Q. Consider an economy characterized by imperfect factor mkt and good's mkt described as follows: $L = N + U$

Agg production fn: $Y = N$. [N = employed Labour].

Price setting rule: $P = (1+m) \cdot W$, $m > 0$ [m = monopoly power] markup.
(Goods mkt)

Wage setting rule: $W = P^e F(\underset{-}{u}, \underset{+}{z})$, $F_u = \frac{\partial F}{\partial u} < 0$, $F_z = \frac{\partial F}{\partial z} > 0$
(Factor mkt)
[u = unemployment rate,
z = unemployment benefit].

[L = Total Labour].

(i) Derive the SRAS for the economy & plot it in the P-Y plane.

Price setting eqn: $P = (1+m) \cdot W$ ... (i)

Wage setting eqn: $W = P^e F(u, z)$ ... (ii).

AS: Relation b/w. Y, P, pe

$$P = (1+m) \cdot W = (1+m) \cdot P^e F(u, z)$$

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$F(u, z)$

$F(u(Y), z)$

$\left(\frac{\partial F}{\partial u}\right) \frac{\partial u}{\partial Y} = F' \cdot \left(-\frac{1}{L}\right)$.

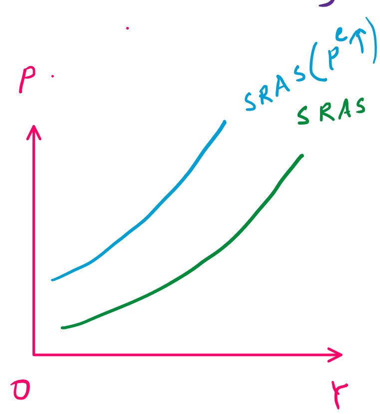
Now, $u = \frac{U}{L} = \frac{L - N}{L} = 1 - \frac{N}{L} = 1 - \frac{Y}{L}$ [∵ Prodn fn is $Y = N$]

$$\boxed{P = P^e (1+m) F\left(1 - \frac{Y}{L}, z\right)} \rightarrow \text{SRAS}.$$

Find $\frac{dP}{dY}$:

Diff: $dP = P^e (1+m) \cdot F_u \cdot \left(-\frac{1}{L}\right) \cdot dY$.

$$\frac{dP}{dY} = \underbrace{P^e}_{>0} \underbrace{(1+m)}_{>0} \cdot \underbrace{F_u}_{<0} \underbrace{\left(-\frac{1}{L}\right)}_{<0} > 0.$$



$P^e \uparrow$ ⇒ Trade unions

$W \uparrow$ ⇒ Cost of prodn ↑

⇒ Firms will increase

(ii) Let $F(u, z) = 1 - \alpha u + z$. Find the

(ii) Let $F(u, z) = 1 - \alpha u + z$. Find the natural rate of unemployment (u_n)

Assume that m, z are so small that m^2, z^2 and higher powers & cross-products can be ignored.

$\Rightarrow$ Firms will increase price $\Rightarrow$ SRAS shift left.

Phillip's curve: $\pi_t = \pi_t^e - \gamma(u_t - u_n)$, $\gamma > 0$ ..... (iii)

Recall: If $\pi_t^e = \pi_{t-1} \Rightarrow u_n$ was NAIRU.

From (iii), If $u_t = u_n \Rightarrow \pi_t = \pi_t^e$.

$$\Rightarrow P_t - \cancel{P_{t-1}} = P_t^e - \cancel{P_{t-1}}$$

$$\Rightarrow P_t = P_t^e.$$

$\therefore$ If $\boxed{u_t = u_n \Rightarrow Y = \bar{Y} \Rightarrow \pi_t = \pi_t^e \Rightarrow P_t = P_t^e}$ ..... (*)

$\therefore$ SRAS: $P = P^e(1+m)\,F(u, z)$.

$$P = P^e(1+m)\cdot(1 - \alpha u + z).$$

$\therefore$ For u_n, $P = P^e \Rightarrow 1 = (1+m)(1 - \alpha \cdot u_n + z)$

$$\Rightarrow u_n = \frac{z(1+m) + m}{\alpha(1+m)}$$

Binomial Expansion

$(1+x)^{-1} = 1 - x + x^2 \ldots\ldots, |x| < 1$

$$\Rightarrow u_n = \frac{1}{\alpha}\left[z + \frac{m}{1+m}\right]$$

$$\Rightarrow u_n = \frac{1}{\alpha}\left[z + m(1+m)^{-1}\right]$$

$$\Rightarrow u_n = \frac{1}{\alpha}\left[z + m(1 - m + m^2 \ldots)\right]$$

$$\Rightarrow u_n = \frac{1}{\alpha}\left[z + m - \cancel{m^2} + \cancel{m^3} \dots \right]$$

$$\Rightarrow \boxed{u_n = \frac{z+m}{\alpha}}$$

Q. Short run agg production fn of economy is given by: $\boxed{Y = \alpha L + \beta \bar{K}}$; $\alpha, \beta > 0$. Consider perfect-competition in both the factor mkt & output mkt. The labour ss curve $L_s = -\gamma + \delta\left(\frac{W}{P}\right)$, $\gamma, \delta > 0$.

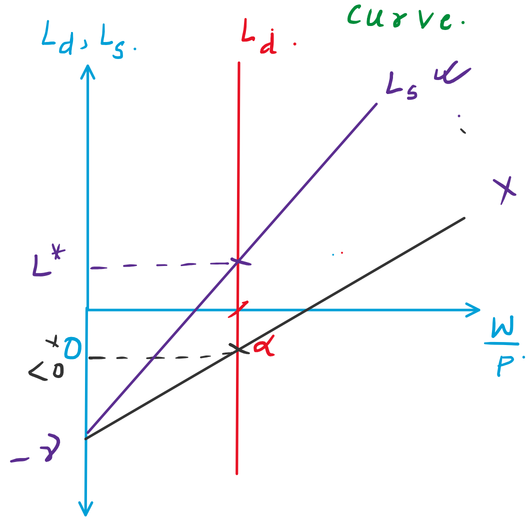
(i) Find the labour mkt clearing condition.

Mkt clearing condition $\Rightarrow$ obtaining the equillibrium.

$Y = \alpha L + \beta \bar{K}$ $\Rightarrow MP_L = \alpha$.

comp. framework. At opt. $MP_L = \frac{W}{P}$. $\Rightarrow \boxed{\alpha = \frac{W}{P}}$ $\Rightarrow$ Labour demand curve.

$L_s = -\gamma + \delta\left(\frac{W}{P}\right)$, $\gamma, \delta > 0$.



$\therefore$ At equillibrium: $\frac{W}{P} = \alpha$.

$\therefore$ Replace in $L_s = -\gamma + \delta \cdot \alpha$.

$\therefore$ For feasibility, $L_s > 0$.

$-\gamma + \delta\alpha > 0$.

$\boxed{\delta\alpha > \gamma}$ $\Rightarrow$ Labour mkt clearing condition.

HW

(ii) Suppose the nominal wage is rigid at $W = \bar{W}$. Plot the

(iii) Suppose the nominal wage is rigid at $W = \bar{W}$. Plot the SRAS curve in the P-Y plane.