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Healthcare Finance: An Introduction to Accounting and Financial Management, Fourth Edition
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Chapter 5: Managerial Accounting Basics, Cost Behavior, and Profit Analysis

Learning Objectives

After studying this chapter, readers will be able to:

- Explain the differences between financial and managerial accounting.
- Describe how costs are classified according to their relationship with volume.
- Conduct profit analyses to analyze the impact of input value changes on both profitability and breakeven points.
- Explain the primary differences in profit analyses that arise when comparing fee-for-service reimbursement with capitation.

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Introduction

Managers of healthcare businesses have many responsibilities. Some of the more important ones are planning and budgeting, establishing policies that control the operations of the organization, and overseeing the day-to-day activities of subordinates. All of these activities require information—to be honest, a great deal of information. Furthermore, this information has to be presented in a format that facilitates analysis, interpretation, and decision making. This is where managerial accounting steps to the fore. Without a timely and effective managerial accounting system, healthcare managers would be left to wander in the dark rather than make decisions on the basis of good information. Of course, accurate information does not ensure good decision making, but without it the chances of making good decisions are almost nil.

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The Basics of Managerial Accounting

Whereas financial accounting focuses on organizational-level data for presentation in a business's financial statements, *managerial accounting* focuses mostly on subunit—say, department data used internally for managerial decision making.[1] For example, managerial accounting information is used for routine budgeting processes, allocation of managerial bonuses, and pricing decisions, all of which deal with subunits of an organization. Also, managerial accounting data can be compiled for special projects such as assessing alternative modes of delivery or projecting the profitability of a particular reimbursement contract. In short, the focus of managerial accounting is to develop information to meet the needs of managers within the organization, rather than interested parties (mainly investors) outside the organization. Thus, while financial accounting information is driven primarily by the needs of outsiders, managerial accounting information is driven by the needs of managers.

Managers are more concerned with what will happen in the future than with what has happened in the past. Unlike financial accounting, managerial accounting is for the most part forward-looking. Because the past is known, while most of the future is unknown, managerial accounting information tends to be much less certain than financial accounting data. As managers embark on budgeting and pricing decisions, they often must make many assumptions regarding factors such as utilization (volume), reimbursement, and costs. This requirement for assumptions about the future, combined with the fact that there are no generally agreed-upon rules for developing managerial accounting data, makes it much more flexible than financial accounting data.

In general, financial accounting can be thought of as reporting work, while managerial accounting is best described as decision work. We do not mean to imply that there is little value in financial accounting data. Indeed, as you will see in Chapter 17, financial statements are key to understanding a business's overall financial condition. Still, the managerial decisions that are made on a daily basis that create this condition are influenced much more by managerial accounting data, which focus on individual activities, than by financial accounting data, which focus on the entire business.

A critical part of managerial accounting is the measurement of costs. In fact, the concept of costs is so important that it has spawned its own field of accounting—cost accounting. *Cost accounting* generally is considered to be a subset of managerial accounting, although cost accounting systems also are used to develop the expense data reported on a business's income statement. Therefore, cost accounting bridges both managerial and financial accounting.

Unfortunately, there is no single definition of the term *cost*. Rather, there are different costs for different purposes. As a general rule for healthcare providers, a cost involves a resource use associated with providing or supporting a specific service. However, the cost-per-service identified for pricing purposes can differ from the cost-per-service used for management control purposes. Also, the cost-per-service used for long-range planning purposes may differ from the cost-per-service defined for short-term purposes. Finally, as we discussed in Chapters 3 and 4, costs do not necessarily reflect actual cash outflows.

Costs are classified in two primary ways: by their relationship to the volume (amount) of services provided and by their relationship to the unit (i.e., department) being analyzed. In this chapter, we focus on the first classification method—the relationship of costs to volume. Our discussion of the latter classification method will be deferred until the next chapter.

Self-Test Questions

1. What are the primary differences between financial and managerial accounting?
2. What is meant by the term *cost?*
3. What are the two primary ways that costs can be classified?

---

[1]The term *management accounting* is sometimes used in place of managerial accounting. Although some accountants differentiate between managerial and management accounting, the differences are small and beyond the scope of this book. Thus, for purposes here, managerial accounting and management accounting are the same.

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Cost Classifications: Fixed and Variable

We can define (classify) several types of costs on the basis of their relationship to the amount of services provided, often referred to as *activity, utilization,* or *volume.* However, such cost classifications require the specification of a likely range of volumes. In dealing with the future, there is always volume uncertainty—the number of patient days, number of visits, number of enrollees, number of laboratory tests, and so on. However, managers often have some idea of the potential range of volume over some future time period. For example, the business manager of Northside Clinic, a small walk-in clinic, might estimate that the number of visits next year could range from 12,000 to 14,000 or from about 34 to 40 per day. If there is little likelihood that utilization will fall outside of these bounds, then the range of 12,000 to 14,000 annual visits defines the clinic's *relevant range.* Note that the relevant range pertains to a particular time period—in this case, next year. For other time periods, the relevant range might differ from its estimate for the coming year.

Fixed Costs

Some costs, called *fixed costs,* are more or less known with certainty, regardless of the level of volume **within the relevant range.** For example, Northside Clinic has a labor force of well-trained permanent employees that would be increased or decreased only under unusual circumstances. Thus, as long as volume falls within the relevant range of 12,000 to 14,000 visits, labor costs at the clinic are fixed for the coming year, regardless of the number of patient visits. Other examples of fixed costs include expenditures on facilities, diagnostic equipment, information systems, and the like. After an organization has acquired these assets, it typically is locked into them for some period of time, regardless of volume. Of course, no costs are fixed over the long run. At some point of increasing volume, healthcare businesses must incur additional fixed costs for new property and equipment, additional staffing, and so on. Likewise, if volume decreases by a substantial amount, an organization likely would reduce fixed costs by shedding part of its fixed assets and labor base.

Variable Costs

Whereas some costs are fixed regardless of volume (within the relevant range), other resources are more or less consumed as volume dictates. Costs that are directly related to volume are called *variable costs.* For example, the costs of the clinical supplies (e.g., rubber gloves, tongue depressors, hypodermics, and so on) used by Northside would be classified as variable costs. Also, some of the diagnostic equipment used in the clinic may be leased on a per procedure basis, which would convert the cost of the equipment from a fixed cost to a variable cost. Finally, some health services organizations pay their employees on the basis of the amount of work performed, which would convert labor costs from fixed to variable.

Self-Test Questions

1. Define relevant range.
2. Explain the features and provide examples of fixed and variable costs.
3. How does time period affect the definition of fixed costs?

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Cost Behavior

Health services managers are vitally interested in how costs are affected by changes in the organization's activity (volume). The relationship between cost and volume, called *cost behavior* or *underlying cost structure,* is used by managers in planning, control, and decision making. The primary reason for defining an organization's underlying cost structure is to provide healthcare managers with a tool for forecasting costs (and ultimately profits) at different volume levels.

To illustrate the concept of cost behavior, consider the hypothetical cost data presented in Table 5.1 for a hospital's clinical laboratory. The underlying cost structure consists of both fixed and variable costs—that is, some of the costs are expected to be volume sensitive and some are not. This structure of both fixed and variable costs is typical in healthcare businesses as well as most other businesses. To begin our discussion of cost behavior, we **unrealistically** assume that the relevant range is from zero to 20,000 tests.

Table 5-1: Cost Behavior Illustration: Fixed and Variable Costs
Open table as spreadsheet

Variable Cost per Test			Fixed Costs per Year	
Laboratory supplies	$10		Labor	$100,000
			Other fixed costs	50,000
				$150,000
Volume	**Fixed Costs**	**Total Variable Costs**	**Total Costs**	**Average Cost per Test**
0	$150,000	$ 0	$150,000	—
1	150,000	10	150,010	$150,010.00
50	150,000	500	150,500	3,010.00
100	150,000	1,000	151,000	1,510.00
500	150,000	5,000	155,000	310.00
1,000	150,000	10,000	160,000	160.00
5,000	150,000	50,000	200,000	40.00
10,000	150,000	100,000	250,000	25.00
15,000	150,000	150,000	300,000	20.00
20,000	150,000	200,000	350,000	17.50

As noted in Table 5.1, the laboratory has $150,000 in fixed costs that consist primarily of labor, facilities, and equipment costs. These costs will occur even if the laboratory does not perform one test, assuming it is kept open. In addition to the fixed costs, each test, on average, requires $10 in laboratory supplies such as glass slides and reagents. The per unit (per test in this example) variable cost of $10 is defined as the *variable cost rate.* If laboratory volume doubles—for example, from 500 to 1,000 tests— *total variable costs* double from $5,000 to $10,000. However, the variable cost rate of $10 per test remains the same whether the test is the first, the hundredth, or the thousandth. Total variable costs, therefore, increase or decrease proportionately as volume changes, but the variable cost rate remains constant.

Fixed costs, in contrast to total variable costs, remain unchanged as the volume varies. When volume doubles from 500 to 1,000 tests, fixed costs remain at $150,000. Because all costs in this example are either fixed or variable, *total costs* are merely the sum of the two. (In the next section, we introduce the concept of semi-fixed costs.) For example, at 5,000 tests, total costs are Fixed costs + Total variable costs = $150,000 + (5,000 × $10) = $150,000 + $50,000 = $200,000. Because variable costs are tied to volume, total variable costs, and hence total costs, increase as the volume increases, even though fixed costs remain constant.

The rightmost column in Table 5.1 contains *average cost* per unit of volume, which in this example is average cost per test. It is calculated by dividing total costs by volume. For example, at 5,000 tests, with total costs of $200,000, the average cost per test is $200,000 / 5,000 = $40. Because fixed costs are spread over more tests as volume increases, the average cost per test declines as volume increases. For example, when volume doubles from 5,000 to 10,000 tests, fixed costs remain at $150,000, but fixed cost per test declines from $150,000 / 5,000 = $30 to $150,000 / 10,000 = $15. With fixed cost per test declining from $30 to $15, the average cost per test declines from $30 + $10 = $40 to $15 + $10 = $25. The fact that higher volume reduces average fixed cost and average cost per unit of activity has important implications regarding the effect of volume changes on profitability. This point will be made clear in a later section.

The cost behavior presented in Table 5.1 in tabular format is presented in graphical format in Figure 5.1. Here, costs are shown on the vertical (Y) axis, and volume (number of tests) is shown on the horizontal (X) axis. Because fixed costs are independent of volume, they are shown as a horizontal dashed line at $150,000. Total variable costs appear as an upward-sloping dotted line that starts at the origin (0 tests, $0 costs) and rises at a rate of $10 for each additional test. Thus, the slope of the total variable costs line is the variable cost rate. When fixed and total variable costs are combined to obtain total costs, the result is the upward-sloping solid line parallel to the total variable costs line but beginning at the Y axis at a value of $150,000 (the fixed costs amount). In effect, the total costs line is nothing more than the total variable costs line shifted upward by the amount of fixed costs.

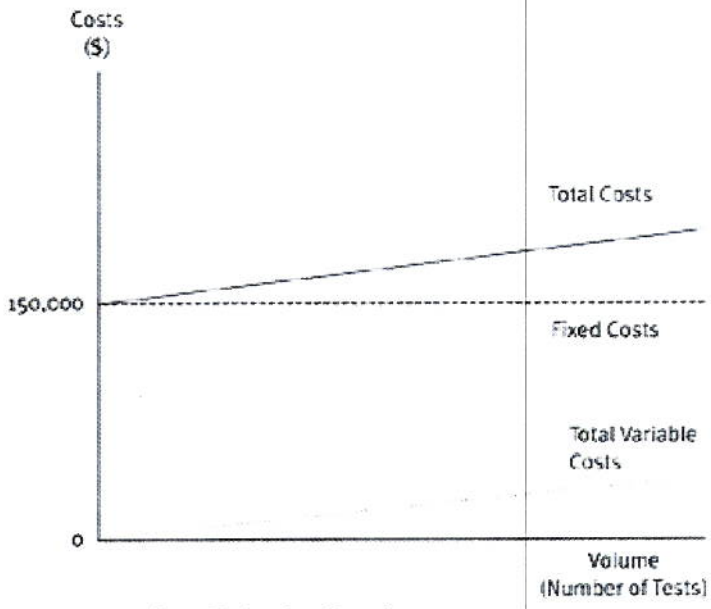

Figure 5.1: Cost Behavior Graph

Note that Figure 5.1 is not drawn to scale. Furthermore, the relevant range is unrealistically large. The intent here is to emphasize the general shape of a cost behavior graph and not its exact position. Also, note that total variable costs plot as a straight line (are linear) because the variable cost rate is assumed to be constant over the relevant range. Although curvilinear total variable costs can occur in some situations, we assume throughout the book that the variable cost rate is constant, and hence total variable costs are linear, at least within the relevant range. Such an assumption is not unreasonable for most health services organizations in most situations.

Self-Test Questions

1. Construct a simple table like the one in Table 5.1, and discuss its elements.

2. Sketch and explain a simple diagram similar to Figure 5.1 to match your table.

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Cost Classifications: Semi-Fixed

Fixed and variable costs represent two ends of the volume classification spectrum. Here, within the relevant range, the costs are either independent of volume (fixed) or directly related to volume (variable). A third classification, *semi-fixed costs,* falls in between the two extremes.[2] To illustrate, assume that the actual relevant range of volume for the clinical laboratory is 10,000 to 20,000 tests. However, the laboratory's current workforce can only handle up to 15,000 tests per year, so an additional technician, at an annual cost of $35,000, would be required if volume exceeds that level. Now, labor costs are fixed from 10,000 to 15,000 tests, and then again fixed at a higher level from 15,000 to 20,000 tests, but they are not fixed at the same level throughout the entire relevant range of 10,000 to 20,000 tests. Semi-fixed costs are fixed within ranges of volume, but there are multiple ranges of semi-fixed costs within the relevant range. Because a plot of semi-fixed costs versus volume looks like a step function, such costs sometimes are called *step-variable costs.*

Table 5.2 and Figure 5.2 illustrate the cost behavior of the laboratory within the new relevant range and with the addition of semi-fixed costs. As shown in Table 5.2, the inclusion of semi-fixed costs prevents average fixed cost and average cost per test from continuously declining throughout the relevant range. At volumes above 15,000 tests, the laboratory must add an additional technician at a cost of $35,000. This causes a jump in total fixed costs (consisting of fixed and semi-fixed costs), average fixed cost, total costs, and average cost per test. However, once this jump (or step) occurs, average fixed cost and average cost per test again begin to decrease as volume increases.

Table 5.2: Cost Behavior Illustration: Fixed, Semi-Fixed, and Variable Costs
Open table as spreadsheet

Variable Costs per Test		**Fixed Costs per Year**		**Semi-Fixed Costs**		
Laboratory supplies		**$10**	**Labor**	**$100,000**	**Increase in labor costs**	**$35,000**
		Other fixed costs		**50,000**	**above 15,000 tests**	
				$150,000		
				$150,000		
Volume	Fixed Costs	Semi-Fixed Costs	Total Fixed Costs	Total Variable Costs	Total Costs	Average Cost per Test
10,000	$150,000	$ 0	$150,000	$100,000	$250,000	$25.00
14,000	150,000	0	150,000	140,000	290,000	20.71
15,000	150,000	0	150,000	150,000	300,000	20.00
16,000	150,000	35,000	185,000	160,000	345,000	21.56
20,000	150,000	35,000	185,000	200,000	385,000	19.25

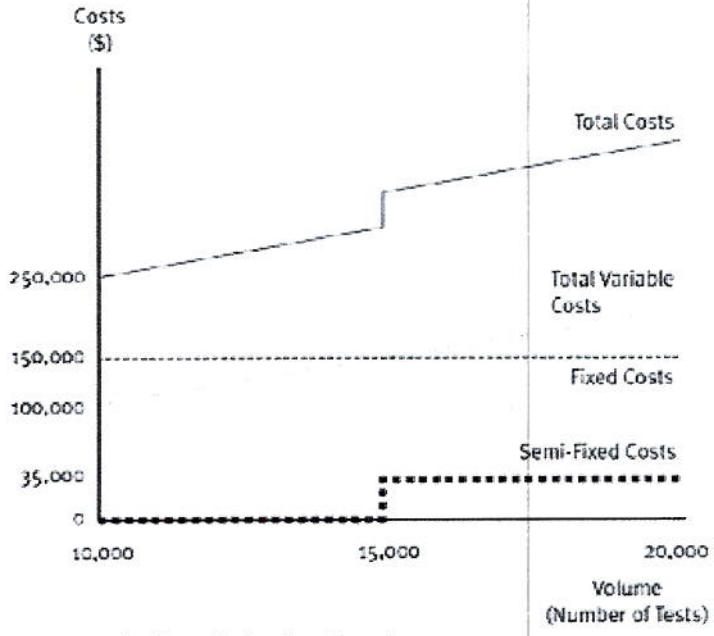

Figure 5.2: Cost Behavior Graph

The jump in total costs is easily identified on the total costs line shown in Figure 5.2. Because of the negative impact of this sudden increase in total costs, the laboratory department head would probably try to avoid hiring an additional technician when volume exceeds 15,000 tests, especially if volume is expected to be only slightly above the jump point or is expected to be temporary. Perhaps new incentives could be put into place to encourage the current technicians to be more productive. Such an action could lower costs in general and create a situation in which the average cost per test would decline continuously throughout the relevant range.

Although semi-fixed costs are common within health services organizations, they add a level of complexity to profit analysis (the topic covered next) without adding a great deal of additional insight. Thus, the remainder of the examples in this book will assume that an organization's cost structure consists only of fixed and variable costs.

Self-Test Questions

1. What is a semi-fixed cost?
2. How does the addition of semi-fixed costs change a cost behavior graph?
3. What is the impact of semi-fixed costs on per unit average cost?

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[2]Semi-fixed costs are sometimes called *semi-variable costs*.

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Profit (CVP) Analysis

Profit analysis is an analytical technique typically used to analyze the effects of volume changes on profit. The same procedures can be used to assess the effects of volume changes on costs, so this type of analysis is often called *cost-volume-profit (CVP) analysis.* CVP analysis allows managers to examine the effects of alternative assumptions regarding costs, volume, and prices. Clearly, such information is useful as managers evaluate future courses of action regarding pricing and the introduction of new services.

Basic Data

Table 5.3 presents the estimated annual costs for Atlanta Clinic, a subsidiary of Atlanta Health Services, for 2008. These costs are based on the clinic's most likely estimate of volume—75,000 visits. The most likely estimate often is called the *base case,* so the data in Table 5.3 represent the clinic's base case cost forecast. Expected total costs for 2008 are $7,080,962. Because these costs support 75,000 visits, the forecasted average cost per visit is $7,080,962 / 75,000 = $94.41.

Table 5.3: Atlanta Clinic: Forecasted Cost Data for 2008 (based on 75,000 patient visits)

Open table as spreadsheet

	Variable Costs	Fixed Costs	Total Costs
Salaries and Benefits:			
Management and supervision	$ 0	$ 928,687	$ 928,687
Coordinators	442,617	598,063	1,040,680
Specialists	0	38,600	38,600
Technicians	681,383	552,670	1,234,053
Clerical/administrative	71.182	58,240	129,422
Social security taxes	89,622	163,188	252,810
Group health insurance	115,924	211,081	327,005
Professional fees	325,489	383,360	708,849
Supplies	313,283	231,184	544.467
Utilities	74,000	45,040	119,040
Allocated costs	0	1.757.349	1,757,349
Total	$2,113,500	$4,967,462	$7,080,962

Focusing solely on total costs does not provide the clinic's managers with much information regarding potential alternative financial outcomes for 2008. In essence, a single (total cost) amount suggests that the clinic's costs will remain constant regardless of the number of patient visits. Similarly, the base case average cost per visit amount of $94.41 implicitly treats all costs as variable costs, suggesting that the cost per visit would be $94.41 regardless of volume. Total cost information is necessary and useful, but the detailed breakdown in Table 5.3 gives the clinic's managers more insight into prospective financial outcomes for 2008 than is possible with a total cost focus.

Table 5.3 categorizes the clinic's total costs of $7,080,962 into two components: total variable costs of $2,113,500 and total fixed costs of $4,967,462. These cost amounts are fundamentally different, both in quantitative and qualitative terms. The total fixed costs of $4,967,462 must be borne by the clinic regardless of the actual volume in 2008. However, total variable costs of $2,113,500 apply only to a volume of 75,000 patient visits. If the actual number of visits realized in 2008 is less than or greater than 75,000, total variable costs will be less than or greater than $2,133,500. (Of course, this is the primary reason that costs are classified as fixed and variable in the first place.)

The best way to highlight that total variable costs vary with volume is to express variable costs on a per unit (variable cost rate) basis. For Atlanta Clinic, the implied variable cost rate is $2,113,500 / 75,000 visits = $28.18 per visit. Thus, the clinic's total costs at any volume within the relevant range can be calculated as follows:

$$\text{Total costs} = \text{Fixed costs} + \text{Total variable costs}$$

$$= \$4{,}967{,}462 + (\$28.18 \times \text{Number of visits}).$$

This equation, the *cost behavior model,* explicitly shows that total costs depend on volume. To illustrate use of the cost behavior model, consider three potential volumes for 2008: 70,000, 75,000, and 80,000 patient visits:

Volume = 70,000:

$$\text{Total costs} = \$4{,}967{,}462 + (\$28.18 \times 70{,}000)$$

$$= \$4{,}967{,}462 + \$1{,}972{,}600 = \$6{,}940{,}062.$$

Volume = 75,000:

$$\text{Total costs} = \$4{,}967{,}462 + (\$28.18 \times 75{,}000)$$

$$= \$4{,}967{,}462 + \$2{,}113{,}500 = \$7{,}080{,}962.$$

Volume = 80,000:

$$\text{Total costs} = \$4{,}967{,}462 + (\$28.18 \times 80{,}000)$$

$$= \$4{,}967{,}462 + \$2{,}254{,}400 = \$7{,}221{,}862.$$

When an organization's costs are expressed in this way, it is easy to see that higher volume leads to higher total costs.

Atlanta Clinic's underlying cost structure is plotted in Figure 5.3. (To simplify the graph, we assume that the relevant range extends to zero visits.) As first illustrated in Figure 5.1, fixed costs are shown as a horizontal dashed line and total costs are shown as an upward-sloping solid line with a slope (rise over run) equal to the variable cost rate—$28.18 per visit. Unlike Figure 5.1, the graphical presentation has been simplified by not showing total variable costs as a separate line starting at the origin. Of course, total variable costs are represented in Figure 5.3 by the vertical distance between the total costs line and the fixed costs line.

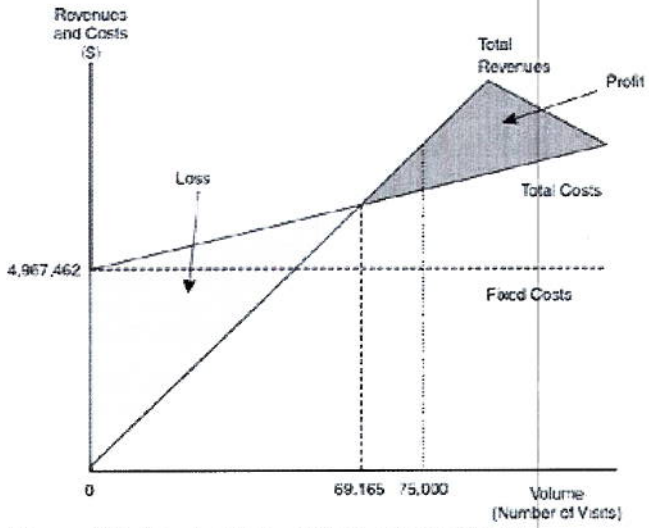

Figure 5.3: Atlanta Clinic: CVP Graphical Model

Note that Atlanta Clinic does not literally write out a check for $28.18 for each visit, although there may be examples of variable costs in which this is the case. Rather, Atlanta's cost structure indicates that the clinic uses certain resources that its managers have defined as inherently variable, and the best estimate of the value of such resources is $28.18 per visit.

The cost structure shown in Figure 5.3 could be estimated in several ways. One way would be to use time-motion studies and interviews with clinic personnel. However, instead of such an intrusive approach, cost accountants could plot the total costs of the clinic at different volume levels for the past several years and then run a regression on these data. In this case, the beta term (slope) of the regression would be the variable cost rate, $28.18, and the alpha term (intercept) would be fixed costs, $4,967,462.

To complete the CVP model, a revenue component must be added. For 2008, Atlanta Clinic expects revenues, on average, to be $100 per patient visit. Total revenues are plotted on Figure 5.3 as an upward-sloping solid line starting at the origin and having a slope of $100 per visit. If there were no visits, total revenues would be zero; at one visit, total revenues would be $100; at ten visits, total revenues would be $1,000; at 75,000 visits, total revenues would be $7,500,000; and so on. Note that the vertical dashed line is drawn at the point where total revenues equal total costs, and the vertical dotted line is drawn at the base case volume estimate, 75,000 visits. We will examine the significance of these lines in later sections.

The Projected P&L Statement

One of the first steps that Atlanta Clinic's managers could take in terms of the 2008 CVP analysis is to project profit (net income), given the base case assumptions. Such a forecast is called a *projected profit and loss (P&L) statement.* The term *profit and loss statement* distinguishes this statement from Atlanta Clinic's audited income statement. There are two primary differences between a P&L statement and an income statement. First, P&L statements, as with all managerial accounting data, can be developed to best serve decision-making purposes, as opposed to following GAAP Second, P&L statements can be created for any subunit within an organization, whereas income statements normally are created only for the overall accounting entity and major subsidiaries.

Atlanta Clinic's 2008 base case projected P&L statement is shown in Table 5.4. The bottom line projects Atlanta's 2008 profit using base case values for costs, volume, and prices. Note that the format of a P&L statement for CVP analysis purposes distinguishes between variable and fixed costs, whereas a typical income statement (and P&L statements for other purposes) does not make this distinction. Also, note that the projected P&L statement contains a line labeled "total contribution margin." This very important concept will be discussed in the next section.

Table 5.4: Atlanta Clinic: 2008 Base Case Projected P&L Statement (based on 75,000 patient visits)

Total revenues ($100 × 75,000)	$7,500,000
Total variable costs ($28.18 × 75,000)	2,113,500
Total contribution margin ($71.82 × 75,000)	$5,386,500
Fixed costs	4,967,462
Profit	$ 419,038

The projected P&L statement used in CVP analysis contains four variables—three of the variables are assumed and the fourth is calculated. In Table 5.4, the assumed variables are expected volume (75,000 visits), expected price ($100 per visit), and expected costs (delineated in terms of the clinic's cost structure). Profit, the fourth variable, is calculated on the basis of the three assumed variables.

The Table 5.4 base case projected P&L statement represents only one point on the Figure 5.3 CVP model. This point is shown by the dotted vertical line at a volume of 75,000 patient visits. Moving up along this dotted line, the distance from the X-axis to the horizontal fixed costs line represents the $4,967,462 fixed costs. The distance from the fixed costs line to the total costs line represents the $2,113,500 total variable costs. The distance between the total costs line and the total revenues line represents the $419,038 profit. As in previous figures, the graph in Figure 5.3 is not drawn to scale because it will not be used to develop numerical data. Rather, it provides the clinic's managers with a pictorial representation of Atlanta's projected financial future.

Contribution Margin

The base case projected P&L statement in Table 5.4 introduces the concept of *contribution margin,* which is defined as the difference between per unit revenue and per unit variable cost (the variable cost rate). In this illustration, the contribution margin is $100.00 – $28.18 = $71.82. What is the inherent meaning of this contribution margin value of $71.82? The contribution margin has the look and feel of profit because it is calculated as revenue minus cost. However,

because none of the fixed costs of providing service have been included in the cost amount used in the calculation, it is **not** profit. Rather, because variable costs have been stripped out, the contribution margin is the dollar amount per visit available to cover Atlanta Clinic's fixed costs. Only after fixed costs are fully covered does the contribution margin begin to contribute to profit.

With a contribution margin of $71.82 on each of the clinic's 75,000 visits, the projected base case *total contribution margin* for 2008 is $71.82 × 75,000 = $5,386,500, which is sufficient to cover the clinic's fixed costs of $4,967,462 and then provide a $5,386,500 – $4,967,462 = $419,038 profit. After fixed costs have been covered, any additional visits contribute to the clinic's profit at a rate of $71.82 per visit. Readers will discover that the contribution margin concept is used again and again as our discussion of CVP analysis continues.

Self-Test Questions

1. Construct a simple P&L statement like the one in Table 5.4, and discuss its elements.
2. Sketch and explain a simple diagram to match your table.
3. Define and explain the contribution margin.

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Breakeven Analysis

In healthcare finance, *breakeven analysis* is applied in many different situations, so it is necessary to understand the context to fully understand the meaning of the term *break even.* Generically, breakeven analyses are used to determine a *breakeven point,* which is the value of a given input variable that produces some minimum desired result. In the specific situation at hand, we will use breakeven analysis to determine the volume, called the *breakeven volume,* at which a business or program or service becomes financially self-sufficient. Although the breakeven analysis discussed here is actually part of profit (CVP) analysis, the concept deserves separate consideration.

Note that there are two different definitions of breakeven volume. *Accounting breakeven* is defined as the volume needed to produce zero profit. In other words, the volume that produces revenues equal to accounting costs. Alternatively, *economie breakeven* is defined as the volume needed to produce a target profit level. In other words, the volume that creates revenues equal to accounting costs **plus** the desired profit amount.

As mentioned in the previous section, the P&L statement format used here is a four-variable model. When the focus is profit, the three assumed variables are costs, volume, and price, while profit is calculated. When the focus is volume breakeven, the same four variables are used, but profit is now assumed to be known while volume is the unknown (calculated) value. However, it is also possible to assume a value for volume and price (or costs) and then calculate the breakeven value for costs (or price). A breakeven point can be obtained two ways: algebraically or graphically. To illustrate the algebraic approach, the projected P&L statement presented in Table 5.4 can be expressed algebraically as the following equation:

$$\text{Total revenues} - \text{Total variable costs} - \text{Fixed costs} = \text{Profit}$$

$$(\$100 \times \text{Volume}) - (\$28.18 \times \text{Volume}) - \$4{,}967{,}462 = \text{Profit}.$$

By definition, at accounting breakeven the clinic's profit equals zero, so the equation can be rewritten this way:

$$(\$100 \times \text{Volume}) - (\$28.18 \times \text{Volume}) - \$4{,}967{,}462 = \$0.$$

Rearranging the terms so that only the terms related to volume appear on the left side produces this equation:

$$(\$100 \times \text{Volume}) - (\$28.18 \times \text{Volume}) = \$4{,}967{,}462.$$

Using basic algebra, the two terms on the left side can be combined because volume appears in both. The end result is this:

$$(\$100 - \$28.18) \times \text{Volume} = \$4{,}967{,}462$$

$$\$71.82 \times \text{Volume} = \$4{,}967{,}462.$$

The left side of the breakeven equation now contains the contribution margin, $71.82, multiplied by volume. Here, the previous conclusion that the clinic will break even when the total contribution margin equals fixed costs is reaffirmed. Solving the equation for volume results in a breakeven point of $4,967,462 / $71.82 = 69,165 visits. Any volume greater than 69,165 visits produces a profit for the clinic, while any volume less than 69,165 results in a loss.

The logic behind the breakeven point is this: Each patient visit brings in $100, of which $28.18 is the variable cost to treat the patient. This leaves a $71.82 contribution margin from each visit. If the clinic sets the contribution margin aside for the first 69,165 visits in 2008, it would have $4,967,430, which is enough (except for a small rounding difference) to cover its fixed costs. Once the clinic exceeds breakeven volume, each visit's contribution margin flows directly to profit. If the clinic achieves its volume estimate of 75,000 visits, the 5,835 visits above the breakeven point result in a total profit of 5,835 × $71.82 = $419,070, which matches the profit (again except for a rounding difference) shown on the clinic's base case projected income statement in Table 5.4.

The second method for determining the breakeven point is by graphical analysis. At accounting breakeven the profit is zero, so total revenues must equal total costs. On a CVP graph such as Figure 5.3, this condition holds at the intersection of the total revenues line and the total costs line. This point is indicated by a vertical dashed line drawn at a volume of 69,165 visits. If a very large sheet of graph paper were used, the lines could be drawn to scale and the breakeven point could be read off of the graph.

The logic of the breakeven point illustrated in Figure 5.3 goes back to the nature of the clinic's fixed and variable cost structure. Before even one patient walks in the door, the clinic has already committed to $4,967,462 in fixed costs. Because the total revenues line is steeper than the total variable costs line, and hence the total costs line, as volume increases total revenues eventually catch up to the clinic's cost structure. Any utilization to the right of the breakeven point, which is shown as a dark-shaded area, produces a profit; any utilization to the left, which is shown as a light-shaded area, results in a loss.

The relationship between breakeven analysis and the projected P&L statement is important to understand. Based on the clinic's base case projection of 75,000 visits, it can anticipate a profit of $419,038. However, management may worry that the clinic will not achieve this projected volume and ask the following question: What is the minimum number of visits that are needed to at least break even? The answer is 69,165 visits.

To verify the breakeven point, Table 5.5 contains a projected P&L statement for 69,165 visits. Except for a small rounding difference, the profit at the breakeven point is $0. (The breakeven point was actually 69,165.4 visits.) As mentioned previously, at breakeven the total contribution margin just covers fixed costs, resulting in zero accounting profit.

Table 5.5: Atlanta Clinic: 2008 Projected P&L Statement (based on 69,165 patient visits)

Total revenues ($100 × 69,165)	$6,916,500
Total variable costs ($28.18 × 69,165)	1,949,070
Total contribution margin	$4,967,430
Fixed costs	4,967,462
Profit	($ 32)

This breakeven analysis contains important assumptions. The first assumption is that the price or set of prices for different types of patients and different payers is independent of volume. In other words, volume increases are not attained by lowering prices, and price increases are not met with volume declines. The second assumption is that costs can be reasonably subdivided into fixed and variable components. The third assumption is that both fixed costs and the variable cost rate are independent of volume over the relevant range, so both the total costs line and the total revenues line are linear.

Breakeven analysis is often performed in an iterative manner. After the breakeven volume is calculated, managers must determine whether the resulting volume can realistically be achieved at the price assumed in the analysis. If the price appears to be unreasonable for the breakeven volume, a new price has to be estimated and the breakeven analysis repeated. Likewise, if the cost structure used for the calculation appears to be unrealistic at the breakeven volume, operational assumptions and hence cost assumptions should be changed and the analysis repeated again.

Instead of asking the number of visits needed for accounting breakeven, Atlanta's managers may ask the number of visits needed to achieve a $100,000 profit or, for that matter, any other profit level. By building a profit target into the breakeven analysis, the focus is now on economic breakeven. The clinic will have a $419,038 profit if it has 75,000 visits, and it will have no profit if it has 69,165 visits. Thus, the number of visits required to achieve a $100,000 profit target (economic breakeven) is somewhere in between 69,165 and 75,000. In fact, the number of visits required is 70,558:

$$\begin{aligned}
\text{Total revenues} - \text{Total variable costs} - \text{Fixed costs} &= \text{Profit} \\
(\$100 \times \text{Volume}) - (\$28.18 \times \text{Volume}) - \$4{,}967{,}462 &= \$100{,}000 \\
(\$71.82 \times \text{Volume}) - \$4{,}967{,}462 &= \$100{,}000 \\
\$71.82 \times \text{Volume} &= \$5{,}067{,}462 \\
\text{Volume} &= 70{,}558.
\end{aligned}$$

Self-Test Questions

1. What is the purpose of breakeven analysis?
2. What is the equation for volume breakeven?
3. Why is breakeven analysis often conducted in an iterative manner?
4. What is the difference between accounting and economic breakeven?

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Operating Leverage

As we have demonstrated, profit analysis is used to examine how changes in volume affect profits and to estimate breakeven points. Assume now that Atlanta Clinic's managers believe that changes in the local market for healthcare services will occur that increase their volume estimate for 2008 to 82,500 visits—an increase of 7,500 visits over the original 75,000 visit base case estimate. Table 5.6 contains the clinic's projected P&L statements at 69,165 (accounting breakeven), 75,000 (base case), and 82,500 visits. The first two columns are the same as previously constructed. The third column, which represents the 82,500 visit estimate, is new.

Table 5.6: Atlanta Clinic: 2008 Projected P&L Statements (based on 69,165; 75,000; and 82,500 patient visits)

Open table as spreadsheet

	Number of Visits		
	69,165	**75,000**	**82,500**
Total revenues ($100 × volume)	$6,916,500	$7,500,000	$8,250,000
Total variable costs ($28.18 × volume)	1,949,070	2,113,500	2,324,850
Total contribution margin ($71.82 × volume)	$4,967,430	$5,386,500	$5,925,150
Fixed costs	4,967,462	4,967,462	4,967,462
Profit	($ 32)	$ 419,038	$ 957,688

Now that P&L statements exist at three different volume levels, the consequences of volume changes can be better understood. As the clinic's forecasted volume moves from 75,000 visits to 82,500 visits, its profit increases by $957,688 – $419,038 = $538,650. This increase is equal to the additional 7,500 visits multiplied by the $71.82 contribution margin. When the volume is beyond the accounting breakeven point, any additional visits are "gravy"—that is, the clinic's fixed costs are now covered, so all contribution margin additions flow directly to profit. Similarly, the outcome is known if the clinic's projected volume dropped from 75,000 to 69,165 visits. In this case, the decrease of 5,835 visits multiplied by the $71.82 contribution margin equals $419,670, which is the loss of profit (except for a rounding difference) that results from the volume decrease.

The movement from 75,000 to 82,500 visits resulted in a (82,500 – 75,000) / 75,000 = 7,500 / 75,000 = 0.10 = 10% increase in volume and thus total revenues. While the top line of the P&L statement— total revenues—increased by 10 percent, the bottom line of the statement— profit—increased by 128.5 percent ($538,650 / $419,038 = 1.285 = 128.5%). This incredible increase in profit occurs because the clinic is reaping the benefit of its cost structure, which includes fixed costs that do not increase with volume.

If a high proportion of a business's total costs are fixed, the business is said to have high *operating leverage.* In physics, leverage implies the use of a lever to raise a heavy object with a small amount of force. In politics, individuals who have leverage can accomplish much with the smallest word or action. In finance, high operating leverage means that a relatively small change in volume results in a large change in profit.

Operating leverage is measured by the *degree of operating leverage (DOL),* which at any volume is calculated by dividing the total contribution margin by earnings before interest and taxes (EBIT), which for not-for-profit businesses is merely profit plus any interest expense. At a volume of 75,000 visits, Atlanta Clinic's degree of operating leverage is $5,386,500 / $419,038 = 12.85. (We have no information regarding the clinic's interest expense, so we are simply using its expected profit.) The DOL indicates how much profit will change for each

1 percent change in volume. Thus, each 1 percent change in volume produces a 12.85 percent change in profit, so a 10 percent increase in volume results in a 10% × 12.85 = 128.5% increase in profit. Note, however, that the DOL changes with volume, so the 12.85 DOL calculated here is applicable only to a starting volume of 75,000 visits.

Cost structures differ widely among industries and among organizations within a given industry. The DOL is greatest in health services organizations with a large proportion of fixed costs and, consequently, a low proportion of variable costs. The end result is a high contribution margin, which contributes to a high DOL. In economics terminology, high-DOL businesses are said to have *economics of scale* because higher volumes lead to lower per unit total costs. In such businesses, a small increase in revenue produces a relatively large increase in profit. However, high DOL businesses have relatively high breakeven points, which increase the risk of losses. Also, operating leverage is a double-edged sword: High DOL businesses suffer large profit declines, and potentially large losses, if volume falls.

To illustrate the negative effect of a high DOL, consider this question: What would happen to Atlanta Clinic's profit if volume fell by 7.8 percent from the base case level of 75,000 visits? To answer this question, recognize that profit would decline by 7.8% × 12.85 ≈ 100%, so the clinic's profit would fall to zero. The data in Table 5.6 confirm this answer. At a projected volume of 69,165 visits (a decrease of 7.8 percent from 75,000 visits), the clinic's profit is zero. Of course, this volume was previously identified as the breakeven point.

To what extent can managers influence a business's operating leverage? In many respects, operating leverage is determined by the inherent nature of the business. In general, hospitals and other institutional providers must make large investments in fixed assets, and hence they have a high proportion of fixed costs and high operating leverage. Conversely, home health care businesses and other noninstitutional providers need few fixed assets, so they tend to have relatively low operating leverage. Still, managers can somewhat influence operating leverage. For example, organizations can make use of temporary, rather than permanent, employees to handle peak patient loads. Also, assets can be leased on a per use (per procedure) basis, rather than purchased or leased on a fixed rental basis. Actions such as these tend to reduce the proportion of fixed costs in an organization's cost structure, and hence reduce operating leverage.

Self-Test Questions

1. What is operating leverage, and how is it measured?
2. Why is the operating leverage concept important to managers?
3. Can managers influence their firms' operating leverage?
4. How does an organization's cost structure affect its exposure to economies of scale?

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Profit Analysis in a Discounted Fee-for-Service Environment

As noted in the previous discussion, profit (CVP) analysis is quite valuable to managers in that it provides information about expected costs and profitability under alternative estimates of volume. To learn more about its usefulness, suppose that one-third (25,000) of Atlanta Clinic's expected 75,000 visits would come from Peachtree HMO, which has proposed that its new contract with the clinic contain a 40 percent discount from charges. Thus, the net price for their patients would be $60 instead of the undiscounted $100. If the clinic refuses, Peachtree has threatened to take its members elsewhere.

At first blush, Peachtree's proposal appears to be unacceptable. Among other reasons, $60 is less than the full cost of providing service, which was determined previously to be $94.41 per visit at a volume of 75,000. Thus, on a full-cost basis, Atlanta would lose $94.41 — $60 = $34.41 per visit on Peachtree's patients. With an estimated 25,000 visits, the discounted contract would result in a total profit loss of 25,000 × $34.41 = $860,250. However, before Atlanta's managers reject Peachtree's proposal, it must be examined more closely.

The Impact of Rejecting the Proposal

If Atlanta's managers reject the proposal, the clinic would lose market share— an estimated 25,000 visits. The projected P&L statement that would result, which is based on 50,000 undiscounted visits, is shown in Table 5.7. At the lower volume, the clinic's total revenues, total variable costs, and total contribution margin decrease proportionately (i.e., by one-third). However, fixed costs are not reduced, so Atlanta would not cover its fixed costs, and hence a loss of $3,591,000 – $4,967,462 = -$1,376,462 would occur. To view the situation another way, the expected volume of 50,000 visits is 19,165 short of the breakeven point, so the clinic would be operating to the left of the breakeven point in Figure 5.3. This shortfall from breakeven of 19,165 visits, when multiplied by the contribution margin of $71.82, produces a loss of $ 1,376,430, which is the same as shown in Table 5.7 (except for a rounding difference).

Table 5.7: Atlanta Clinic: 2008 Projected P&L Statement (based on 50,000 undiscounted patient visits)

Total revenues ($100 × 50,000)	$5,000,000
Total variable costs ($28.18 × 50,000)	1,409,000
Total contribution margin ($71.82 × 50,000)	$3,591,000
Fixed costs	4,967,462
Profit	($1,376,462)

Clearly, the major factor behind the projected loss is the clinic's fixed cost structure of $4,967,462. With a projected decrease in volume of 33 percent, perhaps the clinic could reduce its fixed costs. If Atlanta's managers perceive the volume reduction to be permanent, they would begin to reduce the fixed costs currently in place to meet an anticipated volume of 75,000 visits. However, if the clinic's managers believe that the loss of volume is merely a temporary occurrence, they may choose to maintain the current fixed cost structure and absorb the loss expected for next year. It would not make sense for them to start selling off equipment and facilities, and firing staff, only to reverse these actions one year later. The critical point, though, is that the loss of volume caused by rejecting Peachtree's proposal can have a significant negative impact on the clinic's profit, which indicates that the clinic's fixed cost structure should be reexamined.

The Impact of Accepting the Proposal

An alternative strategy for the clinic's managers would be to accept Peachtree's proposal. The resulting projected P&L statement is contained in Table 5.8. The average per visit revenue of serving these two different payer groups is (2/3 × $100) + (1/3 × $60) = $86.67. Total revenues based on this average revenue per visit would be 75,000 × $86.67 = $6,500,250, which equals the value for total revenues shown in the table (except for a rounding difference). With a lower average revenue per visit, the contribution margin falls to $86.67 — $28.18 = $58.49, which leads to a lower total contribution margin.

Table 5.8: Atlanta Clinic: 2008 Projected P&L Statement (based on 50,000 visits at $100 and 25,000 visits at $60)

Undiscounted revenue ($100 × 50,000)	$5,000,000
Discounted revenue ($60 × 25,000)	1,500,000
Total revenues ($86.67 × 75.000)	$6,500,000
Total variable costs ($28.18 × 75,000)	2,113,500
Total contribution margin ($58.49 × 75,000)	$4,386,500
Fixed costs	4,967,462
Profit	($ 580,962)

The critical point here is that the clinic's total revenues have decreased significantly from the previous situation in which all visits bring in $100 in revenue (see Table 5.4). However, the clinic's total costs remain the same because it is handling the same number of visits—75,000. The impact of the discount is strictly on revenues, and the end result of accepting Peachtree's proposal is a projected loss of $580,962.

Another way of confirming the expected loss at 75,000 visits is to calculate the clinic's accounting breakeven point at the new average per visit revenue of $86.67. The new breakeven point is 84,928 visits, which confirms that the clinic will lose money at 75,000 visits. Because the clinic is projected to be 84,928 — 75,000 = 9,928 visits below breakeven, and the contribution margin is now $58.49, the projected loss is 9,928 × $58.49 = $580,689, which is the amount shown in Table 5.8 (except for a rounding difference).

The change in breakeven point that results from accepting Peachtree's proposal is graphed in Figure 5.4, along with the original breakeven point. The new total revenues line (the dot-dashed line) is flatter than the original line, so when it is combined with the existing cost structure, the breakeven point is pushed to the right, to 84,928 visits. However, any cost-control actions taken by Atlanta's managers would either flatten, if variable costs are lowered, or lower, if fixed costs are reduced, the total costs line, and hence push the breakeven point back to the left.

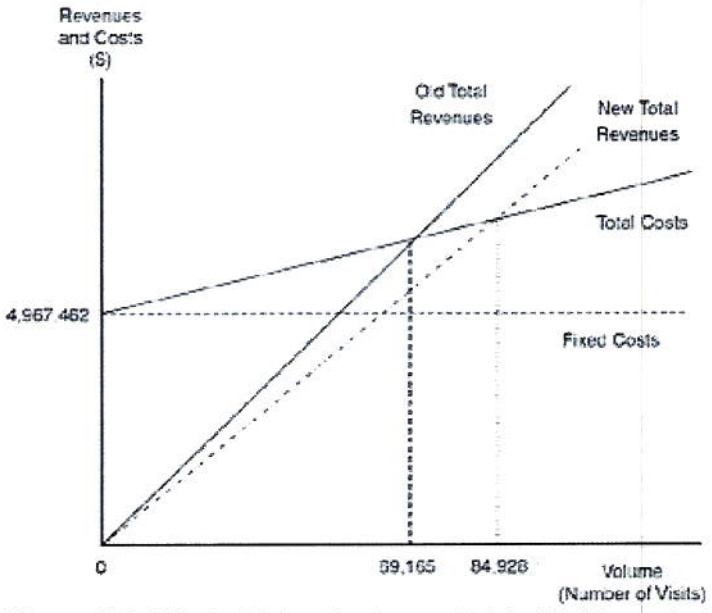

Figure 5.4: Atlanta Clinic: Breakeven Point with Discounted Revenue

Nothing much has changed in terms of core economic underpinnings because of the new discounted-charge environment. The clinic is worse off economically, but the clinic's cost structure, managerial incentives, and solutions to financial problems are essentially the same. To increase profit, more services must be provided. In short, the movement from charges to discounted charges is not that radical with regard to its impact on profit analysis and managerial decision making. The major difference is that the clinic is now under greater financial pressure. However, as we discuss in the next major section, the clinic's entire incentive structure will change if it moves to a capitated environment.

Evaluating the Alternative Strategies

What should Atlanta's managers do? If Peachtree's discount proposal is accepted, the clinic is expected to lose $580,962 rather than make a profit of $419,038 if no discount was demanded. The difference is a swing of $1 million in profit in the wrong direction, hardly an enticing prospect. What happened to the "missing" $1 million? It is now in the hands of Peachtree HMO, which is paying $1 million less to one of its providers (25,000 visits × $40 savings = $1,000,000). This will be reflected as a cost savings on Peachtree's income statement and, if the savings is not passed on to the ultimate payers (typically employers), will result in a profit increase.

If market forces in Atlanta Clinic's service area suggest that making a counter offer to Peachtree is not feasible—perhaps because the clinic is being pitted against another provider—the comparison of a loss of $580,792 to a profit of $419,038 is irrelevant. The only relevant issue at hand for the short-term is the comparison of the $580,792 loss if the clinic accepts the proposal to the $1,376,462 loss if the proposal is rejected and Peachtree's patients are lost to the clinic. Although neither outcome is very appealing, the acceptance of the discount appears to be the lesser of two evils. In fact, the acceptance of the discount is better by $1,376,462 – $580,792 = $795,670. Accepting the discount proposal appears to be Atlanta's best **short-term** strategy because Peachtree's patients still produce a positive contribution margin of $60 — $28.18 = $31.82 per visit, which would be foregone if the clinic rebuffs Peachtree's offer. That $31.82 per visit contribution margin, when multiplied by the expected 25,000 visits on the contract, puts $795,500 on the total contribution margin table that otherwise would be lost. (However, if acceptance of Peachtree's discount proposal leads to similar proposals from other payers, the best **long-term** strategy might be to reject the proposal.)

Marginal Analysis: Short-Term versus Long-Term Implications

The Atlanta/Peachtree illustration points out one way in which the contribution margin can be used in managerial decision making. To help reinforce the concept, the analysis can be viewed from a different perspective. Suppose the clinic is forecasting a base case volume of only **50,000** visits for 2008, and Peachtree HMO offers to provide the clinic 25,000 additional visits at $60 revenue per visit. These 25,000

visits are called *marginal,* or *incremental, visits,* because they add to the existing base of visits. Should the clinic's managers accept this offer?

Although each marginal visit from the contract brings in only $60 compared with $100 on the clinic's other contracts, the *marginal cost,* which is the cost associated with each additional visit, is the variable cost rate of $28.18. The clinic's $4,967,462 in fixed costs will be incurred whether the offer is accepted or rejected, so these costs are not relevant to the decision. In finance parlance, the clinic's fixed costs are *nonincremental* to the decision. Because the contribution margin of each visit at the margin (the *marginal contribution margin)* is a positive $31.82, each visit contributes positively to Atlanta's recovery of fixed costs and ultimately to profits, so the offer must be seriously considered. Note that this conclusion is based on the assumption that the relevant range of volumes is from 50,000 or fewer visits to at least 75,000 visits, and hence that the current level of fixed costs can support the added volume. If 75,000 visits is beyond the relevant range, then new fixed costs must be incurred and these now become incremental to the decision. In this situation, the marginal cost consists of the variable cost rate **plus** the incremental fixed cost per additional visit.)

However, Atlanta's managers cannot ignore the long-term implications associated with accepting the proposal. These are not addressed in detail here, but clearly the clinic cannot survive this scenario in the long run because the clinic's revenues are not covering the full costs of providing services. In the meantime, bleeding $580,962 of losses in 2008 may be better than bleeding $1,376,462 until the clinic can adjust to market forces in its service area. This adjustment may be as simple as merely absorbing the losses while the clinic's competitors, perhaps in poorer financial condition, exit the market as they too face the same difficult economic choices. Should this happen, a new equilibrium would be established in the market that would allow the clinic to raise its prices. If the long-term solution is not that simple, Atlanta Clinic must reduce its cost structure or perish.

Another problem associated with accepting the discount offer is that the clinic's other payers will undoubtedly learn about the reduced payments and want to renegotiate their contracts with the same, or even greater, discount. Such a reaction would clearly place the clinic under even more financial pressure, and a draconian change in either volume or operating costs would be required for survival.

Self-Test Questions

1. What is the impact of a discount contract on fixed costs, total variable costs, and the breakeven point?
2. What is meant by marginal analysis?
3. What is meant by the following statement: "Marginal analysis is made more complicated by long-run considerations."

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Profit Analysis in a Capitated Environment

As a review of profit analysis, consider how the analysis is changed when a provider operates in a capitated environment. Although capitation is being used less today than it was several years ago, the addition of a capitated payment analysis both provides an excellent review of the concepts presented in previous sections and highlights the basic differences between the two reimbursement methods.

To begin, assume that the purchaser of services from Atlanta Clinic is the Alliance, a local business coalition. As in previous illustrations, assume the Alliance is paying the clinic $7,500,000 to provide services for an expected 75,000 visits, but now the amount is **capitated.** Although projected total revenues remain the same as the previous base case (see Table 5.4), the nature of the capitated revenues is actually quite different. The $7,500,000 that the Alliance is paying is not explicitly related to the amount of services provided by the clinic but to the size of the covered employee group. In essence, Atlanta Clinic is no longer merely selling healthcare services as it had in the fee-for-service or discounted fee-for-service environment. Now the clinic is taking on the insurance function in that it is responsible for the health status (utilization) of the covered population and must bear the attendant risks. If the total costs of services delivered by the clinic exceed the premium revenue (paid monthly on a per member basis), the clinic will suffer the financial consequences. However, if the clinic can efficiently manage the healthcare of the served population, it will be the economic beneficiary.

How might Atlanta's managers evaluate whether or not the $7,500,000 revenue attached to the contract is adequate? To do the analysis, they need two critical pieces of information: cost information and actuarial (utilization) information. The clinic already has the cost accounting information—the full cost per visit is expected to be $94.41 (at a volume of 75,000 visits), with an underlying cost structure of $28.18 per visit in variable costs and $4,967,462 in fixed costs. For its actuarial information, Atlanta's managers estimate that the Alliance will have a covered population of 18,750 members with an expected utilization rate of four visits per member per year. Thus, the total number of visits expected is 18,750 × 4 = 75,000. Although this appears to be the same 75,000 visits as in the fee-for-service environment, significant difference exists in the implications of this volume. Because there is no direct linkage between the volume of services provided and revenues, utilization above that expected will bring increased costs with **no corresponding** increase in revenues.

The revenues expected from this contract, $7,500,000, exceed the expected costs of serving this population, which are 75,000 visits multiplied by $94.41 per visit, or $7,080,750. Thus, this contract is expected to generate a profit of $419,250, which, not surprisingly, is the same as the original base case fee-for-service result (except for a rounding difference). (See Table 5.4.)

A Graphical View in Terms of Utilization

Figure 5.5 contains a graphical profit (CVP) analysis for the capitation contract that is constructed similar to the fee-for-service graphs shown in Figures 5.3 and 5.4 in that the horizontal axis shows volume (number of visits), while the vertical axis shows revenues and costs. Also shown is the same underlying cost structure of $4,967,462 in fixed costs coupled with a variable cost rate of $28.18. One very significant difference exists, however. Instead of being upward sloping, the total revenues line is horizontal, which shows that total revenue is $7,500,000 regardless of volume **as measured by the number of visits.**

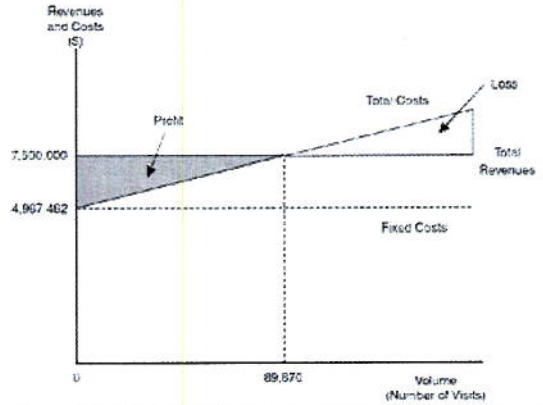

Figure 5.5: Atlanta Clinic: Breakeven Point under Capitation

Several subtle messages are inherent in this flat revenue line. First, it tells managers that revenue is being driven by something other than the volume of services provided. Under capitation, revenue is being driven by the insurance contract (i.e., by the premium payment and the number of covered lives, or *enrollees).* This change in the revenue source is the core of the logic switch from fee-for-service to capitation; the clinic is being rewarded to manage the healthcare of the population served rather than merely to provide services. However, the clinic's costs are still driven by the amount of services provided (the number of visits).

A second critical point about Figure 5.5 is the difference between the flat revenue and the flat fixed-cost base. Atlanta has a spread of $7,500,000 — $4,967,462 = $2,532,538 to work with in the management of the healthcare of this population for the period of the contract. If total variable costs equal $2,532,538, the clinic breaks even; if total variable costs exceed $2,532,538, the clinic loses. Thus, to make a profit, the number of visits must be less than $2,532,538 / $28.18 = 89,870. If everyone in the organization, especially the managers and clinicians, does not understand the inherent utilization risk under capitation, the clinic could find itself in serious financial trouble. On the other hand, if Atlanta's managers and clinicians at all levels understand and manage this utilization risk, a handsome reward may be gained.

A key feature of capitation is the reversal of the profit and loss portions of the graph. To see this, compare Figure 5.5 with Figure 5.3. The idea that profits occur at lower volumes under capitation is contrary to the fee-for-service environment. It is obvious, however, when one recognizes that the contribution margin, on a per visit basis, is $0 — $28.18 = —$28.18. Thus, each additional visit increases costs by $28.18 without bringing in additional revenue. The optimal short-term response to capitation from a purely financial perspective is to take the money and run (provide no services) because zero visits allow the clinic to capture the full spread between total revenues and fixed costs. Of course, the clinic would have trouble renewing the contract in subsequent years, but it will have maximized short-term profit. Obviously, this course of action is neither appropriate nor feasible. Still, its implications are at the heart of concerns expressed by critics of managed care about the incentives to withhold patient care inherent in a capitated environment.

A Graphical View in Terms of Membership

Looking at Figure 5.5 is like being Alice, of *Alice in Wonderland,* peering through the looking glass and finding that everything is reversed. The key to this problem is that the horizontal axis does not measure the volume to which revenues are related—that is, the horizontal axis in Figure 5.5 has number of visits on the horizontal axis, just as if Atlanta Clinic were selling healthcare services. It is not; it is now selling insurance, so the appropriate horizontal axis value is the number of members (enrollees).

Figure 5.6 recognizes that membership, rather than the amount of services provided, drives revenues. With the **number of members** on the horizontal axis, the total revenues line is no longer flat; revenues only look flat when they are considered relative to the number of visits. The revenue earned by the clinic is actually $7,500,000 / 18,750 = $400 per member, which could be broken down to a monthly premium of $400 / 12 = $33.33. Thus, the expected $7,500,000 revenue shown in Figure 5.5 results from an expected enrollee population of 18,750 members. The cost structure can easily be expressed on a membership basis as well. Fixed costs are no problem within the relevant range; they are inherently volume insensitive, whether volume is measured by number of visits or number of members. Thus, Figure 5.6 shows fixed costs as the same flat, dashed line as before. However, the variable cost rate based on number of enrollees is not the same as the variable cost rate based on number of visits. Per member variable cost must be estimated from two other factors: the variable cost rate of $28.18 per visit and the expected utilization of four visits per year. The combination of the two is 4 × $28.18 = $112.72, which is the clinic's expected variable cost per member. Expressed on a per member basis, the contribution margin is now $400 — $112.72 = $287.28, as opposed to the —$28.18 when volume is based on number of visits.

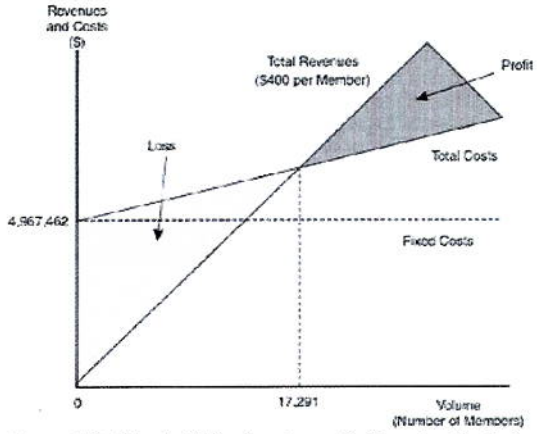

Figure 5.6: Atlanta Clinic: Breakeven Point under Capitation in Insurance Terms

The analysis based on number of members reveals that there are two elements to controlling total variable costs under capitation: the underlying variable cost of the service ($28.18 per visit) and the number of visits per member (four). The two-variable nature of the variable cost rate makes cost control more difficult under capitation. In a fee-for-service environment, cost control entails only minimizing per visit expenses. Utilization is not an issue. If anything, utilization is good because per visit revenue almost always exceeds the variable cost rate. (In other words, there is a positive contribution margin.) Capitation requires a change in management thinking about cost control because utilization is now a component of the variable cost rate and hence total variable costs. Of course, control of fixed costs is always financially prudent, regardless of the type of reimbursement.

Conversely, there is one positive feature of the variable cost structure under capitation. With two elements to control, the clinic has more opportunity to lower the variable cost rate under capitation than under fee-for-service reimbursement. The key is the ability of Atlanta's managers to control utilization. If **both** utilization and per visit costs can be reduced, the clinic can reap greater benefits (profits) than are possible under fee-for-service reimbursement.

Projected P&L Statement Analysis

Table 5.9 contains three projected P&L statements in this capitated environment. The three volume levels shown are the same as those contained in Table 5.6 for a fee-for-service environment. To begin, start with the middle column—the one that contains the expected 75,000 patient visits. The bottom line, $419,038, is the same as in the fee-for-service analysis, which reinforces the point that, at least superficially, the capitated contract is not inherently better or worse than the fee-for-service contract.

Table 5.9: Atlanta Clinic: 2008 Projected P&L Statements (based on 69,165; 75,000; and 82,500 patient visits)

➡ Open table as spreadsheet

	Number of Visits		
	69,165	**75,000**	**82,500**
Total revenues	$7,500,000	$7,500,000	$7,500,000
Total variable costs ($28.18 × volume)	1,949,070	2,113,500	2,324,850
Total contribution margin	$5.550,930	$5,386,500	$5,175,150
Fixed costs	4,967,462	4,967,462	4,967,462

Profit	$ 583,468	$ 419,038	$ 207,688

Although the profit at 75,000 visits is the same, some of the values in the projected analyses and their economic meanings differ. For example, although total revenues are $7,500,000, it is a flat amount in Table 5.9, while it varies with volume in Table 5.6. The variable cost rate is the same in both tables—$28.18 per visit. However, because each visit does not result in additional revenue, the revenue per visit is zero in Table 5.9 and the contribution margin is —$28.18.

What would happen if the clinic experienced more visits than predicted? If the number of visits increases by 10 percent, or by 7,500, to 82,500, the right column in Table 5.9 shows that profit would decrease by $419,038 — $207,688 = $211,350. This occurs because total revenues stay constant while costs increase at a rate of $28.18 for each additional visit. With 7,500 additional visits, the clinic's costs increase by 7,500 × $28.18 = $211,350. Obviously this is quite in contrast to the significant increase in profit at this volume level that occurs in a fee-for-service environment (see Table 5.6).

Under capitation, a decrease in visits will improve the profitability of the clinic. When the number of visits decreases to 69,165, which is the breakeven point in a fee-for-service environment, profit in a capitated environment increases by $164,430 to $583,468. This increase is explained by the decrease in visits (5,835) multiplied by the contribution margin (—$28.18), which results in a $164,430 decrease in costs while revenues remain constant.

The Importance of Utilization

Table 5.9 provides information on the impact of utilization changes on profitability. The center column, the base case, is once again our starting point. With an assumed utilization of four visits for each of Peachtree's 18,750 members, 75,000 visits result in a projected profit of $419,038.

However, if Atlanta's managers are not able to limit utilization to the level forecasted (or less), the clinic's profit would fall. Assume that realized utilization is actually 4.4 visits per member, rather than the 4.0 forecasted. This higher utilization would result in 4.4 × 18,750 = 82,500 visits, which produces the profit of $207,688 shown in the right column in Table 5.9. Because revenues are fixed and total costs are tied to volume, higher utilization leads to higher costs and lower profit. With the same 82,500 visits, but total variable costs of $2,324,850 at the higher utilization rate, the variable cost per member increases to $2,324,850 / 18,750 = $124.99, which could also be found by multiplying 4.4 visits per member by the variable cost rate of $28.18.

The left column of Table 5.9 shows that the clinic's profitability would increase to $583,468 if utilization was reduced to 3.69 visits per member, producing about 69,165 total visits. With lower utilization, total variable costs are reduced and profit increases. The key point is that the ability of a provider to control utilization is the primary key to profitability in a capitated environment. Less utilization means lower total costs, and lower total costs mean greater profit.

In our initial discussion of profit analysis, we introduced the concept of operating leverage, which is related to the cost structure of the organization— the higher the proportion of fixed costs, the greater the operating leverage. In a fee-for-service environment, high operating leverage means a low variable cost rate and a high per visit contribution margin, and hence high risk in that small volume decreases lead to large reductions in profitability. On the other hand, small volume increases can have a significant positive impact on the bottom line.

Under capitation, the situation is reversed because the per visit contribution margin is negative. Whereas a higher proportion of fixed costs drives the positive per visit contribution margin even higher under fee-for-service reimbursement, it drives the negative per visit contribution margin toward zero under capitation. In fact, if all of Atlanta Clinic's costs were fixed, its contribution margin would be zero, and the clinic's profit would be assured regardless of the number of visits, assuming that they fall within the relevant range. (We will have more to say about this in the next major section.)

The Importance of the Number of Members

Table 5.10 contains the projected P&L statements under capitation, recast to focus on the number of members. Assuming a per member utilization of four visits per year, a 10 percent membership increase to 20,625 members increases the projected profit by about 128 percent. However, if membership declines to 17,291, the clinic just breaks even.

Table 5.10: Atlanta Clinic: 2008 Projected P&L Statements (based on 17,291; 18,750; and 20,625 members)

Open table as spreadsheet

	Nurmber of Members		
	17,291	**18,750**	**20,625**
Total revenues ($400 × number of members)	$6,916,400	$7,500,000	$8,250,000
Total variable costs ($112.72 × members)	1,949,042	2,113,500	2,324,850
Total contribution margin	$4,967,358	$5,386,500	$5,925,150
Fixed costs	4,967,462	4,967,462	4,967,462
Profit	($ 104)	$ 419,038	$ 957,688

We can use the breakeven equation to verify the breakeven point:

$$\text{Total revenues} - \text{Total variable costs} - \text{Fixed costs} = \text{Profit}$$

$$(\$400 \times \text{Members}) - (\$112.72 \times \text{Members}) - \$4{,}967{,}462 = \$0$$

$$\$287.28 \times \text{Members} = \$4{,}967{,}462$$

$$\text{Members} = 17{,}291.$$

Thus, breakeven analysis reaffirms that the clinic needs 17,291 members in its contract with the Alliance to break even, given the assumed cost

structure, which in turn assumes utilization of four visits per member and a variable cost rate of $28.18 per visit.

Assuming constant per member utilization, more members increases profitability because additional members create additional revenues that presumably exceed their incremental (variable) costs. Indeed, the DOL concept can be applied here. As shown in Table 5.10, a 10 percent increase to 20,625 members from a base case membership of 18,750 results in a (roughly) 128.5 percent increase in profit (from $419,038 to $957,688, or by $538,650). Thus, each 1 percent increase in membership increases profitability by 12.85 percent. Similarly, if membership decreases to the breakeven point of 17,291, a decrease of 7.8 percent, profitability falls by 7.8% × 12.85 ≈ 100%, which leads to a profit of zero.

Self-Test Questions

1. Under capitation, what is the difference between a CVP graph with the number of visits on the X axis versus one with the number of members on the X axis?
2. What is unique about the contribution margin under capitation?
3. Why is utilization management so important in a capitated environment?
4. Why is the number of members so important in a capitated environment?

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The Impact of Cost Structure on Financial Risk

The financial risk of a healthcare provider, at least in theory, is minimized by having a cost structure that "matches" its revenue structure. To illustrate, consider a clinic with all payers using fee-for-service reimbursement and hence revenues directly related to volume. If the clinic's cost structure consisted of all variable costs (no fixed costs), then each visit would incur costs but at the same time create revenues. Assuming that the per visit revenue amount exceeds the variable cost rate (per visit costs), the clinic would "lock in" a profit on each visit. The total profitability of the clinic would be uncertain, as it is tied to volume, but the ability of the clinic to generate a profit would be guaranteed.

At the other extreme, consider a clinic that is totally capitated. In this situation, assuming a fixed number of covered lives, the clinic's revenue stream is fixed regardless of volume. Now, to match the revenue and cost structures, the clinic must have all fixed (no variable) costs. Assuming that annual fixed revenue exceeds annual fixed costs, the clinic has a guaranteed profit at the end of the year.

Note that in both illustrations, the key to minimizing risk (ensuring a profit) is to create a cost structure that matches the revenue structure: variable costs for fee-for-service revenues and fixed costs for capitated revenues. Of course, "real world" problems occur when a provider tries to implement a cost structure that matches its revenue structure. First, very few providers are reimbursed solely on a fee-for-service or a capitated basis. Most providers face a mix of reimbursement methods. Still, most providers are either predominantly fee-for-service or predominantly capitated.

Second, providers do not have complete control over their cost structures. It is impossible for providers to create cost structures with all variable or all fixed costs. Nevertheless, managers can take actions to change their existing cost structure to one that is more compatible with the revenue structure (has less risk). For example, assume a medical group practice is reimbursed almost exclusively on a per procedure basis. To minimize financial risk, the practice can take such actions as pay physicians on a per procedure basis and use per procedure leases for diagnostic equipment. The greater the proportion of variable costs in the practice's cost structure, the lower its financial risk.

Self-Test Questions

1. Explain this statement: To minimize financial risk, match the cost structure to the revenue structure.
2. What cost structure would minimize risk if a provider had all fee-for-service reimbursement?
3. What cost structure would minimize risk if a provider were entirely capitated?
4. What are the real world constraints on creating matching cost structures?

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Key Concepts

Managers rely on managerial accounting information to plan for and control a business's operations. A critical part of managerial accounting information is the measurement of costs and the use of this information in profit analysis. The key concepts of this chapter are:

- Costs can be classified by their relationship to the *amount of services -provided.*
- *Variable costs* are those costs that are expected to increase and decrease with volume (patient days, number of visits, and so on), while *fixed costs* are the costs that are expected to remain constant regardless of volume within some *relevant range. Semi-fixed costs* are those that are fixed within ranges that are less than the relevant range.
- The relationship between cost and activity (volume) is called *cost behavior* or *underlying cost structure.*
- *Profit analysis,* often called *cost-volume-profit (CVP) analysis,* is an analytical technique that typically is used to analyze the effects of volume changes on revenues, costs, and profit.
- A *projected profit and loss (P&L) statement* is a profit projection that, in a profit analysis context, uses assumed values for volume, price, and costs.
- *Breakeven analysis* is used to estimate the volume needed (or the value of some other variable) for the organization to break even in profitability.
- *Accounting breakeven* occurs when revenues equal accounting costs, while *economic breakeven* occurs when revenues equal accounting costs **plus** some profit target.
- *Contribution margin* is the difference between unit price and the *variable cost rate,* or per unit revenue minus per unit variable cost. Hence, contribution margin is the per unit dollar amount available to first cover an organization's fixed costs and then to contribute to profits.
- *Operating leverage* reflects the extent to which an organization's costs are fixed. It is measured by the *degree of operating leverage (DOL).* Assuming fee-for-service reimbursement, a business with a high DOL has more risk than a business with a low DOL because DOL measures the impact of utilization changes on profits. Thus, in a fee-for-service environment, high-DOL businesses benefit most from increases in utilization. Conversely, high-DOL businesses are hurt the most when utilization falls.
- In *marginal analysis,* the focus is on the incremental (marginal) profitability associated with increasing or decreasing volume.
- A *capitated environment* dramatically changes the situation for providers vis-à-vis a fee-for-service environment. In essence, a capitated provider takes on the insurance function.
- Under capitation, the revenue per unit of volume, when measured traditionally, is zero. Thus, provider risk is minimized with a high DOL (high fixed costs), which results in a low variable cost rate and a small but negative contribution margin.
- The keys to success in a capitated environment are to manage (reduce) utilization and increase the number of members covered.
- To minimize financial risk, a provider should strive to attain a cost structure that matches its revenue structure.

In Chapter 6, the discussion of managerial accounting continues with an examination of the second major classification of costs, which is based on the relationship of costs to the subunit being analyzed.

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Chapter 17: Financial Condition Analysis

Learning Objectives

After studying this chapter, readers will be able to:

- Explain the purposes of financial statement and operating indicator analyses.
- Describe the primary techniques used in financial statement and operating indicator analyses.
- Conduct basic financial statement and operating indicator analyses to assess the financial condition of a business.
- Describe the problems associated with financial statement and operating indicator analyses.
- Explain the Economic Value Added (EVA) model and its relevance to healthcare businesses.
- Describe how Key Performance Indicators (KPIs) and dashboards can be used to monitor financial condition.

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Introduction

One of the most important characteristics of a business is its *financial condition:* Does the business have the financial capacity to perform its mission? Often, judgments about financial condition are made on the basis of *financial statement analysis,* which focuses on the data contained in a business's financial statements. Financial statement analysis is applied both to historical data, which reflect the results of past managerial decisions, and to forecasted data, which comprise the roadmap for the business's future. Therefore, managers use financial statement analysis both to assess current condition and to plan for the future.

Although financial statement analysis provides a great deal of important information regarding financial condition, it often fails to provide much insight into the operational causes of that condition. Thus, financial statement analysis is often supplemented by *operating indicator analysis,* which uses operating data not usually found in a business's financial statements, such as occupancy, patient mix, length of stay, and productivity measures, to help identify those factors that contributed to the assessed financial condition. Through operating indicator analysis, managers are better able to identify and implement strategies that ensure a sound financial condition in the future.

Financial condition analysis involves a number of techniques that extract information contained in a business's financial statements and elsewhere and combine it in a form that facilitates making judgments about the business's financial condition and operations. Often, the end result is a list of corporate strengths and weaknesses. In this chapter, several analytical techniques used in financial condition analyses, some related topics, and the problems inherent in such analyses are discussed. Along the way, you will discover that financial condition analysis generates a great deal of data. A significant problem in assessing financial condition is separating the important from the unimportant and presenting the results in a simple, easy to monitor format. Thus, we close the chapter with some ideas about data presentation.

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Financial Statements

As you learned in the earlier chapters of this text, accounting standards require businesses to prepare several *financial statements,* including three basic financial statements: (1) the *income statement,* (2) the *balance sheet,* and (3) the *statement of cash flows.* Taken together, these statements give an accounting picture of the firm's operations and its financial position. Detailed data are provided for the two or three most recent periods, and brief historical summaries of key operating statistics for longer periods often are included.

In much of this chapter, Riverside Memorial Hospital, a 450-bed not-for-profit facility, is used to illustrate financial condition analysis. Although a hospital is being used to illustrate the techniques, they can be applied to any health services setting. Simplified versions of Riverside's primary financial statements are contained in Tables 17.1, 17.2, and 17.3. Riverside's income statements and balance sheets (Tables 17.1 and 17.2) will be examined in later sections when we discuss ratio analysis and other tools that are used to help interpret the data. For now, our focus is on the statement of cash flows, which can be interpreted without the need for additional data manipulation.

Table 17.1: Riverside Memorial Hospital: Statements of Operations (Income Statements) Years Ended December 31, 2007 and 2006 (in thousands)
Open table as spreadsheet

	2007	2006
Net patient service revenue	$108,600	$ 97.393
Premium revenue	5.232	4.622
Other revenue	3.644	6,014
Total revenues	$117,476	$108,029
Expenses:		
Nursing services	$ 58,285	$ 56,752
Dietary services	5.424	4,718
General services	13,198	11,655
Administrative services	11,427	11,585
Employee health and welfare	10,250	10,705
Provision for uncollectibles	3.328	3.469
Provision for malpractice	1,320	1,204
Depreciation	4,130	4,025
Interest expense	1.542 $108,904	1,521
Total expenses	$108,904	$105,634
Net income	$ 8,572	$ 2,395

Table 17.2: Riverside Memorial Hospital: Balance Sheets December 31, 2007 and 2006 (in thousands)
Open table as spreadsheet

	2007	2006
Cash	$ 4.263	$ 5,095
Short-term investments	2,000	0
Accounts receivable	21,840	20,738
Inventories	3.177	2,982
Total current assets	$ 31,280	$ 28,815
Gross plant and equipment Accumulated depreciation	$ 145,158 25,160	$140,865 21,030
Net plant and equipment	$ 119,998	$ 119,835
Total assets	$ 151,278	$148,650
Accounts payable	$ 4,707	$ 5.145
Accrued expenses	5,650	5.421
Notes payable	2.975	6,237
Total current liabilities	$ 13.332	$ 16,803
Long-term debt	$ 30,582	$ 33.055
Net assets (equity)	$107,364	$ 9^{8}.792
Total liabilities and net assets	$ 151,278	$148,650

Table 17.3: Riverside Memorial Hospital: Statement of Cash Flows Year Ended December 31, 2007 (in thousands)

➡ Open table as spreadsheet

Cash Flows from Operating Activities	
Change in net assets (net income)	$ 8,572
Adjustments:	
Depreciation	4.130
Increase in accounts receivable	(1,102)
Increase in inventories	(195)
Decrease in accounts payable	(438)
Increase in accrued expenses	229
Net cash flow from operations	$11,196
Cash Flows from Investing Activities	
Investment in plant and equipment	($ 4.293)
Cash Flows from Financing Activities	
Investment in short-term securities	($ 2,000)
Repayment of long-term debt	(2,473)
Repayment of notes payable	(3.262)
Net cash flow from financing	($ 7.735)
Net increase (decrease) in cash	($ 832)
Beginning cash and equivalents	$ 5.095
Ending cash and securities	$ 4.263

The statement of cash flows (Table 17.3), first described in Chapter 4, tells such things as whether or not the firm's core operations are profitable, how much capital the firm raised and how this capital was used, and what impact operating and financing decisions had on the firm's cash position.

The top part shows cash generated by and used in operations during 2007. For Riverside, operations provided

$11,196,000 in net cash flow. The income statement reported net income plus depreciation of $8,572,000 + $4,130,000 = $12,702,000, but as part of its operations Riverside invested $1,297,000 in current assets (receivables and inventories) and reduced its spontaneous liabilities (payables and accruals) balances by $209,000. The end result, *net cash flow from operations,* is $12,702,000 – $1,297,000 – $209,000 = $11,196,000.

The next section of the statement of cash flows focuses on investments in fixed assets. Riverside spent $4,293,000 on capital expenditures in 2007. Is that a large or small amount? The top part of the statement of cash flows reports a depreciation expense for 2007 of $4,130,000, so the hospital spent only slightly more than its depreciation on new fixed assets. Thus, it is likely that the capital expenditures were more to replace worn out and obsolete assets than to add a significant amount of new assets.

Riverside's financing activities, as shown in the third section, highlight the fact that the hospital used cash to pay off previously incurred debt and to invest in marketable securities. The net effect of the hospital's financing activities is a *net cash outflow from financing* of $7,735,000.

When the three major sections are totaled, Riverside had a $11,196,000 – $4,293,000 – $7,735,000 = $832,000 *net decrease in cash* (i.e., net cash outflow) during 2007. The very bottom of Table 17.3 reconciles the 2007 net cash flow with the ending cash balance shown on the balance sheet. Riverside began 2007 with $5,095,000; experienced a cash outflow of $832,000 during the year; and ended the year with $5,095,000 – $832,000 = $4,263,000 in its cash account, as verified by the value reported on Table 17.2.

Riverside's statement of cash flows shows nothing unusual or alarming. It does show that the hospital's operations are inherently profitable, at least in 2007. Had the statement showed an operating cash drain, Riverside's managers would have had something to worry about; if it continued, such a drain could bleed the hospital to death. The statement of cash flows also provides easily interpreted information about Riverside's financing and fixed asset investing activities for the year. For example, Riverside's cash flow from operations was used primarily to purchase replacement fixed assets, to invest in short-term securities, and to pay off notes payable and long-term debt. Again, such uses of operating cash flow do not raise any red flags regarding the hospital's financial actions.

Managers and investors must pay close attention to the statement of cash flows. Financial condition is driven by cash flows, and the statement gives a good picture of the annual cash flows generated by the business. An examination of Table 17.3 (or better yet, a series of such tables going back the last five years and projected five years into the future) would give Riverside's managers and creditors an idea of whether or not the hospital's operations are self-sustaining—that is, does the business generate the cash flows necessary to pay its bills, including those associated with the capital employed? Although the statement of cash flows is filled with valuable information, the bottom line tells little about the business's financial condition because operating losses can be covered by financing transactions such as borrowing or selling new common stock (if investor-owned), at least in the short run.

Self-Test Questions

1. What are the three primary financial statements?
2. What type of financial performance information is provided in the statement of cash flows?
3. What is the difference between net income and cash flow, and which is more meaningful to a business's financial condition?
4. Does the fact that a business's cash position has improved provide much insight into the year's financial results?

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Financial Ratio Analysis

The first step in most financial condition analyses is to examine the business's financial statements. Thus, in the last section we analyzed Riverside's statement of cash flows. This was done first because this statement is formatted in a way that facilities interpretation without further data manipulation. Now we examine the income statement and balance sheet. Although these statements contain a wealth of financial information, it is difficult to make meaningful judgments about financial condition by merely examining the statements' raw data. To illustrate, one managed care plan may have $5,248,760 in long-term debt and interest charges of $419,900, while another may have $52,647,980 in debt and interest charges of $3,948,600. The true burden of these debts, and each managed care plan's ability to pay the interest and principal due on them, cannot be easily assessed without additional comparisons, such as those provided by *ratio analysis*.

In essence, ratio analysis combines data to create single numbers that have easily interpreted significance (for our purposes, numbers that measure various aspects of financial condition). *Financial ratio analysis* is ratio analysis applied to the data contained in a business's income statement and balance sheet. In the case of the debt and interest payments described above, ratios could be constructed that relate each plan's debt to its assets and the interest it pays to the income it has available for payment.

Unfortunately, an almost unlimited number of financial ratios can be constructed, and the choice of ratios depends in large part on the nature of the business being analyzed, the purpose of the analysis, and the availability of comparative data. Generally, ratios are grouped into categories to make them easier to interpret. In the paragraphs that follow, the data presented in Tables 17.1 and 17.2 are used to calculate an illustrative sampling of 2007 financial ratios for Riverside Memorial Hospital, which are then compared with hospital industry average ratios.[1] Note that in a real analysis, many more ratios would be calculated and analyzed. Also, although a hospital is used to illustrate ratio analysis, the specific ratios used in any analysis depend on the type of healthcare provider. Some ratios are more meaningful for hospitals, some for managed care organizations, some for group practices, and so on.[2]

Profitability Ratios

Profitability is the net result of a large number of managerial policies and decisions, so *profitability ratios* provide one measure of the aggregate financial performance of a business.

Total Margin

The *total margin*, often called the *total profit margin* or just *profit margin*, is defined as net income divided by total revenues:

$$\text{Total margin} = \frac{\text{Net income}}{\text{Total revenues}} = \frac{\$8{,}572}{\$117{,}476} = 0.073 = 7.3\%.$$

$$\text{Industry average} = 5.0\%.$$

Riverside's total margin of 7.3 percent shows that the hospital makes 7.3 cents on every dollar of total revenues. The total margin measures the ability of the organization to control expenses. With all else the same, the higher the total margin, the lower the expenses relative to revenues. Riverside's total margin is above the industry average of 5 percent, indicating relatively good expense control. How good? The industry data source also reports quartiles; for total margin, the upper quartile was 8.4 percent, meaning that 25 percent of hospitals had total margins higher than 8.4 percent. Thus, although Riverside's total margin was better than average, it was not as good as the top 25 percent of hospitals.

Although industry average figures are discussed in detail later in the chapter, it should be noted here that the industry average is not a magic number that all businesses should strive to achieve. In fact, some very well-managed businesses will be above the average, while other good firms will be below it. However, if a business's ratios are far removed from the average for the industry, its managers should be concerned about why this difference occurs.

Riverside's relatively high total margin could mean that the hospital's charges are relatively high, its allowances are relatively low, its costs are relatively low, it has relatively high nonoperating (other) revenue, or a combination of these factors. A thorough operating indicator analysis would help pinpoint the cause, or causes, of Riverside's high total margin.

When data are available, another useful margin ratio is the *operating margin*, defined as operating income divided by operating revenues. (Operating revenues are defined here as patient service revenue plus premium revenue.) The advantage of this margin measure is that it focuses on core business operations and hence removes the influence of nonoperating gains and losses, which often are transitory and unrelated to core operations. However, the format of many healthcare organizations' financial statements makes this ratio difficult to determine without additional information.

With only the data given in the financial statements, Riverside's operating margin can be estimated as follows: First, Riverside's operating revenue for 2007 was $108,600,000 + $5,232,000 = $113,832,000. If the assumption is made that all expenses were operating expenses, Riverside's 2007 operating margin would be ($113,832-$108,904)/$113,832 = $4,928/$113,832 = 0.043 = 4.3%. Removing nonoperating (other) revenue from the calculation lowers the profit margin.

Return on Assets (Roa)

The ratio of net income to total assets measures the *return on total assets*, often just called *return on assets (ROA)*:

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Total assets}} = \frac{\$8{,}572}{\$151{,}278} = 0.057 = 5.7\%.$$

$$\text{Industry average} = 4.8\%.$$

Riverside's 5.7 percent ROA, which means that each dollar of assets generated 5.7 cents in profit, is well above the 4.8 percent average for the hospital industry. ROA tells managers how productively, in a financial sense, a business is using its assets. The higher the ROA, the greater the net income for each dollar invested in assets and hence the more productive the assets. ROA measures both a business's ability to control expenses, as expressed by the total margin, and its ability to use its assets to generate revenue.

Return on Equity (Roe)

The ratio of net income to total equity (net assets) measures the *return on equity (ROE)*:

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Total equity}} = \frac{\$8{,}572}{\$107{,}364} = 0.080 = 8.0\%.$$

$$\text{Industry average} = 8.4\%.$$

Riverside's 8 percent ROE is slightly below the 8.4 percent industry average. The hospital was able to generate 8 cents of income for each dollar of equity investment, while the average hospital produced 8.4 cents. ROE is especially meaningful for investor-owned businesses because owners are concerned with how well the business's managers are utilizing owner-supplied capital, and ROE gives the answer to this question. For not-for-profit businesses such as Riverside, ROE tells its board of trustees and managers how well, in **financial terms,** its community-supplied capital is being used.

Riverside's 2007 total margin and return on assets were above the industry averages, yet the hospital's ROE is below the average. As we will explain later in the section on Du Pont analysis, this seeming inconsistency is a result of the hospital's relatively low use of debt financing.

Liquidity Ratios

One of the first concerns of most managers, and the major concern of a firm's creditors, is the business's *liquidity.* Will the business be able to meet its obligations as they become due? Riverside has debts totaling more than $13 million (i.e., its current liabilities) that must be paid off within the coming year. Will the hospital be able to make these payments? A full liquidity analysis requires the use of a *cash budget,* which was discussed in Chapter 8. However, by relating the amount of cash and other current assets to current obligations, ratio analysis provides a quick, easy-to-use, rough measure of liquidity.

Current Ratio

The *current ratio* is calculated by dividing current assets by current liabilities:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}} = \frac{\$31{,}280}{\$13{,}332} = 2.3, \text{ or } 2.3 \text{ times}.$$

$$\text{Industry average} = 2.0.$$

The current ratio tells managers that the liquidation of Riverside's current assets at book value would provide $2.30 of cash for every $1 of current liabilities. If a business is getting into financial difficulty, it will begin paying its accounts payable more slowly, building up short-term bank loans (i.e., notes payable), and so on. If these current liabilities rise faster than current assets, the current ratio will fall, and this could spell trouble. Because the current ratio is an indicator of the extent to which short-term claims are covered by assets that are expected to be converted to cash in the near term, it is one commonly used measure of liquidity.

Riverside's current ratio is slightly above the average for the hospital industry. Because current assets should be converted to cash in the near future, it is highly probable that these assets could be liquidated at close to their stated values. With a current ratio of 2.3, the hospital could liquidate current assets at only 43 percent of book value and still pay off current creditors in full.[3]

Days Cash on Hand

The current ratio measures liquidity on the basis of balance sheet accounts, and hence is a static measure of liquidity. However, the true measure of a business's liquidity is whether or not it can meet its payments as they become due, and so liquidity is more related to cash flows than it is to assets and liabilities. The *days-cash-on-hand ratio* moves closer to those factors that truly determine liquidity:

$$\text{Days cash on hand} = \frac{\text{Cash} + \text{Marketable securities}}{(\text{Expenses} - \text{Depreciation} - \text{Provision for uncollectibles})/365}$$

$$= \frac{\$4{,}263 + \$2{,}000}{(\$108{,}904 - \$4{,}130 - \$3{,}328)/365} = \frac{\$6{,}263}{\$277.93} = 22.5 \text{ days}.$$

$$\text{Industry average} = 30.6 \text{ days}.$$

The denominator of the equation *estimates* average daily cash expenses by stripping out noncash expenses from reported total expenses. The numerator is the cash and securities that are available to make those cash payments. Because Riverside's days cash on hand is lower than the industry average, its liquidity position as measured by days cash on hand is worse than that of the average hospital.

For Riverside, the two measures of liquidity, current ratio and days cash on hand, give conflicting results. Perhaps the average hospital has a greater proportion of cash and marketable securities in its current assets than does Riverside. More analysis would be required to make a supportable judgment concerning Riverside's liquidity position. Remember, though, that the cash budget is the primary tool used by managers to ensure liquidity.

Debt Management (Capital Structure) Ratios

The degree to which a firm uses debt financing, or *financial leverage,* is an important measure of financial performance for several reasons. First, by raising funds through debt, owners of for-profit firms can maintain control of the firm with a limited investment. For not-for-profit firms, debt financing allows the organization to provide more services than it could if it were solely financed with contributed and earned capital. Next, creditors look to equity capital to provide a margin of safety; if the owners (or community) have provided only a small proportion of total financing, the risks of the enterprise are borne mainly by its creditors. Finally, if a firm earns more on investments financed with borrowed funds than it pays in interest, its return on equity capital is magnified, or leveraged up.

Two types of ratios are used to assess debt management:

A. **Capitalization ratios.** These ratios use balance sheet data to determine the extent to which borrowed funds have been used to finance assets.

B. **Coverage ratios.** Here, income statement data are used to determine the extent to which fixed financial charges are covered by reported profits.

The two sets of ratios are complementary, so most financial statement analyses examine both types.

Capitalization Ratio 1: Total Debt to Total Assets (Debt Ratio)

The ratio of total debt to total assets (total liabilities and equity), generally called the *debt ratio,* measures the percentage of total capital provided by creditors:

$$\text{Debt ratio} = \frac{\text{Total debt}}{\text{Total assets}} = \frac{\$43{,}914}{\$151{,}278} = 0.290, \text{ or } 29.0\%.$$

$$\text{Industry average} = 42.3\%.$$

For our purposes, debt is defined as **all debt,** including current liabilities and long-term debt—everything but equity. However, as illustrated by the next ratio discussed, capitalization ratios have many variations, many of which use different definitions of what constitutes debt.

Creditors prefer low debt ratios because the lower the ratio, the greater the cushion against creditors' losses in the event of bankruptcy and liquidation. Conversely, owners of for-profit firms may seek high leverage either to leverage up returns or because selling new stock would mean giving up some degree of control. In not-for-profit firms, managers may seek high leverage to offer more services.

Riverside's debt ratio is 29 percent. This means that its creditors have supplied somewhat less than one-third of the business's total financing. Put another way, each dollar of assets was financed with 29 cents of debt, and consequently, 71 cents of equity. (The *equity ratio* is 1 − Debt ratio, so Riverside's equity ratio is 71 percent.) Because the average debt ratio for the hospital industry is over 40 percent, Riverside uses significantly less debt than the average hospital. The low debt ratio indicates that the hospital would find it relatively easy to borrow additional funds, presumably at favorable rates.

The *debt-to-equity ratio,* which is defined as Total debt/Total equity, is a close relative of the debt ratio. These ratios are transformations of one another, and hence provide the same information, but with a slightly different twist. Both the debt ratio and debt-to-equity ratio increase as a business uses a greater proportion of debt financing, but the debt ratio rises linearly and approaches a limit of 100 percent, while the debt-to-equity ratio rises exponentially and approaches infinity. Lenders, in particular, prefer the debt-to-equity ratio to the debt ratio. Their preference is based on the fact that it tells them how much capital creditors have provided to the business **per dollar of equity capital**. The higher this ratio, the riskier the creditors' position. Other analysts tend to prefer the debt ratio because it makes it easier to visualize the liabilities and equity portion of the balance sheet.

Capitalization Ratio 2: Debt-to-Capitalization Ratio

The *debt-to-capitalization ratio,* which is defined as long-term debt divided by long-term capital (long-term debt plus equity), focuses on the proportion of debt used in a business's permanent (long-term) capital. This ratio is also called the *long-term-debt-to-capitalization ratio* or just *capitalization ratio.*

$$\text{Debt-to-capitalization ratio} = \frac{\text{Long-term debt}}{\text{Long-term debt} + \text{Equity}}$$

$$= \frac{\$30{,}582}{\$30{,}582 + \$107{,}364} = 0.222, \text{ or } 22.2\%.$$

$$\text{Industry average} = 34.6\%.$$

Many analysts believe that the debt-to-capitalization ratio best reflects the capital structure of a business. This belief is based on the fact that most businesses use as much spontaneous free credit (current liabilities less short-term bank loans) as they can get. Furthermore, short-term interest-bearing debt typically is used only to fund temporary current asset needs. Thus, the "true" capital structure of a business—the one that reflects its target structure—is best reflected by the debt-to-capitalization ratio, which focuses on permanent (long-term) financing.

Riverside's debt-to-capitalization ratio is 22.2 percent, compared to the industry average of 34.6 percent. This low use of debt financing in Riverside's permanent capital mix confirms the conclusion made earlier that the hospital has unused debt capacity.

Coverage Ratio 1: Times Interest Earned Ratio

The *times interest earned (TIE) ratio* is determined by dividing earnings before interest and taxes (EBIT) by interest charges. EBIT is used in the numerator because it represents the amount of income that is available to pay interest expense. For a not-for-profit business, which does not pay taxes, EBIT = Net income + Interest expense. For Riverside:

$$\text{TIE ratio} = \frac{\text{EBIT}}{\text{Interest expense}} = \frac{\$8{,}572 + \$1{,}542}{\$1{,}542} = \frac{\$10{,}114}{\$1{,}542} = 6.6 \text{ times}.$$

$$\text{Industry average} = 4.0.$$

The TIE ratio measures the number of dollars of income (as opposed to cash flow) available to pay each dollar of interest expense. In essence, it is an indicator of the extent to which income can decline before it is less than annual interest costs. Failure to pay interest can bring legal action by the firm's creditors, possibly resulting in bankruptcy.

Riverside's interest is covered 6.6 times, so it has $6.60 of accounting income to pay each dollar of interest expense. Because the industry average TIE ratio is four times, the hospital is covering its interest charges by a relatively high margin of safety. Thus, the TIE ratio reinforces the previous conclusions based on the debt and debt-to-capitalization ratios—namely, that the hospital could easily expand its use of debt financing.

Coverage ratios are often better measures of a firm's debt utilization than capitalization ratios because coverage ratios discriminate between low-interest rate debt and high-interest rate debt. For example, a group practice might have $10 million of 4 percent debt on its balance sheet, while another might have $10 million of 8 percent debt. If both practices have the same income and assets, both would have the same debt ratio. However, the group that pays 4 percent interest would have lower interest charges and hence would be in better financial condition than the group that pays 8 percent. This difference in financial condition is captured by the TIE ratio.

Coverage Ratio 2: Cash Flow Coverage Ratio

Although the TIE ratio is easy to calculate, it has two major deficiencies. First, leasing has become widespread in recent years, and the TIE ratio ignores lease payments, which like debt payments, are contractual obligations. Also, many debt contracts require that principal payments be made over the life of the loan, rather than only at maturity. Thus, most businesses must meet fixed financial charges other than interest payments. Second, the TIE ratio ignores the fact that accounting income, whether measured by EBIT or net income, does not reflect the actual cash flow available to meet a business's fixed payments. These deficiencies are corrected in the *cash flow coverage (CFC) ratio,* which shows the amount by which cash flow covers fixed financial requirements. Here is Riverside's 2007 CFC ratio assuming the hospital had $1,368,000 of lease payments and $2,000,000 of required debt principal repayments:

$$\text{CFC ratio} = \frac{\text{EBIT} + \text{Lease payments} + \text{Depreciation expense}}{\text{Interest expense} + \text{Lease payments} + \text{Debt principal}/(1 - \text{T})}$$

$$= \frac{\$10{,}114 + \$1{,}368 + \$4{,}130}{\$1{,}542 + \$1{,}368 + \$2{,}000/(1 - 0)} = \frac{\$15{,}612}{\$4{,}910} = 3.2 \text{ times}.$$

$$\text{Industry average} = 2.3.$$

What is the purpose of the (1 – T) term applied to the debt principal? For investor-owned firms, the debt principal repayments, because they are paid with **after-tax dollars,** must be *grossed up* by dividing by 1 – T. This gives the amount of pretax dollars, contained in the numerator, that are required to cover the required principal repayments.

Like its TIE ratio, Riverside's CFC ratio exceeds industry standard, indicating that Riverside is better at covering total fixed payments with cash flow than is the average hospital. This fact should be reassuring both to creditors and to management, and it reinforces the view that Riverside has untapped debt capacity.

Asset Management (Activity) Ratios

The next group of ratios, the *asset management ratios,* is designed to measure how effectively a business's assets are being utilized. These ratios help to answer whether or not the amount of each type of asset reported on the balance sheet seems reasonable, too high, or too low in view of current (or projected) operating levels. Riverside and other hospitals must borrow or raise equity capital to acquire assets. If they have too many assets, then their capital costs will be too high and their profits will be depressed. Conversely, if the level of assets is too low, then volume may be lost or vital services not offered.

Fixed Asset Turnover Ratio

The *fixed asset turnover ratio,* also called the *fixed asset utilization ratio,* measures the utilization of plant and equipment, and it is the ratio of total revenues to net fixed assets:

$$\text{Fixed asset turnover} = \frac{\text{Total revenues}}{\text{Net fixed assets}} = \frac{\$117,476}{\$119,998} = 0.98 \text{ times.}$$

$$\text{Industry average} = 2.2.$$

Riverside's ratio of 0.98 indicates that each dollar of fixed assets generated 98 cents in revenue. This value compares poorly with the industry average of 2.2 times, indicating that Riverside is not using its fixed assets as productively as the average hospital. (The lower quartile value for the industry is 1.1; thus, Riverside falls in the bottom 25 percent of all hospitals in its fixed asset utilization.)

Before condemning Riverside's management for poor performance, it should be pointed out that a major problem exists with the use of the fixed asset turnover ratio for comparative purposes. Recall that most asset values listed on the balance sheet reflect historical costs rather than current values. Inflation and depreciation have caused the values of many assets that were purchased in the past to be seriously understated. Therefore, if an old hospital that had acquired much of its plant and equipment years ago is compared to a new hospital with the same physical capacity, the old hospital, because of a much lower book value of fixed assets, would report a much higher turnover ratio. This difference in fixed asset turnover is more reflective of the inability of financial statements to deal with inflation than of any inefficiency on the part of the new hospital's managers.

Total Asset Turnover Ratio

The *total asset turnover ratio* measures the turnover, or utilization, of all of a business's assets. It is calculated by dividing total revenues by total assets:

$$\text{Total asset turnover} = \frac{\text{Total revenues}}{\text{Total assets}} = \frac{\$117,476}{\$151,278} = 0.78 \text{ times.}$$

$$\text{Industry average} = 0.97.$$

Thus, each dollar of total assets generated 78 cents in total revenue. Riverside's total asset ratio is below the industry average but not as far below as its fixed asset turnover ratio. Thus, relative to the industry, the hospital is utilizing its current assets better than its fixed assets. Such judgments could be confirmed by examining Riverside's current asset turnover.[4]

Days in Patient Accounts Receivable

Days in patient accounts receivable is used to measure effectiveness in managing receivables. This measure of financial performance, which is sometimes classified as a liquidity ratio rather than an asset management ratio, has many names, including *average collection period (ACP)* and *days' sales outstanding (DSO).* It is computed by dividing net patient accounts receivable by average daily patient revenue to find the number of days that it takes an organization, on average, to collect its receivables:[5]

$$\text{Days in patient accounts receivable} = \frac{\text{Net patient accounts receivable}}{\text{Net patient service revenue}/365}$$

$$= \frac{\$21,840}{\$108,600/365} = 73.4 \text{ days.}$$

$$\text{Industry average} = 64.0 \text{ days.}$$

In the calculation for Riverside, premium revenue has not been included because such revenue is collected before services are provided and hence does not affect receivables.

Riverside is not doing as well as the average hospital in collecting its receivables. The lower quartile value is 78.7 days, so a relatively large number of hospitals are doing worse. Still, as was discussed in Chapter 16, it is important that businesses collect their receivables as soon as possible. Clearly, Riverside's managers should strive to increase the hospital's performance in this key area.

Other Ratios

The final group of ratios examines other facets of a business's financial condition.

Average Age of Plant

The *average age of-plant* gives a rough measure of the average age in years of a business's fixed assets:

$$\text{Average age of plant} = \frac{\text{Accumulated depreciation}}{\text{Depreciation expense}} = \frac{\$25,160}{\$4,130} = 6.1 \text{ years.}$$

$$\text{Industry average} = 9.1 \text{ years.}$$

Riverside's physical assets are newer than those of the average hospital. Thus, the hospital is offering more up-to-date facilities than average, and hence it will probably have fewer capital expenditures in the near future. On the other hand, Riverside's net fixed asset valuation will be relatively high, which as pointed out earlier, biases the hospital's fixed asset and total asset turnover ratios downward. This fact raises serious questions about the interpretation of the turnover ratios calculated previously.

Price/Earnings Ratio

For investor-owned firms with publicly traded stock, some ratios can be developed that relate the firm's stock price to its earnings and book value per share. Such *market value ratios* give managers an indication of what equity investors think of the company's past performance and future prospects.

The *-price/earnings (P/E) ratio* shows how much investors are willing to pay per dollar of reported profits. Suppose that the stock of General Home Care, an investor-owned home health care company, sells for $28.50, while the firm had 2007 earnings per share (EPS) of $2.20. Then, its P/E ratio would be 13.0:

$$\text{P/E ratio} = \frac{\text{Price per share}}{\text{Earnings per share}} = \frac{\$28.50}{\$2.20} = 13.0 \text{ times.}$$

$$\text{Industry average} = 15.2.$$

P/E ratios are higher for firms with high growth prospects, other things held constant, but they are lower for riskier firms. General's P/E ratio is slightly below the average of other investor-owned home health care companies, which suggests that the company is regarded as being somewhat riskier than most, as having poorer growth prospects, or both.

Market/Book Ratio The ratio of a stock's market price to its book value gives another indication of how investors regard the company. Companies with relatively high rates of return on equity generally sell at higher multiples of book value than those with low returns. General reported $80 million in total equity on its 2007 balance sheet, and the firm had 5 million shares outstanding, so its *book value per share* is $80 / 5 = $16.00. Dividing the price per share by the book value per share gives a *market/book (M/B) ratio* of 1.8 times:

$$\text{M/B ratio} = \frac{\text{Price per share}}{\text{Book value per share}} = \frac{\$28.50}{\$16.00} = 1.8 \text{ times.}$$

$$\text{Industry average} = 2.1.$$

Investors are willing to pay slightly less for each dollar of General's book value than for that of an average home health care company.

Comparative and Trend Analysis

When conducting ratio analysis, the value of a particular ratio, in the absence of other information, reveals almost nothing about a business's financial condition. For example, if it is known that a nursing home management company has a current ratio of 2.5, it is virtually impossible to say whether this is good or bad. Additional data are needed to help interpret the results of this ratio analysis. In the discussion of Riverside's ratios, the focus was on *comparative analysis*—that is, the hospital's ratios were compared with the average ratios for the industry. Another useful ratio analysis tool is *trend analysis*, in which the trend of a single ratio is analyzed over time. Trend analysis gives clues about whether a business's financial situation is improving, holding constant, or deteriorating.

Open table as spreadsheet

	Return on Equity (ROE)			
		Industry		
Year	Riverside	Lower Quartile	Median	Upper Quartile
2003	12.5%	2.6%	8.6%	13.3%
2004	10.0	2.5	8.6	13.3
2005	6.7	2.8	7.2	12.0
2006	2.4	4.1	7.2	12.1
2007	8.0	3.8	7.4	12.3

It is easy to combine comparative and trend analyses in a single graph such as the one shown in Figure 17.1. Here, Riverside's ROE (the solid lines) and industry average ROE data (the dashed lines) are plotted for the past five years. The graph shows that the hospital's ROE was declining faster than the industry average from 2003 through 2006, but that it rose above the industry in 2007. Other ratios can be analyzed in a similar manner.

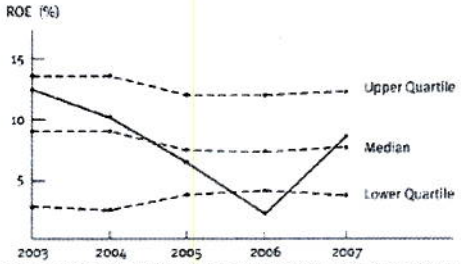

Figure 17.1: Riverside Memorial Hospital: ROE Analysis, 2003-2007

Self-Test Questions

1. What is the purpose of ratio analysis?
2. What are two ratios that measure profitability?
3. What are two ratios that measure liquidity?
4. What are two ratios that measure debt management?
5. What are two ratios that measure asset management?
6. What are two ratios that measure market value?
7. How can comparative and trend analyses be used to help interpret a ratio?

[1]Industry average ratios are available from many sources. For example, Ingenix publishes an annual almanac that provides hospital industry data on 33 financial ratios and 43 operating indicator ratios. The ratios are reported in several groupings, such as by hospital size and geographic location. See ***www.hospitalbenchmarks.com***. The industry average ratios presented in this chapter are for illustrative use only and hence should not be used for making real-world comparisons. Also, note that in accordance with standard practice, we are calling the comparative data *averages*, but in reality they are *median* values. Median values are better for comparisons because they are not biased by extremely high or low values in the industry data set.

[2]A more complete set of both financial and operating indicator ratios is available from the Health Administration Press website for this book. See **ache.org/books/HCFinance4**.

[3]To determine the minimum proportional value that must be obtained from current assets to meet current obligations, divide the number 1 by the current ratio. For Riverside, 1 / 2.3 = 0.43, or 43%. If liquidated at 43 cents on the dollar, the hospital's current assets would provide 0.43 × $31,280,000 $13,332,000 in cash, which equals the amount of current liabilities.

[4]Riverside's 2007 *current asset turnover ratio* (total revenues divided by total current assets) was 3.8, compared to an industry average of 3.6, so the hospital is slightly above average regarding current asset utilization.

[5]Because information on credit sales is generally unavailable, total patient services revenue must be used. Although almost all hospital services are provided on credit because of the third-party-payer system, other healthcare businesses may not have the same high percentage of credit sales. As the proportion of cash sales increases, the days in patient accounts receivable measure loses its usefulness. Also, it would be better to use average receivables in the ratio, either calculated as an average of monthly figures or as (Beginning receivables + Ending receivables) / 2.

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Chapter 17 - Financial Condition Analysis
Healthcare Finance: An Introduction to Accounting and Financial Management, Fourth Edition
by Louis C. Gapenski
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Tying the Financial Ratios Together: Du Pont Analysis

Financial ratio analysis provides a great deal of information about a business's financial condition, but it does not provide an overview nor does it tie any of the ratios together. *Du Pont analysis* provides an overview of a business's financial condition and helps managers and investors understand the relationships among several ratios.[6] Du Pont analysis, so named because managers at the Du Pont Company developed it, combines basic financial ratios in a way that provides valuable insights into a firm's financial performance. The analysis decomposes return on equity (ROE), one of the most important measures of a business's profitability, into the product of three other ratios, each of which has an important economic interpretation. The result is the *Du Pont equation:*

$$\text{ROE} = \text{Total margin} \times \text{Total asset turnover} \times \text{Equity multiplier}$$

$$\frac{\text{Net income}}{\text{Total equity}} = \frac{\text{Net income}}{\text{Total revenue}} \times \frac{\text{Total revenue}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Total equity}}.$$

Riverside's 2007 data are used to illustrate the Du Pont equation:

$$\frac{\$8{,}572}{\$107{,}364} = \frac{\$8{,}572}{\$117{,}476} \times \frac{\$117{,}476}{\$151{,}278} \times \frac{\$151{,}278}{\$107{,}364}$$

$$7.98\% = 7.30\% \times 0.78 \times 1.41$$

$$= 5.69\% \times 1.41.$$

Riverside's 2007 data are used to illustrate the Du Pont equation:

$$\frac{\$8{,}572}{\$107{,}364} = \frac{\$8{,}572}{\$117{,}476} \times \frac{\$117{,}476}{\$151{,}278} \times \frac{\$151{,}278}{\$107{,}364}$$

$$7.98\% = 7.30\% \times 0.78 \times 1.41$$

$$= 5.69\% \times 1.41.$$

In the Du Pont equation, the product of the first two terms on the right side is return on assets (ROA), so the equation can also be written as ROE = ROA × Equity multiplier. Riverside's 2007 total margin was 7.3 percent, so the hospital made 7.3 cents profit on each dollar of total revenue. Furthermore, assets were turned over (or created revenues) 0.78 times during the year, so the hospital earned a return of 7.30% × 0.78 = 5.69% on its assets. This value for ROA, when rounded, is the same as was calculated previously in our ratio analysis discussion.

If the hospital used only equity financing, its 5.69 percent ROA would equal its ROE. However, creditors supplied 29 percent of Riverside's capital, while the equityholders (the community) supplied the rest. Because the 5.69 percent ROA belongs exclusively to the suppliers of equity capital, which comprises only 29 percent of total capital, Riverside's ROE is higher than its 5.69 percent ROA. Specifically, ROA must be multiplied by the *equity multiplier,* which shows the amount of assets working for each dollar of equity capital, to obtain the ROE of 7.98 percent. This 7.98 percent ROE could be calculated directly: ROE = Net income / Total equity = $8,572 / $107,364 = 7.98%. However, the Du Pont equation shows how total margin, which measures **expense control;** total asset turnover, which measures **asset utilization;** and financial leverage, which measures **debt utilization,** interact to determine ROE.

Riverside's managers use the Du Pont equation to suggest how to improve the hospital's financial condition. To influence the profit margin, Riverside must increase revenues and/or reduce costs. Thus, the hospital's marketing staff can study the effects of raising charges, or lowering them to increase volume; moving into new services or markets with higher margins; entering into new contracts with managed care plans; and so on. Furthermore, management accountants can study the expense items and, while working with department heads and clinical staff, can seek ways to reduce costs. More specific ideas regarding actions needed to improve financial condition will be gleaned from an operating indicator analysis, which is discussed later on.

Regarding total asset turnover, Riverside's analysts, while working with both clinical and marketing staffs, can investigate ways of reducing investments in various types of assets. Finally, the hospital's financial staff can analyze the effects of alternative financing strategies on the equity multiplier, seeking to hold down interest expenses and the risks of debt while still using debt to leverage up ROE.

The Du Pont equation provides a useful comparison between a business's performance as measured by ROE and the performance of an average hospital. For example, here is the comparative analysis for 2007:

$$\text{Riverside:} \quad \text{ROE} = 7.3\% \times 0.78 \times 1.41$$

$$= \quad 5.69\% \quad \times 1.41 \approx 8.0\%.$$

$$\text{Industry average: ROE} = 5.0\% \times 0.97 \times 1.73$$

$$4.85\% \quad \times 1.73 \approx 8.4\%.$$

The Du Pont analysis tells managers and creditors that Riverside has a significantly higher profit margin, and thus better control over expenses, than does the average hospital. However, the average hospital has a better total asset turnover, and thus Riverside is getting below-average utilization from its assets. In spite of the average hospital's advantage in asset utilization, Riverside's superior expense control outweighs its utilization disadvantage because its ROA of 5.69 percent is higher than the industry average ROA of 4.85 percent. Finally, the average hospital has offset Riverside's advantage in ROA by using more financial leverage, although Riverside's lower use of debt financing decreases its risk. The end result is that Riverside gets somewhat less return on its equity capital than does the average hospital.

One potential problem with Du Pont and ratio analyses applied to not-for-profit organizations, especially hospitals, is that a large portion of their net income may come from nonoperating sources rather than from operations. If the nonoperating revenues are highly variable and unpredictable, as they often are, return on equity and the ratios as previously defined may be a poor measure of the hospital's inherent profitability. All applicable ratios, as well as the Du Pont analysis, could be recast to focus on operations by using operating revenue in lieu of total revenue.

Self-Test Questions

1. Explain how the Du Pont equation combines several ratios to obtain an overview of a business's financial condition.
2. Why may a focus on operating revenue and operating income be preferable to a focus on total revenue and net income?

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[6]For pedagogic reasons, we discussed ratio analysis **before** Du Pont analysis. However, when actually conducting a financial performance analysis, most analysts would conduct the Du Pont analysis **first.** The idea here is to use Du Pont analysis to gain an overview of the business's financial condition. Then, with some understanding of the business's financial strengths and weaknesses, the ratio analysis can focus on those areas identified as critical to improving performance.

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Other Analytical Techniques

Besides ratio and Du Pont analyses, two additional financial statement analysis techniques are commonly used in financial condition analysis. In *common size analysis,* all income statement items are divided by total revenues and all balance sheet items are divided by total assets. Thus, a common size income statement shows each item as a percentage of total revenues, and a common size balance sheet shows each account as a percentage of total assets. The advantage of common size statements is that they facilitate comparisons of income statements and balance sheets over time and across companies because they remove the influence of the scale (size) of the business.

Another frequently used technique when analyzing financial statements is *-percentage change analysis.* Here, the percentage changes in the balance sheet accounts and income statement items from year to year are calculated and compared. In this format, it is easy to see what accounts and items are growing faster or slower than others and thus to identify which are under control and which are out of control.

The conclusions reached in common size and percentage change analyses generally parallel those derived from ratio analysis. However, occasionally a serious deficiency is highlighted only by one of the three analytical techniques, while the other two techniques fail to bring the deficiency to light. Thus, a thorough financial statement analysis usually consists of a Du Pont analysis to provide an overview and then includes several different techniques such as ratio, common size, and percentage change analyses.[7]

Self-Test Questions

1. How are common size statements created?
2. What advantage do common size statements have over regular statements when conducting a financial statement analysis?
3. What is percentage change analysis, and why is it useful?
4. Which analytical techniques should be used in a complete financial statement analysis?

[7]For more information on common size and percentage change analysis, see L. C. Gapenski, *Understanding Healthcare Financial Management* (Chicago: Health Administration Press, 2007), Chapter 13.

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Operating Indicator Analysis

Operating indicator analysis goes one step beyond financial statement analysis in that operating indicator analysis examines operating variables with the goal of **explaining** a business's financial condition. Like the financial ratios, *operating indicators* are typically grouped into major categories to make interpretation easier.

Because of the large number of indicators used in a typical operating indicator analysis, it cannot be discussed in detail here. However, to give readers an appreciation for this type of analysis, six commonly used hospital operating indicators are defined and illustrated. Note that most of the data needed to calculate operating indicators are not contained in a business's financial statements. Thus, a larger data set is required for this type of analysis, and hence it is used more by managers than by outside analysts.

Net Price per Discharge

Net price per discharge measures the average revenue collected on each inpatient discharge. In 2007, Riverside reported $93,740,000 in inpatient service revenue and discharged 18,281 patients:

$$\text{Net price per discharge} = \frac{\text{Net inpatient revenue}}{\text{Total discharges}} = \frac{\$93{,}740{,}000}{18{,}281} = \$5{,}128.$$

$$\text{Industry average} = \$5{,}510.$$

Riverside collects less per discharge than the average hospital, ignoring bad debt losses. However, if Riverside's case mix, which measures the average intensity of services provided, were lower than average, perhaps its net price per discharge is appropriate, even though it is below the industry average. In fact, Riverside's case mix is slightly higher than average. Still, as we explain in a later section, the net price per discharge cannot be completely interpreted without knowing Riverside's cost per discharge.

Medicare Payment Percentage

Medicare payment percentage measures the exposure of a hospital to Medicare patients and hence to payments set by political, rather than economic, processes:

$$\text{Medicare payment percentage} = \frac{\text{Medicare discharges}}{\text{Total discharges}} = \frac{7{,}642}{18{,}281} = 41.8\%.$$

$$\text{Industry average} = 43.5\%.$$

Riverside has a somewhat lower percentage of Medicare patients than the average hospital. To the extent that Medicare payments are less than payments from other third-party payers, a higher Medicare payment percentage puts pressure on operating revenues. Conversely, if Medicare payments are higher than reimbursements by managed care plans, then, in some situations, a higher Medicare payment percentage might be good. Similar operating indicators could be constructed for Medicaid, managed care plan, and bad debt and charity care patients.

Outpatient Revenue Percentage

The *outpatient revenue percentage* measures the mix between outpatient and inpatient revenues:

$$\text{Medicare payment percentage} = \frac{\text{Medicare discharges}}{\text{Total discharges}} = \frac{7{,}642}{18{,}281} = 41.8\%.$$

$$\text{Industry average} = 43.5\%.$$

Riverside has a much smaller outpatient program, relative to its size, than the average hospital. During the 1990s, most hospitals significantly expanded their outpatient programs based on the belief that such services were more profitable because Medicare paid for outpatient services on a charge basis, whereas inpatient services were paid for on a prospective basis. However, the claims of increased profitability were never proved, and Medicare has since changed to a prospective payment system for outpatient services.

Occupancy Percentage (Rate)

Occupancy rate measures the extent of utilization of a hospital's beds and hence fixed assets. As discussed in Chapter 5, because overhead costs are incurred on all assets, whether used or not, higher occupancy spreads fixed costs over more patients and hence increases per patient profitability. Based on 95,061 inpatient days in 2007, Riverside's occupancy rate was 57.9 percent:

$$\text{Outpatient revenue percentage} = \frac{\text{Net outpatient revenue}}{\text{Net patient service revenue}} = \frac{\$20{,}092{,}000}{\$113{,}832{,}000} = 17.6\%.$$

$$\text{Industry average} = 34.5\%.$$

Riverside has a higher occupancy rate and hence is using its fixed assets more productively than the average hospital. It is interesting to note that this conclusion is contrary to the financial analysis interpretation of the hospital's 2007 fixed asset turnover ratio. While that ratio is affected by inflation and accounting convention, the occupancy rate is not. Hence, it is a superior measure of pure asset utilization, at least regarding inpatient assets. On this basis, it appears that Riverside's managers are doing a good job, relative to the industry, of utilizing the hospital's inpatient fixed assets.

Average Length of Stay (Alos)

Average length of stay (ALOS), or just *length of stay (LOS),* is the number of days that an average inpatient is hospitalized with each admission.

$$\text{ALOS} = \frac{\text{Inpatient days}}{\text{Total discharges}} = \frac{95{,}061}{18{,}281} = 5.2 \text{ days.}$$

$$\text{Industry average} = 4.1 \text{ days.}$$

On average, Riverside keeps its patients in the hospital longer than the average hospital does. Riverside has a *ease-mix index* of 1.28 compared with an average for the industry of 1.14. The case-mix index is a weighted average of DRG (diagnosis-related group) weights, so the higher the index, the more intense the services provided. Thus, the hospital's patients, on average, require more intensive treatment than patients in the average hospital.

Cost per Discharge

So far, the operating analysis illustration has focused on revenue and volume measures. *Cost per discharge* measures the dollar amount of resources, on average, expended on each discharge. Because Riverside's inpatient operating expenses for 2007 were $84,865,000, its cost per discharge was $4,642:

$$\text{Cost per discharge} = \frac{\text{Inpatient operating expenses}}{\text{Total discharges}} = \frac{\$84{,}865{,}000}{18{,}281} = \$4{,}642.$$

$$\text{Industry average} = \$5,446.$$

Even though Riverside's price per discharge is below average, its cost per discharge is even more so. Thus, the hospital's average margin on each discharge is more than that for the hospital industry.

As is apparent from the six operating indicators presented, operating indicator analysis goes beyond financial analysis in an attempt to identify the operating strengths and weaknesses that underlie a firm's financial performance. Although operating indicator analysis has been illustrated using the hospital industry, the concepts can be applied to any healthcare business, although the ratios selected would differ. Also, operating indicators are interpreted in the same way as financial ratios (i.e., by using comparative and trend analysis).

Self-Test Questions

1. What is the difference between financial and operating indicator analyses?
2. Why is operating indicator analysis important?
3. Describe four indicators commonly used in operating indicator analysis.

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Limitations of Financial Ratio and Operating Indicator Analyses

While financial ratio and operating indicator analyses can provide a great deal of useful information regarding a business's operations and financial condition, such analyses have limitations that necessitate care and judgment. In this section, some of the problem areas are highlighted.

To begin, many large healthcare businesses operate a number of different divisions in quite different lines of business, and in such cases it is difficult to develop meaningful comparative data. This problem tends to make financial statement and operating indicator analyses somewhat more useful for providers with single service lines than for large, multiservice companies.

Next, generalizing about whether or not a particular ratio or indicator is good or bad is often difficult. For example, a high current ratio may show a strong liquidity position, which is good, or an excessive amount of current assets, which is bad. Similarly, a high asset turnover ratio may denote either a business that uses its assets efficiently or one that is undercapitalized and simply cannot afford to buy enough assets. In addition, firms often have some ratios and indicators that look good and others that look bad, which make the firm's financial position, strong or weak, difficult to determine. For this reason, significant judgment is required when analyzing financial and operating performance.

Another problem is that different accounting practices can distort financial statement ratio comparisons. For example, firms can use different accounting conventions to value cost of goods sold and ending inventories. During inflationary periods these differences can lead to ratio distortions. Other accounting practices, such as those related to leases, can also create distortions.

Finally, inflation effects can distort both firms' balance sheets and income statements. Numerous reporting methods have been proposed to adjust accounting statements for inflation, but no consensus has been reached on how to do this or even on the practical usefulness of the resulting data. Nevertheless, accounting standards encourage, but do not require, businesses to disclose supplementary data to reflect the effects of general inflation. Inflation effects tend to make ratio comparisons over time for a given company, and across companies at any point in time, less reliable than would be the case in the absence of inflation.

Self-Test Questions

1. Briefly describe some of the problems encountered when performing financial statement and operating indicator analyses.
2. Explain how inflation effects created problems in the Riverside illustration.

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Economic Value Added (Eva)

Up to this point, we have focused on using different techniques to evaluate the financial condition of a business. In many situations it is useful to have a single measure that provides information on both financial condition and managerial performance. That measure is *Economic Value Added (EVA),* which focuses on managerial effectiveness in a given year.[8] The basic formula for EVA is:

$$\text{EVA} = \text{Net operating profit after taxes (NOPAT)} - (\text{Total capital} \times \text{Corporate cost of capital}).$$

In the EVA equation, NOPAT can be thought of as revenues minus all operating costs, including taxes (if applicable), but excluding interest expense. It is actually calculated as EBIT × (1 − T). Total capital is the sum of the book values of debt and equity and hence total assets, while the corporate cost of capital is the business's cost of financing. In essence, EVA measures the dollar profit above the economic dollar cost of creating that profit. Because the calculation of EVA does not require market value data, it can be applied to both for-profit and not-for-profit businesses.[9]

To illustrate the EVA concept, consider Birmingham Health Providers, a medical group practice. The group had $1 million in NOPAT in 2007 generated from $5 million of investor-supplied debt and equity capital. The firm's corporate cost of capital was 10 percent. With these assumptions, Birmingham Health Providers's 2007 EVA was $500,000:

$$\text{EVA} = \$1 - (\$5 \times 0.10) = \$1 - \$0.5 = \$0.5 \text{ million}.$$

EVA is an estimate of a business's true economic profit for the year, and it differs substantially from accounting profitability measures such as net income. EVA represents the residual income that remains after **all costs,** including the opportunity cost of the employed equity capital, have been recognized. Conversely, accounting profit is formulated without imposing a charge for equity capital. EVA depends on both operating efficiency and balance sheet management: without operating efficiency, profits will be low; without efficient balance sheet management, there will be too many assets and hence too much capital, which results in higher-than-necessary dollar capital costs.

For investor-owned businesses, there is a direct link between EVA and the value of the business—the higher the EVA, the greater the value to owners. For not-for-profit firms, equity capital is a scarce resource that must be managed well to ensure the financial viability of the organization and hence its ability to continue to perform its stated mission. EVA lets managers know how well they are doing in managing this scarce resource because the higher the EVA in any year, the better the job managers are doing in using the organization's contributions and earnings to create value for the community.

Of course, EVA measures only economic value; any social value created by the equity capital is ignored and, therefore, must be subjectively considered. EVA can be applied to divisions as well as to entire businesses, and the charge for capital should reflect the riskiness and capital structure of the business unit, whether it is the aggregate business or an operating division.

In practice, the calculation of EVA is much more complex than presented here because many accounting issues, such as inventory valuation, depreciation, amortization of research and development costs, and the like, must be addressed properly when estimating a firm's NO PAT. In addition, non-interest-bearing debt financing should be subtracted from assets. Nevertheless, the brief discussion here illustrates that a business's true economic profitability depends on both income statement profitability and effective use of balance sheet assets. Specifically, EVA is improved by (1) increasing revenues and decreasing costs, and hence increasing NOPAT; (2) decreasing the amount of assets used to create the NOPAT; and (3) decreasing the business's capital costs. Of course, all of this is easier said than done, and there are potential negative consequences associated with these actions. Still, the EVA model provides a good (but perhaps overly simple) road map to financial excellence.

Self-Test Questions

1. What is Economic Value Added (EVA), and how is it measured?
2. Why is EVA a better measure of financial performance than are accounting measures such as earnings per share and return on equity?
3. What does EVA tell managers about how to achieve good financial performance?

[8]The EVA concept was developed in detail and popularized by the consulting firm of Stern Stewart and Company. For a much more complete discussion of the concept, see G. Bennett Stewart, III, *The Quest for Value* (New York: HarperBusiness, 1991). Also, note that another potential measure of managerial performance for publicly traded investor-owned businesses is *Market Value Added (MVA),* which is the difference between the market value of equity and book value of equity. The larger the MVA, the greater the wealth created for shareholders.

[9]For an excellent example of the application of EVA in setting managerial compensation within not-for-profit firms, see W. O. Cleverley and R K. Harvey, "Economic Value Added—A Framework for Health Care Executive Compensation," *Hospital & Health Services Administration* (Summer 1993): 215-228.

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Benchmarking

Most techniques for evaluating financial condition require comparisons to make meaningful judgments. In the previous examination of selected financial and operating indicator ratios, Riverside's ratios were compared to industry average ratios. However, like managers in most businesses, Riverside's managers go one step further—they compare their ratios not only with industry averages but also with industry leaders and primary competitors. The technique of comparing ratios against selected standards is called *benchmarking,* while the comparative ratios are called *benchmarks.* Riverside's managers benchmark against industry averages; against National/GFB Healthcare and Pennant Healthcare, which are two leading for-profit hospital businesses; and against Woodbridge Memorial Hospital and St. Anthony's, which are its primary local competitors.

To illustrate the concept, consider how Riverside's analysts present total margin data to the firm's board of trustees:

	2007		2006
National/GFB	9.8%	National/GFB	9.6%
Industry top quartile	*8.4*	*Industry top quartile*	*8.0*
St. Anthony's	8.0	St. Anthony's	*7.9*
Riverside	7.3	Pennant Healthcare	5.0
Industry median	5.0	Industry median	4.7
Pennant Healthcare	4.8	**Riverside**	2.2
Industry lower quartile	*1.8*	*Industry lower quartile*	*2.1*
Woodbridge Memorial	0.5	Woodbridge Memorial	(1.3)

Open table as spreadsheet

Benchmarking permits Riverside's managers to easily see where the firm stands relative to its competition both in any given year and over time. As the data show, Riverside was roughly in the middle of the pack in 2007 with respect to its primary competitors and two large investor-owned hospital chains, although its showing was better than the average hospital. Its 2006 performance was significantly worse, so it improved substantially from 2006 to 2007. Although benchmarking is illustrated with one ratio, other ratios can be analyzed similarly. Also, for presentation purposes, charts are often used with comparative data that are color coded for ease of recognition and interpretation.

All comparative analyses require comparative data. Such data are available from a number of sources, including commercial suppliers, federal and state governmental agencies, and various industry trade groups. Each of these data suppliers uses a somewhat different set of ratios designed to meet its own needs. Thus, the comparative data source selected in a very real sense dictates the ratios that will be used in the analysis. Also, there are minor and sometimes major differences in ratio definitions between data sources—for example, one source may use a 365-day year, while another uses a 360-day year. Or one source might use operating values, as opposed to total values, when constructing ratios. It is **very important** to know the specific definitions used in the comparative data because definitional differences between the ratios being calculated and the comparative ratios can lead to erroneous interpretations and conclusions. Thus, the first task in any ratio analysis is to identify the comparative data set and the ratios to be used. Then, make sure that the ratio definitions used in the analysis match those from the comparative data set.

Self-Test Questions

1. What is benchmarking?
2. Why is it important to be familiar with the comparative data set?

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Key Performance Indicators and Dashboards

Financial statement and operating indicator data are usually created on an annual (or perhaps quarterly) basis. Financial condition analyses produced from this information may include literally hundreds of *metrics* (ratios and other measures). Although annual (and quarterly) financial condition analyses are almost always performed, managers need to monitor financial condition on a more regular basis so that problem areas can be identified and corrective action taken in a timely manner. However, the type of financial condition analyses described above with, say, weekly data would overload managers, and as a result, important findings could be missed.

To help solve the data overload and timeliness problems, many healthcare businesses use *Key Performance Indicators (KPIs)* and dashboards. KPIs are a **limited number** of financial and operating metrics that measure performance critical to the success of an organization. In essence, they assess the current state of the business, measure progress toward organizational goals, and prompt managerial action to correct deficiencies.

The KPIs chosen by any business depend on the line of business and its mission, objectives, and goals. In addition, KPIs usually differ by timing. For example, a hospital might have a daily KPI of number of net admissions (admissions minus discharges), while the corresponding quarterly and annual KPI might be occupancy rate. Clearly, the number of KPIs used must be kept to a minimum to allow managers to focus on the most important aspects of financial and operating performance.

Dashboards are a common way to present an organization's KPIs. The term stems from an automobile's dashboard, which presents key information (for example, speed, engine temperature, and oil pressure) about the car's performance. Often, the KPIs are shown as gauges, which allow managers to quickly interpret the indicators. The basic idea here is to allow managers to monitor the business's most important financial and operating metrics on a regular basis (daily for some metrics) in a form that is easy to read and interpret.

Self-Test Questions

1. What is a Key Performance Indicator (KPI)? A dashboard?
2. How are KPIs and dashboards used in financial condition analysis?

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Key Concepts

The primary purpose of this chapter is to present the techniques used by managers and investors to assess a business's financial condition. The main focus is on financial condition as reflected in a business's financial statements, although operating data were also introduced to try to explain a business's current financial status. The key concepts of this chapter are as follows:

- *Financial statement analysis,* which is designed to identify a firm's financial condition, focuses on the firm's financial statements. *Operating indicator analysis,* which uses data typically found outside of the financial statements, provides insights into why a firm is in a given financial condition.
- *Financial ratio analysis,* which focuses on financial statement data, is designed to reveal the relative financial strengths and weaknesses of a company as compared to other companies in the same industry, and to show whether the business's financial condition has been improving or deteriorating over time.
- The *Du Pont equation* indicates how the total margin, the total asset turn over ratio, and the use of debt interact to determine the rate of return on equity. It provides a good overview of a business's financial condition.
- *Liquidity ratios* indicate the business's ability to meet its short-term obligations.
- *Asset management ratios* measure how effectively managers are utilizing the business's assets.
- *Debt management ratios* reveal the extent to which the firm is financed with debt and the extent to which operating cash flows cover debt service and other fixed charge requirements.
- *Profitability ratios* show the combined effects of liquidity, asset management, and debt management on operating results.
- Ratios are analyzed using *comparative analysis,* in which a firm's ratios are compared with industry averages or those of another firm, and *trend analysis,* in which a firm's ratios are examined over time.
- In a *common size analysis,* a business's income statement and balance sheet are expressed in percentages. This facilitates comparisons between firms of different sizes and for a single firm over time.
- In *-percentage change analysis,* the differences in income statement items and balance sheet accounts from one year to the next are expressed in percentages. In this way, it is easy to identify those items and accounts that are growing appreciably faster or slower than average.
- *Economic Value Added (EVA)* measures the overall economic performance of a business.
- *Benchmarking* is the process of comparing the performance of a particular company with a group of benchmark companies, often industry leaders and primary competitors.
- Financial condition analysis is hampered by some serious problems, including *development of comparative data, interpretation of results,* and *inflation effects.*
- *Key Performance Indicators (KPIs)* are a limited number of *metrics* that focus on those measures that are most important to an organization's mission success. Often, KPIs are presented in a format that resembles a *dashboard.*

Financial condition analysis has its limitations, but if used with care and judgment, it can provide managers with a sound picture of a business's financial condition as well as identify those operating factors that contributed to that condition.

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