10.6-7 Cost

Monday, March 15, 2021 8:54 PM

$\pi = P \cdot q - C(q)$

$\text{Cost} = P_1 X_1 + P_2 X_2 + \dots P_n X_n = \sum_i P_i X_i$

Choose inputs to minimize $C(q)$ for each level of q
- no waste
- lowest cost process
- economy not counting capital
  - includes rate of return

Production function
$q(x_1, x_2, x_3, \dots)$ no waste

$\frac{dq}{dx_i} = MP_i$

Input substitution
- perfect subs
- perfect complements
- imperfect subs

$q = 4K^{.5}L^{.5}$

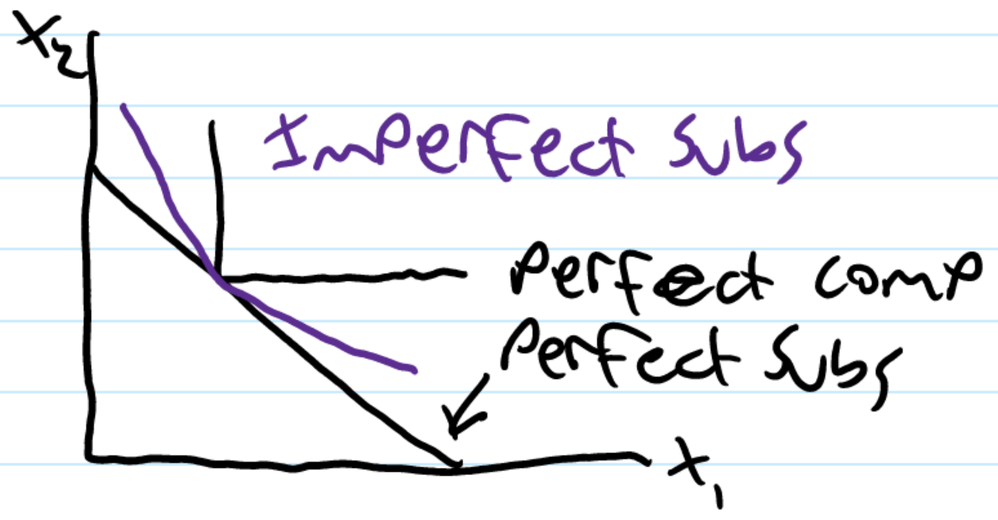
$K = 0$	$q = 0$
$L = 0$	$q = 0$

$MP_K = .5 \cdot 4 \cdot K^{-.5} L^{.5} = 2\sqrt{L/K}$
$MP_L = 2\sqrt{K/L}$

Marginal rate of technical substitution
- $MRTS_{ij} = MP_i / MP_j$

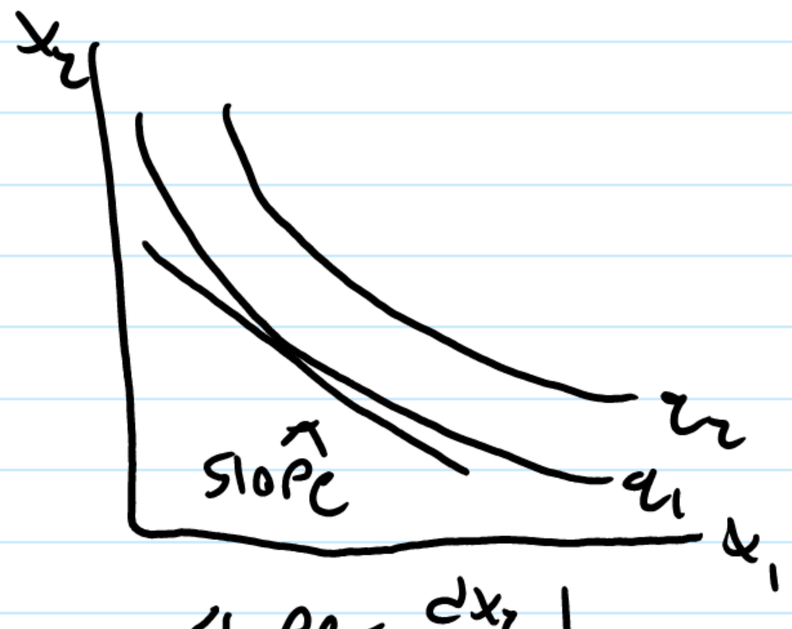
As Labor ↑, Capital ↓ ⇒ MP_L ↓ + MP_K ↑
- diminishing MRTS

Isoquant: level curves of the production function
- $4L^{.5}K^{.5} = 16 \Rightarrow L = 16/K$



Capital K, cost ↑
interest rate } very similar due to arbitrage
rental rate }

Labor L, cost w per unit



$\text{slope} = \left.\frac{dx_2}{dx_1}\right|_{q=q_1}$

$MRTS_{12} = \left.\frac{dx_2}{dx_1}\right|_{q=\bar{q}}$