

Sales Mix Break-even Point Calculation

Sales mix is the proportion in which two or more products are sold. For the calculation of break-even point for sales mix, following assumptions are made in addition to those already made for CVP analysis:

1. The proportion of sales mix must be predetermined. In other words, the proportion of each product in a sales mix is fixed
2. The sales mix must not change within the relevant time period.

The calculation method for the break-even point of sales mix is based on the contribution approach method. Since we have multiple products in sales mix therefore it is most likely that we will be dealing with products with different contribution margin per unit and contribution margin ratios. This problem is overcome by calculating weighted average contribution margin per unit and contribution margin ratio. These are then used to calculate the break-even point for sales mix.

The calculation procedure and the formulas are discussed via following example:

Example: Formulas and Calculation Procedure

Following information is related to sales mix of product A, B and C.

Product	A	B	C
Sales Price per Unit	\$15	\$21	\$36
Variable Cost per Unit	\$9	\$14	\$19
Sales Mix Percentage	20%	20%	60%
Total Fixed Cost	\$40,000		

Calculate the break-even point in units and in dollars.

Calculation

Step 1: Calculate the contribution margin per unit for each product:

Product	A	B	C
Sales Price per Unit	\$15	\$21	\$36
– Variable Cost per Unit	\$9	\$14	\$19
Contribution Margin per Unit	\$6	\$7	\$17

Step 2: Calculate the weighted-average contribution margin per unit for the sales mix using the following formula:

$$\begin{aligned}
 &\text{Product A CM per Unit} \times \text{Product A Sales Mix Percentage} \\
 &+ \text{Product B CM per Unit} \times \text{Product B Sales Mix Percentage} \\
 &+ \text{Product C CM per Unit} \times \text{Product C Sales Mix Percentage} \\
 &= \text{Weighted Average Unit Contribution Margin}
 \end{aligned}$$

Product	A	B	C
Sales Price per Unit	\$15	\$21	\$36
– Variable Cost per Unit	\$9	\$14	\$19
Contribution Margin per Unit	\$6	\$7	\$17
× Sales Mix Percentage	20%	20%	60%
	\$1.2	\$1.4	\$10.2
Sum: Weighted Average CM per Unit	\$12.80		

Step 3: Calculate total units of sales mix required to break-even using the formula:

Break-even Point in Units of Sales Mix = Total Fixed Cost ÷ Weighted Average CM per Unit

Total Fixed Cost	\$40,000
÷ Weighted Average CM per Unit	\$12.80
Break-even Point in Units of Sales Mix	3,125 units

Step 4: Calculate number units of product A, B and C at break-even point:

Product	A	B	C
Sales Mix Ratio	20%	20%	60%
× Total Break-even Units	3,125	3,125	3,125
Product Units at Break-even Point	625	625	1,875

Step 5: Calculate Break-even Point in dollars as follows:

Product	A	B	C
Product Units at Break-even Point	625	625	1,875
× Price per Unit	\$15	\$21	\$36
Product Sales in Dollars	\$9,375	\$13,125	\$67,500
Sum: Break-even Point in Dollars	\$90,000		

Sales Mix Target income Calculation

Calculate in units the number of target sales for each product.

$$\text{Target Sales}_{\text{in Units}} = \frac{\text{Fixed Costs} + \text{Target Profit}}{\text{Weighted Average Contribution Margin}} \times \text{Percentage of Sales Mix}$$

The dollar amount of target sales for a specific product can be calculated by multiplying the number of units by the sales price.

Calculation Example

As the first step, we should calculate the contribution margin per unit for all products.

$$\text{Contribution Margin per Unit}_{\text{Jeans}} = \$95 - \$55 = \$40$$

$$\text{Contribution Margin per Unit}_{\text{T-Shirts}} = \$45 - \$35 = \$10$$

$$\text{Contribution Margin per Unit}_{\text{Sweaters}} = \$90 - \$60 = \$30$$

The second step is to determine the weighted average contribution margin.

$$\text{Weighted Average Contribution Margin} = \$40 \times 0.40 + \$10 \times 0.20 + \$30 \times 0.40 = \$30$$

Finally, we need to calculate target sales in units for all products.

$$\text{Target Sales in Units}_{\text{Jeans}} = (\$600,000 + \$450,000) \div \$30 \times 0.40 = 14,000 \text{ Units}$$

$$\text{Target Sales in Units}_{\text{T-Shirts}} = (\$600,000 + \$450,000) \div \$30 \times 0.40 = 7,000 \text{ Units}$$

$$\text{Target Sales in Units}_{\text{Sweaters}} = (\$600,000 + \$450,000) \div \$30 \times 0.40 = 14,000 \text{ Units}$$

LWD Fashion LLC has to sell 14,000 pairs of jeans, 7,000 T-shirts, and 14,000 sweaters. To determine the dollar amount of target sales, we can simply multiply the number of units by the sales price per unit.

$$\text{Target Sales in Dollars}_{\text{Jeans}} = 14,000 \times \$95 = \$1,330,000$$

$$\text{Target Sales in Dollars}_{\text{T-Shirts}} = 7,000 \times \$45 = \$315,000$$

$$\text{Target Sales in Dollars}_{\text{Sweaters}} = 14,000 \times \$90 = \$1,260,000$$

$$\text{Total Target Sales} = \$1,330,000 + \$315,000 + \$1,260,000 = \$2,905,000$$