Review Session II

- Demand
  - S & I Effects
- Cost / Production
  - Rts Scale
  - SR & LR Cost
- Monopoly / P. D.

$$U = x \cdot y$$

$$\mathcal{L} = x \cdot y - \lambda(P_x \cdot x + P_y \cdot y - I)$$

$$\mathcal{L}_x = y - \lambda P_x = 0$$

$$\mathcal{L}_y = x - \lambda P_y = 0 \qquad \frac{y}{P_x} = \lambda = \frac{x}{P_y}$$

$$\mathcal{L}_\lambda = -(P_x \cdot x + P_y \cdot y - I) = 0$$

(1) $\boxed{\frac{y}{x} = \frac{P_x}{P_y}}$

(2) $\boxed{P_x \cdot x + P_y \cdot y = I}$

$$x = \frac{P_y}{P_x} \cdot y$$

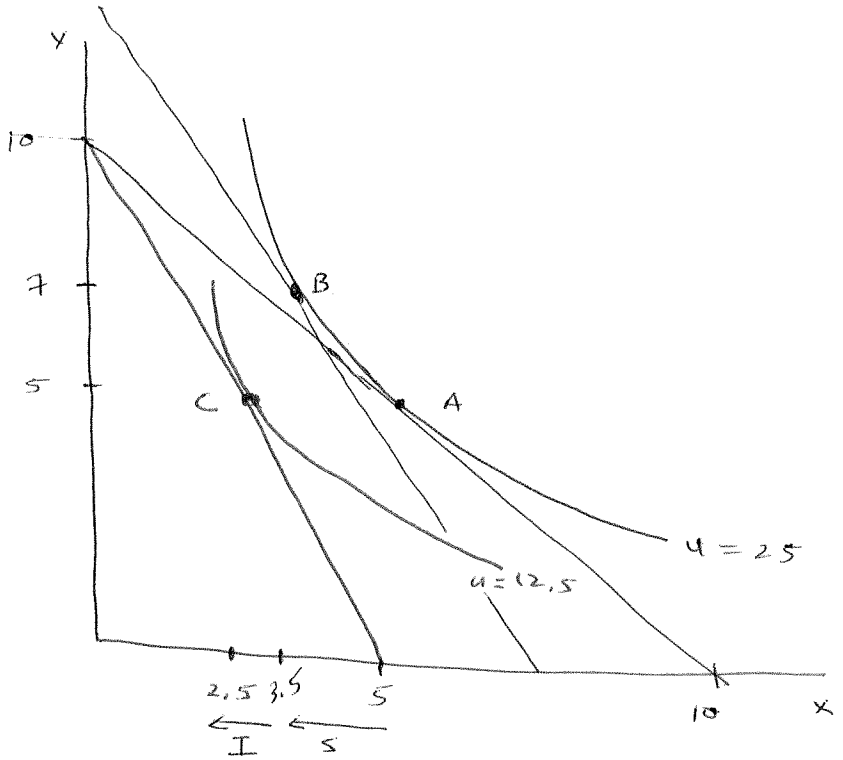
$$P_x\left(\frac{P_y}{P_x} \cdot y\right) + P_y \cdot y = I$$

$$2 P_y \cdot y = I$$

$$\boxed{y = \frac{I}{2P_y}} \qquad \boxed{x = \frac{1}{2} \cdot \frac{I}{P_x}}$$

S & I Effects

If $I = \$10$ and $P_x = 1$ and $P_y = 1$



(A) $x = \frac{1}{2} \cdot \frac{10}{1} = 5$

$y = \frac{1}{2} \cdot \frac{10}{1} = 5$

$\bar{P}_x = \$2$

(C) $x = \frac{1}{2} \cdot \frac{10}{2} = 2.5$

$y = 5$

$u = 12.5$

Intermediate bundle $\Rightarrow$ "Old Utility, New Prices"

Min $P_x \cdot x + P_y \cdot y$ s.t. $x \cdot y = \bar{u}_{old}$

$\mathcal{L} = P_x \cdot x + P_y \cdot y - \lambda (x \cdot y - \bar{u})$

$\mathcal{L} = 2 \cdot x + 1 \cdot y - \lambda (x \cdot y - 25)$

$\mathcal{L}_x = 2 - \lambda y = 0$

$\mathcal{L}_y = 1 - \lambda x = 0$

$\mathcal{L}_\lambda = -(x \cdot y - 25) = 0$

$\frac{2}{y} = \frac{1}{x}$

(1) $\boxed{y = 2x}$

(2) $x \cdot y = 25$

$2x^2 = 25$

$x^2 = 12.5$

$\boxed{x = 3,5 \quad y = 7}$ Bundle B

Production / Cost

$Q = K \cdot L \Rightarrow$ R to Scale ?

Double inputs => What happens to output ?

Long Run Cost

Min Cost s.t. $K \cdot L = \overline{Q}$

$$\mathcal{L} = w \cdot L + r \cdot K - \lambda(K \cdot L - Q)$$

$$\mathcal{L}_L = w - \lambda K = 0$$

$$\mathcal{L}_K = r - \lambda L = 0$$

$$\mathcal{L}_\lambda = -(K \cdot L - Q) = 0$$

$$\frac{w}{K} = \lambda = \frac{r}{L}$$

(1) $\boxed{\frac{w}{r} = \frac{K}{L}}$

(2) $\boxed{K \cdot L = Q}$

$K = L \cdot \frac{w}{r}$ $\quad L = \frac{r}{w} K$

$L \cdot L \frac{w}{r} = Q$ $\quad K \cdot K \cdot \frac{r}{w} = Q$

$L^2 = \frac{r}{w} \cdot Q$ $\quad K^2 = \frac{w}{r} Q$

CFD: $\boxed{L = Q^{1/2} \left(\frac{r}{w}\right)^{1/2}}$ $\quad K = Q^{1/2} \left(\frac{w}{r}\right)^{1/2}$

$$C(w, r, Q) = w \cdot L^* + r \cdot K^*$$

$$C(w, r, Q) = w^{1/2} r^{1/2} Q^{1/2} + w^{1/2} r^{1/2} Q^{1/2}$$

$$C(w, r, Q) = 2 w^{1/2} r^{1/2} Q^{1/2}$$

SR Cost

$Q = \bar{K} \cdot L$ $\qquad L = \frac{Q}{\bar{K}}$ $\qquad$ SR CFD

$C_{SR}(w, r, Q) = w \cdot L^* + r \cdot \bar{K}$

$$C_{SR} = w \cdot \frac{Q}{\bar{K}} + r \cdot \bar{K}$$

$P = 100 - Q$ $\qquad TC = 100 + 20Q$ $\qquad MC = 20$

$MR = 100 - 2Q$

$20 = 100 - 2Q$

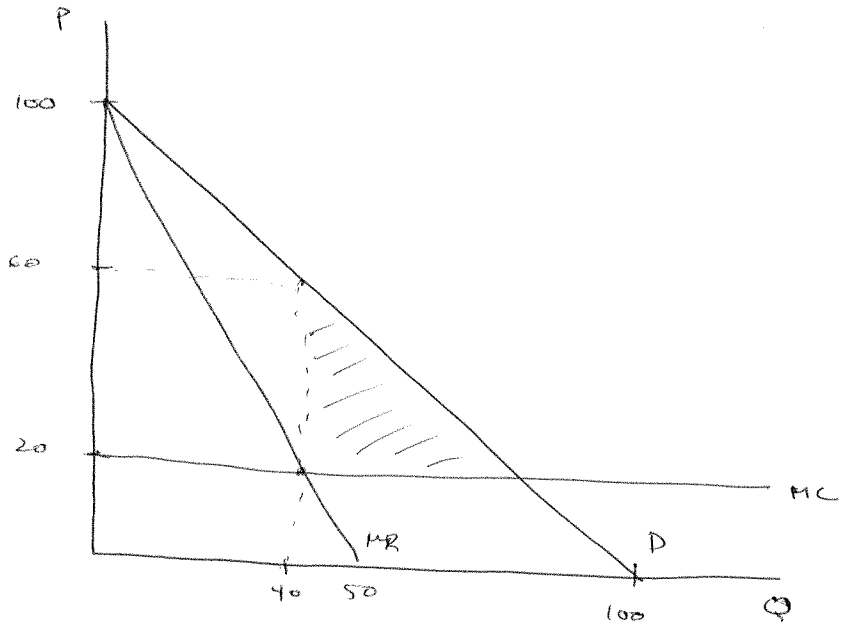
$80 = 2Q$

$Q^* = 40$

$P^* = 60$

$DWL = ?$

$\pi = ?$



What if MC isn't constant?