05/03/19 (Production and cost)

→ Production is value addition process.

→ Short term: $Q = f(L, \bar{K})$ ← fixed.
L: Labour

long run: $Q = f(L, K)$ K: capital

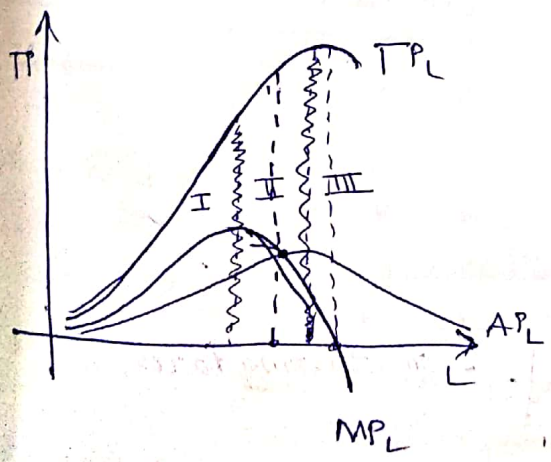
→ Q: Total Product

→ Average Product $= \frac{TP}{L}$

Marginal Product$_L$ $= \frac{dTP}{dL}$

* $Q = -L^3 + 15L^2 + 10L$ (Short run)

∴ for different L: different Q



* law of diminishing marginal ~~Labour (something)~~ return.

* → more and more amount of variable input to fixed input then rate of output increase decreases.

* All other factors constant : If Average production decreases then, no more labour input.

* $Q = AK^{\alpha}L^{\beta}$ cobb Douglas functional form.

laws of returns to scale

$hQ = A(kK)^{\alpha}(kL)^{\beta}$

$hQ = k^{\alpha+\beta} AK^{\alpha}L^{\beta}$

{ Homogenous of degree $\alpha+\beta$.

If $\alpha+\beta > 1$: law of increasing return to scale $(h > k)$

$\alpha+\beta = 1$: law of constant return to scale $(h = k)$

$\alpha+\beta < 1$: " " decreasing " " $(h < k)$

19/08/19

$MP_K = \frac{dQ}{dK} = \alpha A K^{\alpha-1} L^{\beta}$

$= \alpha A \left(\frac{K}{L}\right)^{\alpha-1}$

$MP_L = \beta A \left(\frac{K}{L}\right)^{1-\beta}$

$\ln Q = \ln A + \alpha \ln K + \beta \ln L$ → smoothening factor.

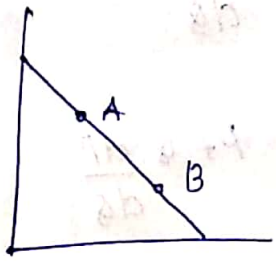
$\frac{dQ}{dK} \cdot \frac{K}{Q} = \alpha$ (elasticity)

* α and β represent distributive share of production wrt capital and labour.

Price elasticity of demand

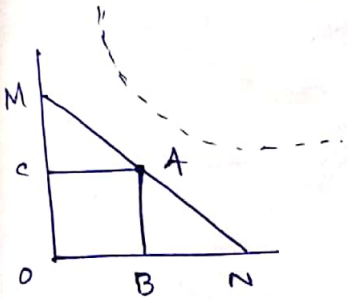
e_p = % change in quant demanded / % change in price of commodity

Arc = $\frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$



Point Elasticity: $-\frac{dQ}{dP} \cdot \frac{P}{Q}$

*



$e = -\frac{dQ}{dP} \cdot \frac{P}{Q} = \frac{BN}{AB} = \frac{\Delta B}{OB} = \frac{AN}{AM}$

$e_p = \frac{\text{lower segment}}{\text{upper segment}}$

26/03/19

Determinants of Elasticity

$e = 1 \Rightarrow$ unitary elasticity

~~e = 1~~

* $Q = a - bP \Rightarrow e = -b\frac{P}{Q}$

$Q = aP^{-b} \Rightarrow e = -b$

Luxury good: high elasticity.

* for profit: at high elasticity reduce price marginally

∴ (I) Nature of commodity.

(II) Proportion of income spent on commodity.

(III) Time factor for adjusting to change.

(IV) Possibility of reduction in consumption of a commodity.

$T.R. = P * Q$

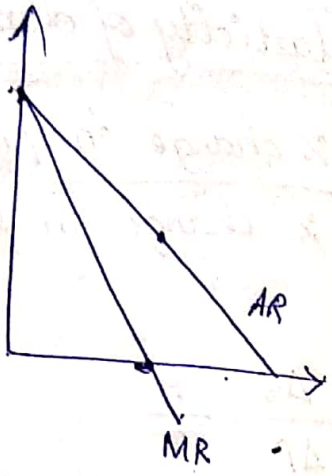
$A.R = \frac{TR}{Q} = P$

$MR = \frac{d(TR)}{dQ}$

$= P + Q \cdot \frac{dP}{dQ}$

$= P\left(1 + \frac{Q}{P} \cdot \frac{dP}{dQ}\right)$

$$\boxed{MR = P\left(1 - \frac{1}{e_p}\right) = AR\left(1 - \frac{1}{e}\right)}$$



Income elasticity

$$e_i = \frac{\% \text{ change in demand}}{\% \text{ change in income}}$$

$= \frac{dQ}{dH} \cdot \frac{H}{Q}$

Cross Elasticity

$$e_c = \frac{\% \text{ change in demand of } X}{\% \text{ change in ~~demand~~ price of } Y}$$

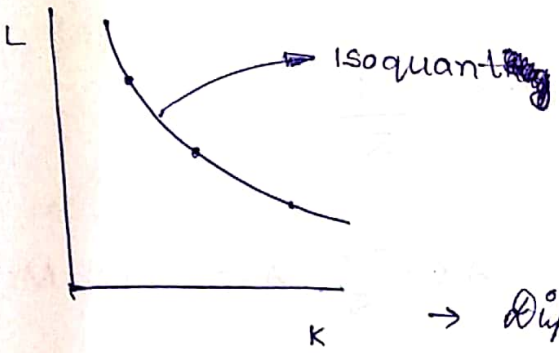
$e_{t,c} = \frac{dQ_t}{dP_c} \cdot \frac{P_c}{Q_t}$

Elasticity of supply

$$e_s = \frac{\%\ \text{change in quantity supplied}}{\%\ \text{change price of good.}}$$

$$= \frac{dQ_s}{dP} \cdot \frac{P}{Q_s}$$

* Isoquant

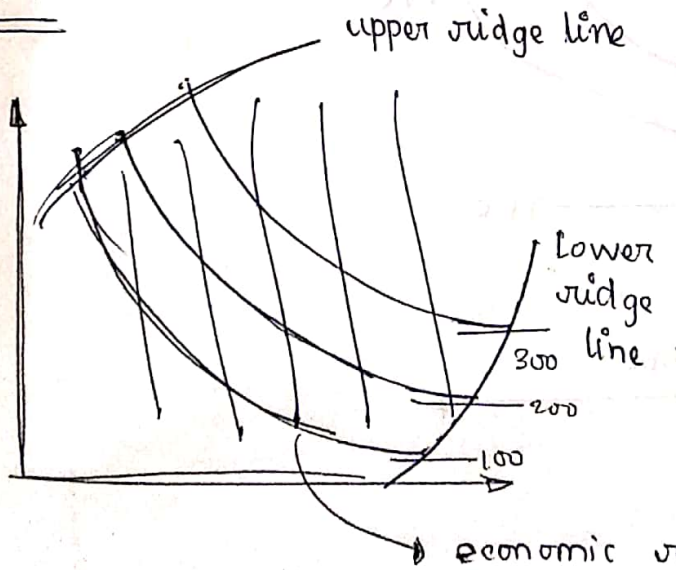


→ Output same but some Labour intensive, some capital intensive.

→ Different combinations of Labour and capital to produce same output

Properties same as indifference curve.

2/4/19



economic region of production.
(slope -ve)

Short Run Production (all inputs fixed)

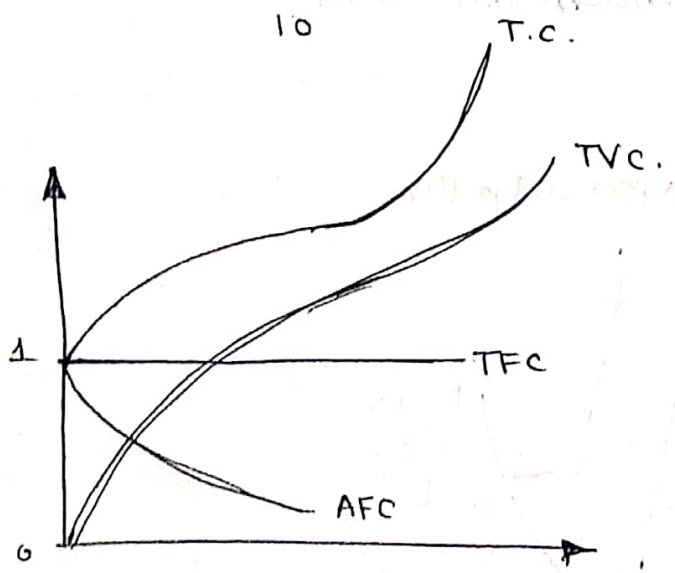
Total cost = $10 + 6Q - 0.9Q^2 + 0.05Q^3$

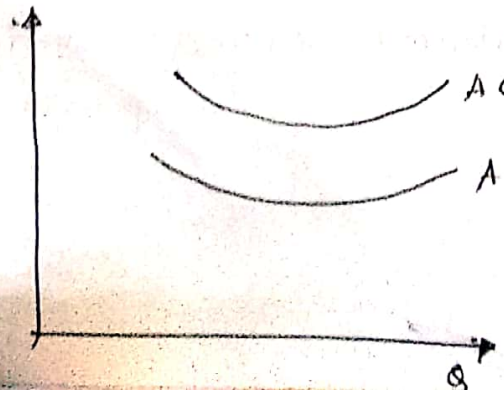
- 10 → total fixed cost
- $6Q - 0.9Q^2 + 0.05Q^3$ → total variable cost.

Average cost = $\frac{T.C}{Q}$ $\qquad$ $M.C = \frac{d(TC)}{dQ}$

$A.V.C = \frac{T.V.C}{Q}$ $\qquad$ $AFC = \frac{TFC}{Q}$

Q	TC	TFC	TVC	$A.C = \frac{T.C}{Q}$	AFC	AVC	MC
1		10					
2		10					
3		10					



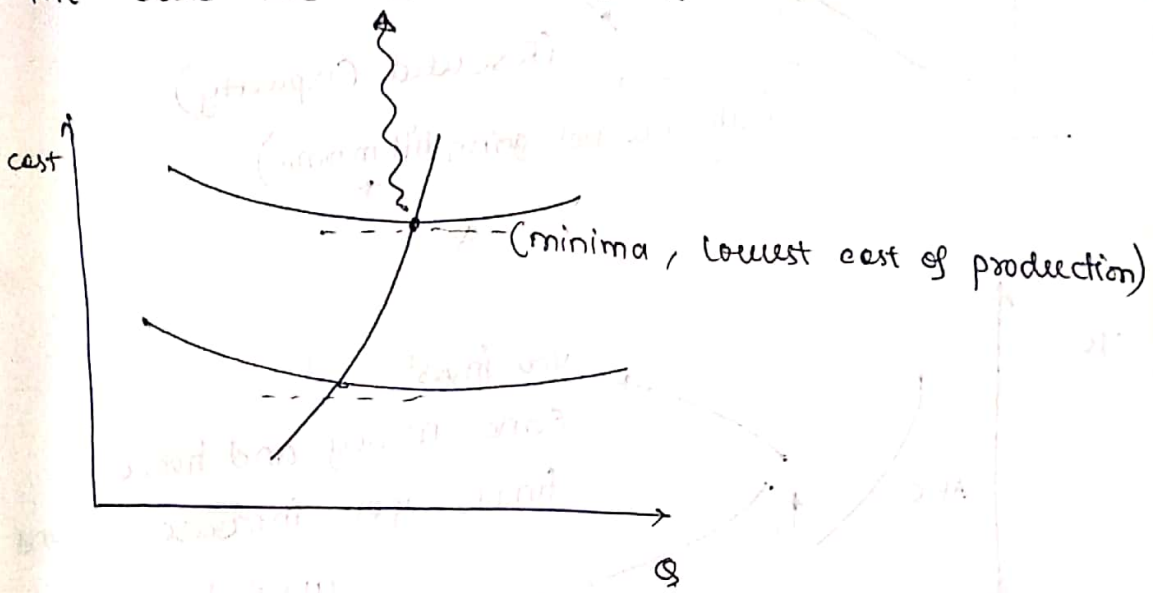


now $M.C. = \frac{dT.C}{dQ} = \frac{d(AC.Q)}{dQ}$

$= Q.\frac{dAC}{dQ} + AC$

$\frac{dAC}{dQ} = \frac{1}{Q}(M.C - A.C)$

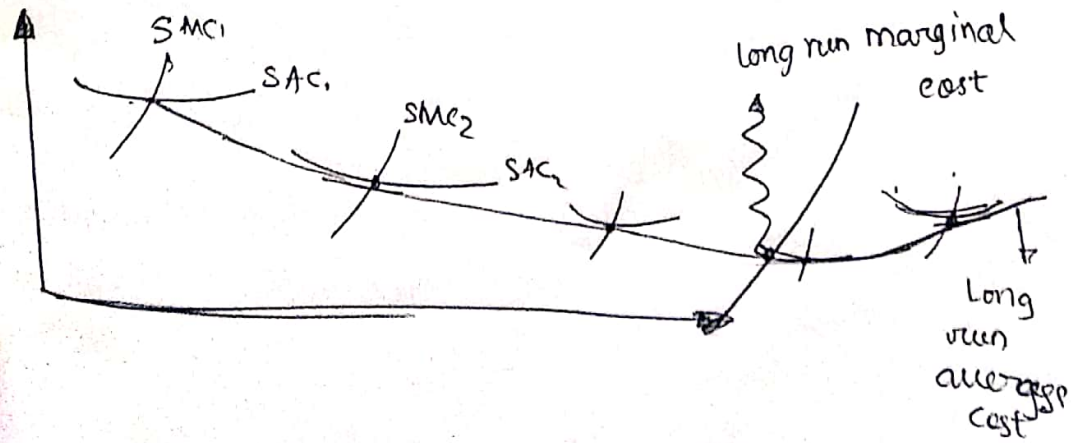
MC cuts AC at its Minima



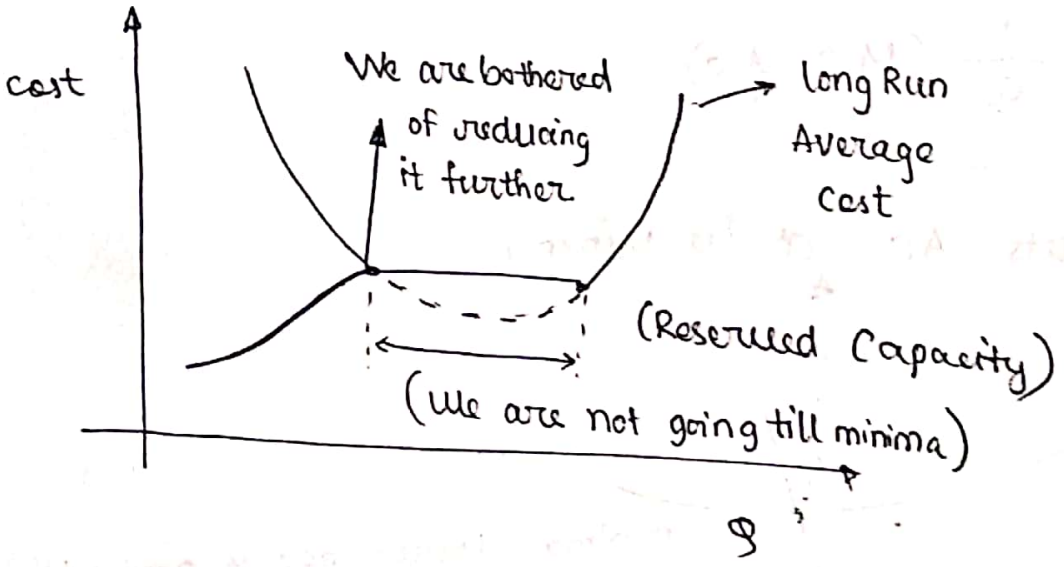
Total profit : $\Pi = TR - TC$

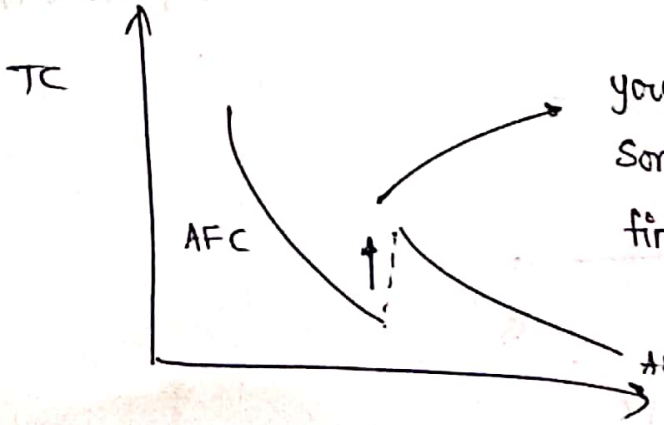
(PQ)

Long Run Production. (sum of short runs)



Due to inefficiencies in the process of production we are always producing in the negatively sloped region of cost-q curve





you invest some money and hence finally you increase q and also ↓ cost of production

09/01/19

Opportunity cost

→ return lost by not taking 2nd best preference.

* Business cost & full cost
  ↓
  along with BC
  Opportunity cost and ~~return~~
  minimal profit

* Explicit cost : Appearing on account
  Implicit cost : Imputed cost of family labour
  (no salary)

* private cost, social cost = private + external cost

* External cost

Economies in scale, diseconomies in scale → average cost goes up

* Average Cost decreases by increase in scale.
* Average cost decreases by
  → increase efficiency.
  → Reduce other cost