent that Jollof's gross profit margins were insufficient to cover the administrative and selling expenses and research and development costs in 2016 and 2017. Large restructuring costs and asset impairment losses contributed to the loss from operating activities in both 2016 and 2017.

3. If Jollof had used the weighted average cost method instead of the FIFO method during 2017, 2016, and 2015, what would be the effect on Jollof's reported cost of sales and inventory carrying amounts? What would be the directional impact on the financial ratios that were calculated for Jollof in Question 1?

### Solution to 3:

If inventory replacement costs were increasing during 2015, 2016, and 2017 (and inventory quantity levels were stable or increasing), Jollof's cost of sales would have been higher and its gross profit margin would have been lower under the weighted average cost inventory method than what was reported under the FIFO method (assuming no inventory write-downs that would otherwise neutralize the differences between the inventory valuation methods). FIFO allocates the oldest inventory costs to cost of sales; the reported cost of sales would be lower under FIFO given increasing inventory costs. Inventory carrying amounts would be higher under the FIFO method than under the weighted average cost method because the more recently purchased inventory items would be included in inventory at their higher costs (again assuming no inventory write-downs that would otherwise neutralize the differences between the inventory valuation methods). Consequently, Jollof's reported gross profit, net income, and retained earnings would also be higher for those years under the FIFO method.

The effects on ratios are as follows:

- The inventory turnover ratios would all be higher under the weighted average cost method because the numerator (cost of sales) would be higher and the denominator (inventory) would be lower than what was reported by Jollof under the FIFO method.
- The number of days of inventory would be lower under the weighted average cost method because the inventory turnover ratios would be higher.

- The gross profit margin ratios would all be lower under the weighted average cost method because cost of sales would be higher under the weighted average cost method than under the FIFO method.
- The current ratios would all be lower under the weighted average cost method because inventory carrying values would be lower than under the FIFO method (current liabilities would be the same under both methods).
- The return-on-assets ratios would all be lower under the weighted average cost method because the incremental profit added to the numerator (net income) under the FIFO method has a greater impact than the incremental increase to the denominator (total assets). By way of example, assume that a company has €3 million in net income and €100 million in total assets using the weighted average cost method. If the company reports another €1 million in net income by using FIFO instead of weighted average cost, it would then also report an additional €1 million in total assets (after tax). Based on this example, the return on assets is 3.00 percent ( $€3/€100$ ) under the weighted average cost method and 3.96 percent ( $€4/€101$ ) under the FIFO method.
- The debt-to-equity ratios would all be higher under the weighted average cost method because retained earnings would be lower than under the FIFO method (again assuming no inventory write-downs that would otherwise neutralize the differences between the inventory valuation methods).

Conversely, if inventory replacement costs were decreasing during 2015, 2016, and 2017 (and inventory quantity levels were stable or increasing), Jollof's cost of sales would have been lower and its gross profit and inventory would have been higher under the weighted average cost method than were reported under the FIFO method (assuming no inventory write-downs that would otherwise neutralize the differences between the inventory valuation methods). As a result, the ratio assessment that was performed above would result in directly opposite conclusions.

## SUMMARY

The choice of inventory valuation method (cost formula or cost flow assumption) can have a potentially significant impact on inventory carrying amounts and cost of sales. These in turn impact other financial statement items, such as current assets, total assets, gross profit, and net income. The financial statements and accompanying notes provide important information about a company's inventory accounting policies that the analyst needs to correctly assess financial performance and compare it with that of other companies. Key concepts in this reading are as follows:

- Inventories are a major factor in the analysis of merchandising and manufacturing companies. Such companies generate their sales and profits through inventory transactions on a regular basis. An important consideration in determining profits for these companies is measuring the cost of sales when inventories are sold.

- The total cost of inventories comprises all costs of purchase, costs of conversion, and other costs incurred in bringing the inventories to their present location and condition. Storage costs of finished inventory and abnormal costs due to waste are typically treated as expenses in the period in which they occurred.
- The allowable inventory valuation methods implicitly involve different assumptions about cost flows. The choice of inventory valuation method determines how the cost of goods available for sale during the period is allocated between inventory and cost of sales.
- IFRS allow three inventory valuation methods (cost formulas): first-in, first-out (FIFO); weighted average cost; and specific identification. The specific identification method is used for inventories of items that are not ordinarily interchangeable and for goods or services produced and segregated for specific projects. US GAAP allow the three methods above plus the last-in, first-out (LIFO) method. The LIFO method is widely used in the United States for both tax and financial reporting purposes because of potential income tax savings.
- The choice of inventory method affects the financial statements and any financial ratios that are based on them. As a consequence, the analyst must carefully consider inventory valuation method differences when evaluating a company's performance over time or in comparison to industry data or industry competitors.
- A company must use the same cost formula for all inventories having a similar nature and use to the entity.
- The inventory accounting system (perpetual or periodic) may result in different values for cost of sales and ending inventory when the weighted average cost or LIFO inventory valuation method is used.
- Under US GAAP, companies that use the LIFO method must disclose in their financial notes the amount of the LIFO reserve or the amount that would have been reported in inventory if the FIFO method had been used. This information can be used to adjust reported LIFO inventory and cost of goods sold balances to the FIFO method for comparison purposes.
- LIFO liquidation occurs when the number of units in ending inventory declines from the number of units that were present at the beginning of the year. If inventory unit costs have generally risen from year to year, this will produce an inventory-related increase in gross profits.
- Consistency of inventory costing is required under both IFRS and US GAAP. If a company changes an accounting policy, the change must be justifiable and applied retrospectively to the financial statements. An exception to the retrospective restatement is when a company reporting under US GAAP changes to the LIFO method.
- Under IFRS, inventories are measured at the lower of cost and net realisable value. Net realisable value is the estimated selling price in the ordinary course of business less the estimated costs necessary to make the sale. Under US GAAP, inventories are measured at the lower of cost, market value, or net realisable value depending upon the inventory method used. Market value is defined as current replacement cost subject to an upper limit of net realizable value and a lower limit of net realizable value less a normal profit margin.
- Reversals of inventory write-downs may occur under IFRS but are not allowed under US GAAP.

- Changes in the carrying amounts within inventory classifications (such as raw materials, work-in-process, and finished goods) may provide signals about a company's future sales and profits. Relevant information with respect to inventory management and future sales may be found in the Management Discussion and Analysis or similar items within the annual or quarterly reports, industry news and publications, and industry economic data.
- The inventory turnover ratio, number of days of inventory ratio, and gross profit margin ratio are useful in evaluating the management of a company's inventory.
- Inventory management may have a substantial impact on a company's activity, profitability, liquidity, and solvency ratios. It is critical for the analyst to be aware of industry trends and management's intentions.
- Financial statement disclosures provide information regarding the accounting policies adopted in measuring inventories, the principal uncertainties regarding the use of estimates related to inventories, and details of the inventory carrying amounts and costs. This information can greatly assist analysts in their evaluation of a company's inventory management.

## PRACTICE PROBLEMS

1. During periods of rising inventory unit costs, a company using the FIFO method rather than the LIFO method will report a lower:
  - A. current ratio.
  - B. inventory turnover.
  - C. gross profit margin.
2. In a period of declining inventory unit costs and constant or increasing inventory quantities, which inventory method is *most likely* to result in a higher debt-to-equity ratio?
  - A. LIFO
  - B. FIFO
  - C. Weighted average cost

### The following information relates to questions 3-10

Hans Annan, CFA, a food and beverage analyst, is reviewing Century Chocolate's inventory policies as part of his evaluation of the company. Century Chocolate, based in Switzerland, manufactures chocolate products and purchases and resells other confectionery products to complement its chocolate line. Annan visited Century Chocolate's manufacturing facility last year. He learned that cacao beans, imported from Brazil, represent the most significant raw material and that the work-in-progress inventory consists primarily of three items: roasted cacao beans, a thick paste produced from the beans (called chocolate liquor), and a sweetened mixture that needs to be "conched" to produce chocolate. On the tour, Annan learned that the conching process ranges from a few hours for lower-quality products to six days for the highest-quality chocolates. While there, Annan saw the facility's climate-controlled area where manufactured finished products (cocoa and chocolate) and purchased finished goods are stored prior to shipment to customers. After touring the facility, Annan had a discussion with Century Chocolate's CFO regarding the types of costs that were included in each inventory category.

Annan has asked his assistant, Joanna Kern, to gather some preliminary information regarding Century Chocolate's financial statements and inventories. He also asked Kern to calculate the inventory turnover ratios for Century Chocolate and another chocolate manufacturer for the most recent five years. Annan does not know Century Chocolate's most direct competitor, so he asks Kern to do some research and select the most appropriate company for the ratio comparison.

Kern reports back that Century Chocolate prepares its financial statements in accordance with IFRS. She tells Annan that the policy footnote states that raw materials and purchased finished goods are valued at purchase cost whereas work in progress and manufactured finished goods are valued at production cost. Raw material inventories and purchased finished goods are accounted for using the FIFO (first-in, first-out) method, and the weighted average cost method is used for other inventories. An allowance is established when the net realisable value of

any inventory item is lower than the value calculated above.

Kern provides Annan with the selected financial statements and inventory data for Century Chocolate shown in Exhibits 1 through 5. The ratio exhibit Kern prepared compares Century Chocolate's inventory turnover ratios to those of Gordon's Goodies, a US-based company. Annan returns the exhibit and tells Kern to select a different competitor that reports using IFRS rather than US GAAP. During this initial review, Annan asks Kern why she has not indicated whether Century Chocolate uses a perpetual or a periodic inventory system. Kern replies that she learned that Century Chocolate uses a perpetual system but did not include this information in her report because inventory values would be the same under either a perpetual or periodic inventory system. Annan tells Kern she is wrong and directs her to research the matter.

While Kern is revising her analysis, Annan reviews the most recent month's Cocoa Market Review from the International Cocoa Organization. He is drawn to the statement that "the ICCO daily price, averaging prices in both futures markets, reached a 29-year high in US\$ terms and a 23-year high in SDR terms (the SDR unit comprises a basket of major currencies used in international trade: US\$, euro, pound sterling and yen)." Annan makes a note that he will need to factor the potential continuation of this trend into his analysis.

#### Exhibit 1: Century Chocolate Income Statements (CHF Millions)

For Years Ended 31 December	2018	2017
Sales	95,290	93,248
Cost of sales	−41,043	−39,047
Marketing, administration, and other expenses	−35,318	−42,481
<b>Profit before taxes</b>	<b>18,929</b>	<b>11,720</b>
Taxes	−3,283	−2,962
<b>Profit for the period</b>	<b>15,646</b>	<b>8,758</b>

#### Exhibit 2: Century Chocolate Balance Sheets (CHF Millions)

31 December	2018	2017
Cash, cash equivalents, and short-term investments	6,190	8,252
Trade receivables and related accounts, net	11,654	12,910
Inventories, net	8,100	7,039
Other current assets	2,709	2,812
<b>Total current assets</b>	<b>28,653</b>	<b>31,013</b>
Property, plant, and equipment, net	18,291	19,130
Other non-current assets	45,144	49,875
<b>Total assets</b>	<b>92,088</b>	<b>100,018</b>
Trade and other payables	10,931	12,299
Other current liabilities	17,873	25,265
<b>Total current liabilities</b>	<b>28,804</b>	<b>37,564</b>
Non-current liabilities	15,672	14,963
<b>Total liabilities</b>	<b>44,476</b>	<b>52,527</b>

31 December	2018	2017
Equity		
Share capital	332	341
Retained earnings and other reserves	47,280	47,150
<b>Total equity</b>	<b>47,612</b>	<b>47,491</b>
<b>Total liabilities and shareholders' equity</b>	<b>92,088</b>	<b>100,018</b>

### Exhibit 3: Century Chocolate Supplementary Footnote Disclosures: Inventories (CHF Millions)

31 December	2018	2017
Raw Materials	2,154	1,585
Work in Progress	1,061	1,027
Finished Goods	5,116	4,665
Total inventories before allowance	8,331	7,277
Allowance for write-downs to net realisable value	-231	-238
Total inventories net of allowance	8,100	7,039

### Exhibit 4: Century Chocolate Inventory Record for Purchased Lemon Drops

Date		Cartons	Per Unit Amount (CHF)
	Beginning inventory	100	22
4 Feb 2018	Purchase	40	25
3 Apr 2018	Sale	50	32
23 Jul 2018	Purchase	70	30
16 Aug 2018	Sale	100	32
9 Sep 2018	Sale	35	32
15 Nov 2018	Purchase	100	28

### Exhibit 5: Century Chocolate Net Realisable Value Information for Black Licorice Jelly Beans

	2018	2017
FIFO cost of inventory at 31 December (CHF)	314,890	374,870
Ending inventory at 31 December (Kilograms)	77,750	92,560
Cost per unit (CHF)	4.05	4.05
Net Realisable Value (CHF per Kilograms)	4.20	3.95



3. The costs *least likely* to be included by the CFO as inventory are:
- A. storage costs for the chocolate liquor.
  - B. excise taxes paid to the government of Brazil for the cacao beans.
  - C. storage costs for chocolate and purchased finished goods awaiting shipment to customers.
4. What is the *most likely* justification for Century Chocolate's choice of inventory valuation method for its purchased finished goods?
- A. It is the preferred method under IFRS.
  - B. It allocates the same per unit cost to both cost of sales and inventory.
  - C. Ending inventory reflects the cost of goods purchased most recently.
5. In Kern's comparative ratio analysis, the 2018 inventory turnover ratio for Century Chocolate is *closest* to:
- A. 5.07.
  - B. 5.42.
  - C. 5.55.
6. The *most accurate* statement regarding Annan's reasoning for requiring Kern to select a competitor that reports under IFRS for comparative purposes is that under US GAAP:
- A. fair values are used to value inventory.
  - B. the LIFO method is permitted to value inventory.
  - C. the specific identification method is permitted to value inventory.
7. Annan's statement regarding the perpetual and periodic inventory systems is most significant when which of the following costing systems is used?
- A. LIFO
  - B. FIFO
  - C. Specific identification
8. Using the inventory record for purchased lemon drops shown in Exhibit 4, the cost of sales for 2018 will be *closest* to:
- A. CHF3,550.
  - B. CHF4,550.
  - C. CHF4,850.
9. Ignoring any tax effect, the 2018 net realisable value reassessment for the black licorice jelly beans will *most likely* result in:
- A. an increase in gross profit of CHF7,775.
  - B. an increase in gross profit of CHF11,670.

- C. no impact on cost of sales because under IFRS, write-downs cannot be reversed.
10. If the trend noted in the ICCO report continues and Century Chocolate plans to maintain constant or increasing inventory quantities, the *most likely* impact on Century Chocolate's financial statements related to its raw materials inventory will be:
- A. a cost of sales that more closely reflects current replacement values.
- B. a higher allocation of the total cost of goods available for sale to cost of sales.
- C. a higher allocation of the total cost of goods available for sale to ending inventory.

## The following information relates to questions 11-16

Robert Groff, an equity analyst, is preparing a report on Crux Corp. As part of his report, Groff makes a comparative financial analysis between Crux and its two main competitors, Rolby Corp. and Mikko Inc. Crux and Mikko report under US GAAP and Rolby reports under IFRS.

Groff gathers information on Crux, Rolby, and Mikko. The relevant financial information he compiles is in Exhibit 1. Some information on the industry is in Exhibit 2.

### Exhibit 1: Selected Financial Information (US\$ Millions)

	Crux	Rolby	Mikko
Inventory valuation method	LIFO	FIFO	LIFO
<b>From the Balance Sheets</b>			
<b>As of 31 December 2018</b>			
Inventory, gross	480	620	510
Valuation allowance	20	25	14
Inventory, net	460	595	496
Total debt	1,122	850	732
Total shareholders' equity	2,543	2,403	2,091
<b>As of 31 December 2017</b>			
Inventory, gross	465	602	401
Valuation allowance	23	15	12
Inventory, net	442	587	389
<b>From the Income Statements</b>			
<b>Year Ended 31 December 2018</b>			
Revenues	4,609	5,442	3,503
Cost of goods sold <sup>a</sup>	3,120	3,782	2,550

	Crux	Rolby	Mikko
Net income	229	327	205
<sup>a</sup> Charges included in cost of goods sold for inventory write-downs*	13	15	15

\* This does not match the change in the inventory valuation allowance because the valuation allowance is reduced to reflect the valuation allowance attached to items sold and increased for additional necessary write-downs.

#### **LIFO Reserve**

As of 31 December 2018	55	0	77
As of 31 December 2017	72	0	50
As of 31 December 2016	96	0	43

#### **Tax Rate**

Effective tax rate	30%	30%	30%
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### **Exhibit 2: Industry Information**

	2018	2017	2016
Raw materials price index	112	105	100
Finished goods price index	114	106	100

To compare the financial performance of the three companies, Groff decides to convert LIFO figures into FIFO figures, and adjust figures to assume no valuation allowance is recognized by any company.

After reading Groff's draft report, his supervisor, Rachel Borghi, asks him the following questions:

- |            |   |
|------------|---|
| Question 1 | Which company's gross profit margin would best reflect current costs of the industry?   |
| Question 2 | Would Rolby's valuation method show a higher gross profit margin than Crux's under an inflationary, a deflationary, or a stable price scenario? |
| Question 3 | Which group of ratios usually appears more favorable with an inventory write-down?  |

11. Crux's inventory turnover ratio computed as of 31 December 2018, after the adjustments suggested by Groff, is *closest* to:

- A. 5.67.
- B. 5.83.
- C. 6.13.

12. Rolby's net profit margin for the year ended 31 December 2018, after the adjustments suggested by Groff, is *closest* to:
- A. 6.01%.
  - B. 6.20%.
  - C. 6.28%.
13. Compared with its unadjusted debt-to-equity ratio, Mikko's debt-to-equity ratio as of 31 December 2018, after the adjustments suggested by Groff, is:
- A. lower.
  - B. higher.
  - C. the same.
14. The *best* answer to Borghi's Question 1 is:
- A. Crux's.
  - B. Rolby's.
  - C. Mikko's.
15. The *best* answer to Borghi's Question 2 is:
- A. stable.
  - B. inflationary.
  - C. deflationary.
16. The *best* answer to Borghi's Question 3 is:
- A. activity ratios.
  - B. solvency ratios.
  - C. profitability ratios.
- 

## The following information relates to questions 17-23

ZP Corporation is a (hypothetical) multinational corporation headquartered in Japan that trades on numerous stock exchanges. ZP prepares its consolidated financial statements in accordance with US GAAP. Excerpts from ZP's 2018 annual report are shown in Exhibits 1–3.

**Exhibit 1: Consolidated Balance Sheets (¥ Millions)**

31 December	2017	2018
<b>Current Assets</b>		
Cash and cash equivalents	¥542,849	¥814,760
⋮	⋮	⋮
Inventories	608,572	486,465
⋮	⋮	⋮
Total current assets	4,028,742	3,766,309
⋮	⋮	⋮
<b>Total assets</b>	<b>¥10,819,440</b>	<b>¥9,687,346</b>
⋮	⋮	⋮
Total current liabilities	¥3,980,247	¥3,529,765
⋮	⋮	⋮
Total long-term liabilities	2,663,795	2,624,002
Minority interest in consolidated subsidiaries	218,889	179,843
Total shareholders' equity	3,956,509	3,353,736
<b>Total liabilities and shareholders' equity</b>	<b>¥10,819,440</b>	<b>¥9,687,346</b>

**Exhibit 2: Consolidated Statements of Income (¥ Millions)**

For the years ended 31 December	2016	2017	2018
<b>Net revenues</b>			
Sales of products	¥7,556,699	¥8,273,503	¥6,391,240
Financing operations	425,998	489,577	451,950
	7,982,697	8,763,080	6,843,190
<b>Cost and expenses</b>			
Cost of products sold	6,118,742	6,817,446	5,822,805
Cost of financing operations	290,713	356,005	329,128
Selling, general and administrative	827,005	832,837	844,927
⋮	⋮	⋮	⋮
<b>Operating income (loss)</b>	746,237	756,792	-153,670
⋮	⋮	⋮	⋮
<b>Net income</b>	¥548,011	¥572,626	-¥145,646

**Exhibit 3: Selected Disclosures in the 2018 Annual Report****Management's Discussion and Analysis of Financial Condition and Results of Operations**

Cost reduction efforts were offset by increased prices of raw materials, other production materials and parts. ... Inventories decreased during fiscal 2018 by ¥122.1 billion, or 20.1%, to ¥486.5 billion. This reflects the impacts of decreased sales volumes and fluctuations in foreign currency translation rates.

## Management & Corporate Information

### Risk Factors

#### Industry and Business Risks

The worldwide market for our products is highly competitive. ZP faces intense competition from other manufacturers in the respective markets in which it operates. Competition has intensified due to the worldwide deterioration in economic conditions. In addition, competition is likely to further intensify because of continuing globalization, possibly resulting in industry reorganization. Factors affecting competition include product quality and features, the amount of time required for innovation and development, pricing, reliability, safety, economy in use, customer service and financing terms. Increased competition may lead to lower unit sales and excess production capacity and excess inventory. This may result in a further downward price pressure.

ZP's ability to adequately respond to the recent rapid changes in the industry and to maintain its competitiveness will be fundamental to its future success in maintaining and expanding its market share in existing and new markets.

## Notes to Consolidated Financial Statements

### 2. Summary of significant accounting policies:

**Inventories.** Inventories are valued at cost, not in excess of market. Cost is determined on the "average-cost" basis, except for the cost of finished products carried by certain subsidiary companies which is determined on a "last-in, first-out" ("LIFO") basis. Inventories valued on the LIFO basis totaled ¥94,578 million and ¥50,037 million at December 31, 2017 and 2018, respectively. Had the "first-in, first-out" basis been used for those companies using the LIFO basis, inventories would have been ¥10,120 million and ¥19,660 million higher than reported at December 31, 2017 and 2018, respectively.

### 9. Inventories:

Inventories consist of the following:

31 December (¥ Millions)	2017	2018
Finished goods	¥403,856	¥291,977
Raw materials	99,869	85,966
Work in process	79,979	83,890
Supplies and other	24,868	24,632
	<b>¥608,572</b>	<b>¥486,465</b>

17. The MD&A indicated that the prices of raw material, other production materials, and parts increased. Based on the inventory valuation methods described in Note 2, which inventory classification would *least accurately* reflect current prices?

- A. Raw materials
- B. Finished goods

- C. Work in process
18. The 2017 inventory value as reported on the 2018 Annual Report if the company had used the FIFO inventory valuation method instead of the LIFO inventory valuation method for a portion of its inventory would be *closest* to:
- A. ¥104,698 million.
  - B. ¥506,125 million.
  - C. ¥618,692 million.
19. If ZP had prepared its financial statement in accordance with IFRS, the inventory turnover ratio (using average inventory) for 2018 would be:
- A. lower.
  - B. higher.
  - C. the same.
20. Inventory levels decreased from 2017 to 2018 for all of the following reasons *except*:
- A. LIFO liquidation.
  - B. decreased sales volume.
  - C. fluctuations in foreign currency translation rates.
21. Which observation is *most likely* a result of looking only at the information reported in Note 9?
- A. Increased competition has led to lower unit sales.
  - B. There have been significant price increases in supplies.
  - C. Management expects a further downturn in sales during 2019.
22. Note 2 indicates that, “Inventories valued on the LIFO basis totaled ¥94,578 million and ¥50,037 million at December 31, 2017 and 2018, respectively.” Based on this, the LIFO reserve should *most likely*:
- A. increase.
  - B. decrease.
  - C. remain the same.
23. The Industry and Business Risk excerpt states that, “Increased competition may lead to lower unit sales and excess production capacity and excess inventory. This may result in a further downward price pressure.” The downward price pressure could lead to inventory that is valued above current market prices or net realisable value. Any write-downs of inventory are *least likely* to have a significant effect on the inventory valued using:
- A. weighted average cost.
  - B. first-in, first-out (FIFO).

- C. last-in, first-out (LIFO).

24. LIFO reserve is *most likely* to increase when inventory unit:

- A. costs are increasing.  
B. costs are decreasing.  
C. levels are decreasing.

25. A company using the LIFO method reports the following in £:

	2018	2017
Cost of goods sold (COGS)	50,800	48,500
Ending inventories	10,550	10,000
LIFO reserve	4,320	2,600

Cost of goods sold for 2018 under the FIFO method is *closest* to:

- A. £48,530.  
B. £49,080.  
C. £52,520.

## The following information relates to questions 26-31

John Martinson, CFA, is an equity analyst with a large pension fund. His supervisor, Linda Packard, asks him to write a report on Karp Inc. Karp prepares its financial statements in accordance with US GAAP. Packard is particularly interested in the effects of the company's use of the LIFO method to account for its inventory. For this purpose, Martinson collects the financial data presented in Exhibits 1 and 2.

### Exhibit 1: Balance Sheet Information (US\$ Millions)

As of 31 December	2018	2017
Cash and cash equivalents	172	157
Accounts receivable	626	458
Inventories	620	539
Other current assets	125	65
Total current assets	1,543	1,219
Property and equipment, net	3,035	2,972
<b>Total assets</b>	<b>4,578</b>	<b>4,191</b>
Total current liabilities	1,495	1,395
Long-term debt	644	604
Total liabilities	2,139	1,999
Common stock and paid in capital	1,652	1,652



As of 31 December	2018	2017
Retained earnings	787	540
Total shareholders' equity	2,439	2,192
<b>Total liabilities and shareholders' equity</b>	<b>4,578</b>	<b>4,191</b>

**Exhibit 2: Income Statement Information (US\$ Millions)**

For the Year Ended 31 December	2018	2017
Sales	4,346	4,161
Cost of goods sold	2,211	2,147
Depreciation and amortisation expense	139	119
Selling, general, and administrative expense	1,656	1,637
Interest expense	31	18
Income tax expense	62	48
Net income	247	192

Martinson finds the following information in the notes to the financial statements:

- The LIFO reserves as of 31 December 2018 and 2017 are \$155 million and \$117 million respectively, and
- The effective income tax rate applicable to Karp for 2018 and earlier periods is 20 percent.

26. If Karp had used FIFO instead of LIFO, the amount of inventory reported as of 31 December 2018 would have been *closest* to:
- A. \$465 million.
  - B. \$658 million.
  - C. \$775 million.
27. If Karp had used FIFO instead of LIFO, the amount of cost of goods sold reported by Karp for the year ended 31 December 2018 would have been *closest* to:
- A. \$2,056 million.
  - B. \$2,173 million.
  - C. \$2,249 million.
28. If Karp had used FIFO instead of LIFO, its reported net income for the year ended 31 December 2018 would have been higher by an amount *closest* to:
- A. \$30 million.
  - B. \$38 million.
  - C. \$155 million.

29. If Karp had used FIFO instead of LIFO, Karp's retained earnings as of 31 December 2018 would have been higher by an amount *closest to*:
- A. \$117 million.
  - B. \$124 million.
  - C. \$155 million.
30. If Karp had used FIFO instead of LIFO, which of the following ratios computed as of 31 December 2018 would *most likely* have been lower?
- A. Cash ratio
  - B. Current ratio
  - C. Gross profit margin
31. If Karp had used FIFO instead of LIFO, its debt to equity ratio computed as of 31 December 2018 would have:
- A. increased.
  - B. decreased.
  - C. remained unchanged.
- 
32. If inventory unit costs are increasing from period-to-period, a LIFO liquidation is *most likely* to result in an increase in:
- A. gross profit.
  - B. LIFO reserve.
  - C. inventory carrying amounts.
33. Carrying inventory at a value above its historical cost would *most likely* be permitted if:
- A. the inventory was held by a producer of agricultural products.
  - B. financial statements were prepared using US GAAP.
  - C. the change resulted from a reversal of a previous write-down.
34. Eric's Used Book Store prepares its financial statements in accordance with IFRS. Inventory was purchased for £1 million and later marked down to £550,000. One of the books, however, was later discovered to be a rare collectible item, and the inventory is now worth an estimated £3 million. The inventory is *most likely* reported on the balance sheet at:
- A. £550,000.
  - B. £1,000,000.
  - C. £3,000,000.
35. Fernando's Pasta purchased inventory and later wrote it down. The current net realisable value is higher than the value when written down. Fernando's inventory

balance will *most likely* be:

- A. higher if it complies with IFRS.
  - B. higher if it complies with US GAAP.
  - C. the same under US GAAP and IFRS.
36. A write down of the value of inventory to its net realizable value will have a positive effect on the:
- A. balance sheet.
  - B. income statement.
  - C. inventory turnover ratio.

## The following information relates to questions 37-48

Assume the companies use a periodic inventory system.

37. Cinnamon Corp. started business in 2017 and uses the weighted average cost method. During 2017, it purchased 45,000 units of inventory at €10 each and sold 40,000 units for €20 each. In 2018, it purchased another 50,000 units at €11 each and sold 45,000 units for €22 each. Its 2018 cost of sales (€ thousands) was *closest* to:
- A. €490.
  - B. €491.
  - C. €495.
38. Zimt AG started business in 2017 and uses the FIFO method. During 2017, it purchased 45,000 units of inventory at €10 each and sold 40,000 units for €20 each. In 2018, it purchased another 50,000 units at €11 each and sold 45,000 units for €22 each. Its 2018 ending inventory balance (€ thousands) was *closest* to:
- A. €105.
  - B. €109.
  - C. €110.
39. Zimt AG uses the FIFO method, and Nutmeg Inc. uses the LIFO method. Compared to the cost of replacing the inventory, during periods of rising prices, the cost of sales reported by:
- A. Zimt is too low.
  - B. Nutmeg is too low.
  - C. Nutmeg is too high.
40. Zimt AG uses the FIFO method, and Nutmeg Inc. uses the LIFO method. Compared to the cost of replacing the inventory, during periods of rising prices the

ending inventory balance reported by:

- A. Zimt is too high.
  - B. Nutmeg is too low.
  - C. Nutmeg is too high.
41. Like many technology companies, TechnoTools operates in an environment of declining prices. Its reported profits will tend to be *highest* if it accounts for inventory using the:
- A. FIFO method.
  - B. LIFO method.
  - C. weighted average cost method.
42. Compared to using the weighted average cost method to account for inventory, during a period in which prices are generally rising, the current ratio of a company using the FIFO method would *most likely* be:
- A. lower.
  - B. higher.
  - C. dependent upon the interaction with accounts payable.
43. Zimt AG wrote down the value of its inventory in 2017 and reversed the write-down in 2018. Compared to the ratios that would have been calculated if the write-down had never occurred, Zimt's reported 2017:
- A. current ratio was too high.
  - B. gross margin was too high.
  - C. inventory turnover was too high.
44. Zimt AG wrote down the value of its inventory in 2017 and reversed the write-down in 2018. Compared to the results the company would have reported if the write-down had never occurred, Zimt's reported 2018:
- A. profit was overstated.
  - B. cash flow from operations was overstated.
  - C. year-end inventory balance was overstated.
45. Compared to a company that uses the FIFO method, during periods of rising prices a company that uses the LIFO method will *most likely* appear more:
- A. liquid.
  - B. efficient.
  - C. profitable.
46. Nutmeg, Inc. uses the LIFO method to account for inventory. During years in which inventory unit costs are generally rising and in which the company purchases more inventory than it sells to customers, its reported gross profit margin

will *most likely* be:

- A. lower than it would be if the company used the FIFO method.
  - B. higher than it would be if the company used the FIFO method.
  - C. about the same as it would be if the company used the FIFO method.
47. Compared to using the FIFO method to account for inventory, during periods of rising prices, a company using the LIFO method is *most likely* to report higher:
- A. net income.
  - B. cost of sales.
  - C. income taxes.
48. Carey Company adheres to US GAAP, whereas Jonathan Company adheres to IFRS. It is *least likely* that:
- A. Carey has reversed an inventory write-down.
  - B. Jonathan has reversed an inventory write-down.
  - C. Jonathan and Carey both use the FIFO inventory accounting method.
- 
49. Company A adheres to US GAAP and Company B adheres to IFRS. Which of the following is *most likely* to be disclosed on the financial statements of both companies?
- A. Any material income resulting from the liquidation of LIFO inventory
  - B. The amount of inventories recognized as an expense during the period
  - C. The circumstances that led to the reversal of a write down of inventories
50. Which of the following *most likely* signals that a manufacturing company expects demand for its product to increase?
- A. Finished goods inventory growth rate higher than the sales growth rate
  - B. Higher unit volumes of work in progress and raw material inventories
  - C. Substantially higher finished goods, with lower raw materials and work-in-process

## SOLUTIONS

1. B is correct. During a period of rising inventory costs, a company using the FIFO method will allocate a lower amount to cost of goods sold and a higher amount to ending inventory as compared with the LIFO method. The inventory turnover ratio is the ratio of cost of sales to ending inventory. A company using the FIFO method will produce a lower inventory turnover ratio as compared with the LIFO method. The current ratio (current assets/current liabilities) and the gross profit margin [gross profit/sales = (sales less cost of goods sold)/sales] will be higher under the FIFO method than under the LIFO method in periods of rising inventory unit costs.
2. B is correct. In an environment of declining inventory unit costs and constant or increasing inventory quantities, FIFO (in comparison with weighted average cost or LIFO) will have higher cost of goods sold and lower net income and inventory. Because both inventory and net income are lower, total equity is lower, resulting in a higher debt-to-equity ratio.
3. C is correct. The storage costs for inventory awaiting shipment to customers are not costs of purchase, costs of conversion, or other costs incurred in bringing the inventories to their present location and condition and are not included in inventory. The storage costs for the chocolate liquor occur during the production process and are thus part of the conversion costs. Excise taxes are part of the purchase cost.
4. C is correct. The carrying amount of inventories under FIFO will more closely reflect current replacement values because inventories are assumed to consist of the most recently purchased items. FIFO is an acceptable, but not preferred, method under IFRS. Weighted average cost, not FIFO, is the cost formula that allocates the same per unit cost to both cost of sales and inventory.
5. B is correct. Inventory turnover = Cost of sales/Average inventory =  $41,043/7,569.5 = 5.42$ . Average inventory is  $(8,100 + 7,039)/2 = 7,569.5$ .
6. B is correct. For comparative purposes, the choice of a competitor that reports under IFRS is requested because LIFO is permitted under US GAAP.
7. A is correct. The carrying amount of the ending inventory may differ because the perpetual system will apply LIFO continuously throughout the year, liquidating layers as sales are made. Under the periodic system, the sales will start from the last layer in the year. Under FIFO, the sales will occur from the same layers regardless of whether a perpetual or periodic system is used. Specific identification identifies the actual products sold and remaining in inventory, and there will be no difference under a perpetual or periodic system.
8. B is correct. The cost of sales is closest to CHF4,550. Under FIFO, the inventory acquired first is sold first. Using Exhibit 4, a total of 310 cartons were available for sale  $(100 + 40 + 70 + 100)$  and 185 cartons were sold  $(50 + 100 + 35)$ , leaving 125 in ending inventory. The FIFO cost would be as follows:
 
$$100 \text{ (beginning inventory)} \times 22 = 2,200$$

$$40 \text{ (4 February 2009)} \times 25 = 1,000$$

$$45 \text{ (23 July 2009)} \times 30 = 1,350$$

$$\text{Cost of sales} = 2,200 + 1,000 + 1,350 = \text{CHF}4,550$$

9. A is correct. Gross profit will most likely increase by CHF7,775. The net realisable value has increased and now exceeds the cost. The write-down from 2017 can be reversed. The write-down in 2017 was 9,256 [ $92,560 \times (4.05 - 3.95)$ ]. IFRS require the reversal of any write-downs for a subsequent increase in value of inventory previously written down. The reversal is limited to the lower of the subsequent increase or the original write-down. Only 77,750 kilograms remain in inventory; the reversal is  $77,750 \times (4.05 - 3.95) = 7,775$ . The amount of any reversal of a write-down is recognised as a reduction in cost of sales. This reduction results in an increase in gross profit.
10. C is correct. Using the FIFO method to value inventories when prices are rising will allocate more of the cost of goods available for sale to ending inventories (the most recent purchases, which are at higher costs, are assumed to remain in inventory) and less to cost of sales (the oldest purchases, which are at lower costs, are assumed to be sold first).
11. B is correct. Crux's adjusted inventory turnover ratio must be computed using cost of goods sold (COGS) under FIFO and excluding charges for increases in valuation allowances.

$$\begin{aligned}\text{COGS (adjusted)} &= \text{COGS (LIFO method)} - \text{Charges included in cost of goods sold for inventory write-downs} - \text{Change in LIFO reserve} \\ &= \$3,120 \text{ million} - 13 \text{ million} - (55 \text{ million} - 72 \text{ million}) \\ &= \$3,124 \text{ million}\end{aligned}$$

*Note:* Minus the change in LIFO reserve is equivalent to plus the decrease in LIFO reserve. The adjusted inventory turnover ratio is computed using average inventory under FIFO.

$$\text{Ending inventory (FIFO)} = \text{Ending inventory (LIFO)} + \text{LIFO reserve}$$

$$\text{Ending inventory 2018 (FIFO)} = \$480 + 55 = \$535$$

$$\text{Ending inventory 2017 (FIFO)} = \$465 + 72 = \$537$$

$$\text{Average inventory} = (\$535 + \$537)/2 = \$536$$

Therefore, adjusted inventory turnover ratio equals:

$$\text{Inventory turnover ratio} = \text{COGS/Average inventory} = \$3,124/\$536 = 5.83$$

12. B is correct. Rolby's adjusted net profit margin must be computed using net income (NI) under FIFO and excluding charges for increases in valuation allowances.

$$\begin{aligned}\text{NI (adjusted)} &= \text{NI (FIFO method)} + \text{Charges, included in cost of goods sold for inventory write-downs, after tax} \\ &= \$327 \text{ million} + 15 \text{ million} \times (1 - 30\%) \\ &= \$337.5 \text{ million}\end{aligned}$$

Therefore, adjusted net profit margin equals:

$$\text{Net profit margin} = \text{NI/Revenues} = \$337.5/\$5,442 = 6.20\%$$

13. A is correct. Mikko's adjusted debt-to-equity ratio is lower because the debt (numerator) is unchanged and the adjusted shareholders' equity (denominator) is higher. The adjusted shareholders' equity corresponds to shareholders' equity under FIFO, excluding charges for increases in valuation allowances. Therefore, adjusted shareholders' equity is higher than reported (unadjusted) shareholders' equity.
14. C is correct. Mikko's and Crux's gross margin ratios would better reflect the current gross margin of the industry than Rolby because both use LIFO. LIFO recognizes as cost of goods sold the cost of the most recently purchased units; therefore, it better reflects replacement cost. However, Mikko's gross margin ratio best reflects the current gross margin of the industry because Crux's LIFO reserve is decreasing. This could reflect a LIFO liquidation by Crux which would distort gross profit margin.
15. B is correct. The FIFO method shows a higher gross profit margin than the LIFO method in an inflationary scenario, because FIFO allocates to cost of goods sold the cost of the oldest units available for sale. In an inflationary environment, these units are the ones with the lowest cost.
16. A is correct. An inventory write-down increases cost of sales, reduces profit, and reduces the carrying value of inventory and assets. This has a negative effect on profitability and solvency ratios. However, activity ratios appear positively affected by a write-down because the asset base, whether total assets or inventory (denominator), is reduced. The numerator, sales, in total asset turnover is unchanged, and the numerator, cost of sales, in inventory turnover is increased. Thus, turnover ratios are higher and appear more favorable as the result of the write-down.
17. B is correct. Finished goods least accurately reflect current prices because some of the finished goods are valued under the "last-in, first-out" ("LIFO") basis. The costs of the newest units available for sale are allocated to cost of goods sold, leaving the oldest units (at lower costs) in inventory. ZP values raw materials and work in process using the weighted average cost method. While not fully reflecting current prices, some inflationary effect will be included in the inventory values.
18. C is correct. FIFO inventory = Reported inventory + LIFO reserve = ¥608,572 + 10,120 = ¥618,692. The LIFO reserve is disclosed in Note 2 of the notes to consolidated financial statements.
19. A is correct. The inventory turnover ratio would be lower. The average inventory would be higher under FIFO and cost of products sold would be lower by the increase in LIFO reserve. LIFO is not permitted under IFRS.
- Inventory turnover ratio = Cost of products sold ÷ Average inventory
- 2018 inventory turnover ratio as reported = 10.63
- = ¥5,822,805 / [(608,572 + 486,465) / 2].
- 2018 inventory turnover ratio adjusted to FIFO as necessary = 10.34
- = [¥5,822,805 - (19,660 - 10,120)] / [(608,572 + 10,120 + 486,465 + 19,660) / 2].
20. A is correct. No LIFO liquidation occurred during 2018; the LIFO reserve increased from ¥10,120 million in 2008 to ¥19,660 million in 2018. Management stated in the MD&A that the decrease in inventories reflected the impacts of decreased sales volumes and fluctuations in foreign currency translation rates.



21. C is correct. Finished goods and raw materials inventories are lower in 2018 when compared to 2017. Reduced levels of inventory typically indicate an anticipated business contraction.
22. B is correct. The decrease in LIFO inventory in 2018 would typically indicate that more inventory units were sold than produced or purchased. Accordingly, one would expect a liquidation of some of the older LIFO layers and the LIFO reserve to decrease. In actuality, the LIFO reserve *increased* from ¥10,120 million in 2017 to ¥19,660 million in 2018. This is not to be expected and is likely caused by the increase in prices of raw materials, other production materials, and parts of foreign currencies as noted in the MD&A. An analyst should seek to confirm this explanation.
23. B is correct. If prices have been decreasing, write-downs under FIFO are least likely to have a significant effect because the inventory is valued at closer to the new, lower prices. Typically, inventories valued using LIFO are less likely to incur inventory write-downs than inventories valued using weighted average cost or FIFO. Under LIFO, the *oldest* costs are reflected in the inventory carrying value on the balance sheet. Given increasing inventory costs, the inventory carrying values under the LIFO method are already conservatively presented at the oldest and lowest costs. Thus, it is far less likely that inventory write-downs will occur under LIFO; and if a write-down does occur, it is likely to be of a lesser magnitude.
24. A is correct. LIFO reserve is the FIFO inventory value less the LIFO inventory value. In periods of rising inventory unit costs, the carrying amount of inventory under FIFO will always exceed the carrying amount of inventory under LIFO. The LIFO reserve may increase over time as a result of the increasing difference between the older costs used to value inventory under LIFO and the more recent costs used to value inventory under FIFO. When inventory unit levels are decreasing, the company will experience a LIFO liquidation, reducing the LIFO reserve.
25. B is correct. The adjusted COGS under the FIFO method is equal to COGS under the LIFO method less the increase in LIFO reserve:
- $$\begin{aligned}\text{COGS (FIFO)} &= \text{COGS (LIFO)} - \text{Increase in LIFO reserve} \\ \text{COGS (FIFO)} &= £50,800 - (£4,320 - £2,600) \\ \text{COGS (FIFO)} &= £49,080\end{aligned}$$
26. C is correct. Karp's inventory under FIFO equals Karp's inventory under LIFO plus the LIFO reserve. Therefore, as of 31 December 2018, Karp's inventory under FIFO equals:
- $$\begin{aligned}\text{Inventory (FIFO method)} &= \text{Inventory (LIFO method)} + \text{LIFO reserve} \\ &= \$620 \text{ million} + 155 \text{ million} \\ &= \$775 \text{ million}\end{aligned}$$
27. B is correct. Karp's cost of goods sold (COGS) under FIFO equals Karp's cost of goods sold under LIFO minus the increase in the LIFO reserve. Therefore, for the

year ended 31 December 2018, Karp's cost of goods sold under FIFO equals:

$$\begin{aligned}\text{COGS (FIFO method)} &= \text{COGS (LIFO method)} - \text{Increase in LIFO reserve} \\ &= \$2,211 \text{ million} - (155 \text{ million} - 117 \text{ million}) \\ &= \$2,173 \text{ million}\end{aligned}$$

28. A is correct. Karp's net income (NI) under FIFO equals Karp's net income under LIFO plus the after-tax increase in the LIFO reserve. For the year ended 31 December 2018, Karp's net income under FIFO equals:

$$\begin{aligned}\text{NI (FIFO method)} &= \text{NI (LIFO method)} + \text{Increase in LIFO reserve} \times (1 - \text{Tax rate}) \\ &= \$247 \text{ million} + 38 \text{ million} \times (1 - 20\%) \\ &= \$277.4 \text{ million}\end{aligned}$$

Therefore, the increase in net income is:

$$\begin{aligned}\text{Increase in NI} &= \text{NI (FIFO method)} - \text{NI (LIFO method)} \\ &= \$277 \text{ million} - 247 \text{ million} \\ &= \$30.4 \text{ million}\end{aligned}$$

29. B is correct. Karp's retained earnings (RE) under FIFO equals Karp's retained earnings under LIFO plus the after-tax LIFO reserve. Therefore, for the year ended 31 December 2018, Karp's retained earnings under FIFO equals:

$$\begin{aligned}\text{RE (FIFO method)} &= \text{RE (LIFO method)} + \text{LIFO reserve} \times (1 - \text{Tax rate}) \\ &= \$787 \text{ million} + 155 \text{ million} \times (1 - 20\%) \\ &= \$911 \text{ million}\end{aligned}$$

Therefore, the increase in retained earnings is:

$$\begin{aligned}\text{Increase in RE} &= \text{RE (FIFO method)} - \text{RE (LIFO method)} \\ &= \$911 \text{ million} - 787 \text{ million} \\ &= \$124 \text{ million}\end{aligned}$$

30. A is correct. The cash ratio (cash and cash equivalents ÷ current liabilities) would be lower because cash would have been less under FIFO. Karp's income before taxes would have been higher under FIFO, and consequently taxes paid by Karp would have also been higher and cash would have been lower. There is no impact on current liabilities. Both Karp's current ratio and gross profit margin would have been higher if FIFO had been used. The current ratio would have been higher because inventory under FIFO increases by a larger amount than the cash decreases for taxes paid. Because the cost of goods sold under FIFO is lower than under LIFO, the gross profit margin would have been higher.
31. B is correct. If Karp had used FIFO instead of LIFO, the debt-to-equity ratio would have decreased. No change in debt would have occurred, but shareholders' equity would have increased as a result of higher retained earnings.
32. A is correct. When the number of units sold exceeds the number of units purchased, a company using LIFO will experience a LIFO liquidation. If inventory

unit costs have been rising from period-to-period and a LIFO liquidation occurs, it will produce an increase in gross profit as a result of the lower inventory carrying amounts of the liquidated units (lower cost per unit of the liquidated units).

33. A is correct. IFRS allow the inventories of producers and dealers of agricultural and forest products, agricultural produce after harvest, and minerals and mineral products to be carried at net realisable value even if above historical cost. (US GAAP treatment is similar.)
34. B is correct. Under IFRS, the reversal of write-downs is required if net realisable value increases. The inventory will be reported on the balance sheet at £1,000,000. The inventory is reported at the lower of cost or net realisable value. Under US GAAP, inventory is carried at the lower of cost or market value. After a write-down, a new cost basis is determined and additional revisions may only reduce the value further. The reversal of write-downs is not permitted.
35. A is correct. IFRS require the reversal of inventory write-downs if net realisable values increase; US GAAP do not permit the reversal of write-downs.
36. C is correct. Activity ratios (for example, inventory turnover and total asset turnover) will be positively affected by a write down to net realizable value because the asset base (denominator) is reduced. On the balance sheet, the inventory carrying amount is written down to its net realizable value and the loss in value (expense) is generally reflected on the income statement in cost of goods sold, thus reducing gross profit, operating profit, and net income.
37. B is correct. Cinnamon uses the weighted average cost method, so in 2018, 5,000 units of inventory were 2017 units at €10 each and 50,000 were 2008 purchases at €11. The weighted average cost of inventory during 2008 was thus  $(5,000 \times 10) + (50,000 \times 11) = 50,000 + 550,000 = €600,000$ , and the weighted average cost was approximately  $€10.91 = €600,000/55,000$ . Cost of sales was  $€10.91 \times 45,000$ , which is approximately €490,950.
38. C is correct. Zimt uses the FIFO method, and thus the first 5,000 units sold in 2018 depleted the 2017 inventory. Of the inventory purchased in 2018, 40,000 units were sold and 10,000 remain, valued at €11 each, for a total of €110,000.
39. A is correct. Zimt uses the FIFO method, so its cost of sales represents units purchased at a (no longer available) lower price. Nutmeg uses the LIFO method, so its cost of sales is approximately equal to the current replacement cost of inventory.
40. B is correct. Nutmeg uses the LIFO method, and thus some of the inventory on the balance sheet was purchased at a (no longer available) lower price. Zimt uses the FIFO method, so the carrying value on the balance sheet represents the most recently purchased units and thus approximates the current replacement cost.
41. B is correct. In a declining price environment, the newest inventory is the lowest-cost inventory. In such circumstances, using the LIFO method (selling the newer, cheaper inventory first) will result in lower cost of sales and higher profit.
42. B is correct. In a rising price environment, inventory balances will be higher for the company using the FIFO method. Accounts payable are based on amounts due to suppliers, not the amounts accrued based on inventory accounting.
43. C is correct. The write-down reduced the value of inventory and increased cost of sales in 2017. The higher numerator and lower denominator mean that the inventory turnover ratio as reported was too high. Gross margin and the current

ratio were both too low.

44. A is correct. The reversal of the write-down shifted cost of sales from 2018 to 2017. The 2017 cost of sales was higher because of the write-down, and the 2018 cost of sales was lower because of the reversal of the write-down. As a result, the reported 2018 profits were overstated. Inventory balance in 2018 is the same because the write-down and reversal cancel each other out. Cash flow from operations is not affected by the non-cash write-down, but the higher profits in 2018 likely resulted in higher taxes and thus lower cash flow from operations.
45. B is correct. LIFO will result in lower inventory and higher cost of sales. Gross margin (a profitability ratio) will be lower, the current ratio (a liquidity ratio) will be lower, and inventory turnover (an efficiency ratio) will be higher.
46. A is correct. LIFO will result in lower inventory and higher cost of sales in periods of rising costs compared to FIFO. Consequently, LIFO results in a lower gross profit margin than FIFO.
47. B is correct. The LIFO method increases cost of sales, thus reducing profits and the taxes thereon.
48. A is correct. US GAAP do not permit inventory write-downs to be reversed.
49. B is correct. Both US GAAP and IFRS require disclosure of the amount of inventories recognized as an expense during the period. Only US GAAP allows the LIFO method and requires disclosure of any material amount of income resulting from the liquidation of LIFO inventory. US GAAP does not permit the reversal of prior-year inventory write downs.
50. B is correct. A significant increase (attributable to increases in unit volume rather than increases in unit cost) in raw materials and/or work-in-progress inventories may signal that the company expects an increase in demand for its products. If the growth of finished goods inventories is greater than the growth of sales, it could indicate a decrease in demand and a decrease in future earnings. A substantial increase in finished goods inventories while raw materials and work-in-progress inventories are declining may signal a decrease in demand for the company's products.

## LEARNING MODULE

# 6

### Long-Lived Assets

by Elaine Henry, PhD, CFA, and Elizabeth A. Gordon, PhD, MBA, CPA.

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#### LEARNING OUTCOMES

<i>Mastery</i>	<i>The candidate should be able to:</i>
<input type="checkbox"/>	describe the different depreciation methods for property, plant, and equipment and calculate depreciation expense
<input type="checkbox"/>	describe how the choice of depreciation method and assumptions concerning useful life and residual value affect depreciation expense, financial statements, and ratios
<input type="checkbox"/>	explain and evaluate how impairment, revaluation, and derecognition of property, plant, and equipment and intangible assets affect financial statements and ratios
<input type="checkbox"/>	describe the different amortisation methods for intangible assets with finite lives and calculate amortisation expense
<input type="checkbox"/>	describe how the choice of amortisation method and assumptions concerning useful life and residual value affect amortisation expense, financial statements, and ratios
<input type="checkbox"/>	describe the revaluation model
<input type="checkbox"/>	compare the financial reporting of investment property with that of property, plant, and equipment

**Note:** Changes in accounting standards as well as new rulings and/or pronouncements issued after the publication of the readings on financial reporting and analysis may cause some of the information in these readings to become dated. Candidates are *not* responsible for anything that occurs after the readings were published. In addition, candidates are expected to be familiar with the analytical frameworks contained in the readings, as well as the implications of alternative accounting methods for financial analysis and valuation discussed in the readings. Candidates are also responsible for the content of accounting standards, but not for the actual reference numbers. Finally, candidates should be aware that certain ratios may be defined and calculated differently. When alternative ratio definitions exist and no specific definition is given, candidates should use the ratio definitions emphasized in the readings.

## 1

## INTRODUCTION

**Long-lived assets**, also referred to as non-current assets or long-term assets, are assets that are expected to provide economic benefits over a future period of time, typically greater than one year.<sup>1</sup> Long-lived assets may be tangible, intangible, or financial assets. Examples of long-lived tangible assets, typically referred to as **property, plant, and equipment** and sometimes as fixed assets, include land, buildings, furniture and fixtures, machinery and equipment, and vehicles; examples of long-lived **intangible assets** (assets lacking physical substance) include patents and trademarks; and examples of long-lived financial assets include investments in equity or debt securities issued by other entities. The scope of this reading is limited to long-lived tangible assets (hereafter, referred to for simplicity as long-lived assets).

The first issue in accounting for a long-lived asset is determining its cost at acquisition. The second issue is how to allocate the cost to expense over time. The costs of most long-lived assets are capitalised and then allocated as expenses in the profit or loss (income) statement over the period of time during which they are expected to provide economic benefits. The two main types of long-lived assets with costs that are typically *not* allocated over time are land, which is not depreciated, and those intangible assets with indefinite useful lives. Additional issues that arise are the treatment of subsequent costs incurred related to the asset, the use of the cost model versus the revaluation model, unexpected declines in the value of the asset, classification of the asset with respect to intent (for example, held for use or held for sale), and the derecognition of the asset.

## 2

## ACQUISITION OF PROPERTY, PLANT AND EQUIPMENT

### Acquisition of Long-Lived Assets

Upon acquisition, property, plant, and equipment (tangible assets with an economic life of longer than one year and intended to be held for the company's own use) are recorded on the balance sheet at cost, which is typically the same as their fair value.<sup>2</sup> Accounting for an intangible asset depends on how the asset is acquired. If several assets are acquired as part of a group, the purchase price is allocated to each asset on the basis of its fair value. An asset's cost potentially includes expenditures additional to the purchase price.

A key concept in accounting for expenditures related to long-lived assets is whether and when such expenditures are capitalised (i.e., included in the asset shown on the balance sheet) versus expensed (i.e., treated as an expense of the period on the income statement). After examining the specific treatment of certain expenditures, we will consider the general financial statement impact of capitalising versus expensing and two analytical issues related to the decision—namely, the effects on an individual company's trend analysis and on comparability across companies.

1 In some industries, inventory is held longer than one year but is nonetheless reported as a current asset.

2 Fair value is defined in International Financial Reporting Standards (IFRS) and under US generally accepted accounting principles (US GAAP) in the Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC) as "the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date." [IFRS 13 and FASB ASC Topic 820]

## Property, Plant, and Equipment

This section primarily discusses the accounting treatment for the acquisition of long-lived tangible assets (property, plant, and equipment) through purchase. Assets can be acquired by methods other than purchase.<sup>3</sup> When an asset is exchanged for another asset, the asset acquired is recorded at fair value if reliable measures of fair value exist. Fair value of the asset acquired is the fair value of the asset given up unless the fair value of the asset acquired is more clearly evident. If there is no reliable measure of fair value, the acquired asset is measured at the carrying amount of the asset given up. In this case, the carrying amount of the assets is unchanged, and no gain or loss is reported. IFRS and US GAAP require that for a company to recognize a gain or loss on a nonmonetary exchange, the transaction must have economic substance.

Typically, accounting for the exchange involves removing the carrying amount of the asset given up, adding a fair value for the asset acquired, and reporting any difference between the carrying amount and the fair value as a gain or loss. A gain would be reported when the fair value used for the newly acquired asset exceeds the carrying amount of the asset given up. A loss would be reported when the fair value used for the newly acquired asset is less than the carrying amount of the asset given up.

When property, plant, or equipment is purchased, the buyer records the asset at cost. In addition to the purchase price, the buyer also includes, as part of the cost of an asset, all the expenditures necessary to get the asset ready for its intended use. For example, freight costs borne by the purchaser to get the asset to the purchaser's place of business and special installation and testing costs required to make the asset usable are included in the total cost of the asset.

Subsequent expenditures related to long-lived assets are included as part of the recorded value of the assets on the balance sheet (i.e., capitalised) if they are expected to provide benefits beyond one year in the future and are expensed if they are not expected to provide benefits in future periods. Expenditures that extend the original life of the asset are typically capitalised. Example 1 illustrates the difference between costs that are capitalised and costs that are expensed in a period.

### EXAMPLE 1

#### Acquisition of PPE

Assume a (hypothetical) company, Trofferini S.A., incurred the following expenditures to purchase a towel and tissue roll machine: €10,900 purchase price including taxes, €200 for delivery of the machine, €300 for installation and testing of the machine, and €100 to train staff on maintaining the machine. In addition, the company paid a construction team €350 to reinforce the factory floor and ceiling joists to accommodate the machine's weight. The company also paid €1,500 to repair the factory roof (a repair expected to extend the useful life of the factory by five years) and €1,000 to have the exterior of the factory and adjoining offices repainted for maintenance reasons. The repainting neither extends the life of factory and offices nor improves their usability.

<sup>3</sup> IAS 16 *Property, Plant and Equipment*, paragraphs 24–26 [Measurement of Cost]; IAS 38 *Intangible Assets*, paragraphs 45–47 [Exchange of Assets]; and FASB ASC Section 845-10-30 [Nonmonetary Transactions – Overall – Initial Measurement].



1. Which of these expenditures will be capitalised and which will be expensed?

### Solution

The company will capitalise as part of the cost of the machine all costs that are necessary to get the new machine ready for its intended use: €10,900 purchase price, €200 for delivery, €300 for installation and testing, and €350 to reinforce the factory floor and ceiling joists to accommodate the machine's weight (which was necessary to use the machine and does not increase the value of the factory). The €100 to train staff is not necessary to get the asset ready for its intended use and will be expensed.

The company will capitalise the expenditure of €1,500 to repair the factory roof because the repair is expected to extend the useful life of the factory. The company will expense the €1,000 to have the exterior of the factory and adjoining offices repainted because the painting does not extend the life or alter the productive capacity of the buildings.

2. How will the treatment of these expenditures affect the company's financial statements?

### Solution

The costs related to the machine that are capitalised—€10,900 purchase price, €200 for delivery, €300 for installation and testing, and €350 to prepare the factory—will increase the carrying amount of the machine asset as shown on the balance sheet and will be included as investing cash outflows. The item related to the factory that is capitalised—the €1,500 roof repair—will increase the carrying amount of the factory asset as shown on the balance sheet and is an investing cash outflow. The expenditures of €100 to train staff and €1,000 to paint are expensed in the period and will reduce the amount of income reported on the company's income statement (and thus reduce retained earnings on the balance sheet) and the operating cash flow.

Example 1 describes capitalising versus expensing in the context of purchasing property, plant, and equipment. When a company constructs an asset (or acquires an asset that requires a long period of time to get ready for its intended use), borrowing costs incurred directly related to the construction are generally capitalised. Constructing a building, whether for sale (in which case, the building is classified as inventory) or for the company's own use (in which case, the building is classified as a long-lived asset), typically requires a substantial amount of time. To finance construction, any borrowing costs incurred prior to the asset being ready for its intended use are capitalised as part of the cost of the asset. The company determines the interest rate to use on the basis of its existing borrowings or, if applicable, on a borrowing specifically incurred for constructing the asset. If a company takes out a loan specifically to construct a building, the interest cost on that loan during the time of construction would be capitalised as part of the building's cost. Under IFRS, but not under US GAAP, income earned on temporarily investing the borrowed monies decreases the amount of borrowing costs eligible for capitalisation.

Thus, a company's interest costs for a period are included either on the balance sheet (to the extent they are capitalised as part of an asset) or on the income statement (to the extent they are expensed). If the interest expenditure is incurred in connection with constructing an asset for the company's own use, the capitalised interest appears on the balance sheet as a part of the relevant long-lived asset (i.e., property, plant, and equipment). The capitalised interest is expensed over time as the property is depreciated and is thus part of subsequent years' depreciation expense rather



than interest expense of the current period. If the interest expenditure is incurred in connection with constructing an asset to sell (for example, by a home builder), the capitalised interest appears on the company's balance sheet as part of inventory. The capitalised interest is expensed as part of the cost of goods sold when the asset is sold. Interest payments made prior to completion of construction that are capitalised are classified as an investing cash outflow. Expensed interest may be classified as an operating or financing cash outflow under IFRS and is classified as an operating cash outflow under US GAAP.

## EXAMPLE 2

### Capitalised Borrowing Costs

BILDA S.A., a hypothetical company, borrows €1,000,000 at an interest rate of 10 percent per year on 1 January 2010 to finance the construction of a factory that will have a useful life of 40 years. Construction is completed after two years, during which time the company earns €20,000 by temporarily investing the loan proceeds.

1. What is the amount of interest that will be capitalised under IFRS, and how would that amount differ from the amount that would be capitalised under US GAAP?

### Solution

The total amount of interest paid on the loan during construction is €200,000 ( $= €1,000,000 \times 10\% \times 2 \text{ years}$ ). Under IFRS, the amount of borrowing cost eligible for capitalisation is reduced by the €20,000 interest income from temporarily investing the loan proceeds, so the amount to be capitalised is €180,000. Under US GAAP, the amount to be capitalised is €200,000.

2. Where will the capitalised borrowing cost appear on the company's financial statements?

### Solution

The capitalised borrowing costs will appear on the company's balance sheet as a component of property, plant, and equipment. In the years prior to completion of construction, the interest paid will appear on the statement of cash flows as an investment activity. Over time, as the property is depreciated, the capitalised interest component is part of subsequent years' depreciation expense on the company's income statement.

## 3

## DEPRECIATION OF LONG-LIVED ASSETS: METHODS AND CALCULATION

- ☐ describe the different depreciation methods for property, plant, and equipment and calculate depreciation expense
- ☐ describe how the choice of depreciation method and assumptions concerning useful life and residual value affect depreciation expense, financial statements, and ratios
- ☐ explain and evaluate how impairment, revaluation, and derecognition of property, plant, and equipment and intangible assets affect financial statements and ratios

Under the cost model of reporting long-lived assets, which is permitted under IFRS and required under US GAAP, the capitalised costs of long-lived tangible assets (other than land, which is not depreciated) and intangible assets with finite useful lives are allocated to subsequent periods as depreciation and amortisation expenses. Depreciation and amortisation are effectively the same concept, with the term depreciation referring to the process of allocating tangible assets' costs and the term amortisation referring to the process of allocating intangible assets' costs.<sup>4</sup> The alternative model of reporting long-lived assets is the **revaluation model**, which is permitted under IFRS but not under US GAAP. Under the revaluation model, a company reports the long-lived asset at fair value rather than at acquisition cost (historical cost) less accumulated depreciation or amortisation, as in the cost model.

An asset's carrying amount is the amount at which the asset is reported on the balance sheet. Under the cost model, at any point in time, the carrying amount (also called carrying value or net book value) of a long-lived asset is equal to its historical cost minus the amount of depreciation or amortisation that has been accumulated since the asset's purchase (assuming that the asset has not been impaired, a topic which will be addressed later). Companies may present on the balance sheet the total net amount of property, plant, and equipment and the total net amount of intangible assets. However, more detail is disclosed in the notes to financial statements. The details disclosed typically include the acquisition costs, the depreciation and amortisation expenses, the accumulated depreciation and amortisation amounts, the depreciation and amortisation methods used, and information on the assumptions used to depreciate and amortise long-lived assets.

### Depreciation Methods and Calculation of Depreciation Expense

Depreciation methods include the **straight-line method**, in which the cost of an asset is allocated to expense evenly over its useful life; **accelerated methods**, in which the allocation of cost is greater in earlier years; and the **units-of-production method**, in which the allocation of cost corresponds to the actual use of an asset in a particular period. The choice of depreciation method affects the amounts reported on the financial statements, including the amounts for reported assets and operating

<sup>4</sup> Depletion is the term applied to a similar concept for natural resources; costs associated with those resources are allocated to a period on the basis of the usage or extraction of those resources.

and net income. This, in turn, affects a variety of financial ratios, including fixed asset turnover, total asset turnover, operating profit margin, operating return on assets, and return on assets.

Using the straight-line method, depreciation expense is calculated as depreciable cost divided by estimated useful life and is the same for each period. Depreciable cost is the historical cost of the tangible asset minus the estimated residual (salvage) value.<sup>5</sup> A commonly used accelerated method is the declining balance method, in which the amount of depreciation expense for a period is calculated as some percentage of the carrying amount (i.e., cost net of accumulated depreciation at the beginning of the period). When an accelerated method is used, the estimated residual value is not used to calculate the depreciation expense, but the carrying amount should not be reduced below the estimated residual value. In the units-of-production method, the amount of depreciation expense for a period is based on the proportion of the asset's production during the period compared with the total estimated productive capacity of the asset over its useful life. The depreciation expense is calculated as depreciable cost times production in the period divided by estimated productive capacity over the life of the asset. Equivalently, the company may estimate a depreciation cost per unit (depreciable cost divided by estimated productive capacity) and calculate depreciation expense as depreciation cost per unit times production in the period. Regardless of the depreciation method used, the carrying amount of the asset is not reduced below the estimated residual value. Example 3 provides an example of these depreciation methods.

### EXAMPLE 3

#### Alternative Depreciation Methods

You are analyzing three hypothetical companies: EVEN-LI Co., SOONER Inc., and AZUSED Co. At the beginning of Year 1, each company buys an identical piece of box manufacturing equipment for \$2,300 and has the same assumptions about useful life, estimated residual value, and productive capacity. The annual production of each company is the same, but each company uses a different method of depreciation. As disclosed in each company's notes to the financial statements, each company's depreciation method, assumptions, and production are as follows:

#### Depreciation method

- EVEN-LI Co.: straight-line method
- SOONER Inc.: double-declining balance method (the rate applied to the carrying amount is double the depreciation rate for the straight-line method)
- AZUSED Co.: units-of-production method

#### Assumptions and production

- Estimated residual value: \$100
- Estimated useful life: 4 years
- Total estimated productive capacity: 800 boxes
- Production in each of the four years: 200 boxes in the first year, 300 in the second year, 200 in the third year, and 100 in the fourth year

<sup>5</sup> The residual value is the estimated amount that an entity will obtain from disposal of the asset at the end of its useful life.

1. Using the following template for each company, record its beginning and ending net book value (carrying amount), end-of-year accumulated depreciation, and annual depreciation expense for the box manufacturing equipment.

Template:

	Beginning Net Book Value	Depreciation Expense	Accumulated Depreciation	Ending Net Book Value
Year 1				
Year 2				
Year 3				
Year 4				

### Solution to 1:

For *each* company, the following information applies: Beginning net book value in Year 1 equals the purchase price of \$2,300; accumulated year-end depreciation equals the balance from the previous year plus the current year's depreciation expense; ending net book value (carrying amount) equals original cost minus accumulated year-end depreciation (which is the same as beginning net book value minus depreciation expense); and beginning net book value in Years 2, 3, and 4 equals the ending net book value of the prior year. The following text and filled-in templates describe how depreciation *expense* is calculated for each company.

EVEN-LI Co. uses the straight-line method, so depreciation expense in each year equals \$550, which is calculated as  $(\$2,300 \text{ original cost} - \$100 \text{ residual value}) / 4 \text{ years}$ . The net book value at the end of Year 4 is the estimated residual value of \$100.

EVEN-LI Co.	Beginning Net Book Value	Depreciation Expense	Accumulated Year-End Depreciation	Ending Net Book Value
Year 1	\$2,300	\$550	\$550	\$1,750
Year 2	1,750	550	1,100	1,200
Year 3	1,200	550	1,650	650
Year 4	650	550	2,200	100

SOONER Inc. uses the double-declining balance method. The depreciation rate for the double-declining balance method is double the depreciation rate for the straight-line method. The depreciation rate under the straight-line method is 25 percent (100 percent divided by 4 years). Thus, the depreciation rate for the double-declining balance method is 50 percent (2 times 25 percent). The depreciation expense for the first year is \$1,150 (50 percent of \$2,300). Note that under this method, the depreciation rate of 50 percent is applied to the carrying amount (net book value) of the asset, without adjustment for expected residual value. Because the carrying amount of the asset is not depreciated below its estimated residual value, however, the depreciation expense in the final year of depreciation decreases the ending net book value (carrying amount) to the estimated residual value.

SOONER Inc.	Beginning Net Book Value	Depreciation Expense	Accumulated Year-End Depreciation	Ending Net Book Value
Year 1	\$2,300	\$1,150	\$1,150	\$1,150
Year 2	1,150	575	1,725	575
Year 3	575	288	2,013	287
Year 4	287	187	2,200	100

Another common approach (not required in this question) is to use an accelerated method, such as the double-declining method, for some period (a year or more) and then to change to the straight-line method for the remaining life of the asset. If SOONER had used the double-declining method for the first year and then switched to the straight-line method for Years 2, 3, and 4, the depreciation expense would be \$350  $[(\$1,150 - \$100 \text{ estimated residual value})/3 \text{ years}]$  a year for Years 2, 3, and 4. The results for SOONER under this alternative approach are shown below.

SOONER Inc.	Beginning Net Book Value	Depreciation Expense	Accumulated Year-End Depreciation	Ending Net Book Value
Year 1	\$2,300	\$1,150	\$1,150	\$1,150
Year 2	1,150	350	1,500	800
Year 3	800	350	1,850	450
Year 4	450	350	2,200	100

AZUSED Co. uses the units-of-production method. Dividing the equipment's total depreciable cost by its total productive capacity gives a cost per unit of \$2.75, calculated as  $(\$2,300 \text{ original cost} - \$100 \text{ residual value})/800$ . The depreciation expense recognised each year is the number of units produced times \$2.75. For Year 1, the amount of depreciation expense is \$550 (200 units times \$2.75). For Year 2, the amount is \$825 (300 units times \$2.75). For Year 3, the amount is \$550. For Year 4, the amount is \$275.

AZUSED Co.	Beginning Net Book Value	Depreciation Expense	Accumulated Year-End Depreciation	Ending Net Book Value
Year 1	\$2,300	\$550	\$550	\$1,750
Year 2	1,750	825	1,375	925
Year 3	925	550	1,925	375
Year 4	375	275	2,200	100

2. Explain the significant differences in the timing of the recognition of the depreciation expense.

### Solution to 2:

All three methods result in the same total amount of accumulated depreciation over the life of the equipment. The significant differences are simply in the timing of the recognition of the depreciation expense. The straight-line method recognises the expense evenly, the accelerated method recognises most of the expense in the first year, and the units-of-production method

recognises the expense on the basis of production (or use of the asset). Under all three methods, the ending net book value is \$100.

3. For each company, assume that sales, earnings before interest, taxes, depreciation, and amortization, and assets other than the box manufacturing equipment are as shown in the following table. Calculate the total asset turnover ratio, the operating profit margin, and the operating return on assets for each company for each of the four years. Discuss the ratios, comparing results within and across companies.

	Sales	Earnings before Interest, Taxes, Depreciation, and Amortization	Carrying Amount of Total Assets, Excluding the Box Manufacturing Equipment, at Year End*
Year 1	\$300,000	\$36,000	\$30,000
Year 2	320,000	38,400	32,000
Year 3	340,000	40,800	34,000
Year 4	360,000	43,200	36,000

\* Assume that total assets at the beginning of Year 1, including the box manufacturing equipment, had a value of \$30,300. Assume that depreciation expense on assets other than the box manufacturing equipment totaled \$1,000 per year.

### Solution to 3:

Total asset turnover ratio = Total revenue ÷ Average total assets

Operating profit margin = Earnings before interest and taxes ÷ Total revenue

Operating return on assets

= Earnings before interest and taxes ÷ Average total assets

Ratios are shown in the table below, and details of the calculations for Years 1 and 2 are described after discussion of the ratios.

	EVEN-LI Co.			SOONER Inc.			AZUSED Co.		
Ratio*	AT	PM (%)	ROA (%)	AT	PM (%)	ROA (%)	AT	PM (%)	ROA (%)
Year 1	9.67	11.48	111.04	9.76	11.28	110.17	9.67	11.48	111.04
Year 2	9.85	11.52	113.47	10.04	11.51	115.57	9.90	11.43	113.10
Year 3	10.02	11.54	115.70	10.17	11.62	118.21	10.10	11.54	116.64
Year 4	10.18	11.57	117.74	10.23	11.67	119.42	10.22	11.65	118.98

\* AT = Total asset turnover ratio. PM = Operating profit margin. ROA = Operating return on assets.

For all companies, the asset turnover ratio increased over time because sales grew at a faster rate than that of the assets. SOONER had consistently higher asset turnover ratios than the other two companies, however, because higher depreciation expense in the earlier periods decreased its average total assets. In addition, the higher depreciation in earlier periods resulted in SOONER having lower operating profit margin and operating ROA in the first year and higher operating profit margin and operating ROA in the later periods. SOONER appears to be more efficiently run, on the basis of its higher asset turnover and greater increases in profit margin and ROA

over time; however, these comparisons reflect differences in the companies' choice of depreciation method. In addition, an analyst might question the sustainability of the extremely high ROAs for all three companies because such high profitability levels would probably attract new competitors, which would likely put downward pressure on the ratios.

### **EVEN-LI Co.**

Year 1:

$$\begin{aligned}\text{Total asset turnover ratio} &= 300,000 / [(30,300 + 30,000 + 1,750) / 2] \\ &= 300,000 / 31,025 = 9.67\end{aligned}$$

$$\begin{aligned}\text{Operating profit margin} &= (36,000 - 1,000 - 550) / 300,000 \\ &= 34,450 / 300,000 = 11.48\%\end{aligned}$$

$$\text{Operating ROA} = 34,450 / 31,025 = 111.04\%$$

Year 2:

$$\begin{aligned}\text{Total asset turnover ratio} &= 320,000 / [(30,000 + 1,750 + 32,000 + 1,200) / 2] \\ &= 320,000 / 32,475 = 9.85\end{aligned}$$

$$\begin{aligned}\text{Operating profit margin} &= (38,400 - 1,000 - 550) / 320,000 \\ &= 36,850 / 320,000 = 11.52\%\end{aligned}$$

$$\text{Operating ROA} = 36,850 / 32,475 = 113.47\%$$

### **SOONER Inc.**

Year 1:

$$\begin{aligned}\text{Total asset turnover ratio} &= 300,000 / [(30,300 + 30,000 + 1,150) / 2] \\ &= 300,000 / 30,725 = 9.76\end{aligned}$$

$$\begin{aligned}\text{Operating profit margin} &= (36,000 - 1,000 - 1,150) / 300,000 \\ &= 33,850 / 300,000 = 11.28\%\end{aligned}$$

$$\text{Operating ROA} = 33,850 / 30,725 = 110.17\%$$

Year 2:

$$\begin{aligned}\text{Total asset turnover ratio} &= 320,000 / [(30,000 + 1,150 + 32,000 + 575) / 2] \\ &= 320,000 / 31,862.50 = 10.04\end{aligned}$$

$$\begin{aligned}\text{Operating profit margin} &= (38,400 - 1,000 - 575) / 320,000 \\ &= 36,825 / 320,000 = 11.51\%\end{aligned}$$

$$\text{Operating ROA} = 36,825 / 31,862.50 = 115.57\%$$

**AZUSED Co.**

Year 1:

$$\begin{aligned}\text{Total asset turnover ratio} &= 300,000 / [(30,300 + 30,000 + 1,750) / 2] \\ &= 300,000 / 31,025 = 9.67\end{aligned}$$

$$\begin{aligned}\text{Operating profit margin} &= (36,000 - 1,000 - 550) / 300,000 \\ &= 34,450 / 300,000 = 11.48\%\end{aligned}$$

$$\text{Operating ROA} = 34,450 / 31,025 = 111.04\%$$

Year 2:

$$\begin{aligned}\text{Total asset turnover ratio} &= 320,000 / [(30,000 + 1,750 + 32,000 + 925) / 2] \\ &= 320,000 / 32,337.50 = 9.90\end{aligned}$$

$$\begin{aligned}\text{Operating profit margin} &= (38,400 - 1,000 - 825) / 320,000 \\ &= 36,575 / 320,000 = 11.43\%\end{aligned}$$

$$\text{Operating ROA} = 36,575 / 32,337.50 = 113.10\%$$

In many countries, a company must use the same depreciation methods for both financial and tax reporting. In other countries, including the United States, a company can use different depreciation methods for financial reporting and tax reporting. As a result of using different depreciation methods for financial and tax reporting, pre-tax income on the income statement and taxable income on the tax return may differ. Thus, the amount of tax expense computed on the basis of pre-tax income and the amount of taxes actually owed on the basis of taxable income may differ. Although these differences eventually reverse because the total depreciation is the same regardless of the timing of its recognition in financial statements versus on tax returns, during the period of the difference, the balance sheet will show what is known as deferred taxes. For instance, if a company uses straight-line depreciation for financial reporting and an accelerated depreciation method for tax purposes, the company's financial statements will report lower depreciation expense and higher pre-tax income in the first year, compared with the amount of depreciation expense and taxable income in its tax reporting. (Compare the depreciation expense in Year 1 for EVEN-LI Co. and SOONER Inc. in the previous example.) Tax expense calculated on the basis of the financial statements' pre-tax income will be higher than taxes payable on the basis of taxable income; the difference between the two amounts represents a deferred tax liability. The deferred tax liability will be reduced as the difference reverses (i.e., when depreciation for financial reporting is higher than the depreciation for tax purposes) and the income tax is paid.

Significant estimates required for calculating depreciation include the useful life of the asset (or its total lifetime productive capacity) and its expected residual value at the end of that useful life. A longer useful life and higher expected residual value decrease the amount of annual depreciation expense relative to a shorter useful life and lower expected residual value. Companies should review their estimates periodically to ensure they remain reasonable. IFRS require companies to review estimates annually.

Although no significant differences exist between IFRS and US GAAP with respect to the definition of depreciation and the acceptable depreciation methods, IFRS require companies to use a component method of depreciation.<sup>6</sup> Companies are required to

6 IAS 16 *Property, Plant and Equipment*, paragraphs 43–47 [Depreciation].



separately depreciate the significant components of an asset (parts of an item with a cost that is significant in relation to the total cost and/or with different useful lives) and thus require additional estimates for the various components. For instance, it may be appropriate to depreciate separately the engine, frame, and interior furnishings of an aircraft. Under US GAAP, the component method of depreciation is allowed but is seldom used in practice.<sup>7</sup> The following example illustrates depreciating components of an asset.

#### EXAMPLE 4

##### Illustration of Depreciating Components of an Asset

CUTITUP Co., a hypothetical company, purchases a milling machine, a type of machine used for shaping metal, at a total cost of \$10,000. \$2,000 was estimated to represent the cost of the rotating cutter, a significant component of the machine. The company expects the machine to have a useful life of eight years and a residual value of \$3,000 and that the rotating cutter will need to be replaced every two years. Assume the entire residual value is attributable to the milling machine itself, and assume the company uses straight-line depreciation for all assets.

1. How much depreciation expense would the company report in Year 1 if it uses the component method of depreciation, and how much depreciation expense would the company report in Year 1 if it does not use the component method?

##### Solution to 1:

Depreciation expense in Year 1 under the component method would be \$1,625. For the portion of the machine excluding the cutter, the depreciable base is total cost minus the cost attributable to the cutter minus the estimated residual value =  $\$10,000 - \$2,000 - \$3,000 = \$5,000$ . Depreciation expense for the machine excluding the cutter in the first year equals \$625 (depreciable cost divided by the useful life of the machine =  $\$5,000/8$  years). For the cutter, the depreciation expense equals \$1,000 (depreciable cost divided by the useful life of the cutter =  $\$2,000/2$  years). Thus, the total depreciation expense for Year 1 under the component method is \$1,625 (the sum of the depreciation expenses of the two components =  $\$625 + \$1,000$ ). Depreciation expense in Year 2 would also be \$1,625.

If the company does not use the component method, depreciation expense in Year 1 is \$875 (the depreciable cost of the total milling machine divided by its useful life =  $[\$10,000 - \$3,000]/8$  years). Depreciation expense in Year 2 would also be \$875.

2. Assuming a new cutter with an estimated two-year useful life is purchased at the end of Year 2 for \$2,000, what depreciation expenses would the com-

<sup>7</sup> According to KPMG's *IFRS Compared to US GAAP*, December 2017, kpmg.com.

pany report in Year 3 if it uses the component method and if it does not use the component method?

### Solution to 2:

Assuming that at the end of Year 2, the company purchases a new cutter for \$2,000 with an estimated two-year life, under the component method, the depreciation expense in Year 3 will remain at \$1,625. If the company does not use the component method and purchases a new cutter with an estimated two-year life for \$2,000 at the end of Year 2, the depreciation expense in Year 3 will be \$1,875 [ $\$875 + (\$2,000/2) = \$875 + \$1,000$ ].

3. Assuming replacement of the cutter every two years at a price of \$2,000, what is the total depreciation expense over the eight years if the company uses the component method compared with the total depreciation expense if the company does not use the component method?

### Solution to 3:

Over the eight years, assuming replacement of the cutters every two years at a price of \$2,000, the total depreciation expense will be \$13,000 [ $\$1,625 \times 8$  years] when the component method is used. When the component method is not used, the total depreciation expense will also be \$13,000 [ $\$875 \times 2$  years +  $\$1,875 \times 6$  years]. This amount equals the total expenditures of \$16,000 [ $\$10,000 + 3$  cutters  $\times$  \$2,000] less the residual value of \$3,000.

4. How many different items must the company estimate in the first year to compute depreciation expense for the milling machine if it uses the component method, and how does this compare with what would be required if it does not use the component method?

### Solution to 4:

The following table summarizes the estimates required in the first year to compute depreciation expense if the company does or does not use the component method:

Estimate	Required using component method?	Required if not using component method?
Useful life of milling machine	Yes	Yes
Residual value of milling machine	Yes	Yes
Portion of machine cost attributable to cutter	Yes	No
Portion of residual value attributable to cutter	Yes	No
Useful life of cutter	Yes	No

Total depreciation expense may be allocated between the cost of sales and other expenses. Within the income statement, depreciation expense of assets used in production is usually allocated to the cost of sales, and the depreciation expense of assets not used in production may be allocated to some other expense category. For instance, depreciation expense may be allocated to selling, general, and administrative expenses if depreciable assets are used in those functional areas. Notes to the financial

statements sometimes disclose information regarding which income statement line items include depreciation expense, although the exact amount of detail disclosed by individual companies varies.

## AMORTISATION OF LONG-LIVED ASSETS: METHODS AND CALCULATION

# 4

- ☐ explain and evaluate how impairment, revaluation, and derecognition of property, plant, and equipment and intangible assets affect financial statements and ratios
- ☐ describe the different amortisation methods for intangible assets with finite lives and calculate amortisation expense
- ☐ describe how the choice of amortisation method and assumptions concerning useful life and residual value affect amortisation expense, financial statements, and ratios

Amortisation is similar in concept to depreciation. The term amortisation applies to intangible assets, and the term depreciation applies to tangible assets. Both terms refer to the process of allocating the cost of an asset over the asset's useful life. Only those intangible assets assumed to have finite useful lives are amortised over their useful lives, following the pattern in which the benefits are used up. Acceptable amortisation methods are the same as the methods acceptable for depreciation. Assets assumed to have an indefinite useful life (in other words, without a finite useful life) are not amortised. An intangible asset is considered to have an indefinite useful life when there is "no foreseeable limit to the period over which the asset is expected to generate net cash inflows" for the company.<sup>8</sup>

Intangible assets with finite useful lives include an acquired customer list expected to provide benefits to a direct-mail marketing company for two to three years, an acquired patent or copyright with a specific expiration date, an acquired license with a specific expiration date and no right to renew the license, and an acquired trademark for a product that a company plans to phase out over a specific number of years. Examples of intangible assets with indefinite useful lives include an acquired license that, although it has a specific expiration date, can be renewed at little or no cost and an acquired trademark that, although it has a specific expiration, can be renewed at a minimal cost and relates to a product that a company plans to continue selling for the foreseeable future.

As with depreciation for a tangible asset, the calculation of amortisation for an intangible asset requires the original amount at which the intangible asset is recognised and estimates of the length of its useful life and its residual value at the end of its useful life. Useful lives are estimated on the basis of the expected use of the asset, considering any factors that may limit the life of the asset, such as legal, regulatory, contractual, competitive, or economic factors.

<sup>8</sup> IAS 38 *Intangible Assets*, paragraph 88.

**EXAMPLE 5****Amortisation Expense**

1. IAS 38 *Intangible Assets* provides illustrative examples regarding the accounting for intangible assets, including the following:

A direct-mail marketing company acquires a customer list and expects that it will be able to derive benefit from the information on the list for at least one year, but no more than three years. The customer list would be amortised over management's best estimate of its useful life, say 18 months. Although the direct-mail marketing company may intend to add customer names and other information to the list in the future, the expected benefits of the acquired customer list relate only to the customers on that list at the date it was acquired.

In this example, in what ways would management's decisions and estimates affect the company's financial statements?

**Solution:**

Because the acquired customer list is expected to generate future economic benefits for a period greater than one year, the cost of the list should be capitalised and not expensed. The acquired customer list is determined to not have an indefinite life and must be amortised. Management must estimate the useful life of the customer list and must select an amortisation method. In this example, the list appears to have no residual value. Both the amortisation method and the estimated useful life affect the amount of the amortisation expense in each period. A shorter estimated useful life, compared with a longer estimated useful life, results in a higher amortisation expense each year over a shorter period, but the *total* accumulated amortisation expense over the life of the intangible asset is unaffected by the estimate of the useful life. Similarly, the total accumulated amortisation expense over the life of the intangible asset is unaffected by the choice of amortisation method. The amortisation expense per period depends on the amortisation method. If the straight-line method is used, the amortisation expense is the same for each year of useful life. If an accelerated method is used, the amortisation expense will be higher in earlier years.

**5****THE REVALUATION MODEL**

- ☐ explain and evaluate how impairment, revaluation, and derecognition of property, plant, and equipment and intangible assets affect financial statements and ratios
- ☐ describe the revaluation model

The revaluation model is an alternative to the cost model for the periodic valuation and reporting of long-lived assets. IFRS permit the use of either the revaluation model or the cost model, but the revaluation model is not allowed under US GAAP.

Revaluation changes the carrying amounts of classes of long-lived assets to fair value (the fair value must be measured reliably). Under the cost model, carrying amounts are historical costs less accumulated depreciation or amortisation. Under the revaluation model, carrying amounts are the fair values at the date of revaluation less any subsequent accumulated depreciation or amortisation.

IFRS allow companies to value long-lived assets either under a cost model at historical cost minus accumulated depreciation or amortisation or under a revaluation model at fair value. In contrast, US accounting standards require that the cost model be used. A key difference between the two models is that the cost model allows only decreases in the values of long-lived assets compared with historical costs but the revaluation model may result in increases in the values of long-lived assets to amounts greater than historical costs.

IFRS allow a company to use the cost model for some classes of assets and the revaluation model for others, but the company must apply the same model to all assets within a particular class of assets and must revalue all items within a class to avoid selective revaluation. Examples of different classes of assets include land, land and buildings, machinery, motor vehicles, furniture and fixtures, and office equipment. The revaluation model may be used for classes of intangible assets but only if an active market for the assets exists, because the revaluation model may only be used if the fair values of the assets can be measured reliably. For practical purposes, the revaluation model is rarely used for either tangible or intangible assets, but its use is especially rare for intangible assets.

Under the revaluation model, whether an asset revaluation affects earnings depends on whether the revaluation initially increases or decreases an asset class's carrying amount. If a revaluation initially decreases the carrying amount of the asset class, the decrease is recognised in profit or loss. Later, if the carrying amount of the asset class increases, the increase is recognised in profit or loss to the extent that it reverses a revaluation decrease of the same asset class previously recognised in profit or loss. Any increase in excess of the reversal amount will not be recognised in the income statement but will be recorded directly to equity in a revaluation surplus account. An upward revaluation is treated the same as the amount in excess of the reversal amount. In other words, if a revaluation initially increases the carrying amount of the asset class, the increase in the carrying amount of the asset class bypasses the income statement and goes directly to equity under the heading of revaluation surplus. Any subsequent decrease in the asset's value first decreases the revaluation surplus and then goes to income. When an asset is retired or disposed of, any related amount of revaluation surplus included in equity is transferred directly to retained earnings.

Asset revaluations offer several considerations for financial statement analyses. First, an increase in the carrying amount of depreciable long-lived assets increases total assets and shareholders' equity, so asset revaluations that increase the carrying amount of an asset can be used to reduce reported leverage. Defining leverage as average total assets divided by average shareholders' equity, increasing both the numerator (assets) and denominator (equity) by the same amount leads to a decline in the ratio. (Mathematically, when a ratio is greater than one, as in this case, an increase in both the numerator and the denominator by the same amount leads to a decline in the ratio.) Therefore, the leverage motivation for the revaluation should be considered in analysis. For example, a company may revalue assets up if it is seeking new capital or approaching leverage limitations set by financial covenants.

Second, asset revaluations that decrease the carrying amount of the assets reduce net income. In the year of the revaluation, profitability measures such as return on assets and return on equity decline. However, because total assets and shareholders' equity are also lower, the company may appear more profitable in future years. Additionally, reversals of downward revaluations also go through income, thus increasing earnings. Managers can then opportunistically time the reversals to manage earnings and increase

income. Third, asset revaluations that increase the carrying amount of an asset initially increase depreciation expense, total assets, and shareholders' equity. Therefore, profitability measures, such as return on assets and return on equity, would decline. Although upward asset revaluations also generally decrease income (through higher depreciation expense), the increase in the value of the long-lived asset is presumably based on increases in the operating capacity of the asset, which will likely be evidenced in increased future revenues.

Finally, an analyst should consider who did the appraisal—i.e. an independent external appraiser or management—and how often revaluations are made. Appraisals of the fair value of long-lived assets involve considerable judgment and discretion. Presumably, appraisals of assets from independent external sources are more reliable. How often assets are revalued can provide an indicator of whether their reported value continues to be representative of their fair values.

The next two examples illustrate revaluation of long-lived assets under IFRS.

#### EXAMPLE 6

##### **Revaluation Resulting in an Increase in Carrying Amount Followed by Subsequent Revaluation Resulting in a Decrease in Carrying Amount**

UPFIRST, a hypothetical manufacturing company, has elected to use the revaluation model for its machinery. Assume for simplicity that the company owns a single machine, which it purchased for €10,000 on the first day of its fiscal period, and that the measurement date occurs simultaneously with the company's fiscal period end.

1. At the end of the first fiscal period after acquisition, assume the fair value of the machine is determined to be €11,000. How will the company's financial statements reflect the asset?

##### **Solution to 1:**

At the end of the first fiscal period, the company's balance sheet will show the asset at a value of €11,000. The €1,000 increase in the value of the asset will appear in other comprehensive income and be accumulated in equity under the heading of revaluation surplus.

2. At the end of the second fiscal period after acquisition, assume the fair value of the machine is determined to be €7,500. How will the company's financial statements reflect the asset?

##### **Solution to 2:**

At the end of the second fiscal period, the company's balance sheet will show the asset at a value of €7,500. The total decrease in the carrying amount of the asset is €3,500 (€11,000 – €7,500). Of the €3,500 decrease, the first €1,000 will reduce the amount previously accumulated in equity under the heading of revaluation surplus. The other €2,500 will be shown as a loss on the income statement.

**EXAMPLE 7****Revaluation Resulting in a Decrease in Asset's Carrying Amount Followed by Subsequent Revaluation Resulting in an Increase in Asset's Carrying Amount**

DOWNFIRST, a hypothetical manufacturing company, has elected to use the revaluation model for its machinery. Assume for simplicity that the company owns a single machine, which it purchased for €10,000 on the first day of its fiscal period, and that the measurement date occurs simultaneously with the company's fiscal period end.

1. At the end of the first fiscal period after acquisition, assume the fair value of the machine is determined to be €7,500. How will the company's financial statements reflect the asset?

**Solution to 1:**

At the end of the first fiscal period, the company's balance sheet will show the asset at a value of €7,500. The €2,500 decrease in the value of the asset will appear as a loss on the company's income statement.

2. At the end of the second fiscal period after acquisition, assume the fair value of the machine is determined to be €11,000. How will the company's financial statements reflect the asset?

**Solution to 2:**

At the end of the second fiscal period, the company's balance sheet will show the asset at a value of €11,000. The total increase in the carrying amount of the asset is an increase of €3,500 (€11,000 – €7,500). Of the €3,500 increase, the first €2,500 reverses a previously reported loss and will be reported as a gain on the income statement. The other €1,000 will bypass profit or loss, be reported as other comprehensive income, and be accumulated in equity under the heading of revaluation surplus.

Exhibit 1 provides two examples of disclosures concerning the revaluation model. The first disclosure is an excerpt from the 2006 annual report of KPN, a Dutch telecommunications and multimedia company. The report was produced at a time during which any IFRS-reporting company with a US stock exchange listing was required to explain differences between its reporting under IFRS and its reporting if it had used US GAAP.<sup>9</sup> One of these differences, as previously noted, is that US GAAP do not allow revaluation of fixed assets held for use. KPN's disclosure states that the company elected to report a class of fixed assets (cables) at fair value and explained that under US GAAP, using the cost model, the value of the asset class would have been €350 million lower. The second disclosure is an excerpt from the 2017 annual report of Avianca Holdings S.A., a Latin American airline that reports under IFRS and uses the revaluation model for one component of its fixed assets.

9 On 15 November 2007, the SEC approved rule amendments under which financial statements from foreign private issuers in the United States will be accepted without reconciliation to US GAAP if the financial statements are prepared in accordance with IFRS as issued by the International Accounting Standards Board. The rule took effect for the 2007 fiscal year. As a result, companies such as KPN no longer need to provide reconciliations to US GAAP.

**Exhibit 1: Impact of Revaluation**

1. Excerpt from the annual report of Koninklijke KPN N.V. explaining certain differences between IFRS and US GAAP regarding “Deemed cost fixed assets”:

KPN elected the exemption to revalue certain of its fixed assets upon the transition to IFRS to fair value and to use this fair value as their deemed cost. KPN applied the depreciated replacement cost method to determine this fair value. The revalued assets pertain to certain cables, which form part of property, plant & equipment. Under US GAAP, this revaluation is not allowed and therefore results in a reconciling item. As a result, the value of these assets as of December 31, 2006 under US GAAP is EUR 350 million lower (2005: EUR 415 million; 2004: EUR 487 million) than under IFRS.

*Source:* KPN’s Form 20-F, p. 168, filed 1 March 2007.

2. The 2017 annual report of Avianca Holdings S.A. and Subsidiaries shows \$58.4 million of “Revaluation and Other Reserves” as a component of Equity on its balance sheet and \$31.0 million in Other Comprehensive Income for the current year’s “Revaluation of Administrative Property.” The relevant footnote disclosure explains:

“Administrative property in Bogota, Medellín, El Salvador, and San Jose is recorded at fair value less accumulated depreciation on buildings and impairment losses recognized at the date of revaluation. Valuations are performed with sufficient frequency to ensure that the fair value of a revalued asset does not differ materially from its carrying amount. A revaluation reserve is recorded in other comprehensive income and credited to the asset revaluation reserve in equity. However, to the extent that it reverses a revaluation deficit of the same asset previously recognized in profit or loss, the increase is recognized in profit and loss. A revaluation deficit is recognized in the income statement, except to the extent that it offsets an existing surplus on the same asset recognized in the asset revaluation reserve. Upon disposal, any revaluation reserve relating to the particular asset being sold is transferred to retained earnings.

*Source:* AVIANCA HOLDINGS S.A. Form 20-F filed 01 May 2018.

Clearly, the use of the revaluation model as opposed to the cost model can have a significant impact on the financial statements of companies. This has potential consequences for comparing financial performance using financial ratios of companies that use different models.

**6****INVESTMENT PROPERTY**

compare the financial reporting of investment property with that of property, plant, and equipment



Investment property is defined under IFRS as property that is owned (or, in some cases, leased under a **finance lease**) for the purpose of earning rentals or capital appreciation or both.<sup>10</sup> An example of investment property is a building owned by a company and leased out to tenants. In contrast, other long-lived tangible assets (i.e., property considered to be property, plant, and equipment) are owner-occupied properties used for producing the company's goods and services or for housing the company's administrative activities. Investment properties do not include long-lived tangible assets held for sale in the ordinary course of business. For example, the houses and property owned by a housing construction company are considered to be its inventory.

Under IFRS, companies are allowed to value investment properties using either a cost model or a fair value model. The cost model is identical to the cost model used for property, plant, and equipment. If the cost model is used, the fair value of investment property must be disclosed.<sup>11</sup> The fair value model, however, differs from the revaluation model used for property, plant, and equipment. Under the revaluation model, whether an asset revaluation affects net income depends on whether the revaluation initially increases or decreases the carrying amount of the asset. In contrast, under the fair value model, all changes in the fair value of the asset affect net income. To use the fair value model, a company must be able to reliably determine the property's fair value on a continuing basis.

Example 8 presents an excerpt from the annual report of a property company reporting under IFRS.

#### EXAMPLE 8

### Financial Statement Presentation and Disclosures for Long-Lived Assets

The following exhibit presents information and excerpts from the annual report for the year ended 31 December 2017 of intu properties plc, a property company headquartered in London that owns, develops and manages shopping centres in the United Kingdom and Spain. Its common stock is listed in London and Johannesburg.

#### Exhibit 2: Information and Excerpts from the Annual Report of intu properties plc (Currency in £ millions)

##### Financial Information

Financial Statement	Item Label	Amount 2017	Amount 2016
Balance Sheet	Investment and development property	9,179.4	9,212.1
Balance Sheet	Plant and equipment	12.2	7.6
Balance Sheet	Total assets	10,794.5	10,369.2
Income Statement	Net rental income	423.4	406.1
Income Statement	Revaluation of investment and development property	30.8	(78.0)

##### Excerpt from Note 2 Accounting policies

<sup>10</sup> IAS 40 *Investment Property* prescribes the accounting treatment for investment property.

<sup>11</sup> Ibid., paragraph 32.

### **Investment and development property**

Investment and development property is owned or leased by the Group and held for long-term rental income and capital appreciation.

The Group has elected to use the fair value model. Properties are initially recognised at cost and subsequently revalued at the balance sheet date to fair value as determined by professionally qualified external valuers on the basis of market value with the exception of certain development land where an assessment of fair value may be made internally. External valuations are received for significant development land once required planning permissions are obtained. The cost of investment and development property includes capitalised interest and other directly attributable outgoings incurred during development. Interest is capitalised on the basis of the average interest rate on the relevant debt outstanding. Interest ceases to be capitalised on the date of practical completion.

Gains or losses arising from changes in the fair value of investment and development property are recognised in the income statement. Depreciation is not provided in respect of investment and development property. Gains or losses arising on the sale of investment and development property are recognised when the significant risks and rewards of ownership have been transferred to the buyer. The gain or loss recognised is the proceeds received less the carrying value of the property and costs directly associated with the sale.

### **Plant and equipment**

Plant and equipment consists of vehicles, fixtures, fittings and other equipment. Plant and equipment is stated at cost less accumulated depreciation and any accumulated impairment losses. Depreciation is charged to the income statement on a straight-line basis over an asset's estimated useful life up to a maximum of five years.

### **Excerpt from Note 14 Investment and development property**

The market value of investment and development property at 31 December 2017 includes £8,831.9 million (31 December 2016: £9,088.6 million) in respect of investment property and £376.5 million (31 December 2016: £153.2 million) in respect of development property. ...All the Group's significant investment and development property relates to prime shopping centres which are of a similar nature and share characteristics and risks....

### **Valuation methodology**

The fair value of the Group's investment and development property at 31 December 2017 was determined by independent external valuers ... Fair values for investment properties are calculated using the present value income approach. ...The key driver of the property valuations is the terms of the leases in place at the valuation date. These determine the majority of the cash flow profile of the property for a number of years and therefore form the base of the valuation...

1. How do the assets included in the balance sheet line item "Investment and development property" differ from the assets included in the balance sheet line item "Plant and equipment"?

### **Solution to 1:**

The assets included in the balance sheet line item "Investment and development property" are shopping centres which the company holds for long-term rental income and capital appreciation. In 2017, the company reported

net rental income of £423.4 million. The balance sheet line item “Plant and equipment” includes vehicles, fixtures, fittings, and other equipment used by the company in its operations.

2. How does the valuation model used by the company for its investment and development property differ from the valuation model used for its plant and equipment?

### **Solution to 2:**

The valuation model used by the company for its investment and development property is the fair value model, in which properties are initially recognised at cost and subsequently revalued and shown on the balance sheet at fair value. All changes in the fair value of the asset affect net income. The company employs external valuation experts to determine the fair value, which is based on expected future cash flow from rental income.

The valuation model used for its plant and equipment is the historical cost model in which properties are shown on the balance sheet at cost minus accumulated depreciation and any impairment losses.

3. How does accounting for depreciation differ for investment and development property versus plant and equipment?

### **Solution to 3:**

Depreciation in accounting refers to the allocation of the cost of a long-lived asset over its useful life. No depreciation is recorded for investment and development property. Depreciation expense for plant and equipment is calculated on a straight-line basis over the asset's estimated useful life.

4. Do the revaluation gains and losses on investment and development properties indicate that the properties have been sold?

### **Solution to 4:**

No. The revaluation gains and losses on investment properties arise from changes in the fair value of properties that are owned by the company. The company reported a revaluation gain of £30.8 million in 2017 and a revaluation loss of £78.0 million in 2016.

Sales of property would have resulted in a gain or loss on disposal, calculated as the proceeds minus the carrying value of the property and related selling costs.

In general, a company must apply its chosen model (cost or fair value) to all of its investment property. If a company chooses the fair value model for its investment property, it must continue to use the fair value model until it disposes of the property or changes its use such that it is no longer considered investment property (e.g., it becomes owner-occupied property or part of inventory). The company must continue to use the fair value model for that property even if transactions on comparable properties, used to estimate fair value, become less frequent.

Certain valuation issues arise when a company changes the use of property such that it moves from being an investment property to owner-occupied property or part of inventory. If a company's chosen model for investment property is the cost model, such transfers do not change the carrying amount of the property transferred. If a company's chosen model is the fair value model, transfers from investment property to owner-occupied property or to inventory are made at fair value. In other words,

the property's fair value at the time of transfer is considered to be its cost for ongoing accounting for the property. If a company's chosen model for investment property is the fair value model and it transfers a property from owner-occupied to investment property, the change in measurement of the property from depreciated cost to fair value is treated like a revaluation. If a company's chosen model is the fair value model and it transfers a property from inventory to investment property, any difference between the inventory carrying amount and the property's fair value at the time of transfer is recognised as profit or loss.

Investment property appears as a separate line item on the balance sheet. Companies are required to disclose whether they use the fair value model or the cost model for their investment property. If the company uses the fair value model, it must make additional disclosures about how it determines fair value and must provide reconciliation between the beginning and ending carrying amounts of investment property. If the company uses the cost model, it must make additional disclosures similar to those for property, plant, and equipment—for example, the depreciation method and useful lives must be disclosed. In addition, if the company uses the cost model, it must also disclose the fair value of investment property.

Under US GAAP, there is no specific definition of investment property. Most operating companies and real estate companies in the United States that hold investment-type property use the historical cost model.

## SUMMARY

- Expenditures related to long-lived assets are capitalised as part of the cost of assets if they are expected to provide future benefits, typically beyond one year. Otherwise, expenditures related to long-lived assets are expensed as incurred.
- Companies must capitalise interest costs associated with acquiring or constructing an asset that requires a long period of time to prepare for its intended use.
- Including capitalised interest in the calculation of interest coverage ratios provides a better assessment of a company's solvency.
- The capitalised costs of long-lived tangible assets and of intangible assets with finite useful lives are allocated to expense in subsequent periods over their useful lives. For tangible assets, this process is referred to as depreciation, and for intangible assets, it is referred to as amortisation.
- Long-lived tangible assets and intangible assets with finite useful lives are reviewed for impairment whenever changes in events or circumstances indicate that the carrying amount of an asset may not be recoverable.
- Intangible assets with an indefinite useful life are not amortised but are reviewed for impairment annually.
- Impairment disclosures can provide useful information about a company's expected cash flows.
- Methods of calculating depreciation or amortisation expense include the straight-line method, in which the cost of an asset is allocated to expense in equal amounts each year over its useful life; accelerated methods, in which the allocation of cost is greater in earlier years; and the units-of-production method, in which the allocation of cost corresponds to the actual use of an asset in a particular period.

- Estimates required for depreciation and amortisation calculations include the useful life of the equipment (or its total lifetime productive capacity) and its expected residual value at the end of that useful life. A longer useful life and higher expected residual value result in a smaller amount of annual depreciation relative to a shorter useful life and lower expected residual value.
- IFRS permit the use of either the cost model or the revaluation model for the valuation and reporting of long-lived assets, but the revaluation model is not allowed under US GAAP.
- Under the revaluation model, carrying amounts are the fair values at the date of revaluation less any subsequent accumulated depreciation or amortisation.

## PRACTICE PROBLEMS

1. JOOVI Inc. has recently purchased and installed a new machine for its manufacturing plant. The company incurred the following costs:

Purchase price	\$12,980
Freight and insurance	\$1,200
Installation	\$700
Testing	\$100
Maintenance staff training costs	\$500

The total cost of the machine to be shown on JOOVI's balance sheet is *closest* to:

- A. \$14,180.
  - B. \$14,980.
  - C. \$15,480.
2. Which costs incurred with the purchase of property and equipment are expensed?
- A. Delivery charges
  - B. Installation and testing
  - C. Training required to use the property and equipment
3. When constructing an asset for sale, directly related borrowing costs are *most likely*:
- A. expensed as incurred.
  - B. capitalized as part of inventory.
  - C. capitalized as part of property, plant, and equipment.
4. BAURU, S.A., a Brazilian corporation that prepares its financial statements in accordance with IFRS, borrows capital from a local bank to finance the construction of its manufacturing plant. The loan has the following conditions:

Borrowing date	1 January 2009
Amount borrowed	500 million Brazilian real (BRL)
Annual interest rate	14 percent
Term of the loan	3 years
Payment method	Annual payment of interest only. Principal amortization is due at the end of the loan term.

The construction of the plant takes two years, during which time BAURU earned BRL10 million by temporarily investing the loan proceeds. Which of the following is the amount of interest related to the plant construction (in BRL million) that can be capitalized in BAURU's balance sheet?

- A. 130.
- B. 140.

C. 210.

5. A financial analyst is studying the income statement effect of two alternative depreciation methods for a recently acquired piece of equipment. She gathers the following information about the equipment's expected production life and use:

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Units of production	2,000	2,000	2,000	2,000	2,500	10,500

Compared with the units-of-production method of depreciation, if the company uses the straight-line method to depreciate the equipment, its net income in Year 1 will *most likely* be:

- A. lower.
  - B. higher.
  - C. the same.
6. A company purchases a piece of equipment for €1,500. The equipment is expected to have a useful life of five years and no residual value. In the first year of use, the units of production are expected to be 15% of the equipment's lifetime production capacity and the equipment is expected to generate €1,500 of revenue and incur €500 of cash expenses.
- The depreciation method yielding the lowest operating profit on the equipment in the first year of use is:
- A. straight line.
  - B. units of production.
  - C. double-declining balance.
7. Juan Martinez, CFO of VIRMIN, S.A., is selecting the depreciation method to use for a new machine. The machine has an expected useful life of six years. Production is expected to be relatively low initially but to increase over time. The method chosen for tax reporting must be the same as the method used for financial reporting. If Martinez wants to minimize tax payments in the first year of the machine's life, which of the following depreciation methods is Martinez *most likely* to use?
- A. Straight-line method
  - B. Units-of-production method
  - C. Double-declining balance method

## The following information relates to questions 8-9

Miguel Rodriguez of MARIO S.A., an Uruguayan corporation, is computing the depreciation expense of a piece of manufacturing equipment for the fiscal year ended 31 December 2009. The equipment was acquired on 1 January 2009. Rodriguez gathers the following information (currency in Uruguayan pesos, UYP):

Cost of the equipment	UYP1,200,000
Estimated residual value	UYP200,000
Expected useful life	8 years
Total productive capacity	800,000 units
Production in FY 2009	135,000 units
Expected production for the next 7 years	95,000 units each year

8. If MARIO uses the straight-line method, the amount of depreciation expense on MARIO's income statement related to the manufacturing equipment is *closest* to:
    - A. 125,000.
    - B. 150,000.
    - C. 168,750.
  9. If MARIO uses the units-of-production method, the amount of depreciation expense (in UYP) on MARIO's income statement related to the manufacturing equipment is *closest* to:
    - A. 118,750.
    - B. 168,750.
    - C. 202,500.
- 
10. A company purchases equipment for \$200,000 with a five-year useful life and salvage value of zero. It uses the double-declining balance method of depreciation for two years, then shifts to straight-line depreciation at the beginning of Year 3. Compared with annual depreciation expense under the double-declining balance method, the resulting annual depreciation expense in Year 4 is:
    - A. smaller.
    - B. the same.
    - C. greater.

## The following information relates to questions 11-13

Melanie Hart, CFA, is a transportation analyst. Hart has been asked to write a research report on Altai Mountain Rail Company (AMRC). Like other companies in the railroad industry, AMRC's operations are capital intensive, with significant investments in such long-lived tangible assets as property, plant, and equipment. In November of 2008, AMRC's board of directors hired a new team to manage the company. In reviewing the company's 2009 annual report, Hart is concerned about some of the accounting choices that the new management has made. These choices differ from those of the previous management and from common industry practice. Hart has highlighted the following statements from the company's annual report:



Statement 1	“In 2009, AMRC spent significant amounts on track replacement and similar improvements. AMRC expensed rather than capitalised a significant proportion of these expenditures.”
Statement 2	“AMRC uses the straight-line method of depreciation for both financial and tax reporting purposes to account for plant and equipment.”
Statement 3	“In 2009, AMRC recognized an impairment loss of €50 million on a fleet of locomotives. The impairment loss was reported as ‘other income’ in the income statement and reduced the carrying amount of the assets on the balance sheet.”

Exhibit 1 and Exhibit 2 contain AMRC’s 2009 consolidated income statement and balance sheet. AMRC prepares its financial statements in accordance with International Financial Reporting Standards.

### Exhibit 1: Consolidated Statement of Income

For the Years Ended 31 December	2009		2008	
	€ Millions	% Revenues	€ Millions	% Revenues
Operating revenues	2,600	100.0	2,300	100.0
Operating expenses				
Depreciation	(200)	(7.7)	(190)	(8.3)
Other operating expense	(1,590)	(61.1)	(1,515)	(65.9)
Total operating expenses	(1,790)	(68.8)	(1,705)	(74.2)
Operating income	810	31.2	595	25.8
Other income	(50)	(1.9)	—	0.0
Interest expense	(73)	(2.8)	(69)	(3.0)
Income before taxes	687	26.5	526	22.8
Income taxes	(272)	(10.5)	(198)	(8.6)
Net income	415	16	328	14.2

### Exhibit 2: Consolidated Balance Sheet

As of 31 December	2009		2008	
	€ Millions	% Assets	€ Millions	% Assets
<b>Assets</b>				
Current assets	500	9.4	450	8.5
Property & equipment:				
Land	700	13.1	700	13.2
Plant & equipment	6,000	112.1	5,800	109.4
Total property & equipment	6,700	125.2	6,500	122.6
Accumulated depreciation	(1,850)	(34.6)	(1,650)	(31.1)

As of 31 December	2009		2008	
Assets	€ Millions	% Assets	€ Millions	% Assets
Net property & equipment	4,850	90.6	4,850	91.5
Total assets	5,350	100.0	5,300	100.0
<b>Liabilities and Shareholders' Equity</b>				
Current liabilities	480	9.0	430	8.1
Long-term debt	1,030	19.3	1,080	20.4
Other long-term provisions and liabilities	1,240	23.1	1,440	27.2
Total liabilities	2,750	51.4	2,950	55.7
Shareholders' equity				
Common stock and paid-in-surplus	760	14.2	760	14.3
Retained earnings	1,888	35.5	1,600	30.2
Other comprehensive losses	(48)	(0.9)	(10)	(0.2)
Total shareholders' equity	2,600	48.6	2,350	44.3
Total liabilities & shareholders' equity	5,350	100.0	5,300	100.0

11. With respect to Statement 1, which of the following is the *most likely* effect of management's decision to expense rather than capitalise these expenditures?
- 2009 net profit margin is higher than if the expenditures had been capitalised.
  - 2009 total asset turnover is lower than if the expenditures had been capitalised.
  - Future profit growth will be higher than if the expenditures had been capitalised.
12. With respect to Statement 2, what would be the *most likely* effect in 2010 if AMRC were to switch to an accelerated depreciation method for both financial and tax reporting?
- Net profit margin would increase.
  - Total asset turnover would decrease.
  - Cash flow from operating activities would increase.
13. With respect to Statement 3, what is the *most likely* effect of the impairment loss?
- Net income in years prior to 2009 was likely understated.
  - Net profit margins in years after 2009 will likely exceed the 2009 net profit margin.
  - Cash flow from operating activities in 2009 was likely lower due to the impairment loss.

## The following information relates to questions 14-17

Brian Jordan is interviewing for a junior equity analyst position at Orion Investment Advisors. As part of the interview process, Mary Benn, Orion's Director of Research, provides Jordan with information about two hypothetical companies, Alpha and Beta, and asks him to comment on the information on their financial statements and ratios. Both companies prepare their financial statements in accordance with International Financial Reporting Standards (IFRS) and are identical in all respects except for their accounting choices.

Jordan is told that at the beginning of the current fiscal year, both companies purchased a major new computer system and began building new manufacturing plants for their own use. Alpha capitalised and Beta expensed the cost of the computer system; Alpha capitalised and Beta expensed the interest costs associated with the construction of the manufacturing plants.

Benn asks Jordan, "What was the impact of these decisions on each company's current fiscal year financial statements and ratios?"

Jordan responds, "Alpha's decision to capitalise the cost of its new computer system instead of expensing it results in lower net income, lower total assets, and higher cash flow from operating activities in the current fiscal year. Alpha's decision to capitalise its interest costs instead of expensing them results in a lower fixed asset turnover ratio and a higher interest coverage ratio."

Jordan is told that Alpha uses the straight-line depreciation method and Beta uses an accelerated depreciation method; both companies estimate the same useful lives for long-lived assets. Many companies in their industry use the units-of-production method.

Benn asks Jordan, "What are the financial statement implications of each depreciation method, and how do you determine a company's need to reinvest in its productive capacity?"

Jordan replies, "All other things being equal, the straight-line depreciation method results in the least variability of net profit margin over time, while an accelerated depreciation method results in a declining trend in net profit margin over time. The units-of-production can result in a net profit margin trend that is quite variable. I use a three-step approach to estimate a company's need to reinvest in its productive capacity. First, I estimate the average age of the assets by dividing net property, plant, and equipment by annual depreciation expense. Second, I estimate the average remaining useful life of the assets by dividing accumulated depreciation by depreciation expense. Third, I add the estimates of the average remaining useful life and the average age of the assets in order to determine the total useful life."

Jordan is told that at the end of the current fiscal year, Alpha revalued a manufacturing plant; this increased its reported carrying amount by 15 percent. There was no previous downward revaluation of the plant. Beta recorded an impairment loss on a manufacturing plant; this reduced its carrying by 10 percent.

Benn asks Jordan "What was the impact of these decisions on each company's current fiscal year financial ratios?"

Jordan responds, "Beta's impairment loss increases its debt to total assets and fixed asset turnover ratios, and lowers its cash flow from operating activities. Alpha's revaluation increases its debt to capital and return on assets ratios, and reduces its return on equity."

At the end of the interview, Benn thanks Jordan for his time and states that a hiring decision will be made shortly.

14. Jordan's response about the financial statement impact of Alpha's decision to capitalise the cost of its new computer system is most likely *correct* with respect to:
- A. lower net income.
  - B. lower total assets.
  - C. higher cash flow from operating activities.
15. Jordan's response about the ratio impact of Alpha's decision to capitalise interest costs is most likely *correct* with respect to the:
- A. interest coverage ratio.
  - B. fixed asset turnover ratio.
  - C. interest coverage and fixed asset turnover ratios.
16. Jordan's response about the impact of the different depreciation methods on net profit margin is most likely *incorrect* with respect to:
- A. accelerated depreciation.
  - B. straight-line depreciation.
  - C. units-of-production depreciation.
17. Jordan's response about the effect of Alpha's revaluation is most likely *correct* with respect to the impact on its:
- A. return on equity.
  - B. return on assets.
  - C. debt to capital ratio.
- 
18. Which of the following amortization methods is *most likely* to evenly distribute the cost of an intangible asset over its useful life?
- A. Straight-line method
  - B. Units-of-production method
  - C. Double-declining balance method
19. Which of the following will cause a company to show a lower amount of amortization of intangible assets in the first year after acquisition?
- A. A higher residual value
  - B. A higher amortization rate
  - C. A shorter useful life
20. An analyst in the finance department of BOOLDO S.A., a French corporation, is computing the amortization of a customer list, an intangible asset, for the fiscal year ended 31 December 2009. She gathers the following information about the

asset:

Acquisition cost	€2,300,000
Acquisition date	1 January 2008
Expected residual value at time of acquisition	€500,000

The customer list is expected to result in extra sales for three years after acquisition. The present value of these expected extra sales exceeds the cost of the list.

If the analyst uses the straight-line method, the amount of accumulated amortization related to the customer list as of 31 December 2009 is *closest* to:

- A. €600,000.
- B. €1,200,000.
- C. €1,533,333.

21. A financial analyst is analyzing the amortization of a product patent acquired by MAKETTI S.p.A., an Italian corporation. He gathers the following information about the patent:

Acquisition cost	€5,800,000
Acquisition date	1 January 2009
Patent expiration date	31 December 2015
Total plant capacity of patented product	40,000 units per year
Production of patented product in fiscal year ended 31 December 2009	20,000 units
Expected production of patented product during life of the patent	175,000 units

If the analyst uses the units-of-production method, the amortization expense on the patent for fiscal year 2009 is *closest* to:

- A. €414,286.
- B. €662,857.
- C. €828,571.

22. A company acquires a patent with an expiration date in six years for ¥100 million. The company assumes that the patent will generate economic benefits that will decline over time and decides to amortize the patent using the double-declining balance method. The annual amortization expense in Year 4 is closest to:

- A. ¥6.6 million.
- B. ¥9.9 million.
- C. ¥19.8 million.

23. A company is comparing straight-line and double-declining balance amortization methods for a non-renewable six-year license, acquired for €600,000. The difference between the Year 4 ending net book values using the two methods is *closest* to:

- A. €81,400.
- B. €118,600.

- C. €200,000.
24. MARU S.A. de C.V., a Mexican corporation that follows IFRS, has elected to use the revaluation model for its property, plant, and equipment. One of MARU's machines was purchased for 2,500,000 Mexican pesos (MXN) at the beginning of the fiscal year ended 31 March 2010. As of 31 March 2010, the machine has a fair value of MXN3,000,000. Should MARU show a profit for the revaluation of the machine?
- A. Yes
  - B. No, because this revaluation is recorded directly in equity
  - C. No, because value increases resulting from revaluation can never be recognized as a profit
25. Which of the following characteristics is *most likely* to differentiate investment property from property, plant, and equipment?
- A. It is tangible.
  - B. It earns rent.
  - C. It is long-lived.
26. If a company uses the fair value model to value investment property, changes in the fair value of the asset are *least likely* to affect:
- A. net income.
  - B. net operating income.
  - C. other comprehensive income.
27. Investment property is *most likely* to:
- A. earn rent.
  - B. be held for resale.
  - C. be used in the production of goods and services.
28. A company is *most likely* to:
- A. use a fair value model for some investment property and a cost model for other investment property.
  - B. change from the fair value model when transactions on comparable properties become less frequent.
  - C. change from the fair value model when the company transfers investment property to property, plant, and equipment.
29. Under the revaluation model for property, plant, and equipment and the fair value model for investment property:
- A. fair value of the asset must be able to be measured reliably.
  - B. net income is affected by all changes in the fair value of the asset.

- C.** net income is never affected if the asset increases in value from its carrying amount.
- 30. Under IFRS, what must be disclosed under the cost model of valuation for investment properties?
  - A.** Useful lives
  - B.** The method for determining fair value
  - C.** Reconciliation between beginning and ending carrying amounts of investment property

## SOLUTIONS

1. B is correct. Only costs necessary for the machine to be ready to use can be capitalized. Therefore, Total capitalized costs =  $12,980 + 1,200 + 700 + 100 = \$14,980$ .
2. C is correct. When property and equipment are purchased, the assets are recorded on the balance sheet at cost. Costs for the assets include all expenditures required to prepare the assets for their intended use. Any other costs are expensed. Costs to train staff for using the machine are not required to prepare the property and equipment for their intended use, and these costs are expensed.
3. B is correct. When a company constructs an asset, borrowing costs incurred directly related to the construction are generally capitalized. If the asset is constructed for sale, the borrowing costs are classified as inventory.
4. A is correct. Borrowing costs can be capitalized under IFRS until the tangible asset is ready for use. Also, under IFRS, income earned on temporarily investing the borrowed monies decreases the amount of borrowing costs eligible for capitalization. Therefore, Total capitalized interest =  $(500 \text{ million} \times 14\% \times 2 \text{ years}) - 10 \text{ million} = 130 \text{ million}$ .
5. A is correct. If the company uses the straight-line method, the depreciation expense will be one-fifth (20 percent) of the depreciable cost in Year 1. If it uses the units-of-production method, the depreciation expense will be 19 percent  $(2,000/10,500)$  of the depreciable cost in Year 1. Therefore, if the company uses the straight-line method, its depreciation expense will be higher and its net income will be lower.
6. C is correct. The operating income or earnings before interest and taxes will be lowest for the method that results in the highest depreciation expense. The double-declining balance method results in the highest depreciation expense in the first year of use.  
Depreciation expense:  
Straight line =  $\text{€}1,500/5 = \text{€}300$ .  
Double-declining balance =  $\text{€}1,500 \times 0.40 = \text{€}600$ .  
Units of production =  $\text{€}1,500 \times 0.15 = \text{€}225$ .
7. C is correct. If Martinez wants to minimize tax payments in the first year of the machine's life, he should use an accelerated method, such as the double-declining balance method.
8. A is correct. Using the straight-line method, depreciation expense amounts to  
Depreciation expense =  $(1,200,000 - 200,000)/8 \text{ years} = 125,000$ .
9. B is correct. Using the units-of-production method, depreciation expense amounts to  
Depreciation expense =  $(1,200,000 - 200,000) \times (135,000/800,000) = 168,750$ .
10. C is correct. Shifting at the end of Year 2 from double-declining balance to straight-line depreciation methodology results in depreciation expense being the same in each of Years 3, 4, and 5. Shifting to the straight-line methodology at the



beginning of Year 3 results in a greater depreciation expense in Year 4 than would have been calculated using the double-declining balance method.

Depreciation expense Year 4 (Using double-declining balance method all five years)

$$= 2 \times \text{Annual depreciation \% using straight-line method} \times \text{Carrying amount at end of Year 3}$$

$$= 40\% \times \$43,200$$

Depreciation expense Year 4 with switch to straight-line method in Year 3

$$= 1/3 \times \text{Remaining depreciable cost at start of Year 3}$$

$$= 1/3 \times \$72,000$$

$$= \$24,000$$

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Equipment	
Purchase Price	\$200,000
Expected Salvage Value	\$0
Useful Life in Years	5
Depreciation Method	Double declining
Straight Line Amortization	20.00%
Double Declining Balance	40.00%
Straight Line Amortization % for Last 3 Years	33.33%

**Double Declining First 2 Years Only**

	Year 1	2	3	4	5
Beginning Balance	200,000	120,000	72,000	48,000	24,000
Annual Depreciation Expense	120,000	48,000	24,000	24,000	24,000
Ending Balance	80,000	72,000	48,000	24,000	0

**Double Declining All 5 Years**

	Year 1	2	3	4	5
Beginning Balance	200,000	120,000	72,000	43,200	25,920

Annual Depreciation Expense	120,000	48,000	28,800	17,280	10,368
Ending Balance	80,000	72,000	43,200	25,920	15,5520

11. C is correct. Expensing rather than capitalising an investment in long-term assets will result in higher expenses and lower net income and net profit margin in the current year. Future years' incomes will not include depreciation expense related to these expenditures. Consequently, year-to-year growth in profitability will be higher. If the expenses had been capitalised, the carrying amount of the assets would have been higher and the 2009 total asset turnover would have been lower.
12. C is correct. In 2010, switching to an accelerated depreciation method would increase depreciation expense and decrease income before taxes, taxes payable, and net income. Cash flow from operating activities would increase because of the resulting tax savings.
13. B is correct. 2009 net income and net profit margin are lower because of the impairment loss. Consequently, net profit margins in subsequent years are likely to be higher. An impairment loss suggests that insufficient depreciation expense was recognized in prior years, and net income was overstated in prior years. The impairment loss is a non-cash item and will not affect operating cash flows.
14. C is correct. The decision to capitalise the costs of the new computer system results in higher cash flow from operating activities; the expenditure is reported as an outflow of investing activities. The company allocates the capitalised amount over the asset's useful life as depreciation or amortisation expense rather than expensing it in the year of expenditure. Net income and total assets are higher in the current fiscal year.
15. B is correct. Alpha's fixed asset turnover will be lower because the capitalised interest will appear on the balance sheet as part of the asset being constructed. Therefore, fixed assets will be higher and the fixed asset turnover ratio (total revenue/average net fixed assets) will be lower than if it had expensed these costs. Capitalised interest appears on the balance sheet as part of the asset being constructed instead of being reported as interest expense in the period incurred. However, the interest coverage ratio should be based on interest payments, not interest expense (earnings before interest and taxes/interest payments), and should be unchanged. To provide a true picture of a company's interest coverage, the entire amount of interest expenditure, both the capitalised portion and the expensed portion, should be used in calculating interest coverage ratios.
16. A is correct. Accelerated depreciation will result in an improving, not declining, net profit margin over time, because the amount of depreciation expense declines each year. Under straight-line depreciation, the amount of depreciation expense will remain the same each year. Under the units-of-production method, the amount of depreciation expense reported each year varies with the number of units produced.
17. A is correct. In an asset revaluation, the carrying amount of the assets increases. The increase in the asset's carrying amount bypasses the income statement and is reported as other comprehensive income and appears in equity under the heading of revaluation surplus. Therefore, shareholders' equity will increase but net income will not be affected, so return on equity will decline. Return on assets and debt to capital ratios will also decrease.

18. A is correct. The straight-line method is the method that evenly distributes the cost of an asset over its useful life because amortization is the same amount every year.

19. A is correct. A higher residual value results in a lower total depreciable cost and, therefore, a lower amount of amortization in the first year after acquisition (and every year after that).

20. B is correct. Using the straight-line method, accumulated amortization amounts to

$$\begin{aligned}\text{Accumulated amortization} &= [(2,300,000 - 500,000)/3 \text{ years}] \times 2 \text{ years} \\ &= 1,200,000\end{aligned}$$

21. B is correct. Using the units-of-production method, depreciation expense amounts to

$$\text{Depreciation expense} = 5,800,000 \times (20,000/175,000) = 662,857$$

22. B is correct. As shown in the following calculations, under the double-declining balance method, the annual amortization expense in Year 4 is closest to ¥9.9 million.

$$\text{Annual amortization expense} = 2 \times \text{Straight-line amortization rate} \times \text{Net book value.}$$

$$\text{Amortization expense Year 4} = 33.3\% \times \text{¥29.6 million} = \text{¥9.9 million.}$$

Patent Acquisition Price	\$100,000,000					
Life of patent in years	6					
Depreciation Method	Double declining					
Straight line Amortization	16.67%					
Double Declining Balance	33.33%					
	<b>Year 1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Beginning Balance	\$100,000,000	66,666,667	44,444,444	29,629,630	19,753,086	13,168,724
Annual Amortization Expense	33,333,333	22,222,222	14,814,815	9,876,543	6,584,362	4,389,575
Ending Balance	66,666,667	44,444,444	29,629,630	19,753,086	13,168,724	8,779,150

23. A is correct. As shown in the following calculations, at the end of Year 4, the difference between the net book values calculated using straight-line versus

double-declining balance amortization is closest to €81,400.

Net book value end of Year 4 using straight-line method = €600,000 –  $[4 \times (\text{€}600,000/6)] = \text{€}200,000$ .

Net book value end of Year 4 using double-declining balance method = €600,000  $(1 - 33.33\%)^4 \approx \text{€}118,600$ .

24. B is correct. In this case, the value increase brought about by the revaluation should be recorded directly in equity. The reason is that under IFRS, an increase in value brought about by a revaluation can only be recognized as a profit to the extent that it reverses a revaluation decrease of the same asset previously recognized in the income statement.
25. B is correct. Investment property earns rent. Investment property and property, plant, and equipment are tangible and long-lived.
26. C is correct. When a company uses the fair value model to value investment property, changes in the fair value of the property are reported in the income statement—not in other comprehensive income.
27. A is correct. Investment property earns rent. Inventory is held for resale, and property, plant, and equipment are used in the production of goods and services.
28. C is correct. A company will change from the fair value model to either the cost model or revaluation model when the company transfers investment property to property, plant, and equipment.
29. A is correct. Under both the revaluation model for property, plant, and equipment and the fair value model for investment property, the asset's fair value must be able to be measured reliably. Under the fair value model, net income is affected by all changes in the asset's fair value. Under the revaluation model, any increase in an asset's value to the extent that it reverses a previous revaluation decrease will be recognized on the income statement and increase net income.
30. A is correct. Under IFRS, when using the cost model for its investment properties, a company must disclose useful lives. The method for determining fair value, as well as reconciliation between beginning and ending carrying amounts of investment property, is a required disclosure when the fair value model is used.

## LEARNING MODULE

# 7

## Income Taxes

by Elbie Louw, PhD, CFA, CIPM, and Michael A. Broihahn, CPA, CIA, CFA.

*Elbie Louw, PhD, CFA, CIPM (South Africa). Michael A. Broihahn, CPA, CIA, CFA, is at Barry University (USA).*

### LEARNING OUTCOMES

<i>Mastery</i>	<i>The candidate should be able to:</i>
<input type="checkbox"/>	calculate the tax base of a company's assets and liabilities
<input type="checkbox"/>	calculate income tax expense, income taxes payable, deferred tax assets, and deferred tax liabilities, and calculate and interpret the adjustment to the financial statements related to a change in the income tax rate
<input type="checkbox"/>	evaluate the effect of tax rate changes on a company's financial statements and ratios
<input type="checkbox"/>	identify and contrast temporary versus permanent differences in pre-tax accounting income and taxable income
<input type="checkbox"/>	explain recognition and measurement of current and deferred tax items
<input type="checkbox"/>	describe the valuation allowance for deferred tax assets—when it is required and what effect it has on financial statements

**Note:** Changes in accounting standards as well as new rulings and/or pronouncements issued after the publication of the readings on financial reporting and analysis may cause some of the information in these readings to become dated. Candidates are *not* responsible for anything that occurs after the readings were published. In addition, candidates are expected to be familiar with the analytical frameworks contained in the readings, as well as the implications of alternative accounting methods for financial analysis and valuation discussed in the readings. Candidates are also responsible for the content of accounting standards, but not for the actual reference numbers. Finally, candidates should be aware that certain ratios may be defined and calculated differently. When alternative ratio definitions exist and no specific definition is given, candidates should use the ratio definitions emphasized in the readings.

## 1

## INTRODUCTION

For those companies reporting under International Financial Reporting Standards (IFRS), IAS 12 [Income Taxes] covers accounting for a company's income taxes and the reporting of deferred taxes. For those companies reporting under United States generally accepted accounting principles (US GAAP), FASB ASC Topic 740 [Income Taxes] is the primary source for information on accounting for income taxes. Although IFRS and US GAAP follow similar conventions on many income tax issues, there are some key differences.

Differences between how and when transactions are recognized for financial reporting purposes relative to tax reporting can give rise to differences in tax expense and related tax assets and liabilities. To reconcile these differences, companies that report under either IFRS or US GAAP recognize a deferred tax asset or deferred tax liability account on the balance sheet, depending on the nature of the situation.

Deferred tax assets or liabilities usually arise when accounting standards and tax authorities recognize revenues and expenses at different times. Because timing differences such as these will eventually reverse over time, they are called “temporary differences.” Deferred tax assets represent taxes that have been recognized for tax reporting purposes (or often the carrying forward of losses from previous periods) but have not yet been recognized on the income statement prepared for financial reporting purposes. Deferred tax liabilities represent tax expense that has appeared on the income statement for financial reporting purposes, but has not yet become payable under tax regulations.

## 2

## DETERMINING THE TAX BASE OF ASSETS AND LIABILITIES



calculate the tax base of a company's assets and liabilities

The tax base of an asset or liability is the amount attributed to the asset or liability for tax purposes, whereas the carrying amount is based on accounting principles. Such a difference is considered temporary if it is expected that the taxes will be recovered or payable at a future date.

### Determining the Tax Base of an Asset

The tax base of an asset is the amount that will be deductible for tax purposes in future periods as the economic benefits become realized and the company recovers the carrying amount of the asset.

For example, a company depreciates equipment on a straight-line basis at a rate of 10 percent per year. The tax authorities allow depreciation of approximately 15 percent per year. At the end of the fiscal year, the carrying amount of equipment for accounting purposes is greater than the asset tax base thus resulting in a temporary difference.

**EXAMPLE 1****Determining the Tax Base of an Asset**

1. The following information pertains to Entiguan Sports, a hypothetical developer of products used to treat sports-related injuries. (The treatment of items for accounting and tax purposes is based on hypothetical accounting and tax standards and is not specific to a particular jurisdiction.) Calculate the tax base and carrying amount for each item.
  1. *Dividends receivable*: On its balance sheet, Entiguan Sports reports dividends of €1 million receivable from a subsidiary. Assume that dividends are not taxable.
  2. *Development costs*: Entiguan Sports capitalized development costs of €3 million during the year. Entiguan amortized €500,000 of this amount during the year. For tax purposes amortization of 25 percent per year is allowed.
  3. *Research costs*: Entiguan incurred €500,000 in research costs, which were all expensed in the current fiscal year for financial reporting purposes. Assume that applicable tax legislation requires research costs to be expensed over a four-year period rather than all in one year.
  4. *Accounts receivable*: Included on the income statement of Entiguan Sports is a provision for doubtful debt of €125,000. The accounts receivable amount reflected on the balance sheet, after taking the provision into account, amounts to €1,500,000. The tax authorities allow a deduction of 25 percent of the gross amount for doubtful debt.

**Solutions:**

	Carrying Amount (€)	Tax Base (€)	Temporary Difference (€)
1. Dividends receivable	1,000,000	1,000,000	0
2. Development costs	2,500,000	2,250,000	250,000
3. Research costs	0	375,000	(375,000)
4. Accounts receivable	1,500,000	1,218,750	281,250

**Comments:**

1. *Dividends receivable*: Although the dividends received are economic benefits from the subsidiary, we are assuming that dividends are not taxable. Therefore, the carrying amount equals the tax base for dividends receivable.
2. *Development costs*: First, we assume that development costs will generate economic benefits for Entiguan Sports. Therefore, they may be included as an asset on the balance sheet for the purposes of this example. Second, the amortization allowed by the tax authorities exceeds the amortization accounted for based on accounting rules. Therefore, the carrying amount of the asset exceeds its tax base. The carrying amount is  $(€3,000,000 - €500,000) = €2,500,000$  whereas the tax base is  $[€3,000,000 - (25\% \times €3,000,000)] = €2,250,000$ .

3. *Research costs:* We assume that research costs will result in future economic benefits for the company. If this were not the case, creation of a deferred tax asset or liability would not be allowed. The tax base of research costs exceeds their carrying amount. The carrying amount is €0 because the full amount has been expensed for financial reporting purposes in the year in which it was incurred. Therefore, there would not have been a balance sheet item “Research costs” for tax purposes, and only a proportion may be deducted in the current fiscal year. The tax base of the asset is  $(€500,000 - €500,000/4) = €375,000$ .
4. *Accounts receivable:* The economic benefits that should have been received from accounts receivable have already been included in revenues in the calculation of the taxable income when the sales occurred. Because the receipt of a portion of the accounts receivable is doubtful, the provision is allowed. The provision, based on tax legislation, results in a greater amount allowed in the current fiscal year than would be the case under accounting principles. This results in the tax base of accounts receivable being lower than its carrying amount. Note that the example specifically states that the balance sheet amount for accounts receivable after the provision for accounting purposes amounts to €1,500,000. Therefore, accounts receivable before any provision was  $€1,500,000 + €125,000 = €1,625,000$ . The tax base is calculated as  $(€1,500,000 + €125,000) - [25\% \times (€1,500,000 + €125,000)] = €1,218,750$ .

## Determining the Tax Base of a Liability

The tax base of a liability is the carrying amount of the liability less any amounts that will be deductible for tax purposes in the future. With respect to payments from customers received in advance of providing the goods and services, the tax base of such a liability is the carrying amount less any amount of the revenue that will not be taxable in future. Keep in mind the following fundamental principle: In general, a company will recognize a deferred tax asset or liability when recovery/settlement of the carrying amount will affect future tax payments by either increasing or reducing the taxable profit. Remember, an analyst is evaluating not only the difference between the carrying amount and the tax base, but the relevance of that difference on future profits and losses and thus by implication future taxes.

IFRS offers specific guidelines with regard to revenue received in advance: IAS 12 states that the tax base is the carrying amount less any amount of the revenue that will not be taxed at a future date. Under US GAAP, an analysis of the tax base would result in a similar outcome. The tax legislation within the jurisdiction will determine the amount recognized on the income statement and whether the liability (revenue received in advance) will have a tax base greater than zero. This will depend on how tax legislation recognizes revenue received in advance.

### EXAMPLE 2

#### Determining the Tax Base of a Liability

1. The following information pertains to the hypothetical company Entiguan Sports for the fiscal year-end. The treatment of items for accounting and tax purposes is based on fictitious accounting and tax standards and is not spe-



cific to a particular jurisdiction. Calculate the tax base and carrying amount for each item.

1. *Donations*: Entiguan Sports made donations of €100,000 in the current fiscal year. The donations were expensed for financial reporting purposes, but are not tax deductible based on applicable tax legislation.
2. *Interest received in advance*: Entiguan Sports received in advance interest of €300,000. The interest is taxed because tax authorities recognize the interest to accrue to the company (part of taxable income) on the date of receipt.
3. *Rent received in advance*: Entiguan recognized €10 million for rent received in advance from a lessee for an unused warehouse building. Rent received in advance is deferred for accounting purposes but taxed on a cash basis.
4. *Loan*: Entiguan Sports secured a long-term loan for €550,000 in the current fiscal year. Interest is charged at 13.5 percent per annum and is payable at the end of each fiscal year.

### Solutions:

	Carrying Amount (€)	Tax Base (€)	Temporary Difference (€)
1. Donations	0	0	0
2. Interest received in advance	300,000	0	(300,000)
3. Rent received in advance	10,000,000	0	(10,000,000)
4. Loan (capital)	0	0	0
Interest paid	0	0	0

### Comments:

1. *Donations*: The amount of €100,000 was immediately expensed on Entiguan's income statement; therefore, the carrying amount is €0. Tax legislation does not allow donations to be deducted for tax purposes, so the tax base of the donations equals the carrying amount. Note that while the carrying amount and tax base are the same, the difference in the treatment of donations for accounting and tax purposes (expensed for accounting purposes, but not deductible for tax purposes) represents a permanent difference (a difference that will not be reversed in the future).
2. *Interest received in advance*: Based on the information provided, for tax purposes, interest is deemed to accrue to the company on the date of receipt. For tax purposes, it is thus irrelevant whether it is for the current or a future accounting period; it must be included in taxable income in the financial year received. Interest received in advance is, for accounting purposes, included in the financial period in which it is deemed to have been earned. For this reason, the interest income received in advance is a balance sheet liability. It was not included on the income statement because the income relates to a future financial year. Because the full €300,000 is included in taxable income in the current fiscal year, the tax base is €300,000 – 300,000 = €0. Note that

although interest received in advance and rent received in advance are both taxed, the timing depends on how the particular item is treated in tax legislation.

3. *Rent received in advance*: The result is similar to interest received in advance. The carrying amount of rent received in advance would be €10,000,000 while the tax base is €0.
4. *Loan*: Repayment of the loan has no tax implications. The repayment of the capital amount does not constitute an income or expense. The interest paid is included as an expense in the calculation of taxable income as well as accounting income. Therefore, the tax base and carrying amount are €0. For clarity, the interest paid that would be included on the income statement for the year amounts to  $13.5\% \times €550,000 = €74,250$  if the loan was acquired at the beginning of the current fiscal year.

### 3

## CHANGES IN INCOME TAX RATES

- ☐ calculate income tax expense, income taxes payable, deferred tax assets, and deferred tax liabilities, and calculate and interpret the adjustment to the financial statements related to a change in the income tax rate
- ☐ evaluate the effect of tax rate changes on a company's financial statements and ratios

The measurement of deferred tax assets and liabilities is based on current tax law. But if there are subsequent changes in tax laws or new income tax rates, existing deferred tax assets and liabilities must be adjusted for the effects of these changes. The resulting effects of the changes are also included in determining accounting profit in the period of change.

When income tax rates change, the deferred tax assets and liabilities are adjusted to the new tax rate. If income tax rates increase, deferred taxes (that is, the deferred tax assets and liabilities) will also increase. Likewise, if income tax rates decrease, deferred taxes will decrease. A decrease in tax rates decreases deferred tax liabilities, which reduces future tax payments to the taxing authorities. A decrease in tax rates will also decrease deferred tax assets, which reduces their value toward the offset of future tax payments to the taxing authorities.

To illustrate the effect of a change in tax rate, consider the example of the company that depreciates equipment on a straight line basis at a rate of 10 percent per year for financial reporting and 15 percent per year for tax purposes again. In that illustration, the timing difference that led to the recognition of a deferred tax liability was attributable to differences in the method of depreciation and the related effects on the accounting carrying value and the asset tax base. The relevant information is restated below.

The carrying amount and tax base for the equipment is:

(£ Millions)	Year 3	Year 2	Year 1
Equipment value for accounting purposes ( <i>carrying amount</i> ) (depreciation of £2,000/year)	£14,000	£16,000	£18,000
Equipment value for tax purposes ( <i>tax base</i> ) (depreciation of £2,857/year)	£11,429	£14,286	£17,143
Difference	£2,571	£1,714	£857

At a 30 percent income tax rate, the deferred tax liability was then determined as follows:

(£ Millions)	Year 3	Year 2	Year 1
<b>Deferred tax liability</b>	£771	£514	£257
(Difference between tax base and carrying amount)			
Year 1: $£(18,000 - 17,143) \times 30\% = £257$			
Year 2: $£(16,000 - 14,286) \times 30\% = £514$			
Year 3: $£(14,000 - 11,429) \times 30\% = £771$			

For this illustration, assume that the taxing authority has changed the income tax rate to 25 percent for Year 3. Although the difference between the carrying amount and the tax base of the depreciable asset is the same, the deferred tax liability for 2017 will be £643 (instead of £771 or a reduction of £128 in the liability)—2017:  $£(14,000 - 11,429) \times 25\% = £643$ .

The provision for income tax expense is also affected by the change in tax rates. Taxable income for Year 3 will now be taxed at a rate of 25 percent. The benefit of the Year 3 accelerated depreciation tax shield is now only £214 ( $£857 \times 25\%$ ) instead of the previous £257 (a reduction of £43). In addition, the reduction in the beginning carrying value of the deferred tax liability for Year 3 (the year of change) further reduces the income tax expense for Year 3. The reduction in income tax expense attributable to the change in tax rate is £86. Year 3— $(30\% - 25\%) \times £1,714 = £86$ . Note that these two components together account for the reduction in the deferred tax liability ( $£43 + £86 = £129$ ).

As may be seen from this discussion, changes in the income tax rate have an effect on a company's deferred tax asset and liability carrying values as well as an effect on the measurement of income tax expense in the year of change. The analyst must thus note that proposed changes in tax law can have a quantifiable effect on these accounts (and any related financial ratios that are derived from them) if the proposed changes are subsequently enacted into law.

## EXCEPTIONS TO THE USUAL RULES FOR TEMPORARY DIFFERENCES

### 4



identify and contrast temporary versus permanent differences in pre-tax accounting income and taxable income

In some situations the carrying amount and tax base of a balance sheet item may vary at initial recognition. For example, a company may deduct a government grant from the initial carrying amount of an asset or liability that appears on the balance sheet. For tax purposes, such grants may not be deducted when determining the tax base

of the balance sheet item. In such circumstances, the carrying amount of the asset or liability will be lower than its tax base. Differences in the tax base of an asset or liability as a result of the circumstances described above may not be recognized as deferred tax assets or liabilities.

For example, a government may offer grants to Small, Medium, and Micro Enterprises (SMMEs) in an attempt to assist these entrepreneurs in their endeavors that contribute to the country's GDP and job creation. Assume that a particular grant is offered for infrastructure needs (office furniture, property, plant, and equipment, etc.). In these circumstances, although the carrying amount will be lower than the tax base of the asset, the related deferred tax may not be recognized. Deferred tax assets and liabilities should not be recognized in cases that would arise from the initial recognition of an asset or liability in transactions that are not a business combination and when, at the time of the transaction, there is no impact on either accounting or taxable profit.

A deferred tax liability will also not be recognized at the initial recognition of goodwill. Although goodwill may be treated differently across tax jurisdictions, which may lead to differences in the carrying amount and tax base of goodwill, IAS 12 does not allow the recognition of such a deferred tax liability. Any impairment that an entity should, for accounting purposes, impose on goodwill will result in a temporary difference between its carrying amount and tax base. Any impairment that an entity should, for accounting purposes, impose on goodwill and if part of the goodwill is related to the initial recognition, that part of the difference in tax base and carrying amount should not result in any deferred taxation because the initial deferred tax liability was not recognized. Any future differences between the carrying amount and tax base as a result of amortization and the deductibility of a portion of goodwill constitute a temporary difference for which provision should be made.

## Business Combinations and Deferred Taxes

The fair value of assets and liabilities acquired in a business combination is determined on the acquisition date and may differ from the previous carrying amount. It is highly probable that the values of acquired intangible assets, including goodwill, would differ from their carrying amounts. This temporary difference will affect deferred taxes as well as the amount of goodwill recognized as a result of the acquisition.

## Investments in Subsidiaries, Branches, Associates and Interests in Joint Ventures

Investments in subsidiaries, branches, associates and interests in joint ventures may lead to temporary differences on the consolidated versus the parent's financial statements. The related deferred tax liabilities as a result of temporary differences will be recognized unless both of the following criterion are satisfied:

- The parent is in a position to control the timing of the future reversal of the temporary difference, and
- It is probable that the temporary difference will not reverse in the future.

With respect to deferred tax assets related to subsidiaries, branches, associates and interests, deferred tax assets will only be recognized if the following criteria are satisfied:

- The temporary difference will reverse in the future, and
- Sufficient taxable profits exist against which the temporary difference can be used.

## UNUSED TAX LOSSES AND TAX CREDITS

# 5



explain recognition and measurement of current and deferred tax items

IAS 12 allows the recognition of unused tax losses and tax credits only to the extent that it is probable that in the future there will be taxable income against which the unused tax losses and credits can be applied. Under US GAAP, a deferred tax asset is recognized in full but is then reduced by a valuation allowance if it is more likely than not that some or all of the deferred tax asset will not be realized. The same requirements for creation of a deferred tax asset as a result of deductible temporary differences also apply to unused tax losses and tax credits. The existence of tax losses may indicate that the entity cannot reasonably be expected to generate sufficient future taxable income. All other things held constant, the greater the history of tax losses, the greater the concern regarding the company's ability to generate future taxable profits.

Should there be concerns about the company's future profitability, then the deferred tax asset may not be recognized until it is realized. When assessing the probability that sufficient taxable profit will be generated in the future, the following criteria can serve as a guide:

- If there is uncertainty as to the probability of future taxable profits, a deferred tax asset as a result of unused tax losses or tax credits is only recognized to the extent of the available taxable temporary differences;
- Assess the probability that the entity will in fact generate future taxable profits before the unused tax losses and/or credits expire pursuant to tax rules regarding the carry forward of the unused tax losses;
- Verify that the above is with the same tax authority and based on the same taxable entity;
- Determine whether the past tax losses were a result of specific circumstances that are unlikely to be repeated; and
- Discover if tax planning opportunities are available to the entity that will result in future profits. These may include changes in tax legislation that are phased in over more than one financial period to the benefit of the entity.

It is imperative that the timing of taxable and deductible temporary differences also be considered before creating a deferred tax asset based on unused tax credits.

## RECOGNITION AND MEASUREMENT OF CURRENT AND DEFERRED TAX

# 6



explain recognition and measurement of current and deferred tax items



describe the valuation allowance for deferred tax assets—when it is required and what effect it has on financial statements

Current taxes payable or recoverable from tax authorities are based on the applicable tax rates at the balance sheet date. Deferred taxes should be measured at the tax rate that is expected to apply when the asset is realized or the liability settled. With respect to the income tax for a current or prior period not yet paid, it is recognized as a tax liability until paid. Any amount paid in excess of any tax obligation is recognized as an asset. The income tax paid in excess or owed to tax authorities is separate from deferred taxes on the company's balance sheet.

When measuring deferred taxes in a jurisdiction, there are different forms of taxation such as income tax, capital gains tax (any capital gains made), or secondary tax on companies (tax payable on the dividends that a company declares) and possibly different tax bases for a balance sheet item (as in the case of government grants influencing the tax base of an asset such as property). In assessing which tax laws should apply, it is dependent on how the related asset or liability will be settled. It would be prudent to use the tax rate and tax base that are consistent with how it is expected the tax base will be recovered or settled.

Although deferred tax assets and liabilities are related to temporary differences expected to be recovered or settled at some future date, neither are discounted to present value in determining the amounts to be booked. Both must be adjusted for changes in tax rates.

Deferred taxes as well as income taxes should always be recognized on the income statement of an entity unless they pertain to:

- Taxes or deferred taxes charged directly to equity, or
- A possible provision for deferred taxes relating to a business combination.

The carrying amount of the deferred tax assets and liabilities should also be assessed. The carrying amounts may change even though there may have been no change in temporary differences during the period evaluated. This can result from:

- Changes in tax rates;
- Reassessments of the recoverability of deferred tax assets; or
- Changes in the expectations for how an asset will be recovered and what influences the deferred tax asset or liability.

All unrecognized deferred tax assets and liabilities must be reassessed at the balance sheet date and measured against the criteria of probable future economic benefits. If such a deferred asset is likely to be recovered, it may be appropriate to recognize the related deferred tax asset.

Different jurisdictions have different requirements for determining tax obligations that can range from different forms of taxation to different tax rates based on taxable income. When comparing financial statements of entities that conduct business in different jurisdictions subject to different tax legislation, the analyst should be cautious in reaching conclusions because of the potentially complex tax rules that may apply.

## Recognition of a Valuation Allowance

Deferred tax assets must be assessed at each balance sheet date. If there is any doubt whether the deferral will be recovered, then the carrying amount should be reduced to the expected recoverable amount. Should circumstances subsequently change and suggest the future will lead to recovery of the deferral, the reduction may be reversed.

Under US GAAP, deferred tax assets are reduced by creating a valuation allowance. Establishing a valuation allowance reduces the deferred tax asset and income in the period in which the allowance is established. Should circumstances change to such

an extent that a deferred tax asset valuation allowance may be reduced, the reversal will increase the deferred tax asset and operating income. Because of the subjective judgment involved, an analyst should carefully scrutinize any such changes.

## Recognition of Current and Deferred Tax Charged Directly to Equity

In general, IFRS and US GAAP require that the recognition of deferred tax liabilities and current income tax be treated similarly to the asset or liability that gave rise to the deferred tax liability or income tax based on accounting treatment. Should an item that gives rise to a deferred tax liability be taken directly to equity, the same should hold true for the resulting deferred tax.

The following are examples of such items:

- Revaluation of property, plant, and equipment (revaluations are not permissible under US GAAP);
- Long-term investments at fair value;
- Changes in accounting policies;
- Errors corrected against the opening balance of retained earnings;
- Initial recognition of an equity component related to complex financial instruments; and
- Exchange rate differences arising from the currency translation procedures for foreign operations.

Whenever it is determined that a deferred tax liability will not be reversed, an adjustment should be made to the liability. The deferred tax liability will be reduced and the amount by which it is reduced should be taken directly to equity. Any deferred taxes related to a business combination must also be recognized in equity.

Depending on the items that gave rise to the deferred tax liabilities, an analyst should exercise judgment regarding whether the taxes should be included with deferred tax liabilities or whether they should be taken directly to equity. It may be more appropriate simply to ignore deferred taxes.

### EXAMPLE 3

#### Taxes Charged Directly to Equity

The following information pertains to Khaleej Company (a hypothetical company). A building owned by Khaleej Company was originally purchased for €1,000,000 on 1 January 20x1. For accounting purposes, buildings are depreciated at 5 percent a year on a straight-line basis, and depreciation for tax purposes is 10 percent a year on a straight-line basis. On the first day of 20x3, the building is revalued at €1,200,000. It is estimated that the remaining useful life of the building from the date of revaluation is 20 years. *Important:* For tax purposes the revaluation of the building is not recognized.

Based on the information provided, the following illustrates the difference in treatment of the building for accounting and tax purposes.

	Carrying Amount of Building	Tax Base of Building
Balance on 1 January 20x1	€1,000,000	€1,000,000
Depreciation 20x1	(50,000)	(100,000)
Balance on 31 December 20x1	€950,000	€900,000

	Carrying Amount of Building	Tax Base of Building
Depreciation 20x2	(50,000)	(100,000)
Balance on 31 December 20x2	€900,000	€800,000
Revaluation on 1 January 20x3	300,000	n/a
Balance on 1 January 20x3	€1,200,000	€800,000
Depreciation 20x3	(60,000)	(100,000)
Balance on 31 December 20x3	€1,140,000	€700,000
<i>Accumulated depreciation</i>		
Balance on 1 January 20x1	€0	€0
Depreciation 20x1	50,000	100,000
Balance on 31 December 20x1	€50,000	€100,000
Depreciation 20x2	50,000	100,000
Balance on 31 December 20x2	€100,000	€200,000
Revaluation at 1 January 20x3	(100,000)	n/a
Balance on 1 January 20x3	€0	€200,000
Depreciation 20x3	60,000	100,000
Balance on 31 December 20x3	€60,000	€300,000

  

	Carrying Amount	Tax Base
On 31 December 20x1	€950,000	€900,000
On 31 December 20x2	€900,000	€800,000
On 31 December 20x3	€1,140,000	€700,000

*31 December 20x1:* On 31 December 20x1, different treatments for depreciation expense result in a temporary difference that gives rise to a deferred tax liability. The difference in the tax base and carrying amount of the building was a result of different depreciation amounts for tax and accounting purposes. Depreciation appears on the income statement. For this reason the deferred tax liability will also be reflected on the income statement. If we assume that the applicable tax rate in 20x1 was 40 percent, then the resulting deferred tax liability will be  $40\% \times (\text{€}950,000 - \text{€}900,000) = \text{€}20,000$ .

*31 December 20x2:* As of 31 December 20x2, the carrying amount of the building remains greater than the tax base. The temporary difference again gives rise to a deferred tax liability. Again, assuming the applicable tax rate to be 40 percent, the deferred tax liability from the building is  $40\% \times (\text{€}900,000 - \text{€}800,000) = \text{€}40,000$ .

*31 December 20x3:* On 31 December 20x3, the carrying amount of the building again exceeds the tax base. This is not the result of disposals or additions, but is a result of the revaluation at the beginning of the 20x3 fiscal year and the different rates of depreciation. The deferred tax liability would seem to be  $40\% \times (\text{€}1,140,000 - \text{€}700,000) = \text{€}176,000$ , *but* the treatment is different than it was for 20x1 and 20x2. In 20x3, revaluation of the building gave rise to a balance sheet equity account, namely “Revaluation Surplus” in the amount of €300,000, which is not recognized for tax purposes.

The deferred tax liability would usually have been calculated as follows:



	20x3	20x2	20x1
<b>Deferred tax liability (closing balance at end of fiscal year)</b>	€176,000	€40,000	€20,000
(Difference between tax base and carrying amount)			
20x1: $€(950,000 - 900,000) \times 40\% = 20,000$			
20x2: $€(900,000 - 800,000) \times 40\% = 40,000$			
20x3: $€(1,140,000 - 700,000) \times 40\% = 176,000$			

The change in the deferred tax liability in 20x1 is €20,000, in 20x2 is €20,000 (€40,000 – €20,000) and, it would seem, in 20x3 is €136,000 (€176,000 – €40,000). In 20x3, although it would seem that the balance for deferred tax liability should be €176,000, the revaluation is not recognized for tax purposes. Only the portion of the difference between the tax base and carrying amount that is not a result of the revaluation is recognized as giving rise to a deferred tax liability.

The effect of the revaluation surplus and the associated tax effects are accounted for in a direct adjustment to equity. The revaluation surplus is reduced by the tax provision associated with the excess of the fair value over the carry value and it affects retained earnings (€300,000 × 40% = €120,000).

The deferred tax liability that should be reflected on the balance sheet is thus not €176,000 but only €56,000 (€176,000 – €120,000). Given the balance of deferred tax liability at the beginning of the 20x3 fiscal year in the amount of €40,000, the change in the deferred tax liability is only €56,000 – €40,000 = €16,000.

In the future, at the end of each year, an amount equal to the depreciation as a result of the revaluation minus the deferred tax effect will be transferred from the revaluation reserve to retained earnings. In 20x3 this will amount to a portion of depreciation resulting from the revaluation, €15,000 (€300,000 ÷ 20), minus the deferred tax effect of €6,000 (€15,000 × 40%), thus €9,000.

## SUMMARY

Income taxes are a significant category of expense for profitable companies. Analyzing income tax expenses is often difficult for the analyst because there are many permanent and temporary timing differences between the accounting that is used for income tax reporting and the accounting that is used for financial reporting on company financial statements. The financial statements and notes to the financial statements of a company provide important information that the analyst needs to assess financial performance and to compare a company's financial performance with other companies. Key concepts in this reading are as follows:

- Differences between the recognition of revenue and expenses for tax and accounting purposes may result in taxable income differing from accounting profit. The discrepancy is a result of different treatments of certain income and expenditure items.

- The tax base of an asset is the amount that will be deductible for tax purposes as an expense in the calculation of taxable income as the company expenses the tax basis of the asset. If the economic benefit will not be taxable, the tax base of the asset will be equal to the carrying amount of the asset.
- The tax base of a liability is the carrying amount of the liability less any amounts that will be deductible for tax purposes in the future. With respect to revenue received in advance, the tax base of such a liability is the carrying amount less any amount of the revenue that will not be taxable in the future.
- Temporary differences arise from recognition of differences in the tax base and carrying amount of assets and liabilities. The creation of a deferred tax asset or liability as a result of a temporary difference will only be allowed if the difference reverses itself at some future date and to the extent that it is expected that the balance sheet item will create future economic benefits for the company.
- Permanent differences result in a difference in tax and financial reporting of revenue (expenses) that will not be reversed at some future date. Because it will not be reversed at a future date, these differences do not constitute temporary differences and do not give rise to a deferred tax asset or liability.
- Current taxes payable or recoverable are based on the applicable tax rates on the balance sheet date of an entity; in contrast, deferred taxes should be measured at the tax rate that is expected to apply when the asset is realized or the liability settled.
- All unrecognized deferred tax assets and liabilities must be reassessed on the appropriate balance sheet date and measured against their probable future economic benefit.
- Deferred tax assets must be assessed for their prospective recoverability. If it is probable that they will be recovered partly or not at all, the carrying amount should be reduced. Under US GAAP, this is done through the use of a valuation allowance.

## PRACTICE PROBLEMS

### The following information relates to questions 1-3

The tax effects of temporary differences that give rise to deferred tax assets and liabilities are as follows (\$ thousands):

	Year 3	Year 2
Deferred tax assets:		
Accrued expenses	\$8,613	\$7,927
Tax credit and net operating loss carryforwards	2,288	2,554
LIFO and inventory reserves	5,286	4,327
Other	2,664	2,109
Deferred tax assets	18,851	16,917
Valuation allowance	(1,245)	(1,360)
Net deferred tax assets	\$17,606	\$15,557
Deferred tax liabilities:		
Depreciation and amortization	\$(27,338)	\$(29,313)
Compensation and retirement plans	(3,831)	(8,963)
Other	(1,470)	(764)
Deferred tax liabilities	(32,639)	(39,040)
Net deferred tax liability	(\$15,033)	(\$23,483)

- A reduction in the statutory tax rate would *most likely* benefit the company's:
  - income statement and balance sheet.
  - income statement but not the balance sheet.
  - balance sheet but not the income statement.
- If the valuation allowance had been the same in Year 3 as it was in Year 2, the company would have reported \$115 *higher*:
  - net income.
  - deferred tax assets.
  - income tax expense.
- Compared to the provision for income taxes in Year 3, the company's cash tax payments were:
  - lower.
  - higher.
  - the same.

4. Zimt AG presents its financial statements in accordance with US GAAP. In Year 3, Zimt discloses a valuation allowance of \$1,101 against total deferred tax assets of \$19,201. In Year 2, Zimt disclosed a valuation allowance of \$1,325 against total deferred tax assets of \$17,325. The change in the valuation allowance *most likely* indicates that Zimt's:
  - A. deferred tax liabilities were reduced in Year 3.
  - B. expectations of future earning power has increased.
  - C. expectations of future earning power has decreased.
5. Cinnamon, Inc. recorded a total deferred tax asset in Year 3 of \$12,301, offset by a \$12,301 valuation allowance. Cinnamon *most likely*:
  - A. fully utilized the deferred tax asset in Year 3.
  - B. has an equal amount of deferred tax assets and deferred tax liabilities.
  - C. expects not to earn any taxable income before the deferred tax asset expires.

## SOLUTIONS

1. A is correct. A lower tax rate would increase net income on the income statement, and because the company has a net deferred tax liability, the net liability position on the balance sheet would also improve (be smaller).
2. C is correct. The reduction in the valuation allowance resulted in a corresponding reduction in the income tax provision.
3. B is correct. The net deferred tax liability was smaller in Year 3 than it was in Year 2, indicating that in addition to meeting the tax payments provided for in Year 3 the company also paid taxes that had been deferred in prior periods.
4. B is correct. The valuation allowance is taken against deferred tax assets to represent uncertainty that future taxable income will be sufficient to fully utilize the assets. By decreasing the allowance, Zimt is signaling greater likelihood that future earnings will be offset by the deferred tax asset.
5. C is correct. The valuation allowance is taken when the company will “more likely than not” fail to earn sufficient income to offset the deferred tax asset. Because the valuation allowance equals the asset, by extension the company expects *no* taxable income prior to the expiration of the deferred tax assets.



## LEARNING MODULE

# 8

### Non-Current (Long-Term) Liabilities

by Elizabeth A. Gordon, PhD, MBA, CPA, and Elaine Henry, PhD, CFA.

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#### LEARNING OUTCOMES

<i>Mastery</i>	<i>The candidate should be able to:</i>
<input type="checkbox"/>	determine the initial recognition, initial measurement and subsequent measurement of bonds
<input type="checkbox"/>	describe the effective interest method and calculate interest expense, amortisation of bond discounts/premiums, and interest payments
<input type="checkbox"/>	explain the derecognition of debt

#### INTRODUCTION

1

A non-current liability (long-term liability) broadly represents a probable sacrifice of economic benefits in periods generally greater than one year in the future. Common types of **non-current liabilities** reported in a company's financial statements include long-term debt (e.g., bonds payable, long-term notes payable), leases, pension liabilities, and deferred tax liabilities. This module focuses on bonds payable.

**Note:** Changes in accounting standards as well as new rulings and/or pronouncements issued after the publication of the readings on financial reporting and analysis may cause some of the information in these readings to become dated. Candidates are *not* responsible for anything that occurs after the readings were published. In addition, candidates are expected to be familiar with the analytical frameworks contained in the readings, as well as the implications of alternative accounting methods for financial analysis and valuation discussed in the readings. Candidates are also responsible for the content of accounting standards, but not for the actual reference numbers. Finally, candidates should be aware that certain ratios may be defined and calculated differently. When alternative ratio definitions exist and no specific definition is given, candidates should use the ratio definitions emphasized in the readings.

## 2

BONDS PAYABLE & ACCOUNTING FOR BOND  
ISSUANCE

determine the initial recognition, initial measurement and subsequent measurement of bonds

In some contexts (e.g., some government debt obligations), the word “bond” is used only for a debt security with a maturity of 10 years or longer; “note” refers to a debt security with a maturity between 2 and 10 years; and “bill” refers to a debt security with a maturity of less than 2 years. In this module, we use the terms bond and note interchangeably because the accounting treatments of bonds payable and long-term notes payable are similar.

### Accounting for Bond Issuance

Bonds are contractual promises made by a company (or other borrowing entity) to pay cash in the future to its lenders (i.e., bondholders) in exchange for receiving cash in the present. The terms of a bond contract are contained in a document called an indenture. The cash or sales proceeds received by a company when it issues bonds is based on the value (price) of the bonds at the time of issue; the price at the time of issue is determined as the present value of the future cash payments promised by the company in the bond agreement.

Ordinarily, bonds contain promises of two types of future cash payments: 1) the face value of the bonds, and 2) periodic interest payments. The **face value** of the bonds is the amount of cash payable by the company to the bondholders when the bonds mature. The face value is also referred to as the principal, par value, stated value, or maturity value. The date of maturity of the bonds (the date on which the face value is paid to bondholders) is stated in the bond contract and typically is a number of years in the future. Periodic interest payments are made based on the interest rate promised in the bond contract applied to the bonds’ face value. The interest rate promised in the contract, which is the rate used to calculate the periodic interest payments, is referred to as the **coupon rate**, nominal rate, or stated rate. Similarly, the periodic interest payment is referred to as the coupon payment or simply the coupon. For fixed rate bonds (the primary focus of our discussion here), the coupon rate remains unchanged throughout the life of the bonds. The frequency with which interest payments are made is also stated in the bond contract. For example, bonds paying interest semi-annually will make two interest payments per year.<sup>1</sup>

The future cash payments are discounted to the present to arrive at the market value of the bonds. The **market rate of interest** is the rate demanded by purchasers of the bonds given the risks associated with future cash payment obligations of the particular bond issue. The market rate of interest at the time of issue often differs from the coupon rate because of interest rate fluctuations that occur between the time the issuer establishes the coupon rate and the day the bonds are actually available to investors. If the market rate of interest when the bonds are issued equals the coupon rate, the market value (price) of the bonds will equal the face value of the bonds. Thus, ignoring issuance costs, the issuing company will receive sales proceeds (cash) equal to the face value of the bonds. When a bond is issued at a price equal to its face value, the bond is said to have been issued at par.

<sup>1</sup> Interest rates are stated on an annual basis regardless of the frequency of payment.



If the coupon rate when the bonds are issued is higher than the market rate, the market value of the bonds—and thus the amount of cash the company receives—will be higher than the face value of the bonds. In other words, the bonds will sell at a premium to face value because they are offering an attractive coupon rate compared to current market rates. If the coupon rate is lower than the market rate, the market value and thus the sale proceeds from the bonds will be less than the face value of the bonds; the bond will sell at a discount to face value. The market rate at the time of issuance is the **effective interest rate** or borrowing rate that the company incurs on the debt. The effective interest rate is the discount rate that equates the present value of the two types of promised future cash payments to their selling price. For the issuing company, interest expense reported for the bonds in the financial statements is based on the effective interest rate.

On the issuing company's statement of cash flows, the cash received (sales proceeds) from issuing bonds is reported as a financing cash inflow. On the issuing company's balance sheet at the time of issue, bonds payable normally are measured and reported at the sales proceeds. In other words, the bonds payable are initially reported at the face value of the bonds minus any discount, or plus any premium.

Using a three-step approach, the following two examples illustrate accounting for bonds issued at face value and then accounting for bonds issued at a discount to face value. Accounting for bonds issued at a premium involves steps similar to the steps followed in the examples below. For simplicity, these examples assume a flat interest rate yield curve (i.e., that the market rate of interest is the same for each period). More-precise bond valuations use the interest rate applicable to each time period in which a payment of interest or principal occurs.

#### EXAMPLE 1

##### Bonds Issued at Face Value

1. Debond Corp. (a hypothetical company) issues £1,000,000 worth of five-year bonds, dated 1 January 2018, when the market interest rate on bonds of comparable risk and terms is 5 percent per annum. The bonds pay 5 percent interest annually on 31 December. What are the sales proceeds of the bonds when issued, and how is the issuance reflected in the financial statements?

##### Solution:

Calculating the value of the bonds at issuance and thus the sales proceeds involves three steps: 1) identifying key features of the bonds and the market interest rate, 2) determining future cash outflows, and 3) discounting the future cash flows to the present.

First, identify key features of the bonds and the market interest rate necessary to determine sales proceeds:

Face value (principal):	£1,000,000
Time to maturity:	5 years
Coupon rate:	5%
Market rate at issuance:	5%

Frequency of interest payments: annual  
Interest payment: £50,000

Each annual interest payment is the face value times the coupon rate (£1,000,000 × 5%). If interest is paid other than annually, adjust the interest rate to match the interest payment period (e.g., divide the annual coupon rate by two for semi-annual interest payments).

Second, determine future cash outflows. Debond will pay bondholders £1,000,000 when the bonds mature in five years. On 31 December of each year until the bonds mature, Debond will make an interest payment of £50,000.

Third, sum the present value<sup>2</sup> of the future payments of interest and principal to obtain the value of the bonds and thus the sales proceeds from issuing the bonds. In this example, the sum is £1,000,000 = (£216,474 + £783,526).

Date	Interest Payment	Present Value at Market Rate (5%)	Face Value Payment	Present Value at Market Rate (5%)	Total Present Value
31 December 2018	£50,000	£47,619			
31 December 2019	50,000	45,352			
31 December 2020	50,000	43,192			
31 December 2021	50,000	41,135			
31 December 2022	50,000	39,176	£1,000,000	£783,526	
Total		£216,474		£783,526	£1,000,000
					Sales Proceeds

The sales proceeds of the bonds when issued are £1,000,000. There is no discount or premium because these bonds are issued at face value. The issuance is reflected on the balance sheet as an increase of cash and an increase in a long-term liability, bonds payable, of £1,000,000. The issuance is reflected in the statement of cash flows as a financing cash inflow of £1,000,000.

The price of bonds is often expressed as a percentage of face value. For example, the price of bonds issued at par, as in Example 1, is 100 (i.e., 100 percent of face value). In Example 2, in which bonds are issued at a discount, the price is 95.79 (i.e., 95.79 percent of face value).

## EXAMPLE 2

### Bonds Issued at a Discount

1. Debond Corp. issues £1,000,000 worth of five-year bonds, dated 1 January 2018, when the market interest rate on bonds of comparable risk and terms is 6 percent. The bonds pay 5 percent interest annually on 31 December. What are the sales proceeds of the bonds when issued, and how is the issuance reflected in the financial statements?

### Solution:

The key features of the bonds and the market interest rate are:

<sup>2</sup> Alternative ways to calculate the present value include 1) to treat the five annual interest payments as an annuity and use the formula for finding the present value of an annuity and then add the present value of the principal payment, or 2) to use a financial calculator to calculate the total present value.

Face value (principal):	£1,000,000	
Time to maturity:	5 years	
Coupon rate:	5%	
Market rate at issuance:	6%	
Frequency of interest payments:	annual	
Interest payment:	£50,000	Each annual interest payment is the face value times the coupon rate (£1,000,000 × 5%).

The future cash outflows (interest payments and face value payment), the present value of the future cash outflows, and the total present value are:

Date	Interest Payment	Present Value at Market Rate (6%)	Face Value Payment	Present Value at Market Rate (6%)	Total Present Value
31 December 2018	£50,000	£47,170			
31 December 2019	50,000	44,500			
31 December 2020	50,000	41,981			
31 December 2021	50,000	39,605			
31 December 2022	50,000	37,363	£1,000,000	£747,258	
Total		£210,618		£747,258	£957,876
					Sales Proceeds

The sales proceeds of the bonds when issued are £957,876. The bonds sell at a discount of £42,124 = (£1,000,000 – £957,876) because the market rate when the bonds are issued (6 percent) is greater than the bonds' coupon rate (5 percent). The issuance is reflected on the balance sheet as an increase of cash and an increase in a long-term liability, bonds payable, of £957,876. The bonds payable is composed of the face value of £1,000,000 minus a discount of £42,124. The issuance is reflected in the statement of cash flows as a financing cash inflow of £957,876.

In Example 2, the bonds were issued at a discount to face value because the bonds' coupon rate of 5 percent was less than the market rate. Bonds are issued at a premium to face value when the bonds' coupon rate exceeds the market rate.

Bonds issued with a coupon rate of zero (zero-coupon bonds) are issued at a discount to face value if the market rate is greater than zero. If the market rate is zero or negative, zero-coupon bonds will be issued at par or at premium, respectively. The value of zero-coupon bonds is based on the present value of the principal payment only because there are no periodic interest payments.

Such issuance costs as printing, legal fees, commissions, and other types of charges are costs incurred when bonds are issued. Under International Financial Reporting Standards (IFRS), all debt issuance costs are included in the measurement of the liability, bonds payable. Under US GAAP, debt issuance costs are generally deducted from the related debt liability (bonds payable), similar to a debt discount. However, for lines of credit, companies may report debt issuance costs as an asset because the SEC indicated that it would not object to this treatment. Under both IFRS and US GAAP, cash outflows related to bond issuance costs are included in the financing section of the statement of cash flows, usually netted against bond proceeds.

## 3

## ACCOUNTING FOR BOND AMORTISATION, INTEREST EXPENSE, AND INTEREST PAYMENTS

- ☐ determine the initial recognition, initial measurement and subsequent measurement of bonds
- ☐ describe the effective interest method and calculate interest expense, amortisation of bond discounts/premiums, and interest payments

Most companies maintain the historical cost (sales proceeds) of the bonds after issuance, and they amortise any discount or premium over the life of the bond. The amount reported on the balance sheet for bonds is thus the historical cost plus or minus the cumulative amortisation, which is referred to as amortised cost. Companies also have the option to report the bonds at their current fair values.

The rationale for reporting the bonds at amortised historical cost is the company's intention to retain the debt until it matures. Therefore, changes in the underlying economic value of the debt are not relevant from the issuing company's perspective. From an investor's perspective, however, analysis of a company's underlying economic liabilities and solvency is more difficult when debt is reported at amortised historical cost. Accordingly, companies are required to disclose the fair value of their debt in the notes to the financial statements. The rest of this section illustrates accounting and reporting of bonds at amortised historical cost. The next section discusses the alternative of reporting bonds at fair value.

Companies initially report bonds as a liability on their balance sheet at the amount of the sales proceeds net of issuance costs under both IFRS and US GAAP. The amount at which bonds are reported on the company's balance sheet is referred to as the carrying amount, carrying value, book value, or net book value. If the bonds are issued at par, the initial carrying amount will be identical to the face value, and usually the carrying amount will not change over the life of the bonds.<sup>3</sup> For bonds issued at face value, the amount of periodic interest *expense* will be the same as the amount of periodic interest *payment* to bondholders.

If, however, the market rate differs from the bonds' coupon rate at issuance such that the bonds are issued at a premium or discount, the premium or discount is amortised systematically over the life of the bonds as a component of interest expense. For bonds issued at a premium to face value, the carrying amount of the bonds is initially greater than the face value. As the premium is amortised, the carrying amount (amortised cost) of the bonds will decrease to the face value. The reported interest expense will be less than the coupon payment. For bonds issued at a discount to face value, the carrying amount of the bonds is initially less than the face value. As the discount is amortised, the carrying amount (amortised cost) of the bonds will increase to the face value. The reported interest expense will be higher than the coupon payment.

The accounting treatment for bonds issued at a discount reflects the fact that the company essentially paid some of its borrowing costs at issuance by selling its bonds at a discount. Rather than there being an actual cash transfer in the future, this "payment" was made in the form of accepting less than the face value for the bonds at the date of issuance. The remaining borrowing cost occurs as a cash interest payment to investors each period. The total interest expense reflects both components of the borrowing cost: the periodic interest payments plus the amortisation of the discount. The accounting treatment for bonds issued at a premium reflects the fact that the

<sup>3</sup> If a company reports debt at fair value, rather than amortised cost, the carrying value may change.

company essentially received a reduction on its borrowing costs at issuance by selling its bonds at a premium. Rather than there being an actual reduced cash transfer in the future, this “reduction” was made in the form of receiving more than face value for the bonds at the date of issuance. The total interest expense reflects both components of the borrowing cost: the periodic interest payments less the amortisation of the premium. When the bonds mature, the carrying amount will be equal to the face value regardless of whether the bonds were issued at face value, a discount, or a premium.

Two methods for amortising the premium or discount of bonds that were issued at a price other than par are the effective interest rate method and the straight-line method. The effective interest rate method is required under IFRS and preferred under US GAAP because it better reflects the economic substance of the transaction. The effective interest rate method applies the market rate in effect when the bonds were issued (historical market rate or effective interest rate) to the current amortised cost (carrying amount) of the bonds to obtain interest expense for the period. The difference between the interest expense (based on the effective interest rate and amortised cost) and the interest payment (based on the coupon rate and face value) is the amortisation of the discount or premium. The straight-line method of amortisation evenly amortises the premium or discount over the life of the bond, similar to straight-line depreciation on long-lived assets. Under either method, as the bond approaches maturity, the amortised cost approaches face value.

Example 3 illustrates both methods of amortisation for bonds issued at a discount. Example 4 shows amortisation for bonds issued at a premium.

### EXAMPLE 3

#### Amortising a Bond Discount

Debond Corp. issues £1,000,000 face value of five-year bonds, dated 1 January 2017, when the market interest rate is 6 percent. The sales proceeds are £957,876. The bonds pay 5 percent interest annually on 31 December.

1. What is the interest *payment* on the bonds each year?

#### Solution to 1:

The interest payment equals £50,000 annually ( $£1,000,000 \times 5\%$ ).

2. What amount of interest *expense* on the bonds would be reported in 2017 and 2018 using the effective interest rate method?

#### Solution to 2:

The sales proceeds of £957,876 are less than the face value of £1,000,000; the bonds were issued at a discount of £42,124. The bonds are initially reported as a long-term liability, bonds payable, of £957,876, which comprises the face value of £1,000,000 minus a discount of £42,124. The discount is amortised over time, ultimately increasing the carrying amount (amortised cost) to face value.

Under the effective interest rate method, interest expense on the bonds is calculated as the bonds' carrying amount times the market rate in effect when the bonds are issued (effective interest rate). For 2017, interest expense is  $£57,473 = (£957,876 \times 6\%)$ . The amount of the discount amortised in 2017 is the difference between the interest expense of £57,473 and the interest payment of £50,000 (i.e., £7,473). The bonds' carrying amount increases by the discount amortisation; at 31 December 2017, the bonds' carrying amount is £965,349 (beginning balance of £957,876 plus £7,473).

discount amortisation). At this point, the carrying amount reflects a remaining unamortised discount of £34,651 (£42,124 discount at issuance minus £7,473 amortised).

For 2018, interest expense is £57,921 = (£965,349 × 6%), the carrying amount of the bonds on 1 January 2018 times the effective interest rate. The amount of the discount amortised in 2018 is the difference between the interest expense of £57,921 and the interest payment of £50,000 (i.e., £7,921). At 31 December 2018, the bonds' carrying amount is £973,270 (beginning balance of £965,349 plus £7,921 discount amortisation).

The following table illustrates interest expense, discount amortisation, and carrying amount (amortised cost) over the life of the bonds.

Year	Carrying Amount (beginning of year)	Interest Expense (at effective interest rate of 6%)	Interest Payment (at coupon rate of 5%)	Amortisation of Discount	Carrying Amount (end of year)
	(a)	(b)	(c)	(d)	(e)
2017	£957,876	£57,473	£50,000	£7,473	£965,349
2018	965,349	57,921	50,000	7,921	973,270
2019	973,270	58,396	50,000	8,396	981,666
2020	981,666	58,900	50,000	8,900	990,566
2021	990,566	59,434	50,000	9,434	1,000,000
Total		£292,124	£250,000	£42,124	

3. Determine the reported value of the bonds (i.e., the carrying amount) at 31 December 2017 and 2018, assuming the effective interest rate method is used to amortise the discount.

### Solution to 3:

The carrying amounts of the bonds at 31 December 2017 and 2018 are £965,349 and £973,270, respectively. Observe that the carrying amount of the bonds issued at a discount increases over the life of the bonds. At maturity, 31 December 2021, the carrying amount of the bonds equals the face value of the bonds. The carrying amount of the bonds will be reduced to zero when the principal payment is made.

4. What amount of interest expense on the bonds would be reported under the straight-line method of amortising the discount?

### Solution to 4:

Under the straight-line method, the discount (or premium) is evenly amortised over the life of the bonds. In this example, the £42,124 discount would be amortised by £8,424.80 (£42,124 divided by 5 years) each year under the straight-line method. So, the annual interest expense under the straight-line method would be £58,424.80 (£50,000 plus £8,424.80).

The accounting and reporting for zero-coupon bonds is similar to the example above except that no interest payments are made; thus, the amount of interest expense each year is the same as the amount of the discount amortisation for the year.

**EXAMPLE 4****Amortising a Bond Premium**

Prembond Corp. issues £1,000,000 face value of five-year bonds, dated 1 January 2017, when the market interest rate is 4 percent. The sales proceeds are £1,044,518. The bonds pay 5 percent interest annually on 31 December.

1. What is the interest *payment* on the bonds each year?

**Solution to 1:**

The interest payment equals £50,000 annually ( $£1,000,000 \times 5\%$ ).

2. What amount of interest *expense* on the bonds would be reported in 2017 and 2018 using the effective interest rate method?

**Solution to 2:**

The sales proceeds of £1,044,518 are more than the face value of £1,000,000; the bonds were issued at a premium of £44,518. The bonds are initially reported as a long-term liability, bonds payable, of £1,044,518, which comprises the face value of £1,000,000 plus a premium of £44,518. The premium is amortised over time, ultimately decreasing the carrying amount (amortised cost) to face value.

Under the effective interest rate method, interest expense on the bonds is calculated as the bonds' carrying amount times the market rate in effect when the bonds are issued (effective interest rate). For 2017, interest expense is £41,781 ( $£1,044,518 \times 4\%$ ). The amount of the premium amortised in 2017 is the difference between the interest expense of £41,781 and the interest payment of £50,000 (i.e., £8,219). The bonds' carrying amount decreases by the premium amortisation; at 31 December 2017, the bonds' carrying amount is £1,036,299 (beginning balance of £1,044,518 less £8,219 premium amortisation). At this point, the carrying amount reflects a remaining unamortised premium of £36,299 (£44,518 premium at issuance minus £8,219 amortised).

For 2018, interest expense is £41,452 ( $£1,036,299 \times 4\%$ ). The amount of the premium amortised in 2018 is the difference between the interest expense of £41,452 and the interest payment of £50,000 (i.e., £8,548). At 31 December 2018, the bonds' carrying amount is £1,027,751 (beginning balance of £1,036,299 less £8,548 premium amortisation).

The following table illustrates interest expense, premium amortisation, and carrying amount (amortised cost) over the life of the bonds.

Year	Carrying Amount (beginning of year)	Interest Expense (at effective interest rate of 4%)	Interest Payment (at coupon rate of 5%)	Amortisation of Premium	Carrying Amount (end of year)
	(a)	(b)	(c)	(d)	(e)
2017	£1,044,518	£41,781	£50,000	£8,219	£1,036,299
2018	1,036,299	41,452	50,000	8,548	1,027,751
2019	1,027,751	41,110	50,000	8,890	1,018,861
2020	1,018,861	40,754	50,000	9,246	1,009,615
2021	1,009,615	40,385	50,000	9,615	1,000,000
Total				£44,518	



3. Determine the reported value of the bonds (i.e., the carrying amount) at 31 December 2017 and 2018, assuming the effective interest rate method is used to amortise the premium.

### Solution to 3:

The carrying amounts of the bonds at 31 December 2017 and 2018 are £1,036,299 and £1,027,751, respectively. Observe that the carrying amount of the bonds issued at a premium decreases over the life of the bonds. At maturity, 31 December 2021, the carrying amount of the bonds equals the face value of the bonds. The carrying amount of the bonds will be reduced to zero when the principal payment is made.

4. What amount of interest expense on the bonds would be reported under the straight-line method of amortising the premium?

### Solution to 4:

Under the straight-line method, the premium is evenly amortised over the life of the bonds. In this example, the £44,518 premium would be amortised by £8,903.64 (£44,518 divided by 5 years) each year under the straight-line method. So, the annual interest expense under the straight-line method would be £41,096.36 (£50,000 less £8,903.64).

The reporting of interest payments on the statement of cash flows can differ under IFRS and US GAAP. Under IFRS, interest payments on bonds can be included as an outflow in either the operating section or the financing section of the statement of cash flows. US GAAP requires interest payments on bonds to be included as an operating cash outflow. (Some financial statement users consider the placement of interest payments in the operating section to be inconsistent with the placement of bond issue proceeds in the financing section of the statement of cash flows.) Typically, cash interest paid is not shown directly on the statement of cash flows, but companies are required to disclose interest paid separately.

Amortisation of a discount (premium) is a non-cash item and thus, apart from its effect on pretax income, has no effect on cash flow. In the section of the statement of cash flows that reconciles net income to operating cash flow, amortisation of a discount (premium) is added back to (subtracted from) net income.

## 4

## ACCOUNTING FOR BONDS AT FAIR VALUE



determine the initial recognition, initial measurement and subsequent measurement of bonds

Reporting bonds at amortised historical costs (historical cost plus or minus the cumulative amortisation) reflects the market rate at the time the bonds were *issued* (i.e., historical market rate or effective interest rate). As market interest rates change, the bonds' carrying amount diverges from the bonds' fair market value. When market interest rates decline, the fair value of a bond with a fixed coupon rate increases. As a result, a company's economic liabilities may be higher than its reported debt based on amortised historical cost. Conversely, when market interest rates increase, the fair value of a bond with a fixed coupon rate decreases and the company's economic liability



may be lower than its reported debt. Using financial statement amounts based on amortised cost may underestimate (or overestimate) a company's debt-to-total-capital ratio and similar leverage ratios.

Companies have the option to report financial liabilities at fair value. Financial liabilities reported at fair value are designated as financial liabilities at fair value through profit or loss under IFRS, or, equivalently under US GAAP, as liabilities under the fair value option. Even if a company does not opt to report financial liabilities at fair value, the availability of fair value information in the financial statements has increased. IFRS and US GAAP require fair value disclosures in the financial statements unless the carrying amount approximates fair value or the fair value cannot be reliably measured.<sup>4</sup>

A company electing to measure a liability at fair value will report decreases in the liability's fair value as income and increases in the liability's fair value as losses. Because changes in a liability's fair value can result from changes in market rates and/or changes in the credit quality of the issuing company, accounting standards require companies to present separately the portion of the change resulting from changes in their own credit risk. Specifically, the company will report the portion of the change in value attributable to changes in their credit risk in other comprehensive income. Only the portion of the change in value not attributable to changes in their credit risk will be recognised in profit or loss.<sup>5</sup>

As of the end of 2021, few companies had elected to report financial liabilities at fair value. Those that have are primarily companies in the financial sector. Reporting standards for financial investments and derivatives already required these companies to report a significant portion of their assets at fair values. Measuring financial liabilities at other than fair value when financial assets are measured at fair value may result in volatility in reported earnings in the financial statements. This volatility is the result of using different bases of measurement for financial assets and financial liabilities. Furthermore, when a liability is related to a specific asset, using different measurement bases creates an accounting mismatch. Goldman Sachs elected to account for some financial liabilities at fair value under the fair value option. In its fiscal year 2017 10-K filing (page 136), Goldman explains this choice:

“The primary reasons for electing the fair value option are to:

- Reflect economic events in earnings on a timely basis;
- Mitigate volatility in earnings from using different measurement attributes (e.g., transfers of financial instruments owned accounted for as financings are recorded at fair value, whereas the related secured financing would be recorded on an accrual basis absent electing the fair value option); and
- Address simplification and cost-benefit considerations (e.g., accounting for hybrid financial instruments at fair value in their entirety versus bifurcation of embedded derivatives and hedge accounting for debt hosts).”

Most companies, as required under IFRS and US GAAP, disclose the fair values of financial liabilities. The primary exception to the disclosure occurs when fair value cannot be reliably measured. Example 5 illustrates ING Group's fair value disclosures, including the fair values of long-term debt.

<sup>4</sup> IFRS (IAS 32, IFRS 7, IFRS 9) and US GAAP (FASB ASC 820 and 825).

<sup>5</sup> IFRS 9, US GAAP (FASB ASC 825 and ASU 2016-01).

**EXAMPLE 5****Fair Value Disclosures of Debt and Financial Instruments****ING Group 2017 Form 20-F****ING Group [Condensed] Balance Sheet as of 31 December 2017 and 2016 [Liabilities Only]**

<i>Amounts in billions of euros</i>	<b>2017</b>	<b>2016</b>
Deposits from banks	36.8	32.0
Customer deposits	539.8	522.9
Financial liabilities at fair value through profit or loss	87.2	99.0
Other liabilities	18.9	20.1
Debt securities in issue/subordinated loans	112.1	120.4
<b>Total liabilities</b>	<b>794.8</b>	<b>794.4</b>

The following are excerpts from the footnotes to ING Group's financial statements.

**Excerpt from Note 1 Accounting Policies****Financial assets and liabilities at fair value through profit or loss**

... Financial liabilities at fair value through profit or loss comprise the following sub-categories: trading liabilities, non-trading derivatives, and other financial liabilities designated at fair value through profit or loss by management. Trading liabilities include equity securities, debt securities, funds on deposit, and derivatives.

A financial asset or financial liability is classified at fair value through profit or loss if acquired principally for the purpose of selling in the short term or if designated by management as such. Management will designate a financial asset or a financial liability as such only if this eliminates a measurement inconsistency or if the related assets and liabilities are managed on a fair value basis....

**Financial liabilities at amortised cost**

Financial liabilities at amortised cost include the following sub-categories: preference shares classified as debt, debt securities in issue, subordinated loans, and deposits from banks and customer deposits.

Financial liabilities at amortised cost are recognised initially at their issue proceeds (fair value of consideration received) net of transaction costs incurred. Liabilities in this category are subsequently stated at amortised cost; any difference between proceeds, net of transaction costs, and the redemption value is recognised in the statement of profit or loss over the period of the liability using the effective interest method....

**Excerpt from Note 16 Debt securities in issue**

Debt securities in issue relate to debentures and other issued debt securities with either fixed interest rates or interest rates based on floating interest rate levels, such as certificates of deposit and accepted bills issued by ING Group, except for subordinated items. Debt securities in issue do not include debt securities presented as Financial liabilities at fair value through profit or loss.

## Excerpt from Note 37 Fair value of assets and liabilities

**Fair Value of Financial Liabilities as of 31 December 2017 and 2016**

Amounts in millions of euros	Estimated Fair Value		Statement of Financial Position Value	
	2017	2016	2017	2016
<b>Financial liabilities</b>				
Deposits from banks	36,868	32,352	36,821	31,964
Customer deposits	540,547	523,850	539,828	522,908
Financial liabilities at fair value through profit or loss				
• trading liabilities	73,596	83,167	73,596	83,167
• non-trading derivatives	2,331	3,541	2,331	3,541
• designated as at fair value through profit or loss	11,215	12,266	11,215	12,266
Other liabilities	14,488	15,247	14,488	15,247
Debt securities in issue	96,736	103,559	96,086	103,234
Subordinated loans	16,457	17,253	15,968	17,223
	<b>792,238</b>	<b>791,235</b>	<b>790,333</b>	<b>789,550</b>

Use the condensed balance sheet and excerpts from the notes to ING Group's financial statements shown above to address the following questions:

1. As of 31 December 2017, what proportion of the amount of liabilities on ING Group's balance sheet is reported at fair value through profit or loss?

**Solution to 1:**

Of ING Group's total €794.8 billion liabilities, 11 percent (=€87.2 billion/€794.8 billion) are reported at fair value through profit or loss.

2. As of 31 December 2017 and 2016, what is the percent difference between the carrying amount and fair value of the debt securities that are shown on ING Group's balance sheet at amortised cost?

**Solution to 2:**

ING's debt securities that are shown on the balance sheet at amortised cost appear in the line labeled "Debt securities in issue." Note 1 states that "Debt securities in issue" are reported at amortised cost. Note 16 indicates that this line item relates to debentures and other issued debt securities, and thus we exclude subordinated loans and deposits from banks and customer deposits in this case (there are no preference shares classified as debt listed in the Note 37 excerpt).

According to the above excerpt from Note 37, in each year the fair value of ING's debt securities is slightly higher than its carrying amount. The difference is 0.7% [= (96,736/96,086) – 1] on 31 December 2017 and 0.3% [= (103,559/103,234) – 1] on 31 December 2016.

## 5

## DERECOGNITION OF DEBT



explain the derecognition of debt

Once bonds are issued, a company may leave the bonds outstanding until maturity or redeem the bonds before maturity either by calling the bonds (if the bond issue includes a call provision) or by purchasing the bonds in the open market. If the bonds remain outstanding until the maturity date, the company pays bondholders the face value of the bonds at maturity. The discount or premium on the bonds would be fully amortised at maturity; the carrying amount would equal face value. Upon repayment, the bonds payable account is reduced by the carrying amount at maturity (face value) of the bonds, and cash is reduced by an equal amount. Repayment of the bonds appears in the statement of cash flows as a financing cash outflow.

If a company decides to redeem bonds before maturity and thus extinguish the liability early, the bonds payable account is reduced by the carrying amount of the redeemed bonds. The difference between the cash required to redeem the bonds and the carrying amount of the bonds is a gain or loss on the extinguishment of debt. Under IFRS, debt issuance costs are included in the measurement of the liability and are thus part of its carrying amount. Under US GAAP, debt issuance costs are accounted for separately from bonds payable and are amortised over the life of the bonds. Any unamortised debt issuance costs must be written off at the time of redemption and included in the gain or loss on debt extinguishment.

For example, a company reporting under IFRS has a £10 million bond issuance with a carrying amount equal to its face value and five years remaining until maturity. The company redeems the bonds at a call price of 103. The redemption cost is £10.3 million ( $= £10 \text{ million} \times 103\%$ ). The company's loss on redemption would be £300 thousand (£10 million carrying amount minus £10.3 million cash paid to redeem the callable bonds).

A gain or loss on the extinguishment of debt is reported on the income statement, in a separate line item, when the amount is material. A company typically discloses further detail about the extinguishment in the management discussion and analysis (MD&A) and/or notes to the financial statements.<sup>6</sup> In addition, in a statement of cash flows prepared using the indirect method, net income is adjusted to remove any gain or loss on the extinguishment of debt from operating cash flows and the cash paid to redeem the bonds is classified as cash used for financing activities. (Recall that the indirect method of the statement of cash flows begins with net income and makes necessary adjustments to arrive at cash from operations, including removal of gains or losses from non-operating activities.)

To illustrate the financial statement impact of the extinguishment of debt, consider the notes payable repurchase in Example 6 below.

<sup>6</sup> We use the term MD&A generally to refer to any management commentary provided on a company's financial condition, changes in financial condition, and results of operations. In the United States, the Securities and Exchange Commission (SEC) requires a management discussion and analysis for companies listed on US public markets. Reporting requirements for such a commentary as the SEC-required MD&A vary across exchanges, but some are similar to the SEC requirements. The IASB issued an IFRS Practice Statement, "Management Commentary," in December 2010 to guide all companies reporting under IFRS.

**EXAMPLE 6****Debt Extinguishment Disclosure**

The following excerpts are from the 2018 annual report of Monte Rock Inc. (a hypothetical company). In its statement of cash flows, the company uses the indirect method to reconcile net income with net cash (used in) provided by operations.

**Excerpt from Consolidated Statements of Income**  
**For the years ended 31 December 2018, 2017, and 2016**

	2018	2017	2016
Revenues:			
⋮	⋮	⋮	⋮
Total revenues	104,908,900	112,416,800	96,879,000
⋮	⋮	⋮	⋮
Total operating expenses	100,279,900	96,140,600	71,018,900
Income from operations	4,629,000	16,276,200	25,860,100
Other income (expense):			
⋮	⋮	⋮	⋮
Gain on debt extinguishment	2,345,000	—	—
⋮	⋮	⋮	⋮
Total other income (expense), net	11,236,100	(14,257,000)	(7,085,800)
Net income	\$15,865,100	\$2,019,200	\$18,774,300

**Excerpt from Consolidated Statements of Cash Flows**  
**For the years ended 31 December 2018, 2017, and 2016**

	2018	2017	2016
CASH FLOWS FROM OPERATING ACTIVITIES:			
Net Income	\$15,865,100	\$2,019,200	\$18,774,300
Adjustments to reconcile net income to net cash (used in) provided by operating activities:			
⋮	⋮	⋮	⋮
Gain on debt extinguishment	(2,345,000)	—	—
⋮	⋮	⋮	⋮
Total adjustments	(16,636,000)	38,842,400	19,815,800
Net cash (used in) provided by operating activities	(770,900)	40,861,600	38,590,100
⋮	⋮	⋮	⋮
CASH FLOWS FROM FINANCING ACTIVITIES:			
Payments for debt financing costs	(294,000)	(1,526,500)	(1,481,500)
⋮	⋮	⋮	⋮
Purchase of debt securities	(2,155,000)	—	(5,000,000)
⋮	⋮	⋮	⋮
Payments of unsecured debt	—	(31,402,960)	(1,356,000)

**Excerpt from NOTE 8: BONDS PAYABLE**

On December 12, 2014, the Company issued \$25 million of unsecured bonds. ... Interest on the bonds is equal to Libor plus 4%, payable quarterly in arrears. ... During the 4th quarter of 2018, the Company repurchased the unsecured bonds with a face value of \$4.5 million and realized a \$2.3 million gain.

1. The balance in bonds payable was reduced at redemption by:

- A. \$2,155,000.
- B. \$2,345,000.
- C. \$4,500,000.

### Solution to 1:

C is correct. The bonds payable is reduced at redemption by the carrying amount of the bonds redeemed. The cash paid to extinguish the bonds plus the gain on redemption equals the carrying amount of the bonds. The carrying amount of the bonds was \$4,500,000. In this case, the carrying amount equals the face value. The company recognised a gain of \$2,345,000 when it extinguished the debt of \$4,500,000 by paying only \$2,155,000.

2. How much cash did the Company pay to redeem the bonds?

- A. \$2,155,000
- B. \$2,345,000
- C. \$4,500,000

### Solution to 2:

A is correct. As shown in the Statement of Cash Flows, the company paid \$2,155,000 to redeem the bonds. The company recognised a gain of \$2,345,000 when it extinguished the debt of \$4,500,000 by paying only \$2,155,000.

## SUMMARY

Non-current liabilities arise from different sources of financing and different types of creditors. Bonds are a common source of financing from debt markets. Key points in accounting and reporting of non-current liabilities include the following:

- The sales proceeds of a bond issue are determined by discounting future cash payments using the market rate of interest at the time of issuance (effective interest rate). The reported interest expense on bonds is based on the effective interest rate.
- Future cash payments on bonds usually include periodic interest payments (made at the stated interest rate or coupon rate) and the principal amount at maturity.
- When the market rate of interest equals the coupon rate for the bonds, the bonds will sell at par (i.e., at a price equal to the face value). When the market rate of interest is higher than the bonds' coupon rate, the bonds will sell at a discount. When the market rate of interest is lower than the bonds' coupon rate, the bonds will sell at a premium.

- An issuer amortises any issuance discount or premium on bonds over the life of the bonds.
- If a company redeems bonds before maturity, it reports a gain or loss on debt extinguishment computed as the net carrying amount of the bonds (including bond issuance costs under IFRS) less the amount required to redeem the bonds.
- The carrying amount of bonds is typically the amortised historical cost, which can differ from their fair value.
- Companies are required to disclose the fair value of financial liabilities, including debt. Although permitted to do so, few companies opt to report debt at fair values on the balance sheet.

## PRACTICE PROBLEMS

1. A company issues €1 million of bonds at face value. When the bonds are issued, the company will record a:
  - A. cash inflow from investing activities.
  - B. cash inflow from financing activities.
  - C. cash inflow from operating activities.
2. At the time of issue of 4.50% coupon bonds, the effective interest rate was 5.00%. The bonds were *most likely* issued at:
  - A. par.
  - B. a discount.
  - C. a premium.
3. Oil Exploration LLC paid \$45,000 in printing, legal fees, commissions, and other costs associated with its recent bond issue. It is *most likely* to record these costs on its financial statements as:
  - A. an asset under US GAAP and reduction of the carrying value of the debt under IFRS.
  - B. a liability under US GAAP and reduction of the carrying value of the debt under IFRS.
  - C. a cash outflow from investing activities under both US GAAP and IFRS.
4. A company issues \$1,000,000 face value of 10-year bonds on 1 January 2015 when the market interest rate on bonds of comparable risk and terms is 5%. The bonds pay 6% interest annually on 31 December. At the time of issue, the bonds payable reflected on the balance sheet is *closest* to:
  - A. \$926,399.
  - B. \$1,000,000.
  - C. \$1,077,217.
5. Midland Brands issues three-year bonds dated 1 January 2015 with a face value of \$5,000,000. The market interest rate on bonds of comparable risk and term is 3%. If the bonds pay 2.5% annually on 31 December, bonds payable when issued are most likely reported as *closest* to:
  - A. \$4,929,285.
  - B. \$5,000,000.
  - C. \$5,071,401.
6. A firm issues a bond with a coupon rate of 5.00% when the market interest rate is 5.50% on bonds of comparable risk and terms. One year later, the market interest rate increases to 6.00%. Based on this information, the effective interest rate is:
  - A. 5.00%.



- B. 5.50%.
- C. 6.00%.
7. On 1 January 2010, Elegant Fragrances Company issues £1,000,000 face value, five-year bonds with annual interest payments of £55,000 to be paid each 31 December. The market interest rate is 6.0 percent. Using the effective interest rate method of amortisation, Elegant Fragrances is *most likely* to record:
- A. an interest expense of £55,000 on its 2010 income statement.
- B. a liability of £982,674 on the 31 December 2010 balance sheet.
- C. a £58,736 cash outflow from operating activity on the 2010 statement of cash flows.
8. Consolidated Enterprises issues €10 million face value, five-year bonds with a coupon rate of 6.5 percent. At the time of issuance, the market interest rate is 6.0 percent. Using the effective interest rate method of amortisation, the carrying value after one year will be *closest* to:
- A. €10.17 million.
- B. €10.21 million.
- C. €10.28 million.
9. A company issues €10,000,000 face value of 10-year bonds dated 1 January 2015 when the market interest rate on bonds of comparable risk and terms is 6%. The bonds pay 7% interest annually on 31 December. Based on the effective interest rate method, the interest expense on 31 December 2015 is *closest* to:
- A. €644,161.
- B. €700,000.
- C. €751,521.
10. A company issues \$30,000,000 face value of five-year bonds dated 1 January 2015 when the market interest rate on bonds of comparable risk and terms is 5%. The bonds pay 4% interest annually on 31 December. Based on the effective interest rate method, the carrying amount of the bonds on 31 December 2015 is *closest* to:
- A. \$28,466,099.
- B. \$28,800,000.
- C. \$28,936,215.
11. Lesp Industries issues five-year bonds dated 1 January 2015 with a face value of \$2,000,000 and 3% coupon rate paid annually on 31 December. The market interest rate on bonds of comparable risk and term is 4%. The sales proceeds of the bonds are \$1,910,964. Under the effective interest rate method, the interest expense in 2017 is *closest* to:
- A. \$77,096.
- B. \$77,780.

- C. \$77,807.
12. For a bond issued at a premium, using the effective interest rate method, the:
- A. carrying amount increases each year.
  - B. amortization of the premium increases each year.
  - C. premium is evenly amortized over the life of the bond.
13. Comte Industries issues \$3,000,000 worth of three-year bonds dated 1 January 2015. The bonds pay interest of 5.5% annually on 31 December. The market interest rate on bonds of comparable risk and term is 5%. The sales proceeds of the bonds are \$3,040,849. Under the straight-line method, the interest expense in the first year is *closest* to:
- A. \$150,000.
  - B. \$151,384.
  - C. \$152,042.
14. Innovative Inventions, Inc. needs to raise €10 million. If the company chooses to issue zero-coupon bonds, its debt-to-equity ratio will *most likely*:
- A. rise as the maturity date approaches.
  - B. decline as the maturity date approaches.
  - C. remain constant throughout the life of the bond.
15. Fairmont Golf issued fixed rate debt when interest rates were 6 percent. Rates have since risen to 7 percent. Using only the carrying amount (based on historical cost) reported on the balance sheet to analyze the company's financial position would *most likely* cause an analyst to:
- A. overestimate Fairmont's economic liabilities.
  - B. underestimate Fairmont's economic liabilities.
  - C. underestimate Fairmont's interest coverage ratio.
16. The management of Bank EZ repurchases its own bonds in the open market. They pay €6.5 million for bonds with a face value of €10.0 million and a carrying value of €9.8 million. The bank will *most likely* report:
- A. other comprehensive income of €3.3 million.
  - B. other comprehensive income of €3.5 million.
  - C. a gain of €3.3 million on the income statement.
17. A company redeems \$1,000,000 face value bonds with a carrying value of \$990,000. If the call price is 104 the company will:
- A. reduce bonds payable by \$1,000,000.
  - B. recognize a loss on the extinguishment of debt of \$50,000.
  - C. recognize a gain on the extinguishment of debt of \$10,000.

## SOLUTIONS

1. B is correct. The company receives €1 million in cash from investors at the time the bonds are issued, which is recorded as a financing activity.
2. B is correct. The effective interest rate is greater than the coupon rate and the bonds will be issued at a discount.
3. A is correct. Under US GAAP, expenses incurred when issuing bonds are generally recorded as an asset and amortised to the related expense (legal, etc.) over the life of the bonds. Under IFRS, they are included in the measurement of the liability. The related cash flows are financing activities.
4. C is correct. The bonds will be issued at a premium because the coupon rate is higher than the market interest rate. The future cash outflows, the present value of the cash outflows, and the total present value are as follows:

Date	Interest Payment (\$)	Present Value at Market Rate 5% (\$)		Present Value at Market Rate 5% (\$)	Total Present Value (\$)
31 December 2015	60,000.00	57,142.86			
31 December 2016	60,000.00	54,421.77			
31 December 2017	60,000.00	51,830.26			
31 December 2018	60,000.00	49,362.15			
31 December 2019	60,000.00	47,011.57			
31 December 2020	60,000.00	44,772.92			
31 December 2021	60,000.00	42,640.88			
31 December 2022	60,000.00	40,610.36			
31 December 2023	60,000.00	38,676.53			
31 December 2024	60,000.00	36,834.80	1,000,000.00	613,913.25	
		463,304.10		613,913.25	1,077,217.35
					Sales Proceeds

The following illustrates the keystrokes for many financial calculators to calculate sales proceeds of \$1,077,217.35:

Calculator Notation	Numerical Value for This Problem
N	10
% <i>i</i> or I/Y	5
FV	\$1,000,000.00
PMT	\$60,000.00
PV compute	X

Thus, the sales proceeds are reported on the balance sheet as an increase in long-term liability, bonds payable of \$1,077,217.

5. A is correct. The bonds payable reported at issue is equal to the sales proceeds. The interest payments and future value of the bond must be discounted at the market interest rate of 3% to determine the sales proceeds.

Date	Interest Payment	Present Value at Market Rate (3%)	Face Value Payment	Present Value at Market Rate (3%)	Total Present Value
31 December 2015	\$125,000.00	\$121,359.22			
31 December 2016	\$125,000.00	\$117,824.49			
31 December 2017	\$125,000.00	\$114,392.71	\$5,000,000.00	\$4,575,708.30	
Total		\$353,576.42		\$4,575,708.30	\$4,929,284.72

The following illustrates the keystrokes for many financial calculators to calculate sales proceeds of \$4,929,284.72:

Calculator Notation	Numerical Value for This Problem
N	3
% <i>i</i> or I/Y	3.0
FV	\$5,000,000.00
PMT	\$125,000.00
PV compute	X

6. B is correct. The market interest rate at the time of issuance is the effective interest rate that the company incurs on the debt. The effective interest rate is the discount rate that equates the present value of the coupon payments and face value to their selling price. Consequently, the effective interest rate is 5.50%.
7. B is correct. The bonds will be issued at a discount because the market interest rate is higher than the stated rate. Discounting the future payments to their present value indicates that at the time of issue, the company will record £978,938 as both a liability and a cash inflow from financing activities. Interest expense in 2010 is £58,736 (£978,938 times 6.0 percent). During the year, the company will pay cash of £55,000 related to the interest payment, but interest expense on the income statement will also reflect £3,736 related to amortisation of the initial discount (£58,736 interest expense less the £55,000 interest payment). Thus, the value of the liability at 31 December 2010 will reflect the initial value (£978,938) plus the amortised discount (£3,736), for a total of £982,674. The cash outflow of £55,000 may be presented as either an operating or financing activity under IFRS.
8. A is correct. The coupon rate on the bonds is higher than the market rate, which indicates that the bonds will be issued at a premium. Taking the present value of each payment, discounted using the market interest rate of 6%, indicates an issue date value of €10,210,618. The interest expense is determined by multiplying the carrying amount at the beginning of the period (€10,210,618) by the market interest rate at the time of issue (6.0 percent) for an interest expense of €612,637. The value after one year will equal the beginning value less the amount of the premium amortised to date, which is the difference between the amount paid (€650,000) and the expense accrued (€612,637) or €37,363. €10,210,618 – €37,363 = €10,173,255 or €10.17 million.
9. A is correct. The future cash outflows, the present value of the cash outflows, and the total present value are as follows:

Date	Interest Payment (€)	Present Value at Market Rate 6% (€)		Present Value at Market Rate 6% (€)	Total Present Value (€)
31 December 2015	700,000.00	660,377.36			
31 December 2016	700,000.00	622,997.51			
31 December 2017	700,000.00	587,733.50			
31 December 2018	700,000.00	554,465.56			
31 December 2019	700,000.00	523,080.72			
31 December 2020	700,000.00	493,472.38			
31 December 2021	700,000.00	465,539.98			
31 December 2022	700,000.00	439,188.66			
31 December 2023	700,000.00	414,328.92			
31 December 2024	700,000.00	390,876.34	10,000,000.00	5,583,947.77	
		5,152,060.94		5,583,947.77	10,736,008.71
					Sales Proceeds

The following illustrates the keystrokes for many financial calculators to calculate sales proceeds of €10,736,008.71:

Calculator Notation	Numerical Value for This Problem
N	10
% <i>i</i> or I/Y	6
FV	\$10,000,000.00
PMT	\$700,000.00
PV compute	X

The interest expense is calculated by multiplying the carrying amount at the beginning of the year by the effective interest rate at issuance. As a result, the interest expense at 31 December 2015 is €644,161 ( $€10,736,008.71 \times 6\%$ ).

10. C is correct. The future cash outflows, the present value of the cash outflows, and the total present value are as follows:

Date	Interest Payment (\$)	Present Value at Market Rate 5% (\$)		Present Value at Market Rate 5% (\$)	Total Present Value (\$)
31 December 2015	1,200,000	1,142,857.14			
31 December 2016	1,200,000	1,088,435.37			
31 December 2017	1,200,000	1,036,605.12			
31 December 2018	1,200,000	987,242.97			
31 December 2019	1,200,000	940,231.40	30,000,000	23,505,785.00	
		5,195,372.00		23,505,785.00	28,701,157.00
					Sales Proceeds

The following illustrates the keystrokes for many financial calculators to calculate sales proceeds of \$28,701,157.00:

Calculator Notation	Numerical Value for This Problem
N	5
% <i>i</i> or I/Y	5
FV	\$30,000,000.00
PMT	\$1,200,000.00
PV compute	X

The following table illustrates interest expense, premium amortization, and carrying amount (amortized cost) for 2015.

Year	Carrying Amount (beginning of year)	Interest Expense (at effective interest rate of 5%)	Interest Payment (at coupon rate of 4%)	Amortization of Discount	Carrying Amount (end of year)
2015	\$28,701,157.00	\$1,435,057.85	\$1,200,000.00	\$235,057.85	\$28,936,214.85

The carrying amount at the end of the year is found by adding the amortization of the discount to the carrying amount at the beginning of the year. As a result, the carrying amount on 31 December 2015 is \$28,936,215.

Alternatively, the following illustrates the keystrokes for many financial calculators to calculate the carrying value at the end of the first year of \$28,936, 215:

Calculator Notation	Numerical Value for This Problem
N	4
% <i>i</i> or I/Y	5
FV	\$30,000,000.00
PMT	\$1,200,000.00
PV compute	X

11. B is correct. The interest expense for a given year is equal to the carrying amount at the beginning of the year times the effective interest of 4%. Under the effective interest rate method, the difference between the interest expense and the interest payment (based on the coupon rate and face value) is the discount amortized in the period, which increases the carrying amount annually. For 2017, the interest expense is the beginning carrying amount (\$1,944,499) times the effective interest of 4%.

Year	Carrying Amount (beginning)	Interest Expense (at effective interest of 4%)	Interest Payment (at coupon rate of 3%)	Amortization of Discount	Carrying Amount (end of year)
2015	\$1,910,964	\$76,439	\$60,000.00	\$16,439	\$1,927,403
2016	\$1,927,403	\$77,096	\$60,000.00	\$17,096	\$1,944,499
2017	\$1,944,499	\$77,780	\$60,000.00	\$17,780	\$1,962,279

12. B is correct. The amortization of the premium equals the interest payment minus the interest expense. The interest payment is constant and the interest expense decreases as the carrying amount decreases. As a result, the amortization of the premium increases each year.
13. B is correct. Under the straight-line method, the bond premium is amortized equally over the life of the bond. The annual interest payment is \$165,000

$(\$3,000,000 \times 5.5\%)$  and annual amortization of the premium under the straight-line method is \$13,616  $[(\$3,040,849 - \$3,000,000)/3]$ . The interest expense is the interest payment less the amortization of the premium  $(\$165,000 - \$13,616 = \$151,384)$ .

14. A is correct. The value of the liability for zero-coupon bonds increases as the discount is amortised over time. Furthermore, the amortised interest will reduce earnings at an increasing rate over time as the value of the liability increases. Higher relative debt and lower relative equity (through retained earnings) will cause the debt-to-equity ratio to increase as the zero-coupon bonds approach maturity.
15. A is correct. When interest rates rise, bonds decline in value. Thus, the carrying amount of the bonds being carried on the balance sheet is higher than the market value. The company could repurchase the bonds for less than the carrying amount, so the economic liabilities are overestimated. Because the bonds are issued at a fixed rate, there is no effect on interest coverage.
16. C is correct. A gain of €3.3 million (carrying amount less amount paid) will be reported on the income statement.
17. B is correct. If a company decides to redeem a bond before maturity, bonds payable is reduced by the carrying amount of the debt. The difference between the cash required to redeem the bonds and the carrying amount of the bonds is a gain or loss on the extinguishment of debt. Because the call price is 104 and the face value is \$1,000,000, the redemption cost is 104% of \$1,000,000 or \$1,040,000. The company's loss on redemption would be \$50,000 (\$990,000 carrying amount of debt minus \$1,040,000 cash paid to redeem the callable bonds).





## LEARNING MODULE

# 9

## Applications of Financial Statement Analysis

by Thomas R. Robinson, PhD, CAIA, CFA, J. Hennie van Greuning, DCom, CFA, Elaine Henry, PhD, CFA, and Michael A. Broihahn, CPA, CIA, CFA.

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### LEARNING OUTCOMES

<i>Mastery</i>	<i>The candidate should be able to:</i>
<input type="checkbox"/>	evaluate a company's past financial performance and explain how a company's strategy is reflected in past financial performance
<input type="checkbox"/>	demonstrate how to forecast a company's future net income and cash flow
<input type="checkbox"/>	describe the role of financial statement analysis in assessing the credit quality of a potential debt investment
<input type="checkbox"/>	describe the use of financial statement analysis in screening for potential equity investments
<input type="checkbox"/>	explain appropriate analyst adjustments to a company's financial statements to facilitate comparison with another company

**Note:** Changes in accounting standards as well as new rulings and/or pronouncements issued after the publication of the readings on financial reporting and analysis may cause some of the information in these readings to become dated. Candidates are *not* responsible for anything that occurs after the readings were published. In addition, candidates are expected to be familiar with the analytical frameworks contained in the readings, as well as the implications of alternative accounting methods for financial analysis and valuation discussed in the readings. Candidates are also responsible for the content of accounting standards, but not for the actual reference numbers. Finally, candidates should be aware that certain ratios may be defined and calculated differently. When alternative ratio definitions exist and no specific definition is given, candidates should use the ratio definitions emphasized in the readings.

## 1

## INTRODUCTION & EVALUATING PAST FINANCIAL PERFORMANCE



evaluate a company's past financial performance and explain how a company's strategy is reflected in past financial performance

This module presents several important applications of financial statement analysis. Among the issues we will address are the following:

- What are the key questions to address in evaluating a company's past financial performance?
- How can an analyst approach forecasting a company's future net income and cash flow?
- How can financial statement analysis be used to evaluate the credit quality of a potential fixed-income investment?
- How can financial statement analysis be used to screen for potential equity investments?
- How can differences in accounting methods affect financial ratio comparisons between companies, and what are some adjustments analysts make to reported financials to facilitate comparability among companies.

Prior to undertaking any analysis, an analyst should explore the purpose and context of the analysis. The purpose and context guide further decisions about the approach, the tools, the data sources, and the format in which to report results of the analysis, and also suggest which aspects of the analysis are most important. Having identified the purpose and context, the analyst should then be able to formulate the key questions that the analysis must address. The questions will suggest the data the analyst needs to collect to objectively address the questions. The analyst then processes and analyzes the data to answer these questions. Conclusions and decisions based on the analysis are communicated in a format appropriate to the context, and follow-up is undertaken as required. Although this module will not formally present applications as a series of steps, the process just described is generally applicable.

### Application: Evaluating Past Financial Performance

Analysts examine a company's past financial performance for a number of reasons. Cross-sectional analysis of financial performance facilitates understanding of the comparability of companies for a market-based valuation.<sup>1</sup> Analysis of a company's historical performance over time can provide a basis for a forward-looking analysis of the company. Both cross-sectional and trend analysis can provide information for evaluating the quality and performance of a company's management.

An evaluation of a company's past performance addresses not only *what* happened (i.e., how the company performed) but also *why* it happened—the causes behind the performance and how the performance reflects the company's strategy. Evaluative

<sup>1</sup> Pinto, Henry, Robinson, and Stowe (*Equity Asset Valuation*, CFA Institute 2010) describe market-based valuation as using price multiples—ratios of a stock's market price to some measure of value per share (e.g., price-to-earnings ratios). Although the valuation method may be used independently of an analysis of a company's past financial performance, such an analysis may provide reasons for differences in companies' price multiples.

judgments assess whether the performance is better or worse than a relevant benchmark, such as the company's own historical performance, a competitor's performance, or market expectations. Some key analytical questions include the following:

- How and why have corporate measures of profitability, efficiency, liquidity, and solvency changed over the periods being analyzed?
- How do the level and trend in a company's profitability, efficiency, liquidity, and solvency compare with the corresponding results of other companies in the same industry? What factors explain any differences?
- What aspects of performance are critical for a company to successfully compete in its industry, and how did the company perform relative to those critical performance aspects?
- What are the company's business model and strategy, and how did they influence the company's performance as reflected in, for example, its sales growth, efficiency, and profitability?

Data available to answer these questions include the company's (and its competitors') financial statements, materials from the company's investor relations department, corporate press releases, and non-financial-statement regulatory filings, such as proxies. Useful data also include industry information (e.g., from industry surveys, trade publications, and government sources), consumer information (e.g., from consumer satisfaction surveys), and information that is gathered by the analyst firsthand (e.g., through on-site visits). Processing the data typically involves creating common-size financial statements, calculating financial ratios, and reviewing or calculating industry-specific metrics. Example 1 illustrates the effects of strategy on performance and the use of basic economic reasoning in interpreting results.

#### EXAMPLE 1

### A Change in Products Reflected in Financial Performance

Apple Inc. is a company that has evolved and adapted over time. In its 1994 Prospectus filed with the US SEC, Apple identified itself as "one of the world's leading personal computer technology companies." At that time, most of its revenue was generated by computer sales. In the prospectus, however, Apple stated, "The Company's strategy is to expand its market share in the personal computing industry while developing and expanding into new related business such as Personal Interactive Electronics and Apple Business Systems." Over time, products other than computers became significant generators of revenue and profit.

In 2005, an article in *Barron's* said, "In the last year, the iPod has become Apple's best-selling product, bringing in a third of revenues for the Cupertino, Calif. firm . . . Little noticed by these iPod zealots, however is a looming threat . . . Wireless phone companies are teaming up with the music industry to make most mobile phones into music players" (*Barron's* 27 June 2005, p. 19). The threat noted by *Barron's* was not unnoticed or ignored by Apple.

In June 2007, Apple itself entered the mobile phone market with the launch of the original iPhone, followed in June 2008 by the second-generation iPhone 3G (a handheld device combining the features of a mobile phone, an iPod, and an internet connection device). Soon after, the company launched the iTunes App Store, which allows users to download third-party applications onto their iPhones. As noted in a 2009 *Business Week* article, Apple "is the world's largest music distributor, having passed Wal-Mart Stores in early 2008. Apple sells

around 90% of song downloads and 75% of digital music players in the United States” (*Business Week*, 28 September 2009, p. 34). Product innovations continue as evidenced by the introduction of the iPad in January 2010.

In analyzing the historical performance of Apple in 2018, an analyst might refer to the information presented in Exhibit 1, which shows sales, profitability, sales by product line and product mix.

**Exhibit 1: (dollars in millions)**

<b>Sales and Profitability</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>	<b>2014</b>	<b>2013</b>	<b>2012</b>	<b>2011</b>	<b>2010</b>
Sales	229,234	215,639	233,715	182,795	170,910	156,608	108,249	65,225
Cost of goods sold	141,048	131,376	140,089	112,258	106,606	87,846	64,431	39,541
Gross profit	88,186	84,263	93,626	70,537	64,304	68,762	43,818	25,684
Gross margin	38.5%	39.1%	40.1%	38.6%	37.6%	43.9%	40.5%	39.4%
Net sales by product								
Mac	25,850	22,831	25,471	24,079	21,483	23,221	21,783	17,480
iPhone and related	141,319	136,700	155,041	101,991	91,279	78,692	45,998	25,177
iPad and related	19,222	20,628	23,227	30,283	31,980	30,945	19,168	4,957
Services	29,980	24,348	19,909	18,063	16,051	12,890	9,373	10,110
Other (includes iPod)	12,863	11,132	10,067	8,379	10,117	10,760	11,927	7,501
Total	229,234	215,639	233,715	182,795	170,910	156,508	108,249	65,225
Net sales % by product								
Mac	11.3%	10.6%	10.9%	13.2%	12.6%	14.8%	20.1%	26.8%
iPhone and related	61.6%	63.4%	66.3%	55.8%	53.4%	50.3%	42.5%	38.6%
iPad and related	8.4%	9.6%	9.9%	16.6%	18.7%	19.8%	17.7%	7.6%
Services	13.1%	11.3%	8.5%	9.9%	9.4%	8.2%	8.7%	15.5%
Other (includes iPod)	5.6%	5.2%	4.3%	4.6%	5.9%	6.9%	11.0%	11.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Apple 10-K filings.

Using the information provided, address the following:

1. How have sales and gross margin changed over time?

### **Solution to 1:**

Since 2010 total sales have increased from \$65 billion to \$229 billion. This represents an annualized growth rate of almost 20%. There was only one year that did not have sales growth in dollars (2016). Gross margin has ranged from 37.6% to 43.9%. Gross margin increased from 2010, when the iPad was introduced, through 2012, when it reached its peak. Gross margin then declined in 2013 and trended upward through 2015. There were modest declines in gross margin after 2015.

2. How has the company's product mix changed since the introduction of the iPad in 2010, and what might this change suggest for an analyst in evaluating Apple's profitability over time and its ability to maintain that profitability?

### Solution to 2:

When the iPad was introduced in 2010 it received a significant share of the product mix, rising to 17.7% in 2011, the first full year after introduction. The iPad's product mix share approached 20% in 2012 and then declined slightly for two years before a larger decline down to a relatively stable product mix share of around 9%. This could be explained by reaching fairly widespread adoption. The iPhone also gained significant product mix share, rising steadily from 38.6% in 2010 to 66.3% in 2015. Share declined slightly since 2015 but still remains the largest of Apple's product segments at more than 60%. Sales of their original product, the Mac, have declined from more than 25% of sales to around 10%. Services have changed significantly but have shown a steady increase in recent years, most likely due to Apple's music and other media subscription plans. Initially a blockbuster product, the iPod is now included in "other," and this is the largest driver of the decline in that category over time.

Apple had a history of introducing new products every few years, but in recent years the company has not created new product categories. Instead the company has periodically introduced new models of iPads and iPhones. The recent decline in margins is attributable in part to the lack of new products and services and highlights the importance of product innovation to Apple in maintaining historically healthy margins.

In calculating and interpreting financial statement ratios, an analyst needs to be aware of the potential impact on the financial statements and related ratios of companies reporting under different accounting standards, such as international financial reporting standards (IFRS), US generally accepted accounting principles (US GAAP), or other home-country GAAP. Furthermore, even within a given set of accounting standards, companies still have discretion to choose among acceptable methods. A company also may make different assumptions and estimates even when applying the same method as another company. Therefore, making selected adjustments to a company's financial statement data may be useful to facilitate comparisons with other companies or with the industry overall. Examples of such analyst adjustments will be discussed in Section 6.

Non-US companies that use any acceptable body of accounting standards (other than IFRS or US GAAP) and file with the US SEC (because their shares or depositary receipts based on their shares trade in the United States) are required to reconcile their net income and shareholders' equity accounts to US GAAP. Note that in 2007, the SEC eliminated the reconciliation requirement for non-US companies using IFRS and filing with the SEC; however, companies may still voluntarily provide this information for comparison purposes.

In general, because the reconciliation data are no longer required by the SEC, we cannot always determine whether differences in net income, equity, and thus ROE also exist between IFRS and the companies' home-country GAAP (including US GAAP).

Comparison of the levels and trends in a company's performance provide information about *how* the company performed. The company's management presents its view about causes underlying its performance in the management commentary or management discussion and analysis (MD&A) section of its annual report and during periodic conference calls with analysts and investors. To gain additional understanding of the causes underlying a company's performance, an analyst can review industry information or seek information from additional sources, such as consumer surveys.

The results of an analysis of past performance provide a basis for reaching conclusions and making recommendations. For example, an analysis undertaken as the basis for a forward-looking study might conclude that a company's future performance is or is not likely to reflect continuation of recent historical trends. As another example, an analysis to support a market-based valuation of a company might focus on whether the company's profitability and growth outlook, which is better (worse) than the peer group median, justifies its relatively high (low) valuation. This analysis would consider market multiples, such as price-to-earnings ratio (P/E), price-to-book ratio, and total invested capital to EBITDA (earnings before interest, taxes, depreciation, and amortization).<sup>2</sup> As another example, an analysis undertaken as part of an evaluation of the management of two companies might result in conclusions about whether one company has grown as fast as another company, or as fast as the industry overall, and whether each company has maintained profitability while growing.

## 2

### APPLICATION: PROJECTING FUTURE FINANCIAL PERFORMANCE AS AN INPUT TO MARKET BASED VALUATION



demonstrate how to forecast a company's future net income and cash flow

Projections of future financial performance are used in determining the value of a company or its equity component. Projections of future financial performance are also used in credit analysis—particularly in project finance or acquisition finance—to determine whether a company's cash flows will be adequate to pay the interest and principal on its debt and to evaluate whether a company will likely remain in compliance with its financial covenants.

Sources of data for analysts' projections include some or all of the following: the company's projections, the company's previous financial statements, industry structure and outlook, and macroeconomic forecasts.

Evaluating a company's past performance may provide a basis for forward-looking analyses. An evaluation of a company's business and economic environment and its history may persuade the analyst that historical information constitutes a valid basis for such analyses and that the analyst's projections may be based on the continuance of past trends, perhaps with some adjustments. Alternatively, in the case of a major acquisition or divestiture, for a start-up company, or for a company operating in a volatile industry, past performance may be less relevant to future performance.

Projections of a company's near-term performance may be used as an input to market-based valuation or relative valuation (i.e., valuation based on price multiples). Such projections may involve projecting next year's sales and using the common-size income statement to project major expense items or particular margins on sales (e.g., gross profit margin or operating profit margin). These calculations will then lead to the development of an income measure for a valuation calculation, such as net income, earnings per share (EPS) or EBITDA. More complex projections of a company's future performance involve developing a more detailed analysis of the components of performance for multiple periods—for example, projections of sales and gross margin

<sup>2</sup> **Total invested capital** is the sum of market value of common equity, book value of preferred equity, and face value of debt.

by product line, projection of operating expenses based on historical patterns, and projection of interest expense based on requisite debt funding, interest rates, and applicable taxes. Furthermore, a projection should include sensitivity analyses applied to the major assumptions.

## **Projecting Performance: An Input to Market-Based Valuation**

One application of financial statement analysis involves projecting a company's near-term performance as an input to market-based valuation. For example, an analyst might project a company's sales and profit margin to estimate EPS and then apply a projected P/E to establish a target price for the company's stock.

Analysts often take a top-down approach to projecting a company's sales.<sup>3</sup> First, industry sales are projected on the basis of their historical relationship with some macroeconomic indicator, such as growth in real gross domestic product (GDP). In researching the automobile industry, for example, the analyst may find that the industry's annual domestic unit car sales (number of cars sold in domestic markets) bears a relationship to annual changes in real GDP. Regression analysis is often used to establish the parameters of such relationships. Other factors in projecting sales may include consumer income or tastes, technological developments, and the availability of substitute products or services. After industry sales are projected, a company's market share is projected. Company-level market share projections may be based on historical market share and a forward-looking assessment of the company's competitive position. The company's sales are then estimated as its projected market share multiplied by projected total industry sales.

After developing a sales forecast for a company, an analyst can choose among various methods for forecasting income and cash flow. An analyst must decide on the level of detail to consider in developing forecasts. For example, separate forecasts may be made for individual expense items or for more aggregated expense items, such as total operating expenses. Rather than stating a forecast in terms of expenses, the forecast might be stated in terms of a forecasted profit margin (gross, operating, or net). The net profit margin, in contrast to the gross or operating profit margins, is affected by financial leverage and tax rates, which are subject to managerial and legal/regulatory revisions; therefore, historical data may sometimes be more relevant for projecting gross or operating profit margins than for projecting net profit margins. Whatever the margin used, the forecasted amount of profit for a given period is the product of the forecasted amount of sales and the forecast of the selected profit margin.

As Example 2 illustrates, for relatively mature companies operating in non-volatile product markets, historical information on operating profit margins can provide a useful starting point for forecasting future operating profits (at least over short forecasting horizons). Historical operating profit margins are typically less reliable for projecting future margins for a new or relatively volatile business or one with significant fixed costs (which can magnify the volatility of operating margins).

<sup>3</sup> The discussion in this paragraph is indebted to Benninga and Sarig (1997).

**EXAMPLE 2****Using Historical Operating Profit Margins to Forecast Operating Profit**

One approach to projecting operating profit is to determine a company's average operating profit margin over the previous several years and apply that margin to a forecast of the company's sales. Use the following information on three companies to answer Questions 1 and 2 below:

- **Johnson & Johnson (JNJ).** This US health care conglomerate, founded in 1887, had 2017 sales of around \$76.5 billion from its three main businesses: pharmaceuticals, medical devices and diagnostics, and consumer products.
- **BHP Billiton (BHP).** This company, with group headquarters in Australia and secondary headquarters in London, is the world's largest natural resources company, reporting revenue of approximately US\$38.3 billion for the fiscal year ended June 2017. The company mines, processes, and markets coal, copper, nickel, iron, bauxite, and silver and also has substantial petroleum operations.
- **Baidu.** This Chinese company, which was established in 2000 and went public on NASDAQ in 2005, is the leading Chinese language search engine. The company's revenues for 2017 were 84.8 billion renminbi (RMB), an increase of 20 percent from 2016 and almost 4 times revenue in 2012.

Using the additional information given, state and justify whether actual results support the usefulness of the stable operating margin assumption.

1. For each of the three companies, state and justify whether the suggested forecasting method (applying the average operating profit over the previous several years to a forecast of sales) would be a reasonable starting point for projecting future operating profit.

**Solution to 1:**

**JNJ.** Because JNJ is an established company with diversified operations in relatively stable businesses, the suggested approach to projecting the company's operating profit would be a reasonable starting point.

**BHP.** Because commodity prices tend to be volatile and the mining industry is relatively capital intensive, the suggested approach to projecting BHP's operating profit would probably not be a useful starting point.

**Baidu.** Compared to the other two companies, Baidu has a more limited operating history and remains in a period of rapid growth. These aspects about the company suggest that the broad approach to projecting operating profit would not be a useful starting point for Baidu.

2. Assume that the 2017 forecast of sales was perfect and, therefore, equal to the realized sales by the company in 2017. Compare the forecast of 2017 operating profit, using an average of the previous five years' operating profit



margins, with the actual 2017 operating profit reported by the company given the following additional information:

- **JNJ:** For the five years prior to 2017, JNJ's average operating profit margin was approximately 25.6 percent. The company's actual operating profit for 2017 was \$18.2 billion.
- **BHP:** For the four years prior to the year ending June 2017, BHP's average operating profit margin was approximately 24.0 percent. The company's actual operating profit for the year ended June 2017 was US\$11.8 billion.
- **Baidu:** Over the four years prior to 2017, Baidu's average operating profit margin was approximately 28.5 percent. The company's actual operating profit for 2017 was RMB15.7 billion.

### Solution to 2:

**JNJ.** JNJ's actual operating profit margin for 2017 was 23.8 percent (\$18.2 billion divided by sales of \$76.5 billion), which is a little less than company's five-year average operating profit margin of approximately 25.6 percent.

**BHP.** BHP's actual operating profit margin for the year ended June 2017 was 30.8 percent (\$11.8 billion divided by sales of \$38.3 billion). If the company's average profit margin of 24.0 percent had been applied to perfectly forecasted sales, the forecasted operating profit would have been approximately US\$9.2 billion, around 22 percent lower than actual operating profit.

**Baidu.** Baidu's actual operating profit margin for 2017 was 18.5 percent (RMB15.7 billion divided by sales of RMB84.8 billion). If the average profit margin of 28.5 percent had been applied to perfectly forecasted sales, the forecasted operating profit would have been approximately RMB24.2 billion, or around 54 percent higher than Baidu's actual operating profit.

Although prior years' profit margins can provide a useful starting point in projections for companies with relatively stable business, the underlying data should, nonetheless, be examined to identify items that are not likely to occur again in the following year(s). Such non-recurring (i.e., transitory) items should be removed from computations of any profit amount or profit margin that will be used in projections. Example 3 illustrates this principle.

### EXAMPLE 3

#### Issues in Forecasting

Following are excerpts from the 2017 annual report of Textron, a global aircraft, defense and industrial company.

**Textron Consolidated Statements of Operations for each of the years in the three-year period ended December 31**

<b>(In millions, except per share data)</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>
Revenues			
Manufacturing revenues	\$14,129	\$13,710	\$13,340
Finance revenues	69	78	83
Total revenues	14,198	13,788	13,423
Costs, expenses and other			
Cost of sales	11,795	11,311	10,979
Selling and administrative expense	1,337	1,304	1,304
Interest expense	174	174	169
Special charges	130	123	—
Total costs, expenses and other	13,436	12,912	12,452
Income from continuing operations before income taxes	762	876	971
Income tax expense	456	33	273
Income from continuing operations	306	843	698
Income (loss) from discontinued operations, net of income taxes*	1	119	(1)
Net income	307	962	697

*Footnotes:*
*2017 Note 12 Special Charges*

In 2016, we initiated a plan to restructure and realign our businesses by implementing headcount reductions, facility consolidations and other actions in order to improve overall operating efficiency across Textron. Under this plan, Textron Systems discontinued production of its sensor-fuzed weapon product within its Weapons and Sensors operating unit, we combined our Jacobsen business with the Textron Specialized Vehicles business by consolidating facilities and general and administrative functions, and we reduced headcount at Textron Aviation, as well as other businesses and corporate functions. In December 2017, we decided to take additional restructuring actions to further consolidate operating facilities and streamline product lines, primarily within the Bell, Textron Systems and Industrial segments, which resulted in additional special charges of \$45 million in the fourth quarter of 2017. We recorded total special charges of \$213 million since the inception of the 2016 plan, which included \$97 million of severance costs, \$84 million of asset impairments and \$32 million in contract terminations and other costs. Of these amounts, \$83 million was incurred at Textron Systems, \$63 million at Textron Aviation, \$38 million at Industrial, \$28 million at Bell and \$1 million at Corporate. The total headcount reduction under this plan is expected to be approximately 2,100 positions, representing 5% of our workforce.

In connection with the acquisition of Arctic Cat, as discussed in Note 2, we initiated a restructuring plan in the first quarter of 2017 to integrate this business into our Textron Specialized Vehicles business within the Industrial segment and reduce operating redundancies and maximize efficiencies. Under the Arctic Cat plan, we recorded restructuring charges of \$28 million in 2017, which included \$19 million of severance costs, largely related to

change-of-control provisions, and \$9 million of contract termination and other costs. In addition, we recorded \$12 million of acquisition-related integration and transaction costs in 2017.

*2016 Financial Statement General Footnote*

\*Income from discontinued operations, net of income taxes for the year ended December 31, 2016 primarily includes the settlement of a U.S. federal income tax audit. See Note 13 to the Consolidated Financial Statements for additional information.

*2016 Note 13 Income Taxes*

The provision for income taxes for 2016 included a benefit of \$319 million to reflect the settlement with the U.S. Internal Revenue Service Office of Appeals for our 1998 to 2008 tax years, which resulted in a \$206 million benefit attributable to continuing operations and \$113 million attributable to discontinued operations.

*Source:* Textron annual reports.

### Discussion:

Results of discontinued operations and restructuring charges should generally not be included when assessing past performance or when forecasting future net income. For purposes of evaluating the company's ongoing operating and net profit margins the special charges related to restructuring and the special tax benefit related to discontinued operations should be removed. For example, the company's operating margin for 2017 including special charges would be 5.4% (\$762 million/\$14,198 million). Excluding special charges, the operating margin would be 6.3% (\$762 million + \$130 million)/\$14,198 million. Similarly, the net profit margin would be determined by eliminating the income from discontinued operations, particularly for 2016.

In general, when earnings projections are used as a foundation for market-based valuations, an analyst will make appropriate allowance for transitory components of past earnings. Occasionally, an analyst will observe that a company takes special charges virtually every year. In such cases, they are not transitory and should not be removed in evaluating past and future margins.

## PROJECTING MULTIPLE-PERIOD PERFORMANCE

### 3



demonstrate how to forecast a company's future net income and cash flow

Projections of future financial performance over multiple periods are needed in valuation models that estimate the value of a company or its equity by discounting future cash flows. The value of a company or its equity developed in this way can then be compared with its current market price as a basis for investment decisions.

Projections of future performance are also used for credit analysis. These projections are important in assessing a borrower's ability to repay interest and principal of debt obligations. Investment recommendations depend on the needs and objectives of the client and on an evaluation of the risk of the investment relative to its expected

return—both of which are a function of the terms of the debt obligation itself as well as financial market conditions. Terms of the debt obligation include amount, interest rate, maturity, financial covenants, and collateral.

Example 4 presents an elementary illustration of net income and cash flow forecasting to illustrate a format for analysis and some basic principles. In Example 4, assumptions are shown first; then, the period-by-period abbreviated financial statement resulting from the assumptions is shown.

Depending on the use of the forecast, an analyst may choose to compute further, more specific cash flow metrics. For example, free cash flow to equity, which is used in discounted cash flow approaches to equity valuation, can be estimated as net income adjusted for noncash items, minus investment in net working capital and in net fixed assets, plus net borrowing.

#### EXAMPLE 4

### Basic Example of Financial Forecasting

1. Assume a company is formed with \$100 of equity capital, all of which is immediately invested in working capital. Assumptions are as follows:

Variable	Assumption
First-year sales	\$100
Sales growth	10% per year
Cost of goods sold/Sales	20%
Operating expense/Sales	70%
Interest income rate	5%
Tax rate	30%
Working capital as percent of sales	90%
Dividends	Non-dividend paying

Based on this information, forecast the company's net income and cash flow for five years.

#### Solution:

Exhibit 2 shows the net income forecasts in Line 7 and cash flow forecasts ("Change in cash") in Line 18.

#### Exhibit 2: Basic Financial Forecasting

	Time Period					
	0	1	2	3	4	5
(1) Sales		100.0	110.0	121.0	133.1	146.4
(2) Cost of goods sold		(20.0)	(22.0)	(24.2)	(26.6)	(29.3)
(3) Operating expenses		(70.0)	(77.0)	(84.7)	(93.2)	(102.5)
(4) Interest income		0.0	0.9	0.8	0.8	0.7
(5) Income before tax		10.0	11.9	12.9	14.1	15.3
(6) Taxes		(3.0)	(3.6)	(3.9)	(4.2)	(4.6)
(7) Net income		7.0	8.3	9.0	9.9	10.7

	Time Period					
	0	1	2	3	4	5
(8) Cash/Borrowing	0.0	17.0	16.3	15.4	14.4	13.1
(9) Working capital (non-cash)	100.0	90.0	99.0	108.9	119.8	131.8
(10) Total assets	100.0	107.0	115.3	124.3	134.2	144.9
(11) Liabilities	0.0	0.0	0.0	0.0	0.0	0.0
(12) Equity	100.0	107.0	115.3	124.3	134.2	144.9
(13) Total liabilities + Equity	100.0	107.0	115.3	124.3	134.2	144.9
(14) Net income		7.0	8.3	9.0	9.9	10.7
(15) Plus: Non-cash items		0.0	0.0	0.0	0.0	0.0
(16) Less: Investment in working capital		-10.0	9.0	9.9	10.9	12.0
(17) Less: Investment in fixed capital		0.0	0.0	0.0	0.0	0.0
(18) Change in cash		17.0	-0.7	-0.9	-1.0	-1.3
(19) Beginning cash		0.0	17.0	16.3	15.4	14.4
(20) Ending cash		17.0	16.3	15.4	14.4	13.1

Exhibit 2 indicates that at time 0, the company is formed with \$100 of equity capital (Line 12). All of the company's capital is assumed to be immediately invested in working capital (Line 9). In future periods, because it is assumed that no dividends are paid, book equity increases each year by the amount of net income (Line 14). Future periods' required working capital (Line 9) is assumed to be 90 percent of annual sales (Line 1). Sales are assumed to be \$100 in the first period and to grow at a constant rate of 10 percent per year (Line 1). The cost of goods sold is assumed to be constant at 20 percent of sales (Line 2), so the gross profit margin is 80 percent. Operating expenses are assumed to be 70 percent of sales each year (Line 3). Interest income (Line 4) is calculated as 5 percent of the beginning balance of cash/borrowing or the ending balance of the previous period (Line 8) and is an income item when there is a cash balance, as in this example. (If available cash is inadequate to cover required cash outflows, the shortfall is presumed to be covered by borrowing. This borrowing would be shown as a negative balance on Line 8 and an associated interest expense on Line 4. Alternatively, a forecast can be presented with separate lines for cash and borrowing.) Taxes of 30 percent are deducted to obtain net income (Line 7).

To calculate each period's cash flow, begin with net income (Line 7 = Line 14), add back any noncash items, such as depreciation (Line 15), deduct investment in working capital in the period or change in working capital over the period (Line 16), and deduct investment in fixed capital in the period (Line 17).<sup>4</sup> In this simple example, we are assuming that the company does not invest in any fixed capital (long-term assets) but, rather, rents furnished office space. Therefore, there is no depreciation and noncash items are zero. Each period's change in cash (Line 18) is added to the beginning cash balance (Line 19) to obtain the ending cash balance (Line 20 = Line 8).

<sup>4</sup> Working capital represents funds that must be invested in the daily operations of a business to, for example, carry inventory and accounts receivable. The term "investment" in this context means "addition to" or "increase in." The "investment in fixed capital" is also referred to as "capital expenditure" ("capex").

Example 4 is simplified to demonstrate some principles of forecasting. In practice, each aspect of a forecast presents a range of challenges. Sales forecasts may be very detailed, with separate forecasts for each year of each product line, each geographical segment, and/or each business segment. Sales forecasts may be based on past results (for relatively stable businesses), management forecasts, industry studies, and/or macroeconomic forecasts. Similarly, gross profit margins may be based on past results or forecasted relationships and may be detailed. Expenses other than cost of goods sold may be broken down into more detailed line items, each of which may be forecasted on the basis of its relationship with sales (if variable) or on the basis of its historical levels. Working capital requirements may be estimated as a proportion of the amount of sales (as in Example 4) or the change in sales or as a compilation of specific forecasts for inventory, receivables, and payables. Most forecasts will involve some investment in fixed assets, in which case, depreciation amounts affect taxable income and net income but not cash flow. Example 4 makes the simplifying assumption that interest is paid on the beginning-of-year cash balance.

Example 4 develops a series of point estimates for future net income and cash flow. In practice, forecasting generally includes an analysis of the risk in forecasts—in this case, an assessment of the impact on income and cash flow if the realized values of variables differ significantly from the assumptions used in the base case or if actual sales are much different from forecasts. Quantifying the risk in forecasts requires an analysis of the economics of the company's businesses and expense structure and the potential impact of events affecting the company, the industry, and the economy in general. When that investigation is completed, the analyst can use scenario analysis or Monte Carlo simulation to assess risk. Scenario analysis involves specifying assumptions that differ from those used as the base-case assumptions. In Example 4, the projections of net income and cash flow could be recast in a more pessimistic scenario, with assumptions changed to reflect slower sales growth and higher costs. A Monte Carlo simulation involves specifying probability distributions of values for variables and random sampling from those distributions. In the analysis in Example 4, the projections would be repeatedly recast with the selected values for the drivers of net income and cash flow, thus permitting the analyst to evaluate a range of possible results and the probability of simulating the possible actual outcomes.

An understanding of financial statements and ratios can enable an analyst to make more detailed projections of income statement, balance sheet, and cash flow statement items. For example, an analyst may collect information on normal inventory and receivables turnover and use this information to forecast accounts receivable, inventory, and cash flows based on sales projections rather than use a composite working capital investment assumption, as in Example 4.

As the analyst makes detailed forecasts, he or she must ensure that the forecasts are consistent with each other. For instance, in Example 5, the analyst's forecast concerning days of sales outstanding (which is an estimate of the average time to collect payment from sales made on credit) should flow from a model of the company that yields a forecast of the change in the average accounts receivable balance. Otherwise, predicted days of sales outstanding and accounts receivable will not be mutually consistent.

#### EXAMPLE 5

##### Consistency of Forecasts

1. Brown Corporation, a hypothetical company, had an average days-of-sales-outstanding (DSO) period of 19 days in 2017. An analyst thinks that Brown's DSO will decline in 2018 (because of expected improvements in the company's collections department) to match the industry average of 15 days. Total

sales (all on credit) in 2017 were \$300 million, and Brown expects total sales (all on credit) to increase to \$320 million in 2018. To achieve the lower DSO, the change in the average accounts receivable balance from 2017 to 2018 that must occur is *closest* to:

- A. −\$3.51 million.
- B. −\$2.46 million.
- C. \$2.46 million.
- D. \$3.51 million.

### Solution:

B is correct. The first step is to calculate accounts receivable turnover from the DSO collection period. Receivable turnover equals  $365/19$  (DSO) = 19.2 for 2017 and  $365/15 = 24.3$  in 2018. Next, the analyst uses the fact that the average accounts receivable balance equals sales/receivable turnover to conclude that for 2017, average accounts receivable was  $\$300,000,000/19.2 = \$15,625,000$  and for 2018, it must equal  $\$320,000,000/24.3 = \$13,168,724$ . The difference is a reduction in receivables of \$2,456,276.

The next section illustrates the application of financial statement analysis to credit risk analysis.

## APPLICATION: ASSESSING CREDIT RISK

# 4



describe the role of financial statement analysis in assessing the credit quality of a potential debt investment

**Credit risk** is the risk of loss caused by a counterparty's or debtor's failure to make a promised payment. For example, credit risk with respect to a bond is the risk that the obligor (the issuer of the bond) will not be able to pay interest and/or principal according to the terms of the bond indenture (contract). **Credit analysis** is the evaluation of credit risk. Credit analysis may relate to the credit risk of an obligor in a particular transaction or to an obligor's overall creditworthiness.

In assessing an obligor's overall creditworthiness, one general approach is credit scoring, a statistical analysis of the determinants of credit default. Credit analysis for specific types of debt (e.g., acquisition financing and other highly leveraged financing) typically involves projections of period-by-period cash flows.

Whatever the techniques adopted, the analytical focus of credit analysis is on debt-paying ability. Unlike payments to equity investors, payments to debt investors are limited by the agreed contractual interest. If a company experiences financial success, its debt becomes less risky but its success does not increase the amount of payments to its debtholders. In contrast, if a company experiences financial distress, it may be unable to pay interest and principal on its debt obligations. Thus, credit analysis has a special concern with the sensitivity of debt-paying ability to adverse events and economic conditions—cases in which the creditor's promised returns may be most at risk. Because those returns are generally paid in cash, credit analysis usually focuses on cash flow rather than accrual income. Typically, credit analysts use return measures related to operating cash flow because it represents cash generated internally, which is available to pay creditors.



These themes are reflected in Example 6, which illustrates Moody's application of four quantitative factors in the credit analysis of the aerospace and defense industry.<sup>5</sup> These factors include

1. scale,
2. business profile,
3. leverage and coverage, and
4. financial policy.

"Scale" relates to a company's sensitivity to adverse events, adverse economic conditions, and other factors—such as market leadership, purchasing power with suppliers, and access to capital markets—that may affect debt-paying ability. "Business profile" represents a company's competitive position, stability of revenues, product and geographic diversity, growth prospects, and stability and volatility of cash flows. "Leverage and coverage" reflects a company's "financial flexibility" and viability. Finally, "financial policy" relates to a company's financial risk tolerance and its capital structure.

#### EXAMPLE 6

### Moody's Evaluation of Quantifiable Rating Factors for the Aerospace and Defense Industry

1. Moody's considers four broad rating factors for the aerospace and defense industry: scale; business profile; leverage and coverage; and financial policy. A company's ratings for each of these factors are weighted and aggregated in determining the overall credit rating assigned. The broad factors, the sub-factors, and weightings are as follows:

Broad Factor	Sub-factors	Sub-factor Weighting (%)	Broad Factor Weighting (%)
Scale	Total revenue	10	25
	Operating profit	15	
Business profile	Competitive position	10	20
	Expected revenue stability	10	
Leverage and coverage	Debt/EBITDA	10	35
	Retained cash flow <sup>a</sup> /Net debt	15	
	EBIT/Interest	10	
Financial policy	Financial policy	20	20
Total		100	100

<sup>a</sup> Retained cash flow is defined by Moody's as cash flow before working capital and after dividends.

Why might the leverage and coverage factor be weighted higher compared to the other rating factors?

<sup>5</sup> The information in this paragraph and in Example 7 are based upon "Rating Methodology: Aerospace and Defense Industry" (Moody's, 2018).



**Solution:**

The level of debt relative to earnings and cash flow is a critical factor in assessing creditworthiness. Higher levels of debt for a company typically result in a higher risk in meeting interest and principal payments on its debt obligations.

A point to note regarding Example 6 is that the rating factors and the metrics used to analyze a company's creditworthiness can vary by industry group.

Analyses of a company's historical and projected financial statements are an integral part of the credit evaluation process. Moody's and other rating agencies compute a variety of ratios in assessing creditworthiness. A comparison of a company's ratios with the ratios of its peers is informative in evaluating relative creditworthiness, as demonstrated in Example 7.

**EXAMPLE 7****Peer Comparison of Ratios**

1. A credit analyst is assessing the efficiency and leverage of two aerospace and defense companies based on certain sub-factors identified by Moody's in Example 6. The analyst collects the information from the companies' annual reports and calculates the following ratios:

	Company 1	Company 2
Debt/EBITDA	9.3	4.1
Retained cash flow/Net debt	2.6%	9.6%
EBIT/Interest	5.7	8.2

Based solely on the data given, which company is more likely to be assigned a higher credit rating, and why?

**Solution:**

The ratio comparisons are all in favor of Company 2, which has a lower level of debt relative to EBITDA, higher retained cash flow to net debt, and higher interest coverage. Based only on the data given, Company 2 is likely to be assigned a higher credit rating.

In calculating credit ratios, such as those presented in Example 7, analysts typically make certain adjustments to reported financial statements. We describe some common adjustments later in the reading.

Financial statement analysis, especially financial ratio analysis, can also be an important tool in selecting equity investments, as discussed in the next section.

**SCREENING FOR POTENTIAL EQUITY INVESTMENTS****5**

describe the use of financial statement analysis in screening for potential equity investments

Ratios constructed from financial statement data and market data are often used to screen for potential equity investments. **Screening** is the application of a set of criteria to reduce a set of potential investments to a smaller set having certain desired characteristics. Criteria involving financial ratios generally involve comparing one or more ratios with some pre-specified target or cutoff values.

A security selection approach incorporating financial ratios may be applied whether the investor uses top-down analysis or bottom-up analysis. **Top-down analysis** involves identifying attractive geographical segments and/or industry segments, from which the investor chooses the most attractive investments. **Bottom-up analysis** involves selection of specific investments from all companies within a specified investment universe. Regardless of the direction, screening for potential equity investments aims to identify companies that meet specific criteria. An analysis of this type may be used as the basis for directly forming a portfolio, or it may be undertaken as a preliminary part of a more thorough analysis of potential investment targets.

Fundamental to this type of analysis are decisions about which metrics to use as screens, how many metrics to include, what values of those metrics to use as cutoff points, and what weighting to give each metric. Metrics may include not only financial ratios but also characteristics such as market capitalization or membership as a component security in a specified index. Exhibit 3 presents a hypothetical example of a simple stock screen based on the following criteria: a valuation ratio (P/E) less than a specified value, a solvency ratio measuring financial leverage (calculated as total liabilities/total assets) not exceeding a specified value, positive operating margin, and dividend yield (dividends per share divided by price per share) greater than a specified value. Exhibit 3 shows the results of applying the screen in August 2018 to a set of 6,406 US companies with market capitalization greater than \$100 million, which compose a hypothetical equity manager's investment universe.

### Exhibit 3: Example of a Stock Screen

Criterion	Stocks Meeting Criterion	
	Number	Percent of Total
Market capitalization > \$100 million	4,357	68.01%
P/E < 15	1,104	17.23%
Total liabilities/Total assets ≤ 0.9	61	0.95%
Operating income/Sales > 0	3,509	54.78%
Dividend yield > 0.5%	2,391	37.32%
Meeting all five criteria simultaneously	17	0.27%

Source for data: <http://google.com/finance/>.

Several points about the screen in Exhibit 3 are consistent with many screens used in practice:

- Some criteria serve as checks on the results from applying other criteria. In this hypothetical example, the second criterion selects stocks that appear relatively cheaply valued. The stocks might be cheap for a good reason, however, such as poor profitability or excessive financial leverage. So, the requirement for operating income relative to sales to be greater than zero serves as a check on profitability, and the limitation on financial leverage serves as a check on financial risk. Of course, financial ratios or other statistics cannot generally control for exposure to certain other types of risk (e.g., risk related to regulatory developments or technological innovation).

- If all the criteria were completely independent of each other, the set of stocks meeting all five criteria would be 2, equal to 6,406 times 0.023 percent—the product of the fraction of stocks satisfying the five criteria individually (i.e.,  $0.6801 \times 0.1723 \times 0.0095 \times 0.5478 \times 0.3732 = 0.000228$ , or 0.023 percent). As the screen illustrates, criteria are often not independent, and the result is that more securities pass the screening than if criteria were independent. In this example, 17 of the securities pass all five screens simultaneously. For an example of the lack of independence, we note that dividend-paying status is probably positively correlated with the ability to generate positive operating margin. If stocks that pass one test tend to also pass another, few are eliminated after the application of the second test.
- The results of screens can sometimes be relatively concentrated in a subset of the sectors represented in the benchmark. The financial leverage criterion in Exhibit 3 would exclude banking stocks, for example. What constitutes a high or low value of a measure of a financial characteristic can be sensitive to the industry in which a company operates.

Screens can be used by both **growth investors** (focused on investing in high-earnings-growth companies), **value investors** (focused on paying a relatively low share price in relation to earnings or assets per share), and **market-oriented investors** (an intermediate grouping of investors whose investment disciplines cannot be clearly categorized as value or growth). Growth screens would typically feature criteria related to earnings growth and/or momentum. Value screens, as a rule, feature criteria setting upper limits for the value of one or more valuation ratios. Market-oriented screens would not strongly emphasize valuation or growth criteria. The use of screens involving financial ratios may be most common among value investors.

An analyst may want to evaluate how a portfolio based on a particular screen would have performed historically. For this purpose, the analyst uses a process known as “back-testing.” **Back-testing** applies the portfolio selection rules to historical data and calculates what returns would have been earned if a particular strategy had been used. The relevance of back-testing to investment success in practice, however, may be limited. Haugen and Baker (1996) described some of these limitations:

- **Survivorship bias:** If the database used in back-testing eliminates companies that cease to exist because of a bankruptcy or merger, then the remaining companies collectively will appear to have performed better.
- **Look-ahead bias:** If a database includes financial data updated for restatements (where companies have restated previously issued financial statements to correct errors or reflect changes in accounting principles), then there is a mismatch between what investors would have actually known at the time of the investment decision and the information used in the back-testing.
- **Data-snooping bias:** If researchers build a model on the basis of previous researchers’ findings and then use the same database to test that model, they are not actually testing the model’s predictive ability. When each step is backward looking, the same rules may or may not produce similar results in the future. The predictive ability of the model’s rules can validly be tested only by using future data. One academic study has argued that the apparent ability of value strategies to generate excess returns is largely explainable as the result of collective data snooping (Conrad, Cooper, and Kaul, 2003).

**EXAMPLE 8****Ratio-Based Screening for Potential Equity Investments**

Below are two alternative strategies under consideration by an investment firm:

*Strategy A:* Invest in stocks that are components of a global equity index, have a ROE above the median ROE of all stocks in the index, and have a P/E less than the median P/E.

*Strategy B:* Invest in stocks that are components of a broad-based US equity index, have a ratio of price to operating cash flow in the lowest quartile of companies in the index, and have shown increases in sales for at least the past three years.

Both strategies were developed with the use of back-testing.

1. How would you characterize the two strategies?

**Solution to 1:**

Strategy A appears to aim for global diversification and combines a requirement for high relative profitability with a traditional measure of value (low P/E). Strategy B focuses on both large and small companies in a single market and apparently aims to identify companies that are growing and have a lower price multiple based on cash flow from operations.

2. What concerns might you have about using such strategies?

**Solution to 2:**

The use of *any* approach to investment decisions depends on the objectives and risk profile of the investor. With that crucial consideration in mind, we note that ratio-based benchmarks may be an efficient way to screen for potential equity investments. In screening, however, many questions arise.

First, unintentional selections can be made if criteria are not specified carefully. For example, Strategy A might unintentionally select a loss-making company with negative shareholders' equity because negative net income divided by negative shareholders' equity arithmetically results in a positive ROE. Strategy B might unintentionally select a company with negative operating cash flow because price to operating cash flow will be negative and thus very low in the ranking. In both cases, the analyst can add additional screening criteria to avoid unintentional selections; these additional criteria could include requiring positive shareholders' equity in Strategy A and requiring positive operating cash flow in Strategy B.

Second, the inputs to ratio analysis are derived from financial statements, and companies may differ in the financial standards they apply (e.g., IFRS versus US GAAP), the specific accounting method(s) they choose within those allowed by the reporting standards, and/or the estimates made in applying an accounting method.

Third, back-testing may not provide a reliable indication of future performance because of survivorship bias, look-ahead bias, or data-snooping bias. Also, as suggested by finance theory and by common sense, the past is not necessarily indicative of the future.

Fourth, implementation decisions can dramatically affect returns. For example, decisions about frequency and timing of portfolio re-evaluation and changes affect transaction costs and taxes paid out of the portfolio.

## FRAMEWORK FOR ANALYST ADJUSTMENTS, ADJUSTMENTS TO INVESTMENTS & ADJUSTMENTS TO INVENTORY

# 6

- explain appropriate analyst adjustments to a company's financial statements to facilitate comparison with another company

When comparing companies that use different accounting methods or estimate key accounting inputs in different ways, analysts frequently adjust a company's financials. In this section, we first provide a framework for considering potential analyst adjustments to facilitate such comparisons and then provide examples of such adjustments. In practice, required adjustments vary widely. The examples presented here are not intended to be comprehensive but, rather, to illustrate the use of adjustments to facilitate a meaningful comparison.

### A Framework for Analyst Adjustments

In this discussion of potential analyst adjustments to a company's financial statements, we use a framework focused on the *balance sheet*. Because the financial statements are interrelated, however, adjustments to items reported on one statement may also be reflected in adjustments to items on another financial statement. For example, an analyst adjustment to inventory on the balance sheet affects cost of goods sold on the income statement (and thus also affects net income and, subsequently, the retained earnings account on the balance sheet).

Regardless of the particular order in which an analyst considers the items that may require adjustment for comparability, the following aspects are appropriate:

- *Importance (materiality)*. Is an adjustment to this item likely to affect the conclusions? In other words, does it matter? For example, in an industry where companies require minimal inventory, does it matter that two companies use different inventory accounting methods?
- *Body of standards*. Is there a difference in the body of standards being used (US GAAP versus IFRS)? If so, in which areas is the difference likely to affect a comparison?
- *Methods*. Is there a difference in accounting methods used by the companies being compared?
- *Estimates*. Is there a difference in important estimates used by the companies being compared?

The following sections illustrate analyst adjustments—first, those relating to the asset side of the balance sheet and then those relating to the liability side.

### Analyst Adjustments Related to Investments

Accounting for investments in the debt and equity securities of other companies (other than investments accounted for under the equity method and investments in consolidated subsidiaries) depends on management's intention (i.e., whether to actively trade the securities, make them available for sale, or in the case of debt securities, hold them to maturity). When securities are classified as "financial assets measured at fair value through profit or loss" (similar to "trading" securities in US GAAP), unrealized gains and losses are reported in the income statement. When securities are classified

as “financial assets measured at fair value through other comprehensive income” (similar to “available-for-sale” securities in US GAAP), unrealized gains and losses are not reported in the income statement and, instead, are recognized in equity. If two otherwise comparable companies have significant differences in the classification of investments, analyst adjustments may be useful to facilitate comparison.

## Analyst Adjustments Related to Inventory

With inventory, adjustments may be required for different accounting methods. As described in previous readings, a company’s decision about inventory method will affect the value of inventory shown on the balance sheet as well as the value of inventory that is sold (cost of goods sold). If a company not reporting under IFRS<sup>6</sup> uses LIFO (last-in, first-out) and another uses FIFO (first-in, first-out), comparability of the financial results of the two companies will suffer. Companies that use the LIFO method, must also, however, disclose the value of their inventory under the FIFO method. To recast inventory values for a company using LIFO reporting on a FIFO basis, the analyst adds the ending balance of the LIFO reserve to the ending value of inventory under LIFO accounting. To adjust cost of goods sold to a FIFO basis, the analyst subtracts the change in the LIFO reserve from the reported cost of goods sold under LIFO accounting. Example 9 illustrates the use of a disclosure of the value of inventory under the FIFO method to make a more consistent comparison of the current ratios of two companies reporting in different methods.

### EXAMPLE 9

#### Adjustment for a Company Using LIFO Accounting for Inventories

An analyst is comparing the financial performance of LP Technology Corporation (LP Tech), a hypothetical company, with the financial performance of a similar company that uses IFRS for reporting. The company reporting under IFRS uses the FIFO method of inventory accounting. Therefore, the analyst converts LP Tech’s results to a comparable basis. Exhibit 4 provides balance sheet information on LP Tech.

#### Exhibit 4: Data for LP Technology Corporation

	30 June	
	2018	2017
Total current assets	820.2	749.7
Total current liabilities	218.1	198.5

<sup>6</sup> IAS No. 2 does not permit the use of LIFO.

	30 June	
	2018	2017
NOTE 6. INVENTORIES		
Inventories consist of the following (\$ millions):		
	30 June	
	2018	2017
Raw materials	\$30.7	\$29.5
Work in process	109.1	90.8
Finished goods	63.8	65.1
	<u>\$203.6</u>	<u>\$185.4</u>

*If the first-in, first-out method of inventory had been used instead of the LIFO method, inventories would have been \$331.8 and \$305.8 million higher as of June 30, 2018 and 2017, respectively.*

**“We value most of our inventory using the LIFO method, which could be repealed resulting in adverse effects on our cash flows and financial condition.**

The cost of our inventories is primarily determined using the Last-In First-Out (“LIFO”) method. Under the LIFO inventory valuation method, changes in the cost of raw materials and production activities are recognized in cost of sales in the current period even though these materials and other costs may have been incurred at significantly different values due to the length of time of our production cycle. Generally in a period of rising prices, LIFO recognizes higher costs of goods sold, which both reduces current income and assigns a lower value to the year-end inventory. Recent proposals have been initiated aimed at repealing the election to use the LIFO method for income tax purposes. According to these proposals, generally taxpayers that currently use the LIFO method would be required to revalue their LIFO inventory to its first-in, first-out (“FIFO”) value. As of June 30, 2018, if the FIFO method of inventory had been used instead of the LIFO method, our inventories would have been about \$332 million higher. This increase in inventory would result in a one time increase in taxable income which would be taken into account ratably over the first taxable year and the following several taxable years. The repeal of LIFO could result in a substantial tax liability which could adversely impact our cash flows and financial condition.”

1. Based on the information in Exhibit 4, calculate LP Tech’s current ratio under FIFO and LIFO for 2017 and 2018.

### Solution to 1:

The calculations of LP Tech’s current ratio (current assets divided by current liabilities) are as follows:

	2018	2017
<b>I. Current ratio (unadjusted)</b>		
Total current assets	\$820.2	\$749.7
Total current liabilities	\$218.1	\$198.5

	2018	2017
Current ratio (unadjusted)	3.8	3.8
<b>II. Current ratio (adjusted)</b>		
Total current assets	\$820.2	\$749.7
Adjust inventory to FIFO, add:	331.8	305.8
Total current assets (adjusted)	\$1,152	\$1,056
Total current liabilities	218.1	198.5
Current ratio (adjusted)	5.3	5.3

To adjust the LIFO inventory to FIFO, add the excess amounts of FIFO cost over LIFO cost to LIFO inventory and increase current assets by an equal amount. The effect of adjusting inventory on the current ratio is to increase the current ratio from 3.8 to 5.3 in both 2017 and 2018. LP Tech has greater liquidity according to the adjusted current ratio.

2. LP Tech makes the following disclosure in the risk section of its MD&A. Assuming an effective tax rate of 35 percent, estimate the impact on LPTC's tax liability.

### Solution to 2:

Assuming an effective tax rate of 35 percent, we find the total increase in LP Tech's tax liability to be \$116.1 million ( $0.35 \times \$331.8$  million).

3. LP Tech reported cash flow from operations of \$115.2 million for the year ended 30 June 2018. In comparison with the company's operating cash flow, how significant is the additional potential tax liability?

### Solution to 3:

The additional tax liability would be greater than the entire amount of the company's cash flow from operations of \$115.2 million; the additional tax liability would be apportioned, however, over several years.

In summary, the information disclosed by companies that use LIFO allows an analyst to calculate the value of the company's inventory as if the company were using the FIFO method. If the LIFO method is used for a substantial part of a company's inventory and the LIFO reserve is large relative to reported inventory, however, the adjustment to a FIFO basis can be important for comparison of the LIFO-reporting company with a company that uses the FIFO method of inventory valuation. Example 10 illustrates a case in which such an adjustment would have a major impact on an analyst's conclusions.



**EXAMPLE 10****Analyst Adjustment to Inventory Value for Comparability in a Current Ratio Comparison**

1. Company A reports under IFRS and uses the FIFO method of inventory accounting. Company B reports under US GAAP and uses the LIFO method. Exhibit 5 gives data pertaining to current assets, LIFO reserves, and current liabilities of these companies.

**Exhibit 5: Data for Companies Accounting for Inventory on Different Bases**

	<b>Company A (FIFO)</b>	<b>Company B (LIFO)</b>
Current assets (includes inventory)	\$ 300,000	\$ 80,000
LIFO reserve	NA	\$ 20,000
Current liabilities	\$ 150,000	\$ 45,000

NA = not applicable.

Based on the data given in Exhibit 5, compare the liquidity of the two companies as measured by the current ratio.

**Solution:**

Company A's current ratio is 2.0. Based on unadjusted balance sheet data, Company B's current ratio is 1.78. Company A's higher current ratio indicates that Company A appears to be more liquid than Company B; however, the use of unadjusted data for Company B is not appropriate for making comparisons with Company A.

After adjusting Company B's inventory to a comparable basis (i.e., to a FIFO basis), the conclusion changes. The following table summarizes the results when Company B's inventory is left on a LIFO basis and when it is placed on a FIFO basis for comparability with Company A.

	<b>Company B</b>		
	<b>Company A (FIFO)</b>	<b>Unadjusted (LIFO basis)</b>	<b>Adjusted (FIFO basis)</b>
Current assets (includes inventory)	\$ 300,000	\$ 80,000	\$ 100,000
Current liabilities	\$ 150,000	\$ 45,000	\$ 45,000
Current ratio	2.00	1.78	2.22

When both companies' inventories are stated on a FIFO basis, Company B appears to be the more liquid, as indicated by its current ratio of 2.22 versus Company A's ratio of 2.00.

The adjustment to place Company B's inventory on a FIFO basis was significant because Company B was assumed to use LIFO for its entire inventory and its inventory reserve was  $\$20,000/\$80,000 = 0.25$ , or 25 percent of its reported inventory.

As mentioned earlier, an analyst can also adjust the cost of goods sold for a company using LIFO to a FIFO basis by subtracting the change in the amount of the LIFO reserve from cost of goods sold. Such an adjustment would be appropriate for making profitability comparisons with a company reporting on a FIFO basis and is important to make when the impact of the adjustment would be material.

## 7

### ADJUSTMENTS RELATED TO PROPERTY, PLANT, AND EQUIPMENT



explain appropriate analyst adjustments to a company's financial statements to facilitate comparison with another company

Management generally has considerable discretion in determination of depreciation expense. Depreciation expense affects the values of reported net income and reported net fixed assets. Analysts often consider management's choices related to depreciation as a qualitative factor in evaluating the quality of a company's financial reporting, and in some cases, analysts may adjust reported depreciation expense for a specific analytical purpose.

The amount of depreciation expense depends on both the accounting method and the estimates used in the calculations. Companies can use the straight-line method, an accelerated method, or a usage method to depreciate fixed assets (other than land). The straight-line method reports an equal amount of depreciation expense each period, and the expense is computed as the depreciable cost divided by the estimated useful life of the asset (when acquired, an asset's depreciable cost is calculated as its total cost minus its estimated salvage value). Accelerated methods depreciate the asset more quickly; they apportion a greater amount of the depreciable cost to depreciation expense in the earlier periods. Usage-based methods depreciate an asset in proportion to its usage. In addition to selecting a depreciation method, companies must estimate an asset's salvage value and useful life to compute depreciation.

Disclosures required for depreciation often do not facilitate specific adjustments, so comparisons of companies concerning their decisions in depreciating assets are often qualitative and general. The accounts that are associated with depreciation include the balance sheet accounts for gross property, plant, and equipment (PPE) and accumulated depreciation; the income statement amount for depreciation expense; and the statement of cash flows disclosure of capital expenditure (capex) and asset disposals. The relationships among these items can reveal various pieces of information. Note, however, that PPE typically includes a mix of assets with different depreciable lives and salvage values, so the items in the following list reflect general relationships in the total pool of assets.

- Accumulated depreciation divided by gross PPE, from the balance sheet, suggests how much of the useful life of the company's overall asset base has passed.
- Accumulated depreciation divided by depreciation expense suggests how many years' worth of depreciation expense have already been recognized (i.e., the average age of the asset base).
- Net PPE (net of accumulated depreciation) divided by depreciation expense is an approximate indicator of how many years of useful life remain for the company's overall asset base.

- Gross PPE divided by depreciation expense suggests the average life of the assets at installation.
- Capex divided by the sum of gross PPE plus capex can suggest what percentage of the asset base is being renewed through new capital investment.
- Capex in relation to asset disposal provides information on growth of the asset base.

As Example 11 shows, these relationships can be evaluated for companies in the same industry to identify differences in their strategies for asset utilization or areas for further investigation.

### EXAMPLE 11

#### Differences in Depreciation

An analyst is evaluating the financial statements of two companies in the same industry. The companies have similar strategies with respect to the use of equipment in manufacturing their products. The following information is provided (amounts in millions):

	Company A	Company B
Net PPE	\$1,200	\$750
Depreciation expense	\$120	\$50

1. Based on the information given, estimate the average remaining useful lives of the asset bases of Company A and Company B.

#### Solution to 1:

The estimated average remaining useful life of Company A's asset base is 10 years (calculated as net PPE divided by depreciation expense, or  $\$1,200/\$120 = 10$  years). For Company B, the average remaining useful life of the asset base appears to be far longer, 15 years ( $\$750/\$50$ ).

2. Suppose that, based on a physical inspection of the companies' plants and other industry information, the analyst believes that the actual remaining useful lives of Company A's and Company B's assets are roughly equal at 10 years. Based only on the facts given, what might the analyst conclude about Company B's reported net income?

#### Solution to 2:

If 10 years were used to calculate Company B's depreciation expense, the expense would be \$75 million (i.e., \$25 million higher than reported) and higher depreciation expense would decrease net income. The analyst might conclude that Company B's reported net income reflects relatively more aggressive accounting estimates than estimates reflected in Company A's reported net income.

## 8

## ADJUSTMENTS RELATED TO GOODWILL



explain appropriate analyst adjustments to a company's financial statements to facilitate comparison with another company

Goodwill arises when one company purchases another for a price that exceeds the fair value of the net identifiable assets acquired. Net identifiable assets include current assets, fixed assets, and certain intangible assets that have value and meet recognition criteria under accounting standards. A broad range of intangible assets might require valuation in the context of a business combination—for example, brands, technology, and customer lists. Goodwill is recorded as an asset and essentially represents the difference between the purchase price and the net identifiable assets. For example, assume ParentCo purchases TargetCo for a purchase price of \$400 million and the fair value of TargetCo's identifiable assets is \$300 million (which includes the fair values of current assets, fixed assets, and a recognized brand). ParentCo will record total assets of \$400 million consisting of \$300 million in identifiable assets (including the fair value of the brand) and \$100 million of goodwill. The goodwill is tested annually for impairment and if the value of the goodwill is determined to be impaired, ParentCo will then reduce the amount of the asset and report a write-off resulting from impairment.

One of the conceptual difficulties with goodwill arises in comparative financial statement analysis. Consider, for example, two hypothetical US companies, one of which has grown by making an acquisition and the other of which has grown internally. Assume that the economic value of the two companies is identical: Each has an identically valuable branded product, well-trained workforce, and proprietary technology. The company that has grown by acquisition will have recorded the transaction to acquire the target company and its underlying net assets on the basis of the total consideration paid for the acquisition. The company that has grown internally will have done so by incurring expenditures for advertising, staff training, and research, all of which are expensed as incurred under US GAAP. Given the immediate expensing, the value of the internally generated assets is not capitalized onto the balance sheet and is thus not directly reflected on the company's balance sheet (revenues, income, and cash flows should reflect the benefits derived from the investment in the intangible assets). Ratios based on asset values and/or income, including profitability ratios (such as ROA) and market value to book value (MV/BV),<sup>7</sup> will generally differ for the two companies because of differences in the accounting values of assets and income related to acquired intangibles and goodwill, although, by assumption, the economic value of the companies is identical.

## EXAMPLE 12

## Ratio Comparisons for Goodwill

Miano Marseglia is an analyst who is evaluating the relative valuation of two securities brokerage companies: TD Ameritrade Holding Corporation (AMTD) and the Charles Schwab Corporation (SCHW). As one part of an overall analysis, Marseglia would like to see how the two companies compare with each other and with the industry based on market value to book value. Because both

<sup>7</sup> MV/BV equals the total market value of the stock (the market capitalization) divided by total stockholders' equity. It is also referred to as the price-to-book ratio because it can also be calculated as price per share divided by stockholders' equity per share.

companies are large players in the industry, Marseglia expects them to sell at a higher MV/BV than the financial services sector median of 2.2. He collects the following data on the two companies.

	SCHW	AMTD
Market capitalization on 30 August 2018 (market price per share times the number of shares outstanding)	\$68,620	\$33,247
Total shareholders' equity (as of 30 June 2018 for both companies)	\$20,097	\$7,936
Goodwill	\$1,227	\$4,198
Other intangible assets	\$93	\$1,363

Marseglia computes the MV/BV for the companies as follows:

$$\text{SCHW } \$68,620 / \$20,097 = 3.4$$

$$\text{AMTD } \$33,247 / \$7,936 = 4.2$$

As expected, each company appears to be selling at a premium to the sector median MV/BV of 2.2. The companies have similar MV/BVs (i.e., they are somewhat equally valued relative to the book value of shareholders' equity). Marseglia is concerned, however, because he notes that AMTD has significant amounts of goodwill and acquired intangible assets. He wonders what the relative value would be if the MV/BV were computed after adjusting book value, first, to remove goodwill and, second, to remove all intangible assets. Book value reduced by all intangible assets (including goodwill) is known as "tangible book value."

1. Compute the MV/BV adjusted for goodwill and the price/tangible book value for each company.

### Solution to 1:

	(\$ millions)	
	SCHW	AMTD
Total stockholders' equity	\$20,097	\$7,936
Less: Goodwill	\$1,227	\$4,198
Book value, adjusted	\$18,870	\$3,738
<b>Adjusted MV/BV</b>	<b>3.6</b>	<b>8.9</b>

	(\$ millions)	
	SCHW	AMTD
Total stockholders' equity	\$20,097	\$7,936
Less: Goodwill	\$1,227	\$4,198
Less: Other intangible assets	\$93	\$1,363
Tangible book value	\$18,777	\$2,375
<b>MV/tangible book value</b>	<b>3.7</b>	<b>14.0</b>

2. Which company appears to be a better value based *solely* on this data? (Note that the MV/BV is only one part of a broader analysis. Much more evidence related to the valuations and the comparability of the companies would be required to reach a conclusion about whether one company is a better value.)

### Solution to 2:

After adjusting for goodwill, SCHW appears to be selling for a much lower price relative to book value than is AMTD (3.6 versus 8.9) after adjusting for goodwill. The difference is more extreme after adjusting for other intangibles.

## SUMMARY

This reading described selected applications of financial statement analysis, including the evaluation of past financial performance, the projection of future financial performance, the assessment of credit risk, and the screening of potential equity investments. In addition, the reading discussed analyst adjustments to reported financials. In all cases, the analyst needs to have a good understanding of the financial reporting standards under which the financial statements were prepared. Because standards evolve over time, analysts must stay current in order to make good investment decisions.

The main points in the reading are as follows:

- Evaluating a company's historical performance addresses not only what happened but also the causes behind the company's performance and how the performance reflects the company's strategy.
- The projection of a company's future net income and cash flow often begins with a top-down sales forecast in which the analyst forecasts industry sales and the company's market share. By projecting profit margins or expenses and the level of investment in working and fixed capital needed to support projected sales, the analyst can forecast net income and cash flow.
- Projections of future performance are needed for discounted cash flow valuation of equity and are often needed in credit analysis to assess a borrower's ability to repay interest and principal of a debt obligation.
- Credit analysis uses financial statement analysis to evaluate credit-relevant factors, including tolerance for leverage, operational stability, and margin stability.
- When ratios constructed from financial statement data and market data are used to screen for potential equity investments, fundamental decisions include which metrics to use as screens, how many metrics to include, what values of those metrics to use as cutoff points, and what weighting to give each metric.
- Analyst adjustments to a company's reported financial statements are sometimes necessary (e.g., when comparing companies that use different accounting methods or assumptions). Adjustments can include those related to investments; inventory; property, plant, and equipment; and goodwill.

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## PRACTICE PROBLEMS

1. Projecting profit margins into the future on the basis of past results would be *most* reliable when the company:
  - A. is in the commodities business.
  - B. operates in a single business segment.
  - C. is a large, diversified company operating in mature industries.
2. Galambos Corporation had an average receivables collection period of 19 days in 2003. Galambos has stated that it wants to decrease its collection period in 2004 to match the industry average of 15 days. Credit sales in 2003 were \$300 million, and analysts expect credit sales to increase to \$400 million in 2004. To achieve the company's goal of decreasing the collection period, the change in the average accounts receivable balance from 2003 to 2004 that must occur is *closest* to:
  - A. -\$420,000.
  - B. \$420,000.
  - C. \$836,000.
3. Credit analysts are likely to consider which of the following in making a rating recommendation?
  - A. Business risk but not financial risk
  - B. Financial risk but not business risk
  - C. Both business risk and financial risk
4. When screening for potential equity investments based on return on equity, to control risk, an analyst would *most likely* include a criterion that requires:
  - A. positive net income.
  - B. negative net income.
  - C. negative shareholders' equity.
5. One concern when screening for stocks with low price-to-earnings ratios is that companies with low P/Es may be financially weak. What criterion might an analyst include to avoid inadvertently selecting weak companies?
  - A. Net income less than zero
  - B. Debt-to-total assets ratio below a certain cutoff point
  - C. Current-year sales growth lower than prior-year sales growth
6. When a database eliminates companies that cease to exist because of a merger or bankruptcy, this can result in:
  - A. look-ahead bias.
  - B. back-testing bias.



- C. survivorship bias.
7. In a comprehensive financial analysis, financial statements should be:
- used as reported without adjustment.
  - adjusted after completing ratio analysis.
  - adjusted for differences in accounting standards, such as International Financial Reporting Standards and US generally accepted accounting principles.
8. When comparing a US company that uses the last in, first out (LIFO) method of inventory with companies that prepare their financial statements under International Financial Reporting Standards (IFRS), analysts should be aware that according to IFRS, the LIFO method of inventory:
- is never acceptable.
  - is always acceptable.
  - is acceptable when applied to finished goods inventory only.
9. An analyst is evaluating the balance sheet of a US company that uses last in, first out (LIFO) accounting for inventory. The analyst collects the following data:

	31 Dec 05	31 Dec 06
Inventory reported on balance sheet	\$500,000	\$600,000
LIFO reserve	\$50,000	\$70,000
Average tax rate	30%	30%

After adjusting the amounts to convert to the first in, first out (FIFO) method, inventory at 31 December 2006 would be closest to:

- \$600,000.
  - \$620,000.
  - \$670,000.
10. An analyst gathered the following data for a company (\$ millions):

	31 Dec 2000	31 Dec 2001
Gross investment in fixed assets	\$2.8	\$2.8
Accumulated depreciation	\$1.2	\$1.6

The average age and average depreciable life of the company's fixed assets at the end of 2001 are *closest* to:

	Average Age	Average Depreciable Life
A	1.75 years	7 years
B	1.75 years	14 years
C	4.00 years	7 years

11. To compute tangible book value, an analyst would:
- A. add goodwill to stockholders' equity.
  - B. add all intangible assets to stockholders' equity.
  - C. subtract all intangible assets from stockholders' equity.

## SOLUTIONS

1. C is correct. For a large, diversified company, margin changes in different business segments may offset each other. Furthermore, margins are most likely to be stable in mature industries.
2. C is correct. Accounts receivable turnover is equal to  $365/19$  (collection period in days) = 19.2 for 2003 and needs to equal  $365/15 = 24.3$  in 2004 for Galambos to meet its goal. Sales/turnover equals the accounts receivable balance. For 2003,  $\$300,000,000/19.2 = \$15,625,000$ , and for 2004,  $\$400,000,000/24.3 = \$16,460,905$ . The difference of \$835,905 is the increase in receivables needed for Galambos to achieve its goal.
3. C is correct. Credit analysts consider both business risk and financial risk.
4. A is correct. Requiring that net income be positive would eliminate companies that report a positive return on equity only because both net income and shareholders' equity are negative.
5. B is correct. A lower value of debt/total assets indicates greater financial strength. Requiring that a company's debt/total assets be below a certain cutoff point would allow the analyst to screen out highly leveraged and, therefore, potentially financially weak companies.
6. C is correct. Survivorship bias exists when companies that merge or go bankrupt are dropped from the database and only surviving companies remain. Look-ahead bias involves using updated financial information in back-testing that would not have been available at the time the decision was made. Back-testing involves testing models in prior periods and is not, itself, a bias.
7. C is correct. Financial statements should be adjusted for differences in accounting standards (as well as accounting and operating choices). These adjustments should be made prior to common-size and ratio analysis.
8. A is correct. LIFO is not permitted under IFRS.
9. C is correct. To convert LIFO inventory to FIFO inventory, the entire LIFO reserve must be added back:  $\$600,000 + \$70,000 = \$670,000$ .
10. C is correct. The company made no additions to or deletions from the fixed asset account during the year, so depreciation expense is equal to the difference in accumulated depreciation at the beginning of the year and the end of the year, or \$0.4 million. Average age is equal to accumulated depreciation/depreciation expense, or  $\$1.6/\$0.4 = 4$  years. Average depreciable life is equal to ending gross investment/depreciation expense =  $\$2.8/\$0.4 = 7$  years.
11. C is correct. Tangible book value removes all intangible assets, including goodwill, from the balance sheet.

