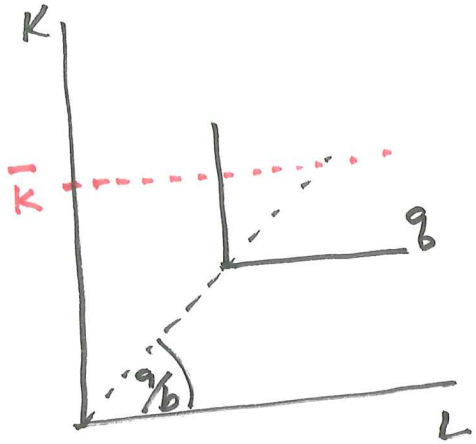
Leontief

$$q = \min\left[\frac{K}{a}, \frac{L}{b}\right]$$

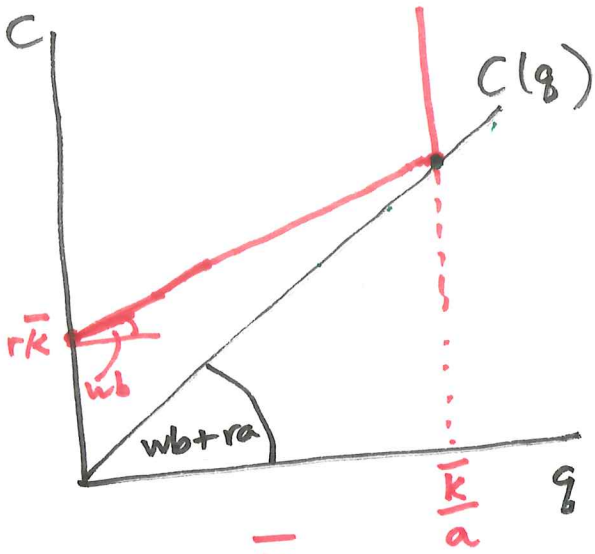
$$q = \frac{K}{a} = \frac{L}{b}$$

$$K^* = aq \quad , \quad L^* = bq$$



$$C^*_{LR}(q, w, r) = wbq + raq$$

$$= (wb + ra)\, q$$

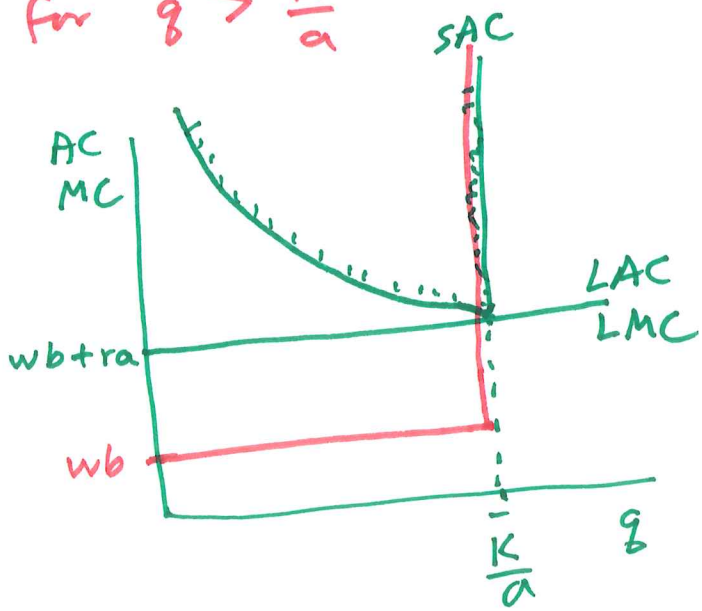


Short-run:

$$K = \bar{K}$$

$$L^* = bq \quad \text{for } q \le \frac{\bar{K}}{a}$$

$$C^*_{SR}(q, w, r) = \begin{cases} r\bar{K} + wbq & \text{for } q \le \frac{\bar{K}}{a} \\ \infty & \text{for } q > \frac{\bar{K}}{a} \end{cases}$$

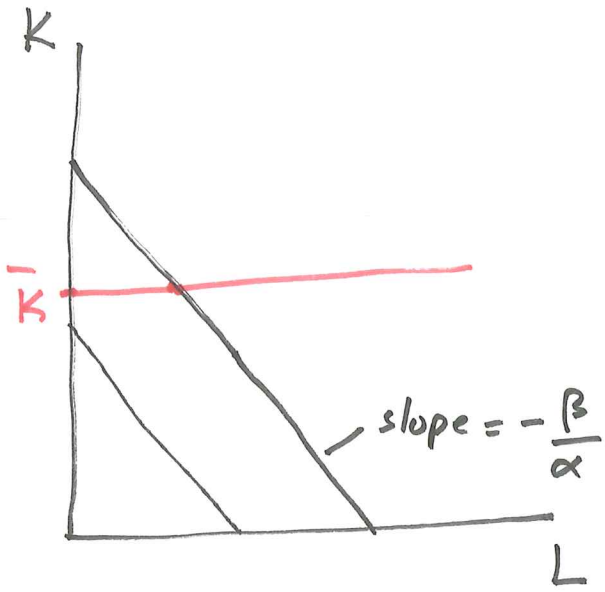


Linear

$$q = \alpha K + \beta L$$

$$K^* = \begin{cases} \frac{q}{\alpha} & \text{if } \frac{w}{r} > \frac{\beta}{\alpha} \\ 0 & \text{if } \frac{w}{r} < \frac{\beta}{\alpha} \end{cases}$$

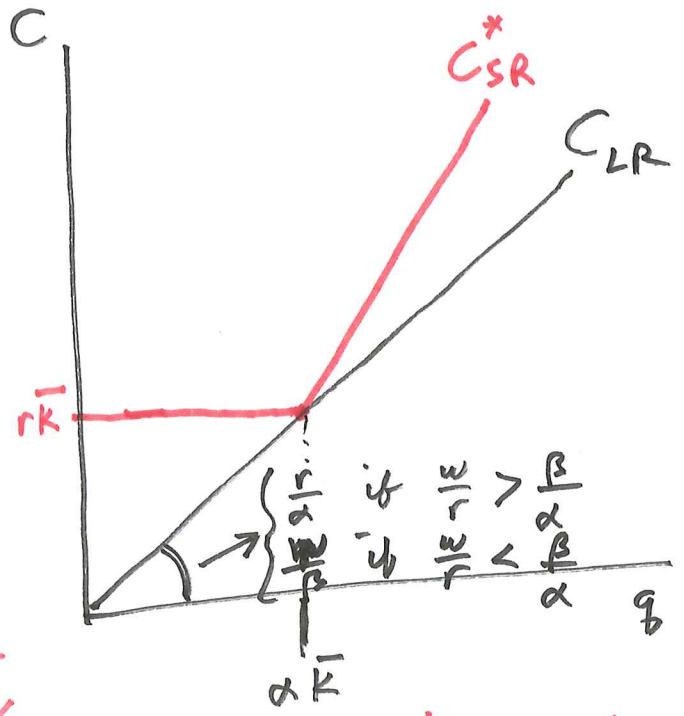
$$L^* = \begin{cases} 0 & \text{if } \frac{w}{r} > \frac{\beta}{\alpha} \\ \frac{q}{\beta} & \text{if } \frac{w}{r} < \frac{\beta}{\alpha} \end{cases}$$



$$C^*(q, w, r) = \begin{cases} \frac{rq}{\alpha} & \text{if } \frac{w}{r} > \frac{\beta}{\alpha} \\ \frac{wq}{\beta} & \text{if } \frac{w}{r} < \frac{\beta}{\alpha} \end{cases}$$

SR: $K = \bar{K}$

$$C^*_{SR} = \begin{cases} r\bar{K} & \text{for } q \le \alpha\bar{K} \\ r\bar{K} + \frac{w}{\beta}(q - \alpha\bar{K}) & \text{for } q > \alpha\bar{K} \end{cases}$$

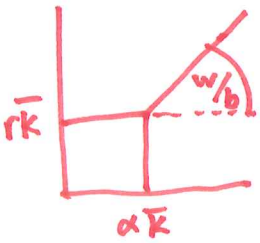


Case 1: $\frac{w}{r} > \frac{\beta}{\alpha} \Rightarrow \frac{w}{\beta} > \frac{r}{\alpha}$

$$C^* = r\bar{K} + \frac{w}{\beta}q - \frac{\alpha}{\beta}w\bar{K}$$

$$= \left(r - \frac{\alpha}{\beta}w\right)\bar{K} + \frac{w}{\beta}q$$

(−)



Case 1: $\frac{w}{r} > \frac{\beta}{\alpha} \Rightarrow \frac{w}{\beta} > \frac{r}{\alpha}$

$$C^*_{LR} = \frac{rq}{\alpha}$$

$$C^*_{SR} = r\bar{K} + \frac{w}{\beta}(q - \alpha\bar{K})$$

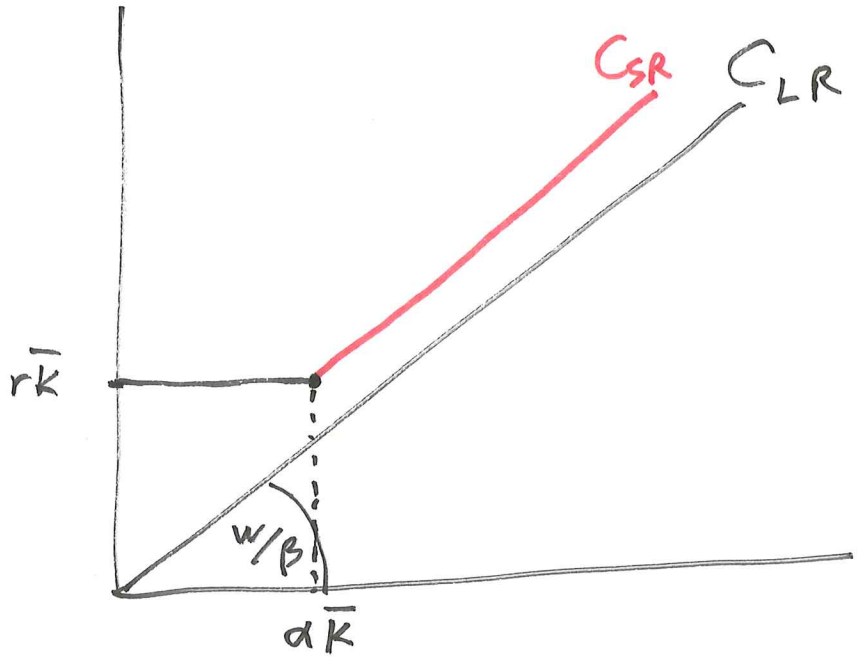
Case 2: $\frac{w}{r} < \frac{\beta}{\alpha}$

$$C^*_{LR} = \frac{w}{\beta} q$$

$$C^*_{SR} = r\bar{K} + \frac{w}{\beta}(q - \alpha\bar{K})$$

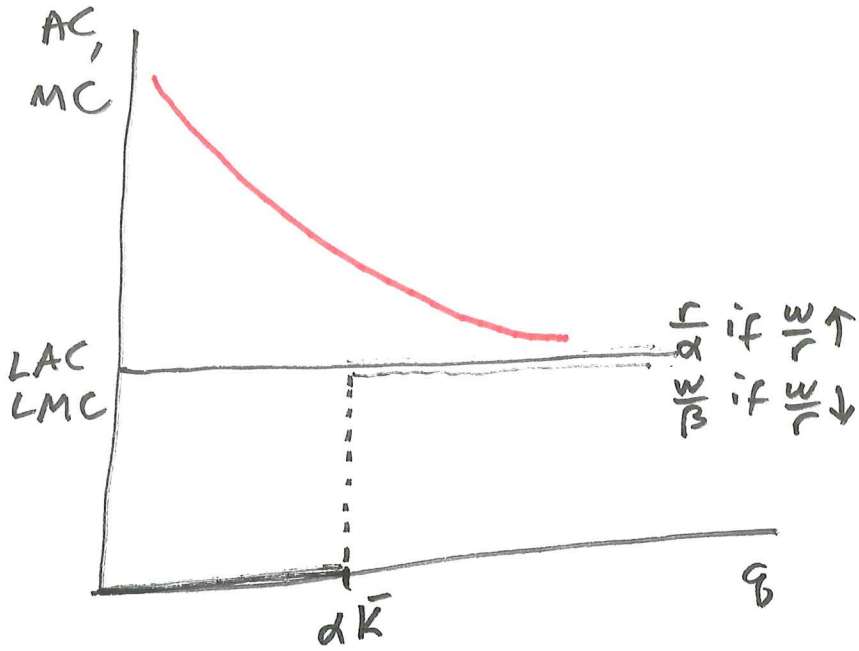
at $q = \alpha\bar{K}$, $C^*_{SR} = r\bar{K}$

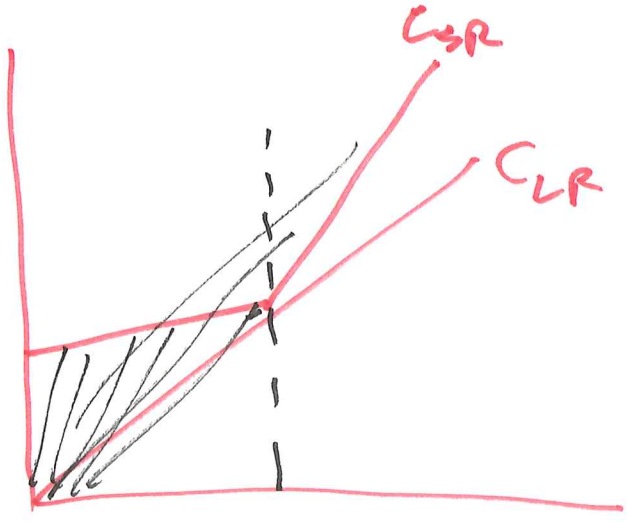
Case 2: $\frac{w}{r} < \frac{\beta}{\alpha}$



$$C^*_{LR} = \begin{cases} \frac{rq}{\alpha} & \text{if } \frac{w}{r} > \frac{\beta}{\alpha} \\ \frac{wq}{\beta} & \text{if } \frac{w}{r} < \frac{\beta}{\alpha} \end{cases}$$

$$C^*_{SR} = \begin{cases} r\bar{K} & \text{for } q \le \alpha\bar{K} \\ r\bar{K} + \left(\frac{w}{\beta}\right)(q - \alpha\bar{K}) & \text{for } q > \alpha\bar{K} \end{cases}$$

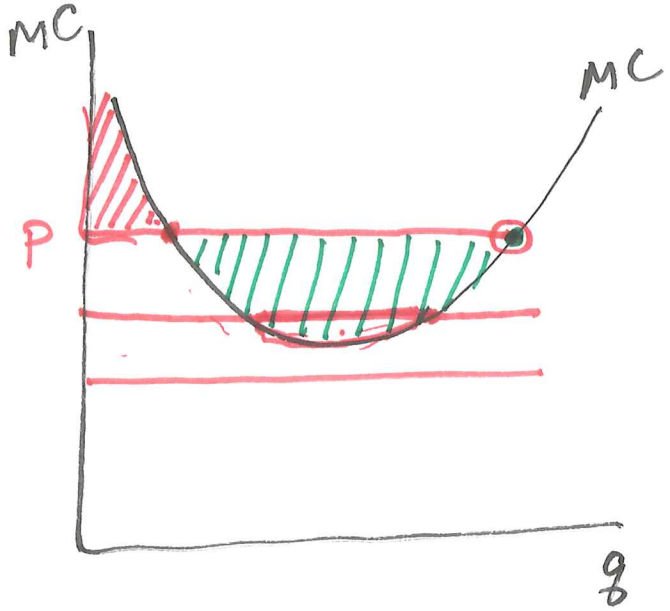


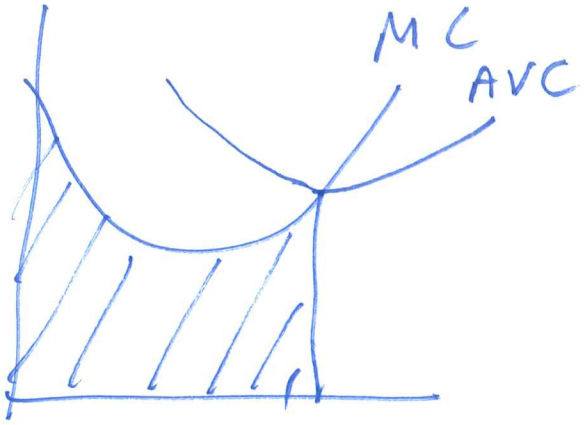


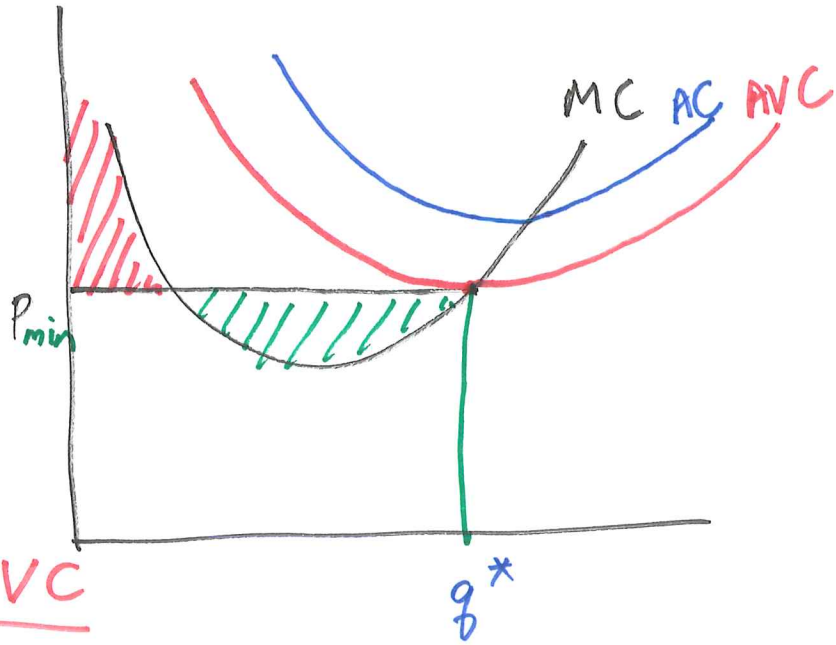
$$\text{Max} \quad \pi = p \cdot q - C(q)$$

$$\frac{d\pi}{dq} = p - MC = 0 \rightarrow p = MC$$

$$\frac{d^2\pi}{dq^2} = -\frac{dMC}{dq}$$





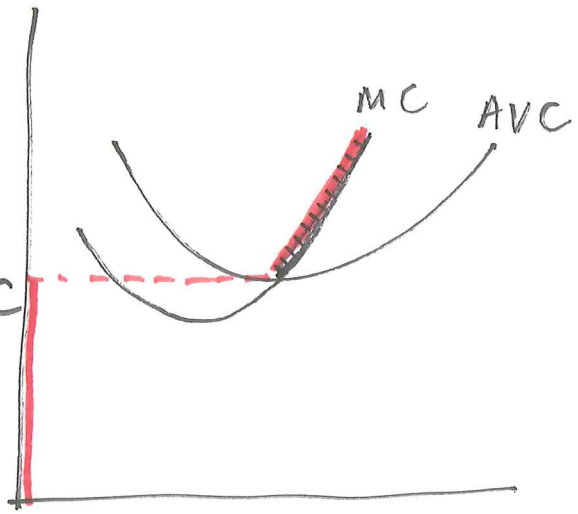


$$AC = \frac{C}{q} = \frac{FC + VC}{q}$$

$p = MC$

$$q^s = \begin{cases} 0 & \text{for } p \leq \min AVC \\ \text{inverse of MC for} & p \geq \min AVC \end{cases}$$

in Short-run



Long-Run