

Part I

Understanding the Fundamentals of Costs

The 5th Wave

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"I'm not familiar with cost accounting terms.
What do you think that means?"

In this part . . .

So you're ready to learn all there is to know about cost accounting. You've come to the right place! Part I introduces cost accounting terms as well as some basic methods of analysis. You compare cost accounting to other accounting methods and learn four important cost terms: direct costs, indirect costs, fixed costs, and variable costs. You also find out about product and period costs, cost-volume-profit (CVP) analysis, and job costing. Process costing and the flow of manufacturing is also looked at.

Chapter 1

So You Want to Know about Cost Accounting

In This Chapter

- ▶ Understanding accounting methods
 - ▶ Comparing cost accounting systems
 - ▶ Controlling your costs
 - ▶ Applying a price to your product
 - ▶ Mulling over quality issues
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In a nutshell, *cost accounting* is the process of analyzing and planning what it costs to produce or supply a product or service. The analysis helps reduce costs — and possibly eliminate them. Lower costs, of course, allow for increased profits.

Business folks use cost accounting to determine the profitability of a product. The rule is simple: The price should cover the product cost and generate a profit. Competition may dictate the price charged for a product. In other instances, a profit is added to a product cost to create a unique price.

This chapter introduces cost accounting and how to compare and contrast cost accounting with other accounting methods. The chapter also explains how cost accounting can help you improve your business, such as by using pricing, budgeting, and other tools that can help you become more profitable.

Comparing Accounting Methods

Accounting is the process of recording, reporting, and analyzing business transactions. It's the written record of a business. *Cost accounting* is the process of capturing all of the costs of “production,” whether a business manufactures products, delivers services, or sells retail items. Cost accounting is used for all types of businesses.

Often, cost accounting overlaps with other types of accounting, such as financial accounting and management accounting. If you have some knowledge about these other areas of accounting, that background can help you understand cost accounting. If not, no big deal. This section helps clarify what cost accounting is, how it's used, and how these accounting methods relate.

Financial accounting is a reporting process. An accountant reports on the financial position of a firm and the firm's performance by creating financial statements. The statements are used by external (outside) parties to show how the company is doing. External parties include *shareholders*, *creditors*, and *regulators*.

The external parties may not have an accounting background, so there are many rules of the road (and they are very specific) for creating financial statements. The rules exist so that each set of financial statements is standardized. If all companies follow the same set of rules to create financial statements, the information is usually comparable.

Financial accounting looks backward. It's *retrospective*. The accountant is creating financial statements for transactions that have already happened. So unlike cost accounting, financial accounting doesn't provide any planning or forecasting.

Your external users want financial statements on a periodic basis. Companies typically issue financial statements on a monthly, quarterly, or annual basis. External users want to know how you're doing — for a variety of reasons.

Considering your shareholders

If you own a business, *shareholders* own shares of your company in the form of common stock. That also means that shareholders own *equity* in your business. You may pay them a share of company earnings as a *dividend*.

Shareholders are interested in seeing the value of the business increase. As your sales and earnings grow, your company is seen as more valuable. A shareholder reviews your financial statements to see if sales and earnings are increasing. If they are, your shareholder is happy — she may even buy more of your common stock.

As sales and earnings grow, other investors may be willing to pay a higher price for your common stock. An existing shareholder might then sell his or her investment in common stock for a gain.

Mulling over creditors

Creditors are lenders. They lend your company money so you can purchase assets, which help your business operate. Assets are defined as items you use to make money in your business, like machinery and equipment. You sign a loan agreement with a lender, and that agreement states the interest rate for the loan and when the loan payments are due. You pay *interest* on the loan and also repay the original amount borrowed — the *principal* amount.

Instead of a bank loan, you can issue debt directly to the public by selling *bonds*. The bond certificate states the terms of the bond. That document lists the interest rate and the *maturity date*. The bond investor is repaid on the maturity date.

A creditor is interested in your ability to pay the interest and repay the loan. Like a shareholder, a creditor wants to see a company that generates earnings and an increasing level of sales. If you create earnings, you eventually collect more cash than you spend. That additional cash pays the principal and interest on the loan.

Addressing concerns of regulators

Nearly every business falls under some sort of regulation. *Regulators* protect the public by enforcing laws and regulations. Part of that process involves reviewing your financial statements.

In addition to the “standard” set of financial reports (covered later in the book), regulators may require extra information from you. This specialized reporting is required to address a specific regulation or law. For example, if you’re a food manufacturer, the Food and Drug Administration (FDA) requires you to disclose food ingredients on a food label. That’s a form of specialized reporting for a regulator.

Using management accounting

Management accounting is the process of creating accurate and timely reports for managers. Managers use the reports to make decisions. There are many theories and accepted practices in management accounting for developing reports. Ultimately, management accounting uses the “whatever works” method to create reports. Any report that provides the best possible information to solve a problem is a good one.

Management accounting is an internal reporting process. The information you create isn’t shared with the outside world. So you can put together any type of report that’s helpful to you.



As an accountant, you may be in a situation in which management asks you to create lots of reports but doesn’t *use* them all. Ask management how a report you’re asked to create will be used. The manager might conclude that the report really isn’t necessary — which saves you time and energy.

Financial accounting looks backward. You report on past events. Management accounting is *forward-looking*. It’s *prospective*. You’re using the reports to make decisions about the future. For example, a decision whether to manufacture a product component or buy it from someone else is a typical management decision based on management accounting.



Every manager has a preferred set of management reports, the ones he or she considers the most useful. I had a conversation with the retired chief financial officer (CFO) of a worldwide defense contractor. Engineers, including all of senior management, dominated the company. The former CFO told me that he was successful because he figured out which financial management reports the engineers wanted. In fact, that set of reports was standardized and used in every senior management meeting.

Fitting in cost accounting

Cost accounting is closer to management accounting than financial accounting. Cost accountants gather information to make decisions about the *future*. Also, cost reports are considered to be internal reports. Both of those traits apply to management accounting.

You see overlap between cost and management accounting. A good example is special orders. A *special order* is an order you take on when you have excess production capacity. A customer approaches you about producing an “extra” order — an order you weren’t expecting. You need to decide what price you will accept for the special order.

Management accounting instructs you to consider only the cost and revenues that *change*, based on your decision, called *differential costs* and revenues. That makes sense, because the method is forward-looking. Old, unchanging stuff generally doesn’t count.

Your price for the special order depends on the costs. Reports you generate about costs help you make the decision to accept or reject the special order. If your producing cost reporting, that sounds like cost accounting to me. So you see how cost and management accounting can overlap. There’s more on special orders later.

Cost accounting sometimes uses historical information to start the analytical process. For example, when you plan your costs for next year, you take a look at spending in past years. Spending in prior year provides a starting point for planning costs — a baseline. The baseline is adjusted for all the foreseeable changes that might occur in the new year. That helps you decide whether your budgeted costs should be higher or lower.

Using Cost Accounting to Your Advantage

Cost accounting runs through your entire business process. To begin, you decide whether the cost of obtaining the information is worth the benefit you receive from it. If you decide that it is, you use cost accounting to analyze your costs, make decisions, and look for cost reductions in your business.

Starting with cost-benefit analysis

The cost of obtaining information should be lower than the benefit you receive from your analysis. The cost includes labor hours and technology costs. For example, you need someone to search for the information. You also may need to create new cost reports in using your technology. The benefit of performing the analysis is the cost savings you're able to implement.

Say you manufacture dining room tables; you make five different models of tables. At one point in production, your staff sands the wooden tabletops by hand.

Until now, you haven't calculated the time required to sand each type of table. You take the total labor costs for sanding and trace them to each table, regardless of the model. Maybe you should do a cost analysis and assign the sanding cost to each table model.

You incur some costs to do the analysis. Someone on your staff will go through the employee time cards (used for payroll). The workers record the time they spend on all tasks, including sanding. They also record the table models they worked on during production. Your accountant can compute the total sanding time per table model, based on the time cards.

Consider what you might gain. You assign the sanding cost more precisely. As a result, each table model's total cost is more accurate. Because your profit is the sale price less the total costs, the updated cost allows you to calculate a more precise profit. Sounds like the cost of the analysis might be worth it, especially if the competition is high in your furniture-making industry.

Planning your work: Budgeting

Cost accounting plays a role in your budgeting process. You might think of budgeting as just forecasting sales and planning expenses. If you own a flower shop, you budget by forecasting sales of each type of flower or arrangement. You also plan expenses, such as utility costs for the shop and your lease payment.

Your work with cost accounting takes budgeting to a new level of detail. Until now, you looked at costs by *type* (utilities, lease expense). Now, you analyze cost by type and by *product* (for example, those roses need to be kept in a cooler, which requires electricity). Based on the product's costs and sale price, you can compute a profit.

So start off with an analysis of each product's cost, price, and profit. Build on that information. You could then put together a budget for each department. Finish up by combining all of your smaller budgets into a company-wide budget. That company-wide budget will give you all of the company's costs by type and your revenue total. You build your company-wide budget based on cost accounting by product.

By starting your budget at the product level, your budget is a lot more specific. When you compare your actual results to your budget, you'll see the differences in more detail. The detail lets you make more precise changes in your business going forward.

Controlling your costs

Cost accounting helps you stay on top of your costs — and make changes along the way. You should analyze costs frequently. Most companies perform this analysis on at least a monthly basis . . . and sometimes weekly or even daily. The more specific you make your analysis, the better. As always, the benefits you gain from your analysis should outweigh the costs.

If you analyze costs frequently, you find areas where you can reduce costs immediately. There's nothing worse than discovering a problem after it's too late to fix, so don't create a budget and shove it in a drawer. Review your actual results, and compare those results to your budget. If you find large differences, dig deeper. Consider reviewing more detail to find out what caused the difference.

Here are some tools you can use to control costs. Each tool is explained in detail in this book:

- ✔ **Cost-volume profit (CVP) analysis:** CVP is a simple tool to analyze costs, sale price, and units sold. There's a user-friendly formula — the kind of tool you can play around with on a notepad or spreadsheet. Check out Chapter 3 for more on CVP.
- ✔ **Variance analysis:** A *variance* is the difference between your planned costs and actual costs. A large variance is a red flag — a number that gets your attention. You investigate variances to find ways to reduce your costs. Chapter 7 tells you more.
- ✔ **Activity-based costing (ABC):** This analysis allows you to assign costs using the activities put into making your product or service. ABC assigns costs to products based on levels of activity: labor hours incurred, machine hours used, and so forth. See Chapter 5 for an in-depth look.
- ✔ **Support costs:** Nearly every business incurs *support costs*. These are areas of your business that support your production and sales efforts. Accounting and legal costs are good examples of support costs.
- ✔ **Joint costing:** Your business may use the same process to produce several different products. This situation is called *joint production*. The products will share common costs of this production, or *joint costs*. Now, it's likely that each product has its own unique costs *after* joint production; however, you need a tool to allocate the joint costs when the products are produced together.

Setting a price

After you've nailed down your product's full cost (all costs, both fixed and variable), you can price your product effectively. The difference between your price and full product cost is your profit (see Chapter 12).

Pricing and competition

Consider how pricing comes into play. Your product's price may be limited, based on competition. Say you sell baseball gloves. To compete and maintain your current level of sales, you can't price your glove any higher than \$100.

To meet your profit goal, you start at the top and work your way down. The top is your \$100 price; you can't go any higher without losing sales. Your profit is sale price less cost. The only way to increase your profit is to lower your costs.

Increasing a price

Assume that you make a product that's unique. You don't have many competitors. As a result, customers are willing to pay more because they can't get the same product somewhere else.

To meet your profit goal, you start at the bottom and work your way up. You compute your full costs first. Then you calculate a sale price, based on your profit goal. You have the ability to push the top (the price) higher because you believe that customers are willing to pay a higher price.

Changing prices after more analysis

In the section "Controlling your costs," you see a list of tools to analyze costs. You use the tools to assign costs to your products more precisely. When you change the costs assigned, you can consider changing the product's price. That's because a change in the product's cost changes the level of profit.

Say that you sell hiking boots. In planning, you budget a sale price of \$80 per pair. During the year, you start performing cost analysis. You determine that \$5 more in machine production cost should be assigned to each pair of hiking boots.

That \$5 increase in cost lowers your profit. So you have a few choices to make to maintain the same level of profit. You could decide to raise your price. If you face heavy competition, a higher price may hurt your sales. The other choice is to find ways to lower other costs.

Keep in mind that pricing your product isn't a one-time event. As you analyze costs, you may need to adjust prices more than once during the year.

Improving going forward

Successful businesses constantly make improvements. This approach is the only way companies can survive and thrive over the long term. That's because competitors eventually take business away from you if you're not willing to change.

One type of improvement is analyzing your business to lower costs. You can lower your costs in several ways. Maybe you remove an activity that isn't necessary. When you eliminate the activity, you get rid of the related costs. Here are some other possible improvements.

Using the accrual method of accounting

You decide to use the accrual method of accounting. This method matches your revenue with the expenses you incur to generate the revenue. Using this method, rather than the cash basis of accounting, gives you a more realistic picture of your profitability. That better view helps you make more informed decisions.

Deciding on relevance

Make a judgment about what you believe to be relevant. Relevant means “important enough” to consider in a decision (see Chapter 11). Your threshold for considering relevance might be expressed as a dollar amount. Maybe any amount over \$10,000 is relevant to you. Relevance can also be expressed as a percentage. You might consider a change of 10 percent or more to be relevant.

When you decide what amount or percentage is relevant, you use it as a filter for decision-making. Anything over the threshold needs to be analyzed and considered in your decision-making. Below the threshold, you “pass further analysis” — a term my old CPA firm used to mean “not important enough to investigate.”

Demanding quality

Demand is a strong word, but it should be applied to quality. You will not succeed as a business without a constant focus on quality. It’s simply too easy for customers to use technology to find the product or service somewhere else.

Quality means more than making a product or service that the client wants. The term also means fixing your product, if it doesn’t work.

Finally, quality means asking customers what changes they want in your product or what new products they would like to see. Ask your customers, and they’ll gladly tell you.

Chapter 2

Brushing Up on Cost Accounting Basics

In This Chapter

- ▶ Distinguishing between direct and indirect costs
 - ▶ Understanding fixed and variable costs
 - ▶ Comparing the costs incurred in different industries
 - ▶ Defining a cost driver
 - ▶ Recognizing inventoriable costs
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This chapter provides the rules of the road for cost accounting. Use these basic terms and ideas to understand more complex topics later in the book. If you read another chapter and start to get lost, head back here and take a look at these concepts again.

Understanding the Big Four Terms

Direct costs, indirect costs, fixed costs, and variable costs are the four most important cost accounting terms . . . and these four terms can be confusing. The following sections outline a process for understanding the differences among these words. If you follow this process, you should be able to keep these important terms straight in your mind.

Comparing direct and indirect costs

Direct costs are costs you can *trace* (or tie) to your product or service. *Indirect costs* can't be traced directly to the product or service. Instead, indirect costs are *allocated*. (Indirect costs are also referred to as *overhead costs*.)

Material and labor costs are good examples of direct costs. Say you manufacture cotton gloves. You buy cotton, yarn, and leather to make the gloves. You can trace the materials directly to the gloves; for example, you can take a glove apart and see the materials that were used to create it. Cotton, yarn, and leather are considered *direct material costs*, because they can be directly tied to one unit of product.

You pay workers to cut, sew, and dye the materials. Because you can trace the hourly labor cost directly to the gloves, these costs are *direct labor costs*. You can review each employee time sheet and determine how many hours each employee worked, and how many gloves he or she moved through production.

Indirect costs can't be *traced* directly to a product or service. So instead, they have to be *allocated*. You typically allocate costs by assigning a cost per unit. The per unit rate attaches all of the indirect costs to your products. The term *overhead* is also used to describe indirect costs.

Allocating indirect costs

To allocate overhead, you need to *compute* a rate or amount of cost per product. Assume you lease the building where you manufacture the cotton gloves. Obviously, the reason you're leasing the building is to make gloves.

You can't trace the cost of the lease to any particular pair of gloves. The cost belongs to all of the gloves, yet the cost does need to be included in the cost of a *single unit of your product*. That way, you can determine the price and profit for one unit (one glove).

One way to allocate overhead is to base it on some level of activity. As you see later in Chapter 5, activities in your business cause you to incur costs. Assume you run a machine for 1,000 hours a year and pay \$2,000 for the repair and maintenance on the machine. You could allocate the repair cost to each hour of machine time as $\$2,000 \div 1,000 \text{ hours}$, or \$2 per machine hour.

Deciding on direct versus indirect costs

As a business owner, you need to analyze all of your costs and decide which ones are direct and which ones are indirect. One way to do that is to visualize your product. Look at that pair of gloves one more time. You can certainly picture the materials (cotton, yarn, and leather) used in a pair of gloves. Also, you can visualize a worker cutting the cotton and sewing it together.

That exercise should convince you that material and labor are direct costs. You can imagine those costs "traveling along" with the gloves as they are produced, packaged, and shipped to a customer. Okay, direct costs. Got it.

Working with direct costs in cost planning is preferable because direct costs are *known*. In the previous example, you defined material and labor costs as direct, because you can attach the costs directly to the product. If the costs are known, your planning is more precise. Actual costs are likely close to your planned amounts. Because indirect costs are based on estimates, your budgeted costs are less precise.

Next, you review your checkbook to find other costs. You find checks for vehicle insurance for a truck. Consider what you just read in the previous section. Insurance costs can't be traced directly to the gloves, so you need to decide on an activity level to allocate the costs.

The truck's insurance cost can be allocated based on the number of miles you drive the truck. Assume you compute an insurance allocation of \$0.10 per mile. You now need to get the cost allocated to your product.

Instead of allocating the cost to individual pairs of gloves, you allocate costs to each *shipment* of gloves. When a customer orders gloves, they are packed up and shipped, using the truck. Based on the number of miles driven to a client, you can allocate the truck insurance cost.



Indirect costs can be allocated using many levels and kinds of activity. You've seen how costs can be allocated by product and by shipment. As you see later in the book, you can allocate costs by company department or product line. As long as the cost is eventually allocated to a product or service, you can justify many methods of indirect cost allocation.

Mulling over fixed and variable costs

Total *fixed costs* don't change when your level of production or sales changes. On the other hand, total *variable costs* do change with your level of production or sales.

Kicking around fixed costs

Consider a lease payment for a piece of equipment. Whether your production increases or decreases, the check you write for the lease stays the same. The cost is fixed in your lease agreement.

Say the lease payment is \$500 per month. Assume you manufacture office desks. You can't directly *trace* the lease payment to the product you produce — the cost is indirect. So you *allocate* the lease payment cost to each desk you produce. In March you produce 1,000 desks. The equipment lease is $\$500 \div 1,000$ desks, or \$0.50 per desk.

In April, you make 800 desks. The April equipment lease is \$500 ÷ 800 desks, or \$0.63 per desk. Because you produce fewer desks in April but the lease payment doesn't change, you allocate a larger *cost per unit* (desk).

There's a difference between *total* fixed costs and the fixed costs *per unit*. The total fixed costs don't change with your activity level. Fixed costs per unit do change as your production level goes up or down. As a strategy, businesses aim to produce and sell as much as they can for the same amount of fixed costs. That strategy generates the lowest possible per unit fixed cost.

Computing variable costs

Total variable costs change in total with your level of production. Say you use plywood to make each office desk. Each desk requires \$4 of plywood. The \$4 cost per desk *does not change* with production.

If you produced 1,000 desks in March, your total variable plywood cost is 1,000 desks × \$4, or \$4,000. The 800 desks produced in April generate \$3,200 in variable plywood costs. The total variable costs *do* change, but the \$4 variable cost per unit stays the same.

Table 2-1 summarizes fixed and variable costs.

Table 2-1		Fixed and Variable Costs	
<i>Change with Level of Production?</i>			
Fixed Costs			
Total fixed costs		no	
Fixed cost per unit		yes	
Variable costs			
Total variable costs		yes	
Variable cost per unit		no	

Fitting the costs together

This section explains how direct costs, indirect costs, fixed costs, and variable costs all fit together. One simple way to explain the relationship is to go over some examples. Table 2-2 shows you an example of four types of costs.

Table 2-2 **Fixed and Variable Costs,
Direct and Indirect Costs — Examples**

	<i>Direct Cost</i>	<i>Indirect Cost</i>
Fixed costs	Hourly union wages	Equipment lease
Variable costs	Material and labor cost	Factory utility costs

Table 2-2 is new territory. Each cost can be classified as either direct or indirect and either fixed or variable. Go through the examples one at a time.

Say you manage a factory. You pay wages to hourly workers based on a union contract. The contract states the number of hours each employee works and his or her pay rate per hour. The total wages paid is a fixed cost. The cost is also a direct cost. That's because the only reason to have hourly workers is because you're producing a product. No production, no hourly workers — and no cost.

In the section “Kicking around fixed costs,” you work with an equipment lease. Because the equipment is used to make a product, the lease is a fixed, indirect cost. You allocate the indirect cost based on the number of units (desks) created.

Material and direct labor costs are addressed in the section “Comparing direct and indirect costs.” Those are variable costs that change (in total) with your level of production.

If you manage a factory, you incur utility costs to heat, cool, and provide power to the factory. The more product you produce, the more utility costs you incur. So utility costs can vary with the level of activity.

Utility costs are also indirect costs. Because you can't trace the costs directly to a product, you have to allocate them. Utility costs are often allocated using labor hours for a particular time period.

Covering Costs in Different Industries

In the Introduction, I note that this book covers both products and services. A *product* is a physical item that your customer can touch, see, and feel. When a customer pays you for *doing* something — such as cleaning an office or driving a product from point A to point B — that's a *service*.

Reviewing manufacturing costs

Manufacturers make products. They incur material and labor costs, as well as overhead.

No manufacturer can produce a product instantly. When you close the factory doors for the night, you have partially completed goods on hand. Those products are called *work-in-process (WIP)*.

Assume you make blue jeans. The jean production moves from one department to another. Say that the denim material has been cut for 100 pairs of jeans. The next step is to sew the denim and then dye the material. You close your factory doors before the jeans move to the sewing department.

Consider the cost you've incurred on the jeans. You purchased the denim, a material cost. You paid your workers to run machines to cut the denim (labor costs). So the work-in-process jeans have incurred costs.

When work-in-process goods are completed, they are defined as *finished goods*. Finished goods are ready for sale to a customer. They incurred all manufacturing costs.

Considering costs for retailers

A *retailer* doesn't make a product. Instead, it buys inventory and sells it to customers. The largest cost for most retailers is inventory. (See Chapter 9 for more on inventory.) Retailers don't create work-in-process or finished goods. Those terms apply only to manufacturers.

Retailers incur ordering costs to order inventory and carrying costs to *store* inventory. Check out Chapter 18 for the details. The risk for a retailer is carrying too much inventory — or running out of inventory when a customer wants to buy more product.

This is a delicate balance. The more inventory you own, the more cash you *spend* (and that gives you less cash to use for other things). You don't recover the cash until the customer pays for the product. Likewise, if you run out of inventory, and there's more demand for your product, you lose sales.

Finding costs most companies incur

Most companies incur costs for human resources, marketing, lawyers, accountants (hey, that's good!), and other experts. The costs might be salary and benefits for experts inside your company. You also might pay outside experts to perform the work.

Most companies incur costs for insurance, utilities, supplies, and depreciation expense on assets. So keep in mind that there are costs that apply to companies of all types. These costs are indirect costs. You can't trace them directly to a product or service.

Salespeople are often paid a salary plus a commission based on sales. The cost of a salesperson's commission is normally traced to the product as a direct cost.

Why Are You Spending?: Cost Drivers

A *cost object* is the product, service, or company department where you incur costs. Picture the cost object as a sponge that sucks up money. A *cost driver* is an item that *changes* costs. If the cost object is a sponge full of costs, the cost driver changes the size of the sponge.

If you manufacture leather baseball gloves, leather material is a cost driver. If you manage the human resources department, an increase in job interviews is a cost driver. More interviews require more time from your staff, and that labor time has a cost.

This section covers two related concepts: relevant range and inventoriable costs.

Pushing equipment too hard and relevant range

Relevant range is the area in which a set of assumptions about your costs hold true. By *area*, I mean a minimum and maximum level of use of an asset. As long as your use of the asset stays in that range, the cost assumptions apply. If you use the asset too much (out of the relevant range), it eventually breaks down. Breakdowns occur when you try to operate beyond your asset's maximum capacity.

The bottom of a range is the minimum. For this book, you focus on the maximum.

At this point, you need to know about assets. An *asset* is anything you use to make money in your business (anything that provides your company with some benefit in the future). Essentially, you use up assets to make money.

An asset may be a *tangible asset* — a factory, a vehicle, or a piece of equipment. An asset can be *intangible*, such as a brand name or a patent. For example, the brand names Coca-Cola, McDonald's, and Nike are assets. Those names drive business to those companies.

Assume you're a plumber. You have a truck that you use to carry equipment to homes to work on plumbing. The truck is an asset. As you drive the truck, two things happen. First, you're doing plumbing work and making money. At the same time, the value of the asset is declining. The decline in value of a tangible asset is called *depreciation*.

Now, here's where relevant range comes in. There's a limit to how much you can use the asset. The truck can be driven only so many miles before it needs maintenance or a repair.

Say you're planning your plumbing business for the month. Based on your experience, you know that your truck needs maintenance every 4,000 miles. The maintenance means the truck can't be used for one day.

Because you perform plumbing work seven days a week, the day maintenance is performed is a day when you don't earn revenue. The relevant range for your truck is up to 4,000 miles. Beyond that point, you need to take it out of service for a day. To work seven days a week, you may need to have another truck — another asset.

There's relevant range for many assets. Maybe you can run your sewing machines for 10,000 hours before they need repairs. You might find that your commercial printing press has a maximum number of print jobs it can perform without breaking down. If you need production capacity above the relevant range, you need to invest in another asset. That investment is a cost.

Relevant range isn't just about breakdowns and maintenance. Even if your machinery works as expected, there's only so much capacity you can handle. Say you have machine capacity to produce 1,000,000 gloves a year. If you want increase production to 1,200,000 gloves, you need more machines. That means an investment in more fixed assets.

Previewing inventoriable costs

Inventoriable costs are costs that can be traced to your inventory. That includes the purchase price of the inventory item. However, there are other costs that should be added to the asset's cost. You refer to these costs as inventoriable.

Assume you own a furniture store that sells lamps. You carry an expensive model of lamp in your store. Parts of the lamp can break easily. As a result, it's expensive to ship the lamps. When the lamps arrive, they're stored carefully to prevent breakage.

Your inventory value for the lamp obviously includes the purchase price. It should also include all costs to *prepare the asset for sale*, such as the shipping cost and any extra costs you incur to store and display the lamp.

Now consider the impact of including more costs in inventory. Inventory costs aren't posted as expenses (*expensed*) until the asset is sold. All of the lamp costs remain in inventory until a lamp is sold. At that point, the lamp cost is posted to *cost of sales* (also called *cost of goods sold*).

Other costs are expensed as soon as they are incurred. A good example is marketing costs. Marketing costs are immediately expensed, because it's difficult to know if and when the costs generated a sale.

If you run a million-dollar ad during the Super Bowl for running shoes, it's not possible to know how many shoes were sold as a result of running the ad. So you expense it sooner than later. This is the *principle of conservatism*, which is explained in the next section.

Following the Rules of the Cost Accounting Road

Accountants are big on rules and guidelines. When you have to make a decision as an accountant, you first check for rules and guidelines. Some rules are regulations or laws. This section talks about some critical guidelines you should use in accounting.

Deciding on accrual basis or cash basis

The *cash basis of accounting* recognizes revenue when cash is received and posts expenses when they are paid in cash. This method means that you post your accounting activity based on when cash moves in or out of your business. It's accounting by "using your checkbook."

Recognizing revenue or expenses refers to the timing of when you post the amounts to your accounting records.

Installing the cash basis

There's a problem with the cash basis of accounting — it doesn't follow the *matching principle*. This principle requires accountants post revenue when it's *earned* and expenses when they are *incurred*.

The matching principle is a two-step process. Your first step is to determine when revenue is earned. You earn revenue when you deliver your product or complete a service you perform for a customer. You may receive payment in advance of the delivery or a few weeks after the delivery. When you earn, the revenue may be different from when you receive the cash payment.

For a retailer, revenue is earned when the customer walks out of the store with, say, a new baseball glove. If you're a tax preparer, you earn revenue when you deliver a completed tax return to your client.

After you determine when revenue is earned, you match the revenue to the expenses that are related to the product or service. The retailer would match the inventory cost of the glove with the baseball glove's revenue. The tax preparer would match the labor cost paid to the staff with the revenue from the tax return.

Because the cash basis doesn't follow the matching principle, the method is used only by very small businesses. Everyone else uses the *accrual method* of accounting.

Moving to the accrual method

The *accrual method of accounting* recognizes revenue when it's earned and expenses when they are incurred. Accrual accounting is more complicated than the cash basis you just read about (but only a little bit). That's because your cash may not move in the same period when revenue or expense is recognized.

Say you ship a good to your client in late January. The customer pays for the order in February. You completed everything that the customer required in January, so you should *recognize revenue* in January. But the *cash moves* (you get paid) in February.

Accrual accounting requires you to make an entry to *accounts receivable* and to sales revenue in January. The entry shows that you earned the revenue, even though you haven't been paid yet. Accounts receivable means that you are owed money for a sale that was posted to revenue in January. When the cash is received in February, you reduce accounts receivable and increase cash.

Assume an employee works in your store during the last week of May. Your next payroll is paid in the first week of June. (You probably worked for a company that paid you every two weeks — regardless of the month of payment).

Your store has sales in May. You should include the salary expense for the employee's work during May with the May revenue. That's how the matching principle works. The process matches the effort (costs) with the reward (revenue). However, the cash doesn't move until June.

Using accrual accounting, you make an entry to *accounts payable* and salary expense in May. Accounts payable represents an amount you owe as a business expense. So you post the salary expense in May. When you pay the employee in June, you reduce accounts payable and you reduce cash.

Finishing with conservatism

The *principle of conservatism* relates to decisions you make as an accountant (or as a business owner doing some accounting). By conservative, accountants mean the less-attractive decision. Your goal is to avoid creating accounting records that are overly optimistic.

Consider revenue. If you need to make a judgment on when to recognize revenue, choose to delay recognition. Delay posting the revenue until you're sure the revenue has been earned. That decision is considered the conservative one. It's conservative because it makes your financial statements less attractive to a reader.

Okay, now consider expenses. You should recognize expenses sooner than later. In the section "Previewing inventoriable costs," marketing costs are recognized immediately. That's because the accountant can't justify delaying the expenses to a later period. Posting more expenses sooner makes your financial statements less attractive.

Chapter 3

Using Cost-Volume-Profit Analysis to Plan Your Business Results

In This Chapter

- ▶ Using the breakeven point to forecast desired sales and profit
 - ▶ Computing contribution margin to cover fixed costs
 - ▶ Determining sales to achieve a target net income
 - ▶ Deciding whether or not to advertise
 - ▶ Changing the sale price to increase profit
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Cost-volume-profit analysis (CVP) is a tool you can use to analyze your costs and plan for a reasonable profit. The CVP formula is simple, and using it is as easy as plugging in numbers as assumptions and seeing where your profit ends up.

Cost-volume-profit works for enterprises of all sizes. Take the neighborhood lemonade stand as an example. To set up a lemonade stand on the sidewalk, you'll have costs. ("It takes money to make money.") Those costs include lemons, sugar, water, stand construction, advertising, and so on.

Assume your lemonade stand startup costs total \$30. You decide to sell each glass of lemonade for \$1. How many glasses do you need to sell to recover all your costs? At what point would each lemonade sale create a profit? If your goal were to earn \$20 in an afternoon, how many glasses would you need to sell? You can answer these questions using cost-volume-profit.

Understanding How Cost-Volume-Profit Analysis Works

A little comprehension goes a long way. I work with many small-business clients who use cost-volume-profit analysis, but they don't know the terminology or how it really works. To illustrate, one client, Barb, owned an advertising premium company, producing and selling promotional items. She made items such as T-shirts, water bottles, bumper stickers, and anything with a company logo that would help promote a company's product or service.

Barb knew the company's total fixed costs. In fact, she could recite the cost of her lease, insurance, and loan interest off the top of her head. She also knew the variable cost she would incur for every item she produced. Finally, she had a sales amount in mind every month that she hoped to achieve. Barb knew how much profit she would generate if she hit that sales number.

Barb's problem was that all of these facts and numbers were swimming around in her head and not organized on paper. She needed a simple tool to analyze costs, sales (volume), and profit in one place. That's the value of cost-volume-profit analysis. An owner or manager can have all three calculations in one formula and understand how they affect one another. So when you understand cost-volume-profit, you've added a powerful analytical tool to your arsenal.

Calculating the breakeven point

Cost-volume-profit analysis starts with the *breakeven point*. Breakeven answers this question: "What's the amount I need to sell to cover all of my costs?" When you open the front door of your business on the first day of a new month, your first concern is likely to be how much you have to sell to at least cover all costs for that month. At a minimum, you don't want to lose money.

It doesn't matter whether you're selling a few glasses of lemonade or manufacturing automobiles. Either way, the breakeven point has three simple elements:

- ✓ It includes fixed costs and variable costs.
- ✓ It includes sales, either units of product sold, or the total dollar amount of sales (revenue). The term volume refers to the level of sales.
- ✓ It assumes profit of zero.



The reason for the name *breakeven point* is pretty obvious. It's the point where you neither make nor lose money. It's the point where you break even.

Examine the elements required to find the breakeven point: Fixed costs remain constant, regardless of the volume of products or services you provide. Variable costs increase or decrease proportionately with the amount of products you sell or services you deliver. The total variable costs, of course, increase as you produce more products or provide more services, and vice versa if fewer items, products, or services are provided. Sales is the total dollar amount received for your product or service. Finally, profit represents sales less all of your costs.

Okay, if you want to split hairs, there's an exception about fixed costs that is important in analyzing cost-volume-profit: relevant range (see Chapter 1). But in most cases, the level of activity stays within the relevant range for fixed costs.

What makes the breakeven point so important is that every sale above your breakeven point generates a profit. If your breakeven point is 100 units, you make a small profit when you sell the 101st unit. That's good! After you know your breakeven point, you can plan the level of sales you need to generate a specific amount of profit.

What goes up can come down. If you sell only 99 units, you have a small loss. That's not good! The fewer units you sell, the larger your loss.

The breakpoint formula

Before you start selling a product, you need to know the fixed costs, the variable costs, and the sale price. See Chapter 2 for more on cost terms. You can use the cost and price information to determine how many units you need to sell to recover all of your costs — your breakeven point. The formula is

$$\text{Profit } (\$0) = \text{sales} - \text{variable costs} - \text{fixed costs}$$

Failing to get a grip on profit, loss, and breakeven point can be funny, at least on TV. *Saturday Night Live* did a skit years ago about "The Change Bank." Its only business was to make change, and its tag line was "We can meet all of your change needs." The owner was asked: "How do you make money just making change?" "Volume!" says the owner.

The joke in the Change Bank skit is that regardless of how much business you do, there's no profit in making change for people.

A case in point (breakeven point, that is)

You own a software company, and you're thinking about buying a booth at a technology trade show. You hope to sell your product to trade-show visitors. Before deciding to attend, you benefit from a little breakeven analysis.

You might say to yourself, "I'm not getting on a plane unless I can at least cover all of my expenses. How many units do I need to sell to cover all expenses?"

That number is the *unit sales* needed to reach your goal. Say your application sells for \$40 per unit, and you have variable costs of \$20 per unit. Fixed costs amount to \$1,000. Plug those numbers into the formula:

$$\text{Profit (\$)} = \text{sales} - \text{variable costs} - \text{fixed costs}$$

$$\text{Profit (\$)} = (\text{units} \times \$40) - (\text{units} \times \$20) - \$1,000$$

$$\text{Profit (\$)} = \text{units} \times (\$40 - \$20) - \$1,000$$

$$\text{Profit (\$)} = \text{units} \times \$20 - \$1,000$$

To finish this little piece of algebra, add \$1,000 to both sides of the equation. Then divide both sides by 20: $X = 50$, or 50 units.

$$\$1,000 = \text{units} \times \$20$$

$$\$1,000 / \$20 = \text{units}$$

$$50 = \text{units}$$

You need to sell 50 units at \$40 per unit. If you don't think you can sell at least 50 units of software, don't get on the plane for the trade show.

Financial losses: The crash of your cash

When your unit sales are less than breakeven, you're operating at a loss. And that could affect the cash you need to operate each month. You likely will need cash to pay expenses (such as rent, utilities, and salaries) before you collect cash from sales.

Every time you incur a loss, it's likely your available cash balance will decline. Generally, losses reduce your cash balance; conversely, profits increase them. Assume your loss for the month is \$1,000. After you collect cash on all of your sales and pay cash for all the bills, your ending cash balance will be \$1,000 lower than where you started.

Losses are the curse of business. After all, the business exists to generate profits. Maybe the only good news about a loss is that it gets you analyzing and fixing problems.

Contribution margin: Covering fixed costs

Variable costs probably won't keep you up at night. It's the fixed costs that may cause insomnia, whether you're talking about trade show cost, the monthly rent, or salaries you need to pay your employees each month.

You focus on covering fixed costs using the *contribution margin* (that is, sales less variable costs):



$$\text{Contribution margin} = \text{sales} - \text{variable costs}$$

Contribution margin is the money derived from sales after you have covered variable costs, which is used to cover fixed costs and keep for your profit:

$$\text{Profit} = \text{contribution margin} - \text{fixed costs}$$

You also can use contribution margin to compute your breakeven point in terms of units. Remember that the breakeven point is the sales needed to cover all of your costs and to create \$0 profit). Consider this formula:

$$\text{Breakeven point in units} = \text{Fixed costs} \div \text{contribution margin per unit}$$

If you sell a software application for \$40, and variable costs are \$20 (which just happens to be the same as in the trade show example), each unit has a contribution margin of \$20. If you have \$1,000 in fixed costs, the formula looks like this:

$$\text{Breakeven point in units} = \$1,000 \div \$20$$

$$\text{Breakeven point in units} = 50$$

If you sell 50 units, you've covered your fixed costs. Any sales over 50 units are all gravy and put you in Profit Land.

Lowering the breakeven point to reach profitability sooner

The lower the breakeven point, the easier it is to achieve your sales goal. It takes less effort to break even if you can lower the number of units you need to sell. Would you rather have to sell 100 units or 500 units just to break even? There's a big difference in time, effort, and financial risk between 100 and 500 units. Think of *less effort* as taking less risk.

You reduce your breakeven point by changing any one of its components, if you can (and that's sometimes a big *if*). Here are some techniques, using the well-worn software application as an example.

If you can change the costs or sales, you can reduce your breakeven point. To do so, make some changes to the earlier formula:

- ✓ Increasing the sale price to \$45 per unit:
 - Contribution margin per unit = $\$45 - \20
 - Contribution margin per unit = $\$25$
 - Breakeven point in units = $\$1,000 \div \25
 - Breakeven point in units = 40
- ✓ Reducing the variable cost to \$15 per unit:
 - Contribution margin per unit = $\$40 - \15
 - Contribution margin per unit = $\$25$
 - Breakeven point in units = $\$1,000 \div \25
 - Breakeven point in units = 40
- ✓ Reducing the fixed cost to \$800 per unit:
 - Contribution margin per unit = $\$40 - \20
 - Contribution margin per unit = $\$20$
 - Breakeven point in units = $\$800 \div \20
 - Breakeven point in units = 40

In each case, you lowered the breakeven point in units to 40 units instead of 50. The result? It takes less selling effort — and requires less financial risk.

Target net income: Setting the profit goal

Target net income is the profit goal you set. (I use *net income* and *profit* to mean the same thing.)

You compute target net income by plugging the figure into the breakeven formula — with one change. The profit changes from \$0 to the target net income amount. Here's the new formula:

$$\text{Target net income} = \text{sales} - \text{variable costs} - \text{fixed costs}$$

If you're going to take that trip to the trade show, how much profit would make your trip worthwhile? How much profit could you produce if you decided not to go? Maybe that's how you should answer the question. Assume your profit goal/target net income here is \$2,000.

Using the original information for sales, variable costs, and fixed costs, you can compute the sales you need to reach target net income:

Target net income = sales – variable costs – fixed costs

$$\$2,000 = \$40 \times (\text{units}) - \$20 \times (\text{units}) - \$1,000$$

$$\$3,000 = \$20 \times (\text{units})$$

$$150 = \$3,000 \div \$20$$

You'll meet target net income by selling 150 units.



You need to sell 100 more units (150 units – 50 units) to increase your profit from breakeven to \$2,000. You can think about your target net income in units or dollars.

If you attend the trade show for three days, you need to average 50 sales per day to sell 150 units. If your booth is open for ten hours a day, you need to sell an average of five units per hour. Determine whether that's reasonable. Is there enough interest in your product to reach that level of sales? That's the real purpose of thinking through target net income.

Lower profits and margin of safety

The *margin of safety* is a cushion. If things don't go as planned — if sales are lower than your budget — you need to know how low your total sales can go before you hit the breakeven point. The word *margin*, in this case, refers to the amount (in dollars or units) above the breakeven point.

Consider this example: You're getting ready to book your tickets for the trade show. You computed a breakeven point of 50 units. To reach your target net income, you need to sell 150 units. Target net income uses your budgeted sales level. The difference between your budgeted level of sales (150 units) and your breakeven sales (50 units) is your *margin of safety*.

If actual sales were 30 units below your budget, your units sold would be 120 (150 – 30). You're still way above your breakeven point of 50 units. The question always is if you don't budget correctly, how far off can you be before your unit sales are below breakeven?

Contribution margin versus gross margin

Contribution margin represents the amount of money you have left after variable costs to cover fixed costs and keep for your profit. *Gross margin* explains how much of your sales proceeds are left after paying cost of sales.

Cost of sales is the direct costs of creating your product. (See the direct and indirect cost section of Chapter 2.) If you were manufacturing denim jeans, you would have material costs for the denim and thread (and maybe a zipper), as well as the labor costs to sew the jeans. Your gross margin per pair of jeans sold might look like this:

Gross margin = sale price – cost of sales (material and labor)

Gross margin = \$60 – \$25

Gross margin = \$35

Contribution margin (sales less variable costs) is part of the target net income formula. Try to avoid confusing the gross margin with contribution margin. The terms look similar, and both are thrown around in accounting conversations. Contribution margin is sales less variable costs. Gross margin, on the other hand, is sales less cost of sales.

Using operating leverage

The *degree of operating leverage* is a formula that shows how well you're using your fixed costs to generate a profit. The more profit you can generate from the same amount of fixed cost, the higher your degree of operating leverage.

Here's the formula:

Degree of operating leverage = contribution margin ÷ profit

Profit = contribution margin – fixed costs

You already covered the component parts that make up this formula. To refresh your memory, see the section “Calculating the breakeven point” and the section “Contribution margin: Covering fixed costs.”

First, calculate the contribution margin. Use the number of units from the target net income discussion above:

Contribution margin = sales – variable costs

Contribution margin = \$40 × (150 units) – \$20 × (150 units)

Contribution margin = \$20 × (150 units)

Contribution margin = \$3,000

Use the degree of operating leverage formula to compute the degree of operating leverage:

Degree of operating leverage = contribution margin ÷ (contribution margin – fixed costs)

Degree of operating leverage = \$3,000 ÷ (\$3,000 – \$1,000)

Degree of operating leverage = \$3,000 ÷ \$2,000

Degree of operating leverage = 1.5

Degree of operating leverage can also be defined as contribution margin divided by profit. It's saying the same thing. All the calculations simply amount to this statement: "At sales of 150 units, contribution margin is 1.5 times profit."

You also can use the degree of operating leverage formula to assess the relationship between costs and profit. If you minimize your fixed costs, you increase your profit. Even better, you can earn more profit without changing your sale price, contribution margin, or units sold.

Here is how the degree of operating leverage looks if fixed costs were only \$500:

$$\text{Degree of operating leverage} = \$3,000 \div (\$3,000 - \$500)$$

$$\text{Degree of operating leverage} = \$3,000 \div \$2,500$$

$$\text{Degree of operating leverage} = 1.2$$

The ratio went down from 1.5 to 1.2. Now contribution margin (\$3,000) is 1.2 times profit (\$2,500). Contribution margin did not change. Because fixed costs went down, profit increased.

What if fixed costs went down to zero? Contribution margin/profit would be 1, and *that's* a trophy position! Your entire contribution margin goes toward profit.

Timing is everything when it comes to costs

Costs are part of almost all of the CVP formulas you use. But (shock and amazement!) some costs are not part of your decision-making.

Sunk costs (past costs or retrospective costs) aren't relevant when you make decisions about the future. By contrast, fixed costs are relevant if they aren't sunk.

When an airline sells you a ticket a few days in advance of your departure, you can be sure most of the costs of the flight have already been incurred (sunk). Costs include the plane's maintenance and fuel, salaries for the crew, and the fee paid for the gate at the airport. In fact, the cost of those tasty peanuts they serve has been factored in, too. Nearly all of the costs for the flight aren't fixed costs but are past or sunk costs. The airline can't change them.

The timing of your ticket purchase is perfect for the airline. Most of the ticket price goes toward profit. That's because most of the costs have already been incurred.

But something different happens when you buy a ticket six months in advance. The timing might be good for you but dicey for the airline. Whereas you may buy a discounted ticket, many costs for the flight can change. For example, the airline might have to pay more for fuel or have to increase flight

attendant salaries. Of course, there's a chance (slim) that fuel prices will go down, flight attendants will work for lower wages, or the airline will negotiate lower gate fees with the airport.

The rule of thumb is the more time you have before providing a product or service, the more control you have over costs. If you can take action to change costs, they aren't past or sunk costs. As you get closer to delivering your product or service, more costs become sunk costs.

Using Cost-Volume-Profit Analysis to Make Savvy Business Decisions

Your business decisions have consequences. That's why you get the big bucks! Use CVP to avoid problems (or at least to see them coming).

Deciding to make a product or offer a service is a big decision. You incur costs, and if you don't meet the level of sales needed to cover costs, you incur a loss. Incurring a loss might also reduce your cash to operate going forward. Finally, a decision to make product A may mean there are no resources to make product B. (After all, you don't have unlimited resources to produce everything!) Sometimes this is called *opportunity cost*, giving up the second-best choice to do the first choice.

Use cost-volume-profit analysis for several common decisions, such as deciding whether or not to advertise, deciding on prices for your products, and deciding how to work with the sales mix to improve profits.

You can also use CVP to calculate the impact of taxes on profit. See the section "The Tax Man Cometh, the Profits Goeth."

Pitching the product: Deciding to advertise

When you advertise, you obviously spend company resources. You need to know if the additional cost will generate higher profits.

A marketing executive I know used to tell potential clients, "If you don't advertise, nothing happens." I know he was trying to sell advertising, but he had a point. You need to consider the financial impact of your decision to advertise. Specifically, will your sales increase to "make up" for the advertising expense and result in higher profits? Cost-volume-profit is the perfect tool to assess advertising decisions.



The old saying is, “It pays to advertise.” But it costs, too. Did you ever hear the old not-so-funny costing joke? CFO: “And further, ladies and gentlemen of the board, think of the money we’ll save by *not* advertising!” That guy is now a hobo, roasting weenies under a railroad bridge somewhere.

Assume your business sells books online, and your sales total 5,000 units. Your sale price is \$25 per unit, variable costs are \$15 per unit, and fixed costs total \$10,000.

Use the formula for the breakeven point, and solve the formula for profit:

$$\text{Profit} = \$25 \times (5,000) - \$15 \times (5,000) - \$10,000$$

$$\text{Profit} = \$125,000 - \$75,000 - \$10,000$$

$$\text{Profit} = \$40,000$$

So far, so good. Next, you decide to spend \$7,000 on advertising. The cost is fixed, regardless of how many books you sell. Total fixed costs increase from \$10,000 to \$17,000.

You expect the advertising to increase your book sales by 10 percent. The new total would be 5,500 units (5,000 units \times 110%). What is your new profit level?

$$\text{Profit} = \$25 \times (5,500) - \$15 \times (5,500) - \$17,000$$

$$\text{Profit} = \$137,500 - \$82,500 - \$17,000$$

$$\text{Profit} = \$38,000$$

In this case, you’re actually worse off. Your profit is \$2,000 lower than before. For this product, at this time, the advertising didn’t work. The correct decision here is not to advertise, because your profit will decrease.

What if sales increase 20 percent? Plugging your new sales number of 6,000 into the formula, you’ll see a \$43,000 profit. In this case, you’re better off with the advertising expense. Your profit is \$3,000 higher. The cost of advertising is the same, so it’s possible you spent the advertising dollars in a better way.



If people buy your products whether or not you advertise, there isn’t much sense in advertising.

Pricing magic: Lowering your price without losing your profit

Just about everyone has shopped at the big discount stores that advertise low prices. Competitive pricing is a tool they use to get customers into the store. As a business owner, you can attract more sales by lowering prices, too. At what point would a price cut be too much — the point where you don’t generate a profit? Cost-volume-profit answers this question.

Imagine that you own a small chain of pizza parlors. You're analyzing sales and costs for one type of pizza: a 16-inch pizza that has always sold well. Sales have increased in the past when you've offered a price cut, so you decide to do it again. Also, you're moving into a big holiday weekend, and you don't want to lose sales to competitors.

Your pizza price is \$20 per unit. Your variable costs are \$8 per unit. Fixed costs total \$20,000. You forecast 10,000 pizza sales. Here's how your profit looks before you reduce your prices:

$$\text{Profit} = \$20 \times (10,000) - \$8 \times (10,000) - \$20,000$$

$$\text{Profit} = \$200,000 - \$80,000 - \$20,000$$

$$\text{Profit} = \$100,000$$

You estimate that sales will increase by 25 percent if you cut the price to \$16. Your fixed costs won't change. Here's the impact of the price cut on profits.

The new sales in units is $10,000 \times 125\% = 12,500$ units. Here's the new profit level:

$$\text{Profit} = \$16 \times (12,500) - \$8 \times (12,500) - \$20,000$$

$$\text{Profit} = \$200,000 - \$100,000 - \$20,000$$

$$\text{Profit} = \$80,000$$

Oops! Your profit's lower by \$20,000. You may have cut the price too much. Trouble is, the increased number of units sold sent the total variable cost up. Use this analysis *before* you cut the price — before you make a decision that would reduce your profit!



If your business is family-owned, you have a spouse who might be upset with a \$20,000 reduction in profit. He or she might have warned you, so look before you leap. Otherwise, you may hear the four worst words in the English language: "I told you so."

Now you're aware that a \$4 price cut (from \$20 to \$16) would be too much. How would your profit look with a price of \$18? As a bonus, you negotiate a lower lease payment on your store space. Assume the same level of sales (12,500 pizzas) and \$15,000 in fixed costs:

$$\text{Profit} = \$18 \times (12,500) - \$8 \times (12,500) - \$15,000$$

$$\text{Profit} = \$225,000 - \$100,000 - \$15,000$$

$$\text{Profit} = \$110,000$$

Trouble is, the increased number of units sold sent the total variable cost up, but variable cost is better covered by the moderate increase in sales and a big reduction in fixed costs.

Sales mix: Combining the results of two products

The *sales mix* is the relative proportion in which a company's products are sold. Most companies sell more than one type of the same product. For example, say you sell shirts. Forty percent of your sales are long-sleeve dress shirts, and 60 percent of your sales are short-sleeve golf shirts. The sales mix is 40 percent long-sleeve and 60 percent short-sleeve.

To use cost-volume-profit analysis effectively, apply the methodology to more than one product at a time. You want to see how multiple products are contributing to your profit goal. Strictly speaking, these are *product types*. You don't have to know the numbers for every color, size, and style of shirt.

Good news! If one product produces less profit (because of low sales), the other product could potentially make up for it. Ideally, you can adjust your sales between products to maintain the total profit you want. If dress shirt sales are lagging, you can sell more golf shirts.

Applying breakeven point to two products

To plan your sales and profits, it's ideal for you to know the breakeven point for every product type you sell. So if you have a store that sells just two product types, compute the breakeven points for both of them.

Say you manage a lumberyard that sells two types of wood to furniture makers: Pristine wood and Sturdy wood. A unit is one board of wood. (If you're selling first-class hardwoods, the sample prices are pretty close to reality. There's some serious money in a board $\frac{1}{8}$ of an inch thick, 10 inches wide, and 40 inches long.)

Pristine wood is used to make beautiful tabletops and sells for \$50 per unit. Variable costs are \$30 per unit, and fixed costs total \$30,000. The breakeven formula is

$$\text{Profit (\$)} = \text{sales} - \text{variable costs} - \text{fixed costs}$$

$$\text{Profit (\$)} = (\text{units} \times \$50) - (\text{units} \times \$30) - \$30,000$$

$$\text{Profit (\$)} = \text{units} \times (\$50 - \$30) - \$30,000$$

$$\text{Profit (\$)} = \text{units} \times \$20 - \$30,000$$

To finish the calculation, add \$30,000 to both sides of the equation. Then divide both sides by \$20:

$$\$30,000 = \text{units} \times \$20$$

$$\$30,000 / \$20 = \text{units}$$

$$1,500 = \text{units}$$

You sell 1,500 units of Pristine wood to break even.

Sturdy wood is used to make pretty good tabletops and sells for \$25 per unit. Variable costs are \$18 per unit, and fixed costs total \$25,000. Here's the breakeven formula:

$$\text{Profit (\$)} = \text{sales} - \text{variable costs} - \text{fixed costs}$$

$$\text{Profit (\$)} = (\text{units} \times \$25) - (\text{units} \times \$18) - \$25,000$$

$$\text{Profit (\$)} = \text{units} \times (\$25 - \$18) - \$25,000$$

$$\text{Profit (\$)} = \text{units} \times \$7 - \$25,000$$

To finish the calculation, add \$25,000 to both sides of the equation. Then divide both sides by \$7:

$$\$25,000 = \text{units} \times \$7$$

$$\$25,000 / \$7 = \text{units}$$

$$3,572 = \text{units}$$

You sell 3,572 units of Sturdy wood to break even.

Pristine wood's breakeven point in units is less than half of the Sturdy wood's (1,500 units versus 3,571 units).

A contribution margin of \$20 (Pristine wood) beats a contribution margin of \$7 (Sturdy wood) any day of the week. The difference in fixed costs is \$5,000 — not a big difference. Pristine has a much larger contribution margin to cover fixed costs. That's why Pristine wood's breakeven point is so much lower.

Applying target net income to two products

After you compute the breakeven points on two products, you can decide on target net income for the period. Assume again that you sell Pristine and Sturdy wood, and your target net income for both types of wood is \$10,000. You target a \$5,000 profit for each product type.

Pristine wood's calculation is

$$\$5,000 = \text{sales} - \text{variable costs} - \text{fixed costs}$$

$$\$5,000 = (\text{units} \times \$50) - (\text{units} \times \$30) - \$30,000$$

$$\$5,000 = \text{units} \times \$20 - \$30,000$$

Finish the calculation, and you see that it takes 1,750 units of Pristine wood to reach target net income of \$5,000.

For Sturdy wood, plug in the variables. You need to sell 4,286 units to reach target net income.

The total profit for both products is \$10,000 (\$5,000 + \$5,000).

Adjusting product sales to reach target net income

If one product’s sales are lower than planned, you can still reach your target net income. Higher sales in one product can make up for lower sales in another product.

For example, say the economy is bad, and customers aren’t eager to buy Pristine wood, so you sell only 1,600 units. The profit calculation is

$$\text{Profit} = \$50 \times (1,600) - \$30 \times (1,600) - \$30,000$$

$$\text{Profit} = \$80,000 - \$48,000 - \$30,000$$

$$\text{Profit} = \$2,000$$

Your target net income for Pristine wood is \$5,000, so you’re \$3,000 short of your goal. To reach your total target net income, maybe you can shift that \$3,000 profit “burden” to Sturdy wood.

To determine how much more you need to sell, just change the Sturdy wood profit to \$8,000, and compute the new number of units sold:

$$\$8,000 = (\text{units} \times \$25) - (\text{units} \times \$18) - \$25,000$$

$$\$8,000 = \text{units} \times \$7 - \$25,000$$

Finish the calculation. The number of units to reach your profit goal is \$33,000 divided by \$7. Therefore, if you sell 4,715 units of Sturdy wood, you generate \$8,000. Your total target net income of \$10,000 is based on \$2,000 from Pristine wood and \$8,000 from Sturdy wood.

The Tax Man Cometh, the Profits Goeth

Do you consider taxes when you make a spending decision? Does a bear live in the woods? The answer is “yes” to both questions. If you’re considering a major purchase, think about the income you need to earn and the tax bite. There’s going to be an impact on your profit. CVP analysis can help you figure everything out.

Understanding pre-tax dollars

Assume the business needs a car. The cost is \$5,000. You have to earn more than \$5,000, pay tax on that amount (say 30 percent), and then pay for the car. How much do you have to earn? Here’s a formula to compute how much you need to earn, which I refer to as *pre-tax dollars*:

$$\text{Pre-tax dollars needed for purchase} = \text{cost of item} \div (1 - \text{tax rate})$$

$$\text{Pre-tax dollars needed for purchase} = \$5,000 \div (1 - 0.30)$$

$$\text{Pre-tax dollars needed for purchase} = \$5,000 \div 0.70$$

$$\text{Pre-tax dollars needed for purchase} = \$7,142.86$$

The cost of the car in pre-tax dollars is \$7,142.86.

When you allow for taxes, it takes \$1.43 to buy \$1.00 worth of car. $\$7,142.86 \div \$5,000$ equals 143% (with rounding). To purchase the car, you need 143% of \$5,000, or \$7,142.86. The taxes paid in this example are \$2,142.86, the difference between \$7,142.86 and \$5,000.

Adjusting target net income for income taxes

It's a smart move to assess the impact of taxes on target net income. Assume your business, Pizza Gone Wild, earns a \$100,000 profit. That profit doesn't account for income taxes. It assumes that as the owner, you keep \$100,000 in your pocket with no taxes paid. Assume a 30 percent tax rate. You can calculate the pre-tax dollars needed to earn \$100,000 after taxes:

$$\text{Pre-tax dollars} = \text{cost of item} \div (1 - \text{tax rate})$$

$$\text{Pre-tax dollars} = \$100,000 \div (1 - 0.30)$$

$$\text{Pre-tax dollars} = \$100,000 \div 0.70$$

$$\text{Pre-tax dollars} = \$142,857.14$$

The taxes paid are \$42,857.14. And you're probably saying, "Oh, I get it. To earn \$100,000 *after tax*, I need to increase my sales to cover the taxes." And you're right. Ideally, sales prices and volume are sufficient to cover the burden of taxes.

Consider an example, using pizza gone wild. The plan for profitability was to sell 10,000 units at \$20 each, but that won't pay the taxes. Calculate the number of units you need to sell to cover profits and taxes (\$142,857.14):

$$\$142,857.14 = (\text{units} \times \$20) - (\text{units} \times \$8) - \$20,000$$

$$\$142,857.14 = \text{units} \times (\$20 - \$8) - \$20,000$$

$$\$142,857.14 = \text{units} \times \$12 - \$20,000$$

To finish the calculation, add \$20,000 to both sides of the equation. Then divide both sides by \$12.

You need to sell 13,571 units to handle the \$142,857.14. That's 10,000 units for your profit and 3,571 units to handle the taxes. You gotta sell a lotta dough to make a little dough.

Chapter 4

Estimating Costs with Job Costing

In This Chapter

- ▶ Deciding when to use job costing and process costing
 - ▶ Identifying cost objects
 - ▶ Using job costs to price a product or service
 - ▶ Learning to use a normal costing system
 - ▶ Applying indirect cost to the budgeting process
-

Job costing is a costing methodology you use when your customers incur unique amounts of costs. Job costing assesses costs by the job and allows you to provide detailed price estimates based on the product constructed or service provided.

By contrast, *process costing* (the topic of Chapter 16) assumes that individual product costs are nearly the same for every customer. For example, if you manufacture office chairs, each chair of a particular model has the same costs. You use the same amount of metal and material, and assemble the chair using the same amount of labor. If you calculate the cost for one chair, you know the cost for every chair of that model. In other words, the customer does not have the option to create his or her own unique product with unique costs.

Roofs (for example) aren't like chairs. If your business puts roofs on houses, each client's costs will be different. The amount of material depends on the type of roof and the square footage. Labor time varies, depending on the roof's size, pitch, and unique angles. This is an example of *job costing*.

When you're deciding on which costing method to use, keep in mind how specific or unique your product or service is. Do the costs differ a great deal from one customer to another? If they do, your business should probably use job costing. Otherwise, use process costing.

In this chapter, you see when job costing is the appropriate costing method to use. You also see how to apply both direct and indirect costs. (If you're not sure about the definitions of direct and indirect costs, they're covered later in this chapter.)

Understanding How Job Costing Works

For some businesses, nearly every customer job has different costs, and that's where job costing asserts its value. You need a job costing estimate in order to get the customer's business, and you need to track costs accurately so you generate a reasonable profit.

The different costs for different jobs will often be self-evident. Material costs, labor hours, mileage cost, and type of equipment used are likely to vary. For example, a tree trimming company would incur more costs to remove a 30-foot tree than to remove a small stump. The big tree takes more labor and different equipment.

Some factors could lower costs and make a business more competitive in price (or improve its bottom line). For example, every few months I receive a flyer in the mail or a knock on my front door from a tree trimming company working on a job in my neighborhood. They offer me a free estimate while they are in my neighborhood. It's a smart business move. If you've incurred the cost to locate your employees and equipment in a certain area, why not perform as much work as possible while you're there? You can spread some costs (mileage, for example) over several jobs. As a result, your cost per job in that neighborhood is lower, and you increase your profit.

The business lesson is that a little bit of flyer can go a long way.

Proper use of job costing

Here are a few examples of job costing. Look at three business sectors.

Service-sector businesses provide a service to clients.

Job costing: Law firm, accounting practice, consulting businesses

Merchandising-sector businesses sell products as a retailer. (Think of a department store.)

Job costing: Shipping expensive goods, customized product sales

Manufacturing-sector businesses make things.

Job costing: Home builder or remodeler, swimming pool contractor

Cost objects: The sponges that absorb money

A *cost object* is anything that causes you to incur costs. Think about a cost object as a sponge that absorbs your money. The object can be a customer, job, a product line, or a company division. Carefully identifying cost objects will help you cost your product or service accurately.

Assume you manage a group of plumbers. You're reviewing the month's mileage expense (the equivalent of gasoline) for your staff and notice a 20 percent increase from the prior month. Why? You start asking questions. As it turns out, the customer demand for plumbing work required your staff to drive more miles. The average customer lived farther away.

You grumble, "That driving ran up a lot of costs!" Yes, it did, and you do the driving to meet the needs of your customers. In this example, the cost object was the group of customers for the month. Without any customers, you wouldn't have paid for all of the gas. (Well, you wouldn't have had any income either, but never mind that.) No cost object means no costs incurred.

Direct costs are *traced* to the cost object, and indirect costs are *allocated* to the cost object.

Indirect costs can be fixed or variable. Insurance costs on vehicles would be a fixed indirect cost. The premiums are fixed, and the cost is indirect to the job because you can't trace the vehicle insurance cost directly to a specific job. Utility costs for the office (such as heating and cooling) are variable indirect costs. Costs vary with the weather, but as with the insurance premiums, you can't trace them directly to any one job.

This list explains how fixed and variable costs are assigned to cost objects:

✔ Direct costs

Variable direct costs, such as denim material, where denim jeans is a cost object

Fixed direct costs, such as a supervisor salary at an auto plant, where an automobile produced is the cost object

✔ Indirect costs

Variable indirect costs, such as utility costs for a television plant, where a television produced is the cost object

Fixed indirect costs, such as insurance for a plumbing vehicle, where a plumbing job is a cost object

Charging customers for direct and indirect costs

To bill a customer and calculate a profit, you must add up all the costs for that customer, whether they are direct or indirect costs.

If, for example, you manufacture kitchen countertops, you would want to include all direct and indirect costs of a custom countertop installation in order to bill the customer. A direct cost might be marble (for material). To find the total cost of material for the job, you'd compute direct material cost as (marble) \times (quantity used).

Indirect costs are different. If your kitchen countertop business makes lease payments on an office building, the cost is indirect. You can't know the exact amount of indirect costs for the client. You also can't trace the cost directly to a specific customer, but you can allocate it using a cost allocation base.



For job costs to be accurate, you need to collect information before you bill the client. You also need to consider the difference between your cost estimate and the final bill. Your client needs to understand how costs higher than the estimate will be handled. Should the customer expect to pay it, or will you absorb the cost (and lower your profit)? If this isn't handled correctly, the customer may be upset. Unforeseen things happen, of course, and you should explain when you hand the customer the estimate that the final bill may be different. A customer would likely accept additional labor costs. That's because the exact cost of labor is probably hard for you to predict.

Think about allocating indirect costs this way: There's a dollar amount of cost to allocate (say, \$100). You spread that cost over a group of customers, a level of production, or some other activity level. In this section, you see how that might work.

A carpenter owns trucks that require repair and maintenance expense. That cost can't be traced to specific customers; instead, these indirect costs are allocated to a cost object. You find a "best" method to assign repair and maintenance expense to clients, perhaps labor hours worked for the customer.

The logic is that if you worked more hours for a specific customer, you probably used your truck more. If you used the truck more, that customer should absorb more of your truck's repair and maintenance cost.

It's virtually impossible to trace the repair and maintenance cost of the truck back to a specific customer. So you make your best educated guess to distribute the cost.

Cost allocation is the process of connecting an indirect cost to a cost object (see Chapter 2 for more). A *cost pool* is a grouping of similar costs. You can

think of a cost pool as a bunch of similar cost objects thrown together. In this case, the cost object is a specific customer job.



A *cost driver* is an item that changes the total costs. If you drive the trucks more, they require more repair and maintenance. An activity (driving to see customers) drives up your costs (repair and maintenance).

Just to clarify: The cost object is the “sponge” that absorbs the cost. The cost driver adds to the size of the sponge. A bigger sponge absorbs more cost.

Assume the total repair and maintenance expense for three carpentry trucks is \$3,000. During the month, your workers provide service to 300 clients. Each customer is allocated \$10 of repair and maintenance expense ($\$3,000 \div 300$ clients).

If the cost driver increased to 400 clients per month, the plumbers would drive more miles. As a result, the trucks would require more maintenance and possibly repairs. Your monthly repair and maintenance expense would be higher.

At 400 customers for the month, assume total repair and maintenance expense for three carpentry trucks is \$3,600. Now each customer is allocated repair expense of \$9 ($\$3,600 \div 400$ clients). The cost driver increase (number of customers) changed your total cost to \$3,600. Because you also have an increase in total customers (400), the \$3,600 is spread over a larger group. The total cost increased, but the cost allocated per customer declined.

You can see how the cost allocation process can get complicated.

It's often beneficial to group similar costs together into the same cost pool when the cost driver is the same. Consider a cost pool for the indirect costs for the plumbing trucks. In addition to repair and maintenance expense, the company pays for insurance and depreciation on the three trucks. None of these costs can be traced to a specific customer; instead, you need to allocate these costs. A good cost pool would include depreciation, insurance, and repair costs on the trucks. This cost pool can be allocated just like the repair and maintenance in the previous example.

Implementing job costing in manufacturing: An example

To implement job costing in a manufacturing company, first think about dividing your costs into two piles: direct costs and indirect costs. In a manufacturing setting, you have direct materials and direct labor you can trace directly to the job. So far, so good. Next, think about what's driving indirect costs. You spread those indirect costs to the work you perform.

As an example, Reliable Fencing manufactures and installs wooden fences for the residential market. Reliable has a manufacturing component and a service component.

Reliable provides the customer a cost estimate. The estimate is based on the type of fence, fence height and length, and labor hours needed for installation. Because nearly every job has a different set of costs, Reliable Fencing uses job costing. This system allows Reliable to compute costs accurately. And from that, Reliable can calculate a selling price that generates a reasonable profit.

Imagine that you're the manager of Reliable Fencing. The Johnsons have requested an estimate for a fence in their backyard. To provide the estimate, you discuss the fence models and types with them. You measure the length needed for the fence and the height requested. Finally, you consider any extra labor costs you might incur. For example, the Johnsons would like the fence to jog around several trees so the fence doesn't damage the tree trunks.

The Johnsons' fence is the cost object. Reliable will incur costs if the client orders a fence and work starts on the project. But before getting an order, you have to provide a cost estimate.

Computing direct costs

Reliable combines the cost of wood, paint, and a waterproofing treatment for the wood. That combined cost represents direct materials. As the manager, you compute direct material costs:

$$\text{Direct materials} = \text{quantity of materials} \times \text{unit price paid for material}$$

You buy material measured in square feet. The unit cost is the price per square foot (see Chapter 2). Here's the amount of material needed and the cost:

$$\text{Direct materials} = 600 \text{ square feet of material needed} \times \$5 \text{ per square foot}$$

$$\text{Direct materials} = \$3,000$$

Your other direct cost is direct labor. Your staff must cut the wood, paint it, waterproof it, and build the fence. Thinking through it further, your staff must measure and dig postholes. They then fill the area around the posts and nail the fence boards onto the posts, all while keeping everything level. Not easy! It takes real skill and planning. As a result, the owners of Reliable Fencing know it's best to hire skilled people and pay them a reasonable hourly rate.

Your experience as Reliable's manager allows you to estimate the labor time needed, based on several factors. You consider the square footage of material needed; the length and height of the fence; and any extra work, such as going around those tree trunks. Here's your formula for direct labor costs:



Direct labor = hours of labor \times rate paid for labor

Note a difference in terms: *Price* is used for materials, and *rate* is the term used for labor. That distinction comes up in the world of cost variances.

You estimate that 2 people working 20 hours can complete the job. Using these numbers, you determine the labor cost:

Direct labor = hours of labor \times hourly rate paid for labor

Direct labor = 2 workers \times 20 hours \times \$20

Direct labor = \$800

Consider one more direct cost. You saw a discussion of mileage expense earlier in chapter. Let's dust off that formula and use it here:

Cost per mile = cost per gallon of gas \div miles per gallon for the vehicle

Mileage costs = miles needed for client \times cost per mile

You calculate 15 miles (round trip) from your office to the job site. However, the work will be completed over several days. You estimate 45 total miles.

Your trucks get 20 miles to the gallon, and your fuel cost is \$4 per gallon. It's not much, but here is the direct cost for mileage:

Cost per mile = \$4 gallon of gas / 20 miles per gallon

Cost per mile = 20 cents per mile

Mileage costs = 45 miles needed for client \times 20 cents per mile

Mileage costs = \$9.00

So you have three direct costs: materials, labor, and mileage. They are direct costs because they can be traced to the cost object: the Johnsons' fence.

Calculating indirect costs

To allocate indirect costs, you decide on two cost pools. One pool is your vehicle and equipment costs, and includes depreciation, maintenance, repair, and insurance costs. The other pool is office cost, which includes salary, benefits, accounting costs, and legal costs for your company. The cost object for allocating these indirect costs is the customer base:

Vehicle and equipment costs \$4,000

Office cost \$7,000

Customers serviced 200

After you resolve how to allocate costs, try to keep it simple. You combine the indirect costs into one amount ($\$4,000 + \$7,000 = \$11,000$). You then divide the indirect cost total by the number of clients for the month:

Indirect cost allocation rate = $\$11,000 \div 200$ customers =
\$55 per customer

Indirect cost allocation rate = \$55 per customer



Your office assistant asks a question: “Is that really fair? What if one client has a \$3,000 job, and another’s project is only \$500? Should we be charging the same amount of costs to both?” You think about the issue over lunch.

After lunch, you stop by your office assistant’s desk and say: “You know, a client should expect that if we show up for a job of any size we’re going to incur some office and vehicle costs. I don’t think a client will be surprised by those fees.”

The assistant thinks for a minute. “Yeah, that’s fair. If they showed up at my house for a job, those indirect costs seem okay. I guess I’d expect to pay for it somehow. As long as the cost charged to a small job is not huge, I think charging a rate per customer is reasonable.”



The discussion with your office assistant may convince you that your indirect cost allocation should be more specific. If you could show the client how their specific job generated indirect costs, he or she would be more inclined to agree with your billing.

You need to weigh the cost and time needed to allocate costs with the benefit of knowing more specific information. If customers generally accept the \$55 allocation rate as reasonable, great. Probably no reason to dig further into your indirect costs.

If the majority of your customers have a problem with the rate, you should consider more detailed analysis and present a more detailed indirect cost billing. If not, you may lose the opportunity to do more work with the same group of clients.

Presenting total job costs

Table 4-1 shows the total costs for the Johnsons’ fence job.

<i>Type of Cost</i>	<i>Amount or Quantity</i>	<i>Price or Rate</i>	<i>Total</i>
Direct material	600 square feet	\$5 per square foot	\$3,000.00
Direct labor	40 hours	\$20 per hour	\$800.00
Mileage	45 miles	\$.20 per mile	\$9.00
Indirect costs	1 customer	\$55 allocation	\$55.00
Total job costs			\$3,864.00

Taking a Closer Look at Indirect Costs using Normal Costing

In this section, you apply indirect costs to your product or service. You also plan direct and indirect costs using a normal costing system. Actual costs represent what comes out of your checkbook. You determine actual costs after the work is completed. *Normal costing* instead uses budgeted data, which is generated before the work is completed. Normal costing uses a budgeted price or rate and multiplies that rate by the actual quantity used.

It's difficult to plan your work without some budgeted rates of cost. That's the purpose of normal costing. The process creates budgeted rates that you can use to plan your work. You don't have to wait until the end of the job and determine your actual costs. You can find more on budgeting in Chapter 6.

Let's say you operate a landscaping company. Changes in costs can make planning difficult, and the changes may be higher or lower. Maybe the costs you pay for materials, labor, and other costs change as the year goes on. The cost of grass seed may go up, increasing your material costs. Or your labor costs decline because the economy slows. More people with the needed skills are looking for landscaping work, so you can offer a lower pay rate.

If you use actual costs, which change over time, it's difficult to price your product to generate a reasonable profit. For example, if you had a 15 percent profit above costs, a cost increase will eat away at your profit. Maybe higher costs lower your profit to 10 percent.

It's also harder to plan your cash needs. If you need to buy \$10,000 of grass seed in the next 30 days, what if the price goes up? Maybe a shortage increases your grass seed cost to \$12,000. That means that the check you need to write will be \$12,000, not \$10,000. Now you need to have \$2,000 more cash available.



Budgeting and cash management is similar to planning a vacation. First, you determine the costs (airline, car rental, hotel, gas). Next, you plan your cash flow to pay for the vacation cost. If the prices are constantly changing, planning is difficult. Many people try to book a vacation trip well in advance, so prices are fixed for the trip!

Budgeting for indirect costs

When you budget for indirect costs, you spread those costs to cost objects, based on a cost driver (refer to the section “Cost objects: The sponges that absorb money”). Before you spread the indirect cost, you come up with a rate to allocate the costs to the product or service. The indirect cost rate allows you to price your product to produce a reasonable profit.

As the manager for the landscaping company, you decide on a cost pool for indirect costs. Your only indirect cost is for vehicles and equipment (depreciation, insurance, and repair costs). Your company is new, with virtually no office costs to consider yet.

Many companies have planning meetings around the end of their fiscal (business) year. In the meetings, they make assumptions about many issues, including next year’s costs. This is when a company plans *predetermined or budgeted indirect cost rate*. The predetermined overhead rate depends on total indirect costs and the cost driver you select.

During a planning session, you consider the prices and rates you paid last year. You think about how prices and rates have changed, and consider your estimates of miles driven each month. Based on that analysis, here is your budgeted indirect cost rate:

$$\text{Predetermined or budgeted indirect cost rate} = \$7,500 \div 1,400 \text{ miles}$$

$$\text{Predetermined or budgeted indirect cost rate} = \$5.36 \text{ per mile}$$

It isn’t until the end of the year that the company knows what the actual total indirect costs will be and the actual miles driven. Here is the actual indirect cost rate for the vehicles and equipment (using miles driven for the month as the cost object). The formula is explained in the section “Computing direct costs and indirect costs”:

$$\text{Indirect cost allocation rate} = \$8,000 \div 1,300 \text{ miles}$$

$$\text{Indirect cost allocation rate} = \$6.15 \text{ per mile}$$



Predetermined or budgeted means planned in advance. Your budgeted monthly rate has a lower monthly cost level (\$7,500 versus \$8,000) but more monthly miles (1,400 versus 1,300). As a result, the budgeted overhead rate is lower. You use this rate to apply indirect costs to every job during the year.

At the end of the year, you realize that you didn't allocate enough costs to your jobs. As a result, your actual profit will be lower than what you budgeted. Because actual costs aren't known until the end of the year, you almost always have a difference between budgeted and actual results.

Following a normal job costing system

Put together your budgeting process for indirect costs with a plan for direct costs. Think of the combined process as *normal costing*. I'll keep hammering away at this point, but it's important: You trace direct costs and allocate indirect costs.

Normal costing combines indirect cost rate with actual production. The process gets you closer to actual total costs for your product.

Computing direct costs and indirect costs

Here are the two steps to implement normal costing:

- ✓ **Direct costs:** Traced to the cost object by multiplying (actual prices/rates) \times (actual quantity for a specific job object)
- ✓ **Indirect costs:** Allocated to the cost object multiplying (predetermined or budgeted indirect cost rate) \times (actual quantity for a specific job object)

Note that both direct and indirect costs use actual quantity in the formula. While you come up with an indirect cost rate in planning, the rate is multiplied by actual quantities. In this case, the quantity is jobs for the month.

Introducing the job cost sheet

A *job cost sheet* lists every cost you've incurred for a particular job. That includes direct material, direct labor, and all indirect costs. The job cost sheet is your basis for computing your sale price and your profit. You use this document to prepare a cost estimate for a client. Table 4-2 shows a job cost sheet using normal costing for a landscaping job.

<i>Type of Cost</i>	<i>Amount or Quantity</i>	<i>Price or Rate</i>	<i>Total Cost (Rounded)</i>
Direct material	100 square feet of grass seed	\$12 per square foot	\$1,200
Direct labor	15 hours of labor	\$15 per hour	\$225
Mileage	30 miles driven	\$0.18 per mile	\$5
Indirect costs	30 miles driven	\$5.36 per mile	\$161
Total job costs			

The indirect cost calculation (vehicle and equipment costs) uses the actual quantity (miles driven) and the estimated rate per mile. The other direct costs on the job sheet use actual quantities and actual prices/rates.

Following the Flow of Costs through a Manufacturing System

Costs flow through a manufacturing system, from buying materials for a product all the way to the customer sale. When you envision the flow of costs, you find it easier to collect all the product costs you need to price a product. When you know all the steps, you remember all of the costs related to those steps!

Control starts with control accounts

Control accounts are temporary holding places for costs. Managing costs has to start somewhere, and in accounting, that process most often starts out with control accounts.

Labor, materials, and indirect costs start off in control accounts. It may sound strange, but these accounts and their balances don't appear in the financial statements. That's because the balances are eventually moved to other accounts. All the checks you write for manufacturing costs are posted first to control accounts.

For many manufacturers and retailers, inventory is the biggest investment; more cash is spent on inventory than any other asset. Because of that, a big part of operating a profitable business is to control the costs of inventory.

Inventory is an asset you eventually sell to someone. (That's a little different, of course, from buildings and equipment.) For manufacturers, inventory has three components: *raw materials*, *work-in-process*, and *finished goods*, whereas retailers just have finished goods. Raw materials inventory is, broadly, products not yet started; work-in-progress inventory is partially completed products; and finished goods inventory is completed products.

The three kinds of inventory are assets, because you eventually sell the goods to a customer. When you do, the inventory asset becomes an expense — cost of goods sold. Managing inventory starts in a control account.

Table 4-3 lists control account titles for each component of inventory.

<i>Type of Costs</i>	<i>Control Account</i>
Materials	Materials control
Labor	Wages payable control
Indirect costs	Overhead control

- ✔ **Materials:** You buy materials (such as wood for making kitchen cabinets) in advance of making your products. *Materials control* is the term for the control account for material costs.
- ✔ **Labor:** Consider labor costs. Employees report the hours they work on *time cards* each week. Those cards list hours worked on various projects. For custom cabinets, the time cards list customer jobs that employees completed, and the hours worked. *Wages payable control* is the term for the control account for labor.
- ✔ **Indirect costs:** A business (such as the kitchen cabinet business) has indirect costs (for example, machine repair and maintenance). Your firm has some method to allocate those costs to clients (see “Budgeting for indirect costs”). However, you may not get to the allocation until after you write checks for the cost. *Overhead control* is the term for the control account for indirect costs.

Control accounts (materials, labor and overhead), work-in-process, and finished goods) are inventory accounts, which are assets. Cost of goods sold (COGS) is an expense account. When you make a sale to a customer, you “use up” the asset. The asset becomes an expense.

Explaining the debit and credit process

You increase and decrease account balances using *debits* and *credits*. Business owners need to know these terms because they can’t understand your accounting process without them.

Don’t be frustrated if you need to read this section a few times. I’ve taught the concept for years, and it requires some review before you fully understand it. Here are rules that never change:

- ✔ **Debits:** Always posted on the *left side* of an account
- ✔ **Credits:** Always posted on the *right side* of an account

All accounts are formatted like this:

Material Control

Debit Credit

In accounting, *debit* and *credit* don't mean the same things they do in common talk. Debit can refer to an increase or a decrease. It depends on what type of account you're working with. The same is true of a credit. Here are the rules for the purposes of this book:

Asset accounts:

Debits: Always *increase* the account balance. A big debit in the Cash account (an asset) is a good thing

Credits: Always *decrease* the account balance

Control accounts, work-in-process, and finished goods are all inventory accounts, making them asset accounts. Cost of goods sold is an expense account. Debiting increases all of these accounts. The balance for any of these accounts is equal to debit balance less credit balance.

Liability accounts:

Debits: Always *decrease* the account balance

Credits: Always *increase* the account balance

Income accounts:

Debits: Always *decrease* the account balance

Credits: Always *increase* the account balance

Expense accounts:

Debits: Always *increase* the account balance.

Credits: Always *decrease* the account balance



There's an accounting mantra: "What's the impact of this transaction on the general ledger?" Always ask. There are several answers, depending on what you're doing, but in time you will know them all. And it's not as though if something goes up something else goes down. For example, when you sell something, cash (an asset) gets a debit and goes up. On the other side of the transaction, income gets a credit and goes up.

Walking through a manufacturing cost example

Say you're the manager of Karl's Kustom Kitchen Cabinets. You order \$20,000 in lumber. You then take \$5,000 of the lumber and start making cabinets for a customer.

When you bought the lumber, cash (an asset) went down, but the material control account (as asset) went up. The material control account was increased (debited) when you bought the lumber.

The material control account balance decreases (credit) when you take \$5,000 in lumber to start using the material for a customer. Now how would your material control account look?

Material control account

<i>Debit</i>	<i>Credit</i>
\$20,000	
	\$5,000

If the month ends with no other activity, the ending material control balance is \$15,000 ($20,000 - \$5,000$).

But the \$5,000 didn't just vanish. When you put materials into production, you reduce (credit) the material control account and increase (debit) the work-in-process control account.

Work-in-process control account

<i>Debit</i>	<i>Credit</i>
\$5,000	

You reduce one asset (material control account) and increase another asset (work-in-process control account).

Now assume that the people on the shop floor finish some cabinets and move \$2,000 of the \$5,000 work-in-process to moved to finished goods.

Work-in-process control account

<i>Debit</i>	<i>Credit</i>
\$5,000	
	\$2,000

You reduce one asset (work-in-process control account) and increase another asset (finished good control account). If the month ends with no other activity, the ending balance is \$3,000 (\$5,000 – \$2,000).

Again, there's no disappearing money. The "other side" of the transaction hits the finished goods control account.

Finished goods control account

<i>Debit</i>	<i>Credit</i>
\$2,000	

So one more time, you reduce one asset (work-in-process control account) and increase another asset (finished goods control account).

At some point, you sell what you made. You've got \$2,000 in finished goods. Because you make custom cabinets, there's one customer. The finished goods control account shows this:

Finished Goods

<i>Debit</i>	<i>Credit</i>
\$2,000	
	\$2,000

You are almost home. When goods are sold, you reduce (credit) the finished goods account and increase (debit) cost of goods sold. And *that's* an expense account. At last!

Cost of Goods Sold

<i>Debit</i>	<i>Credit</i>
\$2,000	

The difference between your sale price and the cost of goods sold is your profit.

Why do you go with the flow? The reason you do this exercise is to fully track where your inventory money is. For custom cabinets, it can be a big deal, if you're building for, say, 20 customers at once. For off-the-shelf cabinets, it can be a very big deal. You might be delivering 2,000 cabinets per month.



The flow not only lets you see where the inventory money is, but also spot production logjams. Too much in the material control account suggest that you're overbuying or not producing. Too much in the work-in-process control account suggests that you're not producing. Too much in the finished goods control account suggests that you're not selling and you have "dead inventory."

Applying the methodology to other control accounts

Use the same flow process for labor and indirect costs. Labor costs accumulate in the control account until they're traced to a customer or product line. At that point, the cost moves to work-in-process. When the goods are completed, the costs move to finished goods. When goods are sold, the cost moves to cost of goods sold. The labor cost process mirrors the system for material costs listed above.

I define cost allocation in the "Budgeting for indirect costs" section. For example, you're recognizing depreciation expense and repair costs on vehicles. Those costs are in an overhead account. You plan a budgeted rate to apply indirect costs to products. As those costs are incurred, the overhead control account is increased (debited).

When you allocate indirect costs to a customer or product line, you reduce (credit) the overhead account and increase (debit) work-in-process control account. After that, the process is the same as with the other control accounts. Costs move from work-in-process to finished goods to cost of sales.

Chapter 5

More Activity, More Cost: Activity-Based Costing

In This Chapter

- ▶ Understanding peanut butter costing
 - ▶ Identifying more details in product costs
 - ▶ Learning how to implement an activity-based costing system
 - ▶ Improving decision-making with activity-based costing
 - ▶ Using activity-based costing to increase profits in the budgeting process
-

As a business owner or manager, you can always use more useful information — information that helps you make informed decisions.

Chapter 4 introduces two widely used costing methods: job costing and process costing. Now dig deeper for better information on costs. Pull apart your product or service, and find out more about the activities that create cost. The result is an activity-based costing system.

Activity-based costing (ABC) is a methodology that focuses on activities. When compared to other costing methodologies, it assigns indirect costs (overhead) more accurately. Because ABC uses more detail, your cost estimates become more precise. As a result, you price your products more effectively.

Avoiding the Slippery Peanut Butter Costing Slope

Activity-based costing is an effective costing system that focuses on activities. You incur costs when production and sales happen. When you take an order over the phone, manufacture a product, or place a box on a delivery truck, the activities generate costs. The *activity* becomes the focus to assign costs. Because you're connecting cost to the activity that creates the cost, your cost per product will be more accurate, and so will your pricing.

Despite the benefits of ABC costing, many business managers use *cost smoothing*, or *peanut butter costing*, instead, which spreads costs over a broad range of cost objects. When you spread peanut butter, you smooth it over the entire slice of bread. You don't pay much attention to how much cost is assigned to any particular part of the bread. Likewise, cost smoothing spreads the cost without paying too much attention to how much cost is assigned to any particular cost object. The trouble is, costs won't be assigned as accurately as they should be.



Cost allocation is the process of allocating indirect costs to products and services. The cost allocation base is the level of activity you use to assign costs. Maybe you use 1,000 machine hours or 200 labor hours. Also, keep in mind that direct costs are *traced* to products and services, not *allocated*. Stroll over to Chapter 4 for more.

To help you understand the benefits of ABC, you need to see the slippery slope of peanut butter costing. Here's the setup: Say you're a food distributor. You have five restaurant clients that order meat, fish, and poultry every day. You take orders, package them, and deliver the food to these businesses every day. Your restaurant clients have high expectations; they expect high-quality, fresh food to be delivered quickly so they can prepare their meals.

Your order manager handles the details of order processing. Her salary, benefits, and other costs total \$5,000 per month, and it's an indirect cost. The cost needs to be charged to the restaurant clients. You can't *trace* the cost of the order manager to your service. Instead, you need to *allocate* it.

The following sections explain how to allocate indirect costs using one type of activity. You'll see that using single indirect cost allocation can lead to errors in assigning costs.

Recognizing a single indirect cost allocation

A *single indirect cost allocation* uses one cost pool. (Chapter 4 defines cost pools.) The food distribution setup uses one pool of costs — order manager costs. With ABC, you end up dividing the costs of order management into more cost pools, and you're better off for it.

Everybody pretty much starts by creating a predetermined or budgeted overhead rate (described in Chapter 4). When you plan at the beginning of the year, using a single indirect cost pool, you come up with an overhead rate for the order manager's cost, such as the following:

$$\text{Annual budgeted indirect cost rate} = \text{cost} \div \text{orders}$$

$$\text{Annual budgeted indirect cost rate} = \$60,000 \div 1,250$$

$$\text{Annual budgeted indirect cost rate} = \$48 \text{ per order}$$

The order manager's cost of \$5,000 per month amounts to \$60,000 per year. The five restaurants order nearly every business day of the year. You figure that total orders will be 1,250 — 250 orders per year from five customers. (Isn't it great that in samples all customers order exactly the same number of times?)

The single indirect cost allocation spreads the cost (order manager) uniformly over the cost object (orders). That's \$48 dollars per order. This is an example of peanut butter costing, where all services receive the same or similar amounts of cost.

A fly in the peanut butter: Dealing with different levels of client activity

If some customers or activities eat up more costs than others, peanut butter costing isn't a true reflection of the costs. A customer or activity that demands more effort should get a larger cost allocation. So companies that use peanut butter costing miss the chance to allocate costs more precisely.

You no doubt know from experience that some customer orders are always smooth as glass. Other orders, from problem customers, always require your staff to jump through extra hoops.

For example, say you notice that your order manager is spending a lot of time with two customers in particular. The Steak Place and Riverside Fishery are making big demands.

It's typical for them to change their orders at the last minute at least once a week. When this happens, the order manager has to cancel the original invoice (the bill), make a new one, and email it. Then she also has to change the shipping instructions document; you don't want the wrong goods put on the truck and sent to the restaurant. So the order manager cancels the original shipping instructions and makes new instructions.

"It's really frustrating," the manager says. "Sometimes they call so late that I have to call the driver and tell him not to leave the dock. We unload the truck and start over." Well, no doubt you'd like to be known for your high level of customer service, but this is getting ridiculous.

There's another issue. When the invoice and shipping order change, the goods coming out of inventory also change. Your pickers are taking products off the shelf, putting them back, and then taking different products. These constant changes eventually lead to mistakes in inventory. A picker might move a product in or out and not record it in the accounting records.



And here's another point to consider: Your business supplies meat, fish, and poultry, items that aren't known for having a long shelf life. The excesses of The Steak Place and Riverside Fishery may leave you with bunches of spoiled products.

You decide to take another run at allocating the office-manager cost. "Why don't we track the time spent on each client? Let's try that for three months and see how your time shakes out. It sounds like we should assign more costs to the two customers you mentioned." You change the cost allocation from orders placed to time spent per customer.

After three months, you review the time spent per customer. Fortunately, you've been tracking time carefully, and you're using an excellent spreadsheet program.

The office manager works 24 days per month, 8 hours per day. Her total monthly hours are 192 hours (24 days \times 8 hours). Table 5-1 shows the breakdown.

Table 5-1 Order Manager — Monthly Hours Per Customer

<i>Restaurant Customer</i>	<i>Hours for Month</i>	<i>Percent of Total</i>
Apple Core Diner	30	15.6
Blue Lantern	30	15.6
Meadowbrook Grill	30	15.6
Riverside Fishery	56	29.2
The Steak Place	46	24.0
Total hours	192	100.0

Aha! The situation is just as the order manager told you, but now you have some metrics. Half the costing battle is measuring reality to confirm your instincts.

To summarize, with peanut butter costing, you spread the cost evenly. You assigned 20 percent of order-manager costs to each customer. Now you see that two customers account for more than 50 percent (!!!) of the order manager's effort. It's time to reallocate the cost.

Missing the mark: Undercosting and overcosting

If you use cost smoothing, it's likely that you will incur product undercosting or product overcosting.

- ✓ *Product undercosting* occurs when a product or service uses more resources (costs) than you assign.
- ✓ *Product overcosting* is the opposite. The product or service uses fewer resources (costs) than you assign.

If either of these costing errors occurs, the cost of the product won't be accurate, and your profit calculation will be incorrect.

Discussing product-cost cross-subsidization

Undercosting or overcosting creates *product-cost cross-subsidization*. Is that a mouthful, or what? Product-cost cross-subsidization means that if you undercost one product, you will overcost another. It's common sense and simple math. There's a fixed amount of cost to assign. If you're "over" in one product, you'll be "short" in the other. That situation throws off your cost and profit calculations.

Say you have two products, A and B. (Obviously, your marketing department needs to come up with better product names.) The total cost to be allocated is \$100. You allocate \$50 of costs to product A and \$50 to product B. If you've overcosted product A by \$10, you've allocated \$10 too much. That means you've undercosted product B by \$10. In other words, the actual costs should have been \$40 for product A and \$60 for product B.

You started with \$100 in your "bucket" of costs. When you allocated too much for product A, there was too little to allocate to product B.

Undercosting or overcosting direct costs is relatively easy to figure out and fix. How do you catch mistakes? You *trace* direct costs, so you can determine the exact cost of material used in production. Undercosting or overcosting of indirect costs is harder. *Allocating* indirect costs is less precise than *tracing* direct costs.

For example, it's a bit difficult to allocate utility costs in a factory. You can't do it easily, but you can do it. The cost accounting "secret" is to invest time investigating the activities that result in utility costs. For example, if one of the manufacturing machines runs twice as long as another, that activity is probably consuming twice as much electricity. The higher machine activity should result in twice as much utility expense.

Table 5-1 shows that investigation pays off. Two customers were chewing up over 50 percent of the order manager's effort by requiring more hours of her time. The investigation of the activity produced metrics, which form the basis of a better cost allocation plan.

For the tools and techniques, see the section "Designing an Activity-Based Costing System."

Underallocating or overallocating messes up pricing

Underallocating or overallocating costs impact your product price and your profit. If your product costs aren't accurate, you can't price your product correctly.

Say you overallocate costs for retailing a men's dress shirt. You think total shirt cost is \$31 in direct and indirect costs, and you'd like a \$10 profit per shirt. You therefore price your shirts at \$41.

But that may not be correct! If the true cost of the shirt is only \$30, \$1 is over-allocated. As a result, your profit is \$11 ($\$41 - \30).

Well, what's wrong with that? You'd rather make \$11 a shirt instead of \$10. Consider this: By pricing your product at a higher price, you may lose some sales. Most people have a *price point*, a maximum price that they're willing to pay based on the value they perceive. There's trouble ahead, because the apparel industry is highly price-driven.

If a lot of customers say to themselves, "The most I would pay for that shirt is \$40," you may lose sales at a \$41 price. Although you make another dollar per shirt at \$41, your sales may decline to the point where you make less total profit.

A bigger pricing problem may be when a product's cost is underallocated. Assume that you underallocate another men's dress shirt by \$5. You think the total cost is \$50. To make a \$10 profit per shirt, you set the sales price at \$60, so everything's fine, right? Wrong! If costs are allocated correctly, the real profit is \$5 ($\$60 - \55). Underallocation has resulted in a sales price that's too low, and that reduces profit.



There's no way you can make up this deficiency through volume sales. Usually, shirts selling for \$60 don't go flying off the display table.

Designing an Activity-Based Costing System

If your ABC system is well designed, you allocate costs more precisely. This section helps you carefully separate costs between direct costs and indirect costs. You also consider the specific activities that drive the indirect costs higher. Finally, the indirect costs are allocated to the activities that cause those costs to be incurred.

Refining your approach

ABC is a *refined costing system*, or a more specific way to assign costs to cost objects. The system avoids using big, generic categories, such as splitting a cost evenly between divisions. Instead, it allocates indirect costs to the activities that generate those costs. The result is likely to be more accurate costing and product pricing.

There are three tasks for the refined costing system:

- ✓ **Direct cost tracing:** Review your direct costs and categorize more costs as direct costs, if possible.
- ✓ **Cost pools:** Review cost pools and create more pools, if necessary.
- ✓ **Cost-allocation bases:** Decide on cost-allocation bases using cause-and-effect criteria.

Direct costs are traced to cost objects. As a result, the amount of cost is fairly easy to determine. For example, it's easy to determine the amount of leather used to make the leather handbags.

Cost pools should be *homogeneous*. Those are cost pools in which each of the costs has the same cost allocation base. The costs have a similar cause-and-effect relationship. Therefore, if you have more than one allocation base, you should have more than one cost pool.

A good example is a cost pool combining vehicle depreciation, repair and maintenance, and fuel costs. The costs all increase when your vehicles drive more miles. The cost allocation base should be mileage, and you simply allocate a dollar amount of indirect cost per mile driven.

Grouping costs using a cost hierarchy

A *cost hierarchy* groups costs into cost pools based on cost drivers or cost allocation bases. A cost hierarchy has levels, which explain how broadly you look at costs and activities.

Here are levels you might use in a cost hierarchy:

- ✔ **Unit-level costs** are cost activities performed on an individual unit, whether a product or service. If you make blue jeans, your unit is one pair of jeans. An individual tax return is a unit, if you prepare tax returns for clients.
- ✔ **Batch-level costs** are cost activities that generate costs at the batch level. For example, when an automobile plant changes from one car model to another, it's changing batches and incurring setup costs. The plant is "retooling," and that might include moving machinery, and certainly includes changing out the dies and reprogramming the welding robots.
- ✔ **Customer-level costs** are cost activities generated for one customer. If you're remodeling a kitchen, your labor costs, materials used, and overhead costs incurred for a specific customer are all customer-level costs. Customer-level costs may include multiple orders from the same client.
- ✔ **Product-sustaining costs** are cost activities that support a particular product or service line, regardless of the number of units produced. A product-sustaining cost extends the life of a product, and technology products are good examples. To stay relevant with customers, software companies come out with endless new versions of software. Extending a product's life is supposed to keep customers buying it. Design costs can be product-sustaining costs. To keep the technology product current, you change the design. You can allocate product-sustaining costs to a product or to an entire product line (sometime called a "product family" in high tech).
- ✔ **Facility-sustaining costs** are cost activities that support the overall company, such as legal and accounting activities. The rent, insurance, and maintenance on the company's building are facility-sustaining costs, because the building is essential to keeping the entire company running. The costs should be allocated over the entire company. Companies with multiple buildings sometimes cost allocate for each building to see if a building is too expensive to occupy.



If you use a fine-enough granularity, you can get really precise costing. On the other hand, too much granularity will make you crazy. The financial benefit of precise costing should be greater than the time and expense to track the cost information. The financial benefit is more accurate product costs and more exact profit calculations.

Testing your ABC design

The following example begins by separating direct and indirect costs. You also see descriptions of the activities that generate indirect costs. This example allocates indirect costs and calculates the full cost of the product.

For this example, assume you manage a company that makes and installs automobile windshields. You have a forward-looking product called a smart windshield, and it uses lasers, infrared sensors, and a camera to help drivers with vision problems drive well. You sell two products: sedan windshields and van windshields.

The company wants to implement activity-based costing for indirect costs. Ready, set, go!

Dealing with direct costs

You begin by sitting down with the production manager to get a handle on direct costs. You produce 1,500 windshields each year (750 for sedans and 750 for vans). You trace \$300 of direct materials per windshield and \$500 in direct labor per unit. Table 5-2 shows direct costs.

<i>Type of Cost</i>	<i>Units × Cost</i>	<i>Total</i>
Direct material	1,500 units × \$300	\$450,000 (\$225,000 per type)
Direct labor	1,500 units × \$500	\$750,000 (\$375,000 per type)

Diving into the cost pools

Next, you and the production manager list the indirect cost activities to manufacture and install windshields. Your goal is to pull apart the cost pools. In other words, you make sure that each cost pool is based on a specific activity. The more specific the cost pool, the more likely you're allocating costs to products correctly. Table 5-3 shows the indirect costs for producing and installing windshields.

Table 5-3 Indirect Cost Activities —
Windshield Production and Installation

<i>Activity</i>	<i>Description</i>
Molding setup	Install mold in machine to create a windshield
Machine operation	Run machine to convert material in mold to a windshield
Quality inspection	Review product for defects
Packaging and delivery	Pack windshield, load into truck for delivery to client
Installation	Install windshield at client location

You review to see if any of these costs are direct costs. That would be good, because it gets you out of the cost allocation business. It's better to have a direct cost *traced* to a product than an indirect cost *allocated* to a product.

Applying indirect costs using a cost allocation base

The next step is to link the indirect costs to the cost pools (the activities) using a cost allocation base. At the start, you agree that labor hours should be used to allocate indirect costs for each activity, except for machine operation. The machine cost will be allocated based on machine hours. Table 5-4 allocates each cost pool (activity) based on the total hours it takes to complete each activity. You perform this analysis for all products.

Table 5-4 Cost Allocation Rates

<i>Activity</i>	<i>Allocation Base</i>	<i>Total Cost</i>	<i>Total Hours</i>	<i>Allocation Rate/Hour</i>
Molding setup	Labor hours	\$20,000	150	\$133/hour
Machine operation	Machine hours	\$500,000	5,700	\$88/hour
Quality inspection	Labor hours	\$100,000	1,050	\$95/hour
Packaging and delivery	Labor hours	\$50,000	525	\$95/hour
Installation	Labor hours	\$30,000	900	\$33/hour

Allocate and celebrate: Assigning the cost allocation rates to the products

You have the allocation rate per hour (either machine hours or labor hours). Now decide how many hours to use to apply the rate. The goal is to tie the cost allocation to the activity as closely as possible.

Each product has a different mold. Your company changes the windshield being produced by changing the mold. Because of the sedan windshield's curve, it takes more labor hours to set up the sedan's mold.

It takes more machine hours to produce the van windshield, simply because the van windshield is bigger. The van's larger windshield also requires more time to inspect, package, and deliver.

Installation costs are the same for both products. Table 5-5 lists the cost allocation for each product and the percentage of the total hours for each activity.

<i>Activity</i>	<i>Allocation Rate/Hour</i>	<i>Sedan Cost and (Percent Hours)</i>	<i>Van Cost and (Percent Hours)</i>
Molding setup	\$133	\$13,333 (67)	\$6,667 (33)
Machine operation	\$88	\$236,842 (47)	\$263,158 (53)
Quality inspection	\$95	\$42,857 (43)	\$57,143 (57)
Packaging and delivery	\$95	\$21,429 (43)	\$28,571 (57)
Installation	\$33	\$15,000 (50)	\$15,000 (50)

At long last, you review the total product costs for sedan and van windshields (see Table 5-6).

<i>Type of Costs</i>	<i>Sedan (750 Units)</i>	<i>Van (750 Units)</i>	<i>Total (1,500 Units)</i>
Direct material	\$225,000	\$225,000	\$450,000
Direct labor	\$375,000	\$375,000	\$750,000
Molding setup	\$13,333	\$6,667	\$20,000
Machine operation	\$236,842	\$263,158	\$500,000
Quality inspection	\$42,857	\$57,143	\$100,000
Packaging and delivery	\$21,429	\$28,571	\$50,000
Installation	\$15,000	\$15,000	\$30,000
Total costs	\$929,461	\$970,539	\$1,900,000
Cost per windshield	\$1,239.28	\$1,294.05	

The cost per van windshield (\$1,294.05) is slightly higher than the cost per sedan windshield. The higher cost for vans makes sense. You can use the total costs in Table 5-4 and the percentages in Table 5-5 to assign costs. You get the same cost allocation that's calculated by using the rates per hour in Table 5-5. You need the cost allocation rates to easily assign costs to all of your production. That's why the rates per hour are important.

Take a look at indirect costs. Installation costs are evenly split, so disregard that cost pool. Consider the other indirect costs. Other than molding setup, all of the remaining indirect cost pools have a larger allocation to the van. That's reasonable, because the van windshield is bigger than the sedan windshield. It costs more to run it through a machine, to inspect it, and to package it.

Using Activity-Based Costing to Compute Total Cost, Profit, and Sale Price



The only constant is change. Demand for your product is probably always changing. Material costs may increase (seems like they rarely go down). Increased competition may force you to lower your prices to prevent sales from slipping. Luckily for you, activity-based costing is a tool to manage indirect cost allocations effectively as conditions change.

Take a look at the following example, which shows how cost allocation is used to compute total cost, profit, and a sale price.

Say you operate a lawn care business that provides two services: flower bed planting and care, and lawn planting and care.

You plan and price your work based on a 25-square-foot area. One unit for your business is 25 square feet, whether it's a lawn or flower bed. You refer to one unit as one customer yard. Table 5-7 shows a summary of the cost objects for the business.

In planning, you determine that your business will service 500 units in the upcoming year. Assume that the sales will be evenly split between the two services (250 yards each).

Table 5-7 Flower Bed and Lawn Care Costs

<i>Type of Costs</i>	<i>Flower Bed</i>	<i>Lawn Care</i>
Direct materials	Mulch and fertilizer	Sod, grass seed, and fertilizer
Direct labor	Clear area, plant, or install material	Clear area, plant, or install material
Estimator cost (indirect cost)	Flower bed inspection and analysis	Same as Flower Bed column
Transportation cost (indirect cost)	Depreciation, insurance for vehicles, and mileage	Same as Flower Bed column
Office cost (indirect cost)	Costs for dispatcher/accountant	Same as Flower Bed column

Allocating indirect costs evenly by product

Initially, you allocate indirect costs by splitting the indirect costs between the product types. Table 5-8 shows an even allocation of indirect costs. The direct costs are traced to each service you provide, either flower bed work or lawn care.

Table 5-8 Costs and Profit by Product — Flower Bed and Lawn Care

<i>Cost (250 Units of Each Product)</i>	<i>Flower Bed</i>	<i>Lawn Care</i>	<i>Total</i>
Direct material	\$25,000	\$30,000	\$55,000
Direct labor	\$37,500	\$25,000	\$62,500
Estimator cost (indirect cost)	\$15,000	\$15,000	\$30,000
Transportation cost (indirect cost)	\$7,500	\$7,500	\$15,000
Office cost (indirect cost)	\$12,500	\$12,500	\$25,000
Total costs	\$97,500	\$90,000	\$187,500
Add: Profit (10 percent of cost)	\$9,750	\$9,000	\$18,750
Total sales	\$107,250	\$99,000	\$206,250
Cost per unit (yard)	\$390	\$360	
Sale price per unit	\$429	\$396	

Estimator cost, transportation cost, and office cost are evenly split.

Now think about profit as a percentage of total costs. In Table 5-8, the flower bed profit calculation is \$9,750, or 10 percent of costs ($\$97,500 \times 0.10$). To compute your sale price for flower beds, add the total cost to profit. That's \$107,250. Finally, divide both the total cost and total sales by 250 yards. That provides cost per unit of \$390 and sale price per unit of \$429 for flower beds.

Analyzing and reallocating cost activities

A key point of activity-based costing is basing each cost pool on a specific activity. This puts you on the road to more accurate costing of your product. To learn more, you ask your staff in detail about their activities.

The estimator's job is to discuss each project with the client. She assesses the current condition of the yard, and the labor and materials needed for the project. Finally, she supervises the work until completion. You ask your estimator to track the amount of time she spends on each type of product. It's simple: She will post her time to a flower bed column or a lawn column on a spreadsheet.

After a few months, you find that the estimator spends 70 percent of her time on flower bed projects. "Flower beds take more time to discuss with the client," she says. "Most of time, there are already some flowers and other plants in the flower bed. The customer decides what to keep and what to throw out. Lawns are easier. There's not much to discuss, other than the current condition of the grass." From this, it's clear that you should assign 70 percent of the estimator's cost to the flower bed product.

At the same time, the estimator tracks mileage on the trucks and vehicles. "If you look at this map, you'll see that most of our flower bed work is in the wealthier area of town. That's farther from our office than most of the lawn work." She looks through her mileage log. "I calculated that 60 percent of our drive time and mileage is spent on flower bed work." Okay, more progress! It looks like you should allocate 60 percent of the transportation costs (vehicle depreciation, insurance, and fuel) to the flower bed product.

Your last stop is your office assistant's desk. "You know we get a lot of cancellations and rescheduled work for lawn care." He pauses for a minute. "I think because the work isn't complicated, and there are a lot of competitors, people don't take it as seriously. They change and cancel without much thought."

Well, a cancellation or rescheduling fee would reduce the problem, but that's a cost story for another day. For now, just consider the activities that generate office costs. The office assistant's cost (salary, office supplies, and computer) can be allocated based on his time. When a customer cancels or

reschedules, the office assistant spends time on the phone with customers, the estimator, and employees. In addition, the paperwork for the project has to be changed. After more analysis, the two of you decide that 60 percent of the office assistant cost should be allocated to lawn work.

Changing allocations to cost pools

You investigated indirect costs and made some changes. Table 5-9 shows the cost allocation changes to the three indirect cost pools. The direct costs didn't change, because they are *traced* directly, not *allocated*. Total costs are still \$187,500. That makes sense, because activity-based costing changes cost allocations, not cost totals. Costs change by product but not in total for the company. Sales are still \$206,250.

Because the per unit sale prices stay the same, the profit calculations changes. Profit for flower beds is now \$4,750 (\$107,250 – \$102,500). Profit for lawn care is now \$14,000 (\$99,000 – \$85,000).

Table 5-9 Activity-Based Costing by Product —
Flower Bed and Lawn Care

<i>Cost (250 Units of Each Product)</i>	<i>Flower Bed</i>	<i>Lawn Care</i>	<i>Total</i>
Direct material	\$25,000	\$30,000	\$55,000
Direct labor	\$37,500	\$25,000	\$62,500
Estimator cost (indirect cost)	\$21,000	\$9,000	\$30,000
Transportation cost (indirect cost)	\$9,000	\$6,000	\$15,000
Office cost (indirect cost)	\$10,000	\$15,000	\$25,000
Total costs	\$102,500	\$85,000	\$187,500
Profit (total sales less total costs)	\$4,750	\$14,000	\$18,750
Total sales	\$107,250	\$99,000	\$206,250
Cost per unit (yard)	\$410	\$340	
Sale price per unit	\$429	\$396	

In Table 5-9, the flower bed total cost increased by \$5,000 (from \$97,500 to \$102,500). As a result, profit for flower beds declined by \$5,000 (from \$9,750 to \$4,750). ABC had the opposite effect on the lawn care business. Lawn care costs went down by \$5,000 (from \$90,000 to \$85,000). Profit increased by \$5,000 (from \$9,000 to \$14,000).

Changing prices after ABC

You overcosted lawn care and undercosted flower beds. When you reallocate that from lawn care to flower beds, the change throws off your profit calculation!

You wanted a profit of 10 percent for each product, but flower beds are producing only a 4.6 percent profit ($\$4,750 \text{ profit} \div \$102,500 \text{ in sales}$). The lawn care profit produces a 16.5 percent profit ($\$14,000 \div \$85,000$). The profit and sales numbers are explained above.

Here's the problem: 4.6 percent may be too small a profit margin. You're spinning your wheels for a bunch of petunias.

Calculate the new sale price for flower beds, based on the ABC and a 10 percent profit. This is shown in Table 5-10.

<i>Cost (250 Units of Each Product)</i>	<i>Flower Beds</i>
Total costs in Table 5-9	\$102,500
Profit (10 percent of total cost)	\$10,250
Total sales	\$112,750
Cost per unit (yard)	\$410
Sale price per unit	\$451

The original price per unit for flower beds was \$429. The new flower bed unit price is now \$451, \$22 higher than before ($\$451 \text{ to } \429). To make a 10 percent profit, change the flower bed sale price to \$451 per unit.

At the old price, you weren't making your desired profit. Now you will. And *that's* the value of using ABC.

You could make up for the lower profit on flower beds by earning more on lawn care. But really, you should assess each product on its own and price each one to produce the correct profit.