
Unit 7 □ Marginal Costing : Conceptual Aspects

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7.1 Introduction

Marginal costing has been defined earlier. Under this method of costing only variable costs are charged to cost units i.e., these are deducted from the revenues earned by selling the product. It thus leaves an amount known as *contribution*. A *contribution pool* is created by aggregating the product contributions. The fixed costs attributable to the *period concerned* (since it is not identifiable to the products) are then written off against this combined contribution pool; the residue, if any, is considered to be the profit.

7.2 Concepts of Marginal Cost and Marginal Costing

Marginal Cost : Marginal cost is the change (increase or decrease) in the total cost consequent to a unit change (increase or decrease) in the volume of production. This is the economists' interpretation of marginal cost. According to the accountants, marginal cost is the variable cost for one unit of a product or service. The two views

are essentially the same. Because it is nothing but the variable cost that accounts for the change in the aggregate cost for a unit change in the volume of production. Within a given range of production (as may be set by the installed production capacity) fixed cost remains constant despite changes in the volume of production. Hence, in the short run during which production capacity (created by fixed costs) is not likely to undergo a change, fixed costs are not therefore considered relevant in decision making; only the variable or marginal costs are relevant.

Marginal Costing : Marginal costing is the technique of ascertaining marginal cost by differentiating between fixed and variable costs; it also studies the effect of changes in the volume and type of product on profit. As stated earlier, only the variable costs are traceable to the product and are, therefore, considered as *Product Costs*. The fixed costs incurred for providing production infrastructure based on policy decision are traceable to the period of production, not to the product directly, are thus known as *Period Costs*. Such fixed costs are periodically charged to periodical (annual) Costing Profit & Loss Account. Variable costs are also included in cost of sales in the Costing Profit & Loss Account.

7.3 Semi-variable Costs

Though only fixed and variable costs are recognized, in practice we may very often come across some costs which are neither 'fixed' nor 'variable'. These are rather partly fixed and partly variable and are known as 'semi-variable' costs. Variation in the amount of these costs (consequent to the changes in the volume of production) is not in proportion to the changes in the volume of production. In effect, each item of these costs contains both the fixed and the variable components. Examples of such costs may include Depreciation, Repairs and Maintenance, Supervision cost. Telephone charges. Electricity charges (when consumption exceeds a particular slab), etc.

7.4 Segregation of Semi-variable Costs

Since marginal costing technique considers only the variable costs as the product costs and since semi-variable costs contain variable components in them, identification of the variable portion (consequently of the fixed portion also) in the semi-variable costs becomes necessary. If this variable portion is not identified and not included in the product cost, the determination of the product cost under marginal costing technique will be vitiated. Accurate product cost determination depends on accurate segregation of semi-variable costs into fixed and variable components. So, we have to deal with different methods of segregation of semi-variable costs.

7.5 Methods of Segregation

There are a number of different methods for segregating semi-variable costs into Fixed and variable components. The major ones are :

- i) Comparison method,
- ii) Range or High and Low Points method,
- iii) Simultaneous Equation method,
- iv) Least Square method,
- v) Averaging method,
- vi) Graphical method,

The major methods are discussed below in brief.

i) Comparison method

Under this method, a comparison of past semi-variable costs either of two periods or of two levels of activities is made. The difference between those two semi-variable costs is attributed to the corresponding variation in the output. So, variable cost per unit can then be easily computed by the following formula :

$$\text{Variable cost per unit} = \frac{\text{(Difference in semi-variable costs)}}{\text{(Difference in output)}}$$

This rate if applied on either of the output levels gives us the total variable cost for that level of output. We get the fixed cost by deducing it from the total semi-variable cost.

ii) Range or High and Low Points method

This is similar to the Comparison method; the only difference is that instead of comparing costs of any two levels the highest and the lowest costs during a given period are compared. The difference between those two costs is related to the difference in the corresponding outputs. The same formula as in the earlier method will give us the variable cost per unit of output.

iii) Simultaneous Equation method

In this method it is assumed that there exists a linear relationship between costs (both fixed and variable) and output. Thus, the following straight line equation can be fitted for every semi-variable cost for a given level of output :

$$y = mx + c, \text{ where } y = \text{total semi-variable cost,} \\ m = \text{variable cost per unit,} \\ x = \text{volume of output (no. of units), and } c = \text{fixed cost.}$$

Two such equations representing relevant data for only two levels of production will enable us to easily compute the values of m and c. It may be mentioned that for a given level of output the values of x and y are known.

iv) Least Squares method

This method uses regression analysis (a statistical technique) for finding out a straight line of 'best fit' from out of a number of observations. To fit a straight line trend, we have to solve the following two normal equations :

$$\Sigma y \text{ n.c} + m \Sigma x \dots\dots\dots (1)$$

$$\Sigma xy = c \Sigma x + m \Sigma x^2 \dots\dots\dots (2)$$

where n is the number of observations and all other notations have the same meanings as mentioned in the above simultaneous equation method [(iii)]. By solving equations (1) and (2), the values of m and c are determined.

v) Averaging method

Under this method average figures of output and costs of two selected groups are compared. The differences in output and costs are then used to segregate the variable and fixed portions.

Illustration

Groups	Average	
	Output (units)	Cost (Rs.)
First Quarter	2000	21,200
Third Quarter	2250	22,700
Difference	250	1,500

Variable cost = Rs. 1,500/250 units = Rs. 6 per unit.

Fixed cost (taking cost figure of First Quarter) :

$$\text{Rs. } [21,200 - (2,000 \times 6)] = \text{Rs. } 9,200.$$

vi) Graphical method

This method is also known as regression line method. This is similar to the least squares method but instead of using statistical technique graphical technique is used to segregate the variable and fixed elements. The steps involved are :

- a) Outputs at different levels are represented on x-axis and costs on y-axis.
- b) Each point representing a particular output and its corresponding cost is plotted on the graph. Abnormal cost, if any, for a particular output is ignored.

- c) A line is so drawn through the plotted points that there remains more or less equal number of points on either side of the line. This is known as the line of best fit and it is also the total cost line.
- d) The 'line of best fit' is extended to the y-axis. The point at which the line intersects the y-axis indicates the fixed cost element.
- e) A line parallel to the x-axis is drawn through the point of intersection [as mentioned in (d)]. This is fixed cost line.
- f) Any vertical line drawn through any point on x-axis representing a particular level of output will intersect the total cost line and the fixed cost line at two different points. The point of intersection with the total cost line will indicate the total cost for that level of output. The difference between the total cost and the fixed cost [as indicated in (d) above] will give us the variable cost for that particular level of output.
- g) Variable cost when divided by the number of units will determine the variable cost.

7.6 Ascertainment of Marginal Cost

Marginal cost consists of all direct costs (or the prime cost) plus indirect variable costs. Direct costs include direct materials, direct labour and direct expense. Since direct cost is constant per unit it is very easy to ascertain all direct costs from the past data. If, however, the firm is new having no past data, the detailed budget of the firm may provide necessary information. Indirect variable costs include the segregated variable portion of the semi-variable cost. Indirect variable cost can also be ascertained from the budgeted figures. The basic source documents are : Material Requisition Note for direct and indirect material costs. Job Cards or Wage Analysis sheet for direct and indirect labour and Expense Analysis Sheet for expenses.

7.7 Concept of Profit under Marginal Costing

As stated at the outset, only marginal or variable costs are recognized as '*product cost*' under marginal costing. Since profit is the excess of revenues over cost, '*product profit*' under marginal costing is the excess of sales value of a product over the '*product cost*'; '*product profit*' is technically known as '*contribution*'. Thus, fixed costs are kept outside the scope of product cost. However, fixed costs are to be deducted from the aggregate contribution of all the products in a firm to derive '*business profit*'. So, fixed costs are treated as '*business costs*' rather than being treated as '*product costs*'. The logic behind assumption of this concept of profit is that a business cannot

make profit by just producing one unit of a product; rather it earns profit from out of the sum total of the activities undertaken during a period. It is illogical to think of arranging just that much of production facility (which involves fixed costs) as may be necessary for producing only one unit of a product as the proportionate share of fixed cost for a unit can command. For example, we can not buy a part of a machine or a part of the machine can not be used for manufacturing one unit of a product.

What has been described above regarding the concept of profit under marginal costing is different from that under absorption costing. Since only marginal costs are treated as product costs under marginal costing, the closing stocks, if any, of finished goods and work-in-progress are not attributed with any element of fixed cost. So, effectively there is no chance of carrying over any portion of fixed cost to the next period. In fact, the entire amount of fixed cost for a given period is deducted from the contribution pool to arrive at the business profit for the period concerned; this is irrespective of whether the entire production of the period is sold out during the same period or a portion is carried over to the next period. On the contrary, fixed cost is included in the product cost under absorption costing. Consequently, a proportionate share of fixed cost is included in the value of closing stock (either of finished goods or of work-in-progress) and carried over to the next period.

7.8 Break-Even Analysis

Break-even is a profitability position of a firm at which the total cost is equal to its total revenue and the profit/loss is, therefore, zero. It is also known as 'no-profit, no-loss' position of a firm. The profit is a function of revenues and costs while both the revenues and the costs depend on the volume of production and sales. So, there is a close interrelationship between cost, volume and profit. Break-even analysis is the study of this interrelationship at various levels of activity. The interrelationship can be presented in the form of the following equation known as the Marginal Cost Equation :

$$S - V = C$$

where S = Sales, V = Variable or marginal cost, and C = Contribution.

Again, $P = C - F$ or, $C = F + P$, where P = Profit and F = Fixed cost.

So, Break-even point (BEP) [in sales value]

$$= (\text{Fixed Cost}/\text{Total Contribution}) \times \text{Total Sales}$$

BEP (in units)

$$= \text{BEP (in sales value)}/\text{Selling price.}$$

- **Profit-Volume Ratio**

Profit-volume Ratio, popularly known as P/V Ratio, is simply the ratio of Contribution (for profit) to Sales (for volume). That is—

$$\begin{aligned} \text{P/V Ratio} &= \text{Contribution/Sales} \\ &= \text{Change in Contribution/Change in Sales} \\ &= \text{Change in Profit (or Loss)/Change in Sales.} \end{aligned}$$

P/V ratio, usually expressed in percentage, is an important measure of profitability. A high P/V ratio indicates high profitability and vice-versa. The ratio can be used to compute BEP. Other uses of P/V ratio include determination of profit or loss at a given level of sales, sales volume needed to earn a given amount of profit, sales needed to maintain profit at a given level when selling price changes, etc. The above formulae of P/V ratio can be used to find out ways and means of improving the ratio and thereby the profitability. For example, P/V ratio can be improved by increasing selling price, reducing variable cost and by changing the sales mix by providing for increasing sales of more profitable products.

- **Break-Even Chart (BEC)**

A Break-even chart is the graphical presentation of the marginal costing information. The chart shows all the information relating to fixed cost, variable cost, sales, and profit/loss at different levels of activities. Resultantly, it also shows the Break-even point. Margin of Safety and Angle of Incidence (the last two terms will be discussed herein after). For construction of a BEC, certain assumptions are to be made. These are stated below :

- i) Selling price remains constant for all volumes of sales; otherwise sales line cannot be shown as a straight line.
- ii) Fixed cost does not change i.e., the component costs constituting Fixed cost do not undergo any change throughout the different levels of activities.
- iii) Variable costs are truly variable.
- iv) Semi-variable costs can be segregated into fixed and variable components.
- v) Volume of production and sales are equal.
- vi) Volume is the only factor which is having influence on costs. In other words, other factors like operating efficiency, production method, product-mix, etc. which may have their influence on cost, are assumed to remain unchanged.

Construction of a BEC

The following procedure is to be followed for construction of a BEC :

- i) Costs and revenues are represented along the vertical axis of the graph.
- ii) Levels of activities or volumes (in units) are represented along the horizontal axis.

- iii) Fixed cost line representing a fixed amount for all the levels is drawn parallel to the x-axis.
- iv) Variable cost line is drawn over fixed cost line so that it takes the form of total cost line. In effect, total costs for different levels of activities (starting with total cost being equal to fixed cost at zero level) are plotted to draw this line.
- v) Sales line is similarly drawn by connecting the plotted points representing sales values of different volumes of sales. The line will pass through the origin since sales value is zero at zero level of activity.
- vi) The point at which sales line intersects with the total cost line is the BEP.
- vii) The perpendicular from BEP drawn on x-axis will indicate BEP in units or levels of activity. It is the horizontal distance along x-axis between the origin and the perpendicular line. Similarly, the vertical distance along y-axis between the origin and the perpendicular line (drawn from BEP on y-axis) will indicate BEP in sales value.
- viii) The angle formed between the total cost line and the sales line is known as *Angle of Incidence*.
- ix) The break-even chart also shows the *Margin of Safety* — the difference between existing sales and the break-even sales.

A typical BEC (not drawn to scale) is shown below :

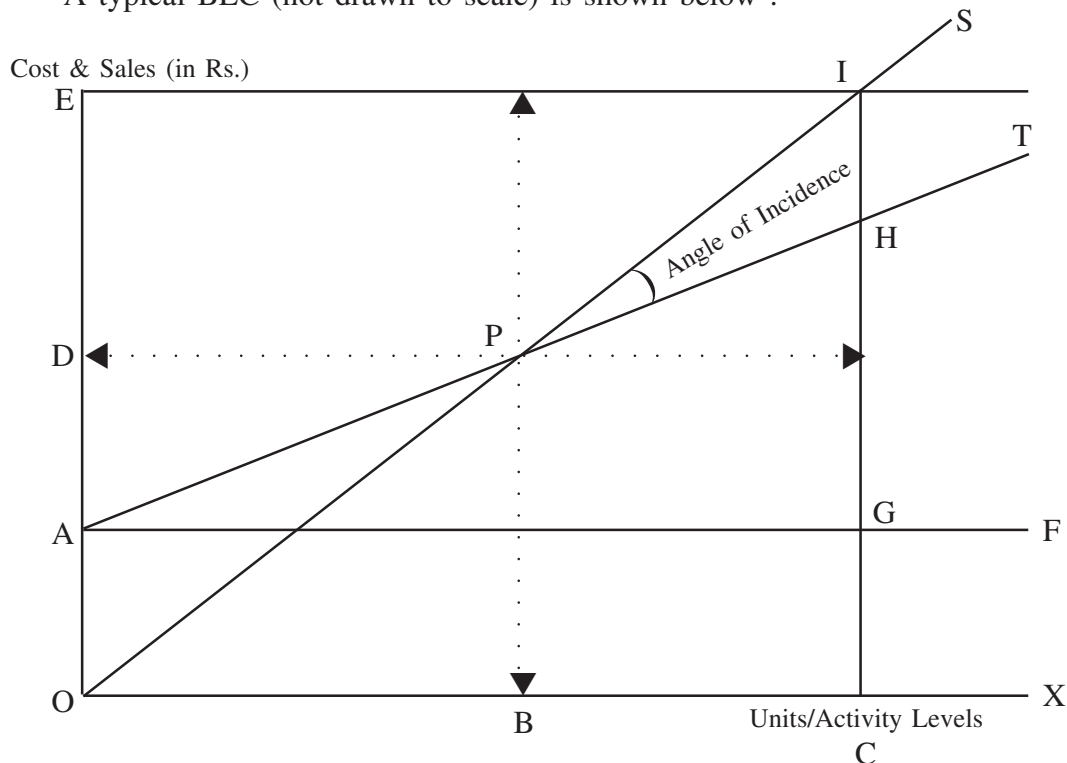


Fig. 1. : Break-Even Chart

Interpretation of the BEC :

- i) AF is the Fixed Cost line.
- ii) AT is the Total Cost (Variable Cost plus Fixed Cost) line.
- iii) OS is the Sales line.
- iv) P, the point of intersection between OS and AT, is the BEP. OB is the BEP in terms of units or levels of activities and OD is BEP in sales value.
- v) The angle SPT, the angle formed between Total Cost line and Sales line is the Angle of Incidence.
- vi) I is any point above BEP on Sales line. It represents sales volume of OC (or EI) and a corresponding sales value of OE (or CI).
- vii) Different costs and profit for a sales volume of OC :
CH = Total Cost, GH = Variable Cost, CG = Fixed Cost, HI = Profit.
- viii) BC and DE are the Margin of Safety in volumes and value respectively.

● **Margin of Safety**

As stated earlier, it is the excess of actual sales over BEP sales. Thus,

Margin of Safety (M/S) = Actual Sales – BEP Sales; M/S is usually expressed as a percentage of actual sales, i.e.,

$$M/S = [(Actual\ Sales - BEP\ Sales)/Actual\ Sales] \times 100.$$

M/S can also be computed by applying P/V ratio :

$$M/S = Profit / (P/V\ Ratio).$$

Margin of Safety is used as an indicator of the soundness or strength of a business. A high M/S of say 60% may indicate that the business remains in safe position even if the sales go down by more than 50%. A low M/S, on the other hand, gives us a signal to take care of improving M/S to avoid imminent danger from the slightest deterioration in sales. The following measures may be taken to improve the M/S :

- i) Increasing the selling price,
- ii) Increasing the level of activity / sales,
- iii) Lowering BEP by reducing costs-fixed and/or variable,
- iv) Changing product-mix by substituting existing product/s by higher-contribution product/s.

● **Angle of Incidence**

As stated earlier, it is the angle formed between the Sales line and the Total Cost line above BEP. Angle of Incidence is an indicator of *profit earning capacity*. A larger

angle of incidence indicates profit earning capacity at higher rate. It may be mentioned that angle of incidence can only be visualized in the graph : we can not compute it by applying any formula.

● **Profit Chart or Profit/Volume Graph**

Sometimes, a BEC is simplified by avoiding cost lines. Only profits/losses corresponding to sales at different levels are shown in *P/V Graph* or what is known as a *Profit Chart* (see Fig. 2). Profits and Losses are represented along the vertical axis – profits are represented along that portion of the vertical axis which is above the zero level and the losses below it. Sales values are represented along the horizontal axis. The profits and losses at different sales levels are plotted on the graph and the points are connected by the line known as Profit/Loss line. The point at which Profit/Loss Line intersects with the Sales Line is the BEP. The portion along vertical axis below zero level that is used to represent losses can also be used to represent fixed cost; the logic may be like this that loss is that portion of fixed cost which remains uncovered by the contribution from sales effected. The Profit/Loss Chart can then be used to show the effects of different amounts of fixed cost on BEP, profits/losses, and on M/S. The Chart is also used to show similar effects of varying selling prices.

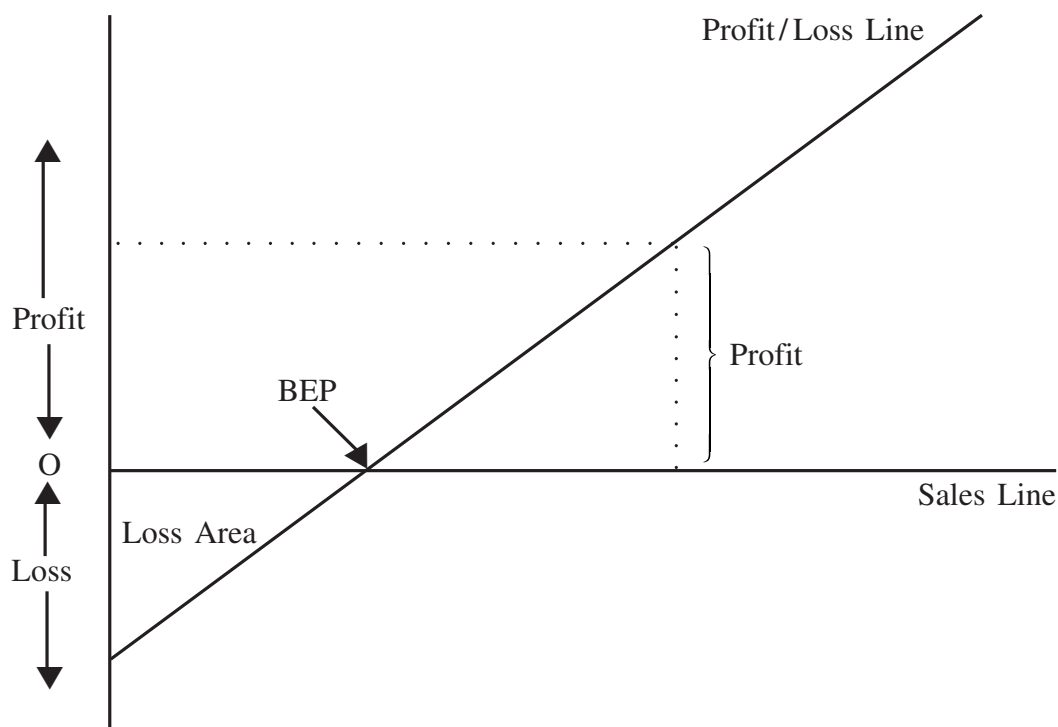


Fig. 2. : Profit/Loss Chart

Different Types of BE Chart

The common BE Chart as has been demonstrated above can be slightly modified so as to suit a specific purpose. There may be a number of such modifications to suit a number of different purposes. These are :

- i) Detailed BE Chart,
- ii) Cash BE Chart, and
- iii) Control BE Chart.

Detailed BE Chart

In this chart, different components of variable costs (like direct materials, direct labour, etc.) are shown in the graph separately. So, there will be a number of variable cost lines – one line drawn above the other (on the basis of cumulative costs). Similar detailing may be made in case of appropriation of profit. The chart which details appropriations of profit (for taxes, dividends, reserves, etc.) is known as *Profit Appropriation BE Chart*. Such detailed BE Chart is very much useful for various managerial decision making and control actions. The basic principles of drawing a break-even chart, however, remain the same.

Figure 3 shows a cash break-even chart and Figure 4, a control break-even chart.

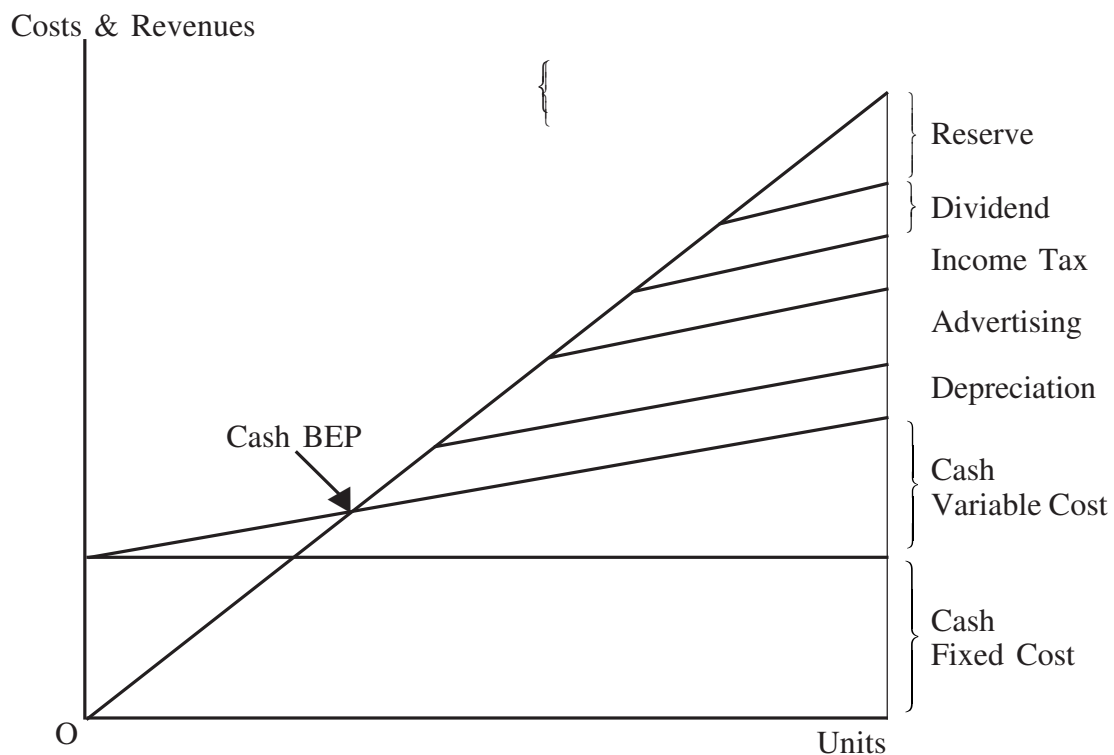


Fig. 3. : Cash BE Chart

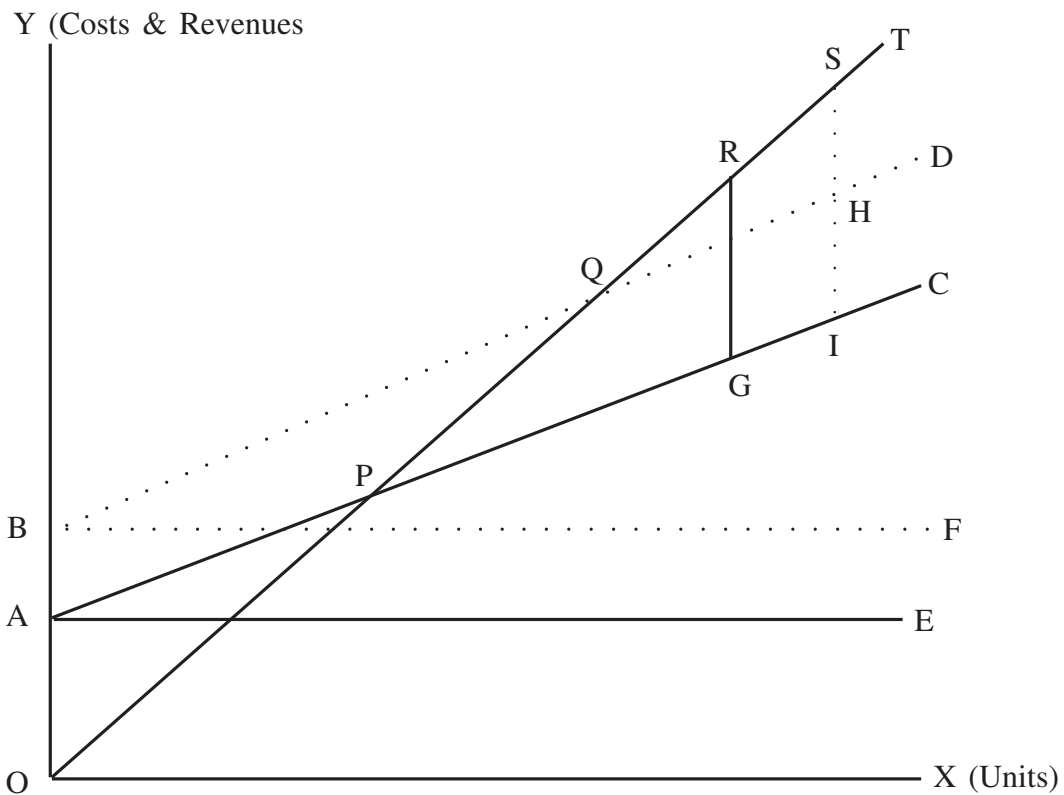


Fig. 4. : Control BE Chart

Abbreviations used

- | | | |
|-------------------------------|-----------------------------|--------------------|
| AE = Budgeted Fixed Cost | BF = Actual Fixed Cost | |
| AC = Budgeted Total Cost Line | BD = Actual Total Cost Line | |
| OT = Sales Line | Q = Actual BEP | P = Budgeted BEP |
| S = Actual Sale | R = Budgeted Sale | SH = Actual Profit |
| RG = Budgeted Profit | HI = Profit Variance | |

Both cash and control break-even charts serve many useful purposes. For a firm running short of cash position, cash break-even Chart gives important information on cash position relative to various levels of activities. Hence, it facilitates cash management. Control break-even chart, by showing details of budgeted and actual figures, helps management control on costs and revenues.

7.9 Advantages of Marginal Costing

The advantages of marginal costing are :

- i) It is simple to understand and operate. There is no complexity involving allocation, apportionment and absorption of overheads; no adjustment is, therefore, necessary for under- or over-absorption of overhead.

- ii) The BE Chart (with its different variants) can help management to readily visualize the effects on profits of various changing factors like selling price, variable as well as fixed costs, volume of sales, etc. It thus helps the management in taking quick and right decisions very easily.
- iii) Closing stock valuation at marginal cost avoids so-called illogical carry forward of a portion of current period's fixed cost to the next period.
- iv) Marginal costing is considered to be a flexible technique in the sense that it can be operated along with other techniques of control like budgetary control and standard costing.

7.10 Limitations of Marginal Costing

Marginal costing suffers from the following limitations :

- i) Only fixed and variable costs are recognized under marginal costing. When segregation of semi-variable costs involves difficulty leading to approximation of costs, the reliability of cost data becomes questionable.
- ii) Some of the assumptions for a BE Chart do not conform to reality. Sometimes the BE Chart may also show a confusing multiple BEPs.
- iii) Exclusion of fixed cost for the purpose of valuation of closing stock is also criticized by some authors on the ground that fixed cost is also a real cost necessary to manufacture product and so the product should bear a legitimate portion of fixed cost.
- iv) Marginal costing technique is not suitable for application in case of Contract Working where high volume of work-in-progress is a common feature. Valuing Work-in-progress at marginal cost only will result in loss every year and profit only on completion of contract.
- v) It helps in control by comparison only; it fails to provide a yardstick for control.

7.11 Computation of Break-Even Analysis and Margin of Safety

Problem 1

ABC Co. Ltd. has prepared the following budget estimates for the year 2005-06 :

Sales units	10,000
Fixed Cost	Rs. 40,000
Sales Value	Rs. 1,20,000
Variable Cost	Rs. 6 per unit

Required :

- i) Find the P/V Ratio, Break-even Point, and Margin of Safety;
- ii) Calculate the revised P/V Ratio, Break-even Point, and Margin of Safety and show the effects on them in each of the following cases :
 - a) 10% decrease in selling price,
 - b) 10% increase in sales volume,
 - c) 10% increase in variable cost, and
 - d) Rs. 10,000 increase in fixed cost.

Solution 1

Present selling price = Rs. 1,20,000/10,000 units = Rs. 12 per unit

Contribution = Selling price – Variable Cost per unit = Rs. (12 – 6) = Rs. 6 per unit

i) P/V Ratio = (Contribution per unit/Selling price) × 100 = (6/12) × 100 = 50%

Break-even Point = Fixed Cost/(P/V) Ratio = Rs. 40,000/0.5 = Rs. 80,000

Margin of Safety = Actual Sales – BE Sales = Rs. (1,20,000 – 80,000) = Rs. 40,000

ii) Revised figures and the effects

Particulars	Alternatives			
	(a)	(b)	(c)	(d)
Selling Price (Rs.)	10.80	12.00	12.00	12.00
Variable Cost p.u. (Rs.)	6.00	6.00	6.60	6.00
Contribution p.u. (Rs.)	4.80	6.00	5.40	6.00
P/V Ratio (%) [(C/S × 100)]	44.44	50.00	45.00	50.00
Effect	declined	No effect	Declined	No effect
Fixed Cost (Rs.)	40,000	40,000	40,000	50,000
Break-even Point (Rs.) [FC/(P/V) Ratio]	[(40,000 × 10.8)/4.8] = 90,000	[(40,000 × 12.0)/6.0] = 80,000	[(40,000 × 12.0)/5.4] = 88,889	[(50,000 × 12.0)/6.0] = 1,00,000
Effect	Increased	No effect	Increased	Increased
Sales Volume (Units)	10,000	11,000	10,000	10,000
Total Sales (Rs.) (Volume × Price)	1,08,000	1,32,000	1,20,000	1,20,000
Margin of Safety (Rs.) (Total Sales – BE Sales)	18,000	52,000	31,111	20,000
Effect	Declined	Increased	Declined	Declined

Note : Students may find out the effect in quantitative term and express in percentage form.

Problem 2

Following figures are available from the records of XYZ Co. Ltd. as on 31st March—

	<u>2004</u>	<u>2005</u>
Sales	Rs. 2,00,000	Rs. 2,50,000
Profit	Rs. 40,000	Rs. 60,000

Calculate :

- a) P/V ratio and fixed cost,
- b) Break-even sales,
- c) Required sales for a profit of Rs. 1,00,000,
- d) Profit or loss if sales were Rs. 3,00,000.

Solution 2

(a) P/V Ratio = [(Change in Profit)/(Change in Sales)] × 100
= Rs. (60,000 – 40,000)/Rs. (2,50,000 – 2,00,000) × 100
= (Rs. 20,000/Rs. 50,000) × 100
= 40%

Fixed Cost = Contribution – Profit
= (P/V Ratio × Sales) – Profit

For 2004 : (40% × Rs. 2,00,000) – Rs. 40,000
= Rs. 40,000.

For 2005 : (40% × Rs. 2,50,000) – Rs. 60,000
= Rs. 40,000

(b) Break-even Sales = Fixed Cost/P/V Ratio
= Rs. 40,000/40% = Rs. 1,00,000.

(c) Required sales for a profit of Rs. 1,00,000

Desired profit = Rs. 1,00,000

Fixed cost = Rs. 40,000

Required contribution = Fixed cost + Required Profit
= Rs. 40,000 + Rs. 1,00,000 = Rs. 1,40,000

Required Sales = Required Contribution/P/V Ratio
= Rs. 1,40,000/40% = Rs. 3,50,000

(d) Profit/Loss if sales were Rs. 3,00,000

Profit/Loss (–) = Contribution – Fixed Cost
= Sales × P/V Ratio – Fixed Cost
= Rs. 3,00,000 × 40% – Rs. 40,000
= Rs. 1,20,000 – Rs. 40,000
= Rs. 80,000.

7.12 Select Readings

Hall
 Horngren, Foster and Datar, Cost Accounting—A Management Emphasis, Prentice
 Hall, Jawahar, Cost Accounting, Tata Mc Graw Hill Publishing Co.Ltd.
 Banerjee, B., Cost Accounting, World Press Pvt. Ltd.

(b) Profit/Loss

Existing BEP (in units) = 25,000 units [as in (a) above]

Proposed sales target = 40,000 units

Excess sale above BEP = (40,000 - 25,000) units = 15,000 units

Revenue from excess sale above BEP

$$= 15,000 \text{ units} \times \text{Rs. } 20 \text{ p.u.} = \text{Rs. } 7,20,000$$

Total Variable Cost for this excess sale

$$= 15,000 \text{ units} \times \text{Rs. } 30.20 = \text{Rs. } 4,23,000$$

Net Profit = Rs. (7,20,000 - 4,23,000) = Rs. 2,97,000.

(c) Revised BEP

Revised selling price = Rs. 20 - 10% of Rs. 20 = Rs. 18

Revised variable cost p.u. = Rs. (30.00 - 2.20) = Rs. 27.80

Revised Contribution p.u. = Rs. (18.00 - 27.80) = Rs. -9.80

Revised fixed cost = Rs. (2,00,000 + 1,60,000) = Rs. 3,60,000

Revised BEP = Revised Fixed Cost / Revised Contribution p.u.

$$= \text{Rs. } 3,60,000 / \text{Rs. } -9.80 \text{ p.u.} = 32,000 \text{ units}$$

(d) Profit/Loss when sales volume is 30,000 units

Sales volume = 30,000 units

Sales value = 30,000 units \times Rs. 20 p.u. = Rs. 12,00,000.

PV Ratio = (Contribution / Sales) \times 100

$$= (\text{Rs. } 20 / \text{Rs. } 20) \times 100 = 40\%$$

Contribution for a sales value of Rs. 12,00,000

$$= \text{Rs. } 12,00,000 \times 40\% = \text{Rs. } 4,80,000$$

Profit/Loss (-) = Contribution - Fixed Cost

$$= \text{Rs. } (4,80,000 - 2,00,000) = \text{Rs. } 2,80,000$$

7.13 Sample Questions

a) Long answer type

1. How can you prepare a multi-product break-even chart? What are the basic assumptions in a break-even chart?
2. Major distinction between marginal costing and absorption costing is manifested in the valuation of closing stocks. Explain the differences between the two methods in the light of the above statement.

b) Short answer type

1. Write short notes on the following :
 - i) P/V Ratio, ii) Margin of Safety, iii) Importance of contribution in marginal costing, iv) Irrelevance of fixed cost in product costing under marginal costing technique, v) Advantages of break-even analysis.
2. Answer the following :
 - i) How does a P/V Chart differ from a Break-even chart?
 - ii) Why is it necessary to segregate semi-variable costs into fixed and variable elements?

c) Objective type

1. Answer the following :
 - i) Is there any difference between P/V Ratio and Marginal Income Ratio?
 - ii) Can Angle of Incidence be computed?
 - iii) Can fixed cost be included in marginal cost?
 - iv) Can there be more than one break-even point of a firm?
 - v) Can marginal costing provide any yardstick for control purpose?
2. Fill in the blanks :
 - i) At BEP, total contribution equals total _____ costs.
 - ii) Break-even analysis assumes that within the relevant range unit _____ costs remain unchanged.
 - iii) Margin of Safety _____ with the increase in sales volume.
 - iv) If profit is 10% and P/V Ratio is 40%, the Margin of Safety is _____ %.
 - v) When production is stopped, the loss equals to _____ .

7.14 Hints for Solution (for objective type questions only)

1. (i) and (ii) No, (iii) and (iv) Yes, (v) No.
2. (i) Fixed, (ii) Variable, (iii) Increases, (iv) 25%, (v) Fixed Cost.