

Perfect Competition

Market

- Defined as the institutional relationship between buyers and sellers.
- Market refers to the interaction between buyers and sellers of a good (or service) at a mutually agreed upon price.
- Such interaction may be at a particular place, or may be over telephone, or even through the Internet!
- Sellers and buyers may meet each other personally, or may not ever see each other, as in E-commerce.
- Thus market may be defined as a place, a function, a process.

Factors that determine structure of a market

- Number of independent sellers:
 - Large
 - Few
 - Two
 - One
- Product differentiation:
 - Perfect substitute/ homogeneous product
 - Close substitute
 - Remote substitute
 - No substitute
- Condition of entry
 - Free
 - Difficult
 - Entry barred/impossible

Market Morphology

- Markets may be characterized on the basis of:
 - Number, size and distribution of sellers in any market
 - Whether the product is homogeneous or differentiated
 - Number and size of buyers:
 - Absence or presence of financial, legal and technological constraints
- Thus we have:
 - Perfect Competition
 - Monopoly
 - Monopolistic competition
 - Oligopoly

Market Morphology

Type of market	Number of firms	Nature of product	Number of buyers	Freedom of entry and exit	Examples
Perfect competition	Very Large	Homogeneous (undifferentiated)	Very Large	Unrestricted	Agricultural commodities, unskilled labour
Monopolistic competition	Many	Differentiated	Many	Unrestricted	Retail stores, FMCG
Oligopoly	Few	Undifferentiated or differentiated	Few	Restricted	Cars, computers, universities
Monopoly	Single	Unique	Many	Restricted	Indian Railways, Microsoft
Monopsony	Many	Undifferentiated or differentiated	Single	Not applicable	Indian defense industry

Features of Perfect Competition

Perfect competition may be defined as that market where infinite number of sellers sell homogeneous good to infinite number of buyers while buyers and sellers have perfect knowledge of market conditions

■ **Features**

- Presence of large number of buyers and sellers
- Homogeneous product
- Freedom of entry and exit
- Perfect knowledge
- Perfectly elastic demand curve
- Perfect mobility of factors of production
- No governmental intervention
- Price determined by market and Firm is a price taker.

Demand and Revenue of a Firm

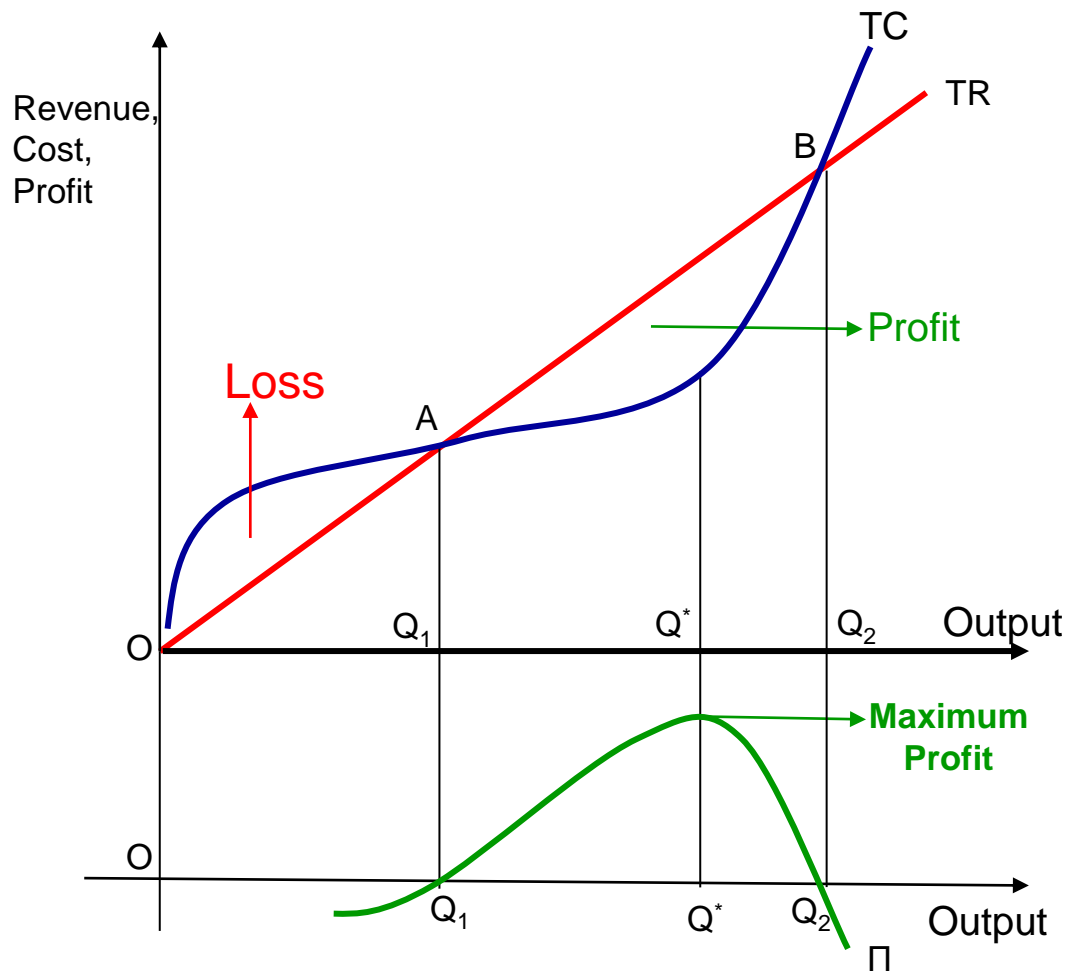
$$\begin{aligned} \text{Marginal Revenue (MR)} &= \frac{dTR}{dQ} = \frac{d}{dQ} PQ \\ &= Q \cdot \frac{dP}{dQ} + P \cdot \frac{dQ}{dQ} = P \dots\dots(1) \end{aligned}$$

[P is assumed to be given (constant)].

- Firms are price takers and can supply as much as they want at the existing price in the market, thus:

$$AR = MR = P \dots\dots\dots(2)$$

Profit, Revenue and Cost Curves of a Firm



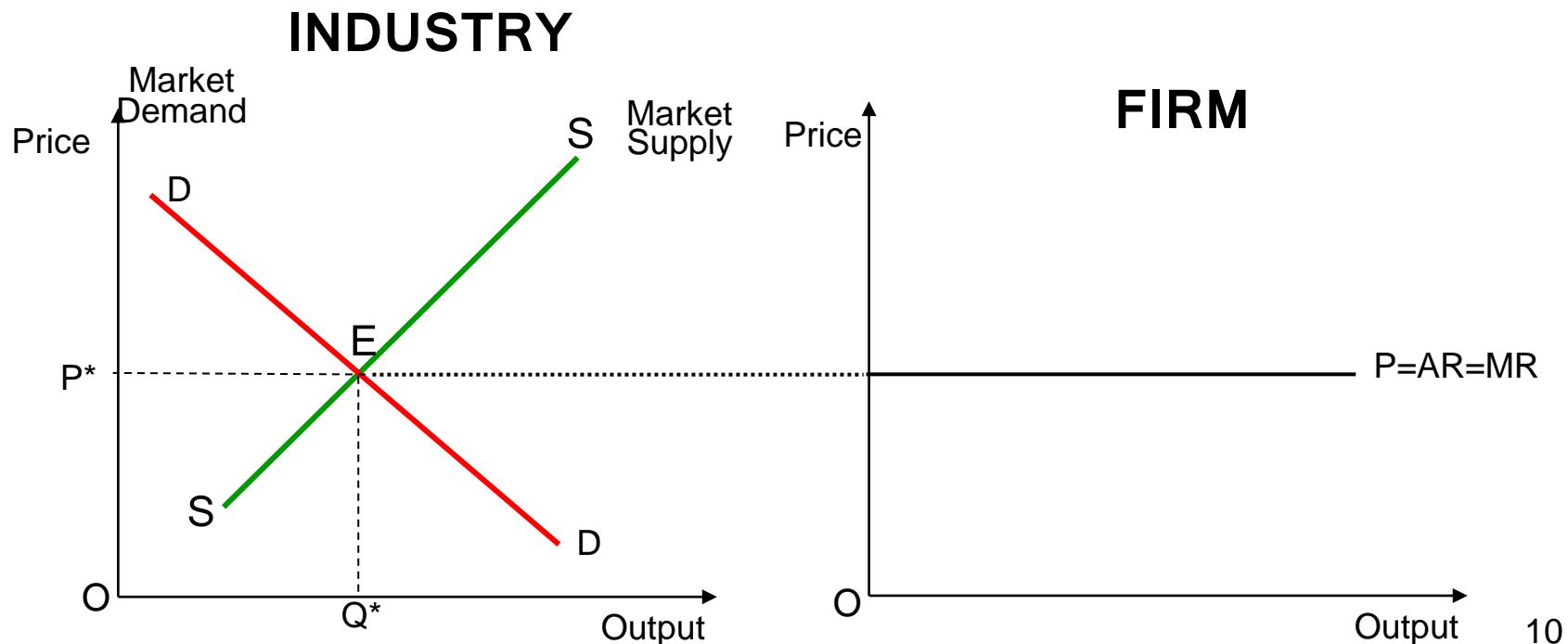
- Profit (Π) = TR - TC.
- Profit curve (Π) begins from the negative axis, implying that the firm incurs losses at an output less than OQ_1 .
- At point A, i.e. output Q_1 firm earns no profit no loss.
- Firm earns maximum profit at output OQ^* .
- At point B, $TR=TC$ again; profit is equal to zero, at output OQ_2 .
- Rational firm would try to maximise profit.

Market Demand Curve and Firm's Demand Curve

- The market demand curve for the whole *industry* is a standard downward sloping curve.
 - An individual buyer is able to get the maximum amount of output at each existing price, at a given time.
- The market demand curve is the horizontal summation of individual demand curves..
- The demand curve for an individual firm is a horizontal straight line showing that
 - the firm can sell infinite volume of output at the same price.

Market Demand Curve and Firm's Demand Curve

- Market equilibrium is at the point of intersection (E) of the market demand and market supply curves, where equilibrium output for the industry is given at Q^* and price at P^* .
- Each perfectly competitive firm, being a price taker, takes the equilibrium price from the market as given at P^* .



Market Demand Curve and Firm's Demand Curve

- Since a firm can sell all it wants at this price, it faces a perfectly elastic demand curve for its product hence the demand curve is straight horizontal line.
- It is not worthwhile for the firm to offer any quantity at a lower price, since it can sell as much as it wants at the prevailing market price.
- If it tries to charge higher price its demand will fall to zero.
- Hence Total Revenue (TR) of a firm would increase at a constant rate, i.e. Marginal Revenue would be constant.
 - Average Revenue will be equal to Marginal Revenue.
- Hence the demand curve, coincides with the AR and MR curves.

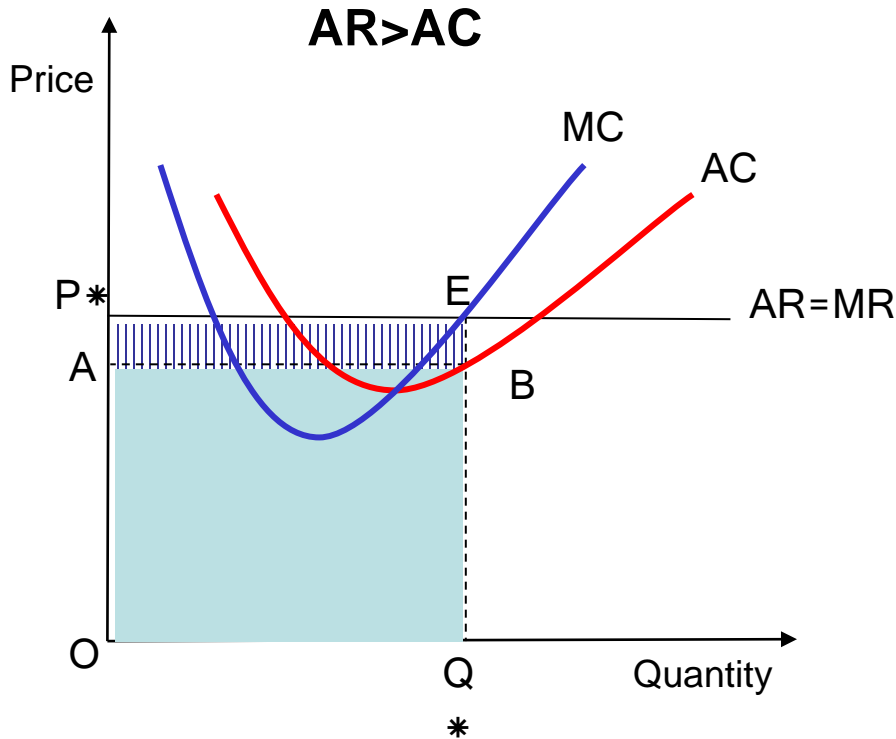
Equilibrium of Firm

- Two conditions must be fulfilled for a profit maximizing firm to reach equilibrium:
 - **First order condition:** $MR=MC$ or $\frac{d\pi}{dQ} = \frac{dR(Q)}{dQ} - \frac{dC(Q)}{dQ} = 0$
 - **Second order condition:** Slope of MR curve $<$ MC curve or $\frac{dMR}{dQ} - \frac{dMC}{dQ} < 0$
- The second order condition is a sufficient condition, because if the inequality sign is reversed, we arrive at a point of loss maximization.

Short Run Price and Output for the Competitive Industry and Firm

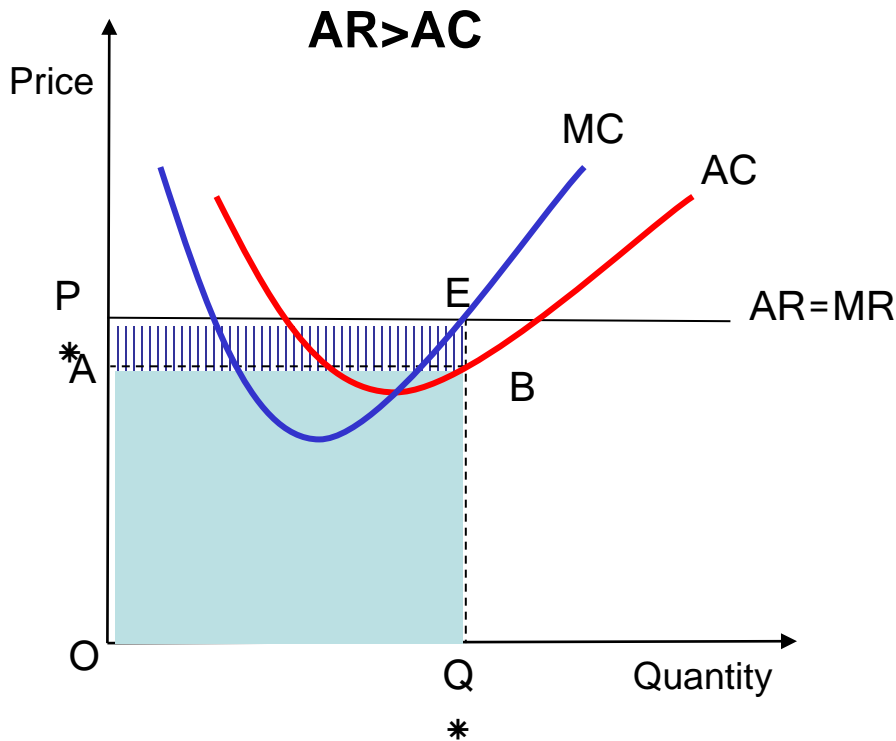
- In short run an individual firm may be in equilibrium and may earn
 - Supernormal profit: $AR > AC$
 - Normal profit: $AR = AC$
 - Losses: $AR < AC$

Supernormal Profit



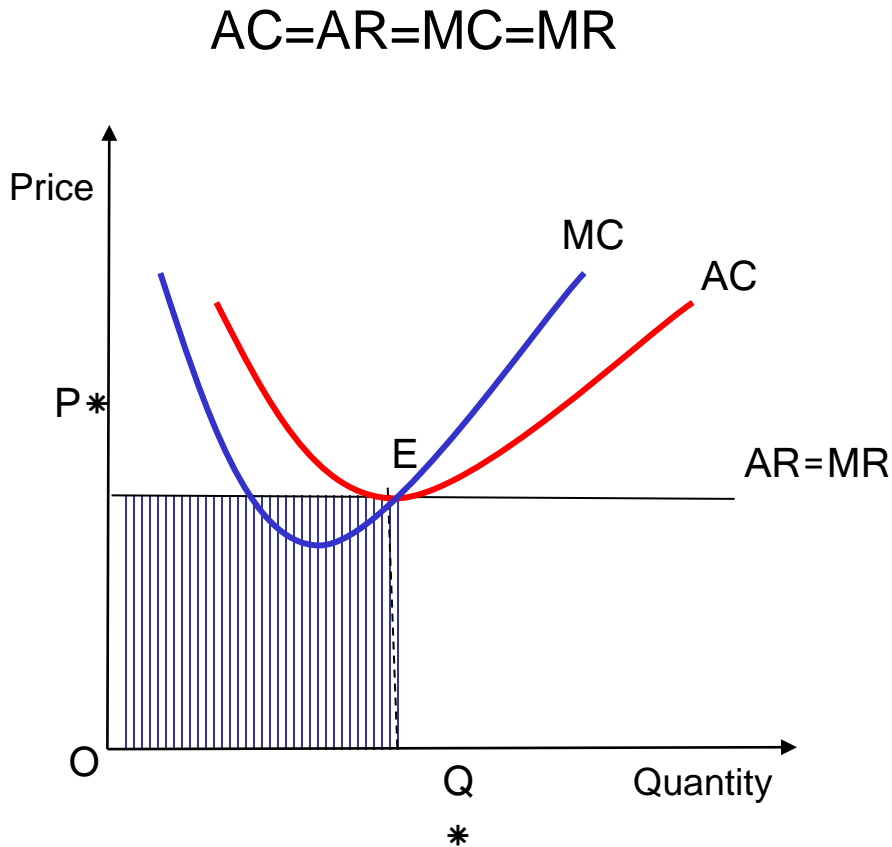
- Firm is in equilibrium at OQ^* output at market price P^* , where both the conditions of equilibrium are fulfilled.
- $TR = OP^*EQ^*$ ($TR = AR \cdot Q$)
- $TC = OABQ^*$ ($TC = AC \cdot Q$)
- Profit = AP^*EB
 $= (OP^*EQ^* - OABQ^*)$
- This is the supernormal profit made by the firm in the short run, because the market price P^* (AR) is greater than average cost.

Supernormal Profit



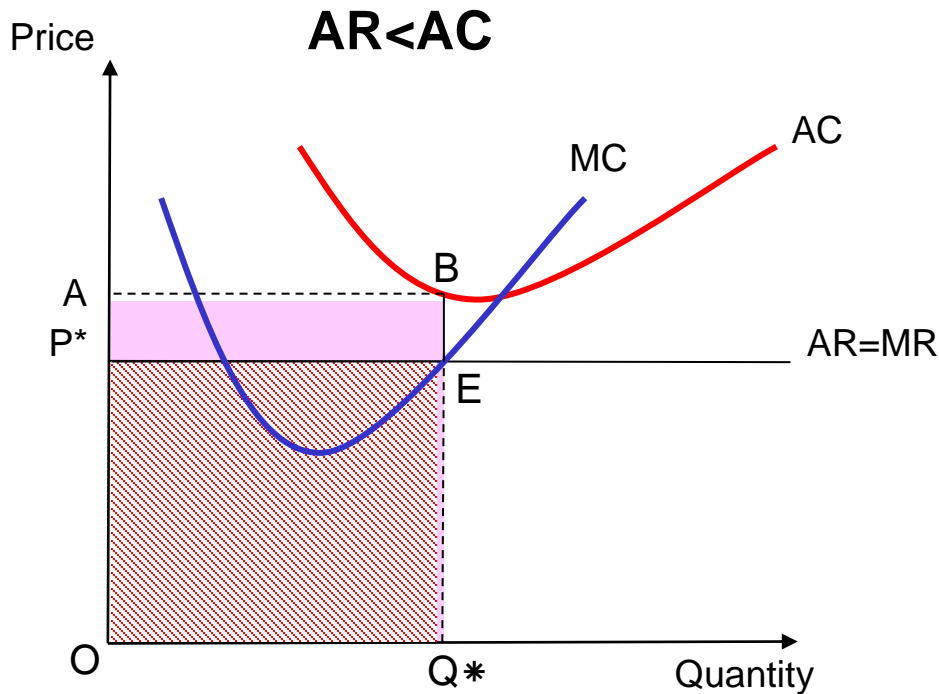
- Firm is in equilibrium at OQ^* output at market price P^* , where both the conditions of equilibrium are fulfilled i.e. point E.
- $TR = OP^*EQ^*$ ($TR = AR \cdot Q$)
- $TC = OABQ^*$ ($TC = AC \cdot Q$)
- Profit = AP^*EB
 $= (OP^*EQ^* - OABQ^*)$
- This is the supernormal profit made by the firm in the short run, because the market price P^* (AR) is greater than average cost.

Normal Profit



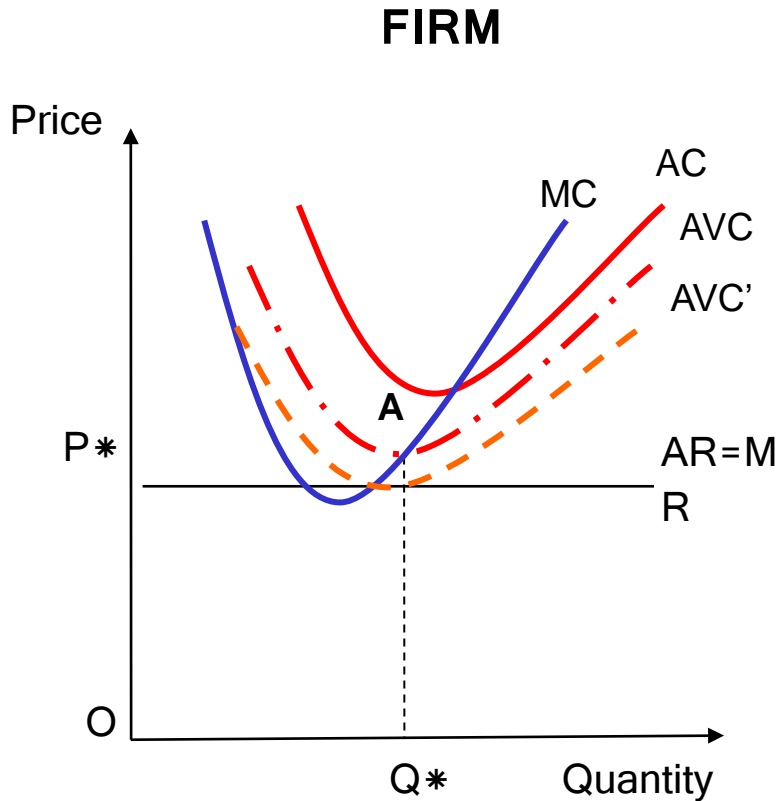
- In the short run some firms may earn only normal profit (when average revenue is equal to average cost).
- Firm is in equilibrium at OQ^* output at market price P^* , where both the conditions of equilibrium are fulfilled.
- $TR = OP^*EQ^*$
- $TC = OP^*EQ^*$
- $TR = TC$
- Firm makes normal profit, and actually ends up producing at the break even level of output.

Subnormal Profit (or Loss)



- Firm is in equilibrium at OQ^* output at market price P^* , where both the conditions of equilibrium are fulfilled (point E).
- $TC = OABQ^*$
- $TR = OP^*EQ^*$
- **Loss = P^*ABE**
 $= OP^*EQ^* - OABQ^*$
- The firm incurs loss or subnormal profit in the short run because the AC of producing this output is more than the market price hence $TR < TC$.
- The firm continues to produce at loss in the short run in anticipation of price rise.

Exit or Shut Down of Production



- A firm incurring losses in the short run will not withdraw from the market, but will wait for market conditions to improve in the long run.
- Firm would continue production till price $>$ average variable cost ($P > AVC$ or $AR > AVC$).
- Point A denotes the shut down point, where price $P^* = AVC = AR$.
- Any increase in VC above A or any fall in market price below P^* will cause the firm to shut down.

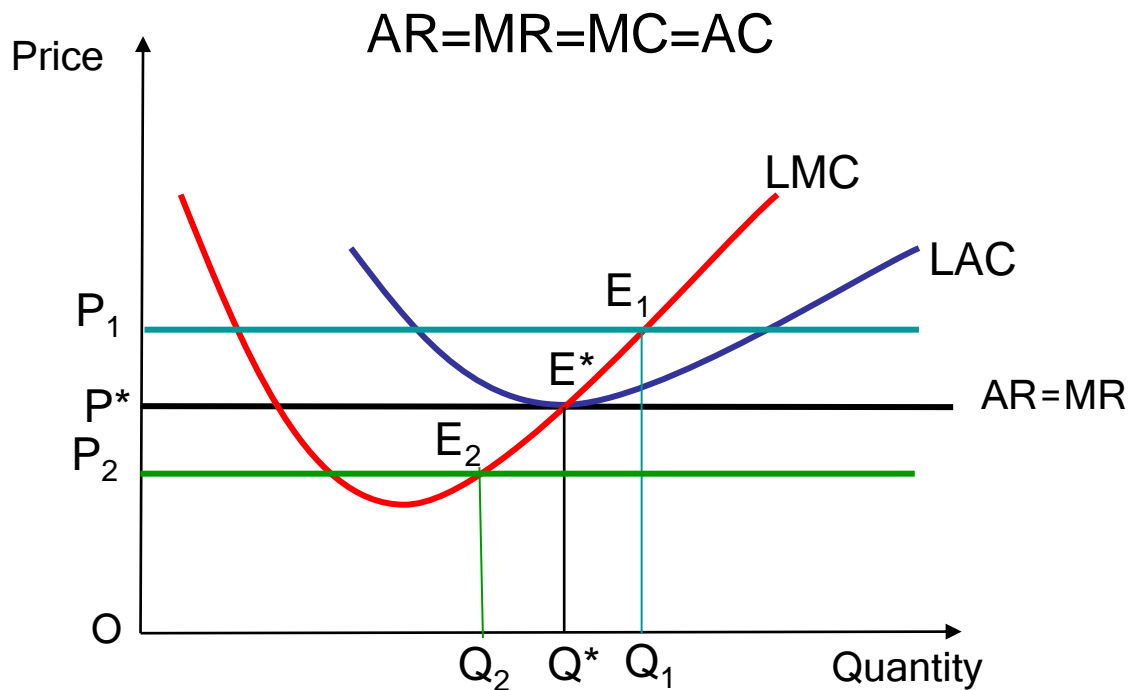
Market Supply Curve and Firm's Supply Curve

- **Condition I:** If $\text{Price} < \text{minimum AVC}$, then shut down
 - For such price, the supply curve would coincide with the vertical axis.
- **Condition II:** If $\text{Price} \geq \text{minimum AVC}$, then choose any output that would maximize profit.
- For any price above minimum AVC, the firm would choose an output level that would satisfy the conditions of profit maximization.
 - The supply curve of the firm would be identical to the short run marginal cost curve *above* the minimum point of the AVC curve.

Long Run Price and Output for the Industry and the Firm

- In the long run perfectly competitive firms earn only normal profits.
 $AR=MR=MC=AC$
- The reason is the unrestricted entry into and exit of firms from the industry in the long run.
- When existing firms enjoy supernormal profits in the short run new firms are attracted to the industry to gain profits.
 - The supply of the commodity in the market increases. Assuming no change in the demand side, this lowers the price level.
- When firms are making losses in the short run, some may be forced to leave the industry in the long run.
 - Their exit from the industry causes a reduction in the supply of the product and as a result the equilibrium price rises.
- This process of adjustment continues up to the point where the price line becomes tangential to the AC curve.

Long Run Price and Output for the Industry and the Firm



- Prevailing price is OP_1 , Equilibrium at Point E_1 and Output OQ_1

- Firms earn supernormal profit ($AR > AC$)

- This will attract more firms, increase in supply will reduce the price till $AC = AR$, i.e. at P^*

- Prevailing price is OP_2 , Equilibrium at Point E_2 and Output OQ_2

- Firms earn loss ($AR < AC$)

- Some firms will exit, decrease in supply will increase the price till $AC = AR$, i.e. at P^*

Problem-1

- Suppose a new bakery shop AB opens in BBSR. The average price of a medium bread say 10 rupees and because of large no. of bread sellers, this price will not be affected by the new entrants in the market. The owner of AB estimates that monthly total cost, including normal profit, will be
- $TC=1,000+2Q+0.01Q^2$

To maximize total profit, how many breads to be produced each month? In the short run, how much extra profit will the business earn each month.

Problem-2

- A Furniture manufacture faces a horizontal demand curve. The firm's total costs are given by the equation

$$TVC = 150Q - 2Q^2 + Q^3$$

where Q is the quantity. Below what price should the firm shut down operations?