7 Flexible Budgets, Direct-Cost Variances, and Management Control

Learning Objectives

1. Understand static budgets and static-budget variances
2. Examine the concept of a flexible budget and learn how to develop it
3. Calculate flexible-budget variances and sales-volume variances
4. Explain why standard costs are often used in variance analysis
5. Compute price variances and efficiency variances for direct-cost categories
6. Understand how managers use variances
7. Describe benchmarking and explain its role in cost management

Professional sports leagues thrive on providing excitement for their fans.

It seems that no expense is spared to entertain spectators and keep them occupied before, during, and after games. Professional basketball has been at the forefront of this trend, popularizing such crowd-pleasing distractions as pregame pyrotechnics, pumped-in noise, fire-shooting scoreboards, and T-shirt-shooting cheerleaders carrying air guns. What is the goal of investing millions in such "game presentation" activities? Such showcasing attracts and maintains the loyalty of younger fans. But eventually, every organization, regardless of its growth, has to step back and take a hard look at the wisdom of its spending choices. And when customers are affected by a recession, the need for an organization to employ budgeting and variance analysis tools for cost control becomes especially critical, as the following article shows.

The NBA: Where Frugal Happens[1]

For more than 20 years, the National Basketball Association (NBA) flew nearly as high as one of LeBron James's slam dunks. The league expanded from 24 to 30 teams, negotiated lucrative TV contracts, and made star players like Kobe Bryant and Dwayne Wade household names and multimillionaires. The NBA was even advertised as "where amazing happens." While costs for brand new arenas and player contracts increased, fans continued to pay escalating ticket prices to see their favorite team. But when the economy nosedived in 2008, the situation changed dramatically.

In the season that followed (2008–2009), more than half of the NBA's franchises lost money. Fans stopped buying tickets and many companies could no longer afford pricy luxury suites. NBA commissioner David Stern announced that overall league revenue for the 2009–2010 season was expected to fall by an additional 5% over the previous disappointing campaign. With revenues dwindling and operating profits tougher to achieve, NBA teams began to heavily emphasize cost control and operating-variance reduction for the first time since the 1980s.

Some of the changes were merely cosmetic. The Charlotte Bobcats stopped paying for halftime entertainment, which cost up to

[1] *Sources:* Arnold, Gregory. 2009. NBA teams cut rosters, assistants, scouts to reduce costs. *The Oregonian*, October 26; Biderman, David. 2009. The NBA: Where frugal happens. *Wall Street Journal*, October 27.

$15,000 per game, while the Cleveland Cavaliers saved $40,000 by switching from paper holiday cards to electronic ones. Many other teams—including the Dallas Mavericks, Indiana Pacers, and Miami Heat—reduced labor costs by laying off front-office staff.

Other changes, however, affected play on the court. While NBA teams were allowed to have 15 players on their respective rosters, 10 teams chose to save money by employing fewer players. For example, the Memphis Grizzlies eliminated its entire scouting department, which provided important information on upcoming opponents and potential future players, while the New Jersey Nets traded away most of its high-priced superstars and chose to play with lower-salaried younger players. Each team cutting costs experienced different results. The Grizzlies were a playoff contender, but the Nets were on pace for one of the worst seasons in NBA history.

Just as companies like General Electric and Bank of America have to manage costs and analyze variances for long-term sustainability, so, too, do sports teams. "The NBA is a business just like any other business," Sacramento Kings co-owner Joe Maloof said. "We have to watch our costs and expenses, especially during this trying economic period. It's better to be safe and watch your expenses and make sure you keep your franchise financially strong."

In Chapter 6, you saw how budgets help managers with their planning function. We now explain how budgets, specifically flexible budgets, are used to compute variances, which assist managers in their control function. Flexible budgets and variances enable managers to make meaningful comparisons of actual results with planned performance, and to obtain insights into why actual results differ from planned performance. They form the critical final function in the five-step decision-making process, by making it possible for managers to *evaluate performance and learn* after decisions are implemented. In this chapter and the next, we explain how.

Learning Objective 1

Understand static budgets

. . . the master budget based on output planned at start of period

and static-budget variances

. . . the difference between the actual result and the corresponding budgeted amount in the static budget

Static Budgets and Variances

A **variance** is the difference between actual results and expected performance. The expected performance is also called **budgeted performance**, which is a point of reference for making comparisons.

The Use of Variances

Variances lie at the point where the planning and control functions of management come together. They assist managers in implementing their strategies by enabling **management by exception.** This is the practice of focusing management attention on areas that are not

operating as expected (such as a large shortfall in sales of a product) and devoting less time to areas operating as expected. In other words, by highlighting the areas that have deviated most from expectations, variances enable managers to focus their efforts on the most critical areas. Consider scrap and rework costs at a Maytag appliances plant. If actual costs are much higher than budgeted, the variances will guide managers to seek explanations and to take early corrective action, ensuring that future operations result in less scrap and rework. Sometimes a large positive variance may occur, such as a significant decrease in manufacturing costs of a product. Managers will try to understand the reasons for this decrease (better operator training or changes in manufacturing methods for example), so these practices can be appropriately continued and transferred to other divisions within the organization.

Variances are also used in performance evaluation and to motivate managers. Production-line managers at Maytag may have quarterly efficiency incentives linked to achieving a budgeted amount of operating costs.

Sometimes variances suggest that the company should consider a change in strategy. For example, large negative variances caused by excessive defect rates for a new product may suggest a flawed product design. Managers may then want to investigate the product design and potentially change the mix of products being offered.

Variance analysis contributes in many ways to making the five-step decision-making process more effective. It allows managers to evaluate performance and learn by providing a framework for correctly assessing current performance. In turn, managers take corrective actions to ensure that decisions are implemented correctly and that previously budgeted results are attained. Variances also enable managers to generate more informed predictions about the future, and thereby improve the quality of the five-step decision-making process.

The benefits of variance analysis are not restricted to companies. In today's difficult economic environment, public officials have realized that the ability to make timely tactical alterations based on variance information guards against having to make more draconian adjustments later. For example, the city of Scottsdale, Arizona, monitors its tax and fee performance against expenditures monthly. Why? One of the city's goals is to keep its water usage rates stable. By monitoring the extent to which water revenues are meeting current expenses and obligations, while simultaneously building up funds for future infrastructure projects, the city can avoid rate spikes and achieve long-run rate stability.[2]

How important is variance analysis? A survey by the United Kingdom's Chartered Institute of Management Accountants in July 2009 found that variance analysis was easily the most popular costing tool in practice, and retained that distinction across organizations of all sizes.

Static Budgets and Static-Budget Variances

We will take a closer look at variances by examining one company's accounting system. Note as you study the exhibits in this chapter that "level" followed by a number denotes the amount of detail shown by a variance analysis. Level 1 reports the least detail; level 2 offers more information; and so on.

Consider Webb Company, a firm that manufactures and sells jackets. The jackets require tailoring and many other hand operations. Webb sells exclusively to distributors, who in turn sell to independent clothing stores and retail chains. For simplicity, we assume that Webb's only costs are in the manufacturing function; Webb incurs no costs in other value-chain functions, such as marketing and distribution. We also assume that all units manufactured in April 2011 are sold in April 2011. Therefore, all direct materials are purchased and used in the same budget period, and there is no direct materials inventory at either the beginning or the end of the period. No work-in-process or finished goods inventories exist at either the beginning or the end of the period.

[2] For an excellent discussion and other related examples from governmental settings, see S. Kavanagh and C. Swanson, "Tactical Financial Management: Cash Flow and Budgetary Variance Analysis," *Government Finance Review* (October 1, 2009).

Webb has three variable-cost categories. The budgeted variable cost per jacket for each category is as follows:

Cost Category	Variable Cost per Jacket
Direct material costs	$60
Direct manufacturing labor costs	16
Variable manufacturing overhead costs	12
Total variable costs	$88

The *number of units manufactured* is the cost driver for direct materials, direct manufacturing labor, and variable manufacturing overhead. The relevant range for the cost driver is from 0 to 12,000 jackets. Budgeted and actual data for April 2011 follow:

Budgeted fixed costs for production between 0 and 12,000 jackets	$276,000
Budgeted selling price	$ 120 per jacket
Budgeted production and sales	12,000 jackets
Actual production and sales	10,000 jackets

The **static budget**, or master budget, is based on the level of output planned at the start of the budget period. The master budget is called a static budget because the budget for the period is developed around a single (static) planned output level. Exhibit 7-1, column 3, presents the static budget for Webb Company for April 2011 that was prepared at the end of 2010. For each line item in the income statement, Exhibit 7-1, column 1, displays data for the actual April results. For example, actual revenues are $1,250,000, and the actual selling price is $1,250,000 ÷ 10,000 jackets = $125 per jacket—compared with the budgeted selling price of $120 per jacket. Similarly, actual direct material costs are $621,600, and the direct material cost per jacket is $621,600 ÷ 10,000 = $62.16 per jacket—compared with the budgeted direct material cost per jacket of $60. We describe potential reasons and explanations for these differences as we discuss different variances throughout the chapter.

The **static-budget variance** (see Exhibit 7-1, column 2) is the difference between the actual result and the corresponding budgeted amount in the static budget.

A **favorable variance**—denoted F in this book—has the effect, when considered in isolation, of increasing operating income relative to the budgeted amount. For revenue

Level 1 Analysis

	Actual Results (1)	Static-Budget Variances (2) = (1) – (3)	Static Budget (3)
Units sold	10,000	2,000 U	12,000
Revenues	$ 1,250,000	$190,000 U	$1,440,000
Variable costs			
Direct materials	621,600	98,400 F	720,000
Direct manufacturing labor	198,000	6,000 U	192,000
Variable manufacturing overhead	130,500	13,500 F	144,000
Total variable costs	950,100	105,900 F	1,056,000
Contribution margin	299,900	84,100 U	384,000
Fixed costs	285,000	9,000 U	276,000
Operating income	$ 14,900	$ 93,100 U	$ 108,000
		$ 93,100 U	

Static-budget variance

Exhibit 7-1

Static-Budget-Based Variance Analysis for Webb Company for April 2011

items, F means actual revenues exceed budgeted revenues. For cost items, F means actual costs are less than budgeted costs. An **unfavorable variance**—denoted U in this book—has the effect, when viewed in isolation, of decreasing operating income relative to the budgeted amount. Unfavorable variances are also called *adverse variances* in some countries, such as the United Kingdom.

The unfavorable static-budget variance for operating income of $93,100 in Exhibit 7-1 is calculated by subtracting static-budget operating income of $108,000 from actual operating income of $14,900:

$$\begin{aligned}\text{Static-budget variance for operating income} &= \text{Actual result} - \text{Static-budget amount}\\ &= \$14{,}900 - \$108{,}000\\ &= \$93{,}100\ \text{U.}\end{aligned}$$

The analysis in Exhibit 7-1 provides managers with additional information on the static-budget variance for operating income of $93,100 U. The more detailed breakdown indicates how the line items that comprise operating income—revenues, individual variable costs, and fixed costs—add up to the static-budget variance of $93,100.

Decision Point

What are static budgets and static-budget variances?

Remember, Webb produced and sold only 10,000 jackets, although managers anticipated an output of 12,000 jackets in the static budget. *Managers want to know how much of the static-budget variance is because of inaccurate forecasting of output units sold and how much is due to Webb's performance in manufacturing and selling 10,000 jackets.* Managers, therefore, create a flexible budget, which enables a more in-depth understanding of deviations from the static budget.

Flexible Budgets

Learning Objective 2

Examine the concept of a flexible budget

. . . the budget that is adjusted (flexed) to recognize the actual output level

and learn how to develop it

. . . proportionately increase variable costs; keep fixed costs the same

A **flexible budget** calculates budgeted revenues and budgeted costs based on *the actual output in the budget period*. The flexible budget is prepared at the end of the period (April 2011), after the actual output of 10,000 jackets is known. The flexible budget is the *hypothetical* budget that Webb would have prepared at the start of the budget period if it had correctly forecast the actual output of 10,000 jackets. In other words, the flexible budget is not the plan Webb initially had in mind for April 2011 (remember Webb planned for an output of 12,000 jackets instead). Rather, it is the budget Webb *would have* put together for April if it knew in advance that the output for the month would be 10,000 jackets. In preparing the flexible budget, note that:

- The budgeted selling price is the same $120 per jacket used in preparing the static budget.
- The budgeted unit variable cost is the same $88 per jacket used in the static budget.
- The budgeted *total* fixed costs are the same static-budget amount of $276,000. Why? Because the 10,000 jackets produced falls within the relevant range of 0 to 12,000 jackets. Therefore, Webb would have budgeted the same amount of fixed costs, $276,000, whether it anticipated making 10,000 or 12,000 jackets.

The *only* difference between the static budget and the flexible budget is that the static budget is prepared for the planned output of 12,000 jackets, whereas the flexible budget is based on the actual output of 10,000 jackets. The static budget is being "flexed," or adjusted, from 12,000 jackets to 10,000 jackets.[3] The flexible budget for 10,000 jackets assumes that all costs are either completely variable or completely fixed with respect to the number of jackets produced.

Webb develops its flexible budget in three steps.

Step 1: Identify the Actual Quantity of Output. In April 2011, Webb produced and sold 10,000 jackets.

[3] Suppose Webb, when preparing its next year's budget at the end of 2010, had perfectly anticipated that its output in April 2011 would equal 10,000 jackets. Then, the flexible budget for April 2011 would be identical to the static budget.

Step 2: Calculate the Flexible Budget for Revenues Based on Budgeted Selling Price and Actual Quantity of Output.

$$\text{Flexible-budget revenues} = \$120 \text{ per jacket} \times 10{,}000 \text{ jackets}$$
$$= \$1{,}200{,}000$$

Step 3: Calculate the Flexible Budget for Costs Based on Budgeted Variable Cost per Output Unit, Actual Quantity of Output, and Budgeted Fixed Costs.

Flexible-budget variable costs	
Direct materials, $60 per jacket × 10,000 jackets	$ 600,000
Direct manufacturing labor, $16 per jacket × 10,000 jackets	160,000
Variable manufacturing overhead, $12 per jacket × 10,000 jackets	120,000
Total flexible-budget variable costs	880,000
Flexible-budget fixed costs	276,000
Flexible-budget total costs	$1,156,000

These three steps enable Webb to prepare a flexible budget, as shown in Exhibit 7-2, column 3. The flexible budget allows for a more detailed analysis of the $93,100 unfavorable static-budget variance for operating income.

Decision Point

How can managers develop a flexible budget and why is it useful to do so?

Flexible-Budget Variances and Sales-Volume Variances

Exhibit 7-2 shows the flexible-budget-based variance analysis for Webb, which subdivides the $93,100 unfavorable static-budget variance for operating income into two parts: a flexible-budget variance of $29,100 U and a sales-volume variance of $64,000 U. The **sales-volume variance** is the difference between a flexible-budget amount and the corresponding static-budget amount. The **flexible-budget variance** is the difference between an actual result and the corresponding flexible-budget amount.

Exhibit 7-2 Level 2 Flexible-Budget-Based Variance Analysis for Webb Company for April 2011[a]

Level 2 Analysis

	Actual Results (1)	Flexible-Budget Variances (2) = (1) – (3)	Flexible Budget (3)	Sales-Volume Variances (4) = (3) – (5)	Static Budget (5)
Units sold	10,000	0	10,000	2,000 U	12,000
Revenues	$1,250,000	$50,000 F	$1,200,000	$240,000 U	$1,440,000
Variable costs					
Direct materials	621,600	21,600 U	600,000	120,000 F	720,000
Direct manufacturing labor	198,000	38,000 U	160,000	32,000 F	192,000
Variable manufacturing overhead	130,500	10,500 U	120,000	24,000 F	144,000
Total variable costs	950,100	70,100 U	880,000	176,000 F	1,056,000
Contribution margin	299,900	20,100 U	320,000	64,000 U	384,000
Fixed manufacturing costs	285,000	9,000 U	276,000	0	276,000
Operating income	$ 14,900	$29,100 U	$ 44,000	$ 64,000 U	$ 108,000
Level 2		$29,100 U Flexible-budget variance		$ 64,000 U Sales-volume variance	
Level 1		$93,100 U Static-budget variance			

[a]F = favorable effect on operating income; U = unfavorable effecton operating income.

Learning Objective 3

Calculate flexible-budget variances

. . . each flexible-budget variance is the difference between an actual result and a flexible-budget amount

and sales-volume variances

. . . each sales-volume variance is the difference between a flexible-budget amount and a static-budget amount

Sales-Volume Variances

Keep in mind that the flexible-budget amounts in column 3 of Exhibit 7-2 and the static-budget amounts in column 5 are both computed using budgeted selling prices, budgeted variable cost per jacket, and budgeted fixed costs. The difference between the static-budget and the flexible-budget amounts is called the sales-volume variance because it arises *solely* from the difference between the 10,000 actual quantity (or volume) of jackets sold and the 12,000 quantity of jackets expected to be sold in the static budget.

$$\begin{aligned}\text{Sales-volume variance for operating income} &= \text{Flexible-budget amount} - \text{Static-budget amount}\\ &= \$44{,}000 - \$108{,}000\\ &= \$64{,}000\ \text{U}\end{aligned}$$

The sales-volume variance in operating income for Webb measures the change in budgeted contribution margin because Webb sold only 10,000 jackets rather than the budgeted 12,000.

$$\begin{aligned}\text{Sales-volume variance for operating income} &= \left(\text{Budgeted contribution margin per unit}\right) \times \left(\text{Actual units sold} - \text{Static-budget units sold}\right)\\ &= \left(\text{Budgeted selling price} - \text{Budgeted variable cost per unit}\right) \times \left(\text{Actual units sold} - \text{Static-budget units sold}\right)\\ &= (\$120 \text{ per jacket} - \$88 \text{ per jacket}) \times (10{,}000 \text{ jackets} - 12{,}000 \text{ jackets})\\ &= \$32 \text{ per jacket} \times (-2{,}000 \text{ jackets})\\ &= \$64{,}000\ \text{U}\end{aligned}$$

Exhibit 7-2, column 4, shows the components of this overall variance by identifying the sales-volume variance for each of the line items in the income statement. Webb's managers determine that the unfavorable sales-volume variance in operating income could be because of one or more of the following reasons:

1. The overall demand for jackets is not growing at the rate that was anticipated.
2. Competitors are taking away market share from Webb.
3. Webb did not adapt quickly to changes in customer preferences and tastes.
4. Budgeted sales targets were set without careful analysis of market conditions.
5. Quality problems developed that led to customer dissatisfaction with Webb's jackets.

How Webb responds to the unfavorable sales-volume variance will be influenced by what management believes to be the cause of the variance. For example, if Webb's managers believe the unfavorable sales-volume variance was caused by market-related reasons (reasons 1, 2, 3, or 4), the sales manager would be in the best position to explain what happened and to suggest corrective actions that may be needed, such as sales promotions or market studies. If, however, managers believe the unfavorable sales-volume variance was caused by quality problems (reason 5), the production manager would be in the best position to analyze the causes and to suggest strategies for improvement, such as changes in the manufacturing process or investments in new machines. The appendix shows how to further analyze the sales volume variance to identify the reasons behind the unfavorable outcome.

The static-budget variances compared actual revenues and costs for 10,000 jackets against budgeted revenues and costs for 12,000 jackets. A portion of this difference, the sales-volume variance, reflects the effects of inaccurate forecasting of output units sold.

By removing this component from the static-budget variance, managers can compare actual revenues earned and costs incurred for April 2011 against the flexible budget—the revenues and costs Webb would have budgeted for the 10,000 jackets actually produced and sold. *These flexible-budget variances are a better measure of operating performance than static-budget variances because they compare actual revenues to budgeted revenues and actual costs to budgeted costs for the same 10,000 jackets of output.*

Flexible-Budget Variances

The first three columns of Exhibit 7-2 compare actual results with flexible-budget amounts. Flexible-budget variances are in column 2 for each line item in the income statement:

$$\text{Flexible-budget variance} = \text{Actual result} - \text{Flexible-budget amount}$$

The operating income line in Exhibit 7-2 shows the flexible-budget variance is $29,100 U ($14,900 – $44,000). The $29,100 U arises because actual selling price, actual variable cost per unit, and actual fixed costs differ from their budgeted amounts. The actual results and budgeted amounts for the selling price and variable cost per unit are as follows:

	Actual Result	Budgeted Amount
Selling price	$125.00 ($1,250,000 ÷ 10,000 jackets)	$120.00 ($1,200,000 ÷ 10,000 jackets)
Variable cost per jacket	$ 95.01 ($ 950,100 ÷ 10,000 jackets)	$ 88.00 ($ 880,000 ÷ 10,000 jackets)

The flexible-budget variance for revenues is called the **selling-price variance** because it arises solely from the difference between the actual selling price and the budgeted selling price:

$$\begin{aligned}\text{Selling-price variance} &= \left(\text{Actual selling price} - \text{Budgeted selling price}\right) \times \text{Actual units sold}\\ &= (\$125 \text{ per jacket} - \$120 \text{ per jacket}) \times 10{,}000 \text{ jackets}\\ &= \$50{,}000 \text{ F}\end{aligned}$$

Webb has a favorable selling-price variance because the $125 actual selling price exceeds the $120 budgeted amount, which increases operating income. Marketing managers are generally in the best position to understand and explain the reason for this selling price difference. For example, was the difference due to better quality? Or was it due to an overall increase in market prices? Webb's managers concluded it was due to a general increase in prices.

The flexible-budget variance for total variable costs is unfavorable ($70,100 U) for the actual output of 10,000 jackets. It's unfavorable because of one or both of the following:

- Webb used greater quantities of inputs (such as direct manufacturing labor-hours) compared to the budgeted quantities of inputs.
- Webb incurred higher prices per unit for the inputs (such as the wage rate per direct manufacturing labor-hour) compared to the budgeted prices per unit of the inputs.

Higher input quantities and/or higher input prices relative to the budgeted amounts could be the result of Webb deciding to produce a better product than what was planned or the result of inefficiencies in Webb's manufacturing and purchasing, or both. *You should always think of variance analysis as providing suggestions for further investigation rather than as establishing conclusive evidence of good or bad performance.*

The actual fixed costs of $285,000 are $9,000 more than the budgeted amount of $276,000. This unfavorable flexible-budget variance reflects unexpected increases in the cost of fixed indirect resources, such as factory rent or supervisory salaries.

In the rest of this chapter, we will focus on variable direct-cost input variances. Chapter 8 emphasizes indirect (overhead) cost variances.

Decision Point

How are flexible-budget and sales-volume variances calculated?

Price Variances and Efficiency Variances for Direct-Cost Inputs

To gain further insight, almost all companies subdivide the flexible-budget variance for direct-cost inputs into two more-detailed variances:

1. A price variance that reflects the difference between an actual input price and a budgeted input price
2. An efficiency variance that reflects the difference between an actual input quantity and a budgeted input quantity

The information available from these variances (which we call level 3 variances) helps managers to better understand past performance and take corrective actions to implement superior strategies in the future. Managers generally have more control over efficiency variances than price variances because the quantity of inputs used is primarily affected by factors inside the company (such as the efficiency with which operations are performed), while changes in the price of materials or in wage rates may be largely dictated by market forces outside the company (see the Concepts in Action feature on p. 237).

Obtaining Budgeted Input Prices and Budgeted Input Quantities

Learning Objective 4

Explain why standard costs are often used in variance analysis

. . . standard costs exclude past inefficiencies and take into account expected future changes

To calculate price and efficiency variances, Webb needs to obtain budgeted input prices and budgeted input quantities. Webb's three main sources for this information are past data, data from similar companies, and standards.

1. **Actual input data from past periods.** Most companies have past data on actual input prices and actual input quantities. These historical data could be analyzed for trends or patterns (using some of the techniques we will discuss in Chapter 10) to obtain estimates of budgeted prices and quantities. The advantage of past data is that they represent quantities and prices that are real rather than hypothetical and can serve as benchmarks for continuous improvement. Another advantage is that past data are typically available at low cost. However, there are limitations to using past data. Past data can include inefficiencies such as wastage of direct materials. They also do not incorporate any changes expected for the budget period.
2. **Data from other companies that have similar processes.** The benefit of using data from peer firms is that the budget numbers represent competitive benchmarks from other companies. For example, Baptist Healthcare System in Louisville, Kentucky, maintains detailed flexible budgets and benchmarks its labor performance against hospitals that provide similar types of services and volumes and are in the upper quartile of a national benchmark. The main difficulty of using this source is that input-price and input quantity data from other companies are often not available or may not be comparable to a particular company's situation. Consider American Apparel, which makes over 1 million articles of clothing a week. At its sole factory, in Los Angeles, workers receive hourly wages, piece rates, and medical benefits well in excess of those paid by its competitors, virtually all of whom are offshore. Moreover, because sourcing organic cotton from overseas results in too high of a carbon footprint, American Apparel purchases more expensive domestic cotton in keeping with its sustainability programs.
3. **Standards developed by Webb.** A **standard** is a carefully determined price, cost, or quantity that is used as a benchmark for judging performance. Standards are usually expressed on a per-unit basis. Consider how Webb determines its direct manufacturing labor standards. Webb conducts engineering studies to obtain a detailed breakdown of the steps required to make a jacket. Each step is assigned a standard time based on work performed by a *skilled* worker using equipment operating in an *efficient* manner. There are two advantages of using standard times: (i) They aim to exclude past inefficiencies and (ii) they aim to take into account changes expected to occur in the budget period. An example of (ii) is the decision by Webb, for strategic reasons, to lease new

sewing machines that operate at a faster speed and enable output to be produced with lower defect rates. Similarly, Webb determines the standard quantity of square yards of cloth required by a skilled operator to make each jacket.

The term "standard" refers to many different things. Always clarify its meaning and how it is being used. A **standard input** is a carefully determined quantity of input—such as square yards of cloth or direct manufacturing labor-hours—required for one unit of output, such as a jacket. A **standard price** is a carefully determined price that a company expects to pay for a unit of input. In the Webb example, the standard wage rate that Webb expects to pay its operators is an example of a standard price of a direct manufacturing labor-hour. A **standard cost** is a carefully determined cost of a unit of output—for example, the standard direct manufacturing labor cost of a jacket at Webb.

$$\begin{array}{c}\text{Standard cost per output unit for}\\ \text{each variable direct-cost input}\end{array} = \begin{array}{c}\text{Standard input allowed}\\ \text{for one output unit}\end{array} \times \begin{array}{c}\text{Standard price}\\ \text{per input unit}\end{array}$$

Standard direct material cost per jacket: 2 square yards of cloth input allowed per output unit (jacket) manufactured, at $30 standard price per square yard

$$\text{Standard direct material cost per jacket} = 2 \text{ square yards} \times \$30 \text{ per square yard} = \$60$$

Standard direct manufacturing labor cost per jacket: 0.8 manufacturing labor-hour of input allowed per output unit manufactured, at $20 standard price per hour

$$\text{Standard direct manufacturing labor cost per jacket} = 0.8 \text{ labor-hour} \times \$20 \text{ per labor-hour} = \$16$$

How are the words "budget" and "standard" related? Budget is the broader term. To clarify, budgeted input prices, input quantities, and costs need *not* be based on standards. As we saw previously, they could be based on past data or competitive benchmarks, for example. However, when standards *are* used to obtain budgeted input quantities and prices, the terms "standard" and "budget" are used interchangeably. The standard cost of each input required for one unit of output is determined by the standard quantity of the input required for one unit of output and the standard price per input unit. See how the standard-cost computations shown previously for direct materials and direct manufacturing labor result in the budgeted direct material cost per jacket of $60 and the budgeted direct manufacturing labor cost of $16 referred to earlier (p. 229).

In its standard costing system, Webb uses standards that are attainable through efficient operations but that allow for normal disruptions. An alternative is to set more-challenging standards that are more difficult to attain. As we discussed in Chapter 6, setting challenging standards can increase motivation and performance. If, however, standards are regarded by workers as essentially unachievable, it can increase frustration and hurt performance.

Decision Point

What is a standard cost and what are its purposes?

Data for Calculating Webb's Price Variances and Efficiency Variances

Learning Objective 5

Compute price variances . . . each price variance is the difference between an actual input price and a budgeted input price and efficiency variances . . . each efficiency variance is the difference between an actual input quantity and a budgeted input quantity for actual output for direct-cost categories

Consider Webb's two direct-cost categories. The actual cost for each of these categories for the 10,000 jackets manufactured and sold in April 2011 is as follows:

Direct Materials Purchased and Used[4]		
1.	Square yards of cloth input purchased and used	22,200
2.	Actual price incurred per square yard	$ 28
3.	Direct material costs (22,200 × $28) [shown in Exhibit 7-2, column 1]	$621,600
Direct Manufacturing Labor		
1.	Direct manufacturing labor-hours	9,000
2.	Actual price incurred per direct manufacturing labor-hour	$ 22
3.	Direct manufacturing labor costs (9,000 × $22) [shown in Exhibit 7-2, column 1]	$198,000

[4] The Problem for Self-Study (pp. 246–247) relaxes the assumption that the quantity of direct materials used equals the quantity of direct materials purchased.

Let's use the Webb Company data to illustrate the price variance and the efficiency variance for direct-cost inputs.

A **price variance** is the difference between actual price and budgeted price, multiplied by actual input quantity, such as direct materials purchased or used. A price variance is sometimes called an **input-price variance** or **rate variance,** especially when referring to a price variance for direct manufacturing labor. An **efficiency variance** is the difference between actual input quantity used—such as square yards of cloth of direct materials—and budgeted input quantity allowed for actual output, multiplied by budgeted price. An efficiency variance is sometimes called a **usage variance**. Let's explore price and efficiency variances in greater detail so we can see how managers use these variances to improve their future performance.

Price Variances

The formula for computing the price variance is as follows:

$$\text{Price variance} = \left(\text{Actual price of input} - \text{Budgeted price of input}\right) \times \text{Actual quantity of input}$$

Price variances for Webb's two direct-cost categories are as follows:

Direct-Cost Category	(Actual price of input − Budgeted price of input)	×	Actual quantity of input	=	Price Variance
Direct materials	($28 per sq. yard − $30 per sq. yard)	×	22,200 square yards	=	$44,400 F
Direct manufacturing labor	($22 per hour − $20 per hour)	×	9,000 hours	=	$18,000 U

The direct materials price variance is favorable because actual price of cloth is less than budgeted price, resulting in an increase in operating income. The direct manufacturing labor price variance is unfavorable because actual wage rate paid to labor is more than the budgeted rate, resulting in a decrease in operating income.

Always consider a broad range of possible causes for a price variance. For example, Webb's favorable direct materials price variance could be due to one or more of the following:

- Webb's purchasing manager negotiated the direct materials prices more skillfully than was planned for in the budget.
- The purchasing manager changed to a lower-price supplier.
- Webb's purchasing manager ordered larger quantities than the quantities budgeted, thereby obtaining quantity discounts.
- Direct material prices decreased unexpectedly because of, say, industry oversupply.
- Budgeted purchase prices of direct materials were set too high without careful analysis of market conditions.
- The purchasing manager received favorable prices because he was willing to accept unfavorable terms on factors other than prices (such as lower-quality material).

Webb's response to a direct materials price variance depends on what is believed to be the cause of the variance. Assume Webb's managers attribute the favorable price variance to the purchasing manager ordering in larger quantities than budgeted, thereby receiving quantity discounts. Webb could examine if purchasing in these larger quantities resulted in higher storage costs. If the increase in storage and inventory holding costs exceeds the quantity discounts, purchasing in larger quantities is not beneficial. Some companies have reduced their materials storage areas to prevent their purchasing managers from ordering in larger quantities.

Efficiency Variance

For any actual level of output, the efficiency variance is the difference between actual quantity of input used and the budgeted quantity of input allowed for that output level, multiplied by the budgeted input price:

$$\text{Efficiency Variance} = \left(\text{Actual quantity of input used} - \text{Budgeted quantity of input allowed for actual output}\right) \times \text{Budgeted price of input}$$

Concepts in Action

Starbucks Reduces Direct-Cost Variances to Brew a Turnaround

Along with coffee, Starbucks brewed profitable growth for many years. From Seattle to Singapore, customers lined up to buy $4 lattes and Frappuccinos. Walking around with a coffee drink from Starbucks became an affordable-luxury status symbol. But when consumers tightened their purse strings amid the recession, the company was in serious trouble. With customers cutting back and lower-priced competition—from Dunkin' Donuts and McDonald's among others—increasing, Starbucks' profit margins were under attack.

For Starbucks, profitability depends on making each high-quality beverage at the lowest possible costs. As a result, an intricate understanding of direct costs is critical. Variance analysis helps managers assess and maintain profitability at desired levels. In each Starbucks store, the two key direct costs are materials and labor.

Materials costs at Starbucks include coffee beans, milk, flavoring syrups, pastries, paper cups, and lids. To reduce budgeted costs for materials, Starbucks focused on two key inputs: coffee and milk. For coffee, Starbucks sought to avoid waste and spoilage by no longer brewing decaffeinated and darker coffee blends in the afternoon and evening, when store traffic is slower. Instead, baristas were instructed to brew a pot only when a customer ordered it. With milk prices rising (and making up around 10% of Starbucks' cost of sales), the company switched to 2% milk, which is healthier and costs less, and redoubled efforts to reduce milk-related spoilage.

Labor costs at Starbucks, which cost 24% of company revenue annually, were another area of variance focus. Many stores employed fewer baristas. In other stores, Starbucks adopted many "lean" production techniques. With 30% of baristas' time involved in walking around behind the counter, reaching for items, and blending drinks, Starbucks sought to make its drink-making processes more efficient. While the changes seem small—keeping bins of coffee beans on top of the counter so baristas don't have to bend over, moving bottles of flavored syrups closer to where drinks are made, and using colored tape to quickly differentiate between pitchers of soy, nonfat, and low-fat milk—some stores experienced a 10% increase in transactions using the same number of workers or fewer.

The company took additional steps to align labor costs with its pricing. Starbucks cut prices on easier-to-make drinks like drip coffee, while lifting prices by as much as 30 cents for larger and more complex drinks, such as a venti caramel macchiato.

Starbucks' focus on reducing year-over-year variances paid off. In fiscal year 2009, the company reduced its store operating expenses by $320 million, or 8.5%. Continued focus on direct-cost variances will be critical to the company's future success in any economic climate.

Sources: Adamy, Janet. 2009. Starbucks brews up new cost cuts by putting lid on afternoon decaf. *Wall Street Journal,* January 28; Adamy, Janet. 2008. New Starbucks brew attracts customers, flak. *Wall Street Journal*, July 1; Harris, Craig. 2007. Starbucks slips; lattes rise. *Seattle Post Intelligencer*, July 23; Jargon, Julie. 2010. Starbucks growth revives, perked by Via. *Wall Street Journal*, January 21; Jargon, Julie. 2009. Latest Starbucks buzzword: 'Lean' Japanese techniques. *Wall Street Journal,* August 4; Kesmodel, David. 2009. Starbucks sees demand stirring again. *Wall Street Journal*, November 6.

The idea here is that a company is inefficient if it uses a larger quantity of input than the budgeted quantity for its actual level of output; the company is efficient if it uses a smaller quantity of input than was budgeted for that output level.

The efficiency variances for each of Webb's direct-cost categories are as follows:

Direct-Cost Category	(Actual quantity of input used − Budgeted quantity of input allowed for actual output)	× Budgeted price of input	= Efficiency Variance
Direct materials	[22,200 sq. yds. − (10,000 units × 2 sq. yds./unit)]	× $30 per sq. yard	
	= (22,200 sq. yds. − 20,000 sq. yds.)	× $30 per sq. yard	= $66,000 U
Direct manufacturing labor	[9,000 hours − (10,000 units × 0.8 hour/unit)]	× $20 per hour	
	= (9,000 hours − 8,000 hours)	× $20 per hour	= 20,000 U

The two manufacturing efficiency variances—direct materials efficiency variance and direct manufacturing labor efficiency variance—are each unfavorable because more input was used than was budgeted for the actual output, resulting in a decrease in operating income.

As with price variances, there is a broad range of possible causes for these efficiency variances. For example, Webb's unfavorable efficiency variance for direct manufacturing labor could be because of one or more of the following:

- Webb's personnel manager hired underskilled workers.
- Webb's production scheduler inefficiently scheduled work, resulting in more manufacturing labor time than budgeted being used per jacket.
- Webb's maintenance department did not properly maintain machines, resulting in more manufacturing labor time than budgeted being used per jacket.
- Budgeted time standards were set too tight without careful analysis of the operating conditions and the employees' skills.

Decision Point

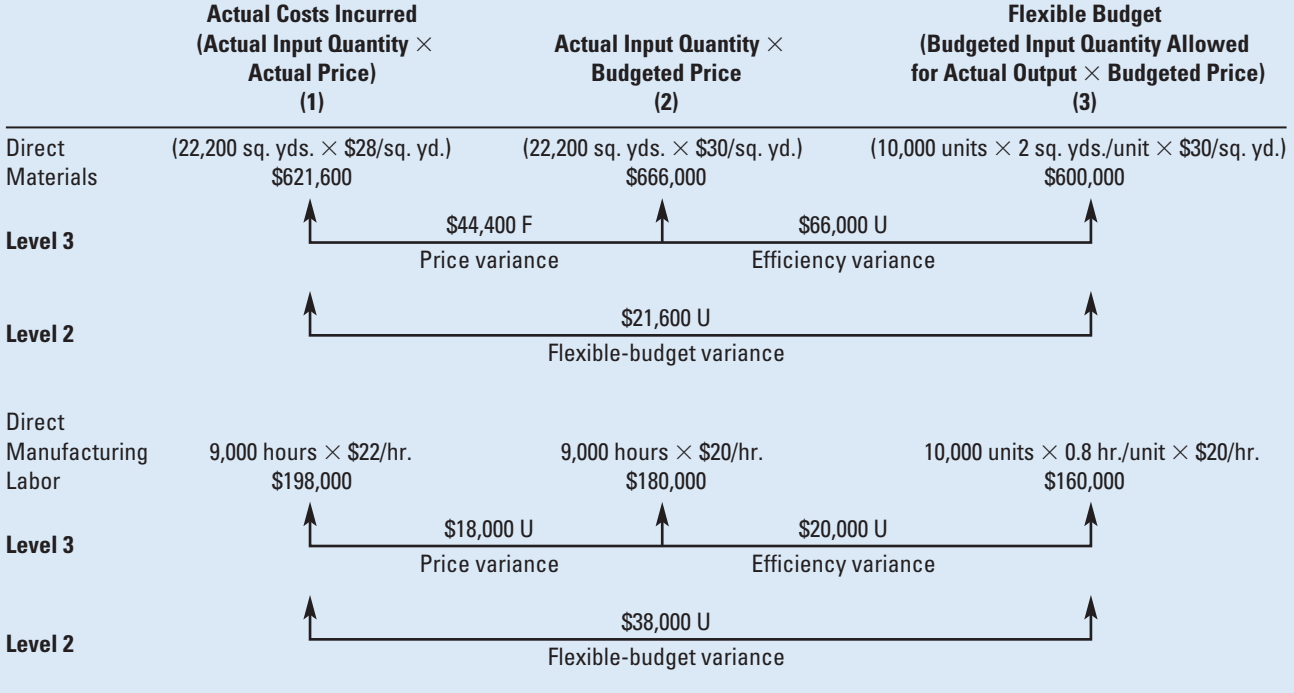
Why should a company calculate price and efficiency variances?

Suppose Webb's managers determine that the unfavorable variance is due to poor machine maintenance. Webb may then establish a team consisting of plant engineers and machine operators to develop a maintenance schedule that will reduce future breakdowns and thereby prevent adverse effects on labor time and product quality.

Exhibit 7-3 provides an alternative way to calculate price and efficiency variances. It also illustrates how the price variance and the efficiency variance subdivide the flexible-budget variance. Consider direct materials. The direct materials flexible-budget variance of $21,600 U is the difference between actual costs incurred (actual input quantity × actual price) of $621,600 shown in column 1 and the flexible budget (budgeted input quantity allowed for actual output × budgeted price) of $600,000 shown in column 3. Column 2 (actual input quantity × budgeted price) is inserted between column 1 and column 3. The difference between columns 1 and 2 is the price variance of $44,400 F. This price variance occurs because the same actual input quantity (22,200 sq. yds.) is multiplied by *actual price* ($28) in column 1 and *budgeted price* ($30) in column 2. The difference between columns 2 and 3 is the efficiency variance of $66,000 U because the same budgeted price ($30) is multiplied by *actual input quantity* (22,200 sq. yds) in column 2

Exhibit 7-3 Columnar Presentation of Variance Analysis: Direct Costs for Webb Company for April 2011[a]

Level 3 Analysis



[a]F = favorable effect on operating income; U = unfavorable effect on operating income.

and *budgeted input quantity allowed for actual output* (20,000 sq. yds.) in column 3. The sum of the direct materials price variance, $44,400 F, and the direct materials efficiency variance, $66,000 U, equals the direct materials flexible budget variance, $21,600 U.

Summary of Variances

Exhibit 7-4 provides a summary of the different variances. Note how the variances at each higher level provide disaggregated and more detailed information for evaluating performance.

The following computations show why actual operating income is $14,900 when the static-budget operating income is $108,000. The numbers in the computations can be found in Exhibits 7-2 and 7-3.

Static-budget operating income			$108,000
Unfavorable sales-volume variance for operating income			(64,000)
Flexible-budget operating income			44,000
Flexible-budget variances for operating income:			
Favorable selling-price variance		$50,000	
Direct materials variances:			
Favorable direct materials price variance	$ 44,400		
Unfavorable direct materials efficiency variance	(66,000)		
Unfavorable direct materials variance		(21,600)	
Direct manufacturing labor variances:			
Unfavorable direct manufacturing labor price variance	(18,000)		
Unfavorable direct manufacturing labor efficiency variance	(20,000)		
Unfavorable direct manufacturing labor variance		(38,000)	
Unfavorable variable manufacturing overhead variance		(10,500)	
Unfavorable fixed manufacturing overhead variance		(9,000)	
Unfavorable flexible-budget variance for operating income			(29,100)
Actual operating income			$ 14,900

The summary of variances highlights three main effects:

1. Webb sold 2,000 fewer units than budgeted, resulting in an unfavorable sales volume variance of $64,000. Sales declined because of quality problems and new styles of jackets introduced by Webb's competitors.
2. Webb sold units at a higher price than budgeted, resulting in a favorable selling-price variance of $50,000. Webb's prices, however, were lower than the prices charged by Webb's competitors.

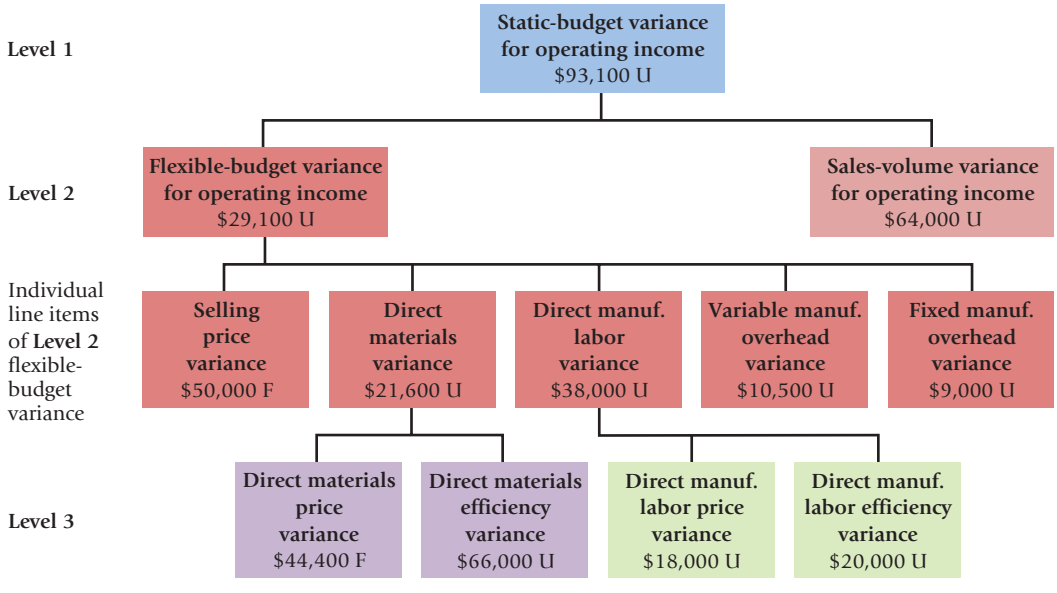


Exhibit 7-4

Summary of Level 1, 2, and 3 Variance Analyses

3. Manufacturing costs for the actual output produced were higher than budgeted—direct materials by $21,600, direct manufacturing labor by $38,000, variable manufacturing overhead by $10,500, and fixed overhead by $9,000 because of poor quality of cloth, poor maintenance of machines, and underskilled workers.

We now present Webb's journal entries under its standard costing system.

Journal Entries Using Standard Costs

Chapter 4 illustrated journal entries when normal costing is used. We will now illustrate journal entries for Webb Company using standard costs. Our focus is on direct materials and direct manufacturing labor. All the numbers included in the following journal entries are found in Exhibit 7-3.

Note: In each of the following entries, unfavorable variances are always debits (they decrease operating income), and favorable variances are always credits (they increase operating income).

JOURNAL ENTRY 1A: Isolate the direct materials price variance at the time of purchase by increasing (debiting) Direct Materials Control at standard prices. This is the earliest time possible to isolate this variance.

1a.	Direct Materials Control		
	(22,200 square yards × $30 per square yard)	666,000	
	Direct Materials Price Variance		
	(22,200 square yards × $2 per square yard)		44,400
	Accounts Payable Control		
	(22,200 square yards × $28 per square yard)		621,600
	To record direct materials purchased.		

JOURNAL ENTRY 1B: Isolate the direct materials efficiency variance at the time the direct materials are used by increasing (debiting) Work-in-Process Control at standard quantities allowed for actual output units manufactured times standard prices.

1b.	Work-in-Process Control		
	(10,000 jackets × 2 yards per jacket × $30 per square yard)	600,000	
	Direct Materials Efficiency Variance		
	(2,200 square yards × $30 per square yard)	66,000	
	Direct Materials Control		
	(22,200 square yards × $30 per square yard)		666,000
	To record direct materials used.		

JOURNAL ENTRY 2: Isolate the direct manufacturing labor price variance and efficiency variance at the time this labor is used by increasing (debiting) Work-in-Process Control at standard quantities allowed for actual output units manufactured at standard prices. Note that Wages Payable Control measures the actual amounts payable to workers based on actual hours worked and actual wage rates.

2.	Work-in-Process Control		
	(10,000 jackets × 0.80 hour per jacket × $20 per hour)	160,000	
	Direct Manufacturing Labor Price Variance		
	(9,000 hours × $2 per hour)	18,000	
	Direct Manufacturing Labor Efficiency Variance		
	(1,000 hours × $20 per hour)	20,000	
	Wages Payable Control		
	(9,000 hours × $22 per hour)		198,000
	To record liability for direct manufacturing labor costs.		

We have seen how standard costing and variance analysis help to focus management attention on areas not operating as expected. The journal entries here point to another advantage of standard costing systems—that is, standard costs simplify product costing. As each unit is manufactured, costs are assigned to it using the standard cost of direct

materials, the standard cost of direct manufacturing labor and, as you will see in Chapter 8, standard manufacturing overhead cost.

From the perspective of control, all variances are isolated at the earliest possible time. For example, by isolating the direct materials price variance at the time of purchase, corrective actions—such as seeking cost reductions from the current supplier or obtaining price quotes from other potential suppliers—can be taken immediately when a large unfavorable variance is first known rather than waiting until after the materials are used in production.

At the end of the fiscal year, the variance accounts are written off to cost of goods sold if they are immaterial in amount. For simplicity, we assume that the balances in the different direct cost variance accounts as of April 2011 are also the balances at the end of 2011 and therefore immaterial in total. Webb would record the following journal entry to write off the direct cost variance accounts to Cost of Goods Sold.

Cost of Goods Sold	59,600	
Direct Materials Price Variance	44,400	
Direct Materials Efficiency Variance		66,000
Direct Manufacturing Labor Price Variance		18,000
Direct Manufacturing Labor Efficiency Variance		20,000

Alternatively, assuming Webb has inventories at the end of the fiscal year, and the variances are material in their amounts, the variance accounts are prorated between cost of goods sold and various inventory accounts using the methods described in Chapter 4 (pp. 117–122). For example, Direct Materials Price Variance is prorated among Materials Control, Work-in-Process Control, Finished Goods Control and Cost of Goods Sold on the basis of the standard costs of direct materials in each account's ending balance. Direct Materials Efficiency Variance is prorated among Work-in-Process Control, Finished Goods Control, and Cost of Goods Sold on the basis of the direct material costs in each account's ending balance (after proration of the direct materials price variance).

Many accountants, industrial engineers, and managers maintain that to the extent that variances measure inefficiency or abnormal efficiency during the year, they should be written off instead of being prorated among inventories and cost of goods sold. This reasoning argues for applying a combination of the write-off and proration methods for each individual variance. Consider the efficiency variance. The portion of the efficiency variance that is due to inefficiency and could have been avoided should be written off to cost of goods sold while the portion that is unavoidable should be prorated. If another variance, such as the direct materials price variance, is considered unavoidable because it is entirely caused by general market conditions, it should be prorated. Unlike full proration, this approach avoids carrying the costs of inefficiency as part of inventoriable costs.

Implementing Standard Costing

Standard costing provides valuable information for the management and control of materials, labor, and other activities related to production.

Standard Costing and Information Technology

Modern information technology promotes the increased use of standard costing systems for product costing and control. Companies such as Dell and Sandoz store standard prices and standard quantities in their computer systems. A bar code scanner records the receipt of materials, immediately costing each material using its stored standard price. The receipt of materials is then matched with the purchase order to record accounts payable and to isolate the direct materials price variance.

The direct materials efficiency variance is calculated as output is completed by comparing the standard quantity of direct materials that should have been used with the computerized request for direct materials submitted by an operator on the production floor. Labor variances are calculated as employees log into production-floor terminals and punch in their employee numbers, start and end times, and the quantity of product they helped produce. Managers use this instantaneous feedback from variances to initiate immediate corrective action, as needed.

Wide Applicability of Standard Costing

Companies that have implemented total quality management and computer-integrated manufacturing (CIM) systems, as well as companies in the service sector, find standard costing to be a useful tool. Companies implementing total quality management programs use standard costing to control materials costs. Service-sector companies such as McDonald's are labor intensive and use standard costs to control labor costs. Companies that have implemented CIM, such as Toyota, use flexible budgeting and standard costing to manage activities such as materials handling and setups. The growing use of Enterprise Resource Planning (ERP) systems, as described in Chapter 6, has made it easy for firms to keep track of standard, average, and actual costs for inventory items and to make real-time assessments of variances. Managers use variance information to identify areas of the firm's manufacturing or purchasing process that most need attention.

Management Uses of Variances

Learning Objective 6

Understand how managers use variances

. . . managers use variances to improve future performance

Managers and management accountants use variances to evaluate performance after decisions are implemented, to trigger organization learning, and to make continuous improvements. Variances serve as an early warning system to alert managers to existing problems or to prospective opportunities. Variance analysis enables managers to evaluate the effectiveness of the actions and performance of personnel in the current period, as well as to fine-tune strategies for achieving improved performance in the future. To make sure that managers interpret variances correctly and make appropriate decisions based on them, managers need to recognize that variances can have multiple causes.

Multiple Causes of Variances

Managers must not interpret variances in isolation of each other. The causes of variances in one part of the value chain can be the result of decisions made in another part of the value chain. Consider an unfavorable direct materials efficiency variance on Webb's production line. Possible operational causes of this variance across the value chain of the company are as follows:

1. Poor design of products or processes
2. Poor work on the production line because of underskilled workers or faulty machines
3. Inappropriate assignment of labor or machines to specific jobs
4. Congestion due to scheduling a large number of rush orders from Webb's sales representatives
5. Webb's suppliers not manufacturing cloth materials of uniformly high quality

Item 5 offers an even broader reason for the cause of the unfavorable direct materials efficiency variance by considering inefficiencies in the supply chain of companies—in this case, by the cloth suppliers for Webb's jackets. Whenever possible, managers must attempt to understand the root causes of the variances.

When to Investigate Variances

Managers realize that a standard is not a single measure but rather a range of possible acceptable input quantities, costs, output quantities, or prices. Consequently, they expect small variances to arise. A variance within an acceptable range is considered to be an "in control occurrence" and calls for no investigation or action by managers. So when would managers need to investigate variances?

Frequently, managers investigate variances based on subjective judgments or rules of thumb. For critical items, such as product defects, even a small variance may prompt investigations and actions. For other items, such as direct material costs, labor costs, and repair costs, companies generally have rules such as "investigate all variances exceeding $5,000 or 25% of the budgeted cost, whichever is lower." The idea is that a 4% variance in direct material costs of $1 million—a $40,000 variance—deserves more attention than a 20% variance in repair costs of $10,000—a $2,000 variance. Variance analysis is subject to the same cost-benefit test as all other phases of a management control system.

Performance Measurement Using Variances

Managers often use variance analysis when evaluating the performance of their subordinates. Two attributes of performance are commonly evaluated:

1. **Effectiveness**: the degree to which a predetermined objective or target is met—for example, sales, market share and customer satisfaction ratings of Starbucks' new VIA® Ready Brew line of instant coffees.
2. **Efficiency**: the relative amount of inputs used to achieve a given output level—the smaller the quantity of Arabica beans used to make a given number of VIA packets or the greater the number of VIA packets made from a given quantity of beans, the greater the efficiency.

As we discussed earlier, managers must be sure they understand the causes of a variance before using it for performance evaluation. Suppose a Webb purchasing manager has just negotiated a deal that results in a favorable price variance for direct materials. The deal could have achieved a favorable variance for any or all of the following reasons:

1. The purchasing manager bargained effectively with suppliers.
2. The purchasing manager secured a discount for buying in bulk with fewer purchase orders. However, buying larger quantities than necessary for the short run resulted in excessive inventory.
3. The purchasing manager accepted a bid from the lowest-priced supplier after only minimal effort to check quality amid concerns about the supplier's materials.

If the purchasing manager's performance is evaluated solely on price variances, then the evaluation will be positive. Reason 1 would support this favorable conclusion: The purchasing manager bargained effectively. Reasons 2 and 3 have short-run gains, buying in bulk or making only minimal effort to check the supplier's quality-monitoring procedures. However, these short-run gains could be offset by higher inventory storage costs or higher inspection costs and defect rates on Webb's production line, leading to unfavorable direct manufacturing labor and direct materials efficiency variances. Webb may ultimately lose more money because of reasons 2 and 3 than it gains from the favorable price variance.

Bottom line: Managers should not automatically interpret a favorable variance as "good news."

Managers benefit from variance analysis because it highlights individual aspects of performance. However, if any single performance measure (for example, a labor efficiency variance or a consumer rating report) receives excessive emphasis, managers will tend to make decisions that will cause the particular performance measure to look good. These actions may conflict with the company's overall goals, inhibiting the goals from being achieved. This faulty perspective on performance usually arises when top management designs a performance evaluation and reward system that does not emphasize total company objectives.

Organization Learning

The goal of variance analysis is for managers to understand why variances arise, to learn, and to improve future performance. For instance, to reduce the unfavorable direct materials efficiency variance, Webb's managers may seek improvements in product design, in the commitment of workers to do the job right the first time, and in the quality of supplied materials, among other improvements. Sometimes an unfavorable direct materials efficiency variance may signal a need to change product strategy, perhaps because the product cannot be made at a low enough cost. Variance analysis should not be a tool to "play the blame game" (that is, seeking a person to blame for every unfavorable variance). Rather, it should help the company learn about what happened and how to perform better in the future.

Managers need to strike a delicate balance between the two uses of variances we have discussed: performance evaluation and organization learning. Variance analysis is helpful for performance evaluation, but an overemphasis on performance evaluation and meeting individual variance targets can undermine learning and continuous improvement. Why? Because achieving the standard becomes an end in and of itself. As a result, managers will seek targets that are easy to attain rather than targets that are challenging and that require

creativity and resourcefulness. For example, if performance evaluation is overemphasized, Webb's manufacturing manager will prefer an easy standard that allows workers ample time to manufacture a jacket; he will then have little incentive to improve processes and methods to reduce manufacturing time and cost.

An overemphasis on performance evaluation may also cause managers to take actions to achieve the budget and avoid an unfavorable variance, even if such actions could hurt the company in the long run. For example, the manufacturing manager may push workers to produce jackets within the time allowed, even if this action could lead to poorer quality jackets being produced, which could later hurt revenues. Such negative impacts are less likely to occur if variance analysis is seen as a way of promoting organization learning.

Continuous Improvement

Managers can also use variance analysis to create a virtuous cycle of continuous improvement. How? By repeatedly identifying causes of variances, initiating corrective actions, and evaluating results of actions. Improvement opportunities are often easier to identify when products are first produced. Once the easy opportunities have been identified ("the low-hanging fruit picked"), much more ingenuity may be required to identify successive improvement opportunities. Some companies use kaizen budgeting (Chapter 6, p. 203) to specifically target reductions in budgeted costs over successive periods. The advantage of kaizen budgeting is that it makes continuous improvement goals explicit.

Financial and Nonfinancial Performance Measures

Almost all companies use a combination of financial and nonfinancial performance measures for planning and control rather than relying exclusively on either type of measure. To control a production process, supervisors cannot wait for an accounting report with variances reported in dollars. Instead, timely nonfinancial performance measures are frequently used for control purposes in such situations. For example, a Nissan plant compiles data such as defect rates and production-schedule attainment and broadcasts them in ticker-tape fashion on screens throughout the plant.

Decision Point

How do managers use variances?

In Webb's cutting room, cloth is laid out and cut into pieces, which are then matched and assembled. Managers exercise control in the cutting room by observing workers and by focusing on *nonfinancial measures*, such as number of square yards of cloth used to produce 1,000 jackets or percentage of jackets started and completed without requiring any rework. Webb production workers find these nonfinancial measures easy to understand. At the same time, Webb production managers will also use *financial measures* to evaluate the overall cost efficiency with which operations are being run and to help guide decisions about, say, changing the mix of inputs used in manufacturing jackets. Financial measures are often critical in a company because they indicate the economic impact of diverse physical activities. This knowledge allows managers to make trade-offs—increase the costs of one physical activity (say, cutting) to reduce the costs of another physical measure (say, defects).

Benchmarking and Variance Analysis

Learning Objective 7

Describe benchmarking and explain its role in cost management

. . . benchmarking compares actual performance against the best levels of performance

The budgeted amounts in the Webb Company illustration are based on analysis of operations within their own respective companies. We now turn to the situation in which companies develop standards based on an analysis of operations at other companies. **Benchmarking** is the continuous process of comparing the levels of performance in producing products and services and executing activities against the best levels of performance in competing companies or in companies having similar processes. When benchmarks are used as standards, managers and management accountants know that the company will be competitive in the marketplace if it can attain the standards.

Companies develop benchmarks and calculate variances on items that are the most important to their businesses. Consider the cost per available seat mile (ASM) for United Airlines; ASMs equal the total seats in a plane multiplied by the distance traveled, and are a measure of airline size. Assume United uses data from each of seven competing U.S. airlines in its benchmark cost comparisons. Summary data are in Exhibit 7-5. The benchmark

Exhibit 7-5 Available Seat Mile (ASM) Benchmark Comparison of United Airlines with Seven Other Airlines

Home Insert Page Layout Formulas Data Review View

	A	B	C	D	E	F	G
1		Operating Cost per ASM (1)	Operating Revenue per ASM (2)	Operating Income per ASM (3) = (2) – (1)	Fuel Cost per ASM (4)	Labor Cost per ASM (5)	Total ASMs (Millions) (6)
2							
3	**Airline**						
4							
5	United Airlines	$0.1574	$0.1258	–$0.0315	$0.0568	$0.0317	135,861
6	Airlines used as benchmarks:						
7	JetBlue Airways	$0.1011	$0.1045	$0.0034	$0.0417	$0.0214	32,422
8	Southwest Airlines	$0.1024	$0.1067	$0.0043	$0.0360	$0.0323	103,271
9	Continental Airlines	$0.1347	$0.1319	–$0.0027	$0.0425	$0.0258	115,511
10	Alaska Airlines	$0.1383	$0.1330	–$0.0053	$0.0480	$0.0319	24,218
11	American Airlines	$0.1387	$0.1301	–$0.0086	$0.0551	$0.0407	163,532
12	U.S. Airways	$0.1466	$0.1263	–$0.0203	$0.0488	$0.0301	74,151
13	Delta/Northwest Airlines	$0.1872	$0.1370	–$0.0502	$0.0443	$0.0290	165,639
14	Average of airlines						
15	used as benchmarks	$0.1356	$0.1242	–$0.0113	$0.0452	$0.0302	96,963
16							
17							
18	*Source:* Individual companies' 10-K reports for the year ending December 31, 2008						

companies are ranked from lowest to highest operating cost per ASM in column 1. Also reported in Exhibit 7-5 are operating revenue per ASM, operating income per ASM, labor cost per ASM, fuel cost per ASM, and total available seat miles. The impact of the recession on the travel industry is evident in the fact that only two airlines—JetBlue and Southwest—have positive levels of operating income.

How well did United manage its costs? The answer depends on which specific benchmark is being used for comparison. United's actual operating cost of $0.1574 per ASM is above the average operating cost of $0.1356 per ASM of the seven other airlines. Moreover, United's operating cost per ASM is 55.7% higher than JetBlue Airways, the lowest-cost competitor at $0.1011 per ASM [($0.1574 – $0.1011) ÷ $0.1011 = 55.7%]. So why is United's operating cost per ASM so high? Columns E and F suggest that both fuel cost and labor cost are possible reasons. These benchmarking data alert management at United that it needs to become more efficient in its use of both material and labor inputs to become more cost competitive.

Using benchmarks such as those in Exhibit 7-5 is not without problems. Finding appropriate benchmarks is a major issue in implementing benchmarking. Many companies purchase benchmark data from consulting firms. Another problem is ensuring the benchmark numbers are comparable. In other words, there needs to be an "apples to apples" comparison. Differences can exist across companies in their strategies, inventory costing methods, depreciation methods, and so on. For example, JetBlue serves fewer cities and has mostly long-haul flights compared with United, which serves almost all major U.S. cities and several international cities and has both long-haul and short-haul flights. Southwest Airlines differs from United because it specializes in short-haul direct flights and offers fewer services on board its planes. Because United's strategy is different from the strategies of JetBlue and Southwest, one might expect its cost per ASM to be different too. United's strategy is more comparable to the strategies of American, Continental, Delta, and U.S. Airways. Note that its costs per ASM are relatively more competitive with these airlines. But United competes head-to-head with JetBlue and Southwest in several cities and markets, so it still needs to benchmark against these carriers as well.

Decision Point

What is benchmarking and why is it useful?

United's management accountants can use benchmarking data to address several questions. How do factors such as plane size and type, or the duration of flights, affect the cost per ASM? Do airlines differ in their fixed cost/variable cost structures? Can performance be improved by rerouting flights, using different types of aircraft on different routes, or changing the frequency or timing of specific flights? What explains revenue differences per ASM across airlines? Is it differences in perceived quality of service or differences in competitive power at specific airports? Management accountants are more valuable to managers when they use benchmarking data to provide insight into *why* costs or revenues differ across companies, or within plants of the same company, as distinguished from simply reporting the magnitude of such differences.

Problem for Self-Study

O'Shea Company manufactures ceramic vases. It uses its standard costing system when developing its flexible-budget amounts. In April 2012, 2,000 finished units were produced. The following information relates to its two direct manufacturing cost categories: direct materials and direct manufacturing labor.

Direct materials used were 4,400 kilograms (kg). The standard direct materials input allowed for one output unit is 2 kilograms at $15 per kilogram. O'Shea purchased 5,000 kilograms of materials at $16.50 per kilogram, a total of $82,500. (This Problem for Self-Study illustrates how to calculate direct materials variances when the quantity of materials *purchased* in a period differs from the quantity of materials *used* in that period.)

Actual direct manufacturing labor-hours were 3,250, at a total cost of $66,300. Standard manufacturing labor time allowed is 1.5 hours per output unit, and the standard direct manufacturing labor cost is $20 per hour.

Required

1. Calculate the direct materials price variance and efficiency variance, and the direct manufacturing labor price variance and efficiency variance. Base the direct materials price variance on a flexible budget for *actual quantity purchased*, but base the direct materials efficiency variance on a flexible budget for *actual quantity used*.
2. Prepare journal entries for a standard costing system that isolates variances at the earliest possible time.

Solution

1. Exhibit 7-6 shows how the columnar presentation of variances introduced in Exhibit 7-3 can be adjusted for the difference in timing between purchase and use of materials. Note, in particular, the two sets of computations in column 2 for direct materials—the $75,000 for direct materials purchased and the $66,000 for direct materials used. The direct materials price variance is calculated on purchases so that managers responsible for the purchase can immediately identify and isolate reasons for the variance and initiate any desired corrective action. The efficiency variance is the responsibility of the production manager, so this variance is identified only at the time materials are used.

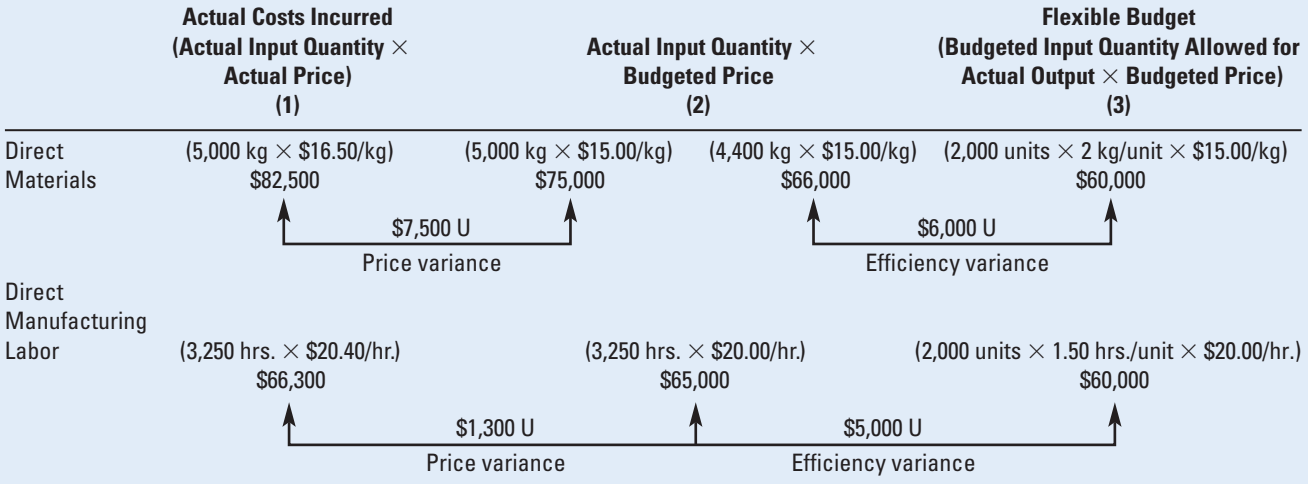
2.

Materials Control (5,000 kg × $15 per kg)	75,000	
Direct Materials Price Variance (5,000 kg × $1.50 per kg)	7,500	
Accounts Payable Control (5,000 kg × $16.50 per kg)		82,500
Work-in-Process Control (2,000 units × 2 kg per unit × $15 per kg)	60,000	
Direct Materials Efficiency Variance (400 kg × $15 per kg)	6,000	
Materials Control (4,400 kg × $15 per kg)		66,000
Work-in-Process Control (2,000 units × 1.5 hours per unit × $20 per hour)	60,000	
Direct Manufacturing Labor Price Variance (3,250 hours × $0.40 per hour)	1,300	
Direct Manufacturing Labor Efficiency Variance (250 hours × $20 per hour)	5,000	
Wages Payable Control (3,250 hours × $20.40 per hour)		66,300

Note: All the variances are debits because they are unfavorable and therefore reduce operating income.

Exhibit 7-6 Columnar Presentation of Variance Analysis for O'Shea Company: Direct Materials and Direct Manufacturing Labor for April 2012[a]

Level 3 Analysis



[a]F = favorable effect on operating income; U = unfavorable effect on operating income.

Decision Points

The following question-and-answer format summarizes the chapter's learning objectives. Each decision presents a key question related to a learning objective. The guidelines are the answer to that question.

Decision	Guidelines
1. What are static budgets and static-budget variances?	A static budget is based on the level of output planned at the start of the budget period. The static-budget variance is the difference between the actual result and the corresponding budgeted amount in the static budget.
2. How can managers develop a flexible budget and why is it useful to do so?	A flexible budget is adjusted (flexed) to recognize the actual output level of the budget period. Managers use a three-step procedure to develop a flexible budget. When all costs are either variable with respect to output units or fixed, these three steps require only information about budgeted selling price, budgeted variable cost per output unit, budgeted fixed costs, and actual quantity of output units. Flexible budgets help managers gain more insight into the causes of variances than is available from static budgets.
3. How are flexible-budget and sales-volume variances calculated?	The static-budget variance can be subdivided into a flexible-budget variance (the difference between an actual result and the corresponding flexible-budget amount) and a sales-volume variance (the difference between the flexible-budget amount and the corresponding static-budget amount).
4. What is a standard cost and what are its purposes?	A standard cost is a carefully determined cost used as a benchmark for judging performance. The purposes of a standard cost are to exclude past inefficiencies and to take into account changes expected to occur in the budget period.
5. Why should a company calculate price and efficiency variables?	The computation of price and efficiency variances helps managers gain insight into two different—but not independent—aspects of performance. The price variance focuses on the difference between actual input price and budgeted input price. The efficiency variance focuses on the difference between actual quantity of input and budgeted quantity of input allowed for actual output.

6. How do managers use variances?

Managers use variances for control, decision implementation, performance evaluation, organization learning, and continuous improvement. When using variances for these purposes, managers consider several variances together rather than focusing only on an individual variance.

7. What is benchmarking and why is it useful?

Benchmarking is the process of comparing the level of performance in producing products and services and executing activities against the best levels of performance in competing companies or companies with similar processes. Benchmarking measures how well a company and its managers are doing in comparison to other organizations.

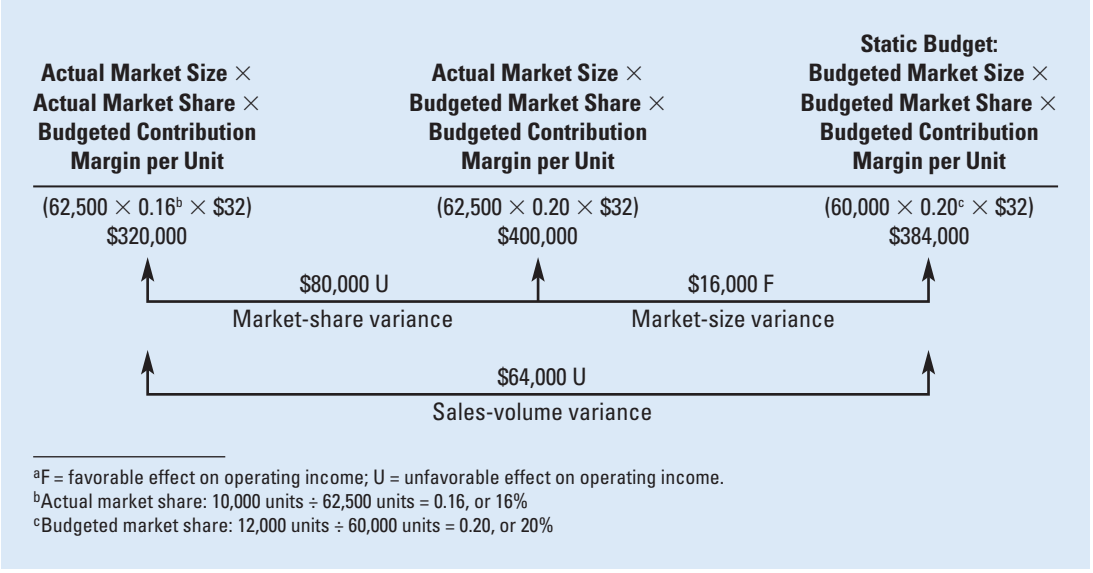
Appendix

Market-Share and Market-Size Variances

The chapter described the sales-volume variance, the difference between a flexible-budget amount and the corresponding static-budget amount. Exhibit 7-2 points out that the sales-volume variances for operating income and contribution margin are the same. In the Webb example, this amount equals 64,000 U, because Webb had a sales shortfall of 2,000 units (10,000 units sold compared to the budgeted 12,000 units), at a budgeted contribution margin of $32 per jacket. Webb's managers can gain more insight into the sales-volume variance by subdividing it. We explore one such analysis here.

Recall that Webb sells a single product, jackets, using a single distribution channel. In this case, the sales-volume variance is also called the *sales-quantity variance*.[5] Sales depend on overall demand for jackets, as well as Webb's share of the market. Assume that Webb derived its total unit sales budget for April 2011 from a management estimate of a 20% market share and a budgeted industry market size of 60,000 units (0.20 × 60,000 units = 12,000 units). For April 2011, actual market size was 62,500 units and actual market share was 16% (10,000 units ÷ 62,500 units = 0.16 or 16%). Exhibit 7-7 shows the columnar presentation of how Webb's sales-quantity variance can be decomposed into market-share and market-size variances.

Exhibit 7-7 Market-Share and Market-Size Variance Analysis of Webb Company for April 2011[a]



[a]F = favorable effect on operating income; U = unfavorable effect on operating income.
[b]Actual market share: 10,000 units ÷ 62,500 units = 0.16, or 16%
[c]Budgeted market share: 12,000 units ÷ 60,000 units = 0.20, or 20%

[5] Chapter 14 examines more complex settings with multiple products and multiple distribution channels. In those cases, the sales-quantity variance is one of the components of the sales-volume variance; the other portion has to do with the mix of products/channels used by the firm for generating sales revenues.

Market-Share Variance

The **market-share variance** is the difference in budgeted contribution margin for actual market size in units caused solely by *actual market share* being different from *budgeted market share*. The formula for computing the market-share variance is as follows:

$$\begin{aligned}\text{Market-share variance} &= \begin{matrix}\text{Actual}\\ \text{market size}\\ \text{in units}\end{matrix} \times \left(\begin{matrix}\text{Actual}\\ \text{market}\\ \text{share}\end{matrix} - \begin{matrix}\text{Budgeted}\\ \text{market}\\ \text{share}\end{matrix} \right) \times \begin{matrix}\text{Budgeted}\\ \text{contribution margin}\\ \text{per unit}\end{matrix}\\ &= 62{,}500 \text{ units} \times (0.16 - 0.20) \times \$32 \text{ per unit}\\ &= \$80{,}000 \text{ U}\end{aligned}$$

Webb lost 4.0 market-share percentage points—from the 20% budgeted share to the actual share of 16%. The $80,000 U market-share variance is the decline in contribution margin as a result of those lost sales.

Market-Size Variance

The **market-size variance** is the difference in budgeted contribution margin at budgeted market share caused solely by *actual market size in units* being different from *budgeted market size in units*. The formula for computing the market-size variance is as follows:

$$\begin{aligned}\text{Market-size variance} &= \left(\begin{matrix}\text{Actual}\\ \text{market}\\ \text{size}\end{matrix} - \begin{matrix}\text{Budgeted}\\ \text{market}\\ \text{size}\end{matrix} \right) \times \begin{matrix}\text{Budgeted}\\ \text{market}\\ \text{share}\end{matrix} \times \begin{matrix}\text{Budgeted}\\ \text{contribution margin}\\ \text{per unit}\end{matrix}\\ &= (62{,}500 \text{ units} - 60{,}000 \text{ units}) \times 0.20 \times \$32 \text{ per unit}\\ &= \$16{,}000 \text{ F}\end{aligned}$$

The market-size variance is favorable because actual market size increased 4.17% [(62,500 – 60,000) ÷ 60,000 = 0.417, or 4.17%] compared to budgeted market size.

Managers should probe the reasons for the market-size and market-share variances for April 2011. Is the $16,000 F market-size variance because of an increase in market size that can be expected to continue in the future? If yes, Webb has much to gain by attaining or exceeding its budgeted 20% market share. Was the $80,000 unfavorable market-share variance because of competitors providing better offerings or greater value to customers? We saw earlier that Webb was able to charge a higher selling price than expected, resulting in a favorable selling-price variance. However, competitors introduced new styles of jackets that stimulated market demand and enabled them to charge higher prices than Webb. Webb's products also experienced quality-control problems that were the subject of negative media coverage, leading to a significant drop in market share, even as overall industry sales were growing.

Some companies place more emphasis on the market-share variance than the market-size variance when evaluating their managers. That's because they believe the market-size variance is influenced by economy-wide factors and shifts in consumer preferences that are outside the managers' control, whereas the market-share variance measures how well managers performed relative to their peers.

Be cautious when computing the market-size variance and the market-share variance. Reliable information on market size and market share is available for some, but not all, industries. The automobile, computer, and television industries are cases in which market-size and market-share statistics are widely available. In other industries, such as management consulting and personal financial planning, information about market size and market share is far less reliable.

Terms to Learn

This chapter and the Glossary at the end of the book contain definitions of the following important terms:

benchmarking **(p. 244)**
budgeted performance **(p. 227)**
effectiveness **(p. 243)**
efficiency **(p. 243)**
efficiency variance **(p. 236)**
favorable variance **(p. 229)**
flexible budget **(p. 230)**
flexible-budget variance **(p. 231)**
input-price variance **(p. 236)**
management by exception **(p. 227)**
market-share variance **(p. 249)**
market-size variance **(p. 249)**
price variance **(p. 236)**
rate variance **(p. 236)**
sales-volume variance **(p. 231)**
selling-price variance **(p. 233)**
standard **(p. 234)**
standard cost **(p. 235)**

standard input **(p. 235)**
standard price **(p. 235)**
static budget **(p. 229)**
static-budget variance **(p. 229)**
unfavorable variance **(p. 230)**
usage variance **(p. 236)**
variance **(p. 227)**

Assignment Material

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Questions

7-1 What is the relationship between management by exception and variance analysis?
7-2 What are two possible sources of information a company might use to compute the budgeted amount in variance analysis?
7-3 Distinguish between a favorable variance and an unfavorable variance.
7-4 What is the key difference between a static budget and a flexible budget?
7-5 Why might managers find a flexible-budget analysis more informative than a static-budget analysis?
7-6 Describe the steps in developing a flexible budget.
7-7 List four reasons for using standard costs.
7-8 How might a manager gain insight into the causes of a flexible-budget variance for direct materials?
7-9 List three causes of a favorable direct materials price variance.
7-10 Describe three reasons for an unfavorable direct manufacturing labor efficiency variance.
7-11 How does variance analysis help in continuous improvement?
7-12 Why might an analyst examining variances in the production area look beyond that business function for explanations of those variances?
7-13 Comment on the following statement made by a plant manager: "Meetings with my plant accountant are frustrating. All he wants to do is pin the blame on someone for the many variances he reports."
7-14 How can the sales-volume variance be decomposed further to obtain useful information?
7-15 "Benchmarking against other companies enables a company to identify the lowest-cost producer. This amount should become the performance measure for next year." Do you agree?

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Exercises

7-16 **Flexible budget.** Brabham Enterprises manufactures tires for the Formula I motor racing circuit. For August 2012, it budgeted to manufacture and sell 3,000 tires at a variable cost of $74 per tire and total fixed costs of $54,000. The budgeted selling price was $110 per tire. Actual results in August 2012 were 2,800 tires manufactured and sold at a selling price of $112 per tire. The actual total variable costs were $229,600, and the actual total fixed costs were $50,000.

Required

1. Prepare a performance report (akin to Exhibit 7-2, p. 231) that uses a flexible budget and a static budget.
2. Comment on the results in requirement 1.

7-17 **Flexible budget.** Connor Company's budgeted prices for direct materials, direct manufacturing labor, and direct marketing (distribution) labor per attaché case are $40, $8, and $12, respectively. The president is pleased with the following performance report:

	Actual Costs	Static Budget	Variance
Direct materials	$364,000	$400,000	$36,000 F
Direct manufacturing labor	78,000	80,000	2,000 F
Direct marketing (distribution) labor	110,000	120,000	10,000 F

Actual output was 8,800 attaché cases. Assume all three direct-cost items shown are variable costs.

Required

Is the president's pleasure justified? Prepare a revised performance report that uses a flexible budget and a static budget.

7-18 **Flexible-budget preparation and analysis.** Bank Management Printers, Inc., produces luxury checkbooks with three checks and stubs per page. Each checkbook is designed for an individual customer and is ordered through the customer's bank. The company's operating budget for September 2012 included these data:

Number of checkbooks	15,000
Selling price per book	$ 20
Variable cost per book	$ 8
Fixed costs for the month	$145,000

The actual results for September 2012 were as follows:

Number of checkbooks produced and sold	12,000
Average selling price per book	$ 21
Variable cost per book	$ 7
Fixed costs for the month	$150,000

The executive vice president of the company observed that the operating income for September was much lower than anticipated, despite a higher-than-budgeted selling price and a lower-than-budgeted variable cost per unit. As the company's management accountant, you have been asked to provide explanations for the disappointing September results.

Bank Management develops its flexible budget on the basis of budgeted per-output-unit revenue and per-output-unit variable costs without detailed analysis of budgeted inputs.

Required

1. Prepare a static-budget-based variance analysis of the September performance.
2. Prepare a flexible-budget-based variance analysis of the September performance.
3. Why might Bank Management find the flexible-budget-based variance analysis more informative than the static-budget-based variance analysis? Explain your answer.

7-19 Flexible budget, working backward. The Clarkson Company produces engine parts for car manufacturers. A new accountant intern at Clarkson has accidentally deleted the calculations on the company's variance analysis calculations for the year ended December 31, 2012. The following table is what remains of the data.

Home Insert Page Layout Formulas Data Review View

	A	B	C	D	E	F
1	Performance Report, Year Ended December 31, 2012					
2						
3		Actual Results	Flexible-Budget Variances	Flexible Budget	Sales-Volume Variances	Static Budget
4	Units sold	130,000				120,000
5	Revenues (sales)	$715,000				$420,000
6	Variable costs	515,000				240,000
7	Contribution margin	200,000				180,000
8	Fixed costs	140,000				120,000
9	Operating income	$ 60,000				$ 60,000

Required

1. Calculate all the required variances. (If your work is accurate, you will find that the total static-budget variance is $0.)
2. What are the actual and budgeted selling prices? What are the actual and budgeted variable costs per unit?
3. Review the variances you have calculated and discuss possible causes and potential problems. What is the important lesson learned here?

7-20 Flexible-budget and sales volume variances, market-share and market-size variances. Marron, Inc., produces the basic fillings used in many popular frozen desserts and treats—vanilla and chocolate ice creams, puddings, meringues, and fudge. Marron uses standard costing and carries over no inventory from one month to the next. The ice-cream product group's results for June 2012 were as follows:

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	A	B	C
1	Performance Report, June 2012		
2		Actual Results	Static Budget
3	Units (pounds)	355,000	345,000
4	Revenues	$1,917,000	$1,880,250
5	Variable manufacturing costs	1,260,250	1,207,500
6	Contribution margin	$ 656,750	$ 672,750

Ted Levine, the business manager for ice-cream products, is pleased that more pounds of ice cream were sold than budgeted and that revenues were up. Unfortunately, variable manufacturing costs went up too. The bottom line is that contribution margin declined by $16,000, which is less than 1% of the budgeted revenues of $1,880,250. Overall, Levine feels that the business is running fine.

Levine would also like to analyze how the company is performing compared to the overall market for ice-cream products. He knows that the expected total market for ice-cream products was 1,150,000 pounds and that the actual total market was 1,109,375 pounds.

Required

1. Calculate the static-budget variance in units, revenues, variable manufacturing costs, and contribution margin. What percentage is each static-budget variance relative to its static-budget amount?
2. Break down each static-budget variance into a flexible-budget variance and a sales-volume variance.
3. Calculate the selling-price variance.
4. Calculate the market-share and market-size variances.
5. Assume the role of management accountant at Marron. How would you present the results to Ted Levine? Should he be more concerned? If so, why?

7-21 Price and efficiency variances. Peterson Foods manufactures pumpkin scones. For January 2012, it budgeted to purchase and use 15,000 pounds of pumpkin at $0.89 a pound. Actual purchases and usage for January 2012 were 16,000 pounds at $0.82 a pound. Peterson budgeted for 60,000 pumpkin scones. Actual output was 60,800 pumpkin scones.

Required

1. Compute the flexible-budget variance.
2. Compute the price and efficiency variances.
3. Comment on the results for requirements 1 and 2 and provide a possible explanation for them.

7-22 Materials and manufacturing labor variances. Consider the following data collected for Great Homes, Inc.:

	Direct Materials	Direct Manufacturing Labor
Cost incurred: Actual inputs × actual prices	$200,000	$90,000
Actual inputs × standard prices	214,000	86,000
Standard inputs allowed for actual output × standard prices	225,000	80,000

Required

Compute the price, efficiency, and flexible-budget variances for direct materials and direct manufacturing labor.

7-23 Direct materials and direct manufacturing labor variances. GloriaDee, Inc., designs and manufactures T-shirts. It sells its T-shirts to brand-name clothes retailers in lots of one dozen. GloriaDee's May 2011 static budget and actual results for direct inputs are as follows:

Static Budget	
Number of T-shirt lots (1 lot = 1 dozen)	500
Per Lot of T-shirts:	
Direct materials	12 meters at $1.50 per meter = $18.00
Direct manufacturing labor	2 hours at $8.00 per hour = $16.00
Actual Results	
Number of T-shirt lots sold	550
Total Direct Inputs:	
Direct materials	7,260 meters at $1.75 per meter = $12,705.00
Direct manufacturing labor	1,045 hours at $8.10 per hour = $8,464.50

GloriaDee has a policy of analyzing all input variances when they add up to more than 10% of the total cost of materials and labor in the flexible budget, and this is true in May 2011. The production manager discusses the sources of the variances: "A new type of material was purchased in May. This led to faster cutting and sewing, but the workers used more material than usual as they learned to work with it. For now, the standards are fine."

Required

1. Calculate the direct materials and direct manufacturing labor price and efficiency variances in May 2011. What is the total flexible-budget variance for both inputs (direct materials and direct manufacturing labor) combined? What percentage is this variance of the total cost of direct materials and direct manufacturing labor in the flexible budget?

2. Gloria Denham, the CEO, is concerned about the input variances. But, she likes the quality and feel of the new material and agrees to use it for one more year. In May 2012, GloriaDee again produces 550 lots of T-shirts. Relative to May 2011, 2% less direct material is used, direct material price is down 5%, and 2% less direct manufacturing labor is used. Labor price has remained the same as in May 2011. Calculate the direct materials and direct manufacturing labor price and efficiency variances in May 2012. What is the total flexible-budget variance for both inputs (direct materials and direct manufacturing labor) combined? What percentage is this variance of the total cost of direct materials and direct manufacturing labor in the flexible budget?
3. Comment on the May 2012 results. Would you continue the "experiment" of using the new material?

7-24 Price and efficiency variances, journal entries. The Monroe Corporation manufactures lamps. It has set up the following standards per finished unit for direct materials and direct manufacturing labor:

Direct materials: 10 lb. at $4.50 per lb.	$45.00
Direct manufacturing labor: 0.5 hour at $30 per hour	15.00

The number of finished units budgeted for January 2012 was 10,000; 9,850 units were actually produced.

Actual results in January 2012 were as follows:

Direct materials: 98,055 lb. used	
Direct manufacturing labor: 4,900 hours	$154,350

Assume that there was no beginning inventory of either direct materials or finished units.

During the month, materials purchased amounted to 100,000 lb., at a total cost of $465,000. Input price variances are isolated upon purchase. Input-efficiency variances are isolated at the time of usage.

Required

1. Compute the January 2012 price and efficiency variances of direct materials and direct manufacturing labor.
2. Prepare journal entries to record the variances in requirement 1.
3. Comment on the January 2012 price and efficiency variances of Monroe Corporation.
4. Why might Monroe calculate direct materials price variances and direct materials efficiency variances with reference to different points in time?

7-25 Continuous improvement (continuation of 7-24). The Monroe Corporation sets monthly standard costs using a continuous-improvement approach. In January 2012, the standard direct material cost is $45 per unit and the standard direct manufacturing labor cost is $15 per unit. Due to more efficient operations, the standard quantities for February 2012 are set at 0.980 of the standard quantities for January. In March 2012, the standard quantities are set at 0.990 of the standard quantities for February 2012. Assume the same information for March 2012 as in Exercise 7-24, except for these revised standard quantities.

Required

1. Compute the March 2012 standard quantities for direct materials and direct manufacturing labor (to three decimal places).
2. Compute the March 2012 price and efficiency variances for direct materials and direct manufacturing labor (round to the nearest dollar).

7-26 Materials and manufacturing labor variances, standard costs. Dunn, Inc., is a privately held furniture manufacturer. For August 2012, Dunn had the following standards for one of its products, a wicker chair:

	Standards per Chair
Direct materials	2 square yards of input at $5 per square yard
Direct manufacturing labor	0.5 hour of input at $10 per hour

The following data were compiled regarding *actual performance*: actual output units (chairs) produced, 2,000; square yards of input purchased and used, 3,700; price per square yard, $5.10; direct manufacturing labor costs, $8,820; actual hours of input, 900; labor price per hour, $9.80.

1. Show computations of price and efficiency variances for direct materials and direct manufacturing labor. Give a plausible explanation of why each variance occurred.
2. Suppose 6,000 square yards of materials were purchased (at $5.10 per square yard), even though only 3,700 square yards were used. Suppose further that variances are identified at their most timely control point; accordingly, direct materials price variances are isolated and traced at the time of purchase to the purchasing department rather than to the production department. Compute the price and efficiency variances under this approach.

7-27 Journal entries and T-accounts (continuation of 7-26). Prepare journal entries and post them to T-accounts for all transactions in Exercise 7-26, including requirement 2. Summarize how these journal entries differ from the normal-costing entries described in Chapter 4, pages 112–114.

7-28 Flexible budget. (Refer to data in Exercise 7-26). Suppose the static budget was for 2,500 units of output. Actual output was 2,000 units. The variances are shown in the following report:

	Actual Results	Static Budget	Variance
Direct materials	$18,870	$25,000	$6,130F
Direct manufacturing labor	$ 8,820	$12,500	$3,680F

Required What are the price, efficiency, and sales-volume variances for direct materials and direct manufacturing labor? Based on your results, explain why the static budget was not achieved.

7-29 Market-Share and Market-Size Variances. Rhaden Company produces sweat-resistant headbands for joggers. Information pertaining to Rhaden's operations for May 2011 follows:

	Actual	Budget
Units sold	230,550	220,000
Sales revenue	$3,412,140	$3,300,000
Variable cost ratio	68%	64%
Market size in units	4,350,000	4,400,000

Required

1. Compute the sales volume variance for May 2011.
2. Compute the market-share and market-size variances for May 2011.
3. Comment on possible reasons for the variances you computed in requirement 2.

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Problems

7-30 Flexible budget, direct materials, and direct manufacturing labor variances. Tuscany Statuary manufactures bust statues of famous historical figures. All statues are the same size. Each unit requires the same amount of resources. The following information is from the static budget for 2011:

Expected production and sales	6,000 units
Direct materials	72,000 pounds
Direct manufacturing labor	21,000 hours
Total fixed costs	$1,200,000

Standard quantities, standard prices, and standard unit costs follow for direct materials and direct manufacturing labor:

	Standard Quantity	Standard Price	Standard Unit Cost
Direct materials	12 pounds	$10 per pound	$120
Direct manufacturing labor	3.5 hours	$50 per hour	$175

During 2011, actual number of units produced and sold was 5,500. Actual cost of direct materials used was $668,800, based on 70,400 pounds purchased at $9.50 per pound. Direct manufacturing labor-hours actually used were 18,500, at the rate of $51.50 per hour. As a result, actual direct manufacturing labor costs were $952,750. Actual fixed costs were $1,180,000. There were no beginning or ending inventories.

Required

1. Calculate the sales-volume variance and flexible-budget variance for operating income.
2. Compute price and efficiency variances for direct materials and direct manufacturing labor.

7-31 Variance analysis, nonmanufacturing setting. Stevie McQueen has run Lightning Car Detailing for the past 10 years. His static budget and actual results for June 2011 are provided next. Stevie has one employee who has been with him for all 10 years that he has been in business. In addition, at any given time he also employs two other less experienced workers. It usually takes each employee 2 hours to detail a vehicle, regardless of his or her experience. Stevie pays his experienced employee $40 per vehicle and the other two employees $20 per vehicle. There were no wage increases in June.

Lightning Car Detailing
Actual and Budgeted Income Statements
For the Month Ended June 30, 2011

	Budget	Actual
Cars detailed	200	225
Revenue	$30,000	$39,375
Variable costs		
Costs of supplies	1,500	2,250
Labor	5,600	6,000
Total variable costs	7,100	8,250
Contribution margin	22,900	31,125
Fixed costs	9,500	9,500
Operating income	$13,400	$21,625

Required

1. How many cars, on average, did Stevie budget for each employee? How many cars did each employee actually detail?
2. Prepare a flexible budget for June 2011.
3. Compute the sales price variance and the labor efficiency variance for each labor type.
4. What information, in addition to that provided in the income statements, would you want Stevie to gather, if you wanted to improve operational efficiency?

7-32 Comprehensive variance analysis, responsibility issues. (CMA, adapted) Styles, Inc., manufactures a full line of well-known sunglasses frames and lenses. Styles uses a standard costing system to set attainable standards for direct materials, labor, and overhead costs. Styles reviews and revises standards annually, as necessary. Department managers, whose evaluations and bonuses are affected by their department's performance, are held responsible to explain variances in their department performance reports.

Recently, the manufacturing variances in the Image prestige line of sunglasses have caused some concern. For no apparent reason, unfavorable materials and labor variances have occurred. At the monthly staff meeting, Jack Barton, manager of the Image line, will be expected to explain his variances and suggest ways of improving performance. Barton will be asked to explain the following performance report for 2011:

	Actual Results	Static-Budget Amounts
Units sold	7,275	7,500
Revenues	$596,550	$600,000
Variable manufacturing costs	351,965	324,000
Fixed manufacturing costs	108,398	112,500
Gross margin	136,187	163,500

Barton collected the following information:

Three items comprised the standard variable manufacturing costs in 2011:

- Direct materials: Frames. Static budget cost of $49,500. The standard input for 2008 is 3.00 ounces per unit.
- Direct materials: Lenses. Static budget costs of $139,500. The standard input for 2008 is 6.00 ounces per unit.
- Direct manufacturing labor: Static budget costs of $135,000. The standard input for 2008 is 1.20 hours per unit.

Assume there are no variable manufacturing overhead costs.

The actual variable manufacturing costs in 2011 were as follows:

- Direct materials: Frames. Actual costs of $55,872. Actual ounces used were 3.20 ounces per unit.
- Direct materials: Lenses. Actual costs of $150,738. Actual ounces used were 7.00 ounces per unit.
- Direct manufacturing labor: Actual costs of $145,355. The actual labor rate was $14.80 per hour.

Required

1. Prepare a report that includes the following:
   a. Selling-price variance
   b. Sales-volume variance and flexible-budget variance for operating income in the format of the analysis in Exhibit 7-2

c. Price and efficiency variances for the following:
- Direct materials: frames
- Direct materials: lenses
- Direct manufacturing labor

2. Give three possible explanations for each of the three price and efficiency variances at Styles in requirement 1c.

7-33 Possible causes for price and efficiency variances. You are a student preparing for a job interview with a *Fortune* 100 consumer products manufacturer. You are applying for a job in the finance department. This company is known for its rigorous case-based interview process. One of the students who successfully obtained a job with them upon graduation last year advised you to "know your variances cold!" When you inquired further, she told you that she had been asked to pretend that she was investigating wage and materials variances. Per her advice, you have been studying the causes and consequences of variances. You are excited when you walk in and find that the first case deals with variance analysis. You are given the following data for May for a detergent bottling plant located in Mexico:

Actual		
Bottles filled	340,000	
Direct materials used in production	6,150,000	oz.
Actual direct material cost	2,275,500	pesos
Actual direct manufacturing labor-hours	26,000	hours
Actual direct labor cost	784,420	pesos
Standards		
Purchase price of direct materials	0.36	pesos/oz
Bottle size	15	oz.
Wage rate	29.25	pesos/hour
Bottles per minute	0.50	

Required

Please respond to the following questions as if you were in an interview situation:

1. Calculate the materials efficiency and price variance, and the wage and labor efficiency variances for the month of May.

2. You are given the following context: "Union organizers are targeting our detergent bottling plant in Puebla, Mexico, for a union." Can you provide a better explanation for the variances that you have calculated on the basis of this information?

7-34 Material cost variances, use of variances for performance evaluation. Katharine Stanley is the owner of Better Bikes, a company that produces high quality cross-country bicycles. Better Bikes participates in a supply chain that consists of suppliers, manufacturers, distributors, and elite bicycle shops. For several years Better Bikes has purchased titanium from suppliers in the supply chain. Better Bikes uses titanium for the bicycle frames because it is stronger and lighter than other metals and therefore increases the quality of the bicycle. Earlier this year, Better Bikes hired Michael Scott, a recent graduate from State University, as purchasing manager. Michael believed that he could reduce costs if he purchased titanium from an online marketplace at a lower price.

Better Bikes established the following standards based upon the company's experience with previous suppliers. The standards are as follows:

Cost of titanium	$22	per pound
Titanium used per bicycle	8	lb.

Actual results for the first month using the online supplier of titanium are as follows:

Bicycles produced	800	
Titanium purchased	8,400	lb. for $159,600
Titanium used in production	7,900	lb.

Required

1. Compute the direct materials price and efficiency variances.

2. What factors can explain the variances identified in requirement 1? Could any other variances be affected?

3. Was switching suppliers a good idea for Better Bikes? Explain why or why not.

4. Should Michael Scott's performance evaluation be based solely on price variances? Should the production manager's evaluation be based solely on efficiency variances? Why it is important for Katharine Stanley to understand the causes of a variance before she evaluates performance?

5. Other than performance evaluation, what reasons are there for calculating variances?

6. What future problems could result from Better Bikes' decision to buy a lower quality of titanium from the online marketplace?

7-35 Direct manufacturing labor and direct materials variances, missing data. (CMA, heavily adapted) Morro Bay Surfboards manufactures fiberglass surfboards. The standard cost of direct materials and direct manufacturing labor is $225 per board. This includes 30 pounds of direct materials, at the budgeted price of $3 per pound, and 9 hours of direct manufacturing labor, at the budgeted rate of $15 per hour. Following are additional data for the month of July:

Units completed	5,500 units
Direct material purchases	190,000 pounds
Cost of direct material purchases	$579,500
Actual direct manufacturing labor-hours	49,000 hours
Actual direct labor cost	$739,900
Direct materials efficiency variance	$ 1,500 F

There were no beginning inventories.

Required

1. Compute direct manufacturing labor variances for July.
2. Compute the actual pounds of direct materials used in production in July.
3. Calculate the actual price per pound of direct materials purchased.
4. Calculate the direct materials price variance.

7-36 Direct materials and manufacturing labor variances, solving unknowns. (CPA, adapted) On May 1, 2012, Bovar Company began the manufacture of a new paging machine known as Dandy. The company installed a standard costing system to account for manufacturing costs. The standard costs for a unit of Dandy follow:

Direct materials (3 lb. at $5 per lb.)	$15.00
Direct manufacturing labor (1/2 hour at $20 per hour)	10.00
Manufacturing overhead (75% of direct manufacturing labor costs)	7.50
	$32.50

The following data were obtained from Bovar's records for the month of May:

	Debit	Credit
Revenues		$125,000
Accounts payable control (for May's purchases of direct materials)		68,250
Direct materials price variance	$3,250	
Direct materials efficiency variance	2,500	
Direct manufacturing labor price variance	1,900	
Direct manufacturing labor efficiency variance		2,000

Actual production in May was 4,000 units of Dandy, and actual sales in May were 2,500 units.

The amount shown for direct materials price variance applies to materials purchased during May. There was no beginning inventory of materials on May 1, 2012.

Compute each of the following items for Bovar for the month of May. Show your computations.

Required

1. Standard direct manufacturing labor-hours allowed for actual output produced
2. Actual direct manufacturing labor-hours worked
3. Actual direct manufacturing labor wage rate
4. Standard quantity of direct materials allowed (in pounds)
5. Actual quantity of direct materials used (in pounds)
6. Actual quantity of direct materials purchased (in pounds)
7. Actual direct materials price per pound

7-37 Direct materials and manufacturing labor variances, journal entries. Shayna's Smart Shawls, Inc., is a small business that Shayna developed while in college. She began hand-knitting shawls for her dorm friends to wear while studying. As demand grew, she hired some workers and began to manage the operation. Shayna's shawls require wool and labor. She experiments with the type of wool that she uses, and she has great variety in the shawls she produces. Shayna has bimodal turnover in her labor. She has some employees who have been with her for a very long time and others who are new and inexperienced.

Shayna uses standard costing for her shawls. She expects that a typical shawl should take 4 hours to produce, and the standard wage rate is $10.00 per hour. An average shawl uses 12 skeins of wool. Shayna shops around for good deals, and expects to pay $3.50 per skein.

Shayna uses a just-in-time inventory system, as she has clients tell her what type and color of wool they would like her to use.

For the month of April, Shayna's workers produced 235 shawls using 925 hours and 3,040 skeins of wool. Shayna bought wool for $10,336 (and used the entire quantity), and incurred labor costs of $9,620.

Required

1. Calculate the price and efficiency variances for the wool, and the price and efficiency variances for direct manufacturing labor.
2. Record the journal entries for the variances incurred.
3. Discuss logical explanations for the combination of variances that Shayna experienced.

7-38 Use of materials and manufacturing labor variances for benchmarking. You are a new junior accountant at Clearview Corporation, maker of lenses for eyeglasses. Your company sells generic-quality lenses for a moderate price. Your boss, the Controller, has given you the latest month's report for the lens trade association. This report includes information related to operations for your firm and three of your competitors within the trade association. The report also includes information related to the industry benchmark for each line item in the report. You do not know which firm is which, except that you know you are Firm A.

Unit Variable Costs
Member Firms
For the Month Ended September 30, 2012

	Firm A	Firm B	Firm C	Firm D	Industry Benchmark
Materials input	2.00	1.95	2.15	2.50	2.0 oz. of glass
Materials price	$ 4.90	$ 5.60	$ 5.00	$ 4.50	$ 5.00 per oz.
Labor-hours used	1.10	1.15	0.95	1.00	1.00 hours
Wage rate	$15.00	$15.50	$16.50	$15.90	$13.00 per DLH
Variable overhead rate	$ 9.00	$13.50	$ 7.50	$11.25	$12.00 per DLH

Required

1. Calculate the total variable cost per unit for each firm in the trade association. Compute the percent of total for the material, labor, and variable overhead components.
2. Using the trade association's industry benchmark, calculate direct materials and direct manufacturing labor price and efficiency variances for the four firms. Calculate the percent over standard for each firm and each variance.
3. Write a brief memo to your boss outlining the advantages and disadvantages of belonging to this trade association for benchmarking purposes. Include a few ideas to improve productivity that you want your boss to take to the department heads' meeting.

7-39 Comprehensive variance analysis review. Sonnet, Inc., has the following budgeted standards for the month of March 2011:

Average selling price per diskette	$ 6.00
Total direct material cost per diskette	$ 1.50
Direct manufacturing labor	
Direct manufacturing labor cost per hour	$ 12.00
Average labor productivity rate (diskettes per hour)	300
Direct marketing cost per unit	$ 0.30
Fixed overhead	$800,000

Sales of 1,500,000 units are budgeted for March. The expected total market for this product was 7,500,000 diskettes. Actual March results are as follows:

- Unit sales and production totaled 95% of plan.
- Actual average selling price increased to $6.10.
- Productivity dropped to 250 diskettes per hour.
- Actual direct manufacturing labor cost is $12.20 per hour.
- Actual total direct material cost per unit increased to $1.60.
- Actual direct marketing costs were $0.25 per unit.
- Fixed overhead costs were $10,000 above plan.
- Actual market size was 8,906,250 diskettes.

Required

Calculate the following:

1. Static-budget and actual operating income
2. Static-budget variance for operating income
3. Flexible-budget operating income
4. Flexible-budget variance for operating income
5. Sales-volume variance for operating income
6. Market share and market size variances
7. Price and efficiency variances for direct manufacturing labor
8. Flexible-budget variance for direct manufacturing labor

7-40 Comprehensive variance analysis. (CMA) Iceland, Inc., is a fast-growing ice-cream maker. The company's new ice-cream flavor, Cherry Star, sells for $9 per pound. The standard monthly production level is 300,000 pounds, and the standard inputs and costs are as follows:

	A	B	C	D	E
1		Quantity per		Standard	
2	Cost Item	Pound of Ice Cream		Unit Costs	
3	Direct materials				
4	Cream	12	oz.	$ 0.03	/oz.
5	Vanilla extract	4	oz.	0.12	/oz.
6	Cherry	1	oz.	0.45	/oz.
7					
8	Direct manufacturing labor[a]				
9	Preparing	1.2	min.	14.40	/hr.
10	Stirring	1.8	min.	18.00	/hr.
11					
12	Variable overhead[b]	3	min.	32.40	/hr.
13					
14	[a] Direct manufacturing labor rates include employee benefits.				
15	[b] Allocated on the basis of direct manufacturing labor-hours.				

Molly Cates, the CFO, is disappointed with the results for May 2011, prepared based on these standard costs.

	A	B	C	D	E	F	G
17	Performance Report, May 2011						
18		Actual		Budget		Variance	
19	Units (pounds)	275,000		300,000		25,000	U
20	Revenues	$2,502,500		$2,700,000		$197,500	U
21	Direct materials	432,500		387,000		45,500	U
22	Direct manufacturing labor	174,000		248,400		74,400	F

Cates notes that despite a sizable increase in the pounds of ice cream sold in May, Cherry Star's contribution to the company's overall profitability has been lower than expected. Cates gathers the following information to help analyze the situation:

	A	B	C	D
25	Usage Report, May 2011			
26	Cost Item	Quantity		Actual Cost
27	Direct materials			
28	Cream	3,120,000	oz.	$124,800
29	Vanilla extract	1,230,000	oz.	184,500
30	Cherry	325,000	oz.	133,250
31				
32	Direct manufacturing labor			
33	Preparing	310,000	min.	77,500
34	Stirring	515,000	min.	154,500

Required Compute the following variances. Comment on the variances, with particular attention to the variances that may be related to each other and the controllability of each variance:

1. Selling-price variance
2. Direct materials price variance
3. Direct materials efficiency variance
4. Direct manufacturing labor efficiency variance

7-41 Price and efficiency variances, problems in standard-setting, and benchmarking. Stuckey, Inc., manufactures industrial 55 gallon drums for storing chemicals used in the mining industry. The body of the drums is made from aluminum and the lid is made of chemical resistant plastic. Andy Jorgenson, the controller, is becoming increasingly disenchanted with Stuckey's standard costing system. The budgeted information for direct materials and direct manufacturing labor for June 2011 were as follows:

	Budget
Drums and lids produced	5,200
Direct materials price per sq. ft.	
Aluminum	$ 3.00
Plastic	$ 1.50
Direct materials per unit	
Aluminum (sq. ft.)	20
Plastic (sq. ft.)	7
Direct labor-hours per unit	2.3
Direct labor cost per hour	$12.00

The actual number of drums and lids produced was 4,920. The actual cost of aluminum and plastic was $283,023 (95,940 sq. ft.) and $50,184 (33,456 sq. ft.), respectively. The actual direct labor cost incurred was $118,572 (9,840 hours). There were no beginning or ending inventories of materials.

Standard costs are based on a study of the operations conducted by an independent consultant six months earlier. Jorgenson observes that since that study he has rarely seen an unfavorable variance of any magnitude. He notes that even at their current output levels, the workers seem to have a lot of time for sitting around and gossiping. Jorgenson is concerned that the production manager, Charlie Fenton, is aware of this but does not want to tighten up the standards because the lax standards make his performance look good.

Required

1. Compute the price and efficiency variances of Stuckey, Inc., for each direct material and direct manufacturing labor in June 2011.
2. Describe the types of actions the employees at Stuckey, Inc., may have taken to reduce the accuracy of the standards set by the independent consultant. Why would employees take those actions? Is this behavior ethical?
3. If Jorgenson does nothing about the standard costs, will his behavior violate any of the Standards of Ethical Conduct for Management Accountants described in Exhibit 1-7 on page 16?
4. What actions should Jorgenson take?
5. Jorgenson can obtain benchmarking information about the estimated costs of Stuckey's major competitors from Benchmarking Clearing House (BCH). Discuss the pros and cons of using the BCH information to compute the variances in requirement 1.

Collaborative Learning Problem

7-42 Comprehensive variance analysis. Sol Electronics, a fast-growing electronic device producer, uses a standard costing system, with standards set at the beginning of each year.

In the second quarter of 2011, Sol faced two challenges: It had to negotiate and sign a new short-term labor agreement with its workers' union, and it also had to pay a higher rate to its suppliers for direct materials. The new labor contract raised the cost of direct manufacturing labor relative to the company's 2011 standards. Similarly, the new rate for direct materials exceeded the company's 2011 standards. However, the materials were of better quality than expected, so Sol's management was confident that there would be less waste and less rework in the manufacturing process. Management also speculated that the per-unit direct manufacturing labor cost might decline as a result of the materials' improved quality.

At the end of the second quarter, Sol's CFO, Terence Shaw, reviewed the following results:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1		Variable Costs Per Unit																	
2	**Per Unit Variable Costs**	**Standard**						**First Quarter 2011 Actual Results**						**Second Quarter 2011 Actual Results**					
3	Direct materials	2.2	lb.	at	$5.70	per lb.	$12.54	2.3	lb.	at	$ 5.80	per lb.	$13.34	2.0	lb.	at	$ 6.00	per lb.	$12.00
4	Direct manufacturing labor	0.5	hrs.	at	$ 12	per hr.	$ 6.00	0.52	hrs.	at	$ 12	per hr.	$ 6.24	0.45	hrs.	at	$ 14	per hr.	$ 6.30
5	Other variable costs						$10.00						$10.00						$ 9.85
6							$28.54						$29.58						$28.15

	U	V	W	X
1				
2		**Static Budget for Each Quarter Based on 2011**	**First Quarter 2011 Results**	**Second Quarter 2011 Results**
3	Units	4,000	4,400	4,800
4	Selling price	$ 70	$ 72	$ 71.50
5	Sales	$280,000	$316,800	$343,200
6	Variable costs			
7	Direct materials	50,160	58,696	57,600
8	Direct manufacturing labor	24,000	27,456	30,240
9	Other variable costs	40,000	44,000	47,280
10	Total variable costs	114,160	130,152	135,120
11	Contribution margin	165,840	186,648	208,080
12	Fixed costs	68,000	66,000	68,400
13	Operating income	$ 97,840	$120,648	$139,680

Shaw was relieved to see that the anticipated savings in material waste and rework seemed to have materialized. But, he was concerned that the union would press hard for higher wages given that actual unit costs came in below standard unit costs and operating income continued to climb.

Required

1. Prepare a detailed variance analysis of the second quarter results relative to the static budget. Show how much of the improvement in operating income arose due to changes in sales volume and how much arose for other reasons. Calculate variances that isolate the effects of price and usage changes in direct materials and direct manufacturing labor.
2. Use the results of requirement 1 to prepare a rebuttal to the union's anticipated demands in light of the second quarter results.
3. Terence Shaw thinks that the company can negotiate better if it changes the standards. Without performing any calculations, discuss the pros and cons of immediately changing the standards.