EC 101
LA 001

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* micro vs macro - independent grading ↔ final grading - 10% AA + Subjective Questions

Definations | Practice | Theory

* Economics:
  - ↳ science of making choices
  - ↳ Modern economics is science of rational choices / decision-making under scarcity.

① Phenomena - cause / effect / hypothesis
② Observe - phenomia / hypothesis
③ Replicated

god example ① ✓ ② ✓ ③ ✗ → so god ≠ science

science iff ① ✓ ② ✓ ③ ✓

choice vs rational choice (100 ₹ example - given all choices I can only buy pizza? (rational choice) or (optimised behaviour))

- → choice from optimised/maximised behaviour
- → pizza choice example

Example: we pay high price for good which is more efficient?

HP: printer slower to increase profit.

Tesla: Electric car slower to ↑ profit.

Economics gives us idea of optimised choice - replicable ✓✓

Advantage? - control every ind behaviour (in average sense)

macro institutes (gov/comp) policies to manipulate stuff.

WHY?: slower, more sales?: fast high price HP only for offices → made it slow → now cannot be used by offices. → By making slow → ② markets

for Tesla: same car

- slow
- fast

slow: 0.2 × 1 → profit ofc

fast: 1

one more example: Long term capital gain tax: (>1 yr)

gold / land / diamond

gold, diamond not splitable

tax value is same

conclusion: people can be manipulated as everyone thinks rational.

no one is going to purchase it

0.2(X − 36570000)

0.125(X + 7000000)

↳ Here if > 8CR: profit

Capital gain tax on indexed capital gain vs capital gain

inflation? 100 ₹ → 500 ₹ or 100 ₹ after 24 yrs? (325 ₹)

Increase in value of capital → tax

indexed capital gain

30th July : "merchantilism"

Development of society: maximising/ welth accumalisation → How to increase gold? → international trade

→ Chanyaka : how to use data for betterment of society? : merchatalism.
↓ No continuety of work so we don't study that.

↓ clasical + marxcian

"marginalism" (early 20th century)
↳ 10 pen buy → Benifit
↘ trade

marginalism is not this thinking

think of using 9 pen, one additional unit ? what is one additional unit benifit ? cost ? → Benifit of 10th > cost of 10th purchase else don't

they help us in ① marginalism ② partial Eq. → only look for pen
↑ optimisation and models
③ genral Eq. ↳ all markets simentanously

Before : make sales → sell and buy : "sales law" : supply create demand

1929 : The great depression : Huge accomodation of inventory, goods cannot be sold, no demand. "kensian Economics" : we have to look at the demand side also → increase govn. Expenditure.
↓
* let's say they start factory
↳ employment
* govn by taxation

macroeconomics has evolved b/w ancient v/s Cassical

mordern Econ - Behaviour economics - Economics and Psychology } Explains many anomolies like ?
↳ why individuals take risk ?
↓ more money if coming from airport but less money for same dist not airport
↳ uber vs kali pili line
more line

↓
2008 Housing crises

AB
BA
BB
BBB
} → Bad bonds failed

modelling human behaviour and changing them
↳ Hence : No freedom of choice

see : slides for definations

Note : to consume goods, no need to optimise only supply.

wealth : anything that don't have exchang value not wealth.

Economic value : Anything that creates value - mother creates/ works in house - not measured
↓ → In economics we see this only
markcatable activity : measured - someone working

} see slides first guy.

Norm : society culture → good v/s bad, value system
Normaties : society develops norm, good if follow or bad then - touching legs is norm
second guy : see ppt

normative v/s positive
↳ good vs bad
↳ cause and effect (No mention of good v/s bad)

→ New tax system :
① value of RE more then 8cr
② less tax in new system
③ none tax if less then 8cr

Last economic thinker - P.A. samuelson, Now it is model based

1st alg: model: measurement of economic activities (small country / economy)

FIRMS | HH

factors: ① market
2 economic units interacting: who is producing goods? FIRMS
what do they need

Factors of production: ① LAND ② LABOUR ③ CAPITAL ④ ENTREPENUR

③ CAPITAL * → "Produced means of production" stocks and all is used to purchase this produced means of production

* → clear example: CAPITAL: goods that using in production
↳ Furniture, PA system,
↳ Factories, machines

Note: This is a stock concept. ← * (K_t)

Change of capital is investment.

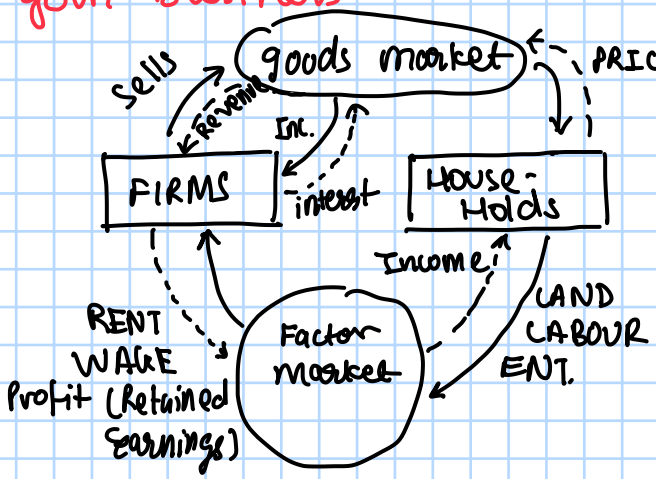
$I_t = K_t - K_{t-1} + \delta K_{t-1}$

Economic model for calculating GDP in a year (t)
GDP: value of all the final goods and services produced within the geographical boundary of a country in year t.

investment = change in capital stock.

* NO external trade
* NO govn business

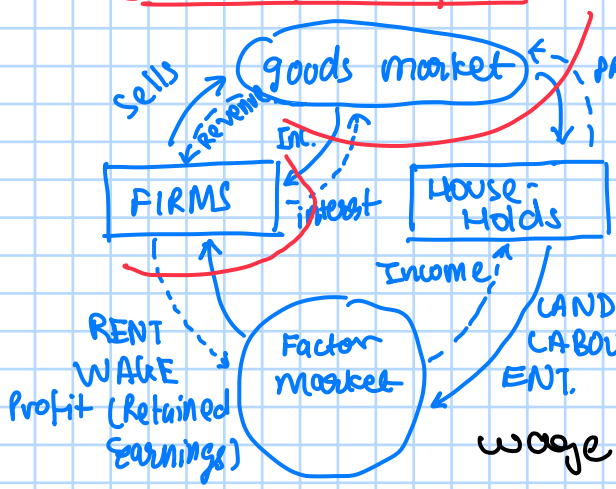
} Basic example



CIRCULAR FLOW DIAGRAM

To produce goods FIRMS NEED
① LAND ② LABOUR ③ CAPITAL ④ ENT
"Produced means of production"
See its opposites

Calculation of GDP:



consumption or expenditure
investments
} Total GDP

Expenditure method:

GDP = C + I → investments + unwanted inventory
↓
consumption

wage, interest, profit, rent } Total GDP

Income method:

GDP = wage + int + Profit + Rent

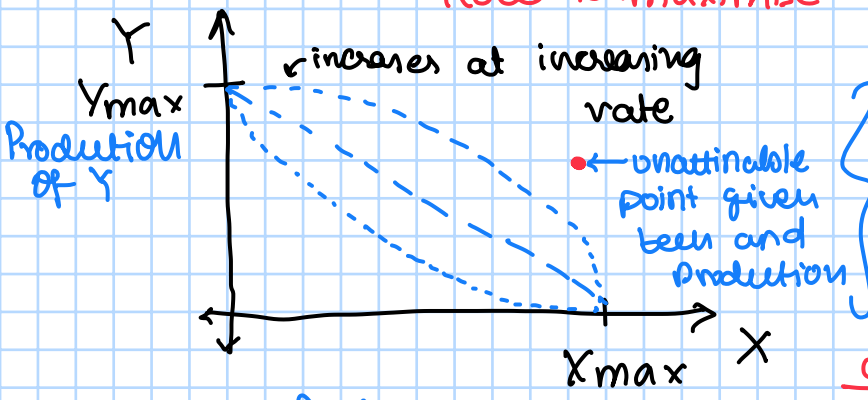
Note: C + I = wage + interest + Profit + Rent
↳ consumption or expenditure
↳ Investment + unwanted inventory

Production possibility Frontier:

scare resource in production
producing 2 goods : X, Y

Scare resource : L

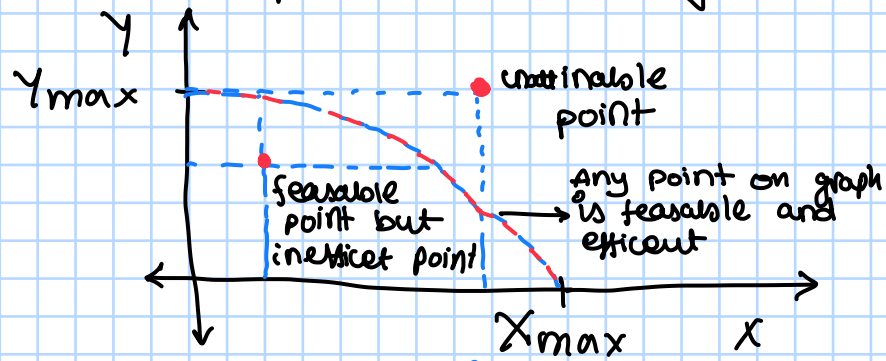
How to maximise production?



This is a model that tells the correlation of production of X and Y with each other (given the resource)

Opportunity cost: giving up something to produce something else

graph production possibility frontier



Social welfare function:

$\max W(X, Y)$ ← we have to maximise social welfare

Amount of labour
$\sum T(X, Y) \leq L$ ← maximum labour country has

$X \geq 0 \quad , \quad Y \geq 0$

Assumptions:
1. Labour is scarce
2. Labour is fixed
3. Technology is fixed
4. Both X and Y needs labour
5. Individuals are rational

So we also should model irrational behavior or

BOUNDED RATIONALITY

so if economy is fully not cares then we don't rationalise decisions.

Pricipal of economics: See slides but:

- * Trade Offs
- * Cost is what we give
- * Rational people – think margin
- * People respond to incetive
- * Trade make everyone better
- * markets are efficient way to organize activity.

- * govn has to interfear in mak.
- * Stand of living ∝ goods & sevices

5th Aug: Circular flow diagram:

* interest payments: Borrower gets money - what is being exchanged?
  - what lender gets?
  - transation of promise.
  - also finiancial market is based on promises (fewer options)

Opportunity cost - which good it produces?
- why does it produce it?

Producer has some resources (labour for example)

cloaks | Beer

* why will producer create cloak and not beer?
* which will produce higher returns?
* is producer a passive identity?
  ↳ just because the producer is eff. in cotton, then cotton is generated cheaply → more profit
  ↳ Profit is outcome

In terms of efficiency

A_1 . . . A_5

LABOUR → lowest sacrifice } opportunity cost

Opportunity cost - value of the next best alternative that is forgon for making choice.

Example: sleep 1 hour, miss lecture:
opportunity cost: "value" of lecture we are missing

Example - producer → cheese, wine

L ← Resource = labour

a_{LC}: amount of labour for 1 unit cheese
a_{LW}: amount of labour for 1 unit wine
↳ technology

Note: economy tries to make a_{LW}, a_{LC} less (technological innovation)

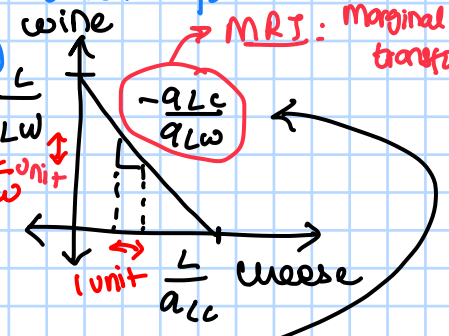
a_{LC}: Q_C ← amount produced $Q_C a_{LC}$ = labour allocated for production of cheese.
a_{LW}: Q_W ← amount produced $Q_W a_{LW}$ = Labour allocated for wine.

$Q_C a_{LC} + Q_W a_{LW} \leq L$ (Labour)

PRODUCTION POSSIBILITY FRONTIER

a_{LW} ..... 1 unit wine
1 ..... $\frac{1}{a_{LW}}$ unit wine (right graph)

if 1 unit cheese (a_{LC} labour free) free



a_{LC} is free, used for wine:

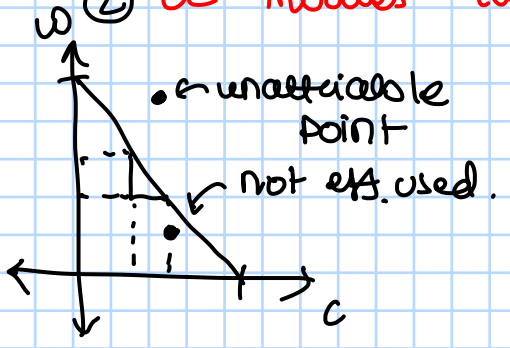
amount of wine = $1 \times a_{LC} \times \frac{1}{a_{LW}} = \frac{a_{LC}}{a_{LW}}$ extra wine produced.

Note: slope gives opportunity cost of cheese cost wine. [as wine is next best thing]

Here opportunity cost is dependent on:
Technology.
(Not labour but a_{LW} and a_{LC})

Every 1 unit of cheese ⇒ we have to give up $\frac{a_{LC}}{a_{LW}}$ units of wine = slope = opportunity cost.

Assumptions : ① Labour is fully used
② OC invalues the efficency in the usage of the resources.



Efficient vs optimum

- without unemployment of resources.
- use all resources
- all 10 used
- produce more

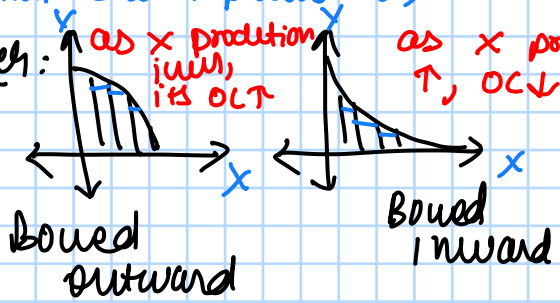
- maximising something
- 3 people out of 10 used for example.
- produce optimum

Us :- production of rose
- american consumer wants rose
- Rose: more resources, labour, etc
- price to import is less than cost.
- opportunity cost: amount of resources will be large to give up
  But: India has less OC (so india should produce it)

Types of production possibity frontier:

PPF of increasing OC V/s

PPF of decreasing OC.



Note : OC just gives us what to produce.

6th Aug :

Minimum opportunity cost decision taken? — YES

cheese vs wine example : $\frac{\Delta c}{\Delta w}$ } 1 unit of cheese production, how much wine given up?

Numerator good

Let say = B (everything now should be cost d)

Name (CB)

To produce B = B unit
To produce C = 0.5 B give up
To produce C = 1.4 B give up

options	Resources	Name (CB)	Min opp	Choice
A	60	1.5	0.7	C
B	40	1	0.7	
C	30	0.7	0.7	

Free trade : see noble lecture
- ↳ country has no restriction on trade
- ↳ no tax on import and export
- ↳ Home county bias - also a type of trade barrier. "made in china" labels

* government doesn't interfear at all
* if done based on OC and comp. advatage benificially.

(Pounds)	cloath	wine
Portugal	90	80
England (pand)	100	120

100 unit labour = 1 unit cloath = 100 pounds

comp. advantage
- producer - min opp cost
- then comp. advatage

80 labour — 1 wine
1 labour — $\frac{1}{80}$ wine

90 labour — $\frac{90}{80}$ wine

1 cotton — $\frac{9}{8}$ wine

* England is producing cloath
* portugal is producing wine → comp. advantage

consumes → goes to UK → buy cotton (100 pounds)
market = £100
→ goes to portugal sells it for £ 90

goes to UK ← Purchases wine $\frac{9}{8}$ units

sells wine: $\frac{9}{8} \times 120$ = £135 Arbitrage

consumes own choice ← Free trade → producer own choice

Free trade → Business own choice

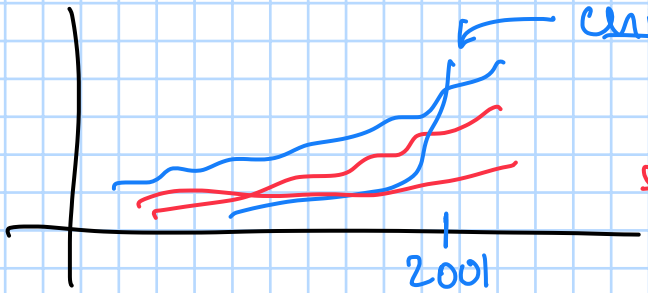
So free trade is when there is no barrier, if production, consumption and transaction done in free trade there will always be Arbitrage gain. In free trade: all producers will produce cloath and all in portugal - wine.

Total production will be maximised

free trade ← good + bad

Division of labours ≈ Lowest opp cost ≈ comp. advantage ≈ more efficiency

specialisation
division of labour
law of competitive advantage } min opp cost ⇓ efficiency



China : export volume of advanced-technology

so across time, OC may change with technology.

Note: for a country to make gains, one country has to fall.
* if portugal advances and makes cotton, england feels.
* if china advances other country fails

Demand and supply:
- Producers will produce goods in which it has lowest opportunity cost.
- producers will specialize
- Division of labour

Questions:

what will be the rate at which goods will exchange? → HOW PRICES WILL BE DETERMINED? → INTERACTION OF PRODUCER & CONSUMER

what is demand? & what is difference b/w desire and demand?

Desire: Need, want
- utility from consuming that good $u(x) > 0$ } + the ability to pay for the good ⇐ Demand

Factors determines the demand of a good?
- PRICES of the good.
- Income
- PRICES of other related goods.
- weather, ect.

} How demand of a good varies as the price of the goods changes if other factors (income, price of other goods) remain const?

8th Aug:

Arbitrage option: If free trade is possible

controllable

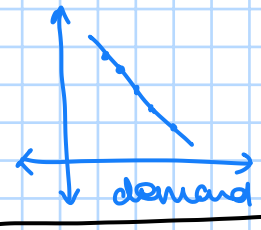
price
product
promotion

→ DEMAND ← uncontrollable

see in notes

Law of demand: Note this is not dynamic (time = const, price = not change)

Rational individuality { "The quantity demanded of a good is inversely related to its price, other things remain const"



demand curve:
neg sloped
↳ subst. effect
↳ income effect

Price of tomatoes ↑, then prices of all goods wrt the individual goes down.

Income effect

P_x ↑ ← money income (Rel) ↓ $\frac{M}{P_x}$

as $\frac{M}{P_x}$ goes down, money income not feeling that good, in relativity the individ thinks income goes down. (But every good)

P_x high ⇒ Other goods cheaper ⇒ consumes sub. to cheaper goods.

this happen in two different goods

P_x high → other goods → cheaper } substitution effect because P_x is high

if individual encounters higher price of that good, since individual has limited budget, compared to this good, other are cheaper.

phone vs food ↔ substitution of goods ≠ gross substitution

cheap phone vs I-phone

$Q_x^D = a + bP_x + \theta$ ← all other factors for demand

Q_x^D = Quality demanded.

$Q_x^D = b P_x^\beta$ (isolectric)

Demand curve faced by firms: depends on
* size of market
* industry's organisation

Big firms:

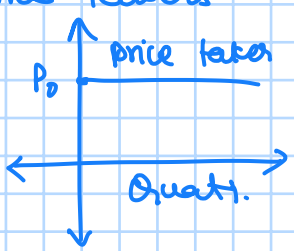
Monopoly:
↳ nuclear
↳ if supply ↓ price ↑
↳ lottering to market
↳ price setting behaviour

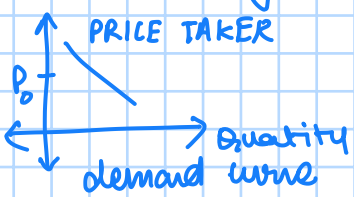
Price taker
* Perfect comp.

price setter
* monopoly
* monopolistic competition
* oligopoly

monopoly eg: ① Nuclear ② Oil

→ Small firm
↳ production does not matter to market.
↳ price takers





Change in Quatity demanded → Price of underline good are different

vs

Change in demand

↓

① P_x → Price is const.

② but other factors changes.

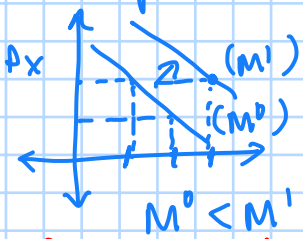
like a) Income

b) Price of related goods

c) Other factors

Change in income

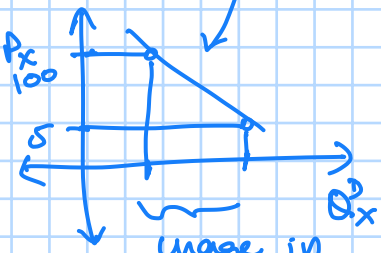
Consumer encounters higher income



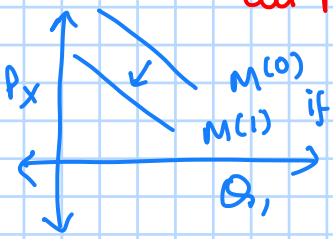
$M^0 < M^1$

Q_x – Normal good

– for $M^1 > M^0$, the demand shift for all P_x.



Change in Quality demanded

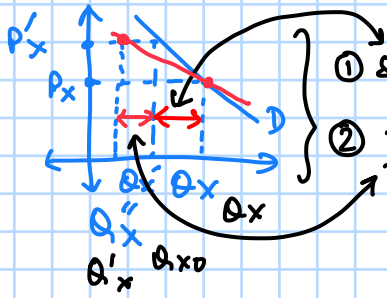


if for all P_x and $M^{(0)} < M^{(1)}$

Q_x – INFERIOR GOODS

Example:- Ramen noodles – NORMAL GOOD first

– Ramen noodles if $M^1 > M^0$ → INFERIOR GOOD



① subst effect: as $P_x \uparrow$, $Q_x \downarrow$

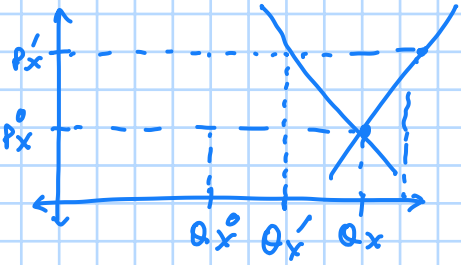
② income effect: Real income $\frac{M}{P_x} \downarrow$, consume less

$Q_x Q_x' \rightarrow$ PE (Price effect total)

$Q_x Q_{xo} \rightarrow$ SE

$Q_{xo} Q_x' \rightarrow$ IE

If Q_x → INFERIOR GOOD



Positive, Income effect > Substitution effect } good has to be inferior good } Note: certain conditions

$\frac{M}{P_x} \downarrow$

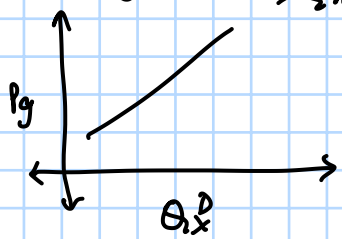
Potatos and wheat } GIFFIN GOOD

* inferior good, income ↑ we will shift to meat (as inf good)

* if Potato price ↑, consumption of meat falls, we sub all wheat to potato. (as carbs are needed but potato are more imp) potato Consumption ↑

we consume gold, → NORMAL GOOD

If $P_{gold} \uparrow$ → sup of $P_{gold} \uparrow$ then demand ↓



NOT GIFFIN GOOD

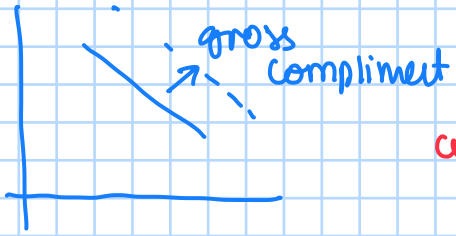
GIFFIN GOOD ⇒ INFERIOR GOOD

GOOD

12th Aug: Normal good vs Inferior good

Law of demand – sub. effect
– income effect

positively slope demand curve : income effect > sub effect
+ inferior good



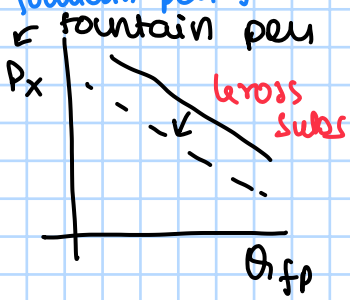
: might not be inferior good – gold

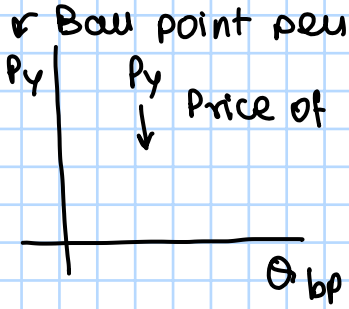
change in Quality demand → last class
vs
change in demand

income → last class

Price of other good change
– consumption of fountain pen

Ball point pen } Related
fountain pen





gross sub – other goods

net sub – new good
(similar) cheaper

$\frac{\partial Q_x^D}{\partial M} > 0$

$\frac{\partial Q_x^D}{\partial M} < 0$

compliment goods

gross comp. { fountain pen ↕ ink } Jointly

$Q_x^D = f(P_x, P_y, M, \theta)$

$\frac{\partial Q_x^D}{\partial P_x} < 0$ Law of demand (P↑, demand ↓)

$\frac{\partial Q_x^D}{\partial P_Y} > 0$ gross sub (PY↓, demand of Q_x↓)

$\frac{\partial Q_x^D}{\partial P_Y} < 0$ gross comp (PY↓, demand of Qx↑)

Law of supply : Quality supplied ∝ Price
(other things constant)

Q_x^S = Quality supplied during a period

cost of production

firms want to just produce goods, don't want to see anything else → their decision is to maximise profit.

$PROFIT = P Q_x^S - C(Q_x^S)$

where $C(Q_x^S) = wL + rK + H + \text{Retained profit}$

rate of interest

wages (variable) · rent (const.) · to ent.

cannot change P

Price taker
Price maker
↳ can change P

$Profit = PQ - (wL + rK + H + RP)$

const · variable

as a production /decision maker ↙ goes away

$C(Q) = wL + rK + (H + \text{retained profit})$

$\pi = PQ - (wL + rK)$ ⟵ π should be maximised

① O.C decided production decision
② we remove H and retained profit.

Ent. will try to $\max(\pi) = PQ - (\text{wages} + \text{rate} + \text{rent})$

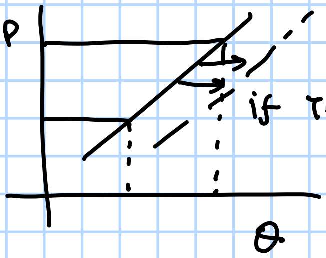
Note $PQ - (mL + rL + \text{rent} + \text{retained } \varepsilon) = 0$

accounting profit $= PQ - (mL + rL + \text{rent})$

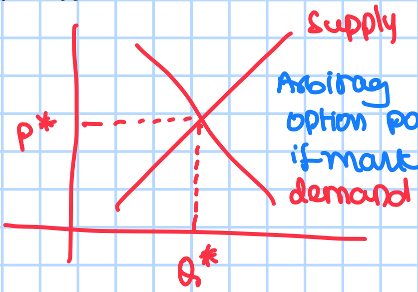
factors affect supply:

$\text{Profit} = PQ - (wL + rK)$
↳ max ↘ Technology; cost of prod.

following factors:
① cost of production
② technology
③ price of other goods ⟶ production of subst. paddy profit↑, Rice↓ ; production of comp. ink↑, pen↑
④ Taxes
↳ Excise tax
↳ Ad valorem tax



$Q^s_x \propto P$



Arbitrage option possible if market doesnt have (Q^*, P^*)

13th Aug: Profit

$\pi = PQ - wL - rK - Rent$

↑ Retained E. or imp cost

if P, w, r are comp prices

PQ = Total sales

P → comp price of output (Fair market price)

w, r } fair

PRODUCTION DECISION:

i.e $Q > 0$ if ⊙

Retained profit = Opp cost

Economic profit = $PQ - wL - rK - Rent - Ret\ earn = 0$ ← comp. prices

This is normal profit = 0 (as w, r, P are fair market price)

nonopoly market $PQ - wL - rK - Rent >$ imp cost / Ret. earning

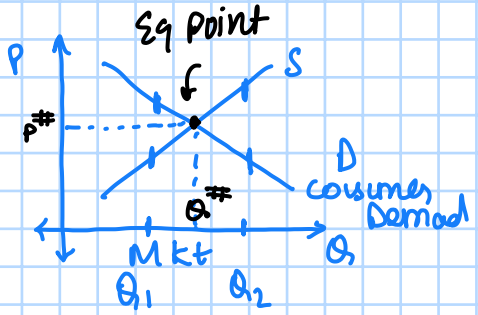
Examples of 1 firm buying us many wage, w↓, $PQ - wL - rK - Rent$↑

Note: Role of comp/regulators to this does not happen. as w is not fair

↳ ideal society

How is P, w, r determined in a comp. market?

① large buyers/sellers ② prices adjust if market imperfection ③ ideal



market not in eq.

for $P^{\#}$, $Q^{\#}$ → market in equilibrium

Note: There can be instability with eq ∴ stability and eq not connected

Equilibrium:

ED = excess demand

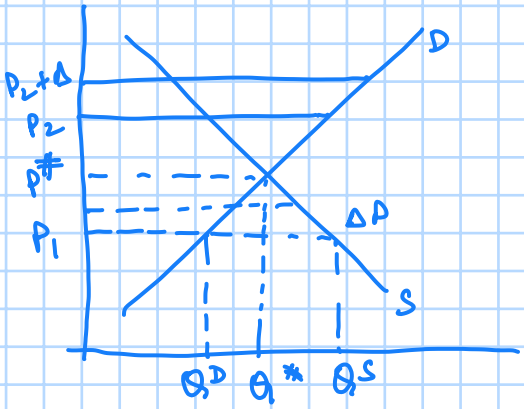
$= D(P_x, P_y, M, \theta) - S(P_x, P_z, C_p, A)$

Eq: Buyer willing to purchase and seller sell (same opp)

Stability - if not at eq point but there are market forces forcing to be at eq point, then called stable market

price Buyer = price seller

Unstable market - opp.

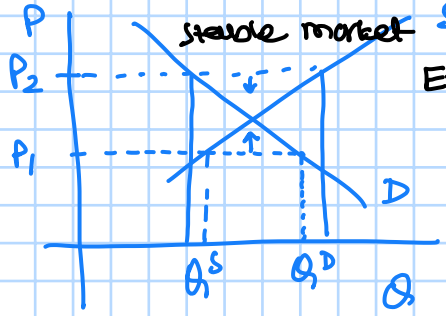


Unstable equilibrium:

Excess DD = $Q^D - Q^S$

if $P' = P + \Delta P$

then Excess DD↑



Stable market:

Excess DD = $Q_S^D - Q^S$

if $P' = P + \Delta P$ from seller then Excess DD↓ (Stable market)

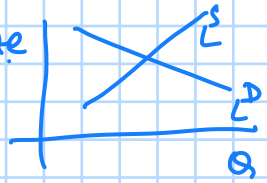
$\frac{\partial ED}{\partial P_x} < 0$ → Stable

$\frac{\partial D}{\partial P_x} - \frac{\partial S}{\partial P_x} < 0$

example of unstable equilibrium

labour - not getting employment sitting for job - any type of emp - like vadapav shop

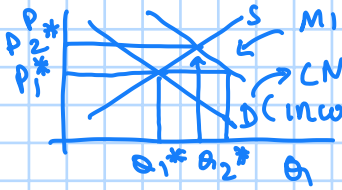
demanding labour - firms, if rate↑, demand↓ supply↑



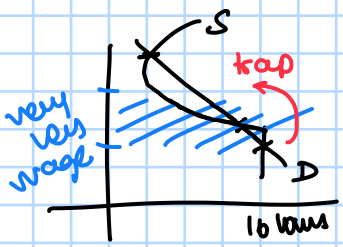
wage rate is low and we cannot sustain livelihood → restrict labour very low wage ← wage↓, supply↓

Medical expenditure:

poor per capita spend more on health than rich.



→ Q = normal

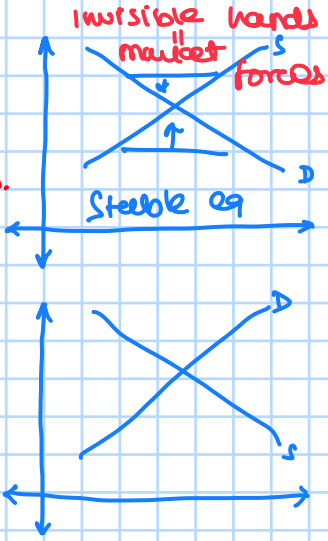


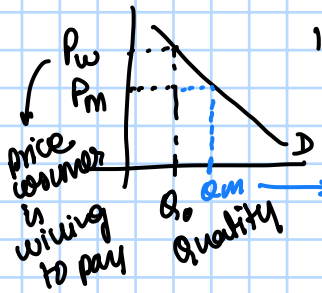
as very low

19th Aug: Quiz 1: 2nd sept monday in class

Recap: market equilibrium: D-S → supply ; $\frac{\partial ED}{\partial Px} < 0$ (stable)
↳ demand

Note: wherever there is different price then Equity, it creates welfare loss.

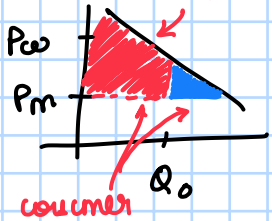


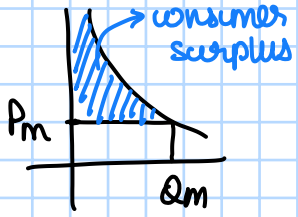


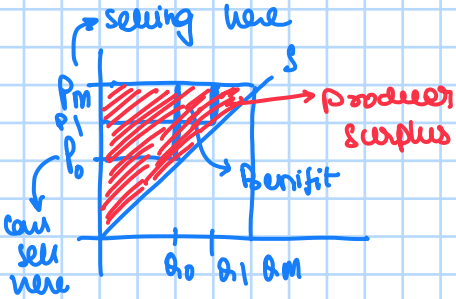
If Pm = market price
then Pw - Pm = benifit

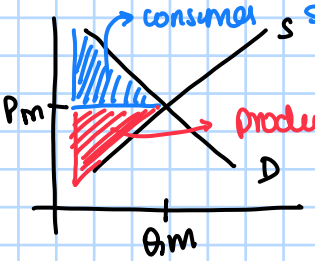
→ at Pm, Qm benifit

Total benifit for consuming Q0 good:







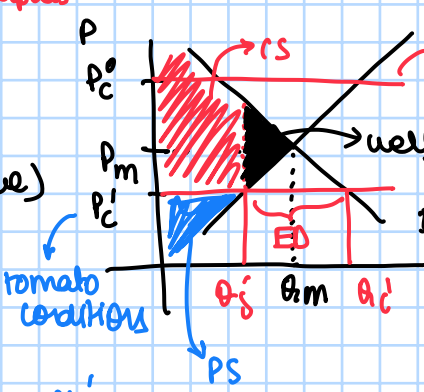


= welfare = CS + PS

Prices in comp market
* if both producer and consumer agree
* max welfare = CS + PS

Government:

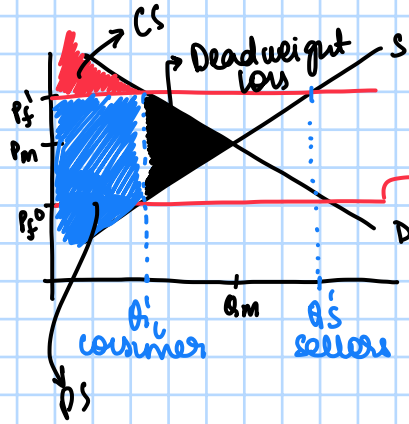
* price ceiling: ceiling to price (max it can achieve)
* price floor: Eg: min wage, min support price



Price ceiling: ① Deadweight loss, ② Excess DD

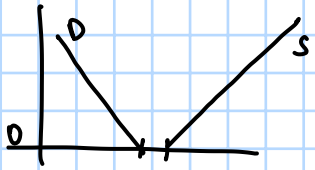
Black market ← → Queing

farmers' protest



Free goods: air? water? - is water free? or we have water filter?
- water is not free in Mumbai
- some places like village-free

when supply > demand at 0 price.



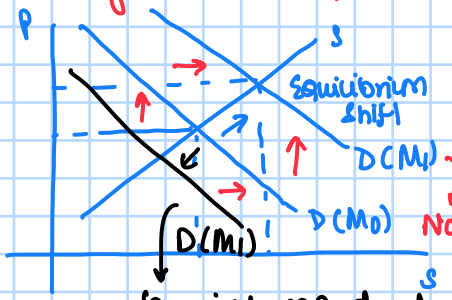
consumer surplus - extra value consumer gets

producer surplus - extra value producer gets

} Addition of both is called welfare

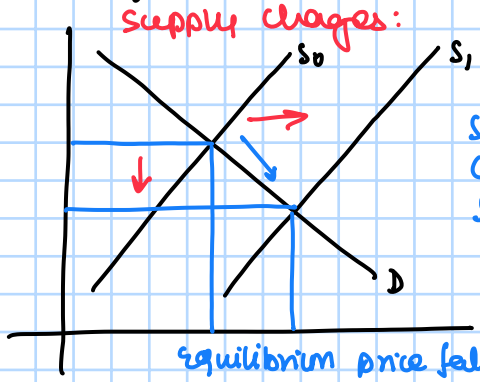
Question types:
- integrate functions and get solutions
- Normal triangles

Change in Quantity demanded - only price change
- if other factors changes then will be shift in demand curve.



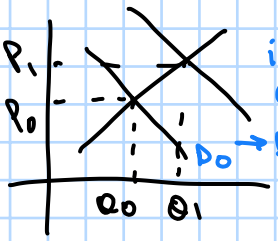
Note: good is normal good

Supply changes:



20th Aug : Related goods : Subs vs Comp goods

tea vs coffee

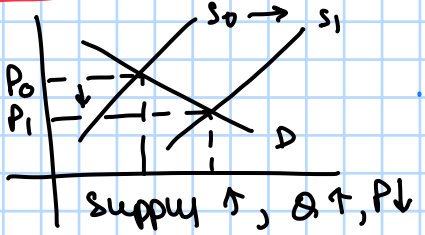


if tea price↑ coffee demand increase

coffee vs milk

for coffee ↑ demand for milk ↓

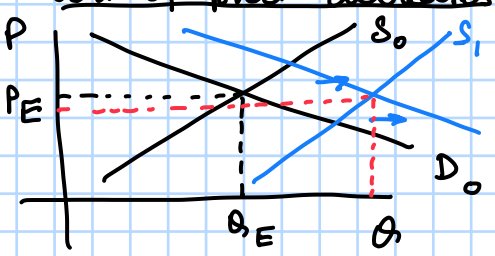
cost of prod. decreased



Now due to technological innovation, productivity ↑ ⇒ wages to labour ↑ ⇒ income ↑ (This is for shoes)

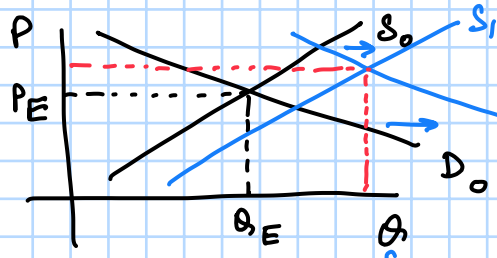
Question:
① what happens to price of shoes?
② what happens to Eq in market?

Cost of Prod^n decreases : (case I)



S1 supply ↑ Q↑, P↓

Note: as wages ↑ demand for shoes ↑



(case II)

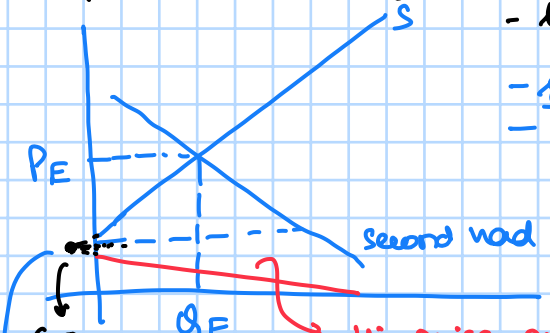
in both the cases
* Q_E increases
* P_E cannot say

Shift in demand is more than shift in supply $P_E' > P_E$

Shift in demand is less than shift in supply $P_E' < P_E$

Vanishing market

- lemons are used for second hand cars
- Story : The noble price steel institute.
- we dont know quality of car, info from market will give us. Lemons = second hand cars



second had, Price↓, Quality ↓

∴ Larger the second hand market, worst is the Quality.

His price expectation

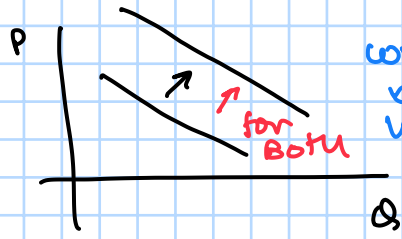
He thinks that this price is too much for the Quality he will get.

Eq point does not exist

∴ no eq point

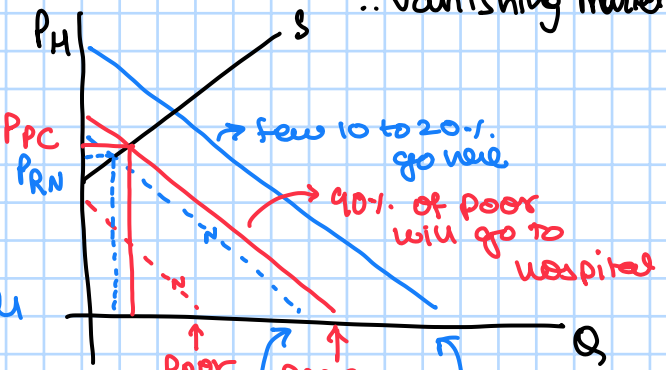
∴ vanishing market

Rich and poor health :



condition become critical, healthcare demand ↑, for both poor and rich

(Example III)



Elasticity of demand :

Def^n : -1. change in demand by change of any factor that affect quality demanded.

$$E_{Px} = -\frac{\%\text{ change in demand}}{\%\text{ change in own price}} = -\frac{\Delta Q}{\Delta P}\cdot\frac{P}{Q}$$

this is called the own price elasticity

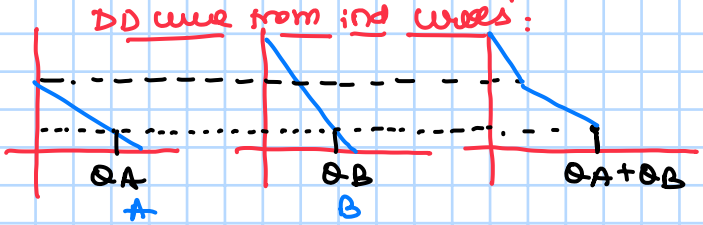
22nd Aug:

$Q_D = Q(P, M, P_{Oa}, \theta)$ ← Quatity demanded as fuction of price

$Q_D = \alpha - \beta P + \rho M + \delta P_{Oa} + \theta$ ← Direct demand f^n

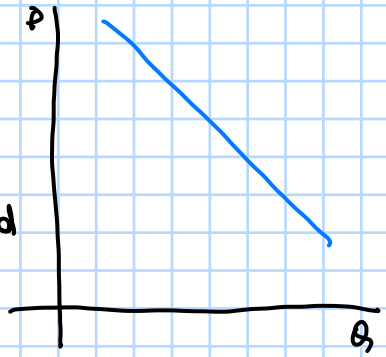
↑ Price of good; ↑ money income; ↑ price of other goods (related); ↑ other factors

Note: When demand curve are depicted s.t DD curve from ind curves:



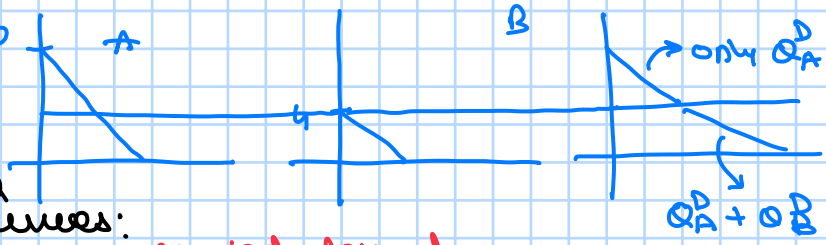
$P = a + bQ + cM + dP_{OT} + \theta$

inverse demand fuction

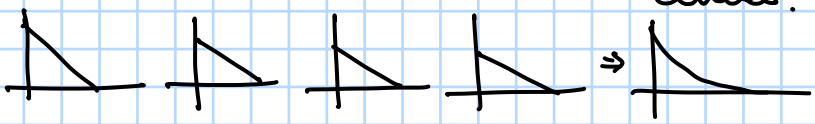


Example: $Q_D^A = 10 - P$, $Q_D^B = 20 - 5P$ } market demand curve:

$$Q_M = \begin{cases} 10 - P & ; 4 \le P \le 10 \\ 30 - 6P & ; 0 \le P < 4 \end{cases}$$



In market there are many demand curves:

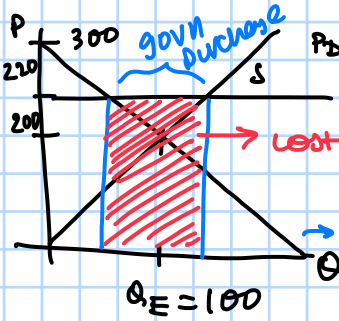


so, ind. demand curves be linear but market linear curve not true.

$Q_M = 30 - 6P$

Minimum support price problem: (Question discussed in class)

Note: there is nothing like a good or bad policy using maths. we can only say what is going to happen.



Policy A (MSP)

← govn. maintains 220 (MSP)

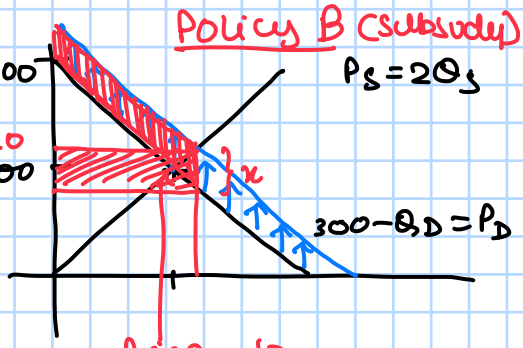
→ cost to govn

(80,220) (110,220)

(80,0) (110,0)

Area = (30)(220) = 6600

Policy B (subsidy)



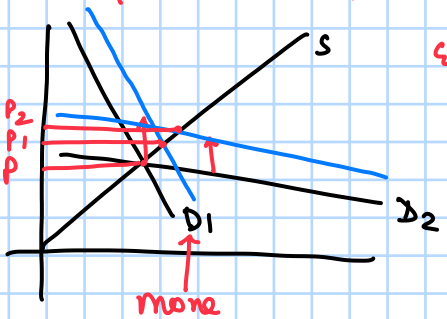
Price to govn.

cost to govn = 3300

Note: in policy B see that two area will be left side as right side S>D so would not buy.

Now: consumer surplus and producer surplus calc welfare.

Elasticity of demand:



elasticity = − %. change in demand / %. change in own price

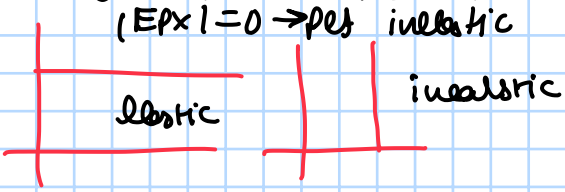
$|E_{px}| \to \infty$ Perf. elastic

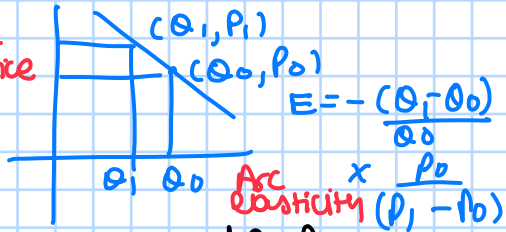
$1 < |E_{px}| < M \to$ elastic

$|E_{px}| = 1 \to$ unity elastic

$0 < |E_{px}| < 1 \to$ inelastic

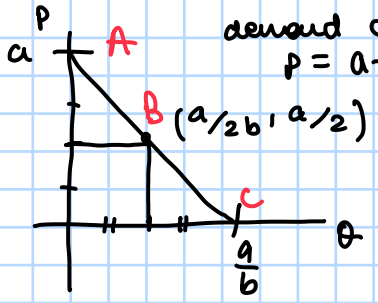
$|E_{px}| = 0 \to$ Perf inelastic





$E = -\frac{(Q_1 - Q_0)}{Q_0} \times \frac{P_0}{(P_1 - P_0)}$ Arc elasticity

$E = -\frac{dQ}{dP}\frac{P}{Q}$ Point elasticity



demand curve
$P = a - bQ$

K	Q
0	0
1	a/2b
2	a/b

$0 \le Q \le \frac{a}{b}$

$Q = k\frac{a}{2b}$

$K = 0 \rightarrow A$

$0 < K < 1$ A to B

$K = 1 \rightarrow B$

$1 < K < 2$ B to C

$K = 2 \rightarrow C$

$$\varepsilon_p = -\frac{dQ}{dP} \cdot \frac{P}{Q} = \left(\frac{-1}{b}\right)\left(\frac{a-bQ}{Q}\right)$$

$$\varepsilon_p = \frac{a-bQ}{bQ} = \frac{a}{bQ} - 1 = \frac{2}{K} - 1$$

K	Q	ε_p
0	0	$\lvert\varepsilon_p\rvert \rightarrow \infty$
$0 < K < 1$	A and B	$\lvert\varepsilon_p\rvert > 1$
$K = 1$	B	$\lvert\varepsilon_p\rvert = 1$
$1 < K < 2$	B and C	$\lvert\varepsilon_p\rvert < 1$
$K = 2$	C	$\lvert\varepsilon_p\rvert = 0$

So for a st line curve, Elasticity will vary.

Factors affecting own price

* Availability of substitutes
* Percentage of consumers Budget
* period of adjustment.

26th Aug:

Production is technological invention

adding a new factor of production - Time

What, who, how { land / labour (variable) / capital / ent - given all technology, we choose a technology

↳ capital employed decides on scale (large/small)

Let's assume $Q = f(T, K)$ (T: Technically efficient)

if $Q < f(L, K)$ then it is called technically inefficient

Production function $Q \leq f(L, K)$ → function with labour and capital

This tells us the max Q to be produced.

$Q = A + \alpha L + \beta K$ ① linear P/f

$Q = \min[L, K]$ ② leontive P/f

$Q = AL^{\alpha} K^{\beta}$ ③ Cobb Douglas P/f

$Q = A[\alpha L^{\rho} + (1-\alpha) K^{\rho}]^{\frac{1}{\rho}}$ ④ const elasticity of substitution (CES)

$Q = f(L, K)$ } input

Cost efficient - combination of input that produces the output Q at minimum cost.

Time

Long run → Short run

How much labour to use and how large should be the business. } when all factors of production can be changed.

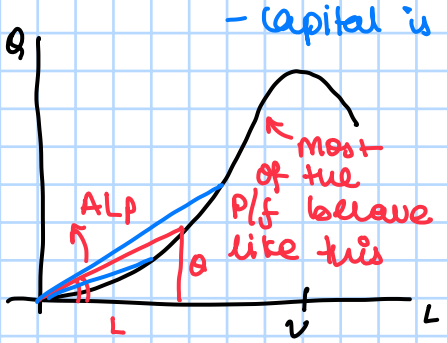
some factors cannot be changed (fixed) } concept of time varies a lot and is not same as financial year/calander year

variable factor of production is a factor of production which can be varied in short run.

- labour is an example.

fixed factor of production is a factor of production which cannot be varied in short run.

- capital is an example.



Return to factor (short run)

after ν – the Q ↓ as labour exceeds

so in all P/f – short run K is fixed

P/f – long run K, L is variable

Note: firms decision is to decide on K, L on long run, after that a particular scale for short run.

↓

after scale – return to factor

Note: Also labour hours can be used (same curve)

It doesn't flatline after 41 – 50 unit – max 200 unit – same output not possible

Technology ≠ Rationality

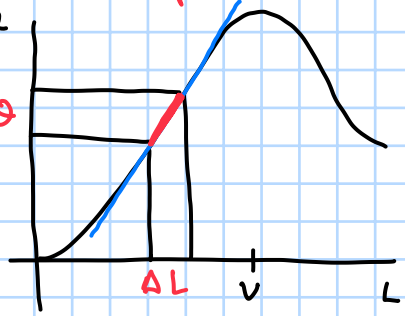
Productivity of labour: Amount of output produced by a unit of labour

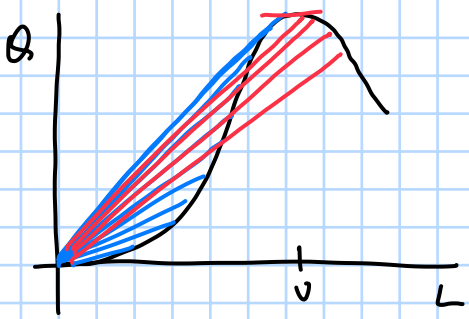
Average output / Amount of labour ← $AP_L = \frac{Q}{L}$ → total output produced / labour at that point

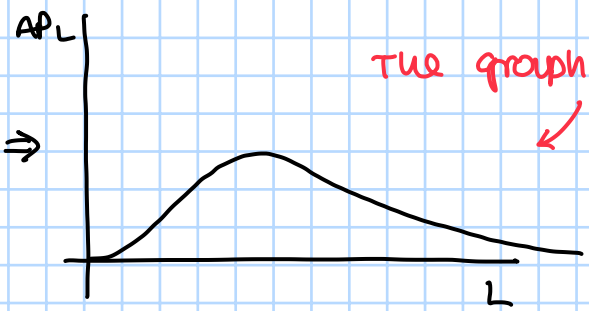
definition of mean

Marginal product of labour: $\frac{\Delta Q}{\Delta L}$ $\lim_{\Delta L \to 0} \frac{\Delta Q}{\Delta L} = \frac{dQ}{dL}$

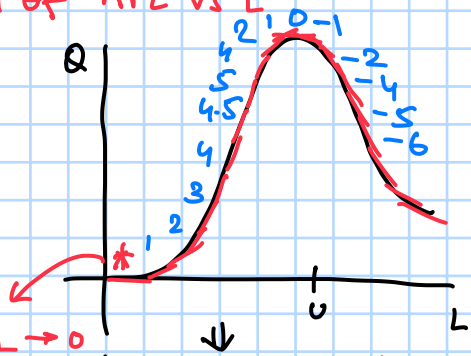
↓ Slope at that point







The graph of AP_L vs L



$$AP_L = \frac{Q}{L}$$

$$\frac{d\,AP_L}{dL} = \frac{L\frac{dQ}{dL} - Q}{L^2} = \frac{1}{L}\left[\frac{dQ}{dL} - \frac{Q}{L}\right]$$

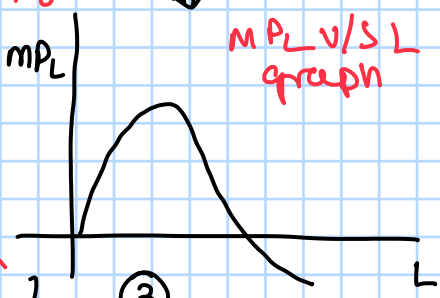
Note: $\frac{dQ}{dL}$ as $\lim L \to 0$, $\frac{dQ}{dL} \to \infty$

$$\frac{d\,AP_L}{dL} = \frac{1}{L}\left[MP_L - AP_L\right]$$

①

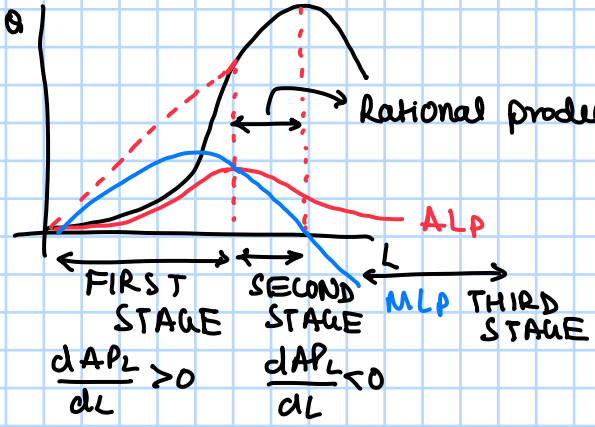
∴ if marginal product > average product, $\frac{d\,AP_L}{dL} > 0$ or AP_L is increasing

② opposite - $AP_L > MP_L$, then AP_L is decreasing

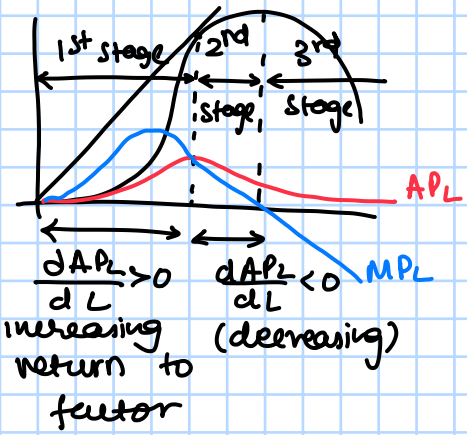


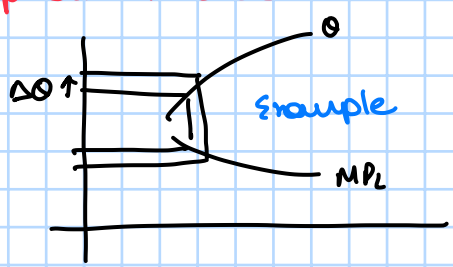
MPL v/s L graph

③ $AP_L = MP_L$ then AP_L is at maxima



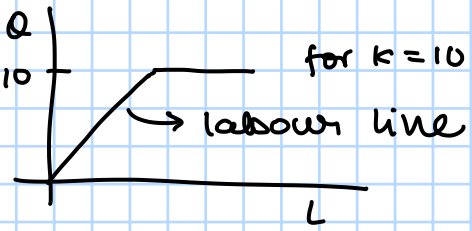
27th Aug: Quiz - objectives, application based





$Q = A + \alpha L + \beta K$ (linear prod. function)

$Q = \min[L, K]$

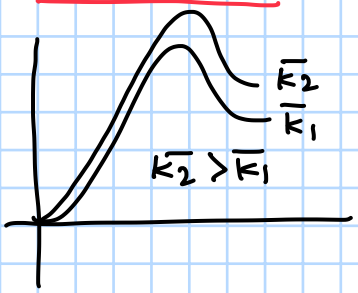


$Q = AL^{\alpha} K^{\beta}$

$Q = A[\theta L^{\alpha} + (1-\theta)K^{\alpha}]^{\frac{1}{\alpha}}$ → do (HW)

Note: Return to factor is <u>short term</u> (in this case K is fixed)
↖ how large business is

<u>Retail to scale</u> - is a <u>long term</u> factor, deals with change in capital stock



Both K, L variable is concept of Retail to change.

- $(\Delta K = \Delta L) < \Delta Q$ - increasing return to scale
- $(\Delta K = \Delta L) > \Delta Q$ - dec. return to scale
- $(\Delta K = \Delta L) = \Delta Q$ - const. retail to scale

<u>Explicit cost</u> - fixed / known cost - land / labour / capital
<u>Implicit cost</u> - unobservable cost - Ent (firm pays Ent) - opportunity cost of Ent.

Economic cost = Exp cost + imp cost
Economic profit = Total rev − Exp cost − imp cost
This is important
Economic profit = Accounting profit - imp cost
(Retail earning)

<u>Remember</u>:
fair condition
Economic profit = 0
Accounting profit = imp cost

Economic profit = 0 if every thing at fair value.

<u>Economic rent</u>: if economic profit > 0 (profit that does not belong to us)
Not good in economics

<u>Only Explicit cost</u>: cost = <u>fixed cost</u> + <u>variable cost</u>
(fixed cost: does not change in short run; variable cost: change in short run)

If we do not produce we get back our some fixed cost = 0

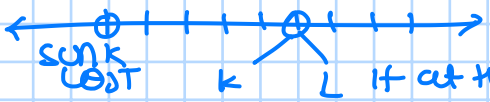
$C(L,K) = rK + wL$
$C(L,\bar{K}) = r\bar{K} + wL$

If Production = 0 (stops) still registration fee ≠ 0
↳ No effect on business (a type of fixed cost)

<u>SUNK COST</u>
- cost to do business but no effect on business.

By producing or not-producing still will cost me. → It cannot be changed

Example
- Booked a ticket, then Quiz → Should come to Quiz



If at this point I do not produce, K, L = 0 but Still sunk

Question from slides: Tailor 10,000 €

6000	→ sunk cost
4000	→ fined cost

After 1 month we cannot sell and get even 0 €
∴ Sunk cost = 10,000

AVC, MC with AP MP:

Average cost

$$AC = w\frac{1}{AP_L} + r\frac{1}{AP_K}$$

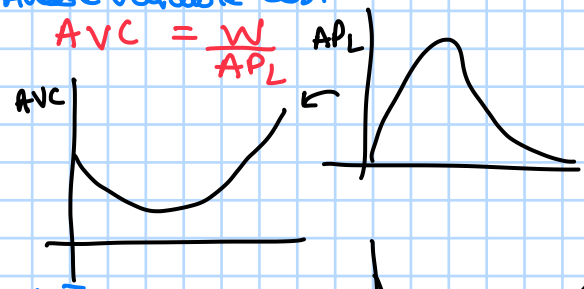
$AP_L \neq 0$
$AP_K \neq 0$

$w\frac{1}{AP_L}$ ← Average variable cost

$r\frac{1}{AP_K}$ ← Average fixed cost

Average variable cost

$$AVC = \frac{w}{AP_L}$$



Average fixed cost

$$AFC = \frac{r}{AP_L}$$

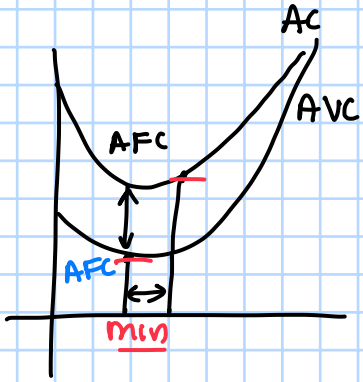
as $AFC = \frac{r\bar{K}}{Q}$

$AFC \cdot Q = r\bar{K}$

$C = r\bar{K} + wL$

$\frac{C}{Q} = \frac{r\bar{K}}{Q} + \frac{wL}{Q}$

$AC = \frac{r}{AP_K} + \frac{w}{AP_L}$



29th Aug :

Relationship b/w Production fn and cost function

$TC = VC + FC$ ($VC = wL$, $FC = r\bar{K}$)

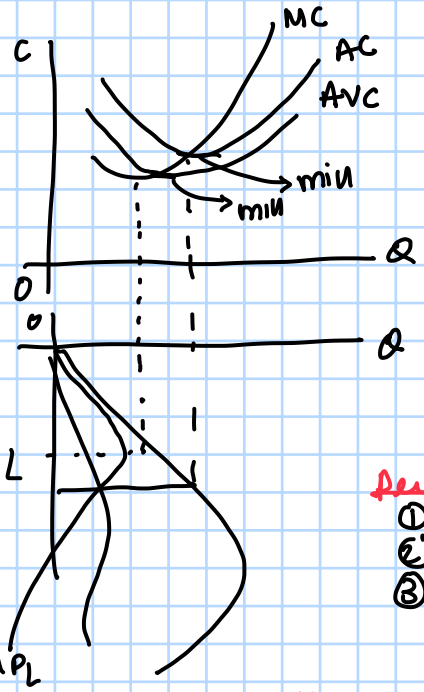
$AC = \frac{TC}{Q} = \frac{VC}{Q} + \frac{FC}{Q} = AVC + AFC$

$MC = \frac{dTC}{dQ} = \frac{dVC}{dQ}$ ← as FC does not change

$= \frac{w}{MP_L}$

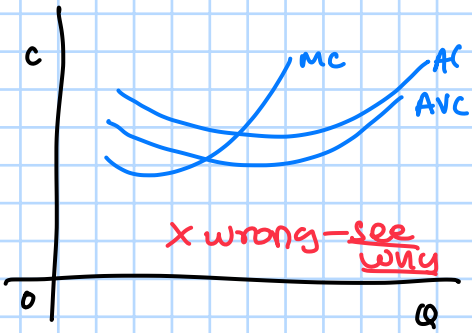
$\frac{dATC}{dQ} = \frac{1}{Q}[MC - ATC]$

$\frac{dAVC}{dQ} = \frac{1}{Q}[MC - AVC]$

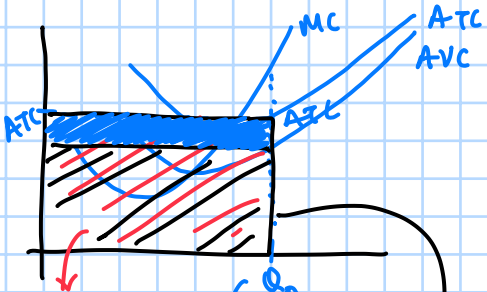


Marshallian diagram

min of AC will be after AVC. (Note this in graph) (and also after MC attains min)



✗ wrong — see why



Area = $(Q_0)(ATC)$ = Total cost of firm

Q_0 output is produced

Area = $(Q_0)(AVC)$ = Total variable cost of firm

Blue area = Total fixed cost of firm

Perfect competition :

① perfect comp market
② no-market power
③ no barrier

If factory ① monopoly - only one / only produces
② 'different' / niche product - differentiator product
(Sugarcane example)

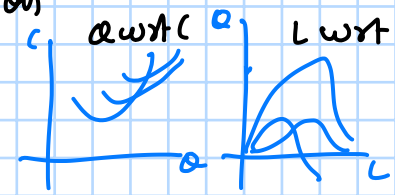
Every society in world should try to make this / get this assumption correct.

no rent seeking activity

If we break this assumption, stuff becomes too complex so we study ideal case

Perfect competition this is not there. Not a single producer can put a stop / barrier.

This assumption is very restrictive



$\Rightarrow$

$\max PQ - C(Q)$ (max profit)

$PQ - C(Q) = \text{profit}$ → to max this

$\pi = PQ - C(Q)$

$\frac{d\pi}{dQ} = P - \frac{d}{dQ}C(Q) = 0$

→ (MC)

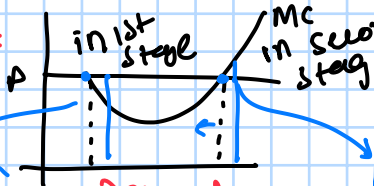
P is marginal cost

$\frac{\partial^2 \pi}{\partial Q^2} < 0$

$\Rightarrow -\left(\frac{d^2 MC}{dQ}\right) < 0$

$\frac{d}{dQ} MC > 0$

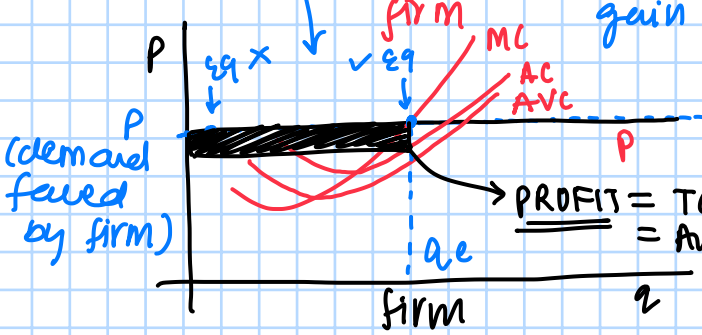
Second stage :



as prod ↑ gain more ∴ unstable

Demand use by producer / firm

production ↑ gain ↓, production ↓ gain ↑



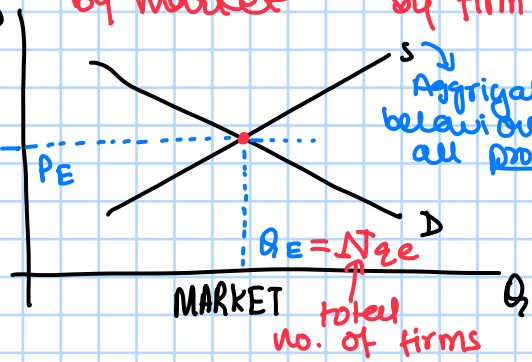
PROFIT = TC − Revenue = Area big − Area small

MARKET

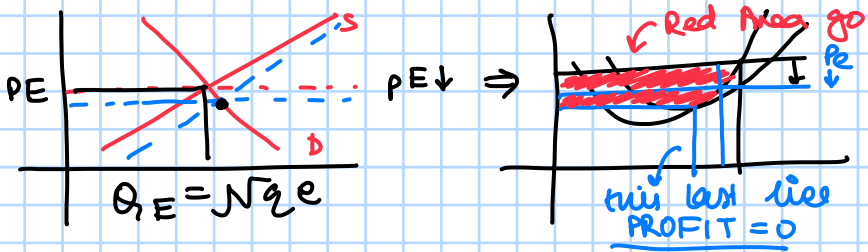
Q ← Quantity by market

FIRM

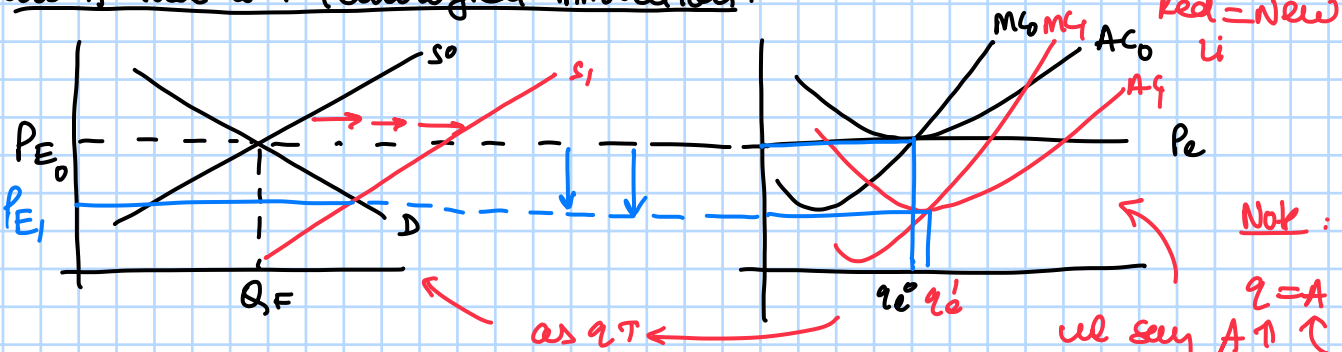
q ← quantity by firm (small)



If there is profit, $N \uparrow$ as $N \uparrow$, the $S \rightarrow$ and $p^E \downarrow$



Now if there is a tecnological innovation:

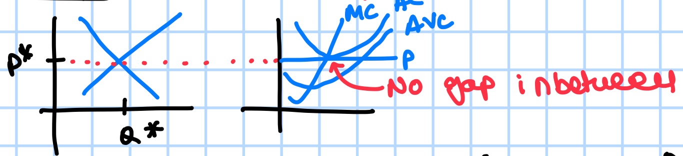


Note:

$q = A L^{\alpha} K^{\beta}$

we say $A \uparrow$ some tech. baseline

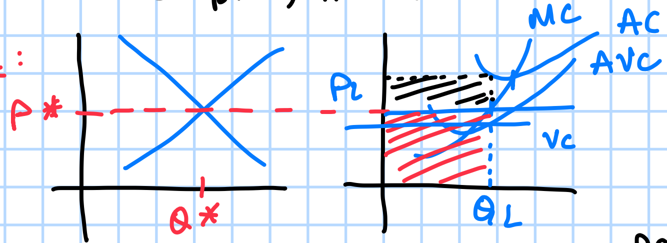
9th sept : perfect comp



market determines price, firm uses it

Note: If there is a profit more firms enter and as $Q^* = Nq$ → $N\uparrow$ or $P^* \downarrow$

Loss side :



Revenue = ▭
Total cost = ▭
= VC + FC

Here in case of loss making means revenue < 0

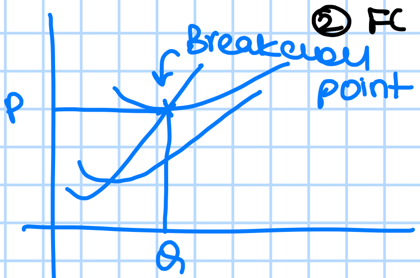
Revenue = Revd − VC − FC → Revenue < 0

(VC: complete; FC: some part of fixed cost)

Note: If we stop production, we don't have to pay VC

← firm stops producing
∴ ① VC = 0
② FC (does not change)

① Firms leave → if P is below AVC then will stop only
② Firms keep on going

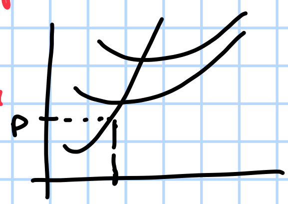


This happens till it goes to breakeven point

$Q = Nq$ as $N\downarrow$
$Q\downarrow$

Note: in this adjustment, capital is fixed, so this is a shortrun adjustment and not a long term adjustment.

Shutdown point - P < min (AVC) then firms shutdown



if Revenue covers fc — shutdown
Revenue covers some fc - till breakeven point

See that p = mc → competitive equilibrium → No incentive to enter or exit then p = mc = min AC → zero profit → fair distrib. to every factor of production

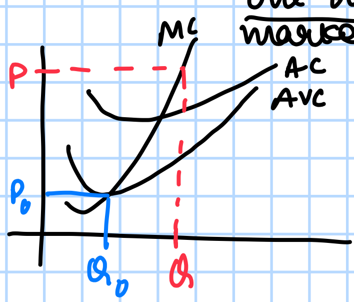
If rent seeking activities do not happen. then →

If every producer gets rent on ownership (Economic profit > 0) then there will exploitation. In india (40% GDP with 1000 families)
↑ China AI, edtech example

Having more profit ⇏ Having more innovation

Supply function of a firm :

One-one relationship b/w the price the firm faces in the market and the quantity it supplies.



Note: $S(P) = \begin{cases} q \text{ (P at mc)} ; & P > P_0 \\ 0 ; & P < P_0 \end{cases}$

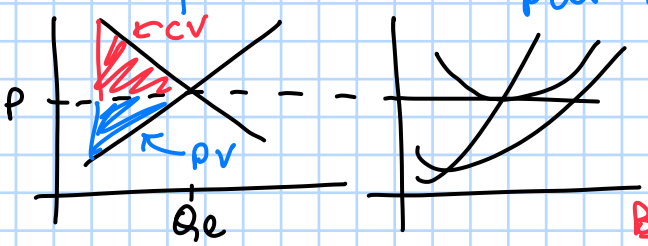
stop production as P is less than min(A.V.C)

Example Question
market D & market S given, find (P^*, Q^*)
find $mc = P^*$
so q^* found
then $N = \frac{Q^*}{q^*}$

Question example: ATC ← determination

$\frac{C(q)}{q}$, minimise it to get $q^e = 2$, $ATC(2) = 100$

$\therefore P^e = 100$ ← No entry / exit (Breakeven point)



Put P^e in $D(Q), S(Q)$ to get $Q_E = 980$

and firms $= \frac{980}{2} = 490$ firms

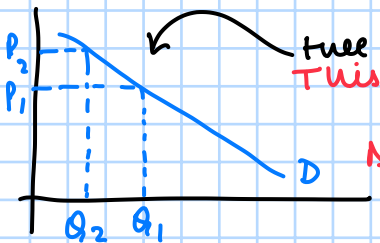
No deadweight loss

But: true will be deadweight loss in monopoly

10th Sept:

Monopoly - One producer or seller in the market

monopoly → large number of consumers } monopoly market



true for monopoly

This is not correct - monopoly can't charge any price ↩ they are constrained by demand

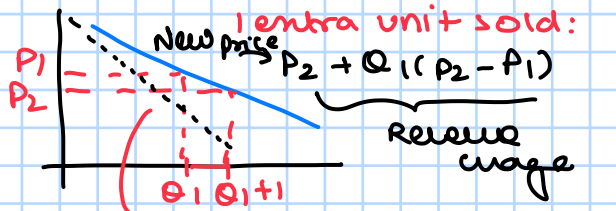
Note: monopoly do not go to inelastic demand market.

Problem of monopoly - To max profit, by choosing Quality produced and sold.

Profit = PQ − C(Q) where demand function is P(Q)

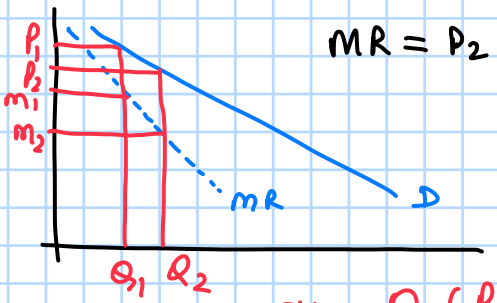
$\pi = P(Q)Q - C(Q)$

Let's see if firm produces 1 more unit of good:



marginal revenue = $P_2 + Q_1(P_2 - P_1)$

↑ All previous units also sold at lower price



$MR = P_2 + Q_1(P_2 - P_1)$

Negative

$MR = P_2 + Q_1(P_2 - P_1)$

at $Q_1 = 0$ $MR = P$

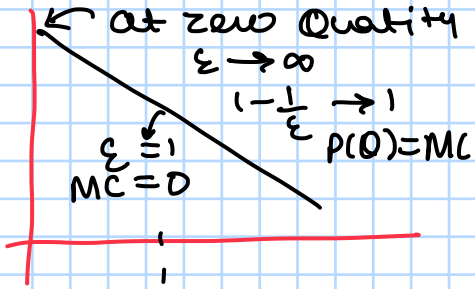
∴ line intersects and then less than the demand function.

the $Q_1(P_2 - P_1)$ ← only comes in monopoly

$$\max \pi = P(Q)Q - C(Q)$$

$$\frac{d\pi}{dQ} = P(Q) + Q\frac{dP(Q)}{dQ} - \frac{dC(Q)}{dQ} = 0$$

$\frac{dP(Q)}{dQ}Q$: marginal revenue; $\frac{dC(Q)}{dQ}$: marginal cost



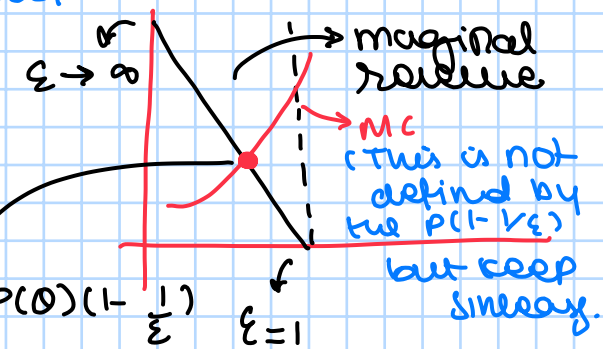
$$0 = P(Q)\left[1 + \frac{Q}{P(Q)}\frac{dP(Q)}{dQ}\right] - MC$$

$$= P(Q)\left[1 - \left(-\frac{1}{\left(\frac{dQ}{dP}\right)\left(\frac{P}{Q}\right)}\right)\right] - MC$$

$$= P(Q)\left[1 - \frac{1}{\text{elasticity}}\right] - MC$$

$$= P(Q)\left[1 - \frac{1}{\varepsilon}\right] - MC$$

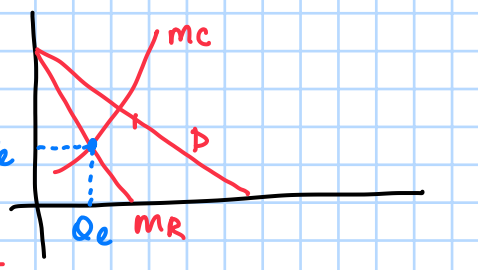
$$\Rightarrow MC = P(Q)\left[1 - \frac{1}{\varepsilon}\right]$$



where $P(Q)(1 - \frac{1}{\varepsilon}) = MC$

∴ if $MC > 0$, then $1 - \frac{1}{\varepsilon} > 0$

$\Rightarrow \varepsilon > 1$ ← Rational profit max. monopolies will always sell in a elastic market

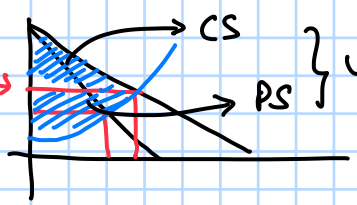


If we impose perfect competition here, supply decision by MC, then it will be imposed when D = MC = P for max. welfare } price by monopoly

→ Price in comp. market

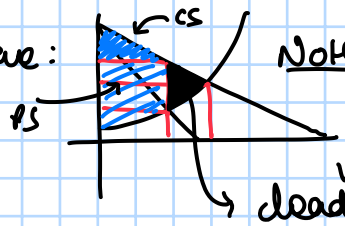
→ very interesting (If we impose perfect comp in monopoly)

Note: under perfect comp. the welfare will be PS + CS



welfare max

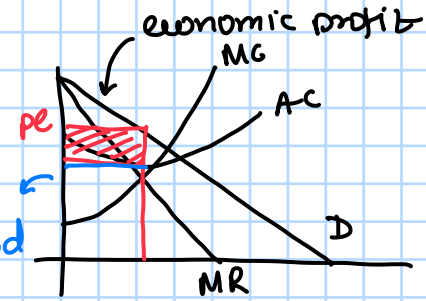
monopoly welfare:



Note: CS will always inc, but PS may not inc or dec

↳ deadweight loss

Note: If $P \neq MC$, then economic profit > 0



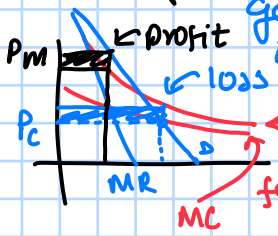
Is monopoly always bad? — Natural monopoly

Eg: Utility providers (gas / LPG)

↳ have large fixed cost

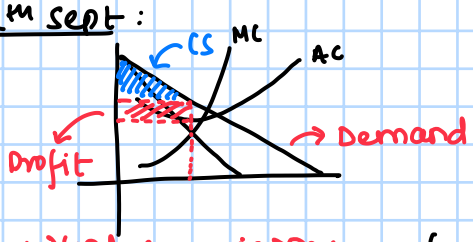
↳ AC is falling

Still wear good



Perfect comp will not sustain, but monopoly would.

12th sept:



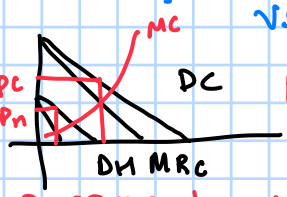
Assume ① monopoly
② together they sell goods/could charge cheaper

price discrimination
- Not always possible for firm
- Due to different demand

London tube example: 15 pounds ticket vs 21 pounds ticket

What conditions this is not done?
Small commercial unit – loses consumer to some monopoly

Electricity bill example: corporate vs houses



Peak load pricing: 2 different demand, so 2 different pricing

→ legal system strong we cannot do this / detect it using some mechanism that deters them

Third degree price discrimination:
- Doctors
- Lawyers

→ market 1: no doctor region, he is only supplier – monopoly – inelastic
→ market 2: multiple doctors available – not a monopoly – elastic
→ one more example: specialised doctor – inelastic demand, if service as normal doctor – elastic demand

$P_1(Q_1)$ ← elastic
$P_2(Q_2)$ ← inelastic

profit $\pi = P_1(Q_1)Q_1 + P_2(Q_2)Q_2 - c(Q_1+Q_2)$

$$\frac{\partial \pi}{\partial Q_1} = P_1\left[1-\frac{1}{\varepsilon_1}\right] - c'(Q_1+Q_2) = 0$$

$$\Rightarrow P_1\left[1-\frac{1}{\varepsilon_1}\right] = c'(Q_1+Q_2) = MC$$

Sim $P_2\left[1-\frac{1}{\varepsilon_2}\right] = MC$

The calculation means that with inelastic demand P > elastic demand

$$P_1\left(1-\frac{1}{\varepsilon_1}\right) = P_2\left(1-\frac{1}{\varepsilon_2}\right)$$

$$\frac{P_1}{P_2} = \frac{\left(1-\frac{1}{\varepsilon_2}\right)}{\left(1-\frac{1}{\varepsilon_1}\right)}$$

$\varepsilon_1 > \varepsilon_2 \Rightarrow \frac{1}{\varepsilon_2} > \frac{1}{\varepsilon_1}$

$\Rightarrow -\frac{1}{\varepsilon_2} < -\frac{1}{\varepsilon_1}$

$\Rightarrow 1-\frac{1}{\varepsilon_2} < 1-\frac{1}{\varepsilon_1}$

$\Rightarrow \frac{P_1}{P_2} < 1$

People in slum → can go to market 2

→ Not possible as slum people can go and take less money service

But for specialisation case differentiation can be achieved

$P_1 < P_2$

P_1: elastic market
P_2: inelastic market

If consumer cannot take arbitrage there we can have this degree price discrimination.

2nd degree price discrimination – Block pricing

per unit price ← Bundling goods together is low

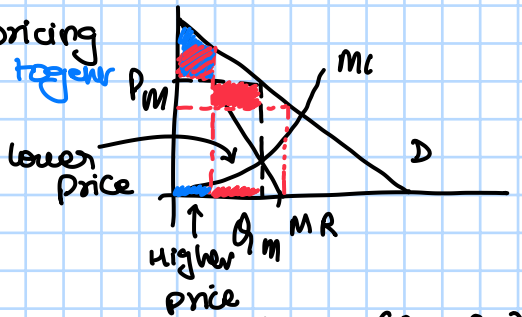
$P = 100 - Q$

monopoly selling gets profit

$\pi = (100-Q)(Q) - Q^2$

$\pi = (100-Q)Q - Q^2 \quad C = Q^2$

$Q_M^* = 25 \quad P_M^* = 75$



→ producer bundle $(0-Q_1)-(Q_1-Q_2)$

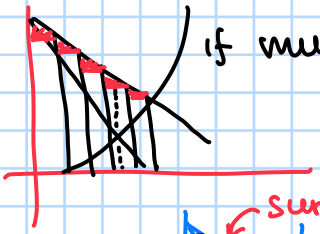
profit from bundle

$\pi = (100-Q_1)(Q_1) + (100-Q_2)(Q_2-Q_1) - Q^2$

$Q_1^* = \frac{100}{7} \quad Q_2^* = \frac{200}{7}$

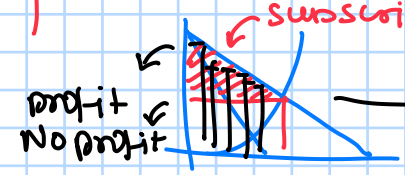
Profit under monopoly $\pi = (100-25)25 - 25^2$

profit under bundling > profit under monopoly



if multidemands and if monopoly know the exact value of good – 1st degree

Amazon prime – fee, new movies you have to pay more



→ only monopolies can do this