

2 Financial Review and Pro Forma Analysis

**FOR
RE**

MARKET VIEW

The Quaker Oats Company— The Significant Cost of Valuation Errors

The Quaker Oats Company's \$1.7 billion purchase of Snapple in late 1994 stands as one of that decade's worst acquisitions. With Snapple's poor operating performance dragging the consolidated operating results down, Quaker's stock price stagnated while the Dow Jones industrial average moved up by more than 70 percent. So now that Quaker has sold the beverage company, should Quaker shareholders celebrate?

Mourning would be more appropriate. The price Quaker paid for its soft-drink misadventure goes well beyond the \$1.4 billion in losses directly associated with the sale of Snapple to Triarc Company for just \$300 million. In addition, Quaker absorbed more than \$100 million in cash losses and charges related to Snapple from 1994 to 1997. And since the deal damaged its balance sheet, Quaker's credit rating suffered, raising its cost of capital.

Another cost: Quaker helped pay for the acquisition by selling its petfood and candy businesses that had given it a larger scale, steady earnings, and international reach. It also paid punishing capital-gains taxes on those sales.

The total losses associated with the Snapple acquisition may well exceed the original acquisition price.

Adapted from G. Burns, "What Price the Snapple Debacle?" *Business Week*, 14 April 1997, 42.

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Why did more than 50 percent of the major mergers and acquisitions in the United States completed in the 1990s, according to *Business Week* magazine, erode shareholder value? And why did more than 77 percent of those transactions, according to *Forbes* magazine, not earn a rate of return at least equivalent to the cost of the capital necessary to finance them? The answer to both questions is often the same: overestimation of target firm value.

The process of valuing a firm presents innumerable opportunities for error, and analysts and executives frequently tend to err on the positive side when assessing firm value. This predisposition to “focus on the good side of things” has been referred to as the **winner's curse**, in that winning a bidding war for an acquisition target may actually mean losing.¹

This chapter begins our exploration of the process of valuing a firm. We assume that a target company has been identified and that the acquisition appears desirable from a strategic standpoint. Hence, we enter the valuation process at the point when the question is raised, “What does the future hold for the target company?” The answer necessitates a review of the recent past and the development of various scenarios about the future. In this chapter, we formalize the historical review of an acquisition target by means of **financial review**, and we articulate the alternative future scenarios by means of **pro forma analysis**.

Specifically, this chapter addresses the following key questions:

- How should the historical financial review of a target company be organized?
- Which financial ratios should be calculated?
- How can forward-looking pro forma financial statements be developed?
- How can the sensitivity of the pro forma scenarios to key forecast assumptions be evaluated?

Financial Review

Financial review is the process of analyzing, evaluating, and describing the financial history of a company; it is a key element of the process of **due diligence** that precedes any acquisition offer. Financial review serves

four key functions when an acquisition candidate is being valued. First, it provides the necessary information for an acquirer to confirm that a target company is a financially appropriate and desirable acquisition. Second, it identifies the target company's financial strengths and weaknesses, and hence those factors that will enhance or detract from future consolidated results. Third, it helps the executive or analyst gain an understanding of the fundamental business model of a target and identify the key revenue and cost drivers of the business. Finally, it provides a set of benchmark relationships the analyst needs to build a realistic set of pro forma financial statements. As we will see below, the common-size statements and ratios developed as part of the historic financial review often provide the key percentage estimates and relationships used for building pro forma financial statements.

The techniques of financial review are many and varied, hence, we limit our consideration to those techniques most relevant to the valuation process: ratio analysis and cash flow analysis. (For further details, see Lev 1974; Ferris, Tennant, and Jerris 1992; Stickney and Brown 1999; and Haskins, Ferris, and Selling 2000.)

Ratio analysis is the process of investigating the relationship between various balance sheet, income statement, and cash flow statement accounts. Analysts may use ratios to investigate these relationships across multiple time periods through what is commonly called **trend analysis** or between various alternative target companies in what is traditionally labeled **cross-section analysis**. In addition to comparing ratios over time for a given target, or between alternative targets, it is often advisable for an analyst to compare a target company's ratios to industrywide indices. Standard & Poor's, Moody's Investors Service, Value Line, Dun & Bradstreet, and *The Financial Times*, among others, provide industry statistics that permit comparisons of a company's performance against the average performance of all companies within a given industry. This type of comparison enables the executive or valuation analyst to assess the relative performance of a target candidate against a set of comparable companies.

Cash flow analysis refers to the process of identifying the various sources and uses of cash flows of a target company. This analysis enables the following questions to be addressed:

- Is the target company generating a positive **cash flow from operations** (CFFO), and if so, is it generating a positive **discretionary cash flow**?²

- How has the target company been using its available cash resources — to retire debt, to repurchase shares, to pay dividends, or to replace property, plant, and equipment?
- How has the target company been financing its capital expenditures — from debt, equity placements, operations, or the liquidation of noncurrent assets?
- Is the target company likely to need a cash infusion after the acquisition?

As cash is the primary investment attribute of interest to investors, the analysis of cash flows is particularly significant in the process of financial review.

Ratio Analysis

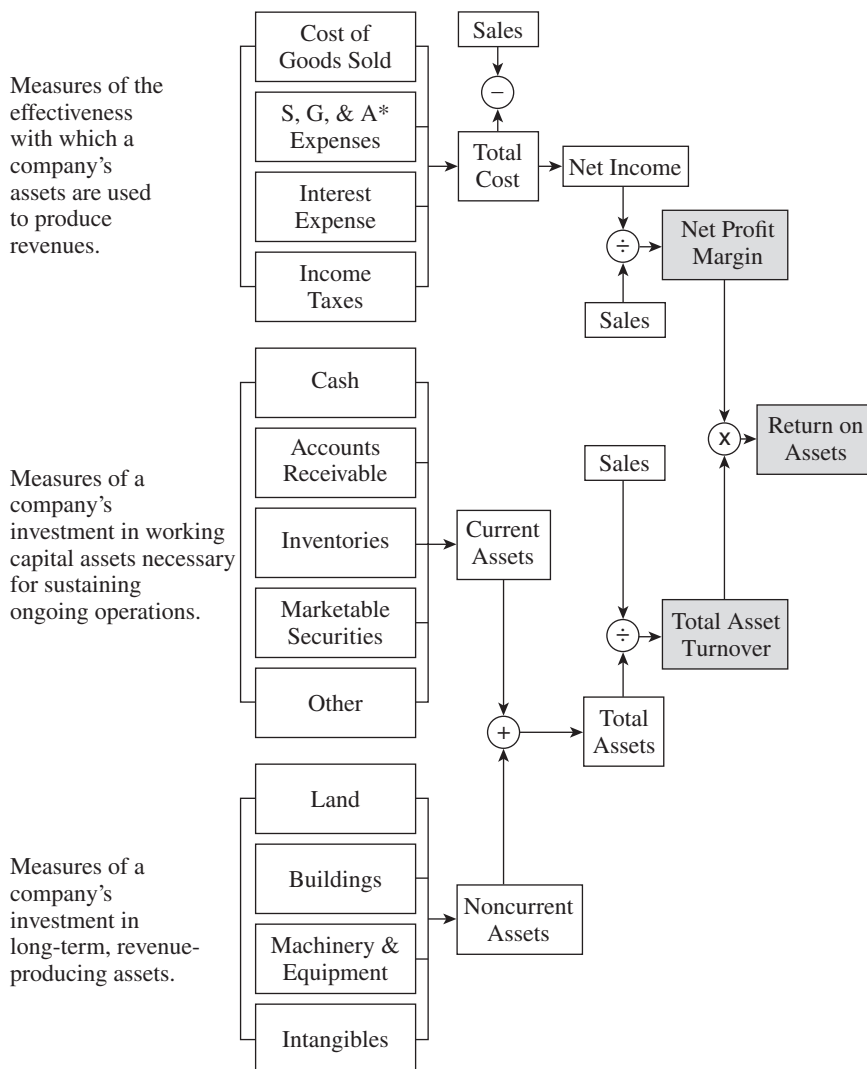
Professional analysts have always faced the problem of deciding how to organize a financial review of a target company. It is commonly acknowledged that the five key areas of interest are firm profitability, effective asset management, liquidity, solvency, and shareholders' returns. But a coherent framework linking these key areas has been elusive. (For an international perspective, see Choi et al. 1985.)

One framework that has been successfully implemented is the **DuPont Model**, so named for the company in which it was developed. This model successfully integrates the areas of **profitability** and **asset management**, featuring a company's return on assets (ROA) as the quintessential measure of firm and managerial performance. One advantage of the DuPont Model (see Exhibit 2.1) is that it highlights the important interplay between effective asset management and firm profitability, namely, that a company's ROA can be positively affected by

- increasing the net profit margin on each individual sale transaction,
- increasing the volume of sales transactions (i.e., increasing turnover), or
- some combination of increasing profit margins and increasing turnover.

In essence, the DuPont Model focuses on evaluating earnings and a company's investment in assets — that is, its business or operational risk. It focuses on the income statement and the asset side of the balance sheet. Unfortunately, the model ignores the important issue of how a company has financed its investment in assets (i.e., its financial risk) — with debt or equity, and if with debt, whether short-term or long-term debt.

Exhibit 2.1 The DuPont Model



*S, G, & A expenses are selling, general, and administrative expenses.

To overcome this limitation, many analysts have turned to an extension of the DuPont Model known as the **ROE Model**, or the **return on shareholders' equity model**. The strength of the ROE Model is that not only does it integrate all five areas of analysis, but it is also premised on the widely held notion that the *principal goal of management is to maxi-*

mize shareholder wealth. In essence, the ROE Model is broader in scope than the DuPont Model, considering the operating, investing, and financial decisions of a business.

The cornerstone of the ROE Model is a single shareholder-focused index of firm performance called the **return on equity**, or ROE:

$$\text{ROE} = \frac{\text{Net Income after Taxes} - \text{Preferred Stock Dividends}}{\text{Average Common Shareholders' Equity}}$$

ROE measures the rate of return generated by a company for its owners — the voting (or common) shareholders.³ This return largely depends on two factors: (1) How profitably a company is able to use the assets that it has at its disposal, and (2) the relative size of the owners' investment in the firm. Clearly, the more profitably a company uses its assets, the greater the returns to the owners. A second way that the owners' returns can be maximized, however, is through the use of **financial leverage**, or borrowing. If a company can generate a return on its borrowed assets that exceeds its cost of borrowing, then the company can enhance its ROE by leveraging the owners' investment. Thus, the ROE Model highlights the fact that corporate management can affect shareholder wealth through *both* its operating decisions *and* its financing decisions.

These relationships become apparent by decomposing ROE into its two principal components — profitability and financial leverage:⁴

$$\begin{aligned} \text{ROE} &= \text{Profitability} \times \text{Financial Leverage} \\ &= \frac{\text{Net Income after Taxes}}{\text{Average Total Assets}} \\ &\quad \times \frac{\text{Average Total Assets}}{\text{Average Common Shareholders' Equity}} \end{aligned}$$

Notice that the first component of ROE is nothing more than a company's ROA, the cornerstone of the DuPont Model. **ROA** tells us about a firm's profitability, whereas the second component, financial leverage, tells us how the company has been financed and how successfully management has been able to lever the owners' investment. It is important to observe that leverage, or the extent to which a company is able to borrow, is a double-edged sword: Leverage will enhance a company's ROE only as long as the cost of borrowing is *less* than the returns generated on the borrowed assets; thereafter, leverage will reduce a firm's ROE and destroy shareholder value.

ROE can be further decomposed by examining the individual factors that contribute to a company's profitability. Firm profitability, as measured by ROA, can be seen to depend on two factors: (1) the relative profitability of each sale that a company generates — that is, its net profit margin, and (2) the number of sales, or turnover, that a company is able to generate given its existing asset base. These relationships are observable by decomposing ROA into its component elements — net profit margin and asset turnover:⁵

$$\begin{aligned} \text{Profitability} &= \text{Net Profit Margin} \times \text{Asset Turnover} \\ &= \frac{\text{Net Income after Taxes}}{\text{Net Sales}} \times \frac{\text{Net Sales}}{\text{Average Total Assets}} \end{aligned}$$

Decomposing ROA into its individual components highlights the two principal ways that management can enhance shareholders' returns through its operating decisions. The above equation reveals, for example, that shareholders' returns can be positively affected either by increasing a company's net profit margin or by increasing the number (or volume) of its sales transactions. That is, the higher a company's net profit margin, the greater will be the shareholders' returns on any given sale; and the higher the number of sales that are generated for a given investment in assets, the greater a firm's overall profitability.

Returning to our cornerstone ratio and incorporating these latest concepts yields the following equation:

$$\text{ROE} = (\text{Net Profit Margin} \times \text{Asset Turnover}) \times \text{Financial Leverage}$$

This equation reveals that the three principal drivers of shareholders' returns are (1) the relative profitability of each sale transaction, (2) the number of sale transactions generated given a company's investment in operating assets, and (3) the extent to which a company has been able to successfully lever the shareholders' investment. Exhibit 2.2 presents an illustration of how the ROE Model both builds on and extends the DuPont Model.

To illustrate the relationship of these performance drivers, consider the financial data for Nokia Corporation, one of the world's leading telecommunications companies, headquartered in Finland. Using data from the company's summary of selected financial information, performance ratios for the period 1994–1997 can be calculated to reveal the trend in Nokia's shareholders' returns (see the shaded area in Exhibit 2.3). In

Exhibit 2.2 The Return on Shareholders' Equity (ROE) Model

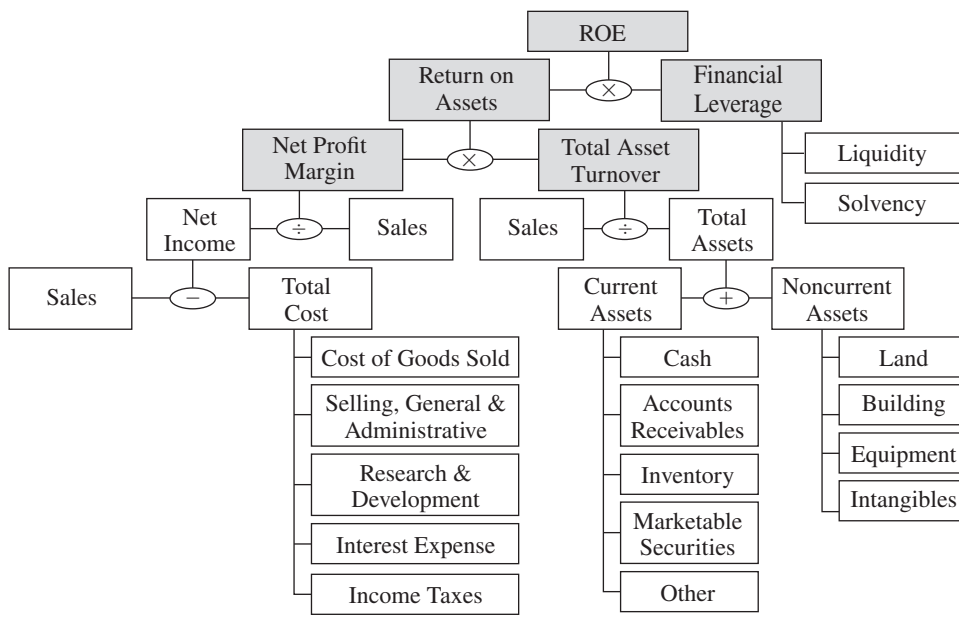


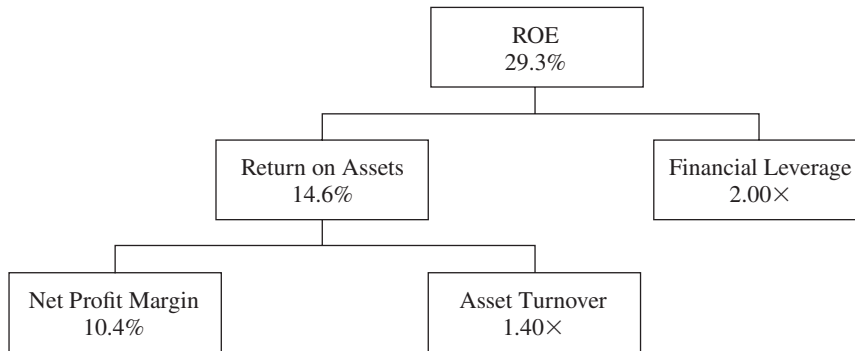
Exhibit 2.3 Nokia Corporation Return on Equity Analysis

Performance Measure	1994	1995	1996	1997
Net profit margin	8.6%	3.2%	6.5%	10.4%
Asset turnover	1.20×	1.21×	1.19×	1.40×
ROA	10.3%	3.9%	7.8%	14.6%
Financial leverage	2.67×	2.31×	2.22×	2.00×
ROE	27.5%	9.0%	17.2%	29.3%

ROA is return on assets; and ROE, return on equity.

1997, Nokia's ROE was 29.3 percent, up from 9.0 percent in 1995 and 17.2 percent in 1996. (See Appendix 2A for the Nokia data used in this analysis.)

To understand the causal factors of this growth, Nokia's ROE for 1997 can be decomposed as follows:



Considering the company's trend data in Exhibit 2.3, we see that the growth in Nokia's ROE has largely come from its increasing net profit margin, up from 3.2 percent in 1995 to 10.4 percent in 1997, and its asset turnover, which increased from 1.21 times in 1995 to 1.40 times in 1997. The company's financial leverage declined from its 1994 high of 2.67 times to 2.00 times in 1997.

Decomposition Analysis

Just as it is possible to decompose ROE into its three key drivers of profit margin, asset turnover, and financial leverage, so is it possible to decompose each of these three key drivers into their subcomponents. **Decomposition analysis** is the process of segmenting a component of ROE into its principal subcomponents and in so doing enabling the analyst to begin the process of identifying the *specific* causes of change in each of the key ROE drivers.

Decomposing Profit Margin. A company's net profit margin reveals the relative profitability of its basic operating activity. For the valuation analyst to be able to identify just which components of operations were responsible for generating an increase (or decrease) in profitability, it is instructive for him or her to decompose the net profit margin into the various subratios that, collectively, comprise this ratio.

The most effective way of decomposing a company's net profit margin into its subcomponents is by means of **common-size income statements**. In common-size financial statements, all amounts are expressed as a percentage of some base financial statement item. For example, in common-size income statements all amounts are expressed as a percentage of net sales. (In common-size balance sheets, all amounts are

Exhibit 2.4 Nokia Corporation Common-Size Income Statements

	1994	1995	1996	1997
Net sales	100.0%	100.0%	100.0%	100.0%
Cost of goods sold	(67.1)	(67.1)	(69.6)	(63.1)
Gross profit	32.9	32.9	30.4	36.9
Research and development expense	(5.9)	(5.0)	(6.2)	(6.7)
Selling, general, and administrative expense	(11.8)	(9.3)	(7.7)	(8.9)
Operating profit	15.2	18.6	16.5	21.3
Share of results of associated companies	0.1	0.2	0.1	0.1
Net financial income	1.7	1.6	1.4	1.5
Exchange gains and losses	1.5	0.0	0.1	0.2
Profit before interest, tax, depreciation, and minority interest	18.5	20.4	18.1	23.1
Interest expense	(1.9)	(2.0)	(2.5)	(1.9)
Depreciation/amortization expense	(3.3)	(5.0)	(5.7)	(5.3)
Income tax expense	(3.1)	(2.1)	(2.2)	(4.3)
Minority interest	(0.3)	(0.2)	(0.0)	(0.2)
Profit from continuing operations	9.9	11.1	7.7	11.4
Discontinued operations	—	(6.4)	0.6	0.5
Net profit	9.9	4.7	8.3	11.9
Preferred stock dividends	(1.3)	(1.6)	(1.8)	(1.5)
Net profit margin	8.6	3.2	6.5	10.4

expressed as a percentage of total assets.) Trend analysis of common-size income statements permits an analyst to assess how a company's income statement accounts are changing over time relative to sales, and thus how the various income statement items contribute to the net profit margin. Exhibit 2.4, for example, presents the common-size income statement data for Nokia Corporation, 1994–1997.

The data in Exhibit 2.4 reveal the following:

- Nokia's net income as a percentage of net sales grew from 3.2 percent in 1995 to 10.4 percent in 1997.
- Nokia's cost of goods sold declined from 67.1 percent to 63.1 percent over the four years, accounting for most of the company's increase in profitability.
- Research and development costs increased slightly from 5.0 percent in 1995 to 6.7 percent in 1997.

- Selling, administrative, and general expenses declined from 11.8 percent in 1994 to 8.9 percent in 1997, accounting for approximately 21 percent of Nokia's increase in profitability.
- Interest expense generally increased over the four years until 1997 when it declined to 1.9 percent, whereas income taxes increased from 3.1 to 4.3 percent.

As the above analysis of Nokia's common-size income statement data reveals, decomposing the net profit margin enables the analyst to address the following questions:

- Is the target company's net profit margin changing over time? If so, what factors are causing the changes: cost of goods sold, research and development outlays, selling and administrative costs, interest costs, income taxes, or what?
- How well is the target company management managing its cost of doing business? Has the company reached sufficient volume levels to gain any economies of scale? In what areas, if any, does the company seem to be overspending?

Decomposing Asset Turnover. Asset turnover, or what is sometimes called "asset management," refers to the degree of productivity that a company is able to achieve with respect to its operating assets. It is a measure of the effectiveness with which a company's management is able to employ the valuable resources provided by creditors and owners alike. Not surprisingly, a strong link exists between the effective use of a company's assets and the degree of profitability that a company is able to achieve. Whereas the net profit margin focuses on the *rate* at which profit is generated from each unit of sales, the asset turnover ratio focuses on the *volume* of sales generated from a given investment in operating assets. Thus, in Exhibit 2.3, we see that in 1997 Nokia Corporation generated 0.104 Finnish markka (FIM) in net profit from each markka of sales revenue, while generating 1.40 FIM in sales revenue from each markka invested in operating assets. It can be readily seen from this data that Nokia can increase its return to shareholders *either* by increasing the rate of profit per markka of sales or by increasing the number of sales markkas generated from its existing investment in operating assets.

The decomposition of asset turnover traditionally focuses on two groups of assets that are closely linked to the operations of a company:

the working capital assets, which include cash, trade receivables, and inventory; and the noncurrent revenue-producing assets such as property, plant, and equipment. For most companies, analysts usually calculate the following ratios when determining how effectively corporate management has used a company's key operating assets:

Working Capital Ratios:

$$\text{Current Asset Turnover} = \frac{\text{Net Sales}}{\text{Average Current Assets}}$$

A measure of the value of net sales generated from a given investment in current assets.

$$\text{Accounts Receivable Turnover} = \frac{\text{Net Sales}}{\text{Average Accounts Receivable}}$$

A measure of the number of receivable collection cycles (i.e., credit sale → accounts receivable → cash collection) occurring in a given period of time (usually one quarter or one year).

$$\text{Receivable Collection Period} = \frac{365 \text{ Days}}{\text{Receivable Turnover}}$$

A measure of the number of days, on average, required for collecting an outstanding account receivable, calculated on an annual (or quarterly) basis.

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

A measure of the number of production cycles (i.e., inventory production → sale) occurring in a given period of time (usually one quarter or one year).

$$\text{Days' Inventory on Hand} = \frac{365 \text{ Days}}{\text{Inventory Turnover}}$$

A measure of the quantity of inventory on hand, expressed in terms of the number of days needed to sell the existing inventory, calculated on an annual (or quarterly) basis.

$$\text{Accounts Payable Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Average Accounts Payable}}$$

A measure of the number of account payment cycles (i.e., buy inventory on credit → sell inventory → payment on account) occurring in a given period of time (usually one quarter or one year).

$$\text{Days' Payable Period} = \frac{365 \text{ Days}}{\text{Payable Turnover}}$$

A measure of the number of days, on average, required for paying an outstanding account payable, calculated on an annual (or quarterly) basis.

Noncurrent Asset Ratios:

$$\text{Noncurrent Asset Turnover} = \frac{\text{Net Sales}}{\text{Average Noncurrent Assets}}$$

A measure of the value of net sales generated for a given investment in noncurrent assets.

$$\text{Property, Plant, and Equipment Turnover} = \frac{\text{Net Sales}}{\text{Average Property, Plant, and Equipment}}$$

A measure of the value of net sales generated for a given investment in property, plant, and equipment.

Exhibit 2.5 Nokia Corporation Asset Turnover Decomposition Analysis

Performance Measure	1994	1995	1996	1997
Asset turnover	1.20×	1.21×	1.19×	1.40×
Current asset turnover	1.75×	1.69×	1.62×	1.84×
Accounts receivable turnover	4.29×	4.24×	3.85×	4.45×
Receivable collection period (days)	85	86	95	82
Inventory turnover	3.39×	2.94×	3.34×	4.83×
Days' inventory on hand (days)	108	124	109	76
Accounts payable turnover	2.88×	2.83×	2.74×	2.64×
Days' payable period (days)	127	129	133	138
Noncurrent asset turnover	3.79×	4.33×	4.51×	5.89×
Property, plant, and equipment turnover	6.12×	6.57×	6.68×	8.84×

Several observations about the preceding ratios are noteworthy. First, in most cases, the denominator of each ratio is an average. The purpose of averaging a beginning-of-period and an end-of-period balance is to try to eliminate the effects of any significant increases or decreases in a given account. For example, it would distort the inventory turnover ratio to divide a company's cost of goods sold by its ending inventory if the firm had experienced either a dramatic increase or decrease in inventory at year end; in either case, the inventory turnover ratio would be biased by the end-of-period contraction/expansion in inventory. Second, not all of the above ratios are relevant for all companies. For example, an enterprise such as The McDonald's Company, a worldwide chain of fast-food restaurants, maintains an insignificant balance in accounts receivable. Few, if any, of the company's customer sales are undertaken on a credit basis. Thus, the analysis of receivable turnover for a company like McDonald's is unnecessary. Third, some of the ratios are merely transformations of other ratios. For example, the days' inventory-on-hand ratio is merely a transformation of the inventory turnover ratio. It is often unnecessary for analysts to calculate both ratios, although many do. Fourth, it is probably obvious that in almost all cases a high rate of turnover is to be preferred to a lower rate.⁶ This generality will hold except in those cases in which management is liquidating its revenue-producing assets — a dangerous situation for any company in the long term. Finally, the above set of ratios should not be considered to be exhaustive; analysts frequently add to and subtract from the above list.

To illustrate the use of these ratios, consider Exhibit 2.5, which shows the asset turnover ratios for Nokia. The data in Exhibit 2.5 reveal the following:

- In 1997, Nokia generated 1.84 FIM in net sales for each markka invested in current assets, up 14 percent from 1.62 FIM in 1996.
- Nokia's receivable turnover cycle vacillated from a low of 3.85 times in 1996 to a high of 4.45 times in 1997. This increase in the number of receivable collection cycles is reflected in Nokia's declining receivable collection period, which was down nearly thirteen days between 1996 and 1997.
- Nokia's inventory turnover cycle count remained relatively stable (i.e., 2.94 times to 3.39 times) from 1994 to 1996 but increased markedly in 1997 to 4.83 times. The higher the rate of inventory turnover, the higher the returns to shareholders, unless the higher turnover is achieved by means of price reductions (and hence reduced profit margins). Although Nokia's 4.83 inventory turns is quite respectable, it lags the industry average of 6.2 turns, indicating that there is still room for improvement. The increase in inventory turnover count is also reflected in a reduced days' inventory-on-hand ratio, which declined from a high of 124 days in 1995 to 76 days in 1997. This 48-day reduction undoubtedly contributed to Nokia's improved profitability in 1997.
- Nokia's accounts payable turnover declined from 2.88 times in 1994 to 2.64 times in 1997. This decline is reflected in an increase in Nokia's accounts payable period from 127 days to 138 days. When contrasted with Nokia's average receivable collection period of 82 days in 1997, this suggests that Nokia is managing its working capital flows very efficiently.
- Nokia's property, plant, and equipment (PP&E) turnover grew steadily from 6.12 FIM for each markka invested in PP&E in 1994 to 8.84 FIM in 1997. This indicates that Nokia increased its efficiency with respect to PP&E: The company was able to generate a 44 percent higher volume of sales for an equivalent investment in PP&E.

The decomposition analysis of Nokia's asset turnover suggests that the increase in the company's asset turnover from 1994 to 1997 almost certainly resulted from an improvement in the company's management of all key operating asset categories: receivables, inventory, and PP&E.

Decomposing Financial Leverage. Financial leverage refers to the ability of a company to increase its asset base through borrowing.

Financial leverage can be a powerful tool for enhancing shareholders' returns, but the effectiveness of leverage in maximizing shareholders' returns is directly linked to the spread between a company's cost of borrowing and the returns on those borrowed funds. As this spread declines, the ability of financial leverage to enhance shareholders' returns also declines.

The ability of financial leverage to enhance shareholders' returns can thus be seen to be a function of a firm's cost of borrowing and its return on borrowed assets (which we ignore for the moment). Furthermore, a firm's cost of borrowing is directly linked to its ability to service its existing debt — what is commonly called **financial risk**. A company with low financial risk (i.e., a high ability to repay debt and debt service charges) will be able to borrow at a lower cost than a company with higher financial risk. For this type of company, increases in the amount of leverage will be more effective in enhancing shareholders' returns than will increases in leverage for a company with high financial risk. Hence, one way that analysts evaluate the extent and effectiveness of financial leverage is by evaluating a company's current financial riskiness.

The analysis of financial leverage usually focuses on two dimensions of financial riskiness: short-term risk, or **liquidity**, and long-term risk, or **solvency**. For most companies, the following ratios are calculated when financial risk is analyzed:

Short-Term Risk:

$$\text{Quick Ratio}^7 = \frac{\text{Cash} + \text{Marketable Securities} + \text{Trade Receivables}}{\text{Current Liabilities}}$$

A measure of the highly liquid current assets available for repaying short-term liabilities.

$$\text{Operating Cash Flow Ratio} = \frac{\text{Cash Flow from Operations}}{\text{Current Liabilities}}$$

A measure of the cash flow from operations available for repaying short-term liabilities.

Long-Term Risk:

$$\text{Total Liabilities-to-Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Common Shareholders' Equity}}$$

A measure of the relative investment of creditors versus common shareholders in a company.

$$\text{Long-Term Debt-to-Equity Ratio} = \frac{\text{Long-Term Debt}}{\text{Common Shareholders' Equity}}$$

A measure of the relative investment of long-term creditors versus common shareholders in a company.

$$\text{Interest Coverage Ratio} = \frac{\text{Income before Taxes} + \text{Interest Expense}}{\text{Interest Expense}}$$

A measure of the extent to which current operations can support current debt service charges.

Two observations about the above ratios are useful. First, a company's short-term obligations can be repaid with cash generated from a variety of sources: future operations, existing liquid assets (as reflected by the current asset section of the balance sheet), the sale of assets, the sale of stock, or new borrowings. The short-term liquidity ratios focus on the two sources of liquid resources that are immediately available to managers: cash from operations and cash (or other highly liquid current assets) on hand. Second, the long-term solvency ratios themselves focus on two separate aspects of risk: (1) the ability of a company to cover the current cost of debt from the income generated by existing operations, and (2) the existing level of financial leverage that currently characterizes a company. If a company is already highly leveraged (i.e., already has a high proportion of assets from creditors), then further financial leverage will not be as effective in enhancing shareholders' returns. As stated above, as the degree of leverage increases, so too does a firm's riskiness, and lenders will charge commensurately higher interest costs, thereby reducing the utility of additional leverage.

Exhibit 2.6 Nokia Corporation Financial Leverage Decomposition Analysis

Performance Measure	1994	1995	1996	1997
Financial leverage	2.67×	2.31×	2.22×	2.00×
Short-term liquidity				
Quick ratio	115.8%	86.1%	123.7%	135.9%
Operating cash flow ratio	22.5%	−4.0%	55.8%	55.5%
Long-term solvency				
Total liabilities–to–equity ratio	119.8%	134.2%	108.8%	93.0%
Long-term debt–to–equity ratio	28.6%	18.7%	15.2%	7.6%
Interest coverage ratio	6.90×	6.62×	4.04×	8.32×

To illustrate the use of these ratios, consider Exhibit 2.6, which shows a decomposition analysis of Nokia Corporation's financial leverage ratios. The data in Exhibit 2.6 reveal the following:

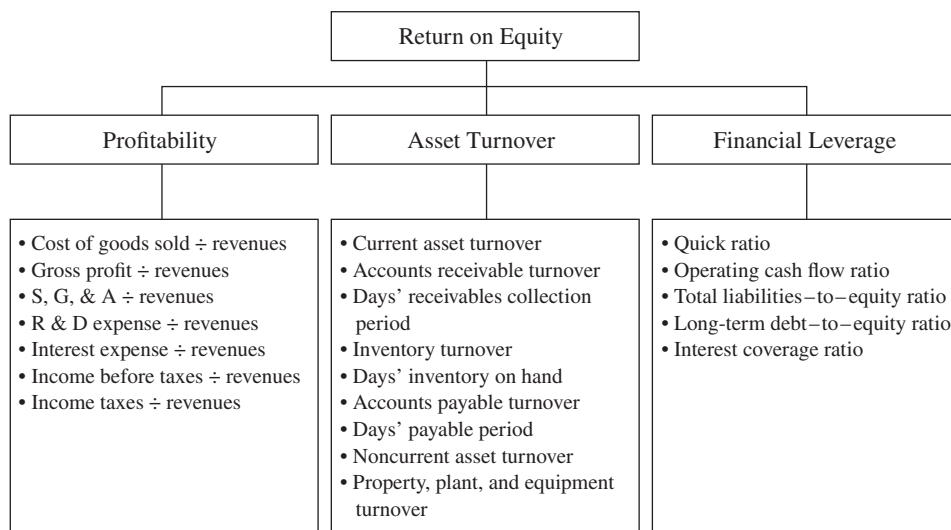
- Nokia's use of financial leverage steadily declined from its high of 2.67 times in 1994 to 2.00 times in 1997. This decline in the use of financial leverage is reflected in the significant increases in Nokia's liquidity and solvency over the same period.
- With respect to liquidity, the quick ratio increased from 115.8 percent in 1994 to 135.9 percent in 1997, and the operating cash flow ratio increased from −4.0 percent in 1995 to 55.5 percent in 1997. Both ratios indicate improved levels of liquidity, and hence a reduced use of short-term leverage.
- With respect to solvency, the total liabilities–to–equity ratio declined from 119.8 percent in 1994 to 93.0 percent in 1997, and the long-term debt–to–equity ratio declined from 28.6 percent in 1994 to 7.6 percent in 1997. The interest coverage ratio generally increased from 6.90 times in 1994 to 8.32 times in 1997. The decline in Nokia's debt–to–equity ratios and the significant improvement in the interest coverage ratio indicate a material decline in Nokia's reliance on long-term leverage.

Overall, the decomposition analysis of Nokia's financial leverage indicates a dramatic reduction (i.e., more than 25 percent) in the use of financial leverage.

Analytical Framework: Putting It All Together

Exhibit 2.7 presents a composite framework for the ratio analysis of a target company. The framework is premised on the notion that the principal goal of corporate management is to maximize shareholders' wealth.

Exhibit 2.7 ROE Model for Financial Review



S, G, & A is selling, general, and administrative; and R & D, research and development.

As such, the cornerstone of the model is the return on common shareholders' equity, or ROE. As discussed above, ROE can be decomposed into the three key drivers of profitability, asset turnover, and financial leverage. And each of the three key drivers can themselves be decomposed into various subcomponents, as depicted in Exhibit 2.7.

Cash Flow Analysis

With the exception of the operating cash flow ratio, all of the ratios discussed thus far are derived from income statement and balance sheet data. Given that cash is the one asset that a company cannot operate without, and that it is the investment attribute of principal interest to investors, the analysis of cash flows is an important component of any financial review. Since the demand for cash flow data has become widespread, most countries now require the presentation of a statement of cash flows (SCF). Where an SCF is not presented, the valuation analyst must have the necessary skills to prepare one. (Appendix 2B presents a methodology for the preparation of an SCF from balance sheet and income statement data.)

The structure of the SCF worldwide has evolved into a fairly consistent presentation composed of three categories:

- Cash flows from operating activities (CFFO)
- Cash flows from investing activities (CFFI)
- Cash flows from financing activities (CFFF)

The CFFO represents the cash generated from the sale of goods or the provision of services, less the cash paid for operations — in essence, net income on a modified cash basis. The CFFI, on the other hand, represents the cash paid for intercorporate investments (both short- and long-term), the cash paid for new capital investments, and the cash received from the sale or disposal of noncurrent assets. Finally, the CFFF represents the cash generated from the sale of stock and from long- and short-term borrowings, less the cash paid for retiring outstanding debt, repurchasing treasury stock, or paying dividends.

Cash flow analysis enables the analyst to address a variety of key questions, such as the following:

- Is the target company generating a positive CFFO, and if so, is it also generating a positive discretionary cash flow?
- What types of strategic investments has the target company been making?
- How has the target company been financing its operations and its strategic investments?
- How has the target company financed its dividend payments?

To illustrate this type of analysis, consider Exhibit 2.8, which contains the SCF for the Nokia Corporation for 1995–1997; this data reveals the following:

- Nokia generated a positive CFFO of 10.201 billion FIM in 1997, an increase of about 23 percent over 1996. The company also generated a positive discretionary cash flow of 3.782 billion FIM, calculated as follows:

CFFO		10.201 billion
Less	Dividend payments	(1.061)
	Debt retirements	(2.007)
	Capital and research and development expenditures	<u>(3.351)</u>
Discretionary cash flow		3.782 billion

- Nokia's 1997 CFFI was a negative 2.972 billion FIM. The company made significant investments in new PP&E (2.402 billion),

**Exhibit 2.8 Nokia Corporation Cash Flow Analysis:
Consolidated Statements of Cash Flows***

	1995	1996	1997
Operating activities			
Net income	1,747	3,263	6,259
Depreciation/amortization	1,825	2,236	2,762
Deferred income taxes	(333)	195	640
Equity income, net of dividends	(85)	(37)	(54)
Other items	1,566	(331)	(283)
Net change in operating assets and liabilities	<u>5,351</u>	<u>2,993</u>	<u>877</u>
Net cash provided by operating activities	(631)	8,319	10,201
Investing activities			
Acquisitions and investments	(96)	(175)	(552)
Proceeds from disposals of investments and other assets	2,305	(277)	425
Purchases of property, plant, and equipment	(3,299)	(2,028)	(2,402)
Proceeds from disposals of property, plant, and equipment	396	293	506
Capitalized research and development costs	(742)	(677)	(949)
Net cash used in investing activities	<u>(1,436)</u>	<u>(2,864)</u>	<u>(2,972)</u>
Financing activities			
Retirement of debt (short- and long-term)	1,222	(433)	(2,007)
Payment from affiliates	145	(605)	355
Share issuances	37	—	72
Purchases of treasury shares	—	(210)	—
Dividends	(789)	(901)	(1,061)
Net cash used in financing activities	615	(2,149)	(2,641)
Effect of exchange rate changes on cash and cash equivalents			
	(87)	25	114
Net increase (decrease) during the year	<u>(1,452)</u>	<u>3,306</u>	<u>4,588</u>
Balance at beginning of year	<u>5,268</u>	<u>4,214</u>	<u>7,545</u>
Balance at end of year	<u>3,729</u>	<u>7,545</u>	<u>12,247</u>

*This data has been reformatted. Values are for year ended 31 December, in millions of Finnish markka.

research and development (0.949), and key equity investments (0.552) such as Ipsilon Networks, Inc. These investment outlays were partially offset by the proceeds generated from disposing of select investments (0.425) and certain fixed assets (0.506).

- Nokia's 1997 CFFF was a negative 2.641 billion FIM, largely because of the company's continuing program of debt reduction (2.007 billion) and dividend payments (1.061 billion).

As we shall see in Chapter 3, the link between the SCF and firm value will take on particular meaning as we define a company's free cash flows in terms of its CFFO. With the historical financial review complete, we now turn to the task of generating realistic scenarios about a company's future operating performance.

Pro Forma Analysis

After completing the historical financial review, the valuation analyst is ready to begin developing forward-looking pro forma financial statements. **Pro forma financial statements** are an analyst's best guess as to how a target company will perform in the future. These estimates reflect the likely cost reductions and synergies, as well as revenue enhancements, that an acquiring company can reasonably expect once an acquisition is completed.⁸ Inherent in the process of developing pro forma financial statements is the necessity of the analyst making numerous assumptions about events that have yet to occur. If the valuation analyst is to avoid the winner's curse — that is, overpricing a successful acquisition — it is imperative that he or she base all assumptions on sound logic and reasoning. When such assumptions are not well conceived, the cost to an acquiring firm can be quite significant, as the Quaker Oats vignette at the beginning of this chapter reveals.

The preparation of pro forma statements is typically a six-step process:

1. *Forecast revenues for the target company.* The projection of future revenues is, without question, the single most important step in the pro forma process. As this is the starting point, a misestimation at this stage will be compounded into a multitude of other forecasted values. In general, sales are usually forecasted for three to five years, and possibly as long as ten years. Most professional analysts, however, are considerably reluctant to forecast beyond five years, in large measure because of the high probability of error in such long-term forecasts.⁹ As most businesses will have a continuing value beyond the final forecast year, the analyst must also project a value of the business for all years subsequent to the final forecast year. This value is known as the **continuing, terminal, or exit value**, and the process of estimating this value is discussed in Chapter 3.

2. *Forecast operating expenses (excluding acquisition financing costs).* The projection of operating expenses includes the preparation of forecasts for cost of goods sold, research and development costs, selling and administrative expenses, and other continuing income and expense items. These forecasts should include the effects of any anticipated cost reductions or economies of scale expected to arise as a consequence of an acquisition. Some operating expenses are relatively easy for an analyst to forecast because they are either fixed in amount or vary as a function of revenues, whereas others are more difficult to project because they are neither strictly fixed nor strictly variable. A good source of information for help in forecasting operating expenses is the historical common-size income statements (see Exhibit 2.4). For those operating expenses that vary in a relatively constant relationship with sales, as revealed by a multiyear common-size statement analysis, the common-size percentage may be a useful way for an analyst to forecast these expenses in future periods.

3. *Forecast the change and composition of total assets on the balance sheet.* There are two approaches to forecasting assets: (1) Forecast *total* assets and then allocate this total among the individual asset accounts using common-size balance sheet relationships (and potentially other assumptions), and (2) forecast the *individual* asset accounts and then sum the accounts to arrive at a value for total assets. The first approach is most frequently used largely because of its ease in application. It is usually undertaken by assuming that most companies maintain a relatively constant relation between revenues and total assets (i.e., a constant total asset turnover ratio). The individual asset accounts are then forecasted by reference to various assumptions about the growth (or decline) in the various asset accounts and to a target company's most recent common-size balance sheet.

The second approach to forecasting assets is more complex but somewhat more refined. For example, it is reasonable to expect that the PP&E turnover ratio would decline with small increases in revenues, whereas the current asset turnover ratio would remain relatively fixed. These expected relationships are more easily incorporated in the pro forma balance sheet with the second approach.

4. *Set total equities equal to total assets (from step 3) and forecast the cost of financing the acquisition transaction and the target company's long-term financing in general.* As part of this step, the analyst will need to forecast any net proceeds from the issuance and repurchase of capital stock, any net proceeds from the issuance and retirement of long-term debt, any changes in non-interest-bearing liabilities (i.e., accounts payable and accrued expenses), and the target company's future dividend policy, if any. At this juncture, it is also appropriate for the analyst to deal with the question of cash surpluses (deficits) relative to the balance forecasted in step 3. As most companies maintain bank lines of credit, one useful assumption is adjusting the amount of short-term interest-bearing debt for any cash deficit (or surplus) relative to the step 3 forecast.¹⁰
5. *Complete the pro forma income statement and balance sheet by forecasting interest costs and income taxes.*
6. *Derive the pro forma SCF from the pro forma income statements and balance sheets.*

Embedded in the above six-step process are a number of subtle decisions that are best illustrated by considering an actual situation — to which we now turn. (Appendix 2D contains alternative approaches to forecasting the various income statement and balance sheet accounts.)

Developing Pro Forma Financial Statements: An Illustration

To illustrate the types of forecasting and modeling decisions inherent in the preparation of pro forma financial statements, we begin with Exhibit 2.9, which contains the condensed historical income statements and balance sheets of Nokia Corporation for 1996 and 1997. The task at hand is the development of projected financial statements for 1998.

Nokia's annual report discloses that the company's five-year annual average growth rate for revenues has been approximately 24 percent, although the growth rate from 1996 to 1997 was 34 percent. Standard & Poor's forecast for growth in the global communications equipment industry was 13 percent, whereas BT Alex.Brown, Inc., forecasted net operating revenue growth for Nokia of 25 percent in 1998.¹¹ BT Alex.Brown's higher growth rate reflects the company's "global leadership, strong management, and financial flexibility."¹² For the purposes of our illustration, we begin by adopting BT Alex.Brown's operating revenue forecast for 1998 and apply it to the data in Exhibit 2.9 (see the

Financial Review and Pro Forma Analysis

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Exhibit 2.9 Nokia Corporation Historical and Projected Financial Statements
Forecasting Revenues, Operating Expenses, and Asset Mix

	Historical				Projected*	
	1996	%	1997	%	1998	
Income statement						
Net sales	39,321	100.0	52,612	100.0	65,765	(Step 1)
Cost of goods sold	<u>(27,360)</u>	<u>(69.6)</u>	<u>(33,194)</u>	<u>(63.1)</u>	<u>(41,493)</u>	(Step 2)
Gross profit	11,961	30.4	19,418	36.9	24,273	
Research and development expenses	(2,446)	(6.2)	(3,539)	(6.7)	(4,424)	(Step 2)
Selling, general, and administrative expenses	<u>(3,013)</u>	<u>(7.7)</u>	<u>(4,663)</u>	<u>(8.9)</u>	<u>(5,829)</u>	(Step 2)
Operating profit	6,502	16.5	11,216	21.3	14,020	
Share of results of associated companies	37	0.1	54	0.1	68	(Step 2)
Net financial income	534	1.4	763	1.5	954	(Step 2)
Exchange gains	<u>27</u>	<u>0.1</u>	<u>106</u>	<u>0.2</u>	<u>133</u>	(Step 2)
Profit before interest, tax, depreciation, and minority interest	7,100	18.1	12,139	23.1	15,174	
Interest expense	(966)	(2.5)	(1,006)	(1.9)		
Depreciation/amortization expense	(2,236)	(5.7)	(2,762)	(5.3)		
Income tax expense	(856)	(2.2)	(2,274)	(4.3)		
Minority interest	<u>2</u>	<u>—</u>	<u>(99)</u>	<u>(0.2)</u>		
Profit from continuing operations	3,044	7.7	5,998	11.4		
Discontinued operations	<u>219</u>	<u>0.6</u>	<u>261</u>	<u>0.5</u>		
Net profit	3,263	8.3	6,259	11.9		
Balance sheet						
Intangible assets (net)	1,455	4.4	2,061	4.9	2,576	(Step 3)
Property, plant, and equipment (net)	5,662	17.0	6,240	15.0	7,800	(Step 3)
Investments	901	2.7	789	1.9	986	(Step 3)
Other noncurrent assets	<u>391</u>	<u>1.2</u>	<u>355</u>	<u>0.9</u>	<u>444</u>	(Step 3)
Total noncurrent assets	<u>8,409</u>		<u>9,445</u>		<u>11,806</u>	
Inventories	6,423	19.3	7,314	17.5	9,143	(Step 3)
Accounts receivable (net)	10,898	32.8	12,732	30.5	15,915	(Step 3)
Short-term investments	5,886	17.7	9,363	22.4	11,704	(Step 3)
Cash and cash equivalents	<u>1,659</u>	<u>5.0</u>	<u>2,884</u>	<u>6.9</u>	<u>3,605</u>	(Step 3)
Total current assets	<u>24,866</u>		<u>32,293</u>		<u>40,366</u>	
Total assets	33,275	100.0	41,738	100.0	52,173	(Step 3)

(continued)

Exhibit 2.9 Nokia Corporation Historical and Projected Financial Statements
Forecasting Revenues, Operating Expenses, and Asset Mix (*continued*)

	Historical		Projected*	
	1996	%	1997	%
Share capital	1,498		1,499	
Other restricted equity	5,298		5,542	
Treasury shares	(657)		(654)	
Untaxed reserves	1,516		1,279	
Retained earnings	8,270		13,858	
Total shareholders' equity	<u>15,925</u>		<u>21,524</u>	
Minority interests	<u>29</u>		<u>195</u>	
Long-term debt	2,117		1,348	
Other long-term liabilities	<u>297</u>		<u>295</u>	
Total long-term liabilities	<u>2,414</u>		<u>1,643</u>	
Short-term borrowing	3,404		3,008	
Current portion of long-term debt	555		285	
Accounts payable and accrued expenses	10,610		14,541	
Advance payments	<u>338</u>		<u>542</u>	
Total current liabilities	<u>14,907</u>		<u>18,376</u>	
Total liabilities	<u>17,321</u>		<u>20,019</u>	
Total equities	33,275		41,738	

Values are in millions of Finnish markka.

* All values are rounded to the nearest whole number.

shaded area, which presents the forecasted outcomes from steps 1, 2, and 3 above). To forecast Nokia's operating expenses (i.e., step 2), we use the common-size income statement percentages from 1997. Although this assumption is likely to be incorrect in that it presumes that *all* of Nokia's operating expenses move in a constant proportion to changes in net revenues, it is valid for at least some of Nokia's operating expenses. For the purposes of step 3, we use the common-size percentages from the 1997 balance sheet after assuming that total assets will change in direct proportion to net revenues (i.e., a constant total asset turnover ratio); thus, total assets were first projected at a growth rate of 25 percent, and then the individual asset account balances were distributed on the basis of Nokia's 1997 common-size percentages.

For forecasting Nokia's long-term financing (step 4), the following assumptions were adopted:

- The company's 1998 dividend payments remain approximately the same amount (1,061 million FIM) as in 1997.

- The company issues no new shares; any new financing will be undertaken with lower costing debt.
- The balance of treasury shares remains unchanged.
- The company's 1998 non-interest-bearing debt remains the same percentage of total equities (i.e., 34.8 percent) as in 1997.
- The company maintains constant levels of advance payments, current portion of long-term debt, long-term debt, and other long-term liabilities.

For completion of Nokia's pro forma income statement (step 5), two final items need to be forecasted — interest expense and income taxes. The company's annual report reveals that income taxes average approximately 27 percent, and hence this figure is used to forecast 1998 income taxes (unless a higher or lower rate is anticipated). With respect to interest expense, an equation is needed to calculate this expense, as follows:

$$\text{Interest Expense} = I_{St} \left(\frac{\text{STD}_B + \text{STD}_E}{2} \right) + I_{Lt} \left(\frac{\text{LTD}_B + \text{LTD}_E}{2} \right)$$

where I_{St} is short-term average cost of debt, I_{Lt} is long-term average cost of debt, STD is short-term debt, and LTD is long-term debt (including current maturities).

This equation assumes that Nokia's interest expense is a function of the company's beginning and ending balances of debt, which are averaged in the above equation. Nokia's annual report indicates that the company's weighted average cost of debt was 7.2 and 6.5 percent for short-term and long-term debt, respectively, during 1997. Given forecasts of relatively stable interest rates for 1998, these same rates were adopted for the 1998 forecast. Plugging this data into the equation above for the 1998 interest expense yields

$$\text{Interest Expense} = 7.2\% \left(\frac{3,008 + \text{STD}_E}{2} \right) + 6.5\% \left(\frac{1,633 + 1,633}{2} \right)$$

and reveals that the year-end balance of short-term debt (STD_E) is still unknown.¹³ Finding STD_E and the interest expense that satisfy the above equation with sufficient precision can be conveniently handled by the iterative calculation feature on a spreadsheet program. (See Appendix 2C for the EXCEL™ spreadsheet formulas associated with Exhibit 2.10.)

Exhibit 2.10 presents the final results of our pro forma analysis for 1998 for Nokia.¹⁴ With an expected revenue growth of 25 percent, our

Exhibit 2.10 Nokia Corporation Historical and Projected Financial Statements
Forecasting Net Income and Shareholders' Equity

	Historical		Projected*	
	1997	%	1998	
Income statement				
Net sales	52,612	100.0	65,765	(Step 1)
Cost of goods sold	(33,194)	(63.1)	(41,493)	(Step 2)
Gross profit	19,418	36.9	24,273	
Research and development expenses	(3,539)	(6.7)	(4,424)	(Step 2)
Selling, general, and administrative expenses	(4,663)	(8.9)	(5,829)	(Step 2)
Operating income	11,216	21.3	14,020	
Share of results of associated companies	54	0.1	68	(Step 2)
Net financial income	763	1.5	954	(Step 2)
Exchange gains	106	0.2	133	(Step 2)
Profit before interest, taxes, depreciation, and minority interest	12,139	23.1	15,174	
Interest expense	(1,006)	(1.9)	(286)	(Step 5)
Depreciation/amortization expense	(2,762)	(5.3)	(3,320)	(Step 5)
Income tax expense	(2,274)	(4.3)	(3,090)	(Step 5)
Minority interest	(99)	(0.2)	(124)	(Step 5)
Profit from continuing operations	5,998	11.4	8,354	(Step 5)
Discontinued operation	261	0.5	—	(Step 5)
Net profit	6,259	11.9	8,354	(Step 5)
Balance sheet				
Intangible assets (net)	2,061	4.9	2,576	(Step 3)
Property, plant, and equipment (net)	6,240	15.0	7,800	(Step 3)
Investments	789	1.9	986	(Step 3)
Other noncurrent assets	355	0.9	444	(Step 3)
Total noncurrent assets	9,445		11,806	
Inventories	7,314	17.5	9,143	(Step 3)
Accounts receivable (net)	12,732	30.5	15,915	(Step 3)
Short-term investments	9,363	22.4	11,704	(Step 3)
Cash and cash equivalents	2,884	6.9	3,605	(Step 3)
Total current assets	32,293		40,366	
Total assets	41,738	100.0	52,173	

(continued)

projected results reveal a 33 percent increase in Nokia's after-tax income, reflecting the presence of certain economies of scale at these higher volume levels. Nokia's ROE for 1998 is forecasted to increase slightly to 30.1 percent. The ratios indicate a continuing decline in Nokia's use of financial leverage, whereas the ROA is projected to be up slightly at

Exhibit 2.10 Nokia Corporation Historical and Projected Financial Statements
Forecasting Net Income and Shareholders' Equity (*continued*)

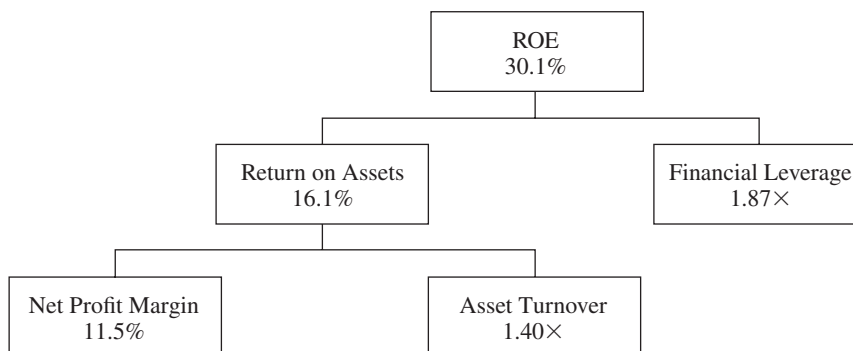
	Historical		Projected*	
	1997	%	1998	
Share capital	1,499		1,499	(Step 4)
Other restricted equity	5,542		5,542	(Step 4)
Treasury shares	(654)		(654)	(Step 4)
Untaxed reserves	1,279		1,279	(Step 4)
Retained earnings	13,858		21,151	(Step 6)
Total shareholders' equity	21,524		28,817	(Step 6)
Minority interests	195		195	(Step 4)
Long-term debt	1,348		1,348	(Step 4)
Other long-term liabilities	295		295	(Step 4)
Total long-term liabilities	1,643		1,643	(Step 4)
Short-term borrowing	3,008		2,515	(Step 6)
Current portion of long-term debt	285		285	(Step 4)
Accounts payable and accrued expenses	14,541	34.8	18,176	(Step 4)
Advance payments	542		542	(Step 4)
Total current liabilities	18,376		21,518	(Step 6)
Total liabilities	20,019		23,161	(Step 6)
Total equities	41,738		52,173	(Step 4)

Values are in millions of Finnish markka.

Shaded areas are forecasted figures for the pro formas.

*All values are rounded to the nearest whole number.

16.1 percent because of a modest increase in the net profit margin to 11.5 percent. The total asset turnover remains constant as a consequence of our assumptions at step 3.



Having completed the preparation of Nokia's 1998 pro forma income statement and balance sheet, it is now possible for a pro forma SCF to

**Exhibit 2.11 Nokia Corporation 1998 Pro Forma
Statement of Cash Flows**

Operating activities	
Net profit	8,354
Depreciation/amortization	3,320
Equity income	(68)
Accounts receivables	(3,183)
Inventories	(1,829)
Accounts payable and accrued expenses	<u>3,635</u>
Cash flow from operations	10,230
Investing activities	
Investments	(130)
Property, plant, and equipment (net)	(4,880)
Intangible assets (net)	(515)
Short-term investments	(2,341)
Other noncurrent assets	<u>(89)</u>
Cash flow from investing	(7,955)
Financing activities	
Short-term borrowing	(493)
Dividends	<u>(1,061)</u>
Cash flow from financing	(1,554)
Change in cash and cash equivalents	721

Values are in millions of Finnish markka.

be prepared. Some analysts prefer to actually project a company's SCF; we believe that it is preferable to develop the statement from existing pro forma income statement and balance sheet data. The latter approach eliminates the need for separately forecasting the effects of exchange rate movements and acquisitions/divestitures. Exhibit 2.11 presents Nokia's 1998 pro forma SCF and reveals that

- Pro forma 1998 CFFO should total approximately 10.230 billion FIM, providing discretionary cash flows of 4.289 billion FIM:

CFFO		10.230 billion
Less	Dividend payments	(1.061)
	Debt retirements	—
	Capital expenditures	<u>(4.880)</u>
Discretionary cash flow		4.289 billion

- Pro forma CFFI is expected to be a negative 7.955 billion FIM, and pro forma CFFF is projected to be a negative 1.554 billion

FIM, largely because of the assumption of continued dividend payments.

Although Exhibit 2.11 presents the CFFO and CFFI separately, some analysts combine the two cash flow categories for the purposes of preparing the pro forma SCF. Two arguments are usually cited for not distinguishing between operating and investing cash flows. First, the distinction between the CFFO and CFFI is not always informative. For example, the fixed asset investments needed for maintaining a company's existing productive capacity are arguably an operating cash flow. Second, there may not be sufficient information for a clear distinction to be made between the two values in the pro forma SCF. For example, in the development of pro forma data, we often do not estimate the depreciation or amortization expense. Consequently, these values are often unavailable for adjusting either the CFFO or the CFFI.¹⁵ Hence, the analyst has two reasonable alternatives: (1) Combine the CFFO with the CFFI and not worry about projecting these noncash items, or (2) project the noncash items when individual values for the CFFO and CFFI are desired. The latter alternative was followed in the Nokia illustration.

As we will see in Chapter 3, separately forecasting the CFFO and CFFI makes the calculation of free cash flows a relatively straightforward exercise and hence is the option we prefer.

Sensitivity Analysis: Alternative Scenarios

Nokia's 1998 pro forma results presented in Exhibit 2.10 reflect a set of assumptions about a series of events that have yet to occur. Given that an analyst cannot know with certainty what the future will hold, it is often instructive for him or her to develop a series of alternative pro forma scenarios. For example, for the purposes of Exhibit 2.10, we used the BT Alex.Brown forecast of net operating revenues of 25 percent. If this estimate proves incorrect, our projected 1998 value for Nokia also will be incorrect. As a consequence, most valuation analysts try to build a range of *probable* values for an acquisition target based on a series of pro forma scenarios. For example, we might want to recalculate our pro forma analysis using a forecast of operating revenues that is somewhat lower and higher than 25 percent, perhaps 13 percent for a lower boundary (Standard & Poor's forecast) and 34 percent for a higher boundary (the growth achieved between 1996 and 1997). Rerunning the spread-

sheet program enables the valuation analyst to assess the effect of these alternative rates of sales growth:

Rate of Growth in Sales	Pro Forma Sales	Pro Forma Net Income
13%	59,452	7,597
20%	63,134	8,038
25%	65,765	8,354
30%	68,396	8,669
34%	70,500	8,921

Thus, we can see that for each 1 percent change in the rate of sales growth, there is an approximate 526 million FIM change in sales and 63 million FIM change in net income.

It is also instructive to revisit some of the other key assumptions inherent in our original pro forma analysis to assess the sensitivity of the company's valuation to alternative assumptions. For example, our equation for the estimation of Nokia's interest expense for 1998 was premised on the assumption that short- and long-term interest rates from 1997 would persist through 1998. The valuation analyst might reestimate the company's pro forma results assuming an interest rate increase of, say, fifty basis points (i.e., one-half of 1 percent), and for a similar decrease. Rerunning the spreadsheet analysis reveals that there is an approximate 11 million FIM decline in net income for each fifty-basis-point increase in the short-term interest rate, and only a 6 million FIM decline in net income for a similar increase in the long-term rate.

Rerunning the pro forma analysis for multiple values of the various key assumptions can be time-consuming. As a consequence, some analysts prepare only three separate scenarios involving the key assumptions: a "most likely" scenario, an "optimistic" scenario, and a "pessimistic" scenario. This strategy is certainly less time intensive in that it requires only three iterations of the forecast model; however, it is not always costless, in that the dynamic interaction of the key assumptions cannot be rigorously explored. For this reason, analysts are increasingly turning to Monte Carlo simulation analysis to fully explore the effect of the key pro forma assumptions. Let's illustrate how we can simulate our forecast with @Risk, a widely used simulation package.

The key assumptions of our model are the sales growth and the short-term and long-term interest rates. In our sensitivity analysis, we chose 13 percent as a lower boundary and 34 percent as an upper boundary for

the growth rate, and we assumed that interest rates could increase (or decrease) by fifty basis points. We might want to investigate how net sales and net profits change when the sales growth rate varies between 13 and 34 percent and, simultaneously, the short-term and long-term interest rates increase or decrease by fifty basis points.

Before simulating, the distributions of the sales growth rate and the short-term and long-term interest rates must be defined. For sales growth, we choose a triangular distribution, with a minimum of 13 percent, a most likely value of 25 percent, and a maximum of 34 percent. For the short-term interest rate, we use a uniform distribution, with a minimum of 6.7 percent and a maximum of 7.7 percent. Similarly, for the long-term interest rate, we choose a uniform distribution, with a minimum of 6 percent and a maximum of 7 percent.¹⁶ The results of the Monte Carlo simulation reveal that

- Nokia's net sales varies between 59,570 and 70,441 million FIM, whereas net profits vary between 7,608 and 8,915 million FIM.
- The tornado graph¹⁷ (not presented) indicates that the effect of the growth in sales on forecasted sales and profit is high, as the correlation is close to 1. On the other hand, the effect of short-term and long-term interest rates on forecasted sales and profit is low. It is positive for sales, whereas it is negative for profit (an increase in interest rates leads to a decrease in profit).

Although reviewing the sensitivity of assumptions inherent in a pro forma analysis can be tedious, it provides the valuation analyst with critical insight regarding the relative importance of each of his or her assumptions. The exercise also enables the analyst to build a range of pro forma values that will have the highest likelihood of occurring and, in so doing, will provide the highest probability of the analyst avoiding the winner's curse.

Summary

In this chapter we considered the related processes of financial review and pro forma analysis. Financial review refers to the process of analyzing, evaluating, and describing the financial history of a target and is an integral part of the due diligence investigation that should precede any acquisition. Financial review also provides essential inputs for the prepa-

ration of pro forma financial statements that are necessary for firm value to be assessed. Although much is made about selecting an appropriate valuation multiple or discount rate, *nothing* is more important in assessing firm value than a complete and accurate modeling of a target's operations.

In Chapter 3, we link the construction of pro forma financial statements to our ultimate goal of assessing firm value.

Notes

1. See Varaiya and Ferris (1989). The winner's curse has also been referred to as the "performance extrapolation hypothesis," which suggests that bidders overextrapolate past performance when assessing the value of a potential acquiree.

2. Discretionary cash flows (DCF) are defined as follows:

$$\begin{aligned} \text{DCF} = & \text{CFFO} - \text{Dividend Payments} - \text{Debt Retirement} \\ & - \text{Capital Expenditures to Replace Used-Up Capacity} \end{aligned}$$

In essence, a company's DCF is that amount remaining from the cash flow from operations (CFFO) after all required cash outflows are deducted. It represents the surplus cash flow that management has at its disposal to undertake some discretionary act — retire debt early, retire stock, acquire another company — without relying on incremental external funding. We differentiate between a firm's discretionary cash flows and its free cash flow, which will be defined in Chapter 3.

3. Preferred stock dividend distributions are not tax deductible in most countries. In those countries (e.g. Germany) in which preferred stock dividends (PD) are tax deductible, a tax adjustment of 1 minus the effective tax rate (tx) must be incorporated into the calculation of ROE as follows:

$$\text{ROE} = \frac{\text{Net Income After Taxes} - \text{PD}(1 - tx)}{\text{Average Common Shareholders' Equity}}$$

4. For convenience, we assume from this point forward that our sample firm has only common stock outstanding, and hence preferred stock dividends are ignored.

5. Some analysts question the internal consistency of ROA as a measure of profitability. Their concern stems from the fact that the traditional accounting income statement deducts an opportunity cost for debt capital (i.e., "interest expense") but makes no similar deduction for the opportunity cost of equity capital. These analysts believe that a more consistent measure of firm profitability is given by unlevered ROA, or UROA:

$$\text{UROA} = \frac{\text{Net Income After Taxes} + \text{Interest Expense}(1 - tx)}{\text{Average Total Assets}}$$

where tx is effective tax rate.

UROA is a measure of firm profitability before interest charges. The adjustment for taxes is designed to recognize the tax benefit resulting from the interest expense deduction. Another refinement some analysts use is to replace average total assets with the sum of shareholders' equity and interest-bearing debt — that is, to eliminate those assets obtained through non-interest-bearing debt. This refinement creates a measure called return on net assets (RONA):

$$\text{RONA} = \frac{\text{Net Income After Taxes} + \text{Interest Expense} (1 - tx)}{\text{Shareholders' Equity} + \text{Debt}}$$

6. It is not true, however, that a high rate of payable turnover is always preferred to a lower rate.

7. A close variant of the quick ratio is the current ratio, measured as current assets divided by current liabilities. The quick ratio is generally preferred to the current ratio because the current ratio includes all current assets, some of which (e.g., inventory and prepaid expenses) are not always liquid.

8. For most acquirers, the preparation of pro forma financial statements is executed in two phases: Phase one involves the preparation of a “base case” forecast of a target, ignoring any cost reductions, synergies, or revenue enhancements that are likely to result as a consequence of the merger. This benchmark forecast is usually a simple extrapolation of recent operating results, on an “as is” basis. Phase two involves the preparation of pro formas for any value-enhancing consequences related to cost reductions, synergies, and/or revenue enhancements that the acquirer hopes to realize after the successful acquisition and integration of the target. Total firm value is then the aggregate of the two separate forecasts.

9. HOLT Value Associates, Inc., a valuation consulting company, prepares forecasts of up to forty years for potential acquisitions. The company has achieved considerable success using a mean-reversion model for its forecast periods beyond ten years.

10. Forecasting the balance sheet is usually more challenging than the income statement because it rarely balances. For instance, forecasted total assets exceeding the sum of forecasted total liabilities and shareholders' equity indicates a need for additional financing for covering a forecasted growth in assets. The easiest way for coping with this imbalance is to create a “line-of-credit” account — in essence, a plug figure. If the line-of-credit account requires a positive (credit) balance for balancing the balance sheet, it implies that the company needed additional financing; on the other hand, if the line-of-credit account requires a negative (debit) balance, the company will presumably produce excess liquid funds that can be used to pay off other interest-bearing debt. In either case, it will be necessary for the analyst to include the line-of-credit account in calculating interest charges in step 5 of the pro forma development process to ensure a correct forecast of interest charges.

11. Standard & Poor's, Industry Surveys: Communications Equipment, 16 October 1997.

12. BT Alex.Brown, "The Information Age Goes Wireless," 18 September 1997.

13. Nokia's long-term debt of 1,633 is the sum of the company's "current position of long-term debt" (285) and "long-term debt" (1,348).

14. As a reality check for our pro forma financial statements, Nokia reported the following actual results for 1998:

Net sales	79,231
Net profits	10,408
Total assets	59,660
CFFO	10,029

Thus, with the exception of the CFFO, our 1998 forecast was quite conservative.

15. Projecting the depreciation and amortization expense can be easily undertaken although several additional assumptions are required. For example, it is necessary to assume an average remaining life for the asset category, a method of depreciation and amortization (usually straight-line), salvage value (usually zero), and the acquisition date for any additions to the asset category (usually a half-year convention).

16. As we do not know what the distributions for sales growth and short-term and long-term interest rates are, we prefer to use a distribution that does not require strong assumptions, such as the normal distribution. The triangular distribution seems appropriate for sales growth as it assumes that the possible values range between a minimum (13 percent) and a maximum (34 percent), with a high probability for the most likely value (25 percent) to be observed. The uniform distribution seems more appropriate for the short-term and long-term interest rates, as they are allowed to vary between a minimum and a maximum, with equal probability.

17. A tornado graph allows one to study the effect of each input on the output.

Appendix 2A

Nokia Corporation

Financial Data

Consolidated Profit and Loss Account*

	1993	1994	1995	1996	1997
Net sales	23,697	30,177	36,810	39,321	52,612
Cost of goods sold	(16,662)	(20,234)	(24,703)	(27,360)	(33,194)
Gross profit	7,035	9,943	12,107	11,961	19,418
Research and development expense	(1,332)	(1,766)	(1,834)	(2,446)	(3,539)
Selling, general, and administrative expense	(3,242)	(3,572)	(3,436)	(3,013)	(4,663)
Operating profit before interest, tax, and depreciation	2,461	4,605	6,837	6,502	11,216
Share of results of associated companies	28	22	85	37	54
Net financial income	637	514	591	534	763
Exchange gains and losses	(134)	450	(10)	27	106
Profit before interest, tax, depreciation, and minority interests	2,992	5,591	7,503	7,100	12,139
Interest expense	(850)	(580)	(745)	(966)	(1,006)
Depreciation/amortization expense	(996)	(1,009)	(1,825)	(2,236)	(2,762)
Income tax expense	(299)	(932)	(769)	(856)	(2,274)
Minority interests	(80)	(75)	(77)	2	(99)
Profit from continuing operations	767	2,995	4,087	3,044	5,998
Discontinued operations	—	—	(2,340)	219	261
Net profit	767	2,995	1,747	3,263	6,259
Preferred stock dividends	(78)	(388)	(571)	(699)	(774)
Shares (as of 31 December 1997):					
Common	Number	78,687,000			
		Price per share	390 FIM		
Preferred	Number	221,165,000			
		Price per share	387 FIM		
Earnings per share	21.17 FIM				
Dividend per share	7.50 FIM				

*Data were prepared using international accounting standards (IAS) and have been reformatted. Values are for year ended 31 December, in millions of Finnish markka.

Consolidated Balance Sheet*

	1993	1994	1995	1996	1997
Assets					
Intangible assets (net)	590	541	1,581	1,455	2,061
Property, plant, and equipment (net)	4,770	5,097	6,109	5,662	6,240
Investments	2,258	1,976	837	901	789
Other noncurrent assets	376	329	520	391	355
Total noncurrent assets	7,994	7,943	9,047	8,409	9,445
Inventories	5,129	6,803	9,982	6,423	7,314
Accounts receivable (net)	6,227	7,835	9,518	10,898	12,732
Short-term investments	2,201	3,989	2,888	5,886	9,363
Cash and cash equivalents	1,096	1,279	1,326	1,659	2,884
Total current assets	14,653	19,906	23,714	24,866	32,293
Total assets	22,647	27,849	32,761	33,275	41,738
Shareholders' equity					
Share capital [†]	1,378	1,498	1,498	1,498	1,499
Other restricted equity	3,329	5,494	5,455	5,298	5,542
Treasury shares	(348)	(437)	(470)	(657)	(654)
Untaxed reserves	1,717	1,727	1,873	1,516	1,279
Retained earnings	435	4,136	5,450	8,270	13,858
Total shareholders' equity	6,511	12,418	13,806	15,925	21,524
Minority interests	536	555	422	29	195
Liabilities					
Long-term debt	3,397	3,071	2,121	2,117	1,348
Other long-term liabilities	683	486	457	297	295
Total long-term liabilities	4,080	3,557	2,578	2,414	1,643
Short-term borrowing	3,435	2,453	4,332	3,404	3,008
Current portion of long-term debt	139	278	187	555	285
Accounts payable and accrued expenses	5,976	8,086	9,388	10,610	14,541
Advance payments	534	502	396	338	542
Provision for discontinued operations	1,436	—	1,652	—	—
Total current liabilities	11,520	11,319	15,955	14,907	18,376
Total liabilities	15,600	14,876	18,533	17,321	20,019
Total equities	22,647	27,849	32,761	33,275	41,738
[†] Includes preferred share capital	556	777	951	999	1,106

*Prepared using international accounting standards (IAS). Values are for year ended 31 December, in millions of Finnish markka.

Appendix 2B

Preparation of Statement of Cash Flows

The demand for cash flow data has become so prevalent that most countries now require a statement of cash flows (SCF). Some countries, however, require the presentation of an SCF only for publicly traded companies (i.e., Argentina, Denmark, and Japan) or for large companies (Finland, Hong Kong, Ireland, Norway, Singapore, Sweden, and the U.K.), and the list of countries *not* requiring an SCF (i.e., Belgium, France, Germany, India, Italy, Luxembourg, The Netherlands, and Switzerland) is dwindling. Nonetheless, the valuation analyst must be prepared to develop an SCF from available financial data either when an SCF is not presented or when a statement of fund flows (SFF) is presented instead. In this appendix, a methodology for coping with these situations is presented.

Cash Flow Fundamentals

To prepare an SCF, the analyst needs the following data: (1) an income statement for the current period, and (2) the balance sheets as of the beginning and the end of the accounting period. With only these three financial statements, the analyst can prepare an approximate SCF using the four-step process outlined below. A more complete SCF is possible where detailed data are given in the footnotes to the financial statements.

To begin, recall that the fundamental accounting equation for the balance sheet is given as

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

$$A = L + OE$$

Substituting the major components of a company's assets, liabilities, and shareholders' equity into this equation yields the following:

$$CA + NCA = CL + NCL + CS + RE$$

where CA is current assets, NCA is noncurrent assets, CL is current liabilities, NCL is noncurrent liabilities, CS is capital stock, and RE is retained earnings.

Decomposing the current asset category into cash (C) and all other current assets (OCA) yields yet another version of the fundamental accounting equation:

$$C + OCA + NCA = CL + NCL + CS + RE \quad (2B.1)$$

At this juncture, it is helpful to recognize that an SCF is nothing more than a formal explanation of the positive and negative changes to a company's cash account. The SCF merely lists where a company's cash inflows came from and how the various cash amounts were used. Having access to a company's internal accounting records would make the preparation of an SCF a simple exercise; it would involve merely listing the various inflows and outflows to the company's cash account. Such access is rarely available, however, and thus a methodology is needed so that the analyst can estimate this data from available financial information.

Because an SCF is merely a listing of the various changes in a company's cash account, it can be expressed in its simplest form by the following equation:

$$\text{Cash}_E - \text{Cash}_B = \Delta \text{Cash} \quad (2B.2)$$

where B is the beginning of the accounting period, E is the end of the accounting period, and Δ is change.

Using a few basic algebraic concepts, it is possible to redefine Equation 2B.2 in terms of Equation 2B.1. Putting the subscripts B and E on the elements of Equation 2B.1 yields

$$C_B + OCA_B + NCA_B = CL_B + NCL_B + CS_B + RE_B$$

and

$$C_E + OCA_E + NCA_E = CL_E + NCL_E + CS_E + RE_E$$

Isolating C_B and C_E on the left-hand side of these two equations yields

$$C_E = CL_E + NCL_E + CS_E + RE_E - (OCA_E + NCA_E)$$

and

$$C_B = CL_B + NCL_B + CS_B + RE_B - (OCA_B + NCA_B)$$

Subtracting the second from the first equation above yields

$$C_E - C_B = (CL_E - CL_B) + (NCL_E - NCL_B) + (CS_E - CS_B) + (RE_E - RE_B) - (OCA_E - OCA_B) - (NCA_E - NCA_B) \quad (2B.3)$$

Equation 2B.3 is a more explicit, formalized version of Equation 2B.2, and thus both are representations of the SCF. More importantly, Equation 2B.3 provides a very simple approach to the preparation of an SCF: In words, it tells us that an SCF can be prepared by merely listing the changes in all of the balance sheet accounts.

From this observation, we can now formulate a four-step procedure for creation of a basic but instructive SCF:

1. Identify the change in the cash and cash equivalents account.* This figure represents the “bottom line” of the SCF: All increases and decreases in cash *must* net to this figure. It is a check figure for verifying the accuracy of the cash flow analysis.
2. Calculate the change in all balance sheet accounts by subtracting the beginning balance *from* the ending balance.
3. Identify each balance sheet account with the activity most closely related to it: operations (O), investing (I), or financing (F). As a general rule, the following associations are usually made, although exceptions will exist:

Operations: RE, OCA, CL

Investing: NCA

Financing: NCL, CS

4. Place each of the individual balance sheet accounts (except cash) under one of three activity categories and identify whether the change in the account balance involved a cash inflow or outflow. (Recall that the total sources and uses of cash must aggregate to the check figure identified in step 1.)

An Illustration

To illustrate the four-step process for building an SCF, we consider the financial statements of Worldwide Enterprises, Inc. (WWE), presented in Exhibits 2B.1 and 2B.2. Exhibit 2B.1 presents WWE’s comparative balance sheets for 1999 and 2000, and Exhibit 2B.2 presents WWE’s income statement for 2000.

1. The check figure for WWE’s SCF is a decrease of 45.6 million (i.e., $34.5 - 80.1$). Thus, WWE’s cash outflows must have exceeded its inflows by 45.6 million.
2. Calculate the change in all balance sheet accounts by subtracting the beginning (1999) balance from the ending (2000) balance; these values are presented in Exhibit 2B.1 under the column headed by the Δ .
3. Identify the activity category associated with each individual balance sheet account (this is done in the far right column of Exhibit 2B.1). It is important to note that judgment calls are necessary at this step. For example, even though most current liabilities, such as accounts payable

*Cash equivalents are short-term (i.e., three months or less), risk-free (i.e., local government-issued) securities.

**Exhibit 2B.1 Worldwide Enterprises, Inc., Comparative
Balance Sheets (in millions)**

	As of 31 December		Δ	Activity Category*
	2000	1999		
Assets				
Cash and cash equivalents	34.5	80.1	(45.6)	
Marketable securities	100.8	0.9	99.9	I
Receivables	299.7	240.3	59.4	O
Inventories	286.2	765.9	(479.7)	O
Total current assets	721.2	1,087.2		
Investments	1,549.5	1,872.3	(322.8)	I
Property and equipment (net)	582.6	571.2	11.4	I
Goodwill (net)	17.7	18.0	(0.3)	I
Other assets	204.3	501.9	(297.6)	I
Total assets	3,075.3	4,050.6		
Liabilities and shareholders' equity				
Notes payable and current long-term debt	162.6	435.3	(272.7)	F
Other current liabilities	457.5	828.3	(370.8)	O
Total current liabilities	620.1	1,263.6		
Long-term debt	1,090.2	1,752.6	(662.4)	F
Deferred income taxes	148.8	107.1	41.7	O
Other debt	24.6	27.3	(2.7)	F
Total noncurrent liabilities	1,263.6	1,887.0		
Shareholders' capital	883.8	862.2	21.6	F
Retained earnings	307.8	37.8	270.0	O
Total shareholders' equity	1,191.6	900.0		
Total equities	3,075.3	4,050.6		

*O is operations; I, investing; and F, financing.

**Exhibit 2B.2 Worldwide Enterprises, Inc.,
2000 Income Statement (in millions)**

Net revenues	1,737.9
Less operating expenses*	(1,341.9)
Income from continuing operations	396.0
Equity in loss of unconsolidated subsidiary	(75.0)
Net income	321.0
Less dividends paid	(51.0)
Transferred to retained earnings	270.0

*Includes depreciation expense of 30.

Exhibit 2B.3 Worldwide Enterprises, Inc., Preliminary Statement of Cash Flows (in millions)*

Operating activities	
Retained earnings	270.0
Receivables	(59.4)
Inventories	479.7
Other current liabilities	(370.8)
Deferred income taxes	41.7
Cash flow from operations	<u>361.2</u>
Investing activities	
Marketable securities	(99.9)
Investments	322.8
Property and equipment (net)	(11.4)
Goodwill	0.3
Other assets	<u>297.6</u>
Cash flow from investing	<u>509.4</u>
Financing activities	
Notes payable and current long-term debt	(272.7)
Long-term debt	(662.4)
Other debt	(2.7)
Contributed capital	<u>21.6</u>
Cash flow for financing	<u>(916.2)</u>
Change in cash and cash equivalents	(45.6)

*Figures in parentheses denote a cash outflow.

and accrued liabilities payable, are typically associated with a company's operations, some current liabilities (e.g., the current portion of long-term debt) are more correctly considered to be related to financing. Similarly, marketable securities, a current asset, may be considered related to operations in some company settings but related to investing in others. Without specific knowledge of the transactions that gave rise to a particular account, it is difficult to be certain of an account's proper classification. A misclassification of an account will not lead to an unbalanced SCF but merely a misspecification of the relative totals of the three activity categories.

- Exhibit 2B.3 contains the preliminary SCF, derived from changes in the balance sheet accounts organized under the three activity categories. Remember that an increase (decrease) of an asset is a use (source) of cash, whereas an increase (decrease) of a liability is a source (use) of cash. Note that the total of the three activity categories equals the change in the cash account (i.e., a decrease of 45.6 million), and this ensures that the analysis was performed correctly.

We can conclude from the preliminary SCF in Exhibit 2B.3 that WWE generated cash flows from operations (CFFO) of 361.2 million and cash flows from investing (CFFI) of 509.4 million, while spending 916.2 million on financing activities (principally the retirement of debt). For many financial analyses, the preliminary SCF will be sufficient; however, in other circumstances, a more exacting estimate of a company's SCF is desirable and can be prepared using other available information. In the preparation of Exhibit 2B.3, only WWE's balance sheet data were used, and this SCF can be refined by incorporating the income statement data from Exhibit 2B.2. For example, Exhibit 2B.2 reveals that WWE's 2000 net income was 321.0 million and dividends paid amounted to 51.0 million. Note that these two amounts net to the change in the retained earnings account on the balance sheet (i.e., $321.0 - 51.0 = 270.0$). Thus, by substituting these two new figures for the retained earnings figure in our initial SCF in Exhibit 2B.3, we are able to produce a refined measure of the company's cash flows. The restated figures are as follows:

	Original	Adjustment	Revised
Operations	361.2	-270.0 in retained earnings +321.0 2000 net income	412.2
Investing	509.4		509.4
Financing	(916.2)	-51.0 2000 dividend payments	(967.2)
Change in cash	(45.6)	0	(45.6)

Observe that the inclusion of the additional income statement data did not change the check figure — a decrease in cash of 45.6 — but did result in a restatement of the CFFO and the cash flows from financing (CFFF). Our restated figures suggest that the CFFO was actually 412.2 million, as opposed to 361.2 million, and the CFFF was a negative 967.2 million instead of a negative 916.2 million. This refinement did not change the CFFI.

Another common refinement that the analyst should undertake involves depreciation and amortization. It is well known that depreciation is an accrual accounting concept in which the original cost for acquiring a depreciable asset is allocated over the many periods that one is expected to benefit from the asset. Thus, depreciation expense is the portion of an asset's cost allocated to a given accounting period; it represents neither a current cash inflow nor a current cash outflow but merely an allocation of a cash expenditure made in a prior period.

Since depreciation is one of the largest expense items deducted in arriving at periodic net income, it is usually necessary for the analyst to adjust net income for this item in order to avoid understating the actual cash flow from operations. Exhibits 2B.1 and 2B.2 reveal the change in property and equipment, net of accumulated depreciation, and current depreciation expense, respectively. Using T-accounts to help visualize the events that led to these ending balances, we can assess the cash flow effects of these accounts as follows:

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	Property and Equipment (net)	2000 Depreciation Expense
12/31/99 Balance	571.2	
2000 Purchases	41.4	30.0
12/31/00 Balance	582.6	30.0

Without reference to the current depreciation charge of 30.0 million, our initial conclusion from Exhibit 2B.3 was that 11.4 million was spent for new property and equipment (i.e., an outflow of cash). By including the depreciation expense, we see that the actual cash expended for new capital equipment was 41.4 million, and with these two figures we are able to further refine our preliminary SCF from Exhibit 2B.3:

		Adjustment	Revised
Operations	412.2	+30.0 2000 depreciation expense	442.2
Investing	509.4	-30.0 additional 2000 purchases	479.4
Financing	<u>(967.2)</u>		<u>(967.2)</u>
Change in cash	(45.6)	0	(45.6)

The inclusion of the depreciation expense does *not* change the bottom-line check figure of 45.6 but does result in a modification of the CFFO and the CFFI. Our restated figures suggest that the CFFO was 442.2 and the CFFI was 479.4. This refinement did not affect the CFFF.

A final modification to our preliminary SCF is possible by incorporating the fact that WWE's 2000 net income of 321.0 million includes 75.0 million representing WWE's "equity in loss of unconsolidated subsidiary." To obtain an accurate estimate of only WWE's CFFO, analysts frequently remove those income or loss items relating to affiliated or associated companies. In this instance, the 75.0 million reduction in WWE's net income should be removed and transferred to the investing activities section as an adjustment to the "investments account." This modification produces the following restated amounts:

		Adjustment	Revised
Operations	442.2	+75.0 equity in subsidiary loss	517.2
Investing	479.4	-75.0 adjustment to "investments"	404.4
Financing	<u>(967.2)</u>		<u>(967.2)</u>
Change in cash	(45.6)	0	(45.6)

Exhibit 2B.4 Worldwide Enterprises, Inc., Statement
of Cash Flows (in millions)

Operating activities	
Net income	426.0 ¹
Receivables	(59.4)
Inventories	479.7
Other current liabilities	(370.8)
Deferred income taxes	41.7
Cash flow from operations	<u>517.2</u>
Investing activities	
Marketable securities	(99.9)
Investments	247.8 ²
Property and equipment (net)	(41.4) ³
Goodwill	0.3
Other assets	<u>297.6</u>
Cash flow from investing	<u>404.4</u>
Financing activities	
Notes payable and current long-term debt	(272.7)
Long-term debt	(662.4)
Other debt	(2.7)
Contributed capital	21.6
Dividends	<u>(51.0)</u>
Cash flow for financing	<u>(967.2)</u>
Change in cash and cash equivalents	(45.6)

¹Net income = 321.0 + 30.0 + 75.0 = 426.0

²Investments = 322.8 - 75.0 = 247.8

³Property and equipment (net) = (11.4) - (30.0) = (41.4)

Incorporating these three modifications into Exhibit 2B.3 provides the final version of WWE's SCF, which is presented in Exhibit 2B.4.

The above three examples involving retained earnings (net income and dividends), property and equipment (depreciation and purchases), and equity in the earnings of a subsidiary readily illustrate the benefit of extending the preliminary SCF when additional data are available. The inclusion of income statement and footnote data enables the analyst to build a relatively accurate estimate of a company's SCF.

Direct versus Indirect Methods. Although no additional information is available for further refinement of WWE's SCF, a final consideration involves the presentation *format* of the operations section of the SCF. Two alternative approaches exist for presenting the CFFO: the **direct method** and the **indirect method**.

Although these two approaches to formatting the operations section of the SCF originated in the United States, they have gained widespread acceptance in

those countries that require the presentation of an SCF as a basic financial statement. Most companies that present an SCF usually prefer the indirect method, which is the format adopted in Exhibit 2B.4; however, most professional analysts prefer to use the direct method because of the additional insights that this format provides regarding a company's operations.

To illustrate how a direct-method version of the CFFO would be constructed, we begin with the major elements of WWE's income statement (see Exhibit 2B.2) and then adjust these elements for the various balance sheet accounts that relate to them. Thus, for example, operating revenues would be adjusted for the change in receivables, and operating expenses for the change in inventory, deferred income taxes, other current liabilities, and, of course, depreciation expense:

	Accrual Income Statement	Adjustment	Direct Method
Net revenues	1,737.9		
	<u>(59.4)</u>	Increase in receivables	
Cash flow from operating revenues			1,678.5
Operating expenses	1,341.9		
	(479.7)	Decrease in inventory	
	370.8	Decrease in other current liabilities	
	(41.7)	Increase in deferred income taxes	
	<u>(30.0)</u>	Depreciation expense	
Cash flow for operating expenses			<u>(1,161.3)</u>
Cash flow from operations			517.2

Note that under either the direct or the indirect method, WWE's CFFO remains the same (i.e., 517.2 million); however, under the direct method, the rearrangement of data allows us to identify two additional cash flow items: cash flow from operating revenues (1,678.5) and cash flow for operating expenses (−1,161.3). These two figures can be quite revealing about a company's internal operations. For example, the relationship of cash operating revenues to accrual operating revenues (i.e., 1,678.5/1,737.9) reveals the rate at which cash is produced for each dollar of sales — in this case, about 96.6 percent. Analysts often use this ratio to assess the quality of a company's revenue recognition policy. In general, the higher the relationship between cash and accrual revenues, the higher the quality of a company's revenue recognition policy. In this case, the relationship is quite strong — it approaches 100 percent — and thus we would conclude that WWE's revenue recognition policies were appropriate and could be relied upon in forecasts of future revenues. When the relation is low (i.e., ap-

proaching 70 percent or less), it often indicates that the company is using an aggressive revenue recognition policy and consequently may be recording accrual sales in advance of the receipt of cash on those sales. When this occurs, it is referred to as **front-end loading** and may indicate that current revenues are an inappropriate basis for forecasting future revenues.

The relationship between cash operating expenses and accrual operating expenses can similarly be used for evaluation of a company's expense recognition policy. For most companies, the relation of its cash to accrual operating expenses (i.e., 1,161.3/1,341.9) will be less than 1, in large measure because of the adjustment for such noncash expenses as depreciation, amortization, and the change in deferred income taxes; however, where this relation is substantially greater than 1, it may be indicative of **rear-end loading**. Rear-end loading occurs when a company incurs significant cash expenditures that are accounted for as assets rather than expenses. In some instances, the capitalization of such expenditures to the balance sheet is justified, whereas in others it may not be. In any case, when the relation of cash operating expenses to accrual operating expenses is large, most professional analysts see a "red flag" requiring further investigation.

The topics of front-end loading and rear-end loading are important due diligence considerations as the valuation analyst reviews the accounting policies an acquisition target uses. We will return to these issues again in Chapter 5.

Converting the SFF

In a number of countries, accepted accounting practice calls for the presentation of a statement of fund flows (SFF) instead of an SCF. This is *not* problematic for the valuation analyst because the SFF frequently contains all of the necessary information for preparation of an SCF. Whereas the SCF presents and reconciles the various changes to a company's cash account, the SFF presents and reconciles the various changes to a company's net working capital (i.e., current assets minus current liabilities) or some similar measure of "funds." The SFF is, thus, just a more broadly defined financial statement; the SCF is more narrowly defined, considering only cash flows. Since the SFF considers a broader definition of "funds flow," a company's cash flows are captured within this broader definition, and the analyst's task is to "tease" the cash flow information from the SFF.

To illustrate the conversion of an SFF to an SCF, we consider the data presented in Exhibit 2B.5. Part A of this exhibit presents the consolidated statement of sources and applications of funds for Pirelli S.p.A., an Italian manufacturer of vehicle tires; Part B presents the same information reorganized into an indirect-method SCF. As always, the preparation of Pirelli's SCF requires that certain assumptions be made (e.g., the "changes in other provisions" relates to operating activities), and the transformation from an SFF to an SCF requires a reinterpretation of the sign of certain account balances (e.g., the decrease in in-

Exhibit 2B.5 Pirelli S.p.A.

A. Consolidated Statement of Sources and Applications of Funds (in millions of lire)

	1993	1992
Sources		
Net loss for the year	(95,839)	(154,008)
Depreciation and amortization	557,099	531,080
Changes in provisions relating to personnel	36,832	(57,190)
Disposal of investments	424,171	292,854
Net book value of fixed assets disposed of	203,728	231,685
Changes in other provisions	<u>(115,840)</u>	<u>(19,570)</u>
Total sources	1,010,151	824,851
Applications		
Increase in property, plant, and equipment	358,964	293,847
Increase in intangible assets	15,602	35,576
Increase in financial assets	—	4,978
Increase (decrease) in inventories	(86,810)	(172,837)
Increase (decrease) in trade and other accounts receivable/payable	142,914	277,240
Other applications (including exchange differences in the year)	<u>38,779</u>	<u>111,437</u>
Total applications	<u>469,449</u>	<u>550,241</u>
	540,702	274,610
Financed by		
Share capital increase	117,369	518,621
Increase (decrease) in short-term financial payables	(366,343)	(366,488)
Increase (decrease) in long-term financial payables	(602,477)	(789,779)
Decrease (increase) in cash and cash equivalents	<u>310,749</u>	<u>363,036</u>
	(540,702)	(274,610)

(continued)

ventories is reported as a negative balance in Part A but a positive balance in Part B). The preparation of Pirelli's SCF requires only a reorganization of existing figures.

Pirelli's SCF in Part B shows several new facts that were disguised by the SFF presentation in Part A:

- Despite net losses in both 1992 and 1993, Pirelli generated a positive CFFO in both years.
- The debt reduction (short- and long-term) observable in both Parts A and B was financed by a combination of cash flow from new share issuances and from operations.
- The proceeds from Pirelli's disposal of investments and fixed assets was largely used to fund new capital investment.

Exhibit 2B.5 Pirelli S.p.A. (continued)

B. Statement of Cash Flows (in millions of lire)	1993	1992
Cash flows from operating activities		
Net loss for the year	(95,839)	(154,008)
Depreciation and amortization	557,099	531,080
Increase (decrease) in inventories	86,810	172,837
Increase (decrease) in trade and other accounts receivable/payable	(142,914)	(277,240)
Changes in provisions relating to personnel	36,832	(57,190)
Changes in other provisions	<u>(115,840)</u>	<u>(19,570)</u>
Cash flow from operations	326,148	195,909
Cash flows from investing activities		
Disposal of investments	424,171	292,854
Net book value of fixed assets disposed of	203,728	231,685
Increase in property, plant, and equipment	(358,964)	(293,847)
Increase in intangible assets	(15,602)	(35,576)
Increase in financial assets	0	(4,978)
Other applications (including exchange differences)	<u>(38,779)</u>	<u>(111,437)</u>
Cash flow from investing	214,554	78,701
Cash flow from financing		
Share capital increase	117,369	518,621
Increase (decrease) in short-term financial payables	(366,343)	(366,488)
Increase (decrease) in long-term financial payables	<u>(602,477)</u>	<u>(789,779)</u>
Cash flow from financing	<u>(851,451)</u>	<u>(637,646)</u>
Decrease (increase) in cash and cash equivalents	(310,749)	(363,036)

- The positive CFFO in 1992 and 1993 resulted largely from the add-back of depreciation and a net decrease in trade and other receivables, and not from the company's basic operations. (Pirelli reported a net loss from operations in both years.)

Summary

The purpose of this appendix has been to present a simple four-step process to help analysts prepare an SCF. A thorough financial analysis would be incomplete without a review of a company's cash flows. Valuation analysts must have the skill to prepare a pro forma SCF from pro forma balance sheet and income statement data as the pro forma cash flow data will be central to any target firm valuation, as we will see in Chapter 3.

Appendix 2C

Displayed Formulas

for EXCEL™

Spreadsheet

A	B	C	D
1 Short-term debt interest rate	0.072		0.072
2 Long-term debt interest rate	0.065		0.065
3 Tax rate	.27		.27
4 Sales growth	.25		.25
5			
6 Income statement	1997	Common-size	Projected 1998
7 Net sales	52,612	= B7/B7	= B7 · (1 + B4)
8 Cost of goods sold	33,194	= B8/B7	= C8 · D7
9 Gross profit	19,418	= B9/B7	= D7 – D8
10 R&D expense	3,539	= B10/B7	= C10 · D7
11 S, G, & A expenses	4,663	= B11/B7	= C11 · D7
12 Operating profit	11,216	= B12/B7	= D9 – D10 – D11
13 Share of results	54	= B13/B7	= C13 · D7
14 Net financial income	763	= B14/B7	= C14 · D7
15 Exchange gains	106	= B15/B7	= C15 · D7
16 EBITDA	12,139	= B16/B7	= D12 + D13 + D14 + D15
17 Interest	1,006	= B17/B7	= B1 · (B50 + D50)/2 + B2 · (B47 + D47)/2
18 Depreciation/amortization	2,762	= B18/B7	= 0.32 · (D28 + D29)
19 Income tax	2,274	= B19/B7	= B3 · (D16 – D17 – D18 – D20)
20 Minority interest	99	= B20/B7	= C20 · D7
21 Profit	5,998	= B21/B7	= D16 – D17 – D18 – D19 – D20
22 Discontinued operations	261	= B22/B7	= 0
23 Net profit	6,259	= B23/B7	= D21
24 Dividends	1,061		= B24
25 Transfer to retained earnings	5,198		= D23 – D24
26			

A	B	C	D
27 Balance Sheet			
28 Intangible assets	2,061	= B28/B38	= C28 · D38
29 PP&E (net)	6,240	= B29/B38	= C29 · D38
30 Investments	789	= B30/B38	= C30 · D38
31 Other noncurrent	355	= B31/B38	= C31 · D38
32 Total noncurrent	9,445	= B32/B38	= SUM(D28:D31)
33 Inventories	7,314	= B33/B38	= C33 · D38
34 Accounts receivable	12,732	= B34/B38	= C34 · D38
35 Short-term investments	9,363	= B35/B38	= C35 · D38
36 Cash and equivalent	2,884	= B36/B38	= C36 · D38
37 Total current	32,293	= B37/B38	= SUM(D33:D36)
38 Total assets	41,738	= B38/B38	= B38 · D7/B7
39			
40 Share capital	1,499		= B40
41 Other capital	5,542		= B41
42 Treasury stock	654		= B42
43 Untaxed reserves	1,279		= B43
44 Retained earnings	13,858		= B44 + D25
45 Total owners' equity	21,524		= D40 + D41 - D42 + D43 + D44
46 Minority interest	195		= B46
47 Long-term debt	1,348		= B47
48 Other long-term debt	295		= B48
49 Total long-term debt	1,643		= D47 + D48
50 Short-term borrowings	3,008		= D56 - D45 - D46 - D49 - D51 - D52 - D53
51 Current maturities	285		= B51
52 Accounts payable	14,541	= B52/B56	= C52 · D38
53 Advance payment	542		= B53
54 Total current	18,376		= SUM(D50:D53)
55 Total debt	20,019		= D49 + D54
56 Total equities	41,738		= D38

R&D is research and development; S, G, & A, selling, general, and administrative; EBITDA, earnings before interest, taxes, depreciation, and amortization; and PP&E, property, plant, and equipment.

Appendix 2D

Account Forecasting Alternatives

Account	Basis for Forecast
• Sales revenue	• Historical trend; third-party forecast; historical trend adjusted for industry outlook and/or inflation rate.
• Cost of goods sold	• Constant percentage of sales revenue (i.e., from common-size income statement); percentage of sales revenue adjusted for expected economies (or dis-economies) of scale; historical growth rate adjusted for inflation.
• Depreciation expense	• Constant (i.e., a fixed cost); gross PP&E divided by average expected life (see footnotes to the financial statements) plus one-half of new capital expenditures for PP&E divided by average expected life (i.e., assuming straight-line depreciation and half-year convention).
• Amortization expense	• Constant (i.e., a fixed cost); gross intangible assets divided by average expected life plus one-half of new intangible asset investment divided by average expected life.
• Selling, general, and administrative expenses	• Constant percentage of sales revenue; percentage of sales revenue adjusted for expected decrease (increase) in spending, as revealed in annual report or other public sources of information; historic growth rate adjusted for inflation.
• Interest expense	• Weighted-average cost of short-term debt times average outstanding balance of short-term debt plus weighted-average cost of long-term debt times average outstanding balance of long-term debt.
• Income tax expense	• Net income before taxes times statutory tax rate (i.e., federal, state, and local); net income before taxes times average effective tax rate as revealed in annual report or other public sources.

Account	Basis for Forecast
• Dividends	• Constant; constant dividend payout ratio; historical dividend payout ratio adjusted for expected stock sales and repurchases; historical growth rate.
• Cash	• Constant percentage of total assets; historical growth rate.
• Trade receivables	• Constant percentage of total assets; historical receivable turnover or historical growth rate (if forecasted individually).
• Inventory	• Constant percentage of total assets; historical inventory turnover.
• Prepaid and other current assets	• Constant percentage of total assets.
• Investments	• Constant; constant percentage of total assets; constant adjusted for any publicly disclosed future acquisitions or divestitures.
• Property, plant, and equipment	• Constant; constant percentage of total assets; constant PP&E turnover ratio; constant adjusted for any publicly disclosed capital expenditures or divestitures.
• Intangible assets	• Constant; constant percentage of total assets.
• Total assets	• Constant total asset turnover; constant adjusted for publicly disclosed expenditures (divestitures) of specific assets; historic growth rate.
• Trade payables	• Constant percentage of total assets; historic payable turnover.
• Short-term debt	• Constant percentage of total assets; a plug for balancing forecasted balance sheet.
• Current maturities of long-term debt	• Constant; constant adjusted for repayment schedule if revealed in footnotes to the financial statements.
• Accrued expenses payable	• Constant; constant percentage of total assets or total current assets.
• Long-term debt	• Constant; constant adjusted for change in current maturities; a plug for balancing forecasted balance sheet (when short-term debt is not plug).
• Contributed capital	• Constant; constant adjusted for publicly disclosed stock placements; historic growth rate.
• Retained earnings (ending)	• Beginning balance plus forecasted earnings less forecasted dividends.
• Treasury stock	• Constant; constant adjusted for publicly disclosed stock buybacks.
• Adjustments to equity	• Constant; constant adjusted for publicly available information on foreign exchange movements.

PP&E is property, plant, and equipment.