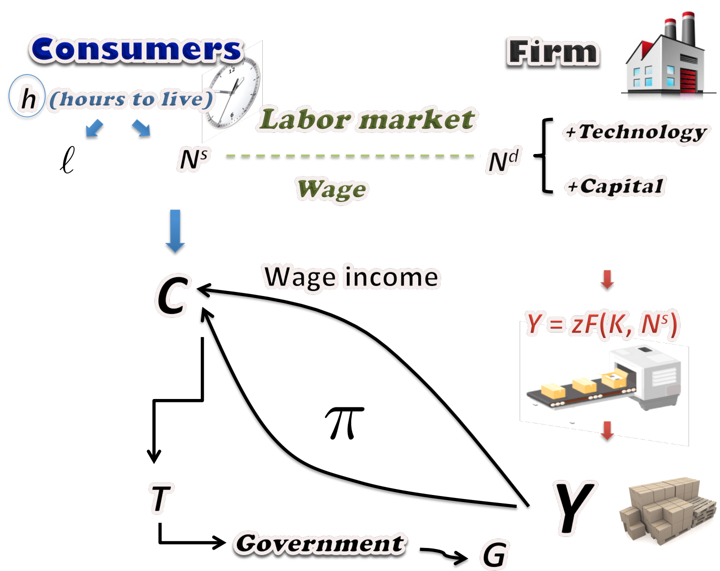
EE312 Macroeconomics, 2/2013 (Sec. 046402)
A Short Note: Ch.3 A Closed Economy One-Period Macroeconomic Model (Part 1)

1. One period decisions; static analysis
2. Consumers
3. Firm
4. Government
5. Equilibrium and Pareto Optimality
6. Application

1 One-period decisions:



2 Consumers : A representative consumer

- Utility Function : $U = U(C, \ell)$,

  $\dfrac{\partial U}{\partial C} = MU_C....0, \dfrac{\partial^2 U}{\partial^2 C}......0$, $MU_C \downarrow$ as $C \uparrow$

  $\dfrac{\partial U}{\partial \ell} = MU_\ell....0, \dfrac{\partial^2 U}{\partial^2 \ell}......0$, $MU_\ell \downarrow$ as $\ell \uparrow$

- Budget constraint :

  $C =$ ....

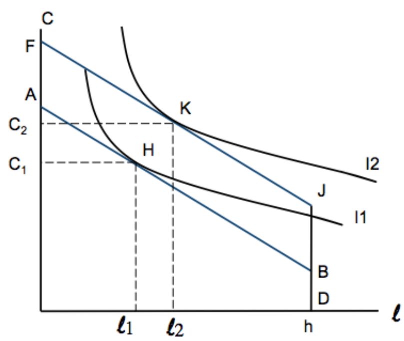
  $C + w\ell =$ ....

The household (consumer) budget constraint may have a kink because ....

From the budget constraint the maximum ℓ will be equal to .... Putting together, since $\ell \leq h$, the budget constraint has a kink at ($\ell =$ ......, $C =$ ....)

w is "the market price" of leisure.

- Optimization : tangency point between indifference curve and the budget line, corner solution is impossible
  - Change in non-wage income $(\pi - T)$.



An increase in π−T

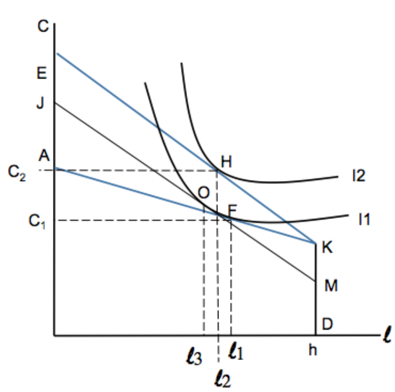
- An increase in π−T (by JB) causes the consumer to increase both C and ℓ.
- For a given real wage, $(\pi - T) \uparrow \Rightarrow C \uparrow$ and $\ell \uparrow$
- This is called .... effect.

  - Change in real wage (w)

$$\ast \quad \begin{array}{llllllll} \mathbf{w}\uparrow & \Rightarrow & \text{Income Effect} & \Rightarrow & \textit{wage income........} \Rightarrow \textit{income} \uparrow & \Rightarrow & C....,\ell...... \\ & \Rightarrow & \text{Substitution Effect} & \Rightarrow & \ell \text{ becomes relatively more expensive} & \Rightarrow & C....,\ell...... \end{array}$$

(Note: A good is normal to consumer if its consumption .... when income rises.
A good is inferior to consumer if its consumption........ when income rises.)

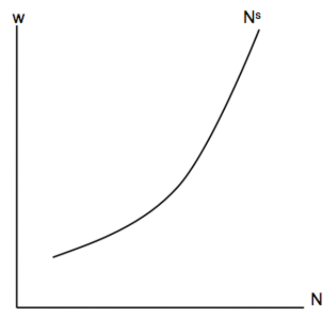
Stronger substitution effect

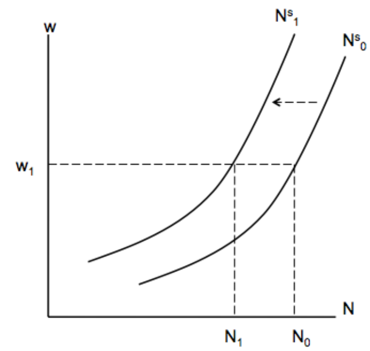


* The budget line rotates clockwise (the slope ..... and the vertical intercept ......) from
* The optimal point changes from ..... to ....
* Draw AM, AM is paralell to the .... budget line (relative price change).
* AM is tangent to ..... (the .... IC). (keeping income constant)
* Point O is where AM is tangent to the .... IC.
* FO is .... effect
* OH is .... effect
* FO > OH, C increases and ℓ decreases.
* So N^s increases.

  - Derive Labor supply function $N^s(w) = h - \ell(w)$.

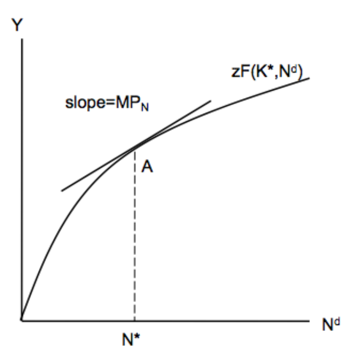
* $w \uparrow$ (keeping non-wage income $(\pi - T)$ constant $\Rightarrow \ell \downarrow$ (stronger substution effect) $\Rightarrow N^s \uparrow$
* As non-wage income $(\pi - T)$ increases, ℓ ...... for all levels of real wage (a pure income effect). As a result, N^s .... for all levels of wage.

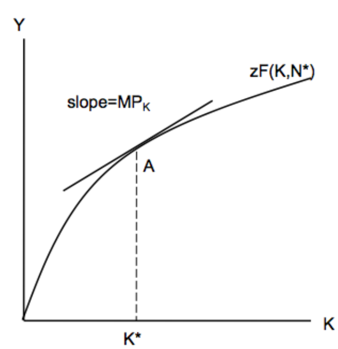


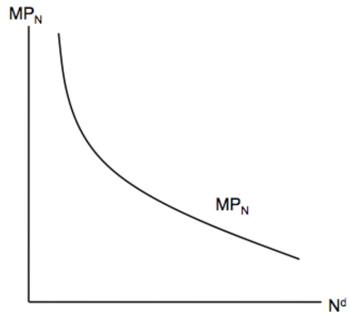


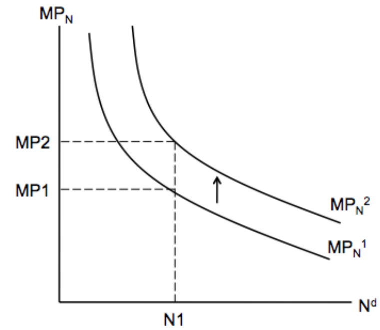
3 Firm : A representative firm

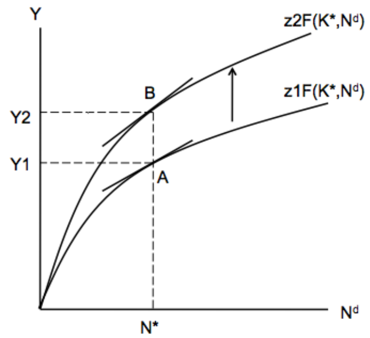
- $Y = zF(K, N^d)$;
  - Y = output of consumption goods;
  - K = capital input;
  - N^d= labor input (hours);
  - z = total factor productivity (TFP).
  - $\dfrac{\partial Y}{\partial K} = \dfrac{\Delta Y}{\Delta K} = MP_K....0$, $\dfrac{\partial Y}{\partial N} = \dfrac{\Delta Y}{\Delta N} = MP_N....0$; upward slope production function
  - $\dfrac{\partial^2 Y}{\partial^2 K}....0$, MP_K ..... as $K \uparrow$; concave production function
  - $\dfrac{\partial^2 Y}{\partial^2 N}....0$, MP_N ..... as $N \uparrow$; concave production function
  - $\dfrac{\partial Y}{\partial K} = z\dfrac{\partial F}{\partial K}, \dfrac{\partial Y}{\partial N} = z\dfrac{\partial F}{\partial N}$
- Constant returns to scale:
  - $zF(xK, xN^d) = xzF(K, N^d)$
  - Increase each input by x times will raise the total output by x times.

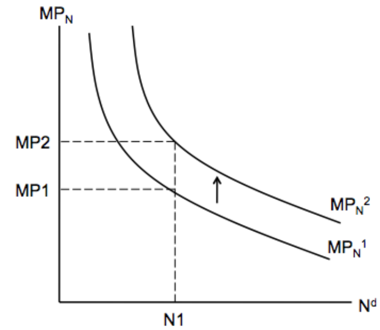




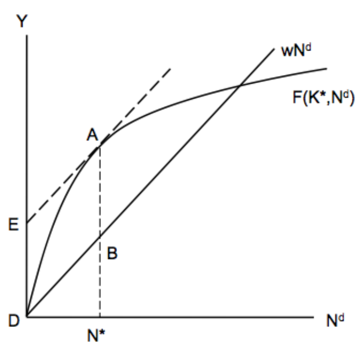








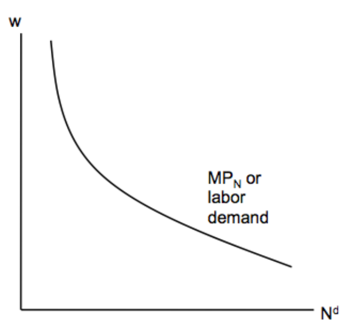
- Profit maximization condition
  $\pi = zF(K, N^d) - wN^d$
  VMPL =Value of the Marginal Product the marginal product of an input
  Profit maximization condition :
  Slope of Y = slope of wN^d;
  $VMPL =$ real wage ,
  $MP_L = w$.
  The MP_N is the firm's labor demand curve.
  Slope of Y = slope of wN^d;



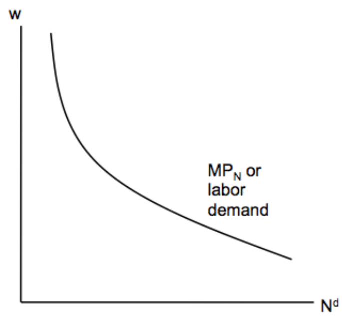
Profit Maximization

- Y = revenue;
- MP_N = marginal revenue;
- wN^d = variable cost;
- w = marginal cost;
- Profit = $Y - wN^d$;
- Max profit = AB where $MP_N = w$.
- $N^* = N^d$ for the given w

- As $w \uparrow$, Max profit : $MP_{N*} = w$, $MP_{N*} \uparrow$, N^*.........
- As $w \uparrow$, N^d.....
- Profit-max: the firm hires labor up to the point where $MP_N = w$.



- What will happen to N^d if $z \uparrow$? What will happen to N^d if $K \uparrow$?



  - An increase in K causes MP_N to rise for all levels of N.
  - Profit-max: the firm hires labor up to the point where $MP_N = w$.
  - For all levels of N^d, MP_N....... and w ....
  - labour demand increases for all w
  - (or in other words, for all levels of labor employed, the real wage the firm is willing to pay increases.)