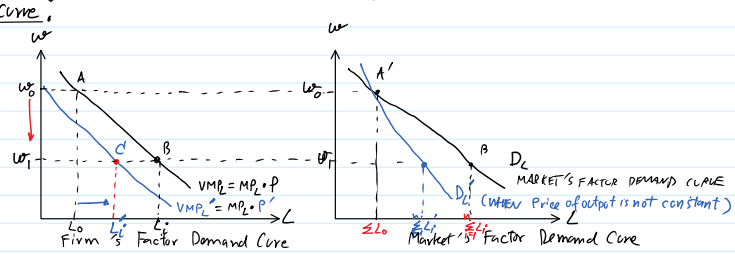
⇨ Finding Market's Factor Demand Curve from A firm's Factor Demand Curve:



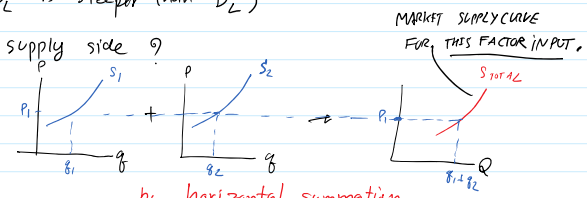
D_L is derived under an assumption that price of output is constant.
However, it may not be true in reality.

Each firm hires more workers as w falls → produce and supply more output into the good market → ↓ PRICE OF OUTPUT (APPLE) will drop! → VMP curve will shift downward from VMP_L → VMP_L'

So, actual quantity demanded for workers would be only L_1' for each firm!!! The market's factor demand curve then would be D_L' which is relatively less elastic than D_L.
(Notice that D_L' is steeper than D_L)

Next, How about on supply side?

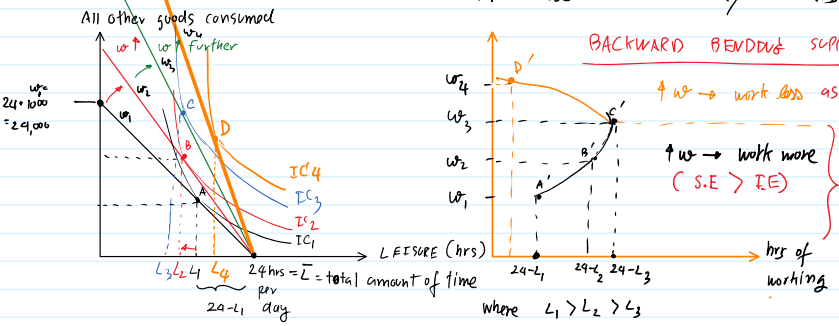
For Factors like oil,



by horizontal summation

How about market supply curve of "LABOR"?

Let's consider an individual worker's decide to work/Leisure...

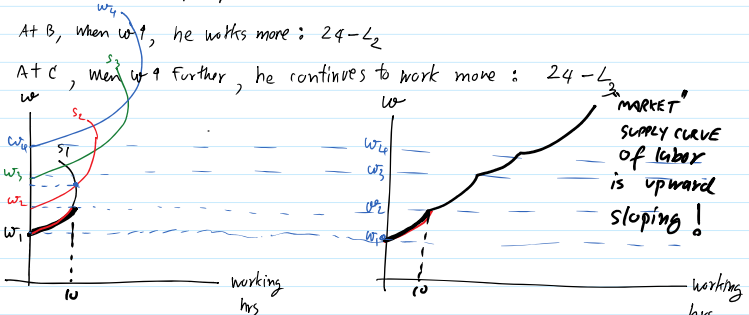


w↑ → opportunity cost of leisure ↑ → via S.E. → work more
w↑ → purchasing power ↑ → via I.E → × (leisure) ↑ → work less
Y (consumption on other goods) ↑
If S.E > I.E → work more!

At A, liesure = L_1
work = $24-L_1$

At B, when w↑, he works more: $24-L_2$

At C, when w↑ further, he continues to work more: $24-L_3$



MESSAGE: Individual supply curve of labor may be bending backward BUT "market" supply curve of labor is NOT!

So far, Market Demand Curve for labor is constructed.
Market Supply curve of labor is constructed.
Let's bring them to plot together...

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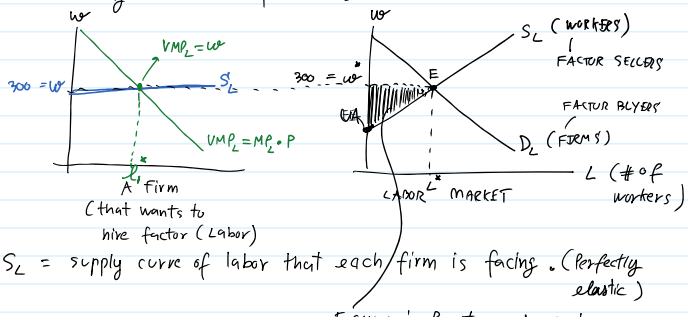
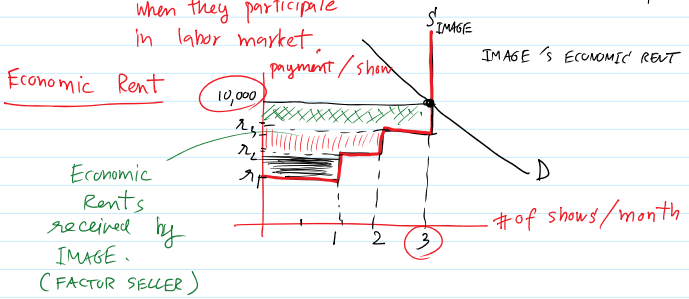


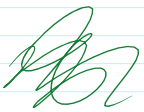
S_L = supply curve of labor that each firm is facing. (Perfectly elastic)

Economic Rent gained by factor sellers (i.e., workers) as they obtain $w^* = 300$ which is above their reservation price!

OR =

Surplus gained by factor owners when they participate in labor market.





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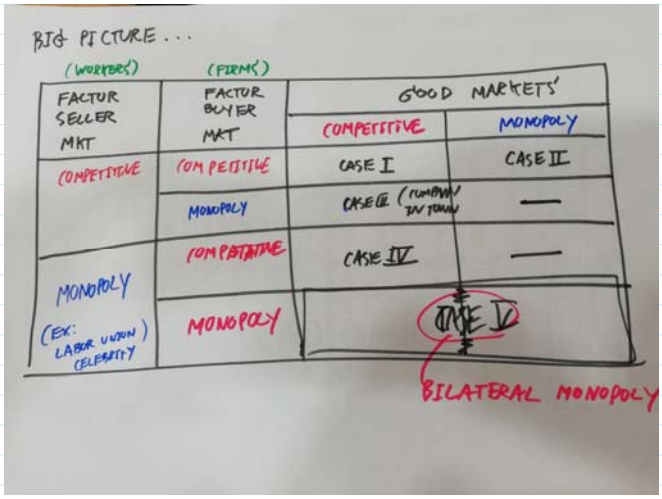
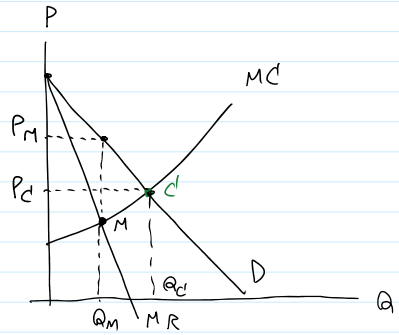


CASE 2 — FACTOR MARKET → COMPETITIVE ⟨ MANY FACTOR BUYERS (FIRMS) ⟩ MANY FACTOR SELLERS (WORKERS)

GOOD MARKET → MONOPOLY (= FIRM ACTS AS A MONOPOLIST)

EXAMPLE — EXAT (EXPRESS WAY AUTHORITY OF THAILAND)

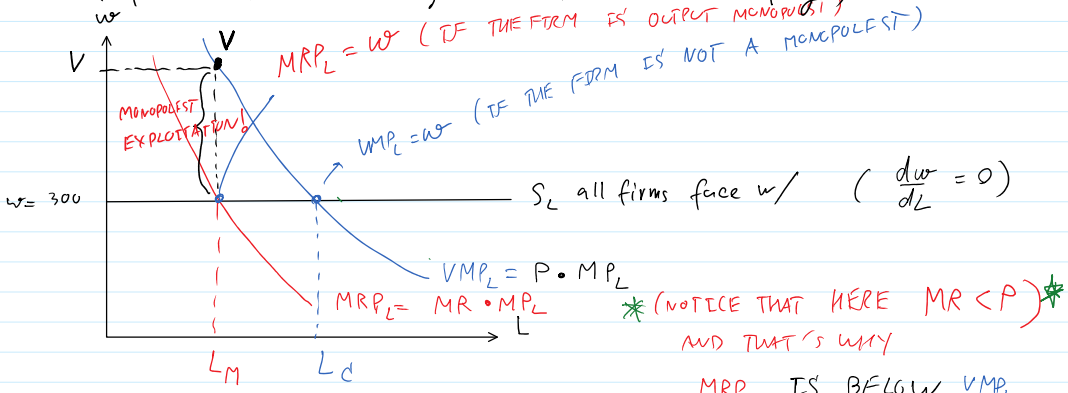


THINK ABOUT WHAT WOULD HAPPEN IN THE GOOD MARKET FIRST...

MONOPOLIST (GOOD MARKET) PRODUCES AT Q_M WHERE $MR = MC$. (POINT M)

BUT FOR A COMPETITIVE GOOD MKT, THE EQUILIBRIUM WILL BE AT POINT C' WHERE DEMAND INTERSECTS W/ MC

Now, consider the factor market which is competitive (keep in mind that good market is monopoly)



* (NOTICE THAT HERE MR < P) AND THAT'S WHY MRP_L IS BELOW VMP_L

① MONOPOLIST WILL HIRE WORKERS SUCH THAT $MRP_L = w$. (i.e., $L = L_M$)

Marginal Revenue Product

② Labor exploitation (Monopolistic Exploitation) occurs as at L_M, you can observe that $VMP_L > w$!!!

(Karl Marx will complain)

Math Box

$$\max_L \Pi(L) = P(Q(L)) \cdot Q(L) - w \cdot L$$

F.O.C. $$\frac{\partial \Pi(L)}{\partial L} = P \cdot \frac{\partial Q(L)}{\partial L} + Q(L) \frac{\partial P}{\partial Q} \cdot \frac{\partial Q(L)}{\partial L} - w = 0$$

$$\left[P + Q \frac{\partial P}{\partial Q} \right] \frac{\partial Q(L)}{\partial L} = w$$

$$MR \cdot MP_L = w$$

$$\boxed{MRP_L = w}$$

Profit maximizing condition for hiring L when output market is monopoly + factor mkt is competitive. (CASE 2)

EXERCISE SUPPOSE ① $Q(L) = b\sqrt{L}$

② $P(Q) = a - Q$

③ FACTOR MARKET → COMPETITIVE

④ OUTPUT MARKET → MONOPOLY

Q: FIND L^* THAT MAXIMIZE THE MONOPOLIST'S PROFITS.

SOLUTION: $$L^* = \frac{1}{4} \cdot \left[\frac{a \cdot b}{1 + w} \right]^2$$

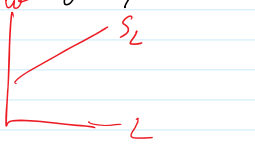
CASE 3 (A COMPANY IN TOWN)

FACTOR MARKET ← A SINGLE FACTOR BUYER ***
MANY MANY FACTOR SELLER

OUTPUT MARKET → COMPETITIVE

W/ ONLY ONE FACTOR BUYER, WE CALL HIM "MONOPSOLIST"

FACT 1 The Monopsonist faces w/ Entire Amount of workers he can hire. That means he is dealing w/ upward sloping labor supply curve.



Implication? ⇒ To induce workers to work more, The monopsonist must offer higher wage: w must increase to make it more attractive to work more / or come to work more.

$w_1 = 100$ baht/ป/day → $L_1 = 2$ hours

If the monopsonist want $L_2 = 3$ hours (resource), workers request $w_2 = 120$ Baht/ป/hr

B/F: total (resource) cost = $100 \times 2 = 200$ Baht

Average Resource Cost of Labor (ARC_L) = $\frac{200}{2} = 100$ baht / hour

A/F: total (resource) cost = $120 \cdot 3 = 360$ baht

ARC_L INCREASES! Please notice.

of Labor 2

A/F : (with $L_L = 3$)

total resource cost = $120 \cdot 3 = 360$ baht

Average Resource Cost of labor (ARC'_L) $= \frac{360}{3} = 120$ baht/hour

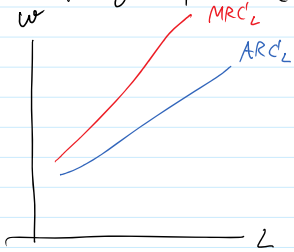
ARC_L INCREASES Please notice.

Marginal Resource Cost of labor (MRC'_L) $= \frac{\Delta TRC'}{\Delta L} = \frac{360 - 200}{3 - 2} = 160$ baht/hr

Notice that MRC'_L (160) $>$ ARC'_L (120)

	1st hr	2nd hr	3rd hr	ARC	MRC
A/F (L=2)	100	100	—	100	—
A/F (L=3)	100 (+20)	120 (+20)	120 (+120)	120	160 !!!
					(+120 + 20 + 20)

As a result from this intuition, if S_L or ARC'_L curve is upward sloping, it would imply that MRC'_L curve must lie above ARC'_L curve so that ARC'_L curve is sloping upward (≡ to induce more worker/or more working hours, $ARC'_L = S_L$ or w must be more pursuasive. (i.e., higher w)

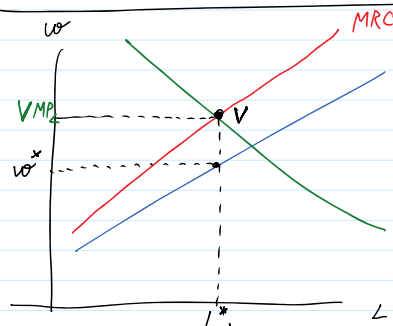


① ARC' is upward sloping b/c $MRC'_L > ARC'_L$ as explained above.

② ARC'_L is supply of labor : it tells us about quantity supplied of labor at various wage levels, the higher the w, the higher quantity supplied of labor.

Now we can discuss about how many L that the Monopsonist should hire in order to maximize his profits.

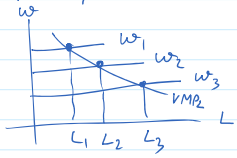
FYI



$ARC'_L = S'_L$ (in Pindyck, it called AE : Average Expenditure)

$VMP_L = P \cdot MP_L$ (Demand Curve for Labor) $= D_L$ which is derived from the principle of $VMP_L = w$

① Now, comparing between VMP_L and MRC'_L: when $VMP_L > MRC'_L$, more L should be hired. Stop hiring when $VMP_L = MRC'_L$ (profit ↑)



② At $L = L^*$, workers' reservation price is w^* (minimum level of wage that would induce workers to supply $L = L^*$ read from S_L curve)

③ As $VMP_L > w^*$ or $VMP_L - w^* > 0$, it reflects

"Monopsonistic Exploitation Rate"

(as output mkt is competitive; actually it is w.)

MATH BOX:

$$\max_L \Pi(L) = P \cdot Q(L) - ARC(L) \cdot L$$

F.O.C.:

$$P \cdot \frac{\partial Q(L)}{\partial L} - \left(ARC(L) \cdot \frac{\partial L}{\partial L} + L \frac{\partial ARC(L)}{\partial L} \right) = 0$$

$$P \cdot MP_L - \left(MRC_L \right) = 0 \quad \text{(why?)}$$

D-I-Y: verify that $ARC(L) + L \frac{\partial ARC(L)}{\partial L} = MRC$.

↑ extra cost when hiring an extra unit of worker (or factor)

So, $\boxed{VMP_L = MRC_L}$ +++ (CASE 3)

(point V in the graph)

Note: As $MRC = w + L \frac{\partial w}{\partial L}$

$$= w + L \frac{\partial w}{\partial L} \cdot \frac{w}{w}$$

$$= w + \left(\frac{\partial w}{\partial L} \cdot \frac{L}{w} \right) \cdot w$$

$$= w + \frac{w}{E_L}$$

WAGE ELASTICITY OF LABOR SUPPLY

where $\boxed{E_L = \frac{\partial L}{\partial w} \cdot \frac{w}{L}}$

At Equilibrium, $VMP_L = MRC_L$. So, we can write

$$VMP_L = w + \frac{w}{E_L} \Rightarrow \boxed{\frac{VMP_L - w}{w} = \frac{1}{E_L}}$$

Exploitation Rate as a percentage of wage is inversely related w/ wage elasticity.

The higher the E_L, the lower exploitation rate, vice versa.

= If workers in the village has an outside option (sth to do if not working for this company), the monopsonist cannot make much gap of VMP − w. (= pay w closer to VMP_L)!

ONLY ONE FACTOR SELLER which is a labor union

CASE 4 (LABOR UNION CASE)

ANOTHER EXAMPLE

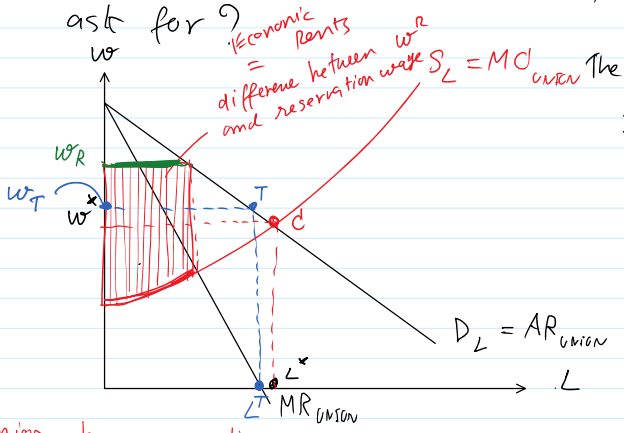
In the past, when we had only Intel as a computer chip maker (No AMD yet),

FACTOR SELLER (ALONE): Intel

FACTOR BUYERSSS: Dell, IBM, HP, etc.

Q: How many workers the Labor Union would decide to release for work when many many firms come to ask for?

... many workers the Labor Union would decide to release for work when many many firms come to ask for?



The Union views ♀ (workers) as sth it has to decide to sell.

The Union has 3 options

① GOAL: MAXIMIZE # of workers hired.

The union will set $w = w^*$ and then $L = L^*_{max}$

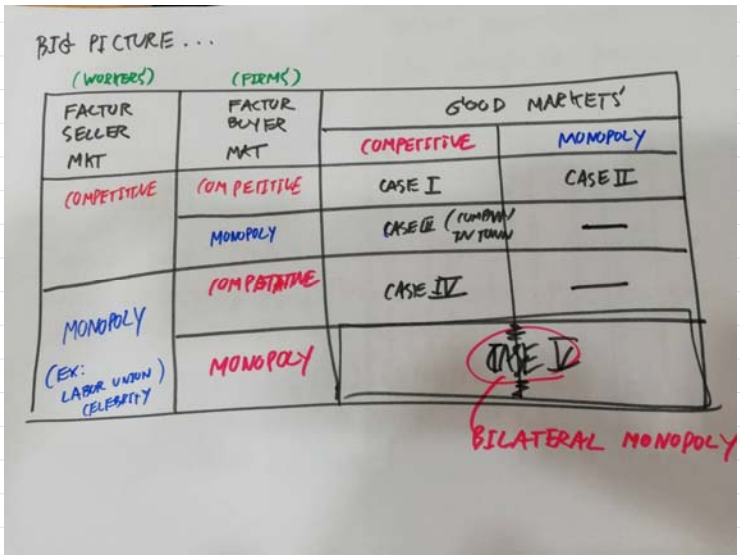
② GOAL: maximize total wages paid to workers.

The union will set w such that $MR_U = 0$. Wage = w_T.

③ GOAL: maximize "economic rents" obtained by workers (who get employed)

The union will set L such that $MR_U = MC_U$ (POINT A)

The economic rent will be .....



CASE 5 Bilateral Monopoly

FACTOR MARKET
- FACTOR BUYER (FIRM) → MONOPSONIST *
- FACTOR SELLER (WORKER) → MONOPOLIST *

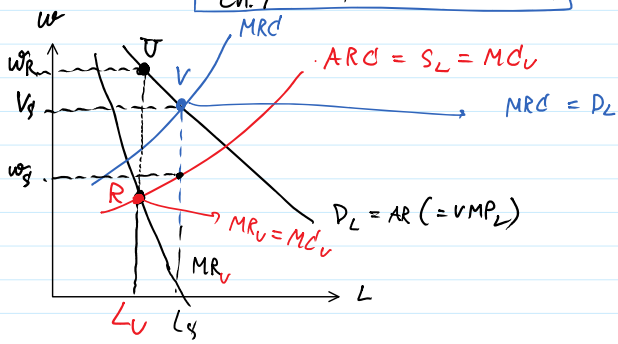
GOOD MARKET CAN BE EITHER COMPETITIVE OR MONOPOLY

EXAMPLE

Mariya → FACTOR SELLER
Ch.7 → FACTOR BUYER

OR

LABOUR UNION → FACTOR SELLER
A MONOPSONIST → FACTOR BUYER



(MONOPSONIST WANTS TO HIRE L^S WHERE MRC = D_L (OR = VMP_L)) FACTOR BUYER WOULD BE WILLING TO PAY w_S.

However, V_S which is value of marginal product that the union created > w_S.

So, if this is the case, Monopsonistic Exploitation arises.

Now, how about the Union?

The Union, let's say, wants to maximize the rents.

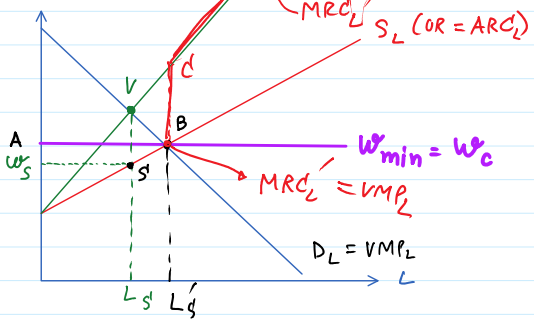
The Union wants to hire L_U where $MR_U = MC_U$ OR AT POINT R AND wants to get w_R which is higher than w_S!!! So Negotiation starts.

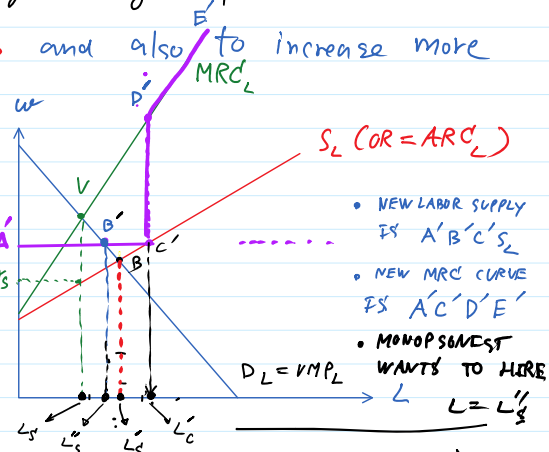
- If the Union has more bargaining power, the wage will stay close to w_R.
- If Monopsonist has more bargaining power, the wage will be close to w_S.

Special issue: Monopsonist & Minimum wage.

As we observed, Monopsonist exploits workers by paying w less than VMP workers generated. So, govt may impose

As we observed, Monopsonist exploits workers by paying w less than VMP workers generated. So, govt may impose "minimum wage" to help workers and also to increase more employment.





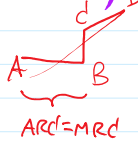
w/o minimum wage law, $L = L_S'$, $w = w_S$ (MONOPSONIST'S HIRING RULE: $MRC'_L = VMP_L$ (POINT V))

w/ minimum wage law, govt. sets $w_{min} = w_c$ ← wage if Labor market were to be competitive.

Now, AB S_L becomes the new labor supply curve or the New ARC'_L curve.

Notice the from A to B (the horizontal line), $ARC'_L = MRC'_L = w_{min}$)

the New MRC'_L curve is ABC'D



- $Q^D_L = L''_S < Q^S_L = L_{C'}$

⇓

unemployment occurs when minimum wage is set too high

- L''_S is also Less than L'_S !!!