

such a statement in Unit 8.2 by preparing a segment margin income statement. As you should recall, the segment margin income statement excludes all allocated costs in the calculation of the segment margin. Only the traceable fixed costs should be subtracted from the contribution margin to arrive at the segment margin. Common fixed costs should not appear in the segment analysis; rather, they should be reported only in the total column. **Exhibit 10.4** shows Centex Yarns' segment margin income statement.

**EXHIBIT 10.4**

Segment margin income statement for Centex Yarns.

	A	B	C	D	E
		<b>Polyester</b>		<b>Nylon</b>	
1		<b>Fibers Division</b>	<b>Rope Division</b>	<b>Fibers Division</b>	<b>Total</b>
2	Revenue	\$ 10,600,000	\$ 6,725,000	\$ 8,650,000	\$ 25,975,000
3	Less variable expenses				
4	Cost of goods sold	5,543,000	2,368,000	4,414,000	12,325,000
5	Selling & administrative	1,334,000	649,000	890,000	2,873,000
6	Contribution margin	3,723,000	3,708,000	3,346,000	10,777,000
7	Less traceable fixed expenses				
8	Cost of goods sold	1,685,000	1,382,000	2,208,000	5,275,000
9	Selling & administrative	236,000	174,000	273,000	683,000
10	Segment margin	\$ 1,802,000	\$ 2,152,000	\$ 865,000	4,819,000
11	Common fixed expenses				2,886,000
12	Net operating income				\$ 1,933,000

**WATCH OUT!**

Several terms can be used in referring to common costs, including allocated costs and unavoidable costs. In preparing a segment margin income statement, instead of looking for a certain phrase that describes the cost (e.g., *traceable or common*), look for the reason the cost was incurred. If it was incurred specifically for the segment, then it is a traceable cost. If it was incurred to support the company as a whole, then it is a common cost.

Notice what happens to the evaluation of the Nylon Fibers division when allocated common fixed costs are removed from the analysis. This division is actually covering its variable costs plus all its traceable fixed costs, and it is contributing an additional \$865,000 toward covering the company's common fixed costs. If this division were eliminated, as James Cameron is inclined to do, the company's net operating income would decrease by \$865,000. So closing the division appears to be a poor decision.

## When Traceable Fixed Costs Become Common Costs

As an organization is broken down into finer segments, costs that were traceable fixed costs at one level may become common fixed costs at a lower level. Let's look at the Nylon Fibers division in more detail. This division has two groups, Textile Yarns and Industrial Yarns. Monica Waltrip treats each group as a profit center and uses segment margin analysis to evaluate each group's financial performance. **Exhibit 10.5** presents the Nylon Fibers division's segment margin income statement.

Notice that the \$2,208,000 in traceable fixed product costs for the Nylon Fibers division shown in Exhibit 10.4 now has been divided into \$1,159,600 in traceable fixed costs and \$1,048,400 in common fixed costs. Apparently the managers of the Textile Yarns and Industrial Yarns groups do not control all the fixed costs in the division. Some of those fixed costs are kept under Monica's control at the Nylon Fibers divisional level. Therefore, the group managers should not be held responsible for them.

## Segment Reporting, Segment Margin, and GAAP

ASC 280, *Segment Reporting*, provides the generally accepted accounting principles that require companies to report selected information about operating segments in the annual report. But even with this pronouncement of generally accepted accounting principles, all companies do not report identical segment information.

**EXHIBIT 10.5**

Segment margin income statement for Centex Yarns' Nylon Fibers division.

	A	B	C	D
		Textile	Industrial	Nylon
		Yarns Group	Yarns Group	Fibers Division
1				
2	Revenue	\$ 6,055,000	\$ 2,595,000	\$ 8,650,000
3	Less variable expenses			
4	Cost of goods sold	3,168,400	1,245,600	4,414,000
5	Selling & administrative	683,000	207,000	890,000
6	Contribution margin	2,203,600	1,142,400	3,346,000
7	Less traceable fixed expenses			
8	Cost of goods sold	744,400	415,200	1,159,600
9	Selling & administrative	191,100	81,900	273,000
10	Segment margin	\$ 1,268,100	\$ 645,300	1,913,400
11	Common fixed expenses			1,048,400
12	Net operating income			\$ 865,000

Let's revisit Apple's segment reporting in its 2018 10-K. Does the reported operating income of \$34,864 million from the Americas segment equal the segment margin for that segment? For Apple, it's probably fairly close. In fact, the segment information footnote includes the following statement: "Costs excluded from segment operating income include various corporate expenses such as research and development, corporate marketing expenses, certain share-based compensation expenses, income taxes, various nonrecurring charges, and other separately managed general and administrative costs."<sup>4</sup>

**Ford Motor Company** takes a different approach in its GAAP-based segment reporting. In its 2018 10-K, the company reported total segment pre-tax income, of \$4,345 million, which equals the total income before income taxes reported on the consolidated income statement. In this instance, the reported segment amounts would not equal the segment margin, since the reported amount appears to include allocated corporate expenses.

One thing that is missing from GAAP-based segment reporting is a breakdown of variable and fixed costs. Thus, when cost behavior is important, even statements that exclude common fixed costs will not be that useful in decision making.

### THINK ABOUT IT 10.2

Do you think managers would support additional segment disclosures in the annual report? Why or why not?

## Unit 10.2 Review

### Key Term

## Practice Questions

- (LO 2)** There is only one way to divide an organization into segments. True or False.
- (LO 2)** The Kleypas Division reported a \$1,000,000 net operating loss for the year. Included in that amount were \$1,500,000 in common fixed corporate expenses that were allocated to divisions based on sales revenue. The division's segment margin was
  - \$500,000.
  - \$1,500,000.
  - \$(1,000,000).
  - \$(500,000).
- (LO 2)** The home healthcare division of Medical Arts, Inc., generated \$5,000,000 in revenues during the year. Variable expenses totaled \$1,200,000, direct fixed expenses totaled \$1,600,000, and common fixed expenses totaled \$1,800,000. The division's segment margin for the year was
  - \$400,000.
  - \$2,200,000.
  - \$3,400,000.
  - \$3,800,000.

## Unit 10.2 Practice Exercise

Andrew Hejtmanek, vice president of operations at Houdyshell Enterprises, received the following income statement for the company's Imaging Products division.

	<u>X-Ray Group</u>	<u>MRI Group</u>	<u>Total</u>
Sales revenue	\$1,500,000	\$2,800,000	\$4,300,000
Less variable expenses:			
Cost of goods sold	540,000	1,800,000	2,340,000
Selling & administrative	200,000	575,000	775,000
Contribution margin	760,000	425,000	1,185,000
Less fixed expenses	350,000	800,000	1,150,000
Operating income	<u>\$ 410,000</u>	<u>\$ (375,000)</u>	<u>\$ 35,000</u>

Andrew is not pleased with the division's performance, and he believes that the MRI group is responsible for its disappointing results. He wants to close the group.

### Required

- Kim Pippin, the division's controller, has determined that corporate headquarters allocated \$225,000 and \$500,000 in common fixed expenses, respectively, to the X-Ray and MRI groups. Prepare a segment margin income statement that will provide Andrew with a better basis for evaluating the two divisions' performance.
- What action do you recommend that Andrew take concerning the MRI group? Why?

## Selected Unit 10.2 Answers

### Think About It 10.2

Because annual reports are distributed to shareholders and creditors, and in the case of publicly-traded companies, to the public, increased disclosure would reveal more information about the business. Depending on the nature of the information, managers might be concerned that revealing the information to competitors could jeopardize business operations. On the other hand, managers of publicly-traded companies might prefer to have certain information disclosed in order to demonstrate their superior performance.

### Practice Questions

- False. An organization can be divided in numerous ways.
- A.  $(\$1,000,000) + \$1,500,000 = \$500,000$
- B.  $\$5,000,000 - \$1,200,000 - \$1,600,000 = \$2,200,000$

**Unit 10.2 Practice Exercise**

a.

	<u>X-Ray Group</u>	<u>MRI Group</u>	<u>Total</u>
Revenue	\$1,500,000	\$2,800,000	\$4,300,000
Less variable expenses:			
Cost of goods sold	540,000	1,800,000	2,340,000
Selling & administrative	200,000	575,000	775,000
Contribution margin	760,000	425,000	1,185,000
Less traceable fixed expenses	125,000	300,000	425,000
Segment margin	<u>\$ 635,000</u>	<u>\$ 125,000</u>	760,000
Less common fixed expenses			725,000
Operating Income			<u>\$ 35,000</u>

- b. Andrew should not close the MRI Group. The group is generating \$125,000 in segment margin, which is helping to cover the \$725,000 in common fixed expenses incurred at the corporate level. Closing the MRI group would reduce total operating income by \$125,000, resulting in a \$90,000 loss (\$35,000 – \$125,000).

**Unit 10.3****Return on Investment****Guided Unit Preparation**

Answering the following questions while you read this unit will guide your understanding of the key concepts found in the unit. The questions are linked to the learning objectives presented at the beginning of the chapter.

- LO 3**
1. How is return on investment (ROI) calculated?
  2. What two ratios can be multiplied to calculate ROI? Define those ratios.
  3. All else held equal, what three actions can a manager take to improve a division's ROI?
  4. How can using ROI as an evaluation tool lead to suboptimal behavior by managers?

Once an organization has chosen to decentralize its decision making, it must develop a system of accountability to facilitate the evaluation of its decisions. For a cost center manager, that typically means an examination of actual costs against budgeted costs. For a profit center manager, the evaluation will include a review of both revenues and expenses, with a focus on operating income. An investment center manager should be evaluated based on how well assets have been used to generate income. In this unit you will learn about return on investment, a common measure used to evaluate an investment center's performance.

**Return on Investment**

In the early 1900s, faced with the challenge of evaluating managers in a decentralized organization, executives at the DuPont Powder Company (now **E. I. du Pont de Nemours and Company**, or more commonly, DuPont) were looking for new performance measures that included invested capital as well as profit. They used the measure they developed, called

return on investment, to evaluate proposals to build new manufacturing facilities and to allocate corporate funds across various facilities. Return on investment is still widely used today to evaluate a broad range of investment options, from manufacturing plants to corporate training programs. It is also used to evaluate entire organizations; organizational units such as divisions, plants, and product lines; and individual investment projects. Finally, it can be used to evaluate past results or to predict future results.

Formally defined, **return on investment (ROI)** measures the rate of return generated by an investment in assets. Expressed as a percentage, it is calculated as

$$\text{ROI} = \frac{\text{Operating income}}{\text{Average operating assets}} \text{ or } \frac{\text{Segment margin}}{\text{Average operating assets}}$$

There is some variation in the income measure used in the calculation of ROI. When an entire organization is being evaluated, operating income, or income before interest and taxes, is a common choice, since at the corporate level, all expenses are under the CEO's control. When ROI is used to evaluate a unit within the organization, the income measure needs to be one that includes only those items that are under the unit manager's control. Some unit managers use the segment margin because it represents revenues and expenses that are directly traceable to the operating unit and controllable by the unit manager. Whatever the income choice, the measure must be used consistently. Throughout the rest of the chapter, we are going to use "operating income" in future formulas, but be aware that "segment margin" can always be substituted when the calculation is for a unit rather than the entire organization.

Since the income measure used in the ROI calculation represents the results obtained for the entire year, the denominator needs to represent the assets used during the year. The most common measure chosen is a simple average of the assets used during the year, computed by adding the beginning and ending asset balances and dividing by 2:

$$\text{Average operating assets} = \frac{\text{Beginning asset balance} + \text{Ending asset balance}}{2}$$

The assets to include in this calculation are those that were actually used in operations, among them cash; accounts receivable; inventory; and property, plant, and equipment. Any asset that was not used to support operations, such as a manufacturing facility that was shut down or a piece of equipment that was no longer in use, should not be included in the asset balance.

Let's calculate the ROI for each of Centex Yarns' divisions. In the following calculations, the segment margins are drawn from Exhibit 10.4.

	<b>Polyester Fibers Division</b>	<b>Rope Division</b>	<b>Nylon Fibers Division</b>
Segment Margin	\$1,802,000	\$2,152,000	\$ 865,000
Average Assets	\$8,153,000	\$8,406,250	\$2,703,000
ROI	$\frac{\$1,802,000}{\$8,153,000} = 22.1\%$	$\frac{\$2,152,000}{\$8,406,250} = 25.6\%$	$\frac{\$ 865,000}{\$2,703,000} = 32\%$

ROI is a relative measure of return. In other words, it says nothing about the *dollar amount* of return; it is simply a *rate* of return. Notice that of the three divisions, the Nylon Fibers division has the highest ROI, yet it also has the smallest segment margin and the smallest dollar amount of assets to use in generating that margin. Based solely on ROI, the Nylon Fibers division is outperforming the other two divisions. Based on segment margin alone, however, the Rope division is outperforming the other two divisions.

### THINK ABOUT IT 10.3

Return on investment is based on the book value of operating assets. However, book value may not be as realistic a measure of the assets' current value as fair market value or appraised value. What effect would using fair market value instead of book value have on the return on investment?