



Module 3

Syllabus : - Basics of Micro Economics II Concept of costs-marginal, average, fixed, variable costs-cost curves-shut down point-long run and short run- Break Even Analysis-Problem-Markets-Perfect Competition, Monopoly and Monopolistic Competition, Oligopoly-Cartel and collusion

Cost

It is an amount that has to be paid or given up in order to get something. In business, cost is usually a monetary valuation of effort, material, resources, time and utilities consumed etc

Mr X has started a factory producing some packaged food items. He has to meet so many expenses or costs like the rent for the building, a monthly amount should be paid if the machines in the factory are bought on lease, the daily wages for the employees, the insurance premium should be paid on periodic basis, raw materials required to manufacture the final product should be brought from suppliers, material transportation cost etc

Fixed costs

There are certain types of costs which do not depend upon the level of production or quantities of output produced. For example, even if the total output produced is zero units or 100 units or unit whatever it may be, we have to pay a fixed amount as building rent, insurance premium, salary of top level employees etc.

*Such costs which does not depend upon the quantity of output produced is known as **fixed cost**.*

Variable cost

If we have decided to produce 100 units of the final product, we have to buy the raw materials required to manufacture 100 units. If we have decided to produce 1000 units of the final product, then we have to buy more raw materials. It means that if the quantity of output is increased then the total cost of raw materials required to manufacture the products also increase.

If more quantity of the product has to be manufactured, then the workers have to work overtime for more hours and as a result the daily wages of the workers will also increase.

*Such types of cost which vary with the variations in the output level or quantities of output produced are known as **variable costs**.*

Eg :- total cost of raw materials, wages etc

- Variable cost per unit of a product is called Average Variable cost (AVC). If variable cost per unit of raw material (AVC) is Rs.10 and 100 units of raw materials are used for the production process, then the total variable cost (TVC) will be $10 \times 100 = \text{Rs.}1000$

Total cost

It calculates the total cost of production. Since cost is made of fixed cost and variable cost :-

$$\text{Total cost (TC)} = \text{Total fixed cost (TFC)} + \text{Total Variable cost (TVC)}$$

But, Total variable cost (TVC) = Average variable cost (AVC) * Quantity (Q), we have

$$\begin{aligned}\text{Total cost (TC)} &= \text{Total fixed cost (TFC)} + \text{Average Variable cost (AVC)} * \text{Quantity (Q)} \\ \text{TC} &= \text{TFC} + (\text{AVC} * \text{Q})\end{aligned}$$

Average cost

$$\text{Average cost (AC)} = \text{Total Cost (TC)} / \text{No.of Quantity produced (Q)}$$

Since $\text{TC} = \text{TFC} + (\text{AVC} * \text{Q})$

$$\text{Average cost (AC)} = \frac{\text{TFC}}{\text{Q}} + \frac{\text{AVC} * \text{Q}}{\text{Q}}$$

Thus, **Average Cost (AC) = Average fixed cost (AFC) + Average Variable cost (AVC)**

Marginal Cost (MC)

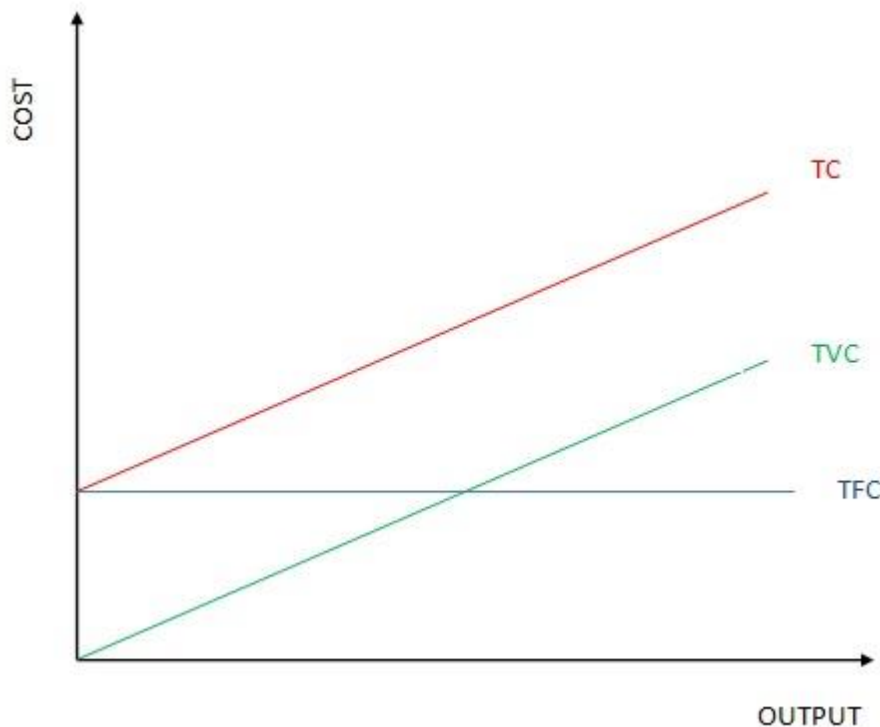
Change in Total cost due to the production of one additional unit of product is known as marginal cost. Eg:- If Producing 100 units cost Rs. 1000 and producing 101 units cost Rs.1010, then marginal cost of 101th unit will be Rs.10

$$\text{Marginal cost (MC)} = \frac{\partial \text{TC}}{\partial \text{Q}}$$

Short run cost : are the costs which vary with variation in output, size of the firm remaining the same. In other words, short run costs are same as variable costs

Long run cost : are costs which are incurred on fixed assets like plant, building, machinery etc. In the long run, even the fixed costs become variable as the size of the firm increases.

Cost curves



--Total fixed cost (TFC) remains fixed for every unit of output.

--Total Variable cost (TVC) increases with increase in output.

--Total Cost (TC) increases as the output increases.

Break even point

Mr.X continued his business for a certain period of time. Let the total fixed cost at that period be Rs.10000 (sum of building rent paid, insurance amount paid and all such fixed costs). The total variable cost depends upon total quantity of production. Let the variable cost per unit or average variable cost (AVC) be Rs.15

Also Mr.X was selling the food product packet at Rs.25 per unit in the market.

Quantity of output produced Q	Total fixed cost TFC	Variable cost per unit AVC	Total variable cost $TVC = AVC * Q$	Total cost $TC = TFC + TVC$	Selling price per unit P	Total revenue $TR = P * Q$
1	10000	15	$15 * 1 = 15$	$10000 + 15 = 10015$	25	$25 * 1 = 25$
2	10000	15	$15 * 2 = 30$	$10000 + 30 = 10030$	25	$25 * 2 = 50$
3	10000	15	$15 * 3 = 45$	$10000 + 45 = 10045$	25	$25 * 3 = 75$

30	10000	15	$15 \times 30 = 450$	$10000 + 450 = 10450$	25	$25 \times 30 = 750$
500	10000	15	$15 \times 500 = 7500$	$10000 + 7500 = 17500$	25	$25 \times 500 = 12500$
1000	10000	15	$15 \times 1000 = 15000$	$10000 + 15000 = 25000$	25	$25 \times 1000 = 25000$
1200	10000	15	$15 \times 1200 = 18000$	$10000 + 18000 = 28000$	25	$25 \times 1200 = 30000$

Examine columns showing Total cost and Total revenue. Initially, the total revenue generated was less than the total cost. When 1000 units were produced and sold in the market, the total revenue and total cost became equal. When more than 1000 units were sold, the revenue generated was more than the total cost.

*The point at which the total revenue and total cost become equal is known as **breakeven point**.*

In our example, breakeven point is attained when 1000 units of the product are sold in the market. Thus break even quantity is 1000 units.

- When less than BEP quantity is produced and sold, the firm faces a loss
- When more than BEP quantity is produced and sold, the firm earns a profit.
- At breakeven point (BEP), there is no profit and no loss. So every firm will try to sell more products than break even quantity to earn profits.

At BEP, we have profit = 0

But Profit = Total revenue (TR) – Total cost (TC)

$$\implies 0 = TR - TC \quad \text{or} \quad TR = TC$$

At BEP, Total Revenue (TR) = Total cost (TC)

- Also $TR = \text{selling price per unit (P)} \times \text{Quantity (Q)}$

$TC = \text{Total fixed cost (TFC)} + \text{Total variable cost (TVC)}$

$= TFC + [\text{Variable cost per unit or average variable cost (AVC)} \times \text{Quantity (Q)}]$

- At BEP, we have $TR = TC$

$$\Rightarrow P*Q = TFC + (AVC*Q)$$

$$\text{At BEP, we have } P*Q = TFC + (AVC*Q)$$

- Also $(P*Q) - (AVC*Q) = TFC$

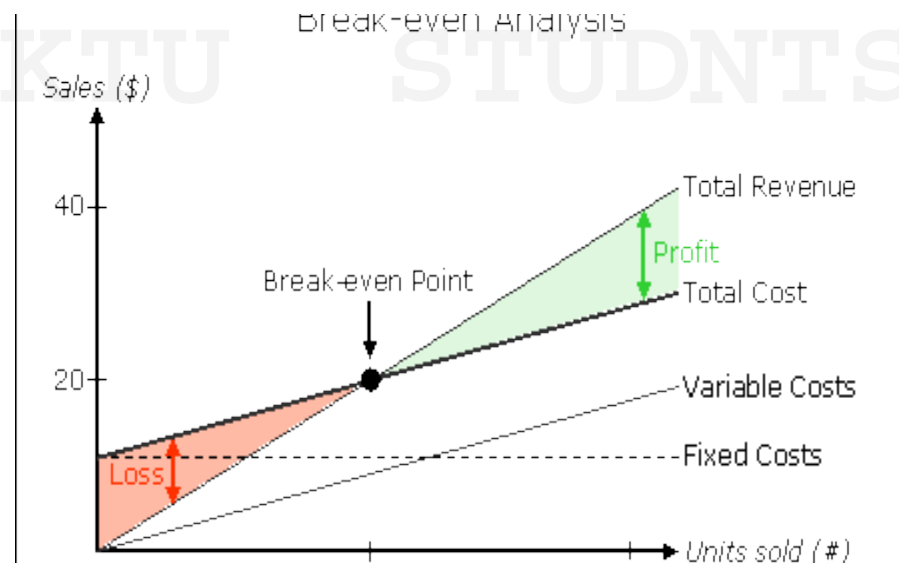
$$\Rightarrow Q(P - AVC) = TFC$$

$$\Rightarrow \text{Break even Quantity } Q = TFC / (P - AVC)$$

- When quantities sold in the market are more than the break even quantity, we can earn profits.

$$\text{Profit} = TR - TC$$

$$\text{Profit} = (P*Q) - [TFC + (AVC*Q)]$$



Numerical problems

- i) Find the breakeven quantity when fixed cost is Rs.9000, selling price is Rs. 8 per unit , average variable cost is Rs. 5 per unit

Ans) For problems related to BEP, we need four factors:

Quantity Q ; Total fixed cost TFC ; Variable cost per unit or average variable cost AVC ; Selling price per unit P

Given $TFC = 9000$; $AVC = 5$; $P = 8$, we have to find Q

At BEP, we have $P*Q = TFC + (AVC*Q)$

Substituting we have $8Q = 9000 + 5Q$

$$8Q - 5Q = 9000 \implies 3Q = 9000 \implies Q = 9000/3 = 3000$$

Break even quantity = 3000 units

- ii) What should be the selling price per unit, if the fixed cost is Rs. 3000, break even quantity is 100 units and variable cost per unit is Rs.15.

For problems related to BEP, we need four factors:

Quantity Q ; Total fixed cost TFC ; Variable cost per unit or average variable cost AVC ;
Selling price per unit P

Given $TFC = 3000$; $AVC = 15$; $P = ?$, $Q = 100$

At BEP, we have $P*Q = TFC + (AVC*Q)$

Substituting we have $P*100 = 3000 + (15*100)$

$$100P = 3000 + 1500 \implies P = 4500/100 \implies P = 45$$

Selling price per unit = Rs.45

- iii) Find the number of quantities to be sold to earn a profit of Rs.1000, when the selling price is Rs. 10 per unit, fixed cost is Rs. 10000 and average variable cost is Rs. 8 per unit.

Given $TFC = 10000$; $AVC = 8$; Selling price $P = 10$, $Q = ?$ Profit = 1000

We have to find Q

Profit = $TR - TC$

Profit = $(P*Q) - [TFC + (AVC*Q)]$

Substituting we get,

$$1000 = (10*Q) - [10000 + (8*Q)] \implies 1000 = 10Q - 10000 - 8Q$$

$$1000 + 10000 = 10Q - 8Q \implies 11000 = 2Q \implies Q = 5500$$

5500 units must be sold to earn a profit of Rs. 1000

OPPORTUNITY COST

It is defined as the expected returns from the second best use of resources which are foregone due to the scarcity of resources. It is also known as alternative cost.

For eg;- A firm has Rs.100000 in its hand for which it has two alternative uses. It can buy either a printing machine or a lathe machine. Only one among them can be selected. From the printing machine, the firm expects annual return of Rs.20,000 and from lathe machine it expects annual return of Rs. 15,000. Naturally, the firm will invest in printing machine. But at that time, the firm has to avoid the benefit of Rs. 15000 that would have been earned from lathe machine. Thus opportunity cost of investing in printing machine is the income that would have earned from lathe machine, Rs. 15000

SHUTDOWN POINT

It is the point at which firms should shutdown their operations.

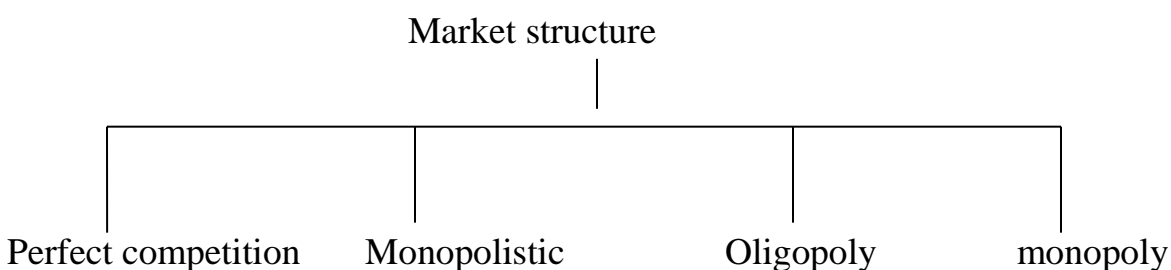
When the selling price of the product (P) is equal to variable cost per unit (AVC), the firm should shutdown their operations.

When $P > AVC$, the firm can earn profit after selling certain quantity of products. So the firm can continue its operations.

When $P \leq AVC$, the firm should shutdown their operations.

MARKET STRUCTURE

A market is a system by which buyers and sellers bargain for the price a product, settle the price and transact their business- buy and sell a product. The buyers are willing to buy a product at a fixed price and the sellers are willing to sell that commodity at that price. A market can be online, local, national or international. Based on the number of sellers and degree of competition, the market can be classified as :-



Market structure	No. of firms	Entry barriers	Nature of product	Control over price	Average size of a single firm	Examples
Perfect competition	Numerous	No barriers to enter and exit the market	Similar products	None	Many small stores	Financial markets and some agricultural products
Monopolistic Competition	Many	Few barriers to enter the market	Differentiated products	Some	Many small stores	Toothpastes, shoes etc
Oligopoly	Few	Many barriers like patents and access to technology	Can be similar or different	Some	Few large firms	Mobile network companies, Aluminium, steel etc
Monopoly	Single	Restricted, controlled or blocked	Unique products	Considerable control will be there but it is usually regulated by the government	One big firm	Public utilities like electricity

Cartel vs. Collusion

- A cartel is an agreement of cooperation formed between competitors in a specific industry.
- Cartels are made up of companies in the same industry that traditionally compete against each other, but who have realized that it is mutually profitable for all players in the marketplace to work in cooperation to control market conditions. Eg : Idea and Vodafone decided to operate together, OPEC formed by Petroleum exporting countries etc.
- Members of a cartel restrict levels of production and output thereby creating high demand for the product and pushing prices higher beyond the equilibrium prices.
- Collusion is a secretive agreement between two or more organizations, formed with the aim of gaining illegal mutual benefits.
- An example of collusion would be two companies that operate in the same industry secretly agree on a scheme to fix prices, thereby eliminating competition between the two firms.
- The main difference between cartel and collusion is that a cartel is more organized and is a formal arrangement such as the OPEC, whereas collusion is informal in nature and involves firms secretly fixing prices and agreeing not to compete in certain areas of the market.

1) A numerical problem on national income which comes under 4th module is given below:-

Calculate NDP_{mp} , NNP_{mp} and national income from the following

(All figures in crores)

GDP_{mp} = 900 depreciation = 100 Net factor income from abroad = 300 Indirect Tax = 50
subsidy = 40

Answer ; - **$NDP_{mp} = GDP_{mp} - Depreciation = 900 - 100 = 800$ crores**

$NNP_{mp} = GNP_{mp} - Depreciation,$

$GNP_{mp} = GDP_{mp} + Net\ income\ from\ abroad = 900 + 300 = 1200$

$NNP_{mp} = 1200 - 100 = 1100$ crores

National income = $NNP_{fc} = NNP_{mp} - indirect\ taxes + subsidies$

$= 1100 - 50 + 40 = 1090$ crores.