

Chapter 8

COST VOLUME PROFIT ANALYSIS

1. Introduction

Cost-volume-profit analysis considers how costs and profits change with changes in the volume or level of activity.

2. Breakeven

Breakeven is the level of activity which gives rise to zero profit. Since profit is the difference between total contribution and fixed costs, breakeven is where the total contribution equals total fixed costs.

$$\text{Breakeven volume} = \frac{\text{Fixed costs}}{\text{Contribution per unit}}$$

Example 1

Product X has variable costs of \$2 per unit, and selling price of \$6 per unit.

The fixed costs are \$1,000 per year

- If budgeted sales and production are 300 units, what is the budgeted profit (or loss) for the year?
- What is the breakeven point (in units)?
- What is the breakeven revenue?
- How many units need to be sold to achieve a target profit of \$300 per year?

3. Margin of safety

The Margin of Safety measures the %'age fall in budgeted sales that can be allowed before breakeven is reached.

$$\text{Margin of safety} = \frac{\text{Budgeted sales} - \text{breakeven}}{\text{Budgeted sales}} \times 100\%$$

It is useful in identifying how big a problem any inaccuracy in the budgeted sales is likely to be.

Example 2

Calculate the margin of safety for example 1



4. Contribution to sales ratio

The contribution to sales ratio (or C/S ratio) is calculated as follows:

$$\text{C/S ratio} = \frac{\text{Contribution in \$}}{\text{Sales in \$}}$$

Since the contribution and the sales revenue both vary linearly with the volume, the C/S ratio will remain constant.

[Note: the C/S ratio is sometimes called the profit to volume (or P/V ratio)].

Example 3

Calculate the C/S ratio for example 1

What sales revenue is needed to generate a target profit of \$320?

5. Breakeven chart

The breakeven chart plots total costs and total revenues at different levels of volume, and shows the activity level at which breakeven is achieved.

Example 4

Draw a breakeven chart for example 1



6. Profit-volume chart

The profit volume chart shows the net profit or loss at any level of activity

Example 5

Draw a profit-volume chart for example 1



7. Multi-product CVP analysis

In practice a company is likely to make several products, each with different CS ratios.

They are still likely to be interested in the break-even sales revenue (in order to cover the fixed overheads), but the existence of several products makes it less certain and all we can really do is calculate breakeven on the assumption that the mix of products remains as per the budgeted mix – even if total sales are lower.

However, as will be illustrated in the following example, the company could reach the breakeven position sooner if it were to sell the product with the highest CS ratio first.



Example 6

A company produces and sells three products: C, V and P.

The budget information for the coming year is as follows:

	C	V	P
Sales (units)	4,800	4,800	12,000
Selling price (p.u.)	\$5	\$6	\$7
Variable cost (p.u.)	\$3.75	\$5.25	\$4.35
Contribution (p.u.)	\$1.25	\$0.75	\$2.65

The total budgeted fixed overheads for the year are \$8,000

- (a) Calculate the CS ratio for each product individually
- (b) Calculate the average CS ratio (assuming that the budget mix of production remains unchanged)
- (c) Calculate the breakeven revenue (assuming that the budget mix of production remains unchanged)
- (d) Construct a PV chart (assuming that the budget mix of production remains unchanged)

Assuming that the products are produced in order of their CS ratios, construct a table showing the cumulative revenue and cumulative profits

Calculate the breakeven sales revenue on this basis

Add the information to the P/V chart already produced for Example 6

8. Limitations of CVP analysis

- The selling price per unit is assumed to remain constant at all levels of activity
- The variable cost per unit is assumed to remain constant at all levels of activity
- It is assumed that the total fixed costs remain constant
- It is assumed that the level of production is equal to the level of sales (i.e. that there are no changes in the levels of inventory)

When you finished this chapter you should attempt the online F5 MCQ Test

