

Marginal Costing

CA ROOPA KAMATH N

What we learn.....

- ✓ Meaning, Importance and technique of Marginal costing
- ✓ Treatment of costs
- ✓ Decision making factors and indicators
- ✓ How does it vary from other techniques

Meaning, Importance and technique

- Ascertainment of Marginal (VARIABLE) cost
- Effects on Profit with changes in the output.
- Providing information to the management
- assistance in **decision making**
- 'VARIBALE' 'OUT OF POCKET' Costing
- Analysis of cost into '**Variable**' and '**Fixed cost**'.

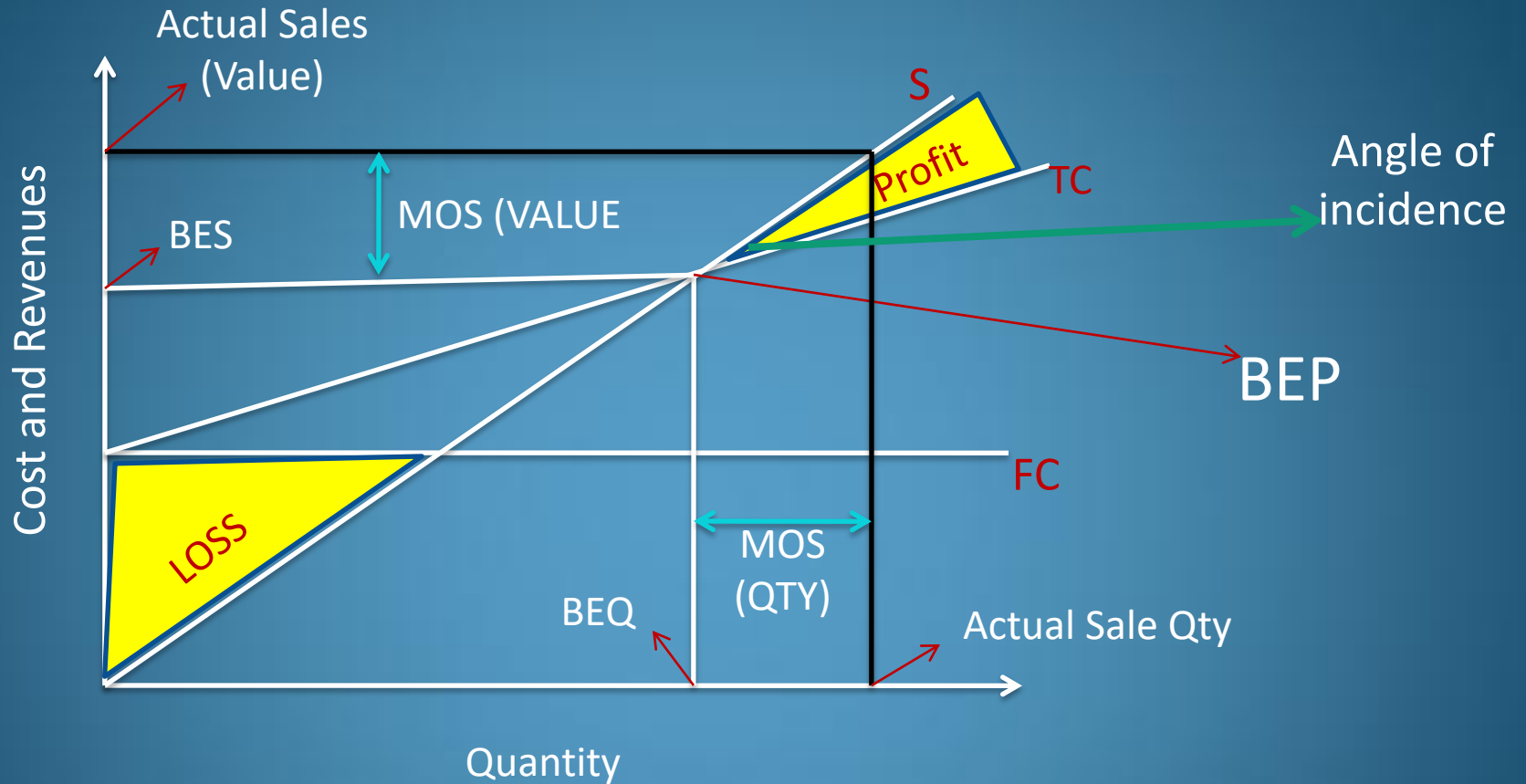
Decision making indicators

- Profit Volume Ratio (PV Ratio)
- Break even point (BEP)
- Margin of Safety (MOS)
- Indifference point
- Shut down point

Indicators - Detail

- **Profit Volume ratio** : establishes the relationship between **Profit** and **sales** with the help of variable cost
 - P V Ratio = $(\text{Contribution} / \text{Sales}) \times 100$
 - Contribution = Sales – Variable cost
 - = Change in Contribution/Change in sales
 - = Change in profit/change in sales
 - **Balance = Variable cost Ratio**

BREAK EVEN CHART



Problem Solving

- $\text{BE Point(Sales)} = \text{FC/PV Ratio}$
- $\text{BE Point(Qty)} = \text{FC/Contr p.u}$
- $\text{Margin of Safety (MOS)} = \text{Total Sales} - \text{BESales}$
 $= \text{Profit/ PV Ratio}$
- $\text{MOS (Qty)} = \text{Total Sales(Qty)} - \text{BEP(Qty)}$
 $= \text{Profit/ Contr. P.u}$

Sales Level for desired Profit =

$\text{FC} + \text{Profit/PV Ratio}$

Marginal Cost Sheet

| | | |
|---------------------------------|---------------------|-------------|
| Sales Value | | XXXX |
| Less : Variable cost | | |
| Direct Material, Direct Labour, | | |
| Variable FOH, AOD, S& D OH | | <u>XXXX</u> |
| | CONTRIBUTION | <u>XXXX</u> |
| Less : Fixed Cost | | <u>XXXX</u> |
| | PROFIT | XXXX |

Indifference Point, Shut down Point

The level of sales where total costs and profits of two levels are EQUAL = Indifference Point
= Difference in FC/Diff in VC Ratio or PV ratio

Level of operations below which it is not justifiable to pursue production = Shut down point
= Avoidable FC/PV Ratio or Contr p.u

ILLUSTRATION

Q A company is producing a single article and sells at Rs. 30/- each. The Marginal cost of production is Rs. 24/- each and fixed cost are Rs. 11,000/ per quarter. Find out

1. Profit Volume Ratio
2. Break even sales in value and volume
3. Sales required to earn a profit of Rs. 15,000
4. Profit at sales of R. 5,00,000
5. Margin of safety for (3) and (4) above

A We know, PV ratio = Contribution/Sales or
= Contrb p.u./Selling P.u

In the given problem, they have given us Selling price p.u and Marginal cost p.u.

Contrb p.u = Selling price p.u – Marginal cost p.u
= 30 – 24 = 6

Now $PV \text{ Ratio} = (6/30) * 100 = 20\%$

- In order to Calculate Break even Sales : Value and volume we know

BEP (Sales) = Fixed cost/PV Ratio

$$= 44,000/.20 = \text{Rs. } 2,20,000$$

Fixed Cost = 11000 per quarter i.e for whole year (11000*4) = **44,000**

- BEP (Volume/Qty) = Fixed cost/Contrb p.u

$$= 44,000/6 = 7,333 \text{ Units}$$

➤ In order to find out the desired sales revenue so that a profit of Rs. 15,000 can be earned

= (Fixed cost + Desired profit) / P/V Ratio

= (44,000 + 15,000) / .20 = **Rs. 2,95,000**

If you are asked to find Sales Volume (Qty) : can be found out either by dividing the Sales revenue by Selling price (2,95,000/30 = 9833 units) or using the above formula i.e $(FC+P)/\text{Contrib p.u}$
 $= (44,000+15000)/6 = 9833 \text{ units}$

➤ Profit at Sales of Rs. 5,00,000.

We know PV Ratio = 20% hence

contribution = $5,00,000 \times .20 = 1,00,000$

Fixed Cost = 44,000

PROFIT = 56,000 (Contr – FC)

Margin of Safety = Actual Sales – Break even sales

➤ MOS (Value)

when Sales Rs. 2,95,000 = $2,95,000 - 2,20,000 = 75,000$

➤ MOS (Value)

When Sales Rs. 5,00,000 = $5,00,000 - 2,20,000 = 2,80,000$

Q A company gives you the following information for a financial year. You are required to find out :

1. P V Ratio
2. Fixed cost
3. Profit or loss where sales are Rs. 8,20,000
4. Sales required to earn a profit of 2,80,000

| | First 6 months | Later 6 months |
|---------------|----------------|----------------|
| Sales | 12,20,000 | 15,40,000 |
| Profit earned | 62,400 | 1,58,400 |

⚠ In this problem in order to find out P V Ratio no information of Variable cost is give, instead comparison for two periods are given, hence

➤ **PV Ratio = Change in Profit/Change in Sales**

$$= \frac{(1,58,400 - 62,400)}{(15,40,000 - 12,20,000)}$$

$$= \boxed{0.3 \text{ or } 30 \%}$$

➤ **Fixed cost = Contribution – Profit**

$$= (15,40,000 * .30) - 1,58,400$$

$$= \boxed{\text{Rs. } 3,03,600}$$

Fixed cost remains fixed for the two level of activity.

➤ Profit or Loss at Sales of Rs. 8,20,000

Contribution = $(8,20,000 \times .30) = 2,46,000$

Less : Fixed cost = 3,03,600

LOSS = (57,600)

➤ Sales required to earn Profit of Rs. 2,80,000

= $(FC + P) / PV \text{ ratio}$

= $(3,03,600 + 2,80,000) / .30$

= **19,45,333 ~ 19,45,000**

Q The following budget estimates are given to you for a financial year - Find

1. PV Ratio, BEP and MOS
2. Calculate the revised PV Ratio, BE and MOS if
 - a) Selling price is decreased by 10%
 - b) Variable cost increases by 10%
 - c) Sales volume increases by 2000 units
 - d) Fixed cost increases by 6,000

| | |
|----------------|--------------|
| Sales (Units) | 15,000 |
| Fixed Expenses | Rs. 34,000 |
| Sales Value | Rs, 1,50,000 |
| Variable costs | Rs. 6 p.u |

➤ **PV Ratio** = Contribution/Sales

Contribution : Sale Value = 1,50,000

Less : Variable Cost (15,000 units*6 p.u) = 90,000

Contribution = 60,000

PV Ratio = 60,000/ 1,50,000 = **40%**

➤ **BEP** = FC/PV Ratio = 34,000/.40 = **Rs. 85,000**

➤ **MOS** = Act Sales – BE Sales = 1,50,000 – 85,000
= **Rs. 65,000**

| | Selling Price decrease by 10% | | Variable Cost increases by 10% |
|----------------------------------|----------------------------------------------------------|----------------------------------|----------------------------------------------------------|
| Current Selling Price | $1,50,000/15000 =$ Rs. 10.p.u | Revised Variable cost | $= 6*.10 = 6.60$ p.u |
| Revised Selling price | $10*.10 = 9$ p.u | Revised Contribution | $10 - 6.6 = 3.4$ p.u |
| Revised contribution p.u | $9 - 6 = 3$ | Revised P V Ratio | $= 3.4 /10 = 34\%$ |
| Revised P V Ratio | $(3/9)* 100 = 33.33\%$ | BE Q | $=34,000/3.4$ $= 10000$ units |
| BEQ | $=34,000/3$ $= 11,333$ units | BE Sales | $=10,000 * 10$ $= 1,00,000$ |
| BE sales | $=11,333 * 9$ $= 1,02,000$ | MOS & MOS (Value) | $= 15,000 - 10000 =$ $5,000$ units * 10 = $50,000$ |
| MOS & MOS (Value) | $= 15,000 - 11,333 =$ 3667 units * 9 = Rs.33,003 | | |

| | Increase in Sales volume by 2,000 units | | Increase of Rs. 6,000 in Fixed costs |
|---------------------|-----------------------------------------|--------------------|--------------------------------------|
| Revised Sales units | $15,000 + 2,000 = 17,000$ units | Revised P V Ratio | $= 4/.10 = 40\%$ |
| Revised P V Ratio | $= 4/10 = 40\%$ | Revised Fixed Cost | $= 34,000 + 6,000 = 40,000$ |
| BEQ | $34,000 / 4 = 8,500$ units | BEQ | $= 40,000 / 4 = 10,000$ units |
| BESales | $= 8,500 * 10 = 85,000$ | BESales | $= 10,000 * 10 = 1,00,000$ |
| MOS (Q) | $17,000 - 8,500 = 8,500$ units | MOS(Q) | $= 15,000 - 10,000 = 5,000$ |
| MOS (Value) | $= 8,500 * 10 = 85,000$ | MOS (V) | $= 5,000 * 10 = 50,000$ |

Q A company has fixed cost of Rs.1,30,000, Sales Rs. 4,50,000 and Profit of Rs. 50,000. Required:

- (i) Sales volume if in the next period, the company suffered a loss of Rs.15,000.
- (ii) What is the margin of safety for a profit of Rs.70,000?

A In order to find the sales volume - from the data given first we need to find the **P V ratio**. In order to find the PV ratio we **need contribution**. In the problem **sales, fixed cost and Profit figures** are given so contribution can be calculated as follows:

| | | |
|----------------------|-------------------|---------------------------------|
| Sales | = 4,50,000 | therefore Contribution |
| Less: Profit | = 50,000 | Sales = 4,50,000 |
| COGS | = 4,00,000 | Less : Variable cost = 2,70,000 |
| Less Fixed cost | = 1,30,000 | CONTRIBUTION = 1,80,000 |
| VARIABLE COST | = 2,70,000 | |

P V Ratio = 1,80,000 / 4,50,000 = 40%

➤ **Desired Sales = 1,30,000 – 15000 (Loss) / .40**
= Rs. 2,87,500

➤ MOS for a profit of Rs. 70,000

Desired Sale at Profit of 70,000

$$= (1,30,000 + 70,000)/.40$$

$$= 5,00,000$$

Break even sales = $1,30,000/.40 = 3,25,000$

Therefore MOS = $5,00,000 - 3,25,000$

$$= 1,75,000$$

Alternatively, MOS = Profit/PV Ratio

$$= 70,000/.40$$

$$= 1,75,000$$

Q The ratio of variable cost to sales is 60%. The break-even point occurs at 80% of the capacity sales.

- (i) Find the capacity sales when fixed costs are 1,60,000
- (ii) Compute profit at 80% of the capacity sales.
- (iii) Find profit if sales is Rs.5,70,000 and fixed cost remain same as above.
- (iv) Find sales, if desired profit is Rs.44,000, and fixed cost is Rs.1,42,000.

➤ Given, Ratio of variable cost to sales = 60%

This means **P V Ratio = 40%**

➤ BE Sales : when FC = 1,60,000

$$= 1,60,000 / .40 = \text{Rs. } 4,00,000$$

✓ We know **BEP occurs at 80%** capacity sales

Therefore, if 80% sales = 4,00,000

$$100\% = \quad ?$$

Therefore Sales when FC 1,60,000 = **5,00,000**

➤ Profit at 80% capacity sales

It is already given that BEP occurs at 80% capacity sales. Hence Profit at 80% capacity sales will **be NIL**. As at the BEP Costs = Revenue

➤ Profit for sales of 5,70,000 and FC = 1,60,000

Variable cost (60% of 5,70,000) = 3,42,000

Fixed Cost = 1,60,000

Total Cost = 5,02,000

Sales = 5,70,000

PROFIT = 68,000

➤ Sales, if desired profit is Rs. 44,000, and fixed cost is Rs. 1,42,000

Desired Sales = (FC + P)/PV Ratio

$$= (1,42,000 + 44,000) / .40$$

$$= \text{Rs. } 4,65,000$$

Note : PV Ratio does not change with the change in the FC or sales value.

Q If margin of safety is Rs 2, 40,000 (40% of sales) and P/V ratio is 30% of Gupta Ltd, calculate its

(1) Break even sales, and

(2) Amount of profit on sales of ` 9,00,000.

➤ **Margin of safety** = Total sales – Besales

Given MOS = 2,40,000 which is 40% of sales

Therefore, Total Sales (100%) = ?

TOTAL Sales = Rs. 6,00,000

Therefore **BES** = Total Sales – MOS

= 6,00,000 – 2,40,000

= Rs. 3,60,000

➤ Amount of profit on sales of ` 9,00,000.

Given PV Ratio = 30%

P V Ratio = (Contribution/Sales) * 100

there for Contribution = Sales * PV Ratio

$$= 6,00,000 * .30$$

$$= 1,80,000$$

We have already found that BE Sales = 3,60,000

Therefore BE Sales = FC/PV Ratio

$$FC = 1,08,000$$

Now, Desired Sales = (FC + Profit)/PV Ratio

$$9,00,000 = (1,08,000 + P) / .30$$

$$Profit = 1,62,000$$

Q A company has fixed cost Rs. 1,00,000 and Sales 2,50,000 with Profits at 60,000

1. Calculate the MO Safety for Profit of Rs. 1,00,000
2. Also find the sales volume if in the subsequent period the company is expected to suffer a loss of 30,000

➤ **MOS** = Total Sales – Break even Sales

BE Sales = FC/PV Ratio

PV Ratio = $1,60,000/2,50,000 = 64\%$

BE Sales = $1,00,000/.64 = \text{Rs. } 1,56,250$

Total Sales = $(1,00,000+1,00,000)/.64 = \text{Rs. } 3,12,500$

MOS = $3,12,500 - 1,56,250 = 1,56,250$

$$\begin{aligned}\text{Contribution} &= \text{Profit} + \text{FC} \\ &= 60,000 + 1,00,000 \\ &= 1,60,000\end{aligned}$$

➤ Sales volume if in the subsequent period the company is expected to suffer a loss of 30,000

$$\begin{aligned}\text{Sales} &= (\text{FC} + \text{Profit}) / \text{PV Ratio} \\ &= (1,00,000 - 30,000) / .64 \\ &= \text{Rs. } 1,09,375\end{aligned}$$

Q Product P has a PV ratio of 25%. Fixed Operating costs directly attributable to product P during the quarter 1 of the financial year is Rs, 2,50,000. Calculate the sales required to earn a quarterly profit of Rs. 80,000.

➤
$$\text{Sales} = (2,50,000 + 80,000) / .25$$
$$= 13,20,000$$