19 February 2024 08:19 PM

Market Structure

Perfectly Competetive Market:

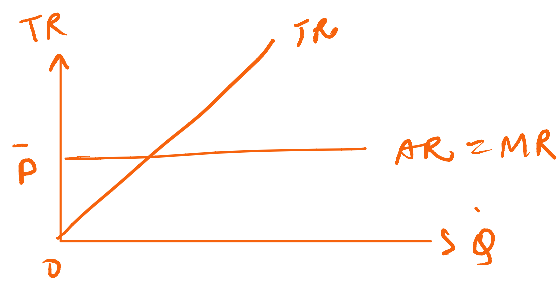
1. infinitely large buyers and sellers.
2. Sellers are price takers. Prices are takes as given. ie. $P = \bar{P}$ const.
3. homogenous/identical products and perfect substitutes.
4. Free entry and free exit.
5. Perfect knowledge among buyers and sellers.
6. Free factor mobility.
7. There is no transportation cost.

Revenue Curves under Perfect Competion

① $TR = P \times Q = \bar{P} \times Q \quad [\because P = \bar{P}]$

Slope of TR $= \dfrac{dTR}{dQ} = \bar{P} =$ const.

or $MR = \bar{P} =$ cons



② $AR = \dfrac{TR}{Q} = \dfrac{\bar{P} \times Q}{Q} = \bar{P}$

↳ demand curve of

firm
AR is a horizontal line which is perfectly elastic
only in a perfectly competitive market
$\boxed{MR = AR = \bar{P}}$

Objective of the firm is to maximise profit

$\pi = TR - TC$

F.O.C $\frac{\partial \pi}{\partial Q} = 0$

$\frac{\partial TR}{\partial Q} - \frac{\partial TC}{\partial Q} = 0$

$MR - MC = 0$

$\boxed{MR = MC}$ ← Necessary condition.

S.O.C $\frac{\partial^2 \pi}{\partial Q^2} < 0$

$\frac{\partial^2 TR}{\partial Q} - \frac{\partial^2 TC}{\partial Q^2} < 0$

Slope of MR − Slope of MC < 0

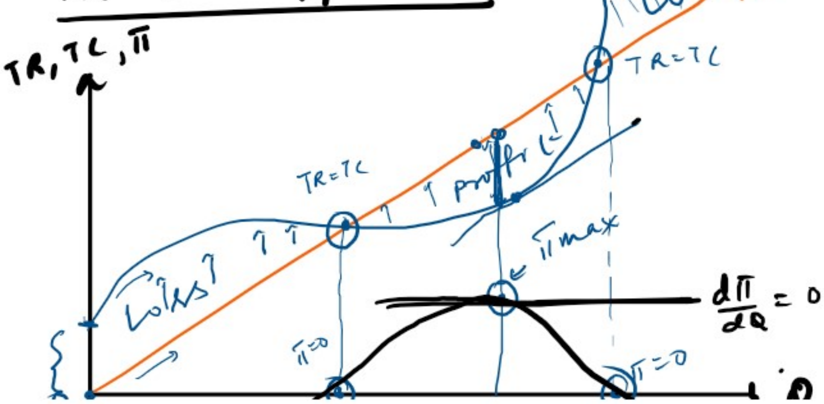
$\boxed{\text{slope of MR} < \text{slope of MC}}$

Sufficiency condition

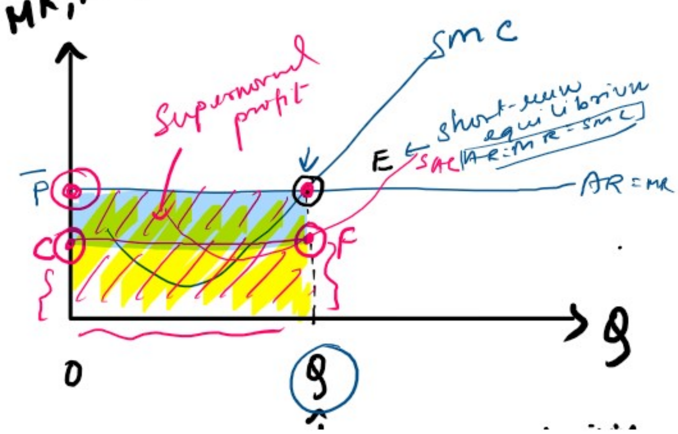
(*) only in P.C, we have
$\boxed{AR = MR = MC = \bar{P}}$

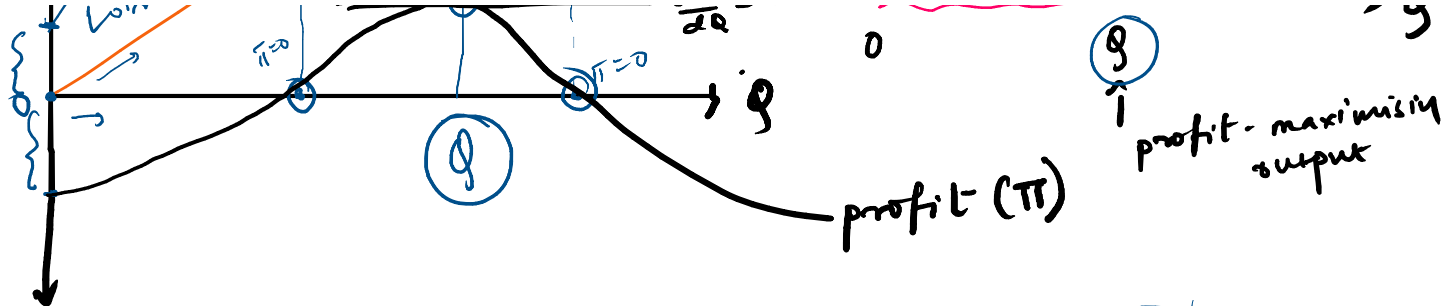
Short-run equil.

TR−TC Approach

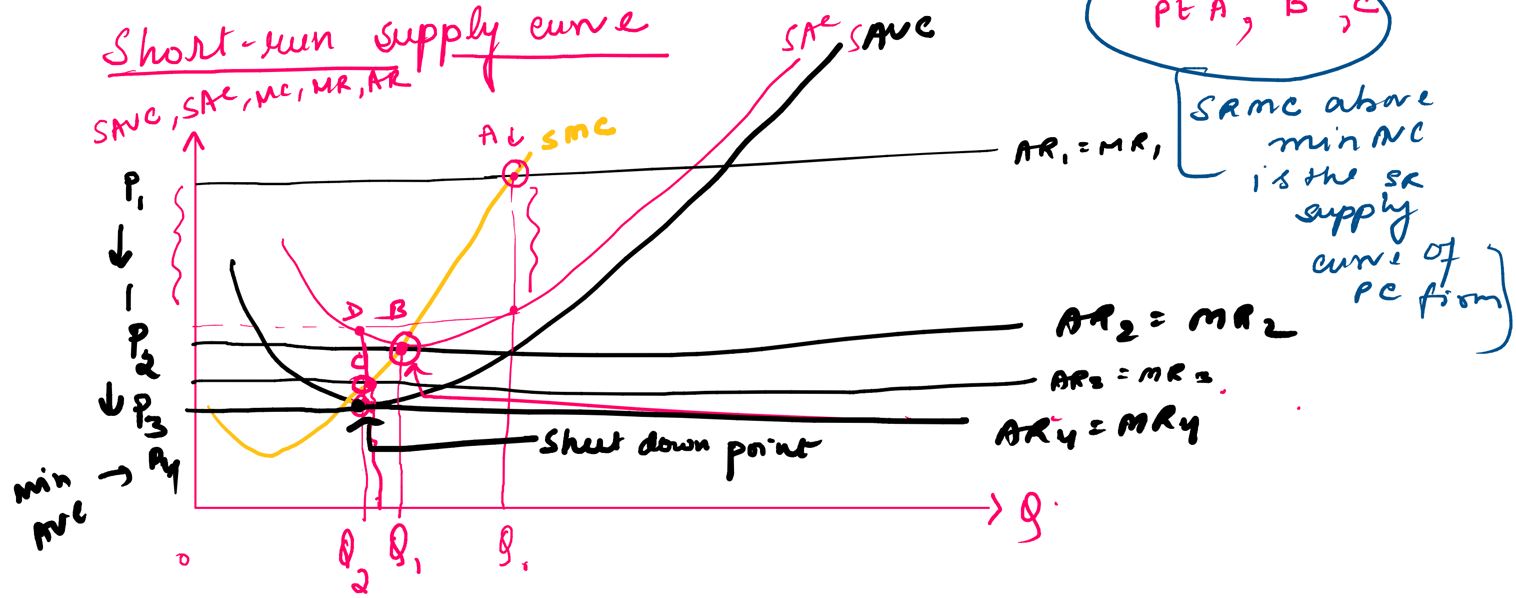


MR−MC Approach





Short-run supply curve



Suppose $p < AVC$

$pq < (AVC)\,q$

$TR < TVC$

$TR < TC - TFC$

$TR - TC < -TFC$

$\boxed{TC - TR} > \boxed{TFC}$

Loss > TFC

Let the cost function of ith firm be

$$c = c_i(q_i)$$

then $\dfrac{\partial c}{\partial q_i} = c'(q_i) = mc$

Given the market price (p) the supply function of the firm is given by

$$\begin{cases} S_i = S_i(P) & \text{for } p \geq \text{min AVC} \\ \quad = 0 & \text{for } p < \text{min AVC} \end{cases}$$

Suppose there are N identical firms, then

$\boxed{\text{market supply}}$ is $S = \sum^{N} S_i(p)$

" $\boxed{\text{market supply}}$ is $S = \sum_{i=1}^{N} S_i(p)$

$$= \boxed{N \times S_i(p) = S(p)}$$

Q. Let the total cost curve is given by
$C_i = 0.1 q_i^3 - 2q_i^2 + 15 q_i + 10.$
Derive the short-run supply curve of a perfectly competitive firm.

$MC_i = 0.3 q_i^2 - 4q_i + 15$

At equil $MC_i = p$

$\therefore 0.3q_i^2 - 4q_i + 15 = p$

or, $0.3 q_i^2 - 4q_i + (15 - p) = 0$

$\therefore q_i = \dfrac{4 \pm \sqrt{16 - 1.2(15-p)}}{0.6}$

$= \dfrac{4 \pm \sqrt{16 - 18 + 1.2p}}{0.6}$

$$\boxed{q_i = \dfrac{4 \pm \sqrt{1.2p - 2}}{0.6}}$$

$C_i = 0.1 q_i^3 - 2q_i^2 + 15 q_i + 10$

$AVC_i = 0.1 q_i^2 - 2q_i + 15$

F.O.C $\quad \dfrac{\partial AVC_i}{\partial q_i} = 0$

$$0.2q_i - 2 = 0$$

$$\boxed{q_i = 10 \text{ units}}$$

$\therefore \min AVC_i = 0.1 \times 10^2 - 2 \times 10 + 15$

$= 10 - 20 + 15 = 5$

$$\therefore \boxed{\min AVC_i = 5}$$

$S_i = \dfrac{4 \pm \sqrt{1.2P - 2}}{0.6}$ for $P \geq 5$

$= 0$ for $P < 5$.

For a market with 100 firms, the market supply curve will be

$S = 100 \times \left[\dfrac{4 \pm \sqrt{1.2P - 2}}{0.6}\right]$ for $P \geq 5$

$= 0$ for $P < 5$

— * —

Longrun equil: $\boxed{SAC = SMC = LMC = MR = AR}$ ($= LAC$)

↓

Normal profit

Break-even point.

Break-even |