

APPENDIX 2

FINANCIAL STATEMENTS

Financial statements provide the fundamental information that we use to analyze and answer valuation questions. Therefore, it is important that we understand the principles governing these statements by looking at three questions:

- How valuable are the assets of a firm? Assets can come in several forms: those with long lives, such as land and buildings; those with shorter lives, such inventory; and intangible assets that still produce revenues for the firm, such as patents and trademarks.
- How did the firm raise the funds to finance these assets? In acquiring them, firms can use the funds of the owners (equity) or borrowed money (debt), and the mix is likely to change as the assets age.
- How profitable are these assets? A good investment, we argued, is one that makes a return greater than the hurdle rate. To evaluate whether the investments that a firm has already made are good, we need to estimate the returns being made on these investments.

We will look at the way accountants would answer these questions and why the answers might be different when doing financial analysis. Some of these differences can be traced to the differences in objectives—accountants try to measure the current standing and immediate past performance of a firm, whereas financial analysis is much more forward-looking.

The Basic Accounting Statements

There are three basic accounting statements that summarize information about a firm. The first is the *balance sheet*, shown in Figure A2.1, which summarizes the assets owned by a firm, the value of these assets, and the mix of financing, debt, and equity used to finance these assets at a point in time.

Figure A2.1: The Balance Sheet

Assets		Liabilities	
Long Lived Real Assets	Fixed Assets	Current Liabilities	Short-term liabilities of the firm
Short-lived Assets	Current Assets	Debt	Debt obligations of firm
Investments in securities & assets of other firms	Financial Investments	Other Liabilities	Other long-term obligations
Assets which are not physical, like patents & trademarks	Intangible Assets	Equity	Equity investment in firm

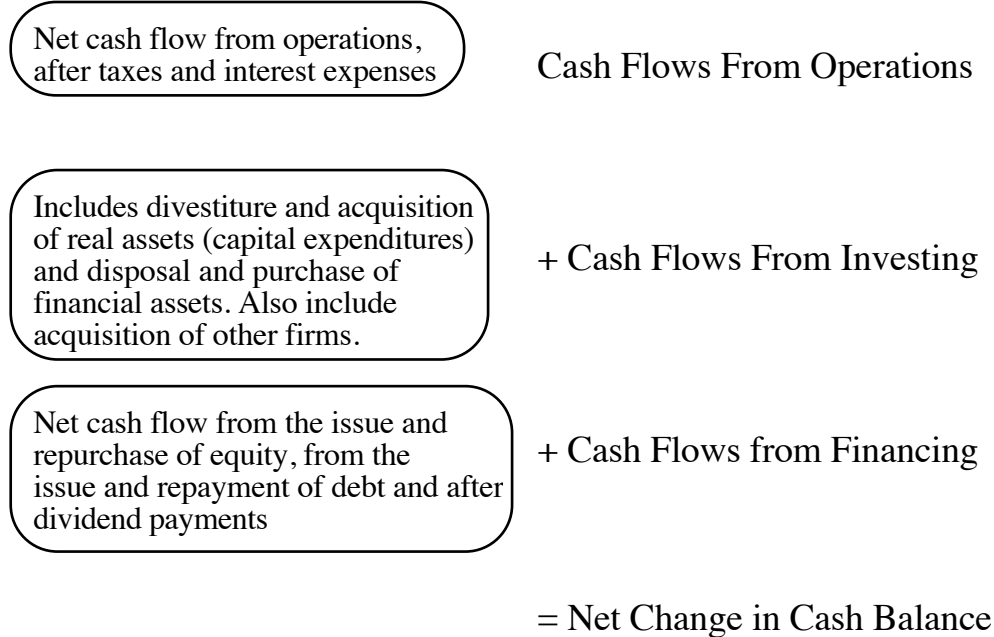
The next is the *income statement*, shown in Figure A2.2, which provides information on the revenues and expenses of the firm and the resulting income made during a period. The period can be a quarter (if it is a quarterly income statement) or a year (if it is an annual report).

Figure A2.2: Income Statement

Gross revenues from sale of products or services	Revenues
Expenses associates with generating revenues	- Operating Expenses
Operating income for the period	= Operating Income
Expenses associated with borrowing and other financing	- Financial Expenses
Taxes due on taxable income	- Taxes
Earnings to Common & Preferred Equity for Current Period	= Net Income before extraordinary items
Profits and Losses not associated with operations	- (+) Extraordinary Losses (Profits)
Profits or losses associated with changes in accounting rules	- Income Changes Associated with Accounting Changes
Dividends paid to preferred stockholders	- Preferred Dividends
	= Net Income to Common Stockholders

Finally, there is the *statement of cash flows*, shown in Figure A2.3, which specifies the sources and uses of cash of the firm from operating, investing, and financing activities during a period.

Figure A2.3: Statement of Cash Flows



The statement of cash flows can be viewed as an attempt to explain how much the cash flows during a period were and why the cash balance changed during the period.

Asset Measurement and Valuation

When analyzing any firm, we would like to know the types of assets that it owns, the values of these assets and the degree of uncertainty about these values. Accounting statements do a reasonably good job of categorizing the assets owned by a firm, a partial job of assessing the values of these assets, and a poor job of reporting uncertainty about asset values. In this section, we will begin by looking at the accounting principles underlying asset categorization and measurement and the limitations of financial statements in providing relevant information about assets.

Accounting Principles Underlying Asset Measurement

The accounting view of asset value is to a great extent grounded in the notion of *historical cost*, which is the original cost of the asset, adjusted upward for improvements made to the asset since purchase and downward for loss in value associated with the aging of the asset. This historical cost is called the *book value*. Although the generally accepted accounting principles for valuing an asset vary across different kinds of assets, three principles underlie the way assets are valued in accounting statements.

- *An abiding belief in book value as the best estimate of value:* Accounting estimates of asset value begin with the book value. Unless a substantial reason is given to do otherwise, accountants view the historical cost as the best estimate of the value of an asset.
- *A distrust of market or estimated value:* When a current market value exists for an asset that is different from the book value, accounting convention seems to view it with suspicion. The market price of an asset is often viewed as both much too volatile and too easily manipulated to be used as an estimate of value for an asset. This suspicion runs even deeper when values are estimated for an asset based on expected future cash flows.
- *A preference for underestimating value rather than overestimating it:* When there is more than one approach to valuing an asset, accounting convention takes the view that the more conservative (lower) estimate of value should be used rather than the less conservative (higher) estimate of value.

Measuring Asset Value

The financial statement in which accountants summarize and report asset value is the balance sheet. To examine how asset value is measured, let us begin with the way assets are categorized in the balance sheet.

- First, there are the *fixed assets*, which include the long-term assets of the firm, such as plant, equipment, land, and buildings. Generally accepted accounting principles (GAAPs) in the United States require the valuation of fixed assets at historical cost, adjusted for any estimated gain and loss in value from improvements and the aging, respectively, of these assets. Although in theory the adjustments for aging should reflect the loss of earning power of the asset as it ages, in practice they are much more a product of accounting rules and convention, and these adjustments are called *depreciation*. Depreciation methods can very broadly be categorized into straight line (where the loss in asset value is assumed to be the same every year over its lifetime) and accelerated (where the asset loses more value in the earlier years and less in the later years).

- Next, we have the short-term assets of the firm, including inventory (such as raw materials, works in progress, and finished goods), receivables (summarizing moneys owed to the firm), and cash; these are categorized as *current assets*. It is in this category accountants are most amenable to the use of market value. Accounts receivable are generally recorded as the amount owed to the firm based on the billing at the time of the credit sale. The only major valuation and accounting issue is when the firm has to recognize accounts receivable that are not collectible. There is some discretion allowed to firms in the valuation of inventory, with three commonly used approaches – First-in, first-out (FIFO), where the inventory is valued based upon the cost of material bought latest in the year, Last-in, first-out (LIFO), where inventory is valued based upon the cost of material bought earliest in the year and Weighted Average, which uses the average cost over the year.
- In the category of *investments and marketable securities*, accountants consider investments made by firms in the securities or assets of other firms and other marketable securities, including Treasury bills or bonds. The way these assets are valued depends on the way the investment is categorized and the motive behind the investment. In general, an investment in the securities of another firm can be categorized as a minority, passive investment; a minority, active investment; or a majority, active investment. If the securities or assets owned in another firm represent less than 20 percent of the overall ownership of that firm, an investment is treated as a minority, passive investment. These investments have an acquisition value, which represents what the firm originally paid for the securities, and often a market value. For investments held to maturity, the valuation is at acquisition value, and interest or dividends from this investment are shown in the income statement under net interest expenses. Investments that are available for sale or trading investments are shown at current market value. If the securities or assets owned in another firm represent between 20 percent and 50 percent of the overall ownership of that firm, an investment is treated as a minority, active investment. Although these investments have an initial acquisition value, a proportional share (based on ownership proportion) of the net income and losses made by the firm in which the investment was made, is used to adjust the acquisition cost. In addition, the dividends received

from the investment reduce the acquisition cost. This approach to valuing investments is called the equity approach. If the securities or assets owned in another firm represent more than 50 percent of the overall ownership of that firm, an investment is treated as a majority active investment.¹ In this case, the investment is no longer shown as a financial investment but is replaced by the assets and liabilities of the firm in which the investment was made. This approach leads to a consolidation of the balance sheets of the two firms, where the assets and liabilities of the two firms are merged and presented as one balance sheet. The share of the equity in the subsidiary that is owned by other investors is shown as a minority interest on the liability side of the balance sheet.

- Finally, we have what is loosely categorized as *intangible assets*. These include patents and trademarks that presumably will create future earnings and cash flows and also uniquely accounting assets, such as goodwill, that arise because of acquisitions made by the firm. Patents and trademarks are valued differently depending on whether they are generated internally or acquired. When patents and trademarks are generated from internal sources, such as research, the costs incurred in developing the asset are expensed in that period, even though the asset might have a life of several accounting periods. Thus, the intangible asset is not usually valued in the balance sheet of the firm. In contrast, when an intangible asset is acquired from an external party, it is treated as an asset. When a firm acquires another firm, the purchase price is first allocated to tangible assets and then allocated to any intangible assets, such as patents or trade names. Any residual becomes goodwill. While accounting standards in the United States gave firms latitude in how they dealt with goodwill until recently, the current requirement is much more stringent. All firms that do acquisitions and pay more than book value have to record goodwill as assets, and this goodwill has to be written off, if the accountants deem it to be impaired.²

¹Firms have evaded the requirements of consolidation by keeping their share of ownership in other firms below 50 percent.

²To make this judgment, accountants have to value the acquired company at regular intervals and compare the value that they get to the price paid. If the value is substantially lower than the price, the company has to write off an equivalent portion of the goodwill.

Measuring Financing Mix

The second set of questions that we would like to answer (and accounting statements to shed some light on) relates to the current value and subsequently the mixture of debt and equity used by the firm. The bulk of the information about these questions is provided on the liability side of the balance sheet and the footnotes.

Accounting Principles Underlying Liability and Equity Measurement

Just as with the measurement of asset value, the accounting categorization of liabilities and equity is governed by a set of fairly rigid principles. The first is a *strict categorization of financing into either a liability or equity* based on the nature of the obligation. For an obligation to be recognized as a liability, it must meet three requirements:

- It must be expected to lead to a future cash outflow or the loss of a future cash inflow at some specified or determinable date.
- The firm cannot avoid the obligation.
- The transaction giving rise to the obligation has happened already.

In keeping with the earlier principle of conservatism in estimating asset value, accountants recognize as liabilities only cash flow obligations that cannot be avoided.

The second principle is that the value of both liabilities and equity in a firm are *better estimated using historical costs* with accounting adjustments, rather than with expected future cash flows or market value. The process by which accountants measure the value of liabilities and equities is inextricably linked to the way they value assets. Because assets are primarily valued at historical cost or at book value, both debt and equity also get measured primarily at book value. In what follows, we will examine the accounting measurement of both liabilities and equity.

Measuring the Value of Liabilities

Accountants categorize liabilities into current liabilities, long-term debt, and long-term liabilities that are neither debt nor equity; the last category includes leases, underfunded pension and health care obligations and deferred taxes.

- *Current liabilities* include all obligations that the firm has coming due in the next accounting period. These generally include accounts payable (representing credit

received from suppliers and other vendors to the firm), short term borrowing (representing short-term loans taken to finance the operations or current asset needs of the business) and the short-term portion of long-term borrowing (representing the portion of the long-term debt or bonds that is coming due in the next year). As with current assets, these items are usually recorded at close to their current market value. *Long-term debt* for firms can take one of two forms: a long-term loan from a bank or other financial institution, or a long-term bond issued to financial markets, in which case the creditors are the investors in the bond. Accountants measure the value of long-term debt by looking at the present value of payments due on the loan or bond at the time of the borrowing. For bank loans, this will be equal to the nominal value of the loan. With bonds, however, there are three possibilities. When bonds are issued at par value, for instance, the value of the long-term debt is generally measured in terms of the nominal obligation created in terms of principal (face value) due on the borrowing. When bonds are issued at a premium or a discount on par value, the bonds are recorded at the issue price, but the premium or discount to the face value is amortized over the life of the bond. In all these cases, the book value of debt is unaffected by changes in interest rates during the life of the loan or bond..

- *Lease obligations* include obligations to lessors on assets that firms have leased. There are two ways of accounting for leases. In an operating lease, the lessor (or owner) transfers only the right to use the property to the lessee. At the end of the lease period, the lessee returns the property to the lessor. Because the lessee does not assume the risk of ownership, the lease expense is treated as an operating expense in the income statement, and the lease does not affect the balance sheet. In a capital lease, the lessee assumes some of the risks of ownership and enjoys some of the benefits. Consequently, the lease, when signed, is recognized both as an asset and as a liability (for the lease payments) on the balance sheet. The firm gets to claim depreciation each year on the asset and also deducts the interest expense component of the lease payment each year.
- In a *pension plan*, the firm agrees to provide certain benefits to its employees, either by specifying a “defined contribution” (wherein a fixed contribution is made to the plan each year by the employer, without any promises as to the benefits to be

delivered in the plan) or a “defined benefit” (wherein the employer promises to pay a certain benefit to the employee). In the latter case, the employer has to put sufficient money into the plan each period to meet the defined benefits. A pension fund whose assets exceed its liabilities is an overfunded plan, whereas one whose assets are less than its liabilities is an underfunded plan, and disclosures to that effect have to be included in financial statements, generally in the footnotes.

- Firms often use different methods of accounting for tax and financial reporting purposes, leading to a question of how tax liabilities should be reported. Because accelerated depreciation and favorable inventory valuation methods for tax accounting purposes lead to a deferral of taxes, the taxes on the income reported in the financial statements will generally be much greater than the actual tax paid. The same principles of matching expenses to income that underlie accrual accounting require that the *deferred income tax* be recognized in the financial statements, as a liability (if the firm underpaid taxes) or as an asset (if the firm overpaid taxes).

Measuring the value of equity

The accounting measure of equity is a historical cost measure. The value of equity shown on the balance sheet reflects the original proceeds received by the firm when it issued the equity, augmented by any earnings made since then (or reduced by losses, if any) and reduced by any dividends paid out during the period. A sustained period of negative earnings can make the book value of equity negative. In addition, any unrealized gain or loss in marketable securities that are classified as available-for-sale is shown as an increase or decrease in the book value of equity in the balance sheet.

When companies buy back stock for short periods with the intent of reissuing the stock or using it to cover option exercises, they are allowed to show the repurchased stock as *treasury stock*, which reduces the book value of equity. Firms are not allowed to keep treasury stock on the books for extended periods and have to reduce their book value of equity by the value of repurchased stock in the case of actions such as stock buybacks. Because these buybacks occur at the current market price, they can result in significant reductions in the book value of equity.

Accounting rules still do not seem to have come to grips with the effect of warrants and equity options (such as those granted by many firms to management) on the book value of equity. If warrants are issued to financial markets, the proceeds from this issue will show up as part of the book value of equity. In the far more prevalent case, where options are given or granted to management, there is no effect on the book value of equity. When the options are exercised, the cash inflows do ultimately show up in the book value of equity, and there is a corresponding increase in the number of shares outstanding. The same point can be made about convertible bonds, which are treated as debt until conversion, at which point they become part of equity.

As a final point on equity, accounting rules still seem to consider preferred stock, with its fixed dividend, as equity or near equity, largely because of the fact that preferred dividends can be deferred or accumulated without the risk of default. Preferred stock is valued on the balance sheet at its original issue price, with any accumulated unpaid dividends added on. To the extent that there can still be a loss of control in the firm (as opposed to bankruptcy), we would argue that preferred stock shares almost as many characteristics with unsecured debt as it does with equity.

Measuring Earnings and Profitability

How profitable is a firm? What did it earn on the assets in which it invested? These are the fundamental questions we would like financial statements to answer. Accountants use the income statement to provide information about a firm's operating activities over a specific time period. In terms of our description of the firm, the income statement is designed to measure the earnings from assets in place.

Accounting Principles Underlying Measurement of Earnings and Profitability

Two primary principles underlie the measurement of accounting earnings and profitability. The first is the principle of accrual accounting. In accrual accounting, the revenue from selling a good or service is recognized in the period in which the good is sold or the service is performed (in whole or substantially). A corresponding effort is

made on the expense side to match expenses to revenues.³ This is in contrast to cash accounting, wherein revenues are recognized when payment is received and expenses are recorded when they are paid.

The second principle is the categorization of expenses into operating, financing, and capital expenses. Operating expenses are expenses that at least in theory provide benefits only for the current period; the cost of labor and materials expended to create products that are sold in the current period is a good example. Financing expenses are expenses arising from the nonequity financing used to raise capital for the business; the most common example is interest expenses. Capital expenses are expected to generate benefits over multiple periods; for instance, the cost of buying land and buildings is treated as a capital expense.

Operating expenses are subtracted from revenues in the current period to arrive at a measure of operating earnings from the firm. Financing expenses are subtracted from operating earnings to estimate earnings to equity investors or net income. Capital expenses are written off over their useful life (in terms of generating benefits) as depreciation or amortization.

Measuring Accounting Earnings and Profitability

Because income can be generated from a number of different sources, accounting principles require that income statements be classified into four sections: income from continuing operations, income from discontinued operations, extraordinary gains or losses, and adjustments for changes in accounting principles.

Accounting principles require publicly traded companies to use accrual accounting to record earnings from continuing operations. Although accrual accounting is straightforward in firms that produce goods and sell them, there are special cases in which accrual accounting can be complicated by the nature of the product or service being offered. For instance, firms that enter into long-term contracts with their customers, for instance, are allowed to recognize revenue on the basis of the percentage of the contract that is completed. As the revenue is recognized on a percentage of completion

³If a cost (such as an administrative cost) cannot be easily linked with a particular revenues, it is usually recognized as an expense in the period in which it is consumed.

basis, a corresponding proportion of the expense is also recognized. When there is considerable uncertainty about the capacity of the buyer of a good or service to pay for a service, the firm providing the good or service may recognize the income only when it collects portions of the selling price under the installment method.

Operating expenses should reflect only those expenses that create revenues in the current period. In practice, however, a number of expenses are classified as operating expenses that do not meet this test. The first is depreciation and amortization. Although the notion that capital expenditures should be written off over multiple periods is reasonable, the accounting depreciation that is computed on the original historical cost often bears little resemblance to the actual economic depreciation. The second expense is research and development expenses, which accounting standards in the United States classify as operating expenses but which clearly provide benefits over multiple periods. The rationale used for this classification is that the benefits cannot be counted on or easily quantified. The third is operating lease expenses, which are closer to being financial than operating expenses.

Much of financial analysis is built around the expected future earnings of a firm, and many of these forecasts start with the current earnings. It is therefore important that we know how much of these earnings come from the ongoing operations of the firm and how much can be attributed to unusual or extraordinary events that are unlikely to recur on a regular basis. Nonrecurring items include the following:

1. *Unusual or infrequent items*, such as gains or losses from the divestiture of an asset or division and write-offs or restructuring costs. Companies sometimes include such items as part of operating expenses. As an example, in 1997 Boeing took a write-off of \$1,400 million to adjust the value of assets it acquired in its acquisition of McDonnell Douglas, and it showed this as part of operating expenses.
2. *Extraordinary items*, which are defined as events that are unusual in nature, infrequent in occurrence, and material in impact. Examples include the accounting gain associated with refinancing high-coupon debt with lower-coupon debt and gains or losses from marketable securities that are held by the firm.

3. *Losses associated with discontinued operations*, which measure both the loss from the phase-out period and the estimated loss on the sale of the operations. To qualify, however, the operations have to be separable from the firm.
4. *Gains or losses associated with accounting changes*, which measure earnings changes created by accounting changes made voluntarily by the firm (such as a change in inventory valuation and change in reporting period) and accounting changes mandated by new accounting standards.

Measures of Profitability

Although the income statement allows us to estimate how profitable a firm is in absolute terms, it is just as important that we gauge the profitability of the firm in comparison terms or percentage returns. The simplest and most useful gauge of profitability is relative to the capital employed to get a rate of return on investment. This can be done either from the viewpoint of just the equity investors or by looking at the entire firm.

I. Return on Assets (ROA) and Return on Capital (ROC)

The *return on assets* (ROA) of a firm measures its operating efficiency in generating profits from its assets, prior to the effects of financing.

$$\text{ROA} = \frac{\text{EBIT} (1 - \text{tax rate})}{\text{Total Assets}}$$

Earnings before interest and taxes (EBIT) is the accounting measure of operating income from the income statement, and total assets refers to the assets as measured using accounting rules, that is, using book value for most assets. Alternatively, ROA can be written as

$$\text{ROA} = \frac{\text{Net Income} + \text{Interest Expenses} (1 - \text{tax rate})}{\text{Total Assets}}$$

By separating the financing effects from the operating effects, the ROA provides a cleaner measure of the true return on these assets.

ROA can also be computed on a pretax basis with no loss of generality, by using the EBIT and not adjusting for taxes:

$$\text{Pre - tax ROA} = \frac{\text{EBIT}}{\text{Total Assets}}$$

This measure is useful if the firm or division is being evaluated for purchase by an acquirer with a different tax rate or structure.

A more useful measure of return relates the operating income to the capital invested in the firm, where capital is defined as the sum of the book value of debt and equity, net of cash and marketable securities. This is the *return on capital* (ROC). When a substantial portion of the liabilities is either current (such as accounts payable) or non-interest-bearing, this approach provides a better measure of the true return earned on capital employed in the business.

$$\text{After - Tax ROC} = \frac{\text{EBIT} (1 - t)}{\text{BV of Debt} + \text{BV of Equity} - \text{Cash}}$$

$$\text{Pre - Tax ROC} = \frac{\text{EBIT}}{\text{BV of Debt} + \text{BV of Equity} - \text{Cash}}$$

The ROC of a firm can be written as a function of its operating profit margin and its capital turnover ratio:

$$\begin{aligned} \text{After - Tax ROC} &= \frac{\text{EBIT} (1 - t)}{\text{BV of Capital}} = \frac{\text{EBIT} (1 - t)}{\text{Sales}} \times \frac{\text{Sales}}{\text{BV of Capital}} \\ &= \text{After - Tax Operating Margin} * \text{Capital Turnover Ratio} \\ \text{Pre - Tax ROC} &= \text{Pre - Tax Operating Margin} * \text{Capital Turnover Ratio} \end{aligned}$$

Thus, a firm can arrive at a high ROC by either increasing its profit margin or more efficiently using its capital to increase sales. There are likely to be competitive and technological constraints on increasing sales, but firms still have some freedom within these constraints to choose the mix of profit margin and capital turnover that maximizes their ROC. The return on capital varies widely across firms in different businesses, largely as a consequence of differences in profit margins and capital turnover ratios.

II. Return on Equity

Although ROC measures the profitability of the overall firm, the *return on equity* (ROE) examines profitability from the perspective of the equity investor by relating profits to the equity investor (net profit after taxes and interest expenses) to the book value of the equity investment.

$$\text{ROE} = \frac{\text{Net Income}}{\text{Book Value of Common Equity}}$$

Because preferred stockholders have a different type of claim on the firm than common stockholders, the net income should be estimated after preferred dividends, and the book value of common equity should not include the book value of preferred stock.

Summary

Financial statements remain the primary source of information for most investors and analysts. There are differences, however, in how accounting and financial analysis approach answering a number of key questions about the firm.

The first question that we examined related to the nature and the value of the assets owned by a firm. The focus in accounting statements on the original price of assets in place (book value) in accounting statements can lead to significant differences between the stated value of these assets and their market value. With growth assets, accounting rules result in low or no values for assets generated by internal research.

The second issue that we examined was the measurement of profitability. The two principles that seem to govern how profits are measured are accrual accounting and the categorization of expenses into operating, financing, and capital expenses. Operating and financing expenses are shown in income statements. Capital expenditures take the form of depreciation and amortization and are spread over several time periods. Accounting standards miscategorize operating leases and R&D expenses as operating expenses (when the former should be categorized as financing expenses and the latter as capital expenses).