→ Humans tend to maximize wellness with limited money

→ Utility of a product changes with time & place

→ Every product has a point of saturation after which its utility vanishes

→ People who quantify (measure) utility in terms of money etc. are called cardinalist i.e. measured in quantitative terms.

(according to a cardinalist)

1st	10/-
2nd	8/-
3rd	5/-
4th	1/-

$MU_{1st} = \frac{10-0}{1-0} = \frac{10}{-}$

$MU_{2nd} = \frac{18-10}{2-1} = \frac{8}{-}$

$MU_{3rd} = \frac{23-18}{3-2} = \frac{5}{-}$ and so on.

Marginality → ΔTU → change in total utility

ΔC → change in quantity

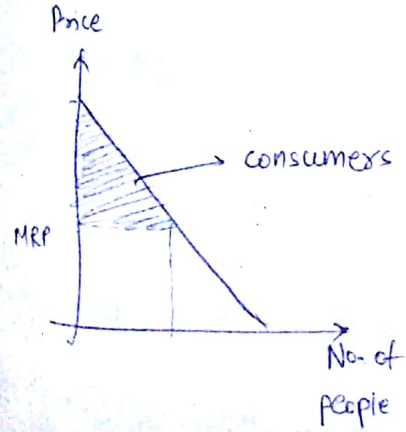
marginal utility → the benifit gained from consuming each additional unit of a product or service

diminishing MU law → if a person increase the consumption of a single product keeping other products quantity const. then the utility derived from that product decreases on increase in quantity of that product.

→ Every one follows law of diminishing marginality

→ assumptions of a cardinalist → i) rational human beings.

ii) marginality of money remains constant.



consumers surplus (ready to give or more money than MRP (rates))

(we can see that if price will decrease, consumer surplus will increase)

law of equimarginal utility → As far as the utility is different (in terms of money), we can take a decision but as soon as marginality becomes equal we stop and take a call.

Cardinal

$MU_x = P_x \cdot MU_m$

- P_x: price we are ready to pay
- MU_m: marginal utility of money (assumed to be constant)

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = MU_m$$

Ordinal

In this method, the approach is you cant quantify utility.

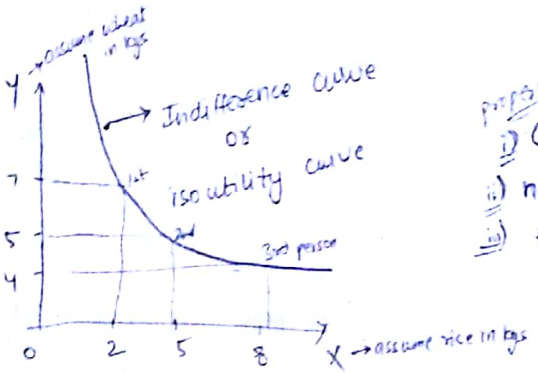
The utility is relative in nature (for ordinal approach)

$MU_m \neq$ constant

assumption i) transitivity → if $A > B$ (preference) & $B > C$ then $A > C$

ii) follows diminishing marginal rate of substitution

iii) humans are rational meaning normal behaviour patterns only.

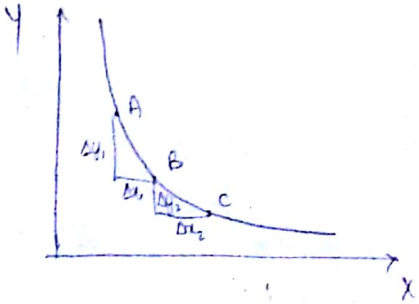


properties:

i) Convex to origin

ii) negative in slope

iii) two different curves never intersect



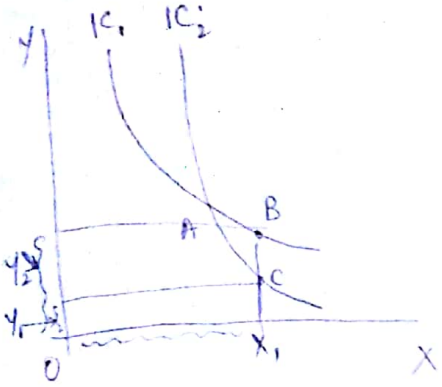
$$\frac{\Delta y_1}{\Delta x_1} > \frac{\Delta y_2}{\Delta x_2}$$

thus represents diminishing marginal rate of substitution

The amount of Y agent to give up for more X for increase in qty of X.

Budget

(learn the previous pdf online, it can come in exams)



wrt X, we obtain 2 Ys

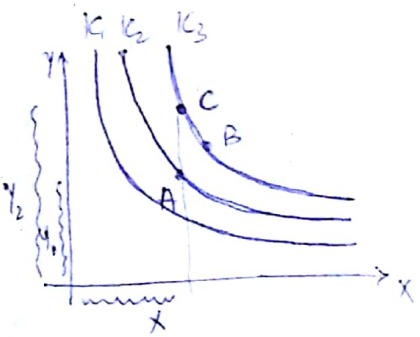
when Y is more, utility more.

wellness is more in B.

Utility (B) > Utility (C).

therefore according to transitivity, this is not possible.

Hence the graphs cant intersect.



for B & C, utility same

for A & C, Utility (C) > Utility (A)

hence Utility (B) > Utility (A)

↑ higher the indifference curve, higher the utility

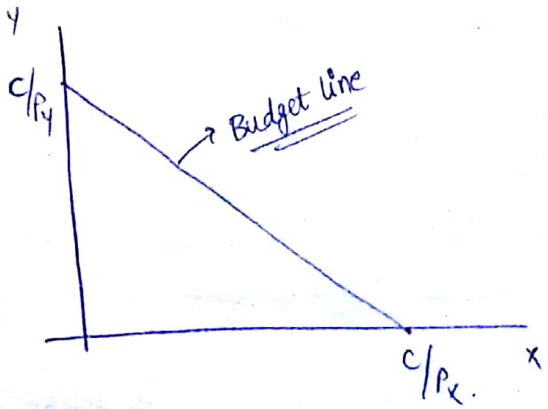
then why is this example not like the previous where we proved intersection is not possible?

3 Budget

$$C = P_x X + P_y Y.$$

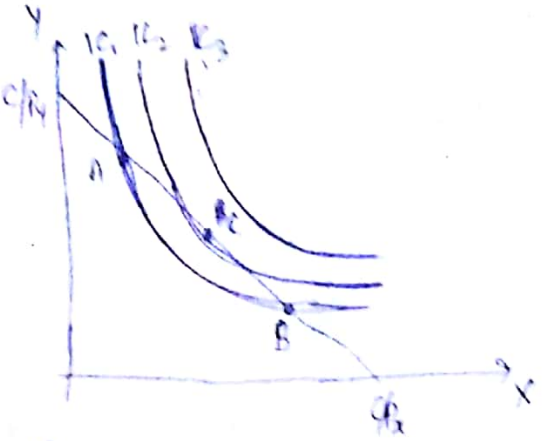
$$X = \frac{C}{P_x} - \frac{P_y \cdot Y}{P_x}$$

$$Y = \frac{C}{P_y} - \frac{P_x \cdot X}{P_y}$$



Any point on the line → Budget utilised

inside → not utilised outside → not possible



here, we will go for C

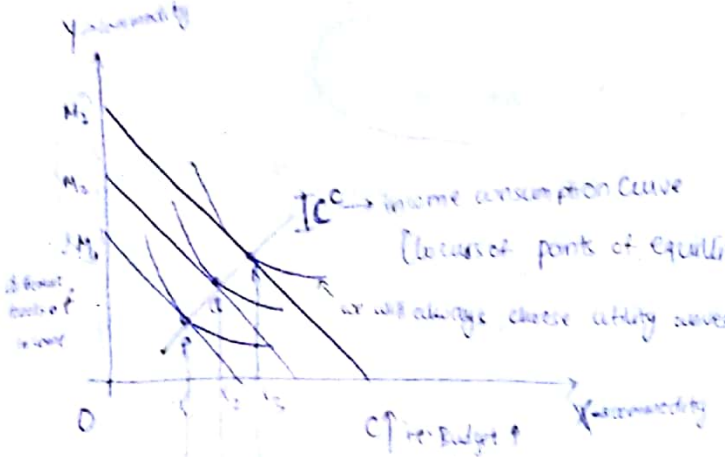
Because it is on higher utility curve

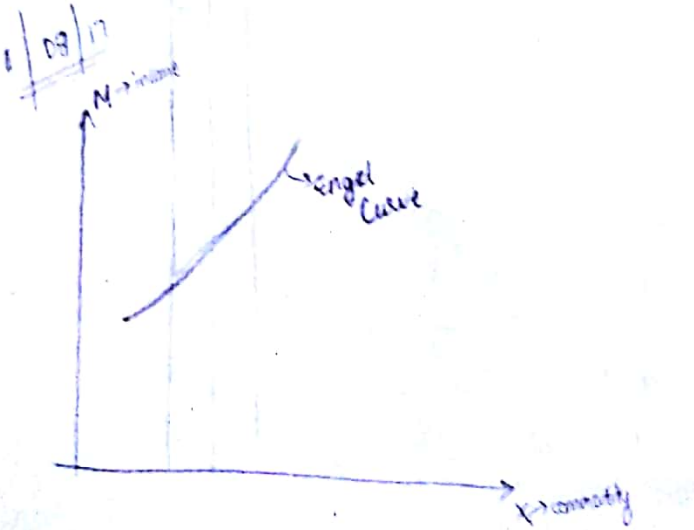
hence utility maximised over given budget constraints.

Conditions

① MRS = Px/Py

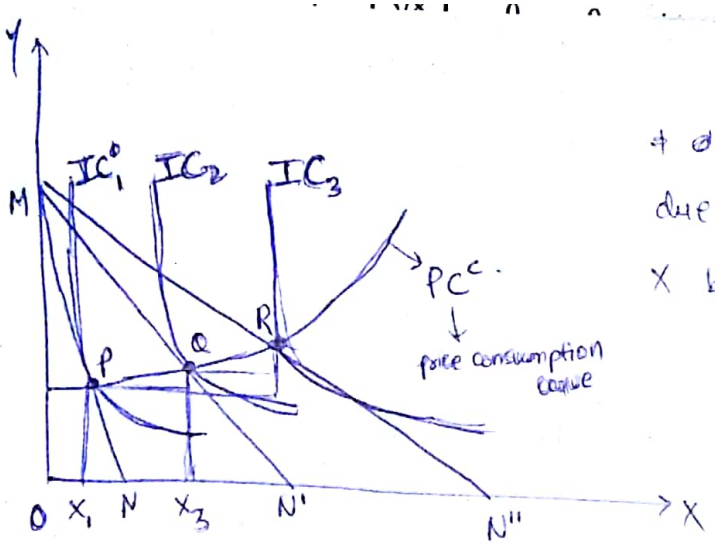
② 1st condition must be fulfilled at highest indifference curve





(curve quantity demand necessarily
orig X=Y.

(IC is a must for drawing Engel curve)



movement from N to N'

↳ change in price of X (decreased price)

due to decreased price, the amount of X bought will increase.

⇒ → price change is an outcome of income effect and substitution

⇒ things to look out b/w PC^c and IC^c

↓ the amount of Y is increasing but decrease in price of X and therefore increases in consumption of X but it is way more horizontal than IC^c at the beginning.

↓ the amount of Y increasing cost X is way more

Income effect

The feeling of increasing income with decrease in expenditure due to change in price of commodity in market.

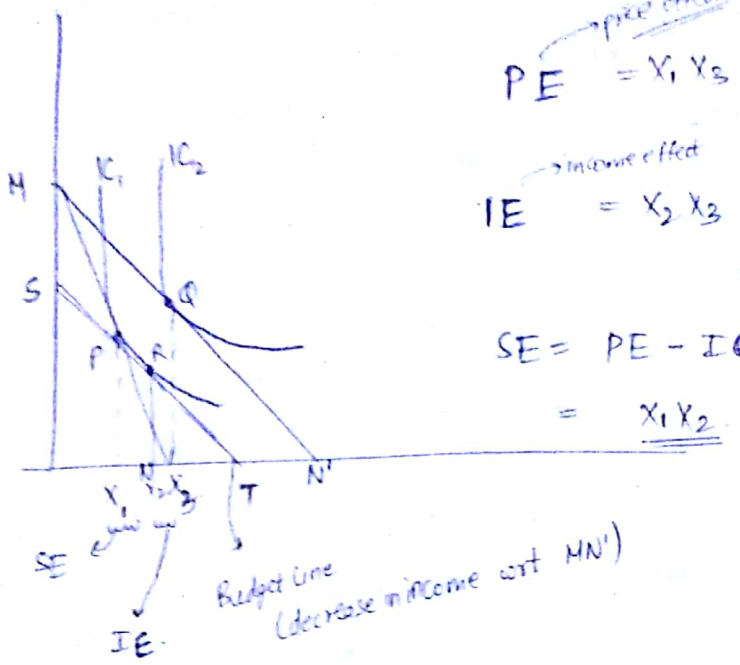
Eg: 50/- onion becomes 25/- ↳ we have extra 25/-

Substitution effect

Substituting one kind of product with another due to varying quality or if former then th going for cheaper product or so on.

Hicksian

Plot of inferior goods v/s essential goods.



PE (price effect) $= X_1 X_3$

IE (income effect) $= X_2 X_3$

$SE = PE - IE$

$= X_1 X_2$

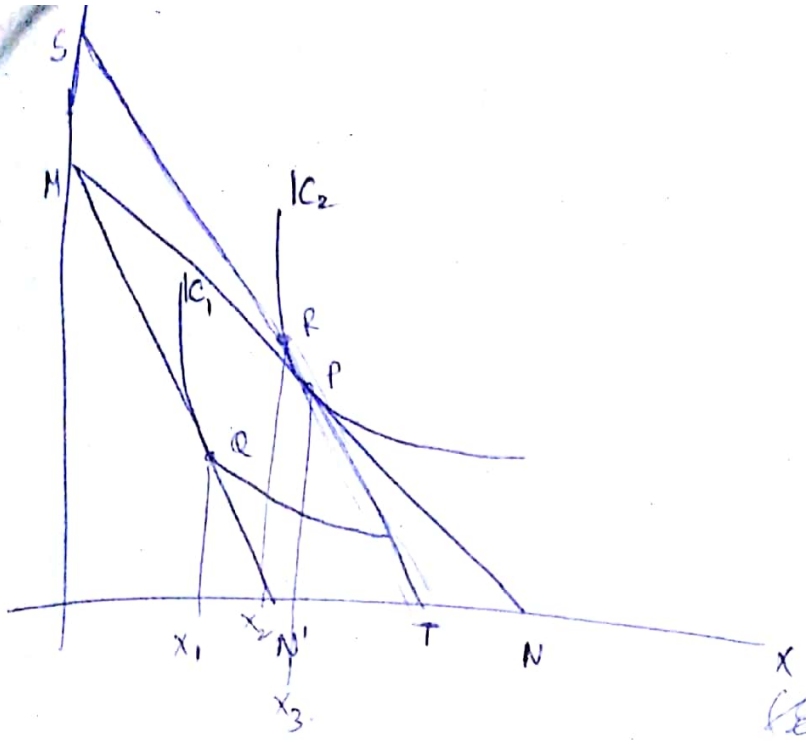
R → point of tangency of ST with IC_1

We move from Q to R · due to decrease in income

Price change is combo of IE and SE.

In Hicksian approach, to determine IE, SE, we will adjust income of consumer in such a way that he can attain the OG level of satisfaction in eqm.

In case of inferior goods, the substitution effect is negative



price of X ↑ so we move from $N \rightarrow N'$

IC_2 to IC_1.

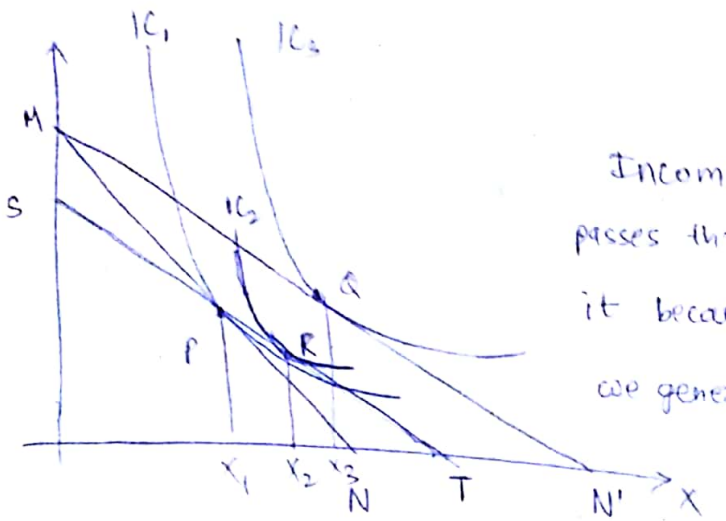
(essential goods)

If income increases, we move from IC_1 to IC_2 again to have more X.

$PE = X_1X_3$

$IE = X_1X_2$

$SE = X_2X_3$



Income decreases such that ST passes through P but we don't buy it because it is not eqm point we generate IC_2 tangent to ST such that R is generated.

$PE = X_1 X_3$

$IE = X_2 X_3$

$SE = X_1 X_2$

9/8/17

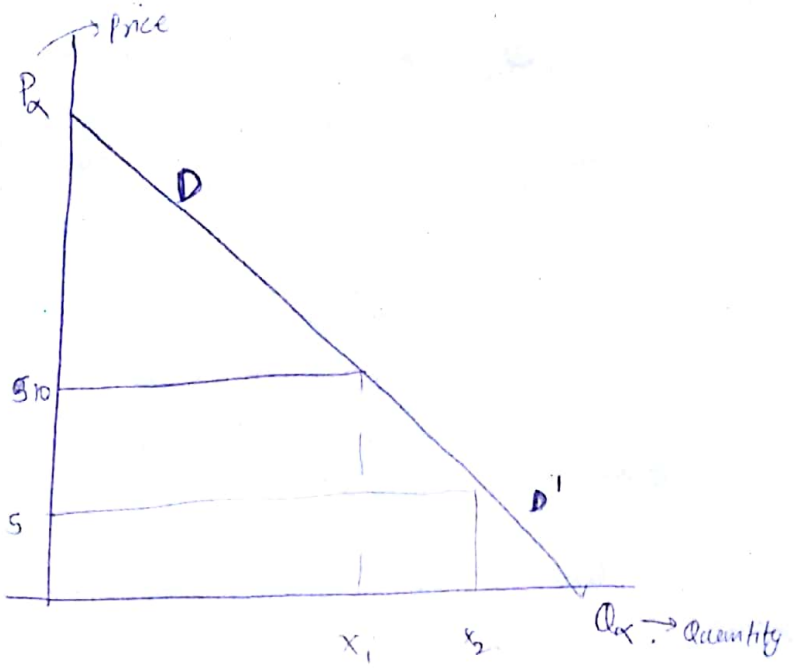
- demand → is the desire for ~~purchasing~~ product backed by purchasing power and the willingness to pay for it.

$Q_x = a - bP_x$

$Q_x = a P_x^{-b}$

$Q_x = \frac{a}{P_x + c} b$

$a, b, c > 0$



$Q_x = f(P_x, \ldots)$

↳ if the time is long, price is not the only factor affecting the demand.

These are 3 other influencers of demand:-

(i) Expectation of price increase after definite time and hence stocking.

(ii) Need on a particular day (functions, parties, gifts etc).

(iii) Giffen goods → any essential commodities exercised by poor households which comprise of a major portion of their income.

A) 10 kg @ 10/- → 100/-

B) 5 kg @ 30/- → 150/-

250/-

↳ Budget

price changed to 15/-

A amount ↑

B amount ↓

Because we want to satisfy our demand of 15kg food under the given budget hence we will purchase low quality A food rather than high quality B food and if budget is not fully spent, we will substitute A with B (SE).

(PE)

(IE combo of PE + SE)

$$Q_x = f(P_x, I, P_{c,s})$$

Q_x → demand, P_x → price, I → income, $P_{c,s}$ → Price of substituted complimentary items

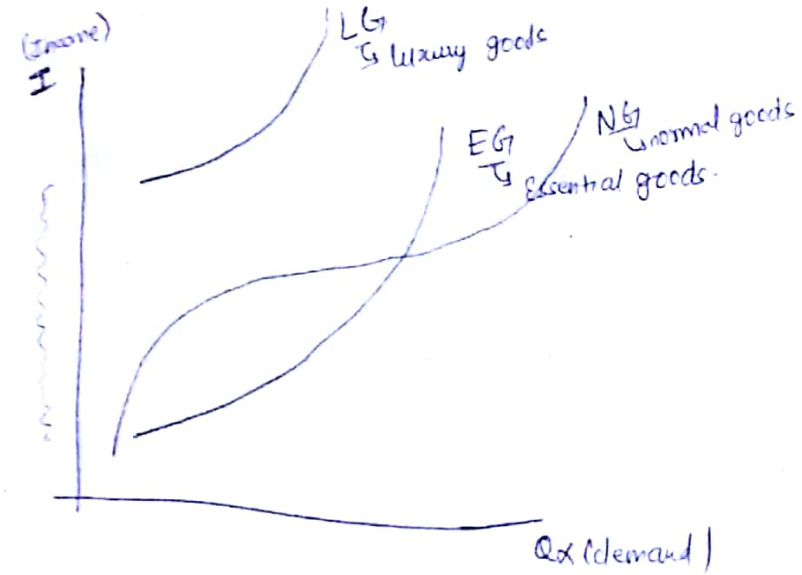
Eg Tea↑ → milk↑ Tea↓ → coffee↑

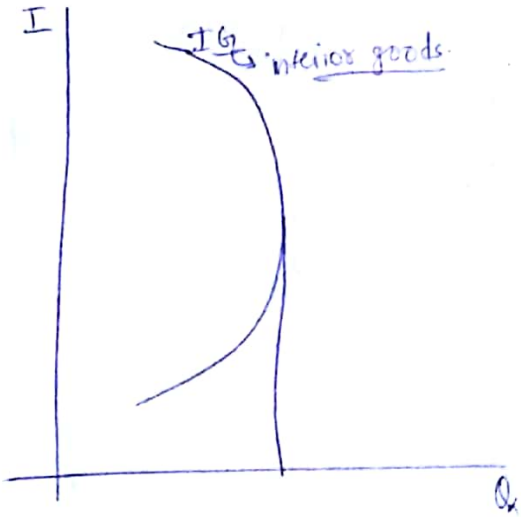
bread↑ → butter↑

- Band Wagon ⟷ Snob

Band Wagon: if an item is rare, u purchase it for social status↑ demand↑

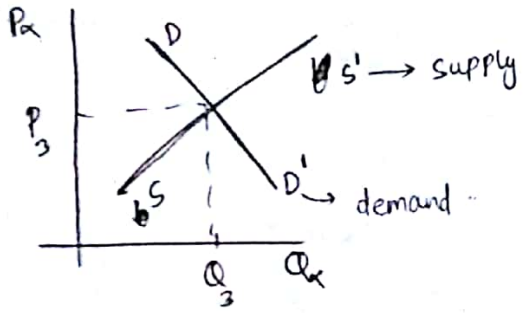
Snob: If an item is common, u stop using it because of it losing the rare factor. demand↓.





New Day

- If All other things are at certain level, if price↑ → Quantity↑ (Supply) and if ↓ then ↓



here P_3 → eqm Price

Q_3 = eqm Quantity

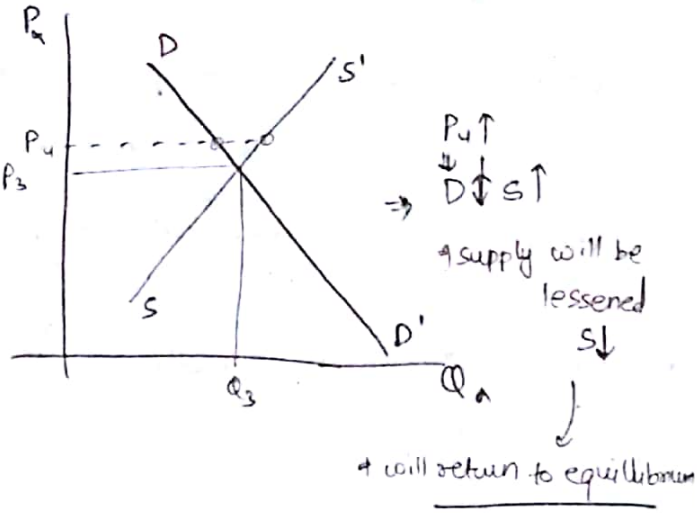
this point is of market equilibrium

- Two kinds of Economy:-

(i) Static Economy (ii) Dynamic Economy.

Static Economy.

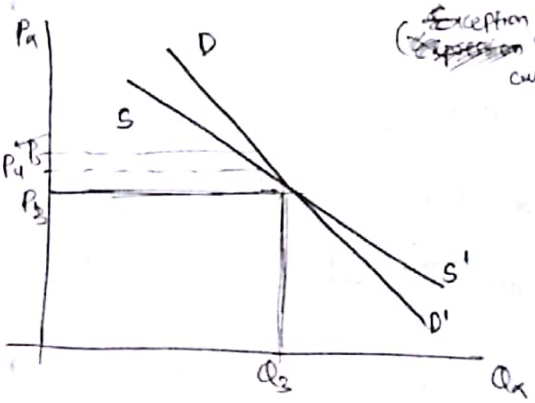
- (1) Stable eqm under static Economy →



→ will return to equilibrium

(2) unstable eqm under Static Economy →

Occurs only in cases like a farmer in distress or depression

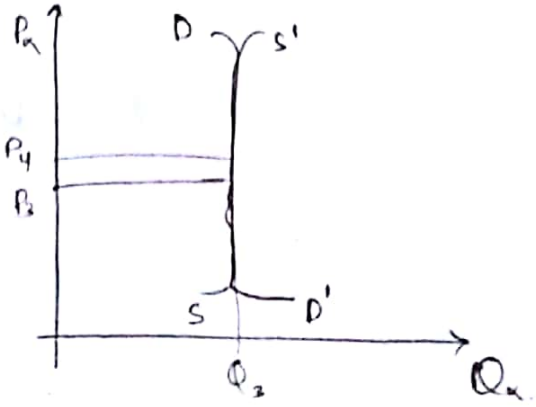


(Exception kind of curve)

$P_4 \uparrow \longrightarrow S \Downarrow$ & $D \Uparrow \downarrow \longrightarrow P_5$

hence unstable eqm

(3) Neutral eqm under Static Economy →



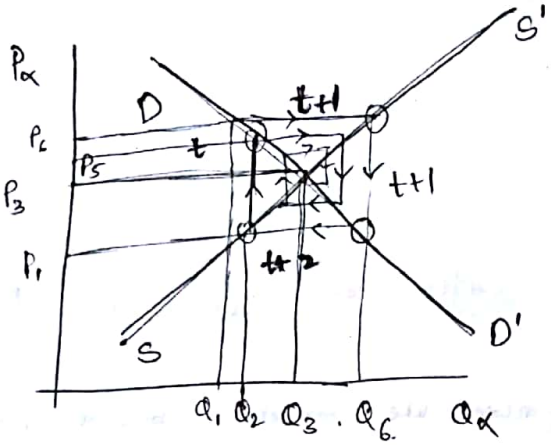
no change.

Dynamic Economy.

Cob Web Theorem

Supply is a lag function of price. whereas demand is not.
ie. Today's price will influence next day's supply. Whereas in case of demand. there is not change instantly much change (? Really?)

(1) stable eqm under dynamic economy.



$P_6 \uparrow \xrightarrow[\text{immediately}]{\text{time}=t} D\downarrow$

$\xrightarrow[\text{(next day)}]{\text{time}=t+1} S\uparrow$ (due to hike in price)

at time $t+1$ $\quad Q_6 = S$

$Q_1 = D$

$S > D \longrightarrow P\downarrow$

$|\text{Slope}(S)| > |\text{Slope}(D)|$

$\Rightarrow$ Stable eqm

∴ Price will reach P_1

$\downarrow$

$Q_6 = D$ ie. $D\uparrow$

$S = Q_6 \qquad D = Q_6$

∴ everything sold out.

at time $t+2$

$S \longrightarrow Q_2$ as Pt the previous day

$\downarrow$

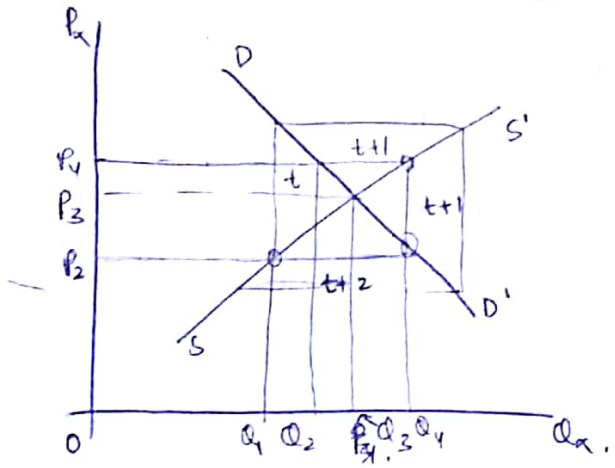
$P\uparrow$ on this day $\Rightarrow P_5 > P_3$.

at time $t+3$

$S \uparrow$ as the previous day price increased to P_5

→ following this trend, we can see that we are slowly converging towards origin i.e. equilibrium position.

② Unstable eqm under dynamic Economy.



$|\text{Slope}(D)| > |\text{Slope}(S)|$

→ unstable eqm

$Q_2 Q_4$ → surplus supply. (t+1)

$t \rightarrow P_0 \uparrow$ to $P_4 \rightarrow D \downarrow$ to Q_2 due to $P \uparrow$

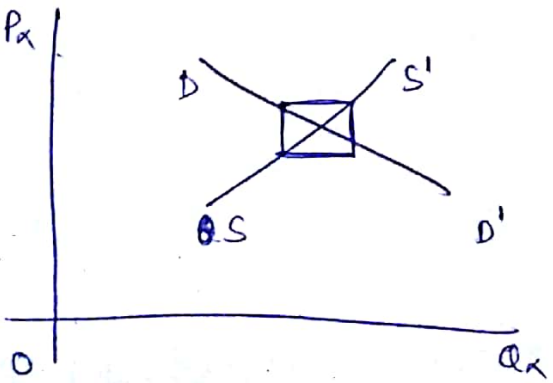
$t+1 \rightarrow S \uparrow$ to Q_4 due to $P \uparrow$ to P_4

at the same time $P \downarrow$ due to surplus

→ $D \uparrow$ to Q_4 due to $P \downarrow$.

$t+2 \rightarrow S \downarrow$ to Q_1 due to $P \downarrow$

③ Oscillating equilibrium P_x



$|\text{Slope}(D)| = |\text{Slope}(S)|$

→ equilibrium

Elasticity

→ elasticity of demand / supply wrt price ⇒ change in demand or supply due to change in price.

~~⇒ percentage~~

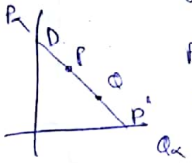
∴ price elasticity ⇒ e_p = % change in Qty demanded / % change in price of the commodity

(Arc elasticity) $= \frac{\Delta Q}{Q} \div \frac{\Delta P}{P} = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$ (this can be initial or final)

hence creates some confusion.

therefore this is the disadvantage of Arc elasticity

Eg



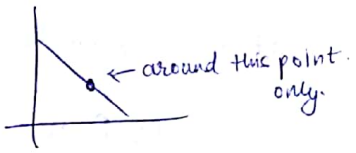
$P \rightarrow Q\ (e_p)$.

$\neq Q \rightarrow P\ (e_p)$

hence measured elasticity for small changes only

(subpart of price elasticity (alter way))

~~15~~ point elasticity ⇒ $e_p = (-)\frac{dQ}{dP} \cdot \frac{P}{Q}$

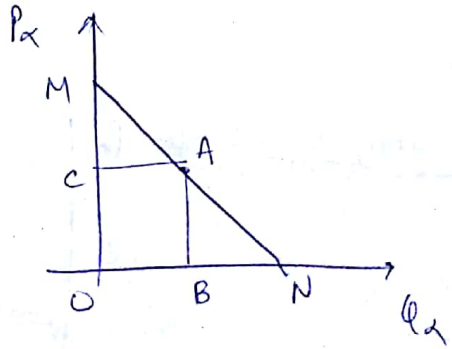


this negative can be optional as dQ/dP will be negative mostly.

$e_p = -\frac{dQ}{dP} \cdot \frac{P}{Q}$

⇒ $\frac{BN}{AB} \cdot \frac{AB}{OB}$

⇒ $\frac{BN}{OB} = \frac{BN}{CA}$



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

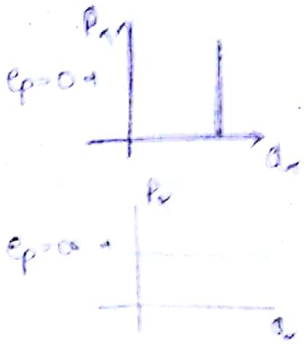
if A is middle of the line

$e_p = 1$ = unitary elasticity.

→ if demand price ↑ by 1% ; demand ↓ by 1%

at N

$e_p = 0$ → perfectly inelastic



between N to midpoint

$e_p < 1$ → relatively inelastic

at M

$e_p = \infty$ → perfectly elastic

between M to midpoint

$e_p > 1$ → relatively elastic

→ determinants of price elasticity of demand.

1) Essential goods are relatively inelastic.

2) Luxury items are relatively elastic.

3) ~~Portion of income~~ proportion of income a commodity demands greatly influences elasticity Eg Car / Match Box.

4) Alternative uses → if alternative uses are less → the commodity could be inelastic

* time required to adjust with new price →
more → relatively elastic
less → relatively inelastic

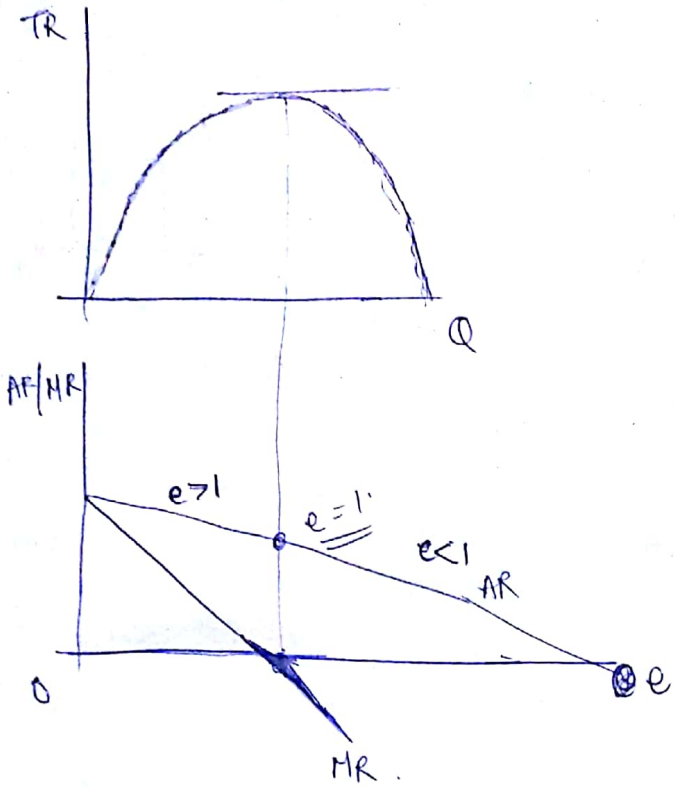
→ total revenue → $P \times Q$.

Profit = Total Revenue - Total Cost

Average revenue = $\frac{\text{Total revenue}}{Q} = P$

Marginal revenue = $\frac{d(\text{Total Revenue})}{dQ} = \frac{d(PQ)}{dQ} = P + Q\frac{dP}{dQ} = P\left(1 + \frac{1}{e_p}\right)$

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



When TR is maximum

$$\frac{d(TR)}{dQ} = MR = 0.$$

Income elasticity

$$e_i = \frac{\%\text{ change in qty demanded}}{\%\text{ change in income of consumer}}$$

Inferior goods if demand decreases with increase in income.

$$= \frac{dQ}{dM} \cdot \frac{M}{Q}$$

e_i can be both positive or negative depending upon the type of goods (normal/inferior)

Cross elasticity

$$e_{t,c} = \frac{\%\text{ change in demand for tea}}{\%\text{ change in price of coffee}}$$

$$= \frac{dQ_t}{dP_c} \cdot \frac{P_c}{Q_t}$$

$e_{x,y} > 0$ if x and y are substitutes (tea/coffee)

$e_{x,y} < 0$ if x and y are complimentary

Elasticity of supply (price elasticity of supply)

e_s = % change in Qty supplied / % change in price of commodity

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

(By default elasticity is of price — with price)

Production and Cost

→ Anything that goes in process of production (planning, human resources, capital) etc is input & that comes out is output

→ $TR = P, Q$

$T - TR - TC = PQ - TC$

→ we tweak P & Q to maximise T.

→ Short Run : Not quantified : Represent time when most inputs are fixed and some are variable.

→ Long Run : Most inputs Vary. (the fixed inputs change due to ample time).

→ $Q = f(L, K)$ — L = labour, K = capital — long run.

→ $Q = f(L, \bar{K})$ — short run — (Q: Product, L: variable, $\bar{K}$: fixed) — L = labour, $\bar{K}$ = fixed capital

→ $\bar{k}$ = technology, land.

Eg $Q = -L^3 + 15L^2 + 10L$

L Q

Short Run production function.

$$Q = -L^3 + 15L^2 + 10L$$

→ Output is dependent on labour (which is variable in short run)

Avg. Product (wrt labour) = $\frac{\text{Total Product}}{\text{labour}} = \frac{Q}{L} = AP_L$

Ex

Marginal Product (wrt labour) = $\frac{dQ}{dL} = MP_L$