



Estimating Breakeven Sales for Your Small Business

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The breakeven amount of sales for a business venture is the dollar amount of sales at which your business earns neither a profit nor a loss. Annual sales that exceed this breakeven point generate profit for the business. Annual sales that fall short of the breakeven point result in a loss. Estimating breakeven sales and conducting a sensitivity analysis relative to breakeven sales can help you answer questions such as:

- What is the minimum dollar volume of sales needed to cover costs?
- How low must variable costs be to break even, based on price and sales forecasts?
- How low must fixed costs be to break even?
- How sensitive is breakeven sales volume to changes in prices or costs?
- How do changes in price levels affect the breakeven sales volume?
- What dollar volume of sales is required to not only break even, but to also generate a desired profit amount?

Estimating breakeven sales for your business venture can help you set goals concerning the sales volume you will need to achieve to be profitable. The time you invest in doing a breakeven analysis can help you make better decisions about how to manage your new venture.

Audience: Owners and managers of a family business or other small business

Content: Presents a simple calculation for assessing the cost and revenue relationships in a venture

Outcome: Users will be able to conduct a breakeven analysis of their venture

Estimating Breakeven Sales

You can calculate breakeven sales using a relatively simple formula. To use it, you will need the information below about your operating costs. An example of a new small business, Sonora Winery is used to illustrate the computation.

- **Annual fixed cost:** the costs of being in business, also known as overhead. These costs don't vary with the level of output of the business and would be incurred if production were to cease. They include rent, insurance, depreciation, salaries, property taxes, and other costs that aren't directly associated with making or selling your product. Sonora Winery expects annual fixed costs of \$80,000.
- **Annual variable cost:** the amount it costs you to buy or create the product you sell. Variable costs include raw material costs, direct labor, sales commissions, freight costs, packaging, and energy costs (fuel, electricity, natural gas) associated with

producing the product. Sonora Winery expects annual variable costs of \$120,000.

- **Annual sales revenue:** the revenue you receive from sales of your product. When estimating this number, you will want to multiply the price actually charged to customers (so make sure you include discounts and special offers) by the number of units you expect to sell. If you have created a sales forecast as part of a projected cash flow or income statement, then use that number. Sonora Winery expects annual revenue of \$200,000.
- **Contribution margin:** the dollar amount by which annual sales revenue exceeds annual variable costs. This margin contributes to the payment of annual fixed costs and, if larger than fixed costs, to profit. Sonora Winery’s contribution margin is expected to be \$80,000.

Some expenses may not be easy to separate into their fixed and variable components because they contain elements of both. An example is Sonora Winery’s energy cost. A portion of the energy cost is attributable to heating office space, and the rest is attributable to producing their product, wine. Only the part associated with actually producing the wine should be considered in variable costs. Bills for heating and cooling the office will need to be paid as long as the business operates, regardless of how much wine is sold, and so are fixed costs.

The formula to calculate the breakeven annual sales is:

$$\text{Breakeven sales (\$)} = \frac{\text{Total annual fixed costs}}{\text{Contribution margin / Total sales}}$$

The formula in the denominator (below the line) is used to calculate the contribution margin ratio. This is the percentage of each sales dollar available to cover fixed costs and contribute to net income.

Sonora Winery anticipates fixed costs of \$80,000 per year, variable costs of \$120,000 per year, and sales revenue of \$200,000 per year. For Sonora Winery, the calculation would be:

$$\begin{aligned} \text{Breakeven sales (\$)} &= \$80,000 \div (\$80,000 \div \$200,000) \\ &= \$80,000 \div 0.40 \\ &= \$200,000 \end{aligned}$$

The contribution margin ratio of 0.40 indicates that 40% of every dollar of sales is available to pay fixed expenses. This \$.40 per dollar of sales *in excess* of breakeven sales is profit. With fixed expenses of \$80,000, the breakeven sales analysis shows that Sonora Winery won’t make any profits until it generates \$200,000 in gross revenue.

Mistakes are easy to make, and the breakeven point is important to your business planning. So it’s a good idea to check your calculations. To do this, compute the contribution margin based on sales of \$200,000 and variable costs of \$120,000. The breakeven point occurs at the dollar amount of sales that generates a contribution margin exactly equal to fixed costs. If the amount was computed correctly, the resulting contribution margin should be exactly equal to the \$80,000 amount of annual fixed costs. The calculation below for Sonora Winery indicates that the breakeven sales amount calculated above is correct.

	Sales	\$200,000
	minus Variable costs	\$120,000
		<hr/>
equals Contribution margin		\$80,000

To convert the breakeven sales number to the equivalent number of units sold at the breakeven point, divide breakeven sales by the average selling price per unit. If Sonora Winery sells each case of wine for an average of \$200, then they need to divide \$200,000 by \$200 to find out that they must sell 1,000 cases in order to break even.

Sensitivity Analysis

Once you have estimated the breakeven sales amount, you should use the breakeven sales computation to evaluate a variety of “what if” questions that will help you better understand the sensitivity of your new venture to changes in sales volume, prices, and costs. With sensitivity analysis, managers can look at the potential effects of undesirable outcomes like a shortfall in sales or an overrun on costs.

If Sonora Winery receives \$200 for each case of wine, then its breakeven unit sales are 1,000. If the owners of Sonora Winery estimated the total market demand for their product at 1,050 units, or cases of wine, then they should be concerned about having a breakeven of 1,000 cases of wine. At 1,050 cases of wine, fixed costs are still \$80,000, and variable costs will be

\$126,000 (variable costs per case of wine are \$120, and there are 50 additional cases). The contribution margin will be only \$4,000, which is hardly likely to be enough profit to sustain the business long term.

What if Sonora Winery’s owners have overestimated the number of cases of wine the business can sell, or what if the economy slows down unexpectedly after business start-up? Such a small margin for error may put the business’s ability to cash flow at risk. The \$4,000 difference between expected sales and breakeven sales indicates how much sales can decline before the business loses money and, as a result, is called the margin of safety.

If the owners of Sonora Winery would like to achieve a minimum net income to sales ratio of 15%, then sales of 1,250 cases of wine won’t even get them close to that goal. In fact, they will have to sell 1,600 cases at \$200 each to achieve that goal. The larger the contribution margin ratio, the less that sales will need to exceed breakeven in order to achieve a particular profit objective. If Sonora Winery could increase its contribution margin per unit, it could gain more profit from each case of wine sold.

Table 1 illustrates that increasing the quantity of product sold is not the only option for improving profitability. If Sonora Winery can manage to cut either variable costs or fixed costs, net income will increase because breakeven sales will decline. Sonora Winery can achieve an even greater effect on its net income by raising the price of the product by 25% (from \$200 per case to \$250 per case). While increasing the sales price of the product produces a benefit to net income, you should

realize that customers will at some point react negatively to higher prices by buying fewer units.

One way to improve the contribution margin is to cut variable costs. This scenario is illustrated in the second-to-last column in Table 1. Cutting variable costs by 25% increases the contribution margin ratio from 0.40 to 0.55 (\$110,000 ÷ \$200,000). This would reduce the breakeven sales level because more margin would be available from each unit sold. So fewer units would be required to cover fixed costs. Thus, if Sonora Winery could maintain sales at \$200,000, then \$30,000 more profit would result.

Adding a Profit Objective to Breakeven Sales

Sonora Winery may wish to target a particular profit level. For example, Sonora Winery’s capital investment in its business is \$500,000. The company wants to earn 10% return on the investment. In this case, the \$50,000 profit required to achieve the objective can be viewed as a fixed cost of doing business. The dollar amount of wine Sonora Winery will have to sell not only to break even, but to also produce the desired profit can be calculated using the following formula:

$$\text{Breakeven sales + profit (\$)} = \frac{\text{Total annual fixed cost + Profit objective}}{\text{Contribution margin / Total sales}}$$

Table 1. Sensitivity Analysis for Sonora Winery’s Breakeven Sales

	Breakeven	Sales Price 25% Higher	Unit Sales 25% Higher	Unit Sales 25% Lower	Variable Costs 25% Lower	Fixed Costs 25% Lower
1. Annual Sales	\$200,000	\$250,000	\$250,000	\$150,000	\$200,000	\$200,000
2. Unit Sales (1/sale price)	1,000	1,000	1,250	750	1,000	1,000
3. Variable Cost	\$120,000	\$120,000	\$150,000	\$90,000	\$90,000	\$120,000
4. Contribution Margin (1-3)	\$80,000	\$130,000	\$100,000	\$60,000	\$110,000	\$80,000
5. Fixed Cost	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	\$60,000
6. Net income or profit (4-5)	\$0	\$50,000	\$20,000	-\$20,000	\$30,000	\$20,000
7. Net Income/Sales (6/1)	0%	20%	8%	-13%	15%	10%

Again, the contribution margin ratio for Sonora Winery is 0.40 based on variable costs of \$120,000 and fixed costs of \$80,000. Doing the math indicates that Sonora Winery will have to sell 1,625 cases of wine at \$200 per case, which means total sales will have to be \$325,000 in order to not only break even but also to earn \$50,000 in net income.

Final Comment

Breakeven analysis is a useful tool for developing an understanding of the cost, volume, and profit relationships of a business. It provides some very useful information that will help new business owners make management decisions. It is useful in setting the sales price of your product relative to your profit goals and analyzing the effect of changes in business volume and costs.

However, a breakeven analysis is limited by the accuracy of the expense estimates you have. Also, when breakeven analysis suggests that expansion may be necessary or desirable, you should follow up the breakeven analysis with an investment analysis to evaluate whether to buy capital assets. You can find information on investment analysis tools in *Capital Investment Analysis and Project Assessment* (EC-731).

Resources

Effective Small Business Management: An Entrepreneurial Approach, Seventh edition. 2003. Norman Scarborough and Thomas Zimmerer. Prentice Hall.

Managerial Accounting: Creating Value in a Dynamic Business Environment, Sixth edition. 2005. Ronald W. Hilton. McGraw-Hill/Irwin.

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