**Module 1 - Background**

**ACCOUNTING COST SYSTEMS AND COST BEHAVIOR**

**Modular Learning Objectives**

Keep the following objectives in mind as you work through the material in this module:

* Define managerial accounting.
* Describe the role of managerial accounting.
* Differentiate between variable and fixed costs.
* Prepare a contribution margin (variable costing) income statement.
* Recognize various approaches to categorizing costs.
* Prepare and analyze a segmented income statement.

**Required Reading**

Begin this module by familiarizing yourself with the following sections pertaining to managerial accounting while keeping the above six objectives in mind. Click on the three arrows to explore each topic in more detail.

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Managerial accounting helps managers make good decisions. Managerial accounting provides information about the cost of goods and services, whether a product is profitable, whether to invest in a new business venture, and how to budget. It compares actual performance to planned performance and facilitates many other important decisions critical to the success of organizations.

Whereas financial accounting provides financial information primarily for external use, managerial accounting information is for internal use. By reporting on the financial activities of the organization, financial accounting provides information needed by investors and creditors.

Most managerial decisions require more detailed information than that provided by external financial reports. For instance, in their external financial statements, large corporations such as General Electric Company show single amounts on their balance sheets for inventory. However, managers need more detailed information about the cost of each of several hundred products.

We show the fundamental differences between managerial and financial accounting in the video and the chart.

<https://www.youtube.com/watch?time_continue=4&v=KCyg8-zM9bA>

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|  | **Financial Accounting** | **Managerial Accounting** |
| Users | External users of information—usually shareholders, financial analysts, and creditors. | Internal users of information—usually managers. |
| GAAP | Must comply with generally accepted accounting principles. | NO generally accepted accounting principle requirements. |
| Time Period | Uses historical (or past) data. | May use estimates of the future for budgeting and decision-making. |
| Detail presented | Presents summary data, costs, revenues, and profits. | More detailed data are presented about product. |

Accountants currently face a big challenge: designing information systems that provide information for multiple purposes. Some people at lower levels in the organization need detailed information, but not the big picture provided by a company’s income statement. However, managers at top levels need to see the big picture.

All of you will use accounting information in your careers. Therefore, you need to know enough about accounting to get the information you need for decision making.

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**Variable and Fixed Expenses**

There are three basic cost behavior patterns: fixed, variable and mixed. Fixed costs remain constant (in total) over some relevant range of output. Often, we describe them as time-related costs. Depreciation, insurance, property taxes, and administrative salaries are examples of fixed costs. Recall that so-called fixed costs are fixed in the short run but not necessarily in the long run. Let us watch a video about cost behavior before looking at examples.

<https://www.youtube.com/watch?v=TLYwPogWdEU>

For example, a local high-tech company did not lay off employees during a recent decrease in business volume because the management did not want to hire and train new people when business picked up again. Management treated direct labor as a fixed cost in this situation. Although volume decreased, direct labor costs remained fixed.

In contrast to fixed costs, **variable costs** vary (in total) directly with changes in volume of production or sales. In particular, total variable costs change as total volume changes. If pizza production increases from 100 10-inch pizzas to 200 10-inch pizzas per day, the amount of dough required per day to make 10-inch pizzas would double. The dough is a variable cost of pizza production. Direct materials and sales commissions are variable costs.

Direct labor is a variable cost in many cases. If the total direct labor cost increases as the volume of output increases and decreases as volume decreases, direct labor is a variable cost. Piecework pay is an excellent example of direct labor as a variable cost. In addition, direct labor is frequently a variable cost for workers paid on an hourly basis, as the volume of output increases, more workers are hired. However, sometimes the nature of the work or management policy does not allow direct labor to change as volume changes and direct labor can be a fixed cost.

Mixed costs have both fixed and variable characteristics. A **mixed cost** contains a fixed portion of cost incurred even when the facility is idle, and a variable portion that increases directly with volume. Electricity is an example of a mixed cost. A company must incur a certain cost for basic electrical service. As the company increases its volume of activity, it runs more machines and runs them longer. The firm also may extend its hours of operation. As activity increases, so does the cost of electricity.

Managers usually separate mixed costs into their fixed and variable components for decision- making purposes. They include the fixed portion of mixed costs with other fixed costs, while assuming the variable part changes with volume.

Although we have described three different cost patterns, we simplify our discussions by assuming managers can separate mixed and step costs into fixed and variable components.

Many costs do not vary in a strictly linear relationship with volume. Rather, costs may vary in a curvilinear pattern—a 10 per cent increase in volume may yield an 8 per cent change in total variable costs at lower output levels and an 11 per cent change in total variable costs at higher output levels. One way to deal with a curvilinear cost pattern is to assume a linear relationship between costs and volume within some relevant range. The **relevant range** is the range of production or sales volume over which the assumptions about cost behavior are valid. Outside of the relevant range, we presume the assumptions about cost behavior may be invalid.

Costs rarely behave in the simple way that would make life easy for decision makers. Even within the relevant range, the assumed cost behavior is usually only approximately linear. As decision makers, we have to live with the fact that cost estimates are not as precise as physical or engineering measurements.

**Contribution Margin (Variable Costing) Income Statements**

We have introduced the concepts of fixed and variable costs, and shown how you can use these concepts in making decisions. However, income statements published for external use do not break costs down into fixed and variable components.

Watch the following video to see more about contribution margin and how it can be used in business.

<https://www.youtube.com/watch?v=pm6Eo9qiUIY>

We now present an income statement that not only breaks down costs into their fixed and variable components but also presents the total contribution margin. The contribution margin income statement subtracts variable costs from revenues to show the contribution margin, and then subtracts fixed costs to derive net income.

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| **Bartlett Company****Income statement (Contribution Margin Approach, Variable Costing)****For the year ending December 31, 20XX** |
| Revenue (9,000 units at $9 per unit) | $81,000 |
| Variable cost of goods sold (9,000 units at $3 per unit) | $27,000 |
| Variable selling expenses (9,000 units at $0.50 per unit) | 4,500 |
| Total variable expenses | 31,500 |
| Total contribution margin | $49,500 |
| Fixed manufacturing costs (expenses) | $9,000 |
| Fixed selling expenses | 15,000 |
| Fixed administrative expenses | 18,000 |
| Total fixed expenses | $42,000 |
| Operating income | $7,500 |

The contribution margin method shows managers the amount of variable costs, the amount of fixed costs, and the contribution the company is making toward covering fixed costs and earning net income. For example, suppose the managers of Bartlett Company asked, "What would be the impact on net income if we increase sales by 10%?” Looking at the contribution margin statement, we predict the following increases:

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| **Bartlett Company****Income statement (Contribution Margin Approach, Variable Costing) - 10% Increase in Sales****For the year ending December 31, 20XX** |
| Revenue (9,900 units at $9 per unit) | $89,100 |
| Variable cost of goods sold (9,900 units at $3 per unit) | $29,700 |
| Variable selling expenses (9,900 units at $0.50 per unit) | 4,950 |
| Total variable expenses | 34,650 |
| Total contribution margin | $54,450 |
| Fixed manufacturing costs (expenses) | $9,000 |
| Fixed selling expenses | 15,000 |
| Fixed administrative expenses | $18,000 |
| Total fixed expenses | $42,000 |
| Operating income | $12,450 |
| Increase in operating income | $4,950 |

If we assume no increase in fixed costs, we expect Bartlett's net income to increase by $4,950 as seen above. The traditional statement does not break down costs into fixed and variable components, so we cannot easily answer the question posed by Bartlett's management. Most companies use the traditional approach for external financial statements, but they use the contribution margin format for internal purposes because it is more informative. Management often needs information on the contribution margin rather than the gross margin to calculate break-even points and make decisions regarding, for example, special-order pricing.

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In addition to classification as fixed and variable, costs may be either directly or indirectly related to a particular cost object. A cost object is a segment, product, or other item for which costs may be accumulated. In other words, a cost is not direct or indirect in and of itself. It is only direct or indirect in relation to a given cost object.

A direct cost (expense) is specifically traceable to a given cost object. An indirect cost (expense) is not traceable to a given cost object but has been allocated to it. Accountants can designate a particular cost (expense) as direct or indirect by reference to a given cost object. Thus, a cost that is direct to one cost object may be indirect to another. For instance, the salary of a segment manager may be a direct cost of a given manufacturing segment but an indirect cost of one of the products manufactured by that segment. In this example, the segment and the product are two distinct cost objects.

Because a direct cost is traceable to a cost object, the cost is likely to be eliminated if the cost object is eliminated. For instance, if the plastics segment of a business closes down, the salary of the manager of that segment probably is eliminated. Sometimes a direct cost would remain even if the cost object was eliminated, but this is the exception rather than the rule.

An indirect cost is not traceable to a particular cost object; therefore, it only becomes an expense of the cost object through an allocation process. For example, consider the depreciation expense on the company headquarters building that is allocated to each segment of the company. The depreciation expense is a direct cost for the company headquarters, but it is an indirect cost to each segment. If a segment of the company is eliminated, the indirect cost for depreciation assigned to that segment does not disappear; the cost is simply allocated among the remaining segments. In a given situation, it may be possible to identify an indirect cost that would be eliminated if the cost object were eliminated, but this would be the exception to the general rule.

Because the direct costs of a segment are clearly identified with that segment, these costs are often controllable by the segment manager. In contrast, indirect costs become segment costs only through allocation; therefore, most indirect costs are non-controllable by the segment manager. Be careful, however, not to equate direct costs with controllable costs. For example, the salary of a segment manager may be direct to that segment and yet is non-controllable by that manager because managers cannot specify their own salaries.

When preparing internal reports on the performance of segments of a company, management often finds it is important to classify expenses as fixed or variable and as direct or indirect to the segment. These classifications may be more useful to management than the traditional classifications of cost of goods sold, operating expenses, and non-operating expenses that are used for external reporting in the company’s financial statements. As a result, many companies prepare an income statement for internal use with the format shown below.

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| **The Tucker Company****Segmented Income Statement with Only Common Fixed Costs****For the year ending Dec. 31, 20XX** |
|  | **A** | **B** | **C** | **Total** |
| Revenues | $12,000 | $15,000 | $18,000 | $45,000 |
| Variable costs |
|      Materials | $2,000 | $4,000 | $5,000 | $11,000 |
|      Labor | $3,000 | $1,500 | $750 | $5,250 |
| Contribution margin | $7,000 | $9,500 | $6,750 | $23,250 |
| Fixed costs |
|      Distribution costs |  |  |  | $4,000 |
|      Telephone, fax, and Internet |  |  |  | $2,000 |
|      Advertising |  |  |  | $1,000 |
|      Other overhead |  |  |  | $3,000 |
| Total common fixed costs |  |  |  | $10,000 |
| Operating (net) income |  |  |  | $13,250 |

Notice that all variable expenses are direct expenses of the segment. Let us create one more segmented income statement where we separate direct and indirect fixed costs. Only advertising is a direct fixed cost in this example.

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| **The Tucker Company****Segmented Income Statement with Direct and Indirect (Common) Fixed Costs****For the year ending Dec. 31, 20XX** |
|  | **A** | **B** | **C** | **Total** |
| Revenues | $12,000 | $15,000 | $18,000 | $45,000 |
| Variable costs |
|      Materials | $2,000 | $5,000 | $5,000 | $27,000 |
|      Labor | $3,000 | $1,500 | $750 | $6,450 |
| Contribution margin | $7,000 | $9,500 | $6,750 | $23,250 |
| Direct fixed costs |
|      Advertising | 465 | 233 | 116 | $1,000 |
| Segment margin | $3,535 | $8,267 | $6,634 | $22,250 |
| Indirect fixed costs |
|      Distribution costs |  |  |  | $4,000 |
|      Telephone, fax, and Internet |  |  |  | $2,000 |
|      Other overhead |  |  |  | $3,000 |
| Total indirect (common) fixed costs |
|      Operating (net) income |  |  |  | $13,250 |

The second subtotal in the contribution margin format income statement is the segment’s contribution to indirect expenses. Contribution to indirect expenses is defined as sales revenue less all direct expenses of the segment (both variable direct expenses and fixed direct expenses). The final total in the income statement is segmental net income, defined as segmental revenues less all expenses (direct expenses and allocated indirect expenses). Common fixed expenses are not allocated in this example. In the above example, all indirect fixed costs were allocated to each segment.

To stress the importance of a segment’s contribution to indirect expenses, many companies prefer the contribution margin income statement format. Notice how the indirect fixed costs are not allocated to individual segments in this example. Indirect fixed expenses appear only in the total column for the computation of net income for the entire company. The computation for each segment stops with the segment’s contribution to indirect expenses; this is the appropriate figure to use for evaluating the earnings performance of a segment. Only for the company as a whole is net income (revenues minus all expenses) computed; this is, of course, the appropriate figure to use for evaluating the company as a whole.

We end this section with a brief video highlighting the use of segmented income statements.

<https://www.youtube.com/watch?v=q39AzZhpoNQ>

**Check Your Understanding**

Check your understanding to make sure that you have a good grasp of the background material. If you are not comfortable with the concepts, review some of the material again or go to the optional resource for more examples.

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| **Final Thoughts**Contribution margin income and absorption income are two distinct approaches to assess operating profit. Many companies use both approaches. The two approaches have benefits and limitations.Multiple descriptive names exist for the two methods of costing and computation of income. For example, the contribution margin approach is also known as variable costing, direct costing. or marginal costing. Absorption income and costing are also known as full costing, GAAP income, financial accounting income, or traditional costing.Management mostly uses the information provided by variable costing method for estimates and internal decision-making purposes. Variable costing is appropriate for detailed analysis of a product or service. GAAP is required for publicly released and audited financial statements. Management uses both approaches for internal decision-making.Cost behavior refers to the way different types of production costs change when there is a change in level of production.There are two main types of costs according to their behavior:***Fixed Costs:***Fixed costs are those, which do not change with the level of activity within the relevant range. These costs will incur even if no units are produced. For example rent expense, straight-line depreciation expense, etc. Fixed cost per unit decreases with increase in production.***Variable Costs:***Variable costs change in direct proportion to the level of production. This means that total variable cost increase when more units are produced and decreases when less units are produced. Although variable in total, these costs are constant per unit. |

**Optional Reading**

For further detail refer to Dr. Walther’s accounting text and videos.

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| *https://tlc.trident.edu/content/enforced/102026-X_FUTURE_ACC201-MOD/images/principles%20of%20accounting%20icon.png?_&d2lSessionVal=4evrPMhlzWxVz1mUwCnwLOz24&ou=107901* | Walther, L. (2017). Chapter 17: [*Introduction to Managerial Account*](http://www.principlesofaccounting.com/chapter-17/)<http://www.principlesofaccounting.com/chapter-17/> |