

Breakeven Sales Volume

Product price can be based on the cost of producing the product. However, there is not a specific price level that you can charge that will assure that you will cover your costs. Because fixed costs need to be covered regardless of the number of units produced and sold, the number of units you produce and sell determines the price needed to break even. To do this you need to classify the costs into the managerial cost categories of variable and fixed costs.

One approach is to pick a sale price or a series of sale prices and compute how much of the product you will need to sell at each price to break even.

Breakeven sales volume is the amount of your product that you will need to produce and sell to cover total costs of production. This can be computed under a range of sale prices with the formula below.

$$\text{Breakeven Sales Volume} = \frac{\text{Total Fixed Cost}}{\text{Selling Price} - \text{Variable Cost per Unit}}$$

A key concept of this formula is the Contributions Margin. *Contributions Margin* is the “selling price less the variable costs per unit”, the denominator in the equation above. It is the amount of money that the sale of each unit will contribute to covering total fixed costs. The breakeven level is the number of units required to be produced and sold to generate enough contributions margin to cover fixed costs.

The example below helps explain the concept. Select a range of sale prices and compute the contribution margin for each price.

Sale Price		Variable Cost per Unit		Contributions Margin
\$7	less	\$5	equals	\$2
\$9	less	\$5	equals	\$4
\$10	less	\$5	equals	\$5
\$15	less	\$5	equals	\$10

Next, divide total fixed cost by each contribution margin to compute the breakeven sales quantity. Notice that the higher the price, the smaller the quantity you will need to sell to break even. However, at higher prices, the product will be more difficult to sell.

Total Fixed Cost		Contributions Margin		Breakeven Sales Quantity
\$100	divided by	\$2	equals	50 units
\$100	divided by	\$4	equals	25 units
\$100	divided by	\$5	equals	20 units
\$100	divided by	\$10	equals	10 units

To prove that the procedure is correct, go through the steps below. First determine gross income.

Sale Price		Sales Quantity		Gross Income	
\$7	multiplied by	50	equals	\$350	
\$9	multiplied by	25	equals	\$225	
\$10	multiplied by	20	equals	\$200	
\$15	multiplied by	10	equals	\$150	

Then determine total variable costs.

Variable Cost per Unit		Sales Quantity		Total Variable Cost	
\$5	multiplied by	50	equals	\$250	
\$5	multiplied by	25	equals	\$125	
\$5	multiplied by	20	equals	\$100	
\$5	multiplied by	10	equals	\$50	

Next compute the return over variable costs.

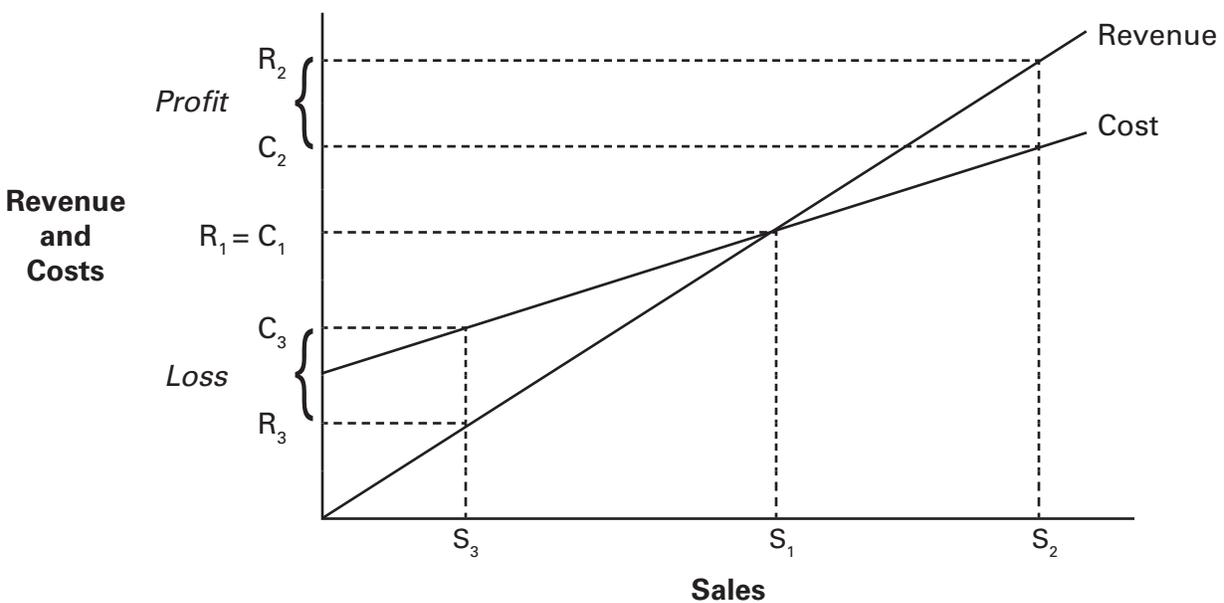
Gross Income		Total Variable Cost		Income Over Variable Cost	
\$350	less	\$250	equals	\$100	
\$225	less	\$125	equals	\$100	
\$200	less	\$100	equals	\$100	
\$150	less	\$50	equals	\$100	

Finally compute the return over all costs. As shown below, because we were computing breakeven price, the return over all costs is zero.

Income Over Variable Cost		Total Fixed Cost		Return Over All Costs	
\$100	less	\$100	equals	\$0	
\$100	less	\$100	equals	\$0	
\$100	less	\$100	equals	\$0	
\$100	less	\$100	equals	\$0	

A graphic representation is shown in Figure 1. The level of sales is on the horizontal axis. Revenue and costs are on the vertical axis. The revenue line shows the total revenue at each level of sales. The total cost line shows the total cost at each level of sales. The cost at zero sales represents the fixed cost. The level of cost over this amount is the variable cost at various levels of sales. The level of sales where the two lines cross (S_1) is the breakeven level of sales. At sales levels above this level (S_2), the amount by which the revenue line is above the cost line is profit. At sales levels below this level (S_3), the amount by which the cost line is above the revenue line is loss.

Figure 1. Breakeven sales volume



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