Ch9 Buying and Selling

In the simple model where we analysed consumer behavior, the income of the consumer was given. In reality people ~~are not~~ earn their income by selling things that they own.

We suppose that we are starting of with an 'endowment' ie you are endowed with ω_1 and ω_2 amt of good 1 and good 2 in the (assumed) two good world.

Value of what one holds = $P_1\omega_1 + P_2\omega_2$
(Note: This fig is equivalent to the 'M' in BL equation).

The budget ~~constraint~~ (set) 'll be

$$p_1x_1 + P_2x_2 \leq P_1\omega_1 + P_2\omega_2$$

with BL being

$$P_1x_1 + P_2x_2 = P_1\omega_1 + P_2\omega_2$$

Net Demand Vs Gross demand.

The gross demand for a good is the amt of the good that the consumer actually ends up consuming ie (x_1, x_2).

The net demand for a good is the difference between what the consumer ends up with and the initial endowment

ie $(x_1 - \omega_1, x_2 - \omega_2)$.

Remember

$(x_1, x_2) \geq 0$.

$(x_1 - \omega_1), (x_2 - \omega_2) < 0$ or $>$.

say if $(x_1 - \omega_1) > 0$ − $\boxed{\text{Net buyer / Net } \cancel{\text{supplier}} \text{ demander}}$ of good 1

if $(x_1 - \omega_1) < 0$ − $\boxed{\text{Net seller / Net supplier}}$ of good 2

~~Slope~~

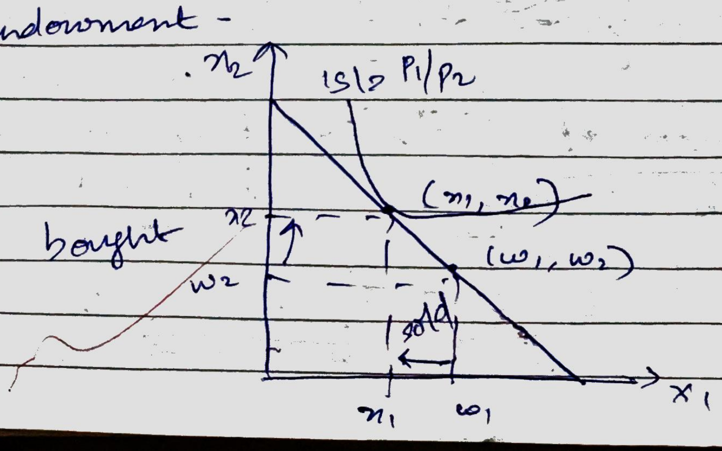
we know

BL: $p_1 x_1 + p_2 x_2 = p_1 \omega_1 + p_2 \omega_2$

$$\Rightarrow x_1 = \frac{p_1\omega_1 + p_2\omega_2}{p_1} - \frac{p_2}{p_1} x_2$$

$$\boxed{\text{Slope} = -p_1/p_2}$$ (taking $x_2 = f(x_1)$)

BL geometrically is a line with slope $-p_1/p_2$ passing through endowment bundle (ω_1, ω_2). Why? The value $x_1 = \omega_1$ & $x_2 = \omega_2$ satisfies the BL. The endowment is always just affordable as it is equal to the value of endowment.



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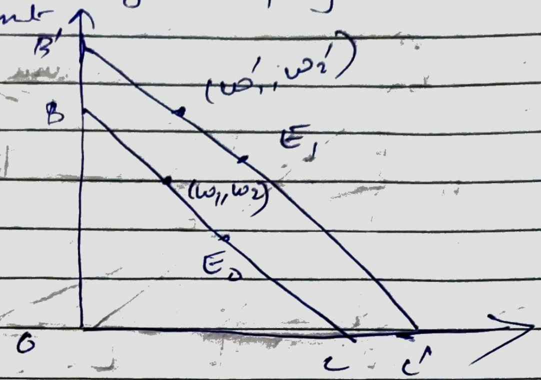
Remember :- An ~~endowmen~~ eq. bundle corresponding to a higher endowment 'll always be pref over the original endowment



Given E_0 and E_1 are the chosen bundles

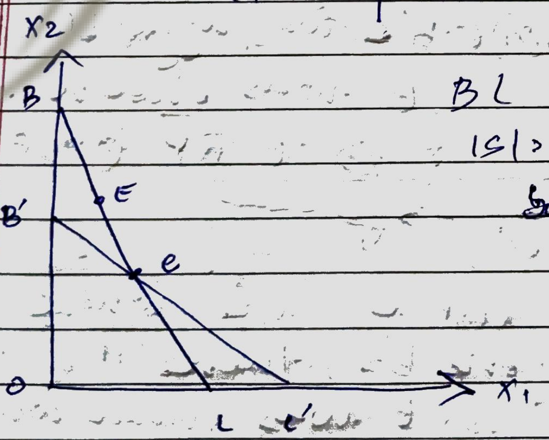
In OBL,
E_0 was chosen when (ω_1, ω_2) was available — ①

In OB'L':
E_1 was chosen when E_0 was available ②

① & ② ⇓ E_0 RP (ω_1, ω_2), E_1 RP E_0 ⇒ $E_0 > (\omega, \omega_2)$, $E_1 > E_0$ ⇒ E_1 RP (ω, ω_2), $E_1 > (\omega, \omega_2)$.

① ② ③

Also note that if $x_1 - \omega_1 < 0$, then $x_2 - \omega_2$ must be > 0 (provided $P_1, P_2 > 0$ — obvious).



BL was the initial bl. when $|s| > P_1/P_2$. Suppose $P_1 \downarrow$ to P_1' so we know the BL would be flatter. But rather than swivelling it got shifted in as well. This is because P_1' causes $P_1\omega_1 + P_2\omega_2$ to be less than that before

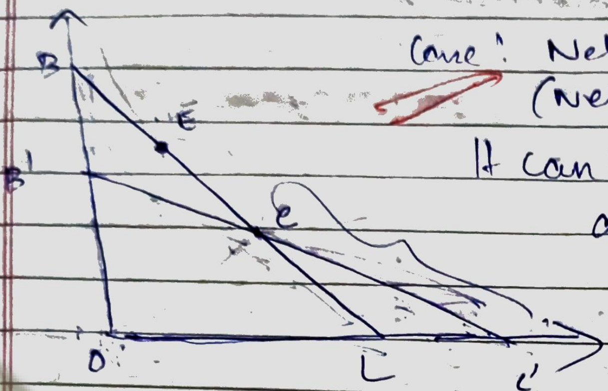
⇒ Shift.

$P_1 \downarrow$ ⇒ Shift + slope change (flatter)

$\underline{P_1\omega_1} + P_2\omega_2 \downarrow$ $\quad$ $\dfrac{P_1}{P_2} \downarrow$

Consider the previous case of $P_1 \downarrow$.

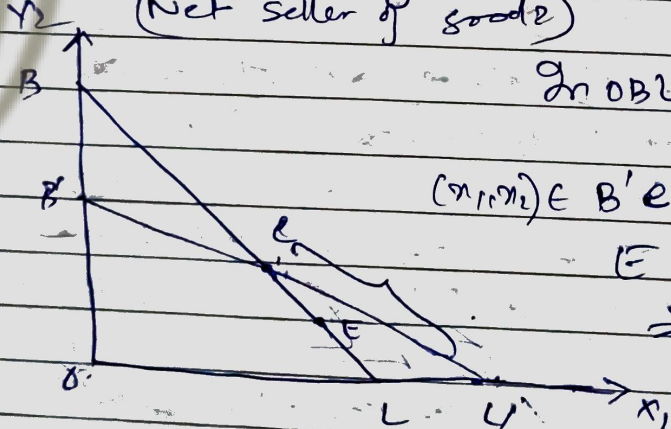
where'll be the new equilibrium?



Case: Net seller of good 1, $P_1 \downarrow$
(Net buyer of good 2)

It can be anywhere b/w B'L' as: In OBL, though E RP over $(x,y) \in B'e$ as E was chosen when those bundles were available, we can't say anything in OB'L' as E is no longer affordable.

Case: Net ~~seller~~ buyer of good 1, $P_1 \downarrow$
(Net seller of good 2)



In OBL E is the chosen bundle.

$(x_1, x_2) \in B'e$ was affordable yet E was chosen.

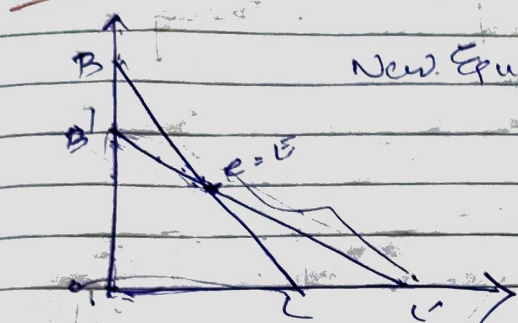
$\Rightarrow$ E RP $(x_1, x_2) \in B'e$

In OB'L' If there exist a case where new equilibrium (E') lie on B'e, then it would mean E' RP E as E' was chosen when E was available. This contradicts WARP

$\Rightarrow$ New equilibrium must be between e and L'.

Case: ~~Net seller~~ Equlbm at 'e' . $P_1 \downarrow$

New Equlbm 'll be $\in [e, L')$.



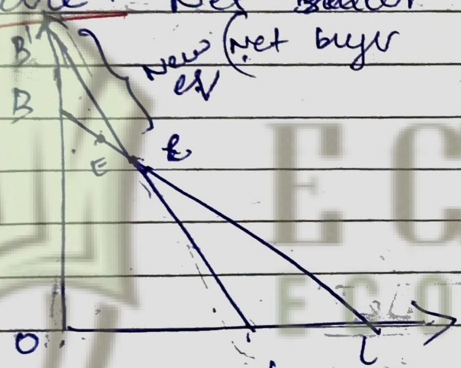
Case: Net ~~Seller~~ Seller of good 1 $P_1 \uparrow$
(Net buyer of good 2)

In OBL E was chosen when $(x_1, x_2) \in (e, L')$ was available

Thus $(x_1, x_2) \in (e, L')$ can't be RP over E when OB'L'.

as still E is affordable.

WARP contradiction

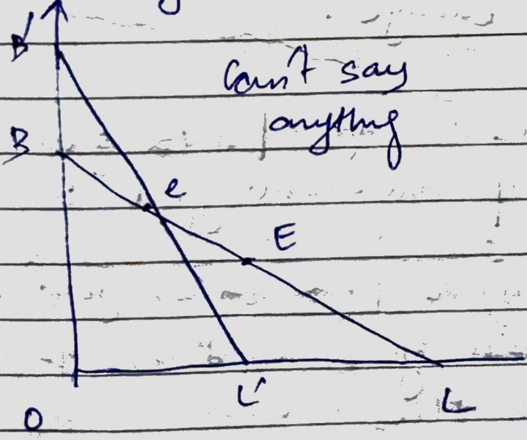


New Equlbm 'll be in the area marked as shown.

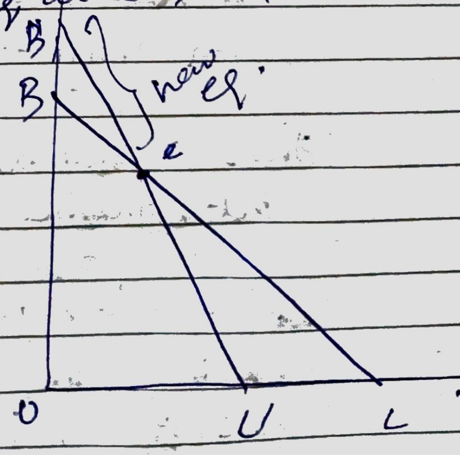
(Net seller of G2)

Net buyer , $P_1 \downarrow$

Can't say anything



Eq at e , $P_1 \uparrow$



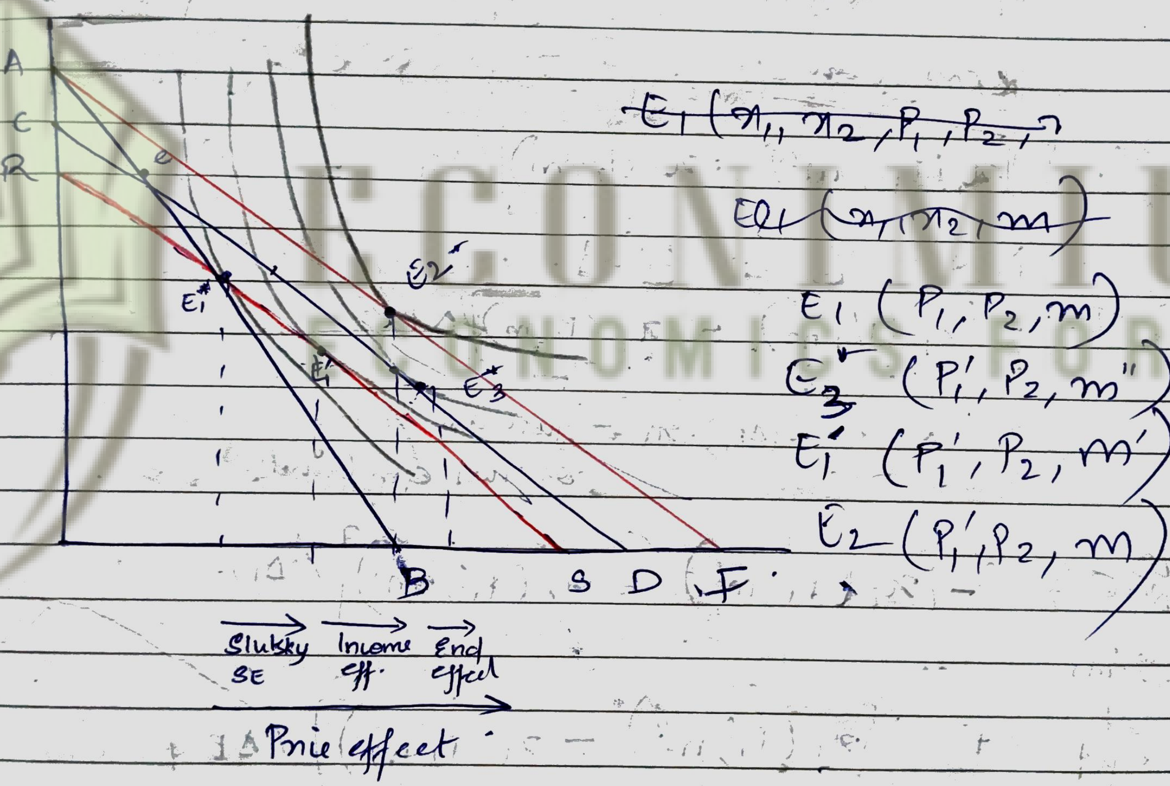
value of your endowment and thus changes your nominal income. This is called endowment effect.

Thus

$$\frac{\Delta x_1}{\Delta p_1} = \frac{\Delta x_1^s}{\Delta p_1} - x_1 \frac{\Delta x_1^m}{\Delta m} + \text{endowment effect}$$

$$m = p_1 w_1 + p_2 w_2$$

$$\Rightarrow \frac{\Delta m}{\Delta p_1} = w_1$$



$E_1^* - E_1' - SE$

$E_1^* - E_2^* - YE$

$E_2^* - E_3^* - En.E.$

Remember E_1' can always be to the right of E_1^* as we've assumed it to be a normal good with a well behaving pref (convex IC).

Note that E_2 can be to the right or to the left of E_3^*.

Explanation for RS and E_3 is known. What is new is E_2^*.

As $P_1 \downarrow$ the endowment changes as well, the money income changes, but in order to show the income effect we must keep real income fixed, which is shown by AF. Thus E_2 comes into the picture.

Derivation

Price effect $\left\{ \left[\underbrace{x_1(P_1', m'')}_{\text{New dd}} - \underbrace{x_1(P_1, m)}_{E_1^* \text{ dd}} \right] / \Delta P_1 = \right.$

$\frac{\Delta x_1^S}{\Delta P}$ SE $\left\{ \left[x_1(P_1', m') - x_1(P_1, m) \right] / \Delta P_1 \right.$

$m' = (\Delta P_1) \cdot x_1$ – just able to buy original eqm bundle.

$\frac{\Delta x_1^m}{\Delta^1 IE}$ $\left\{ - \left[x_1(P_1', m') - x_1(P_1', m) \right] / \Delta P_1 \right.$

$\Delta x_1^{\omega} / \Delta P_1$ End effect $+ \left[x_1(P_1', m'') - x_1(P_1', m) \right] / \Delta P_1$

$=$ m'' is s. $m'' - M = \Delta P_1 \cdot \omega_1$

value of endow. @ new prices

$$\therefore \frac{\Delta x_1}{\Delta P_1} = \frac{\Delta x_1^S}{\Delta P_1} - \frac{\Delta x_1^m}{\Delta m} \cdot x_1 + \frac{\Delta x_1^{\omega}}{\Delta m} \cdot \omega_1.$$

$$= \frac{\Delta x_1^S}{\Delta P_1} + (\omega_1 - x_1) \frac{\Delta x_1^M}{\Delta m}$$

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Take $x = f(p, m(p_1))$
$= x_1(p_1, m(p_1))$ where
$m(p_1) = p_1\omega_1 + p_2\omega_2$

$$\frac{dx_1(p_1, m(p_1))}{dp_1} = \frac{\partial x_1(p_1, m(p_1))}{\partial p_1} + \frac{\partial x(\cdot)}{\partial m} \underbrace{\frac{\partial m(\cdot)}{\partial p_1}}_{\omega_1}$$

$$= \underbrace{\frac{\partial x_1(p_1, m(p_1))}{\partial p_1}}_{\text{old price effect keeping money income const}} + \underbrace{\frac{\partial x(\cdot)}{\partial m} \cdot \omega_1}_{\text{additional endowment effect}}$$

$$\frac{\partial x_1(p_1, m(p_1))}{\partial p_1} = \frac{\partial x_1^s(p_1)}{\partial p_1} + \frac{\partial x(p_1, m)}{\partial m}(\omega_1 - x_1)$$

— For clarification refer to Appendix Pg 180-181.

labor supply

Let the endowment be $(\bar{M}, \bar{L})$, where $\bar{M}$ is the money income that one receives ~~to~~ even if one works/not and $\bar{L}$ is the total hours of leisure that one can have.

ie Endowment $= (\bar{M}, \bar{L})$
to be more precise $= \left(\frac{\bar{M}}{P}, \bar{L}\right)$ where $\frac{\bar{M}}{P}$ is the guaranteed units of consumption.

let us denote $\bar{c} = \frac{\bar{M}}{P}$

Endowment = $(\bar{l}, \bar{c})$

Now 'p' is the price and let c be the consumption units (from the work that one does).

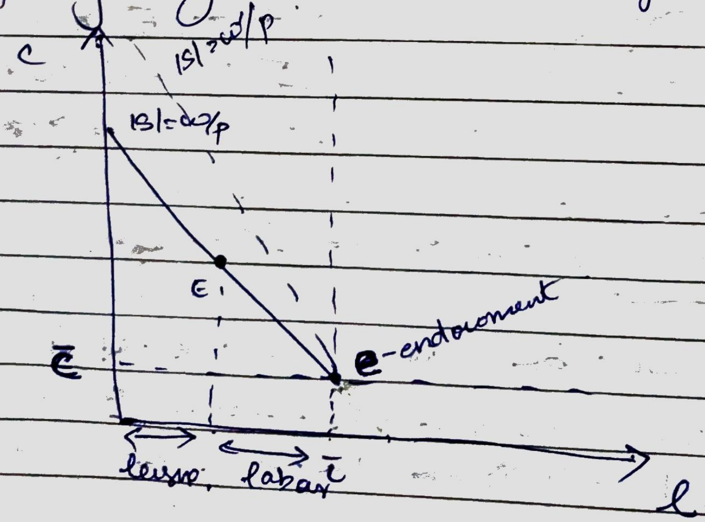
~~Also~~ for work, 'ω' is the wage.

The no. of hours is given by $\bar{l} - l$, where 'l' is the ~~no. of~~ hours of leisure.

$$\Rightarrow BL: \underbrace{p.c}_{\text{Income recd}} = \underbrace{\bar{c}}_{\downarrow \frac{\bar{m}}{p}} + \underbrace{\omega(L - \bar{l})}_{\text{wage}}$$

$$\Rightarrow \quad c = c + \frac{\omega(\bar{l} - l)}{p}$$

Plotting it gives us a line with slope $= -\omega/p$. passing through endowment that goes till point B.



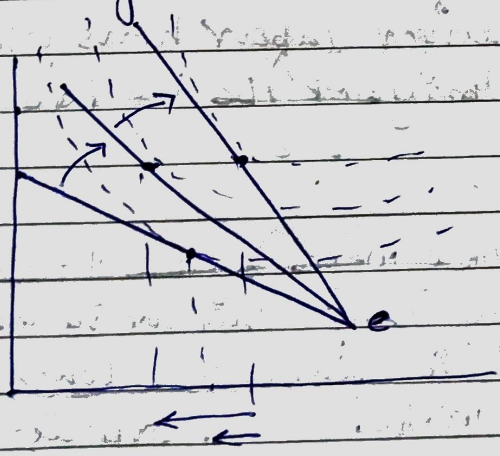
$w \; r$

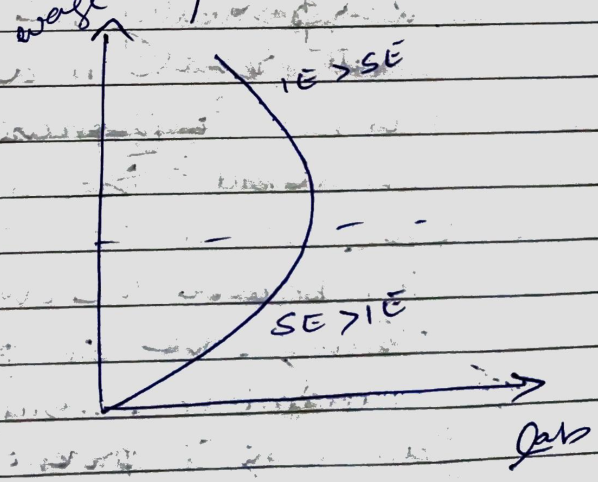
Suppose wage rate ↑ to $\frac{w'}{p}$. The BL would be the dotted line as shown.
When w ↑, leisure becomes expensive, which ⇒ people substitute away from leisure (SE). Since leisure is a normal good, the ↑ in wage ⇒ ↑ in income thus people try to consume more of leisure

$$\frac{\partial(L-\ell)}{\partial w} = \underbrace{\text{sub effect}}_{-} + \underbrace{(\bar{L}-\ell)}_{+} \cdot \underbrace{\boxed{\frac{\Delta(L-\ell)}{\Delta m}}}_{+}$$

or simple SE ⇒ more of cons & less of leisure
IE ⇒ more of leisure & less of cons.

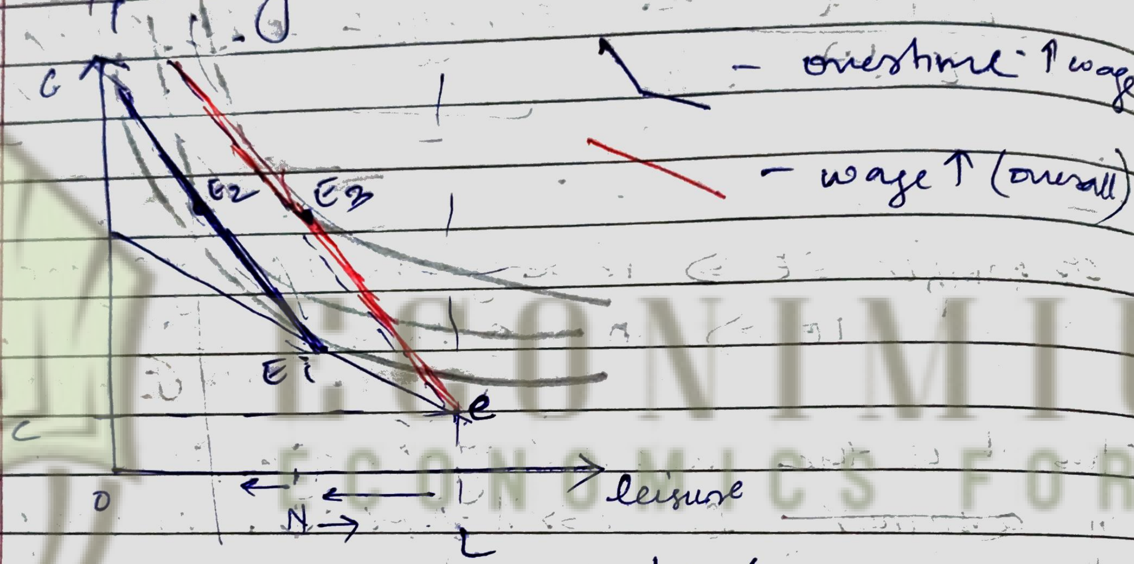
Thus it is the magnitude of the signs that decides if ~~consumer~~ labor ss/l ↑ or ↓. At very high of wage rate, people tend to spend the extra income for leisure.





Overtime and supply of labour.

Suppose the firm offers the higher wage $w' > w$ after say N hours of labour called the overtime wage. Then BL will've a slope of w/p till N and w'/p beyond N.



Diagramatically we can clearly see that, the overtime wage rate results in a longer labour hours whereas it is not (to be precise 'may not') ~~be~~ the line with an overall ↑ in wage

why?

It is because the overtime wage system'll only be having the SE playing and thus we've an unambigous result ie labor ↑. Whereas ambiguity is present in the previous case as mentioned before.

ch 10 - Intertemporal choice.

Let (c_1, c_2) be the comb. of consumption in period 1 and period 2.

Let (m_1, m_2) be the income in period 1 and period 2.

Consumer can borrow and lend @ 'r'. Then BL can take the form:-

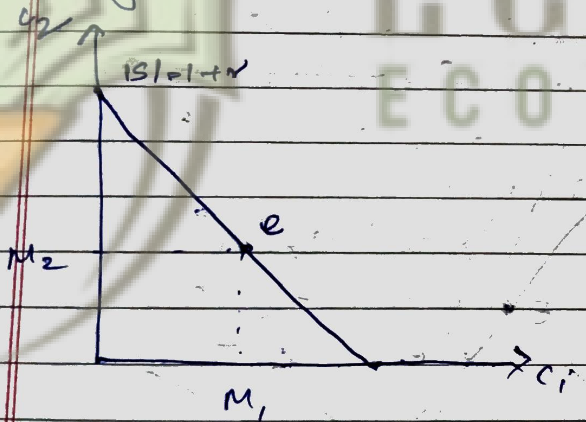
in terms of future cons. / in terms of today cons.

(1) $c_2 = m_2 + (1+r)\underbrace{(m_1 - c_1)}_{\text{saved}}$

(2) $c_1(1+r) + c_2 = m_1(1+r) + m_2$

(3) $c_1 + \dfrac{c_2}{1+r} = m_1 + \dfrac{m_2}{1+r}$

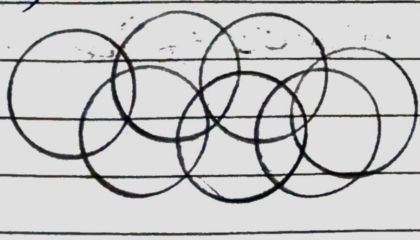
The BL'll be a ↓ sloping straight line with |s| = 1+r passing through the @ (m_1, m_2)



Eqn (2) is BL in terms of future value and Eqn (3) is BL in terms of present value.

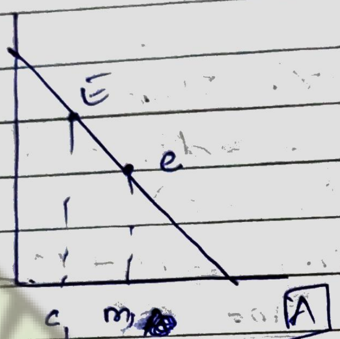
The slope actually tells us the price ratio $\left(\dfrac{1+r}{1} = \dfrac{P_2}{P_1}\right)$

i.e. for every add'l unit in P_1, we have to give up $(1+r)$ times the unit in P_2.

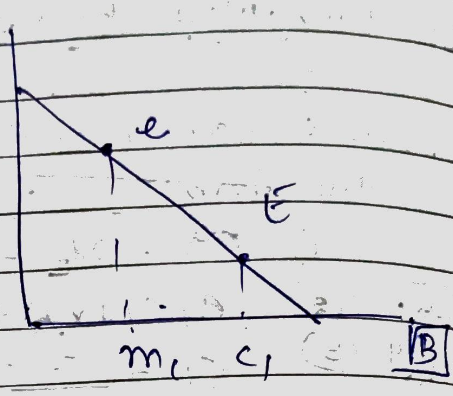


Comparative Statics:

As learnt earlier Fig A shows the case of a lender and Fig b shows that of a borrower



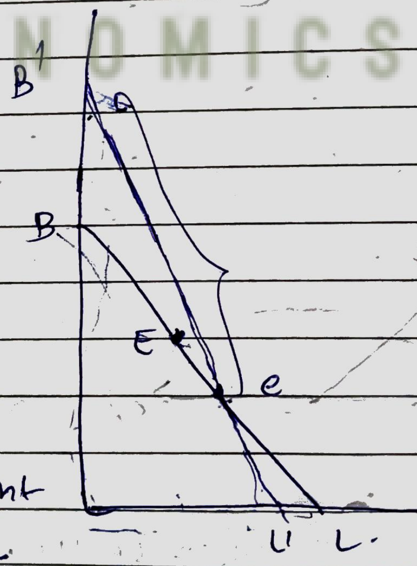
$m_1 > c_1$



$m_1 < c_1$

Change in 'r'.

Lender + r ↑



New eq 'll not be b/w e and L' as a.n.e (eL') was available and wasn't chosen when the Budget set was OBL,
This WARP ensures that new equilibrium 'll be to the left of e.

Thus a lender continues to be a lender when r ↑.

RP - revealed pref

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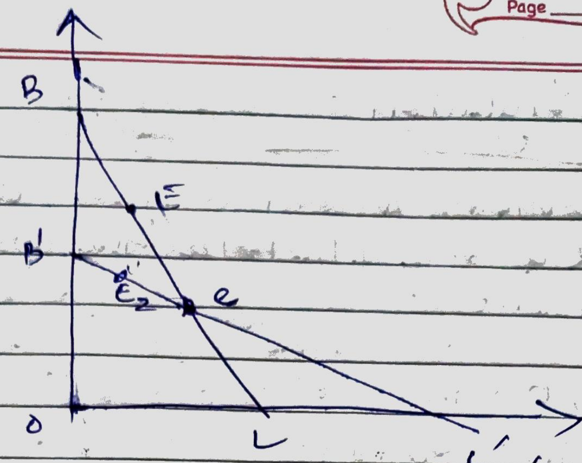
lender + r ↓



There is ambiguity as the person may end up being a lender or a borrower as 'RP' doesnt say anything about it here.

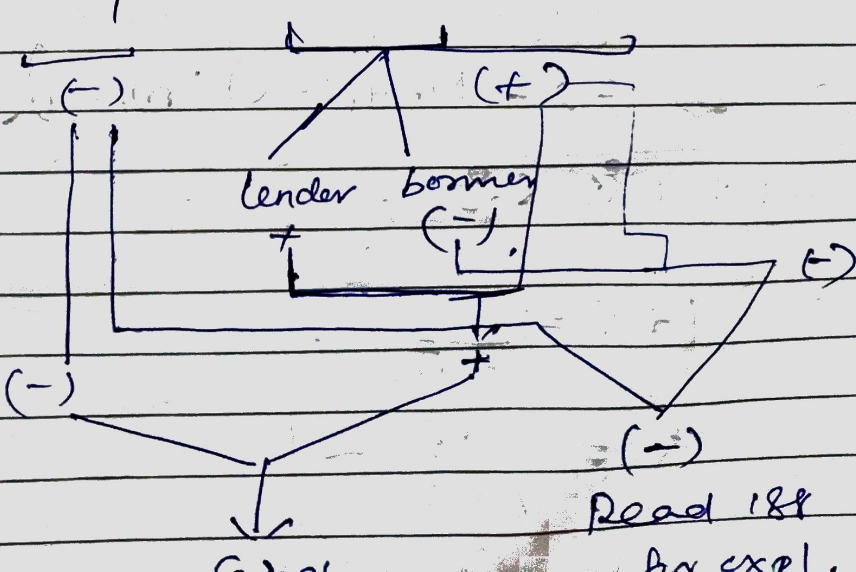
Now if the cr decides to be a lender (at E_2). Then he'll be worse off as E_2 is below E_1.

borrower + r ↓ ⇒ the cr'll stay a borrower (RP ensures it)

borrower + r ↑ (ambiguous), however if the person stays a borrower ⇒ worse off.

Slutsky Equation:

$$\Rightarrow \frac{\Delta c}{\Delta p_1} = \frac{\Delta c_1^s}{\Delta p_1} + (m - c_1) \cdot \frac{\Delta c^m}{\Delta m}$$



Read 188 for exp.

Inflation

Earlier in our analysis we took price to be 1. Let us take (P_1, P_2) as the price with inflation present.

Also remember

BC now becomes

$$P_2 c_2 = P_2 m_2 + (1+r)(m_1 - c_1).$$

$$\Rightarrow c_2 = m_2 + \left(\frac{1+r}{P_2}\right)(m_1 - c_1)$$

(5)

Let $\pi \Rightarrow$ rate of inflation.

$$\Rightarrow P_1 = 1 \text{ (let)}$$
$$P_2 = 1+\pi.$$

$$\Rightarrow c_2 = m_2 + \frac{1+r}{1+\pi}(m_1 - c_1).$$

Let $\frac{1+r}{1+\pi} = 1+\rho.$

$$\Rightarrow c_2 = m_2 + (1+\rho)(m_1 - c_1).$$

What is ρ?

$$1+\rho = \frac{1+r}{1+\pi}.$$

$$\rho = \frac{1+r}{1+\pi} - 1$$

$$\rho = \frac{\cancel{1}+r-\cancel{1}-\pi}{1+\pi}$$

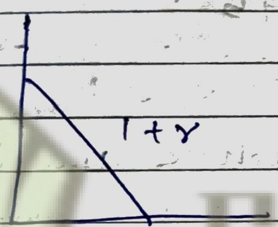
$\rho \simeq r - \pi$

ie ρ is the real rate of interest.

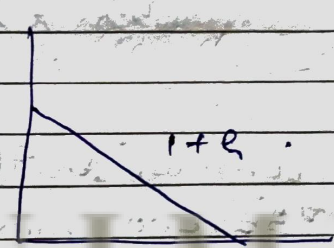
NOTE VVIP

(the r – nominal rate of int used in Micro is the 'i' we use in Macro).

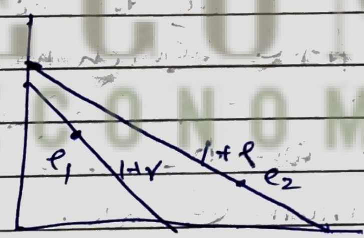
with inflation –



becomes



(i)



higher net present value compared to e_1 thus will never be choose off.

Rest of the portions of this chap – later.