Nov 12, 2019 ①

Review Short-run Cost Functions.

$$TC(Q) = TFC(Q) + TVC(Q)$$

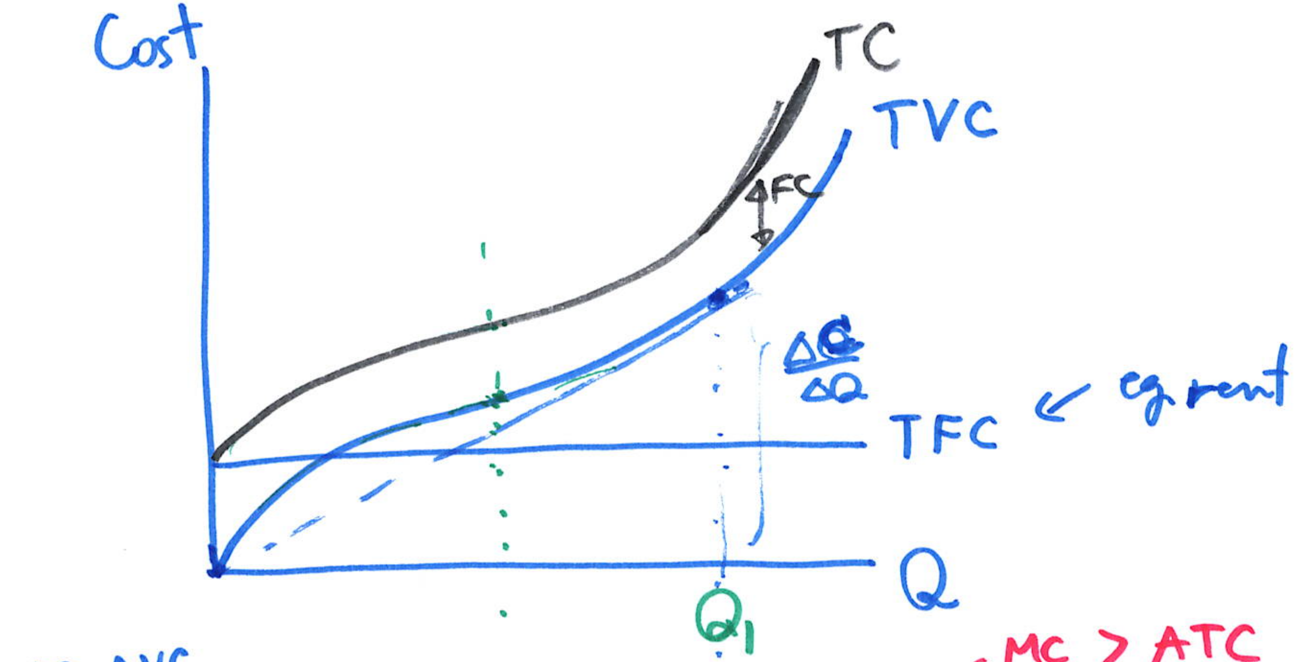
Average Costs : $\frac{TC}{Q} = \frac{TFC(Q)}{Q} + \frac{TVC(Q)}{Q}$

$$\boxed{ATC = AFC + AVC.}$$

Marginal Costs : $MC(Q) = \frac{\Delta(TC)}{\Delta Q} = \frac{d(TC)}{dQ}$

$$= \frac{d\left[TFC(Q) + TVC(Q)\right]}{dQ}$$

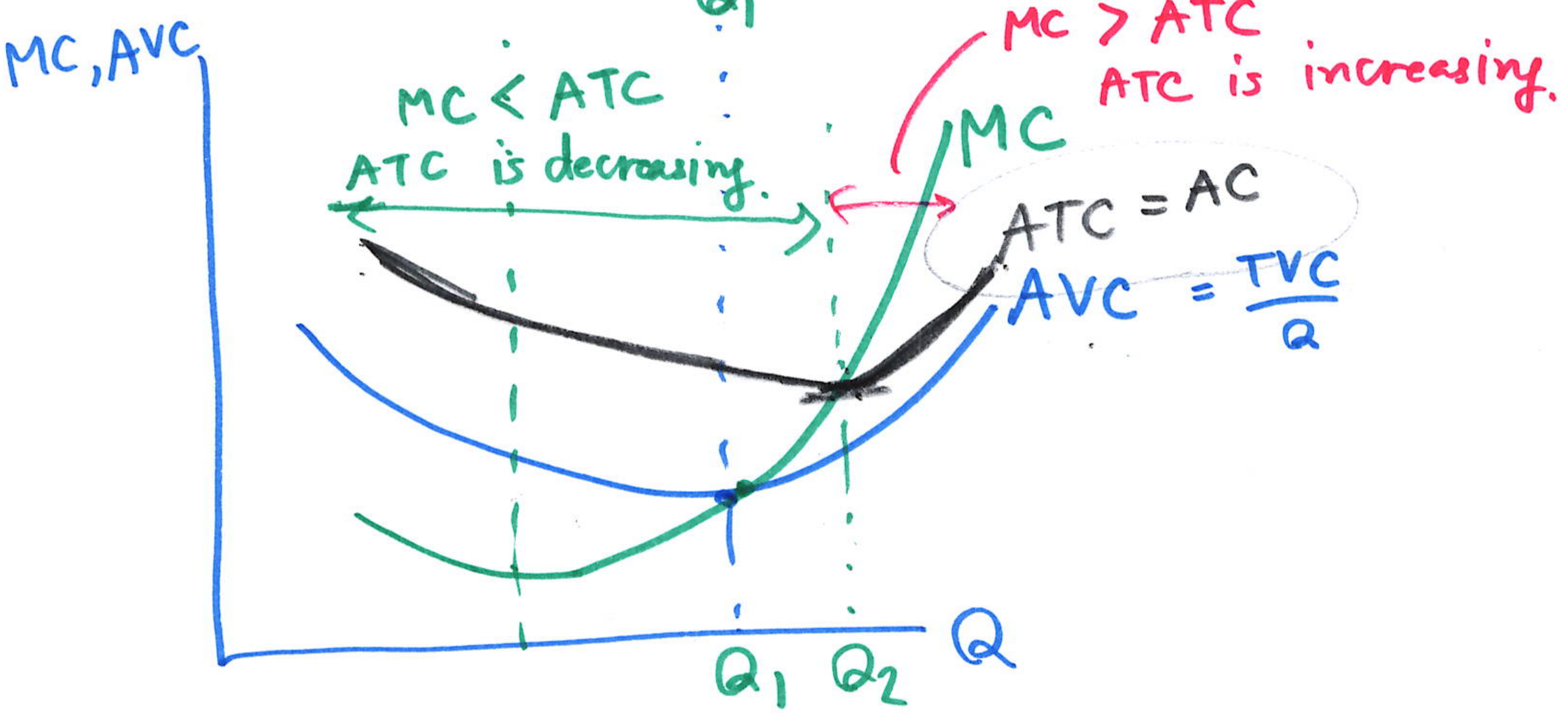
$$\boxed{MC(Q) = \frac{d\left[TVC(Q)\right]}{dQ}}$$



2 changes:

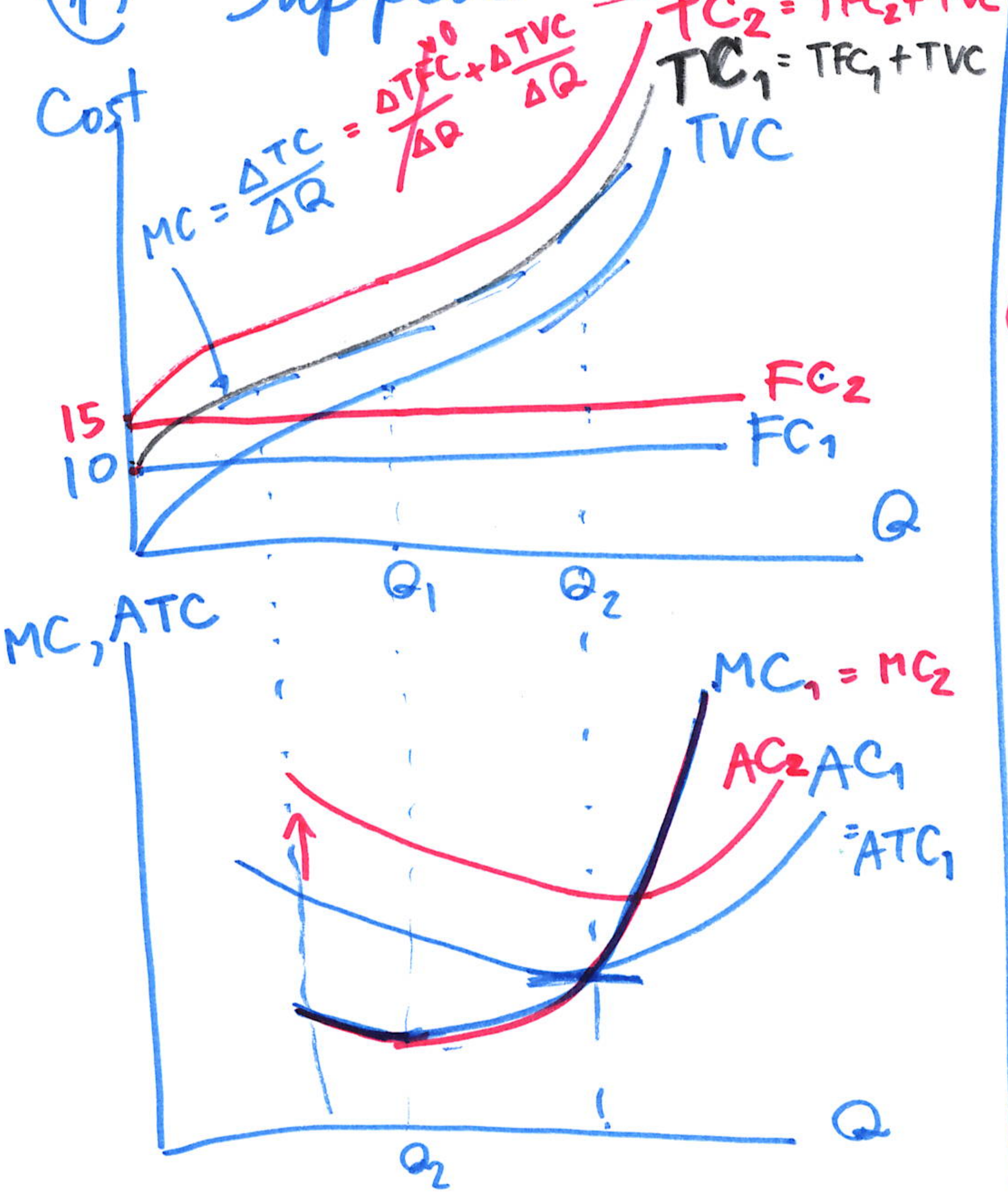
1) Rent increases?

2) Tax $10/unit imposed.



Changes in Cost Curves

① Suppose rent increases.



② Suppose a \$10/unit tax is imposed on the production.

$$TC_0(Q) = TFC_0 + TVC_0(Q)$$

$$TC_1(Q) = TFC_0 + TVC_0(Q) + \overbrace{10 \times Q}^{tax}$$

$$\hookrightarrow TC_1(Q) = TC_0(Q) + (10 \times Q)$$

$$ATC_0 = AFC_0 + AVC_0(Q)$$

$$ATC_1 = \frac{TC_0(Q) + (10Q)}{Q}$$

$$ATC_1 = AFC_0 + AVC_0 + 10$$

$$\therefore \boxed{ATC_1 = ATC_0 + 10}$$

VC changes

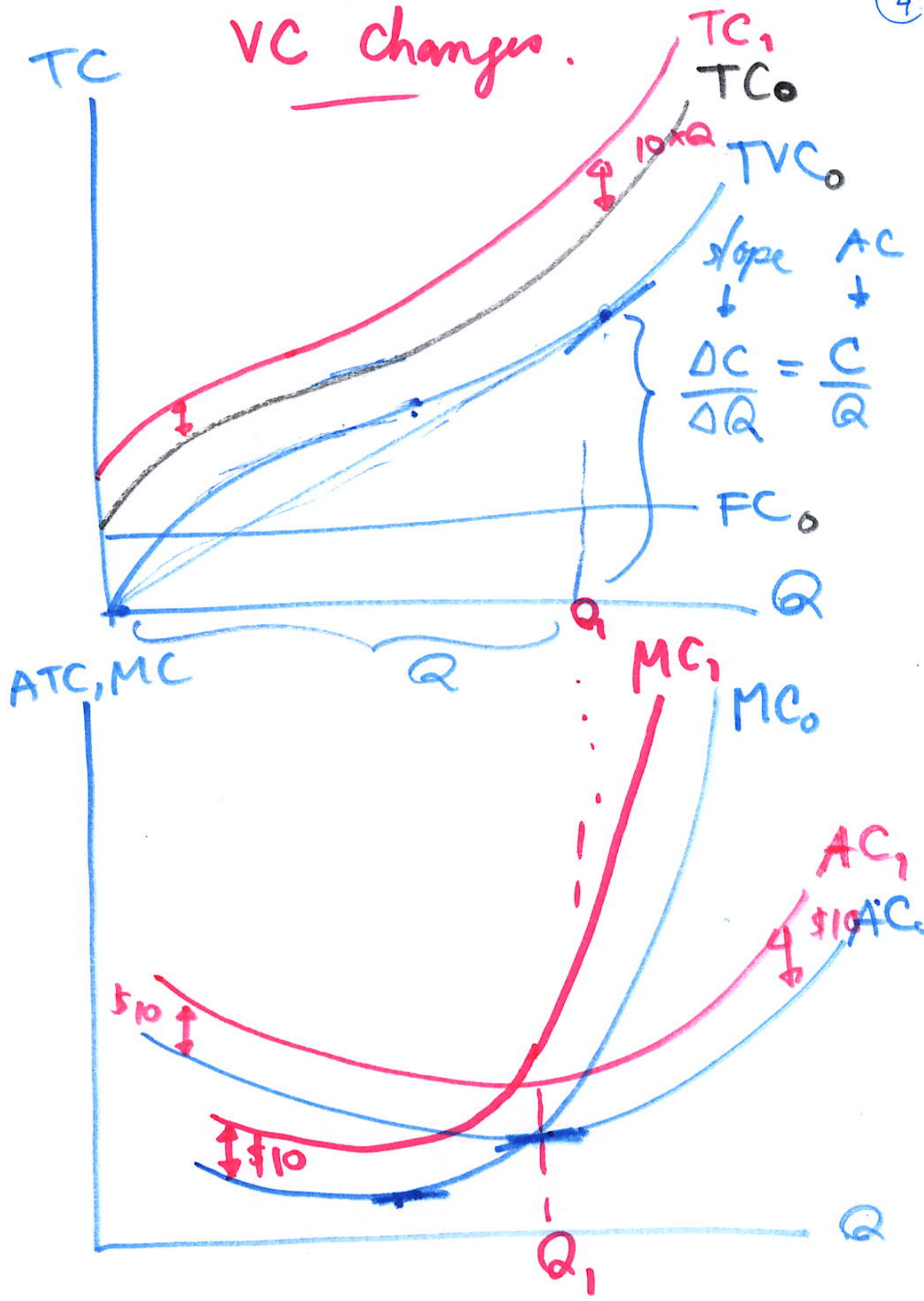
$$TC_1 = TC_0(Q) + 10Q$$

$$MC_1 = ?$$

$$MC_1 = \frac{d(TC_1)}{dQ}$$

$$= \frac{d[TFC_0 + TVC_0 + 10Q]}{dQ}$$

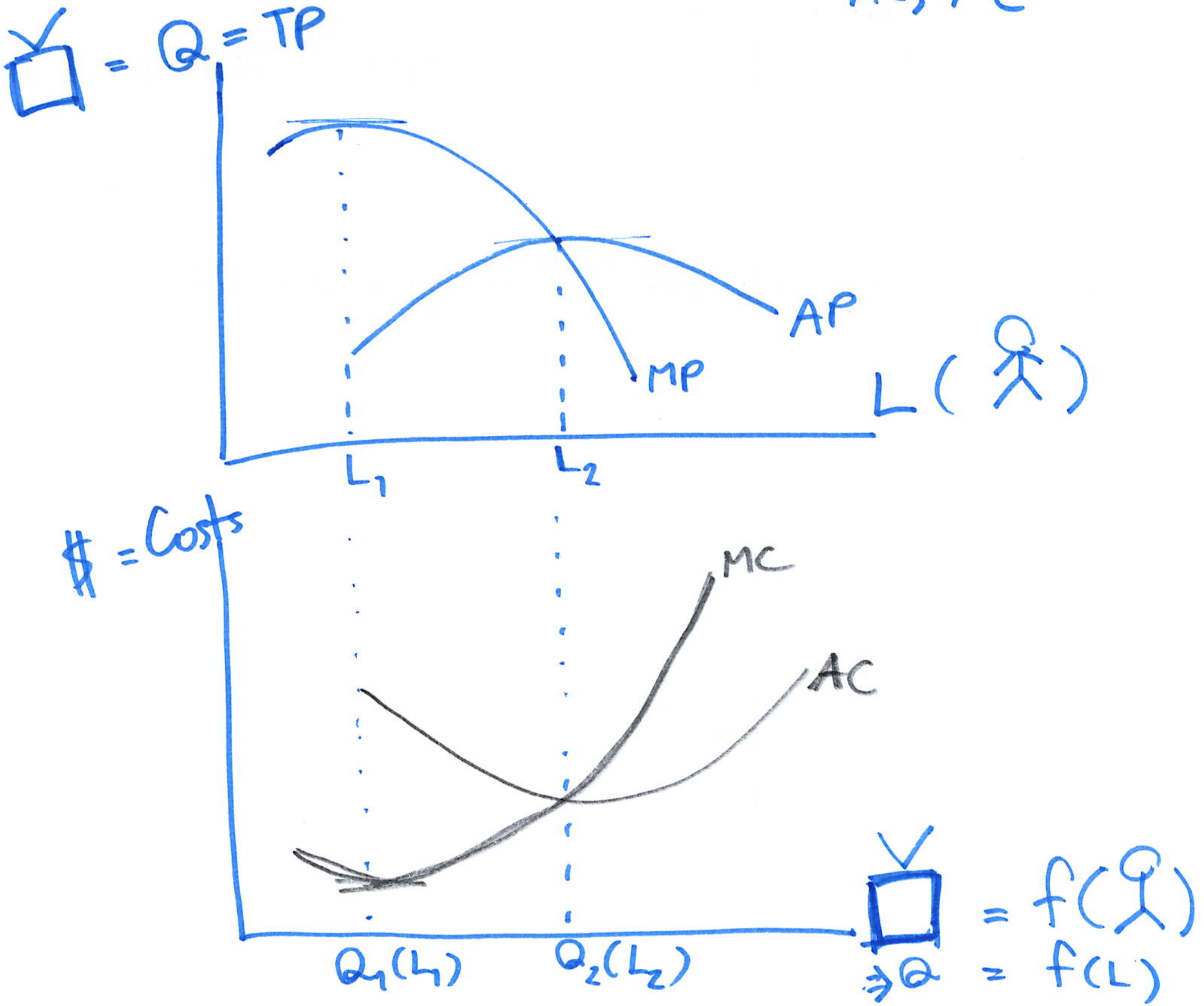
$$MC_1 = MC_0(Q) + 10$$



Relationship between Costs & Production function.

$\underline{\text{Costs}}$: AC, MC

$\underbrace{\text{Production function}}$: MP, AP.



Long-run Production : $Q = f(K, L)$

↳ All variables (factors of production) can be adjusted.

2 Objectives:

1. Maximize output: Max $Q(K, L)$
   subject to fixed cost (C_0).

2. Minimize cost: Min $\text{Cost} = wL + rK$
   subject to fixed output (Q_0)

Long-run Production

$$Q = f(L, K)$$