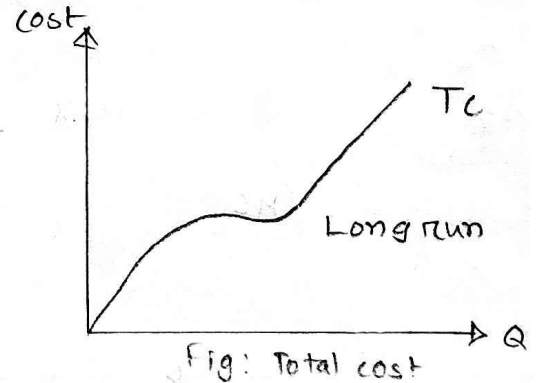
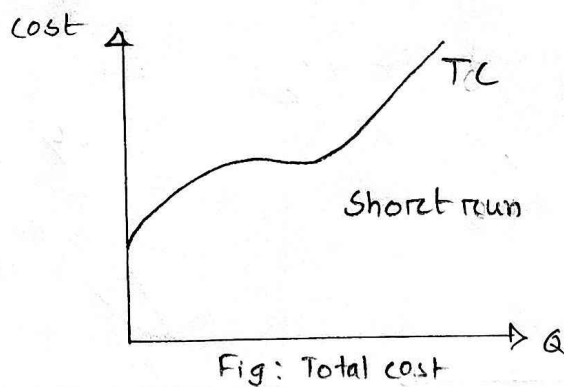
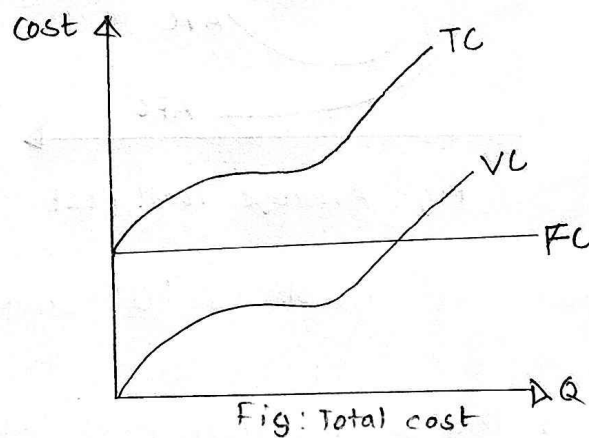
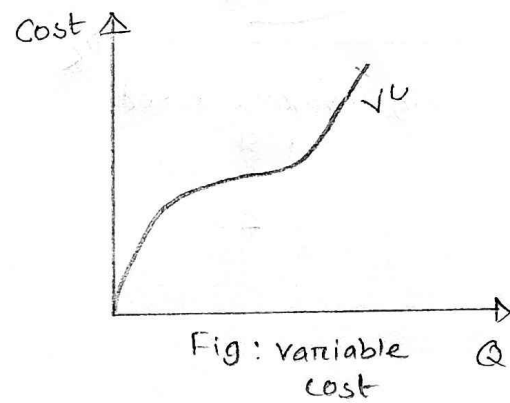
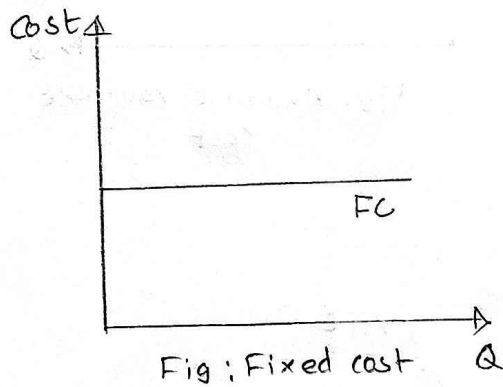


Cost:

→ workers, raw material

$$\text{Total cost} = \text{Fixed cost} + \text{variable cost}$$

→ Infrastructure,



- ... Short run : one factors of production is constant
- ... Long run : both factors of production is variable
- ... Factors of production - capital and labor (main)

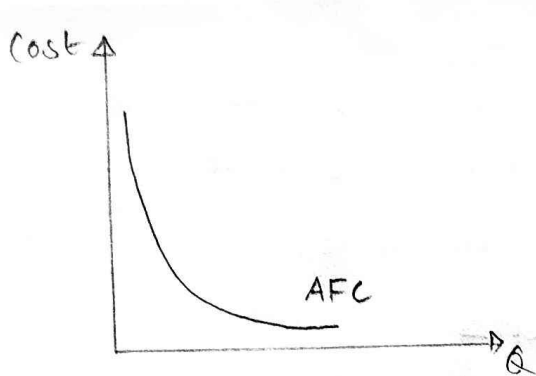


Fig: Average Fixed cost

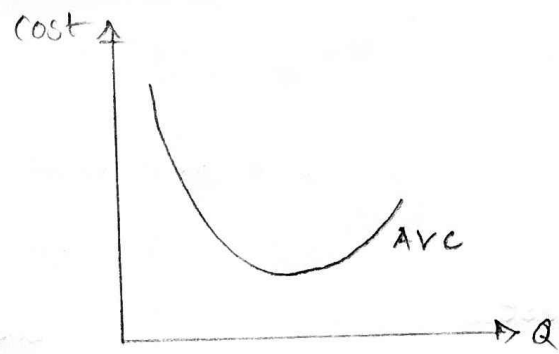


Fig: Average variable cost

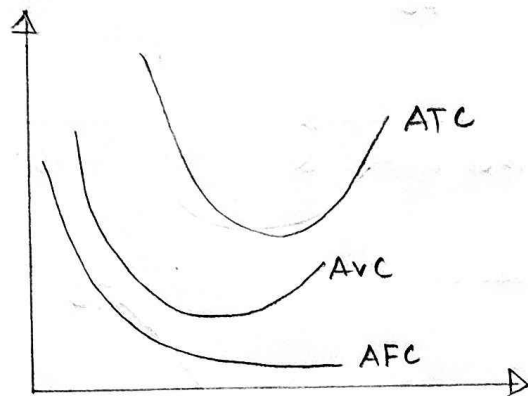


Fig: Average Total cost

④ Average total cost graph is 'u' shape

⑤ Marginal cost: The production cost of last unit of commodity is called marginal cost.

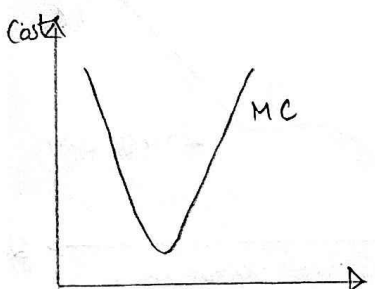


Fig: Marginal cost

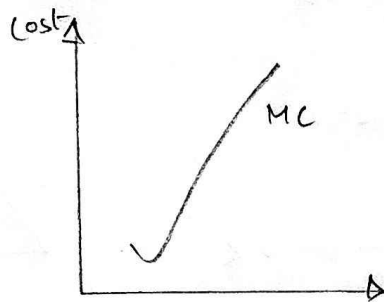


Fig: Marginal cost

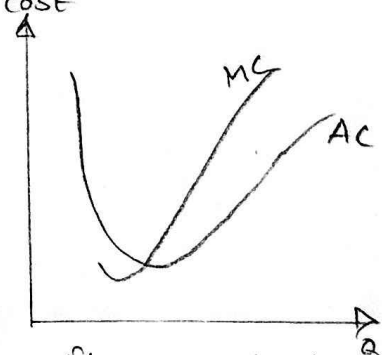


Fig: marginal cost and Average cost

⑥ Marginal cost goes through the minimal point of average cost curve.

Q. what is the relationship between AC and MC?

Sol.

- Firstly, when AC Falls, MC stays below AC
- Secondly, when AC rises MC stays above AC
- Lastly, when AC is minimum, MC equals AC

Q. why long run average curve is called envelope curve.

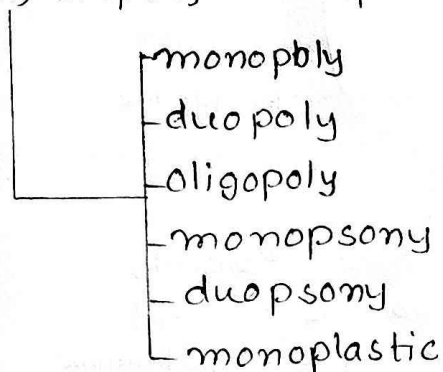
chapter: 5 - Market

... Market: Market is a mechanism in which buyers & sellers of a product bargain with each other and determine the price for the product and buy/sell it.

Markets are classified into multiple categories:

i) perfect competition

ii) Imperfect competition



... Perfect Competition: Perfect competition is a market structure in which a large number of buyers and sellers trade homogenous unit of goods.

⊛ It does not exist.

⇒ Characteristics of perfect competition:

- 1) Large number of buyers and sellers
- 2) Homogeneous goods
- 3) Free entry and exit
- 4) Profit maximization
- 5) No government intervention
- 6) perfect knowledge.
- 7) Absence of Advertisement
- 8) perfect mobility of factors of production.

Quantity (Q)	Price (P)	Total Revenue (TR)	Marginal Revenue (MR)	Average Revenue, $\left(\frac{TR}{Q} = AR\right)$
1	10	10	10	10
2	10	20	10	10
3	10	30	10	10
4	10	40	10	10
5	10	50	10	10

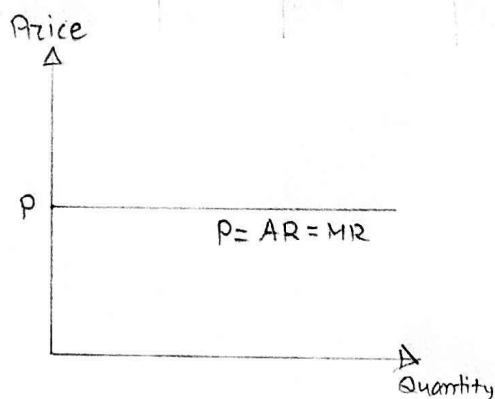


Fig: Price, Average revenue, Marginal revenue -

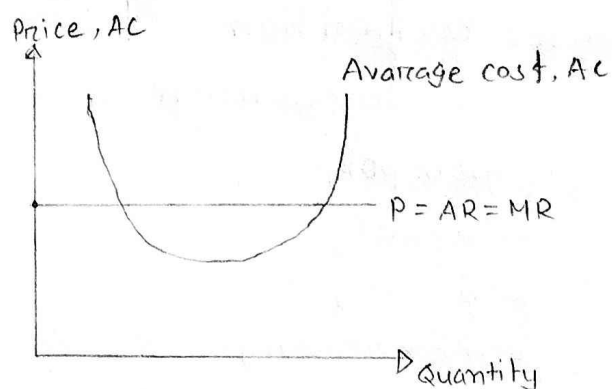


Fig: Average cost and P, AR, MR - equilibrium

... Short Run Equilibrium -

☐ Relationship between Marginal Revenue (MR) and Marginal Cost (MC) : (Equilibrium)

1) $MR = MC$

1D) Slope of MR < Slope of MC

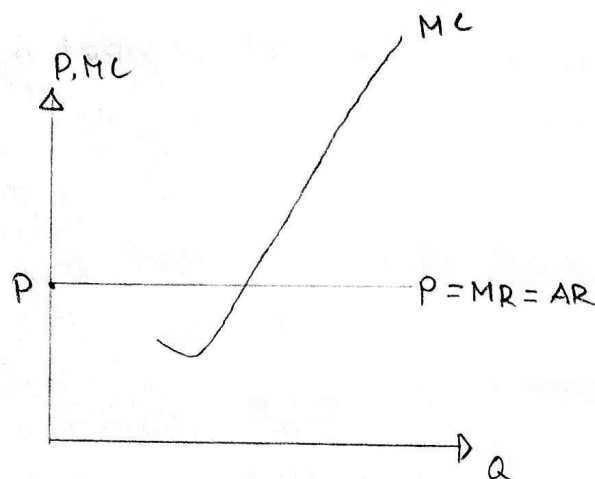


Fig: Equilibrium

Short run Equilibrium

- Economic Profit / Supernormal profit
- normal profit
- Loss

Economic Profit:

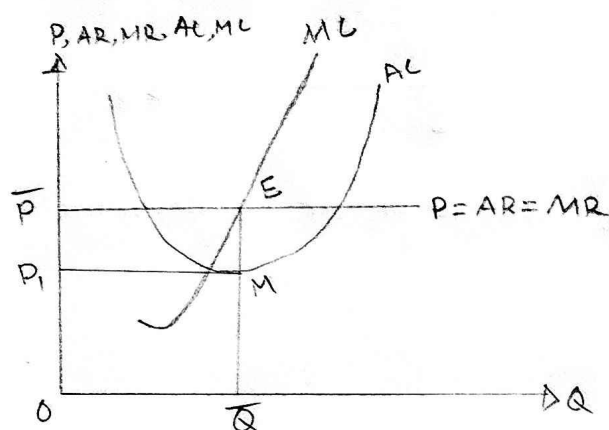


Fig: Economic profit equilibrium

$$\begin{aligned} TR &= AR \times Q \\ &= O\bar{P} \times O\bar{Q} \\ &= O\bar{P}E\bar{Q} \end{aligned}$$

$$\begin{aligned} TC &= AC \times Q \\ &= OP_1 \times O\bar{Q} \\ &= OP_1M\bar{Q} \end{aligned}$$

$$\begin{aligned} \therefore \text{Profit} &= TR - TC \\ &= O\bar{P}E\bar{Q} - OP_1M\bar{Q} \\ &= \bar{P}EMP_1 \end{aligned}$$

This profit is called economic profit / supernormal profit / abnormal profit / excess profit.

Normal Profit :

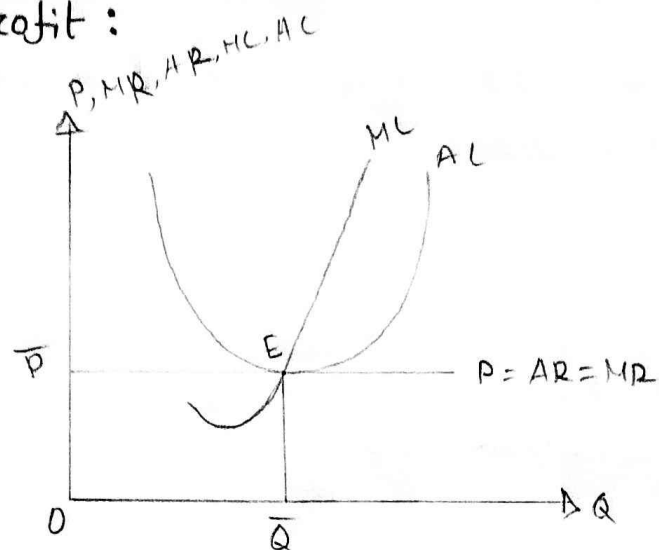


Fig: normal profit equilibrium

$$\begin{aligned} TR &= AR \times Q \\ &= OP \times OQ \\ &= OPEQ \end{aligned}$$

$$\begin{aligned} TC &= AC \times Q \\ &= OP \times OQ \\ &= OPEQ \end{aligned}$$

$$\therefore \text{Profit} = TR - TC = 0$$

Loss :

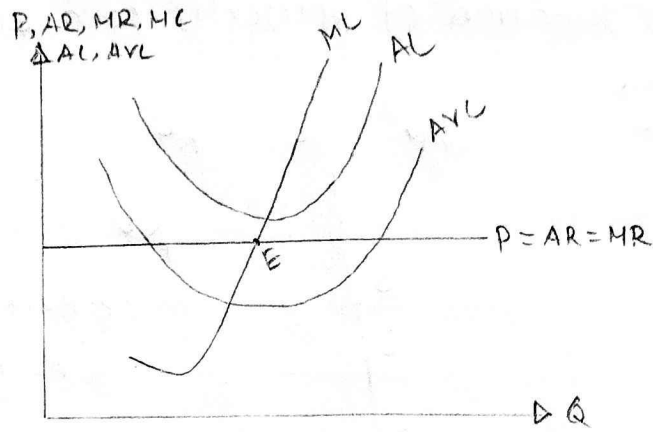


Fig: equilibrium (run business)

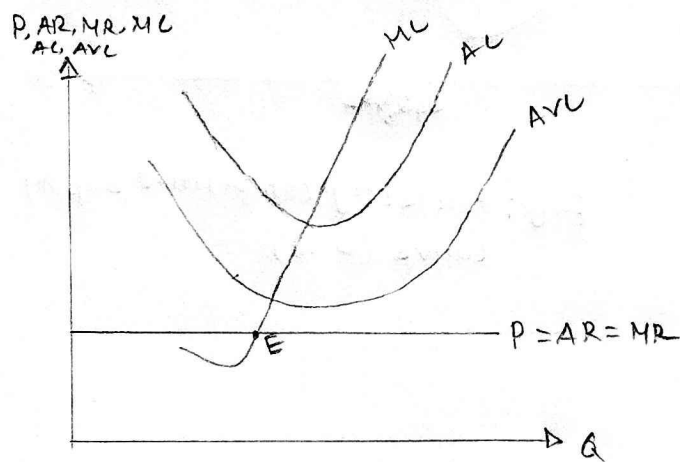


Fig: equilibrium (stop business)

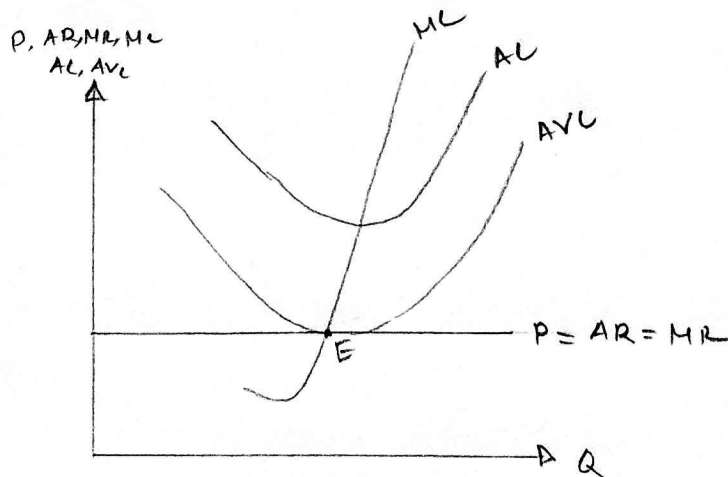


Fig: equilibrium (stop/run same)

▣ Short run supply function of perfectly competitive firm.

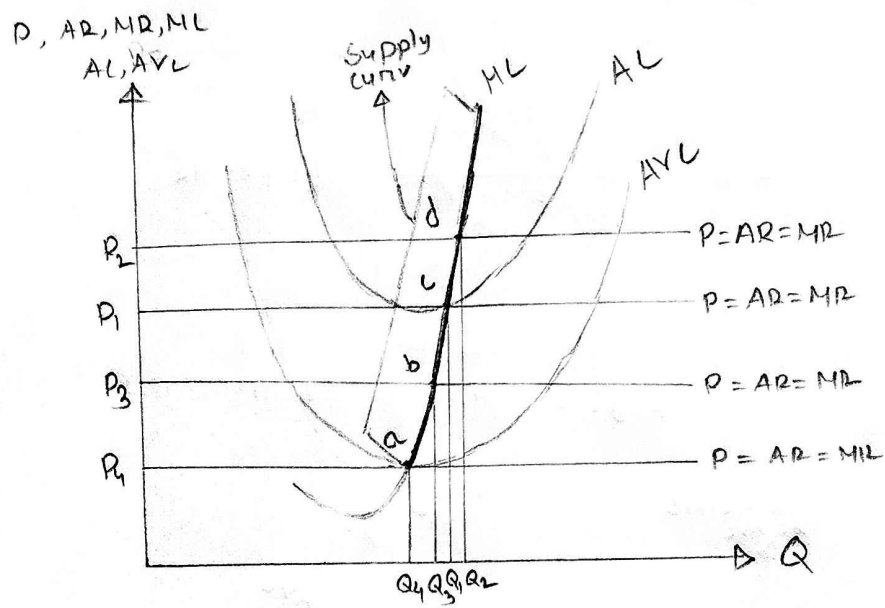


Fig: Perfectly competitive supply curve (bold)

Example: 01 - short run cost function of a perfectly competitive firm is, $C = Q^3 - 45Q^2 + 1000Q + 800$. Find the amount of maximum profit assuming $P = 1000$.

Solⁿ:

$$\begin{aligned}\text{Total revenue, TR} &= \text{Price} \times \text{Quantity} \\ &= P \times Q \\ &= 1000Q\end{aligned}$$

$$\text{Marginal revenue, MR} = \frac{d(TR)}{dQ} = 1000$$

$$\therefore \text{slope of MR} = \frac{d(MR)}{dQ} = 0$$

Given,

$$\text{Total cost, TC} = Q^3 - 45Q^2 + 1000Q + 800$$

$$\therefore \text{Marginal cost, MC} = \frac{d(TC)}{dQ} = 3Q^2 - 90Q + 1000$$

$$\therefore \text{slope of MC} = \frac{d(MC)}{dQ} = 6Q - 90$$

Equilibrium condition,

$$MR = MC$$

$$\Rightarrow 1000 = 3Q^2 - 90Q + 1000$$

$$\Rightarrow 3Q^2 - 90Q = 0$$

$$\Rightarrow 3Q(Q - 30) = 0$$

$$\text{So, } Q = 0, 30$$

$$\text{Slope of MC for } Q = 0; \Rightarrow 6 \times Q - 90 = -90$$

$$\text{Slope of MC for } Q = 30; \Rightarrow 6Q - 90 = 6 \times 30 - 90 = 90 \quad \left[\begin{array}{l} \text{slope, MR} < \\ \text{slope MC} \end{array} \right]$$

$$\therefore \text{Total Revenue, TR} = 1000Q = 1000 \times 30 = 30,000$$

$$\begin{aligned}
 \therefore \text{Total cost, } TC &= Q^3 - 45Q^2 + 1000Q + 800 \\
 &= (30)^3 - 45 \cdot (30)^2 + 1000 \times 30 + 800 \\
 &= 17300
 \end{aligned}$$

$$\begin{aligned}
 \therefore \text{profit} &= TR - TC = 30000 - 17300 \\
 &= 12700
 \end{aligned}$$

\therefore The firm is having supernormal profit. so this firm should stay in business.

Example: 02 - A competitive firm's short run cost function is estimated as $c = \frac{1}{3}Q^3 - 30Q^2 + 800Q + 21000$. Market price is fixed at 400. find the profit of the firm. Is it a good decision to continue operation.

Solⁿ:

$$\begin{aligned}
 \text{Total Revenue, } TR &= \text{Price} \times \text{Quantity} \\
 &= P \times Q \\
 &= 400Q
 \end{aligned}$$

$$\text{Marginal Revenue, } MR = \frac{d(TR)}{dQ} = 400$$

$$\text{slope of } MR = \frac{d(MR)}{dQ} = 0$$

$$\text{Total cost, } TC = \frac{1}{3}Q^3 - 30Q^2 + 800Q + 21000$$

$$\text{Marginal cost, } MC = \frac{d(TC)}{dQ} = Q^2 - 60Q + 800$$

$$\text{slope of MC} = \frac{d(MC)}{dQ} = 2Q - 60$$

Equilibrium condition,

$$MR = MC$$

$$\Rightarrow 400 = Q^2 - 60Q + 800$$

$$\Rightarrow Q^2 - 60Q + 400 = 0$$

$$\therefore Q = 30 + 10\sqrt{5}$$

$$= 52.36$$

$$\text{or, } Q = 30 - 10\sqrt{5}$$

$$= 7.64$$

$$\text{slope of MC for } Q = 52.36, 2Q - 60 = 2 \times 52.36 - 60 = 44.72$$

$$\text{slope of MC for } Q = 7.64, 2Q - 60 = 2 \times 7.64 - 60 = -44.72$$

$$\text{For } Q = 52.36, MR < MC$$

$$\therefore \text{Total revenue, } TR = 400Q = 400 \times 52.36 = 20944$$

$$\therefore \text{Total cost, } TC = \frac{1}{3}Q^3 - 30(Q)^2 + 800Q + 21000$$

$$= \frac{1}{3}(52.36)^3 - 30 \times (52.36)^2 + 800(52.36) + 21000$$

$$= 28490.44$$

$$\therefore \text{Loss} = \text{Total cost} - \text{Total revenue}$$

$$= 28490.44 - 20944$$

$$= 7546.44$$

$$\text{Total variable cost, } TVC = \frac{1}{3}(Q)^3 - 30(Q^2) + 800Q$$

$$= \frac{1}{3}(52.36)^3 - 30(52.36) + 800 \times 52.36$$

$$= 7490.44$$

$$\therefore TVC < TR$$

\therefore This firm should stay in Business.

Long run Equilibrium:

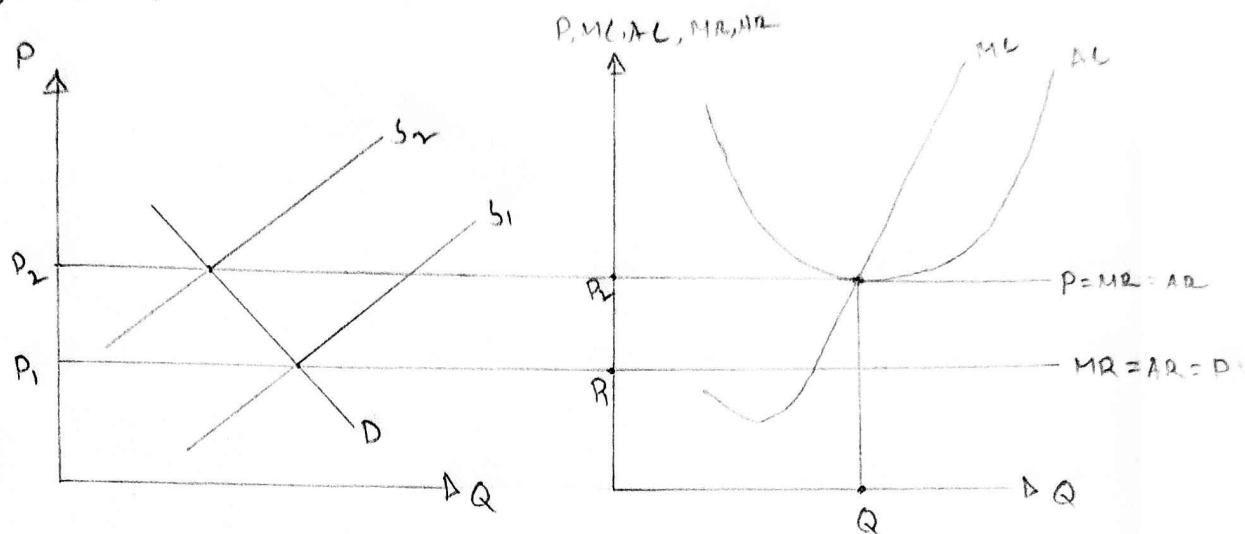


Fig:

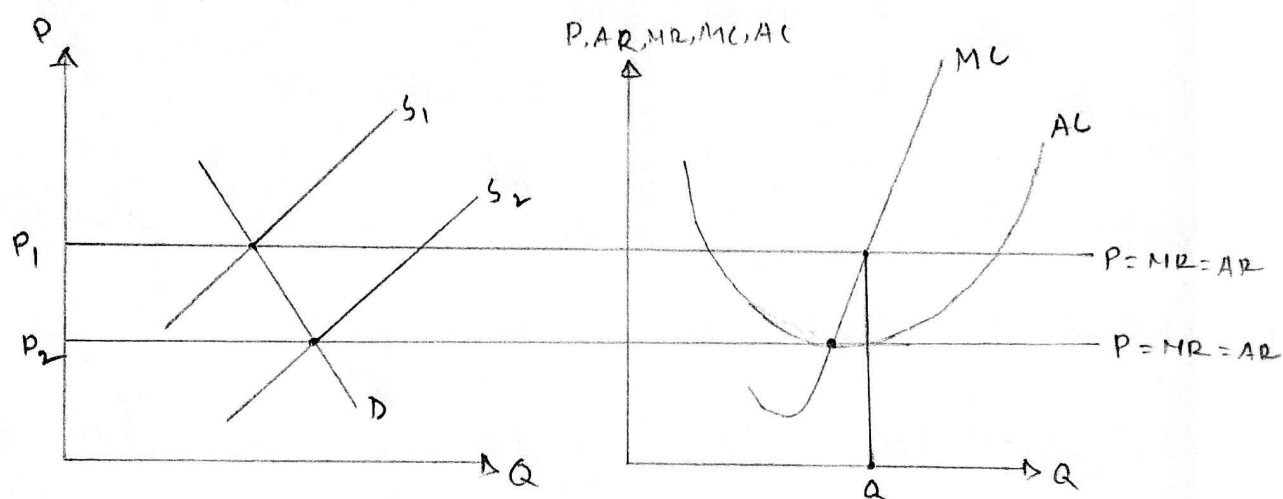


Fig: