



Chapter 8: Absorption and Variable Costing, and Inventory Management

Cornerstones of Managerial Accounting, 4e

Learning Objectives

1. Explain the difference between absorption and variable costing.
2. Prepare segmented income statements.
3. Discuss inventory management under the economic order quantity and just-in-time (JIT) models.



Measuring the Performance of Profit Centers by Using Variable and Absorption Income Statements

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- ▶ Many companies consist of separate business units called profit centers.
- ▶ It is important for these companies to determine both the overall performance of the business and the performance of the individual profit centers.
- ▶ Therefore, it is important to develop a segmented income statement for each profit center.
- ▶ Two methods of computing income have been developed:
 - ▶ one based on variable costing and
 - ▶ the other based on full or absorption costing.





Absorption Costing

- ▶ **Absorption costing** assigns all manufacturing costs to the product.
- ▶ Direct materials, direct labor, variable overhead, and fixed overhead define the cost of a product.
- ▶ Under this method, fixed overhead is assigned to the product through the use of a predetermined fixed overhead rate and is not expensed until the product is sold.
- ▶ In other words, fixed overhead is an inventoriable cost.





Variable Costing

- ▶ Variable costing stresses the difference between fixed and variable manufacturing costs.
- ▶ **Variable costing** assigns only variable manufacturing costs to the product; these costs include direct materials, direct labor, and variable overhead.
- ▶ Fixed overhead is treated as a period expense and is excluded from the product cost.
- ▶ Under variable costing, fixed overhead of a period is seen as expiring that period and is charged in total against the revenues of the period.





Comparison of Variable and Absorption Costing Methods

	Absorption Costing	Variable Costing
Product costs	Direct materials Direct labor Variable overhead Fixed overhead	Direct materials Direct labor Variable overhead
Period costs	Selling expenses Administrative expenses	Fixed overhead Selling expenses Administrative expenses

Generally accepted accounting principles (GAAP) require absorption costing for external reporting. The Financial Accounting Standards Board (FASB), the Internal Revenue Service (IRS), and other regulatory bodies **do not accept** variable costing as a product-costing method for external reporting.





Inventory Valuation

- ▶ Inventory is valued at product or manufacturing cost.
- ▶ Under **absorption costing**, that product cost includes direct materials, direct labor, variable overhead, and fixed overhead.
- ▶ Under **variable costing**, the product cost includes only direct materials, direct labor, and variable overhead.



Cornerstone 8-1

Computing Inventory Cost Under Absorption Costing



Information:

During the most recent year, Fairchild Company had the following data associated with the product it makes:

Units in beginning inventory	—
Units produced	10,000
Units sold (\$300 per unit)	8,000
Variable costs per unit:	
Direct materials	\$50
Direct labor	\$100
Variable overhead	\$50
Fixed costs:	
Fixed overhead per unit produced	\$25
Fixed selling and administrative	\$100,000

Required:

1. How many units are in ending inventory?
2. Using absorption costing, calculate the per-unit product cost.
3. What is the value of ending inventory?



Cornerstone 8-1

Computing Inventory Cost Under Absorption Costing (continued)

Solution:

1. Units ending inventory = Units beginning inventory + Units produced – Units sold
= 0 + 10,000 – 8,000
= 2,000 units

2. Absorption costing unit cost:

Direct materials	\$ 50
Direct labor	100
Variable overhead	50
Fixed overhead	25
Unit product cost	<u>\$225</u>

3. Value of ending inventory = Units ending inventory × Absorption unit product cost
= 2,000 units × \$225
= \$450,000





Cornerstone 8-2

Computing Inventory Cost Under Variable Costing

Information:

During the most recent year, Fairchild Company had the following data associated with the product it makes:

Units in beginning inventory	—
Units produced	10,000
Units sold (\$300 per unit)	8,000
Variable costs per unit:	
Direct materials	\$50
Direct labor	\$100
Variable overhead	\$50
Fixed costs:	
Fixed overhead per unit produced	\$25
Fixed selling and administrative	\$100,000

Required:

1. How many units are in ending inventory?
2. Using variable costing, calculate the per-unit product cost.
3. What is the value of ending inventory?





Cornerstone 8-2

Computing Inventory Cost Under Variable Costing (continued)

Solution:

1. Units ending inventory = Units beginning inventory + Units produced – Units sold
= 0 + 10,000 – 8,000
= 2,000 units

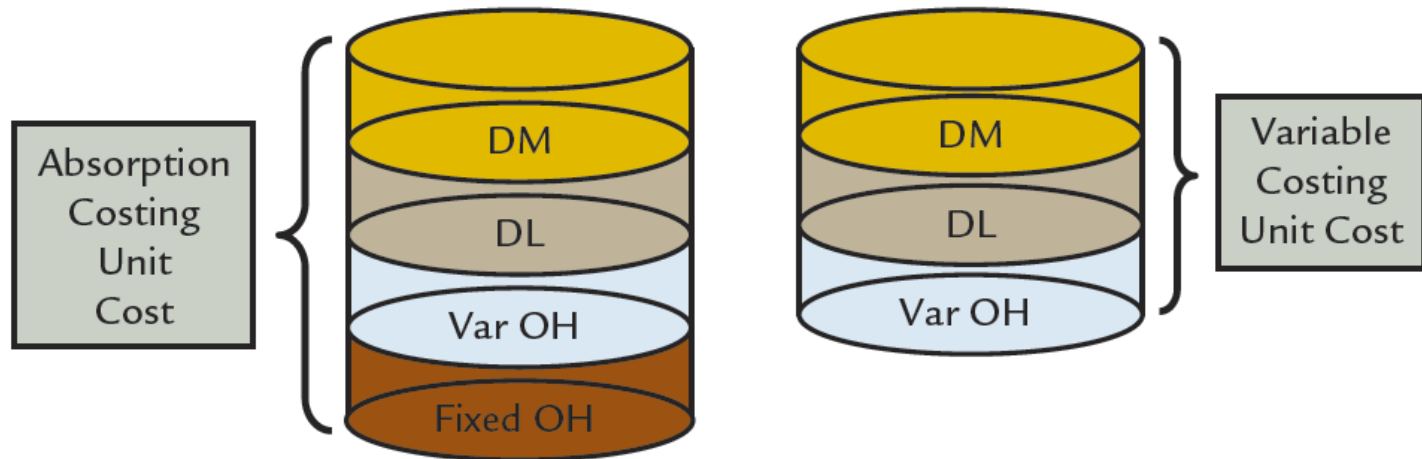
2. Variable costing unit cost:

Direct materials	\$ 50
Direct labor	100
Variable overhead	50
Unit product cost	<u>\$200</u>

3. Value of ending inventory = Units ending inventory × Variable unit product cost
= 2,000 units × \$200
= \$400,000



1 Comparison of Variable and Absorption Costing Methods



The only difference between the two approaches is the treatment of fixed factory overhead. As a result, the unit product cost under absorption costing is always greater than the unit product cost under variable costing.



1 Income Statements Using Variable and Absorption Costing

- ▶ Because unit product costs are the basis for cost of goods sold, the variable and absorption-costing methods can lead to different operating income figures.
- ▶ The difference arises because of the amount of fixed overhead recognized as an expense under the two methods.





Cornerstone 8-3

Preparing An Absorption Costing Income Statement

Information:

During the most recent year, Fairchild Company had the following data associated with the product it makes:

Units in beginning inventory	—
Units produced	10,000
Units sold (\$300 per unit)	8,000
Variable costs per unit:	
Direct materials	\$50
Direct labor	\$100
Variable overhead	\$50
Fixed costs:	
Fixed overhead per unit produced	\$25
Fixed selling and administrative	\$100,000

Required:

1. Calculate the cost of goods sold under absorption costing.
2. Prepare an income statement using absorption costing.



Cornerstone 8-3

Preparing An Absorption Costing Income Statement (continued)



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Solution:

1. Cost of goods sold = Absorption unit product cost \times Units sold
= \$225 \times 8,000
= \$1,800,000

2.

Fairchild Company Absorption-Costing Income Statement

Sales (\$300 \times 8,000)	\$2,400,000
Less: Cost of goods sold	1,800,000
Gross margin	<u>\$ 600,000</u>
Less: Selling and administrative expenses	100,000
Operating income	<u><u>\$ 500,000</u></u>



Cornerstone 8-4



1

Preparing a Variable-Costing Income Statement

Information:

During the most recent year, Fairchild Company had the following data associated with the product it makes:

Units in beginning inventory	—
Units produced	10,000
Units sold (\$300 per unit)	8,000
Variable costs per unit:	
Direct materials	\$50
Direct labor	\$100
Variable overhead	\$50
Fixed costs:	
Fixed overhead per unit produced	\$25
Fixed selling and administrative	\$100,000

Required:

1. Calculate the cost of goods sold under variable costing.
2. Prepare an income statement using variable costing.





Cornerstone 8-4

Preparing a Variable-Costing Income Statement (continued)

Solution:

1. Cost of goods sold = Variable unit product cost \times Units sold
= \$200 \times 8,000
= \$1,600,000

2.

Fairchild Company		
Variable-Costing Income Statement		
Sales (\$300 \times 8,000)		\$2,400,000
Less variable expenses:		
Variable cost of goods sold		<u>1,600,000</u>
Contribution margin		\$ 800,000
Less fixed expenses:		
Fixed overhead	\$250,000	
Fixed selling and administrative	<u>100,000</u>	350,000
Operating income		<u><u>\$ 450,000</u></u>





Production, Sales, and Income Relationships

If

1. Production $>$ Sales
2. Production $<$ Sales
3. Production $=$ Sales

Then

- Absorption income $>$ Variable income
Absorption income $<$ Variable income
Absorption income $=$ Variable income

The relationship between variable-costing income and absorption-costing income changes as the relationship between production and sales changes.





Evaluating Profit-Center Managers

- ▶ The evaluation of managers is often tied to the profitability of the units that they control.
- ▶ In general terms, if income performance is expected to reflect managerial performance, then managers have the right to expect the following:
 - ▶ As sales revenue increases from one period to the next, all other things being equal, income should increase.
 - ▶ As sales revenue decreases from one period to the next, all other things being equal, income should decrease.
 - ▶ As sales revenue remains unchanged from one period to the next, all other things being equal, income should remain unchanged.
- ▶ Variable costing ensures that the above relationships hold; however, absorption costing may not.





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Segmented Income Statements Using Variable Costing

- ▶ Variable costing is useful in preparing segmented income statements because it gives useful information on variable and fixed expenses.
- ▶ A **segment** is a subunit of a company of sufficient importance to warrant the production of performance reports.
- ▶ Segments can be divisions, departments, product lines, customer classes, and so on.
- ▶ In segmented income statements, fixed expenses are broken down into two categories:
 - ▶ direct fixed expenses and
 - ▶ common fixed expenses.





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Direct Fixed Expenses

- ▶ **Direct fixed expenses** are fixed expenses that are directly traceable to a segment.
- ▶ These are sometimes referred to as avoidable fixed expenses or traceable fixed expenses because they vanish if the segment is eliminated.
 - ▶ For example, if the segments were sales regions, a direct fixed expense for each region would be the rent for the sales office.





2

Common Fixed Expenses

- ▶ **Common fixed expenses** are jointly caused by two or more segments.
- ▶ These expenses persist even if one of the segments to which they are common is eliminated.
 - ▶ For example, depreciation on the corporate headquarters building or the salary of the CEO would be a common fixed expense for most large companies.



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Cornerstone 8-5

Preparing a Segmented Income Statement

Information:

Audiomatronics Inc. produces MP3 players and DVD players in a single factory. The following information was provided for the coming year.

	MP3 Players	DVD Players
Sales	\$400,000	\$290,000
Variable cost of goods sold	200,000	150,000
Direct fixed overhead	30,000	20,000

A 5 percent sales commission is paid for each of the product lines. Direct fixed selling and administrative expense was estimated to be \$10,000 for the MP3 line and \$15,000 for the DVD line. Common fixed overhead for the factory was estimated to be \$100,000; common selling and administrative expense was estimated to be \$20,000.

Required:

Prepare a segmented income statement for Audiomatronics Inc. for the coming year, using variable costing.

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Cornerstone 8-5

Preparing a Segmented Income Statement

(continued)

Solution:

Audiomatronics Inc. Segmented Income Statement For the Coming Year			
	MP3 Players	DVD Players	Total
Sales	\$ 400,000	\$ 290,000	\$ 690,000
Variable cost of goods sold	(200,000)	(150,000)	(350,000)
Variable selling expense*	(20,000)	(14,500)	(34,500)
Contribution margin	<u>\$ 180,000</u>	<u>\$ 125,500</u>	<u>\$ 305,500</u>
Less direct fixed expenses:			
Direct fixed overhead	(30,000)	(20,000)	(50,000)
Direct selling and administrative	(10,000)	(15,000)	(25,000)
Segment margin	<u>\$ 140,000</u>	<u>\$ 90,500</u>	<u>\$ 230,500</u>
Less common fixed expenses:			
Common fixed overhead			(100,000)
Common selling and administrative			(20,000)
Operating income			<u><u>\$ 110,500</u></u>

*Variable selling expense for MP3 players = $0.05 \times \text{Sales} = 0.05 \times \$400,000 = \$20,000$

Variable selling expense for DVD players = $0.05 \times \text{Sales} = 0.05 \times \$290,000 = \$14,500$

You Decide



2

Using Segmented Income Statements to Make Decisions

You are the Financial Vice President for Folsom Company, which sells three products, Alpha, Beta, and Gamma. You have just received the income statement shown in Panel A of the next slide. Clearly, Gamma is unprofitable. In fact, the company is losing \$13,740 a year on Gamma.

Should you drop Gamma? Will income go up if you do?

Take a closer look at the income statement. Notice that both the direct fixed costs and the allocated common fixed costs are subtracted from each segment's contribution margin. This is misleading; it seems that dropping any segment would result in losing the operating income associated with the segment. However, if one segment is dropped, the allocated common fixed costs will remain.

A more useful income statement is presented in Panel B of the next slide. Here, the segment margin for all three products is positive, as is overall income. While Gamma is not as profitable as Alpha and Beta, it is profitable. Dropping Gamma will result in a decrease in operating income of \$12,000, the amount of the segment margin.

Separating the direct fixed costs from the common fixed costs, and focusing on the segment margin, will give a truer picture of a segment's profitability.





Comparison of Segmented Income Statement With and Without Allocated Common Fixed Expense

Folsom Company information for last year:

	Alpha	Beta	Gamma
Units produced and sold	10,000	30,000	26,000
Price	\$30	\$25	\$14
Variable cost per unit	\$20	\$18	\$12
Direct fixed expense	\$35,000	\$38,000	\$40,000

**A. Segmented Income Statement
with Allocation of Common Fixed Expense:**

**B. Segmented Income Statement
without Allocation of Common Fixed Expense:**

	Alpha	Beta	Gamma	Total	Alpha	Beta	Gamma	Total
Sales	\$300,000	\$750,000	\$364,000	\$1,414,000	\$300,000	\$750,000	\$364,000	\$1,414,000
Less: Variable cost	200,000	540,000	312,000	1,052,000	200,000	540,000	312,000	1,052,000
Contribution margin	<u>\$100,000</u>	<u>\$210,000</u>	<u>52,000</u>	<u>\$ 362,000</u>	<u>\$100,000</u>	<u>\$210,000</u>	<u>52,000</u>	<u>\$ 362,000</u>
Less: Direct fixed cost	35,000	38,000	40,000	113,000	35,000	38,000	40,000	113,000
Segment margin	<u>\$ 65,000</u>	<u>\$172,000</u>	<u>\$ 12,000</u>	<u>249,000</u>	<u>\$ 65,000</u>	<u>\$172,000</u>	<u>\$ 12,000</u>	<u>249,000</u>
Less: Allocated common cost	21,220	53,040	25,740	100,000				100,000
Operating income	<u><u>\$ 43,780</u></u>	<u><u>\$118,960</u></u>	<u><u>\$ (13,740)</u></u>	<u><u>\$ 149,000</u></u>				<u><u>\$ 149,000</u></u>

