個 體 經 濟 學 二

Microeconomics (II)

CH11 Equilibrium in the Competitive Market

∗ The basic conditions at a perfectly competitive market:

1. There are many small buyers and sellers. Each of them is a price talker. (price taker)
2. Products are homogeneous. ⇨ The consumers care about price only. (homogeneous good)
3. Entry and exit are free in the long run. (free entry)

   ⇨ zero profit in the LR equilibrium.
4. Perfect information about product quality and price. (complete information)

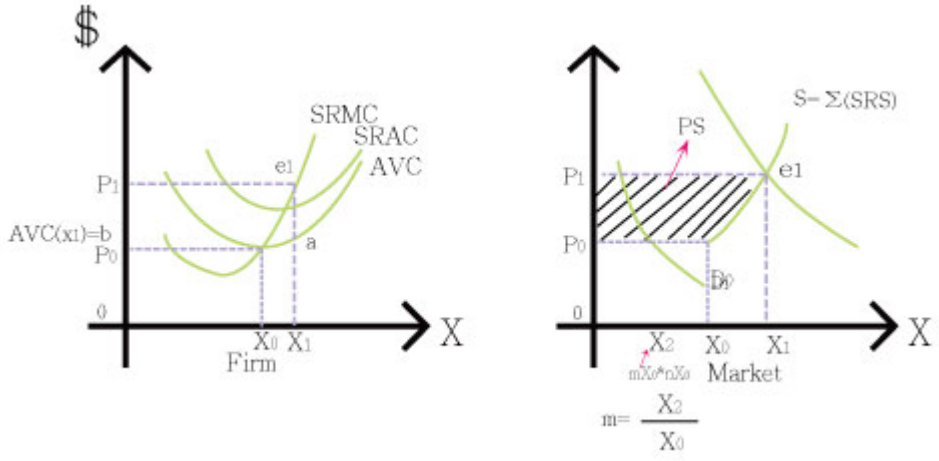
∗ Each competitive firm is a price talker.

⇨ individual firm`s equilibrium — shut down decision

SR: P =MR =SRMC ≥ AVC

LR: P =MR =LRMC ≥ LRAC

Need to discuss market equilibrium.



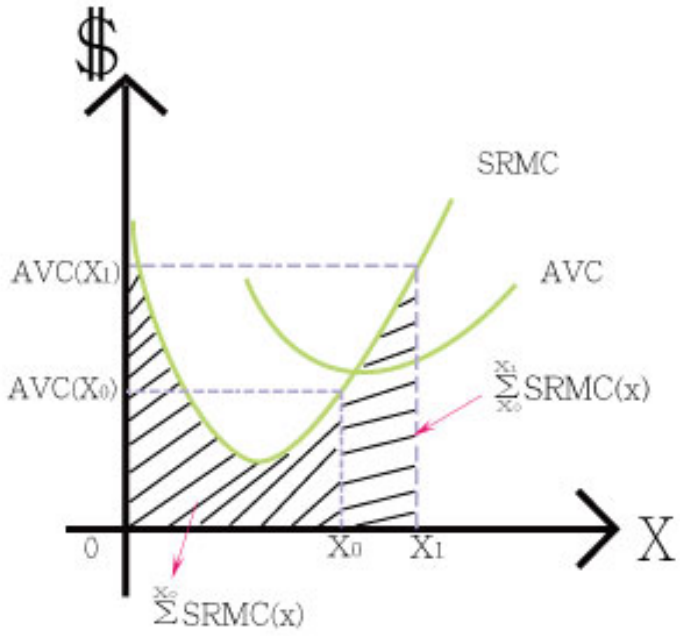
F igure 95:

PS: Producer`s surplus =TR –(minimum amount that producer(s) asks to produce a certain amount of output.)

$$PS(x_1) = TR(x_1) - TVC(x_1)$$

$$= P_1 * x_1 - AVC(x_1) * x_1$$

$$= \square oP_1e_1x_1 - \square obax_1 = \square bP_1e_1a$$



F igure 96:

$TVC_{(X1)} = AVC_{(X1)} * X_1 = \sum_{X=1}^{X1} SRMC_{(x)}$

$SRMC_{(1)} = TVC_{(1)} - TVC_{(0)}$

$SMRC_{(2)} = TVC_{(2)} - TVC_{(1)}$

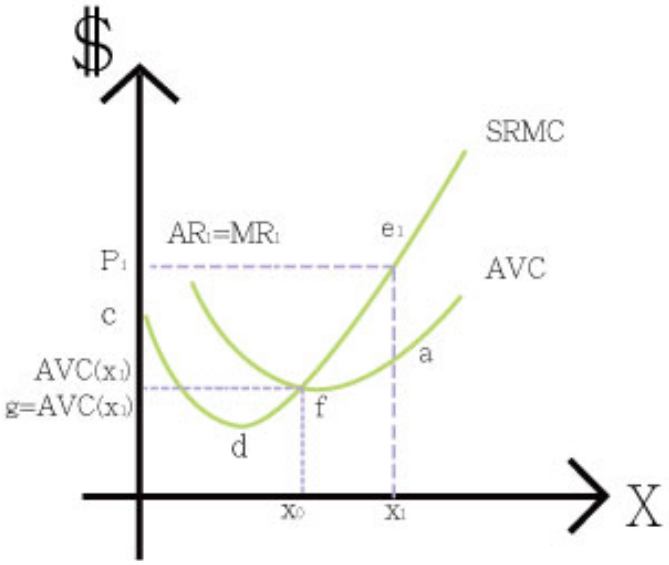
$= TVC_{(2)} - SRMC_{(1)}$

$\Rightarrow$ $TVC_{(2)} = SRMC_{(2)} + SRMC_{(1)}$

……

$TVC_{(X1)} = AVC_{(Xo)}Xo + \sum_{X=Xo}^{X1} SRMC_{(X)} = \sum_{X=1}^{X0} SRMC_{(X)} + \sum_{X=Xo}^{X1} SRMC_{(X)}$

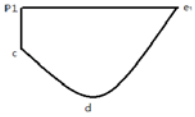
$TVC_{(X1)} = SRMC_{(1)} + SRMC_{(2)} + \ldots SRMC_{(X1)}$



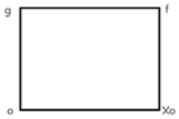
F igure 97

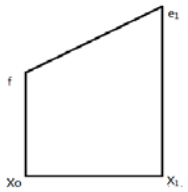
PS(producer surplus) = amount actually received – least amount that a firm asks

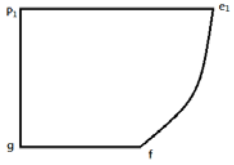
$= (P_1\text{-}AVC_{(x1)}) * X_1$ $\square AVC_{(X1)}Pe_1a$

$=TR_{(X1)} - \sum_{x=1}^{X1} SRMC_{(X)}$ 

$=TR_{(X1)} - AVC_{(Xo)} * Xo - \sum_{X=X0}^{X1} SRMC_{(x)}$







∗LR competitive market equilibrium.

LR price taking firm equilibrium

$$P = AR = MR = LRMC \geq LRAC \quad \Rightarrow X^* \max \boldsymbol{\pi}(x)$$

$$\text{in the LR, entry cost} = 0, \text{profits} > 0 \quad \Rightarrow \quad \text{entry}$$

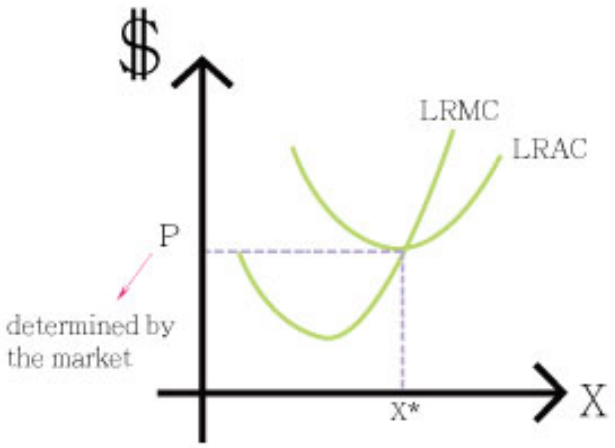
$$\text{profits} \leq 0 \quad \Rightarrow \quad \text{exit}$$

$$\text{exit decision} \Rightarrow \pi(X^*) = 0$$

$X^* \max \pi(x) \Rightarrow P = LRMC(X^*)$

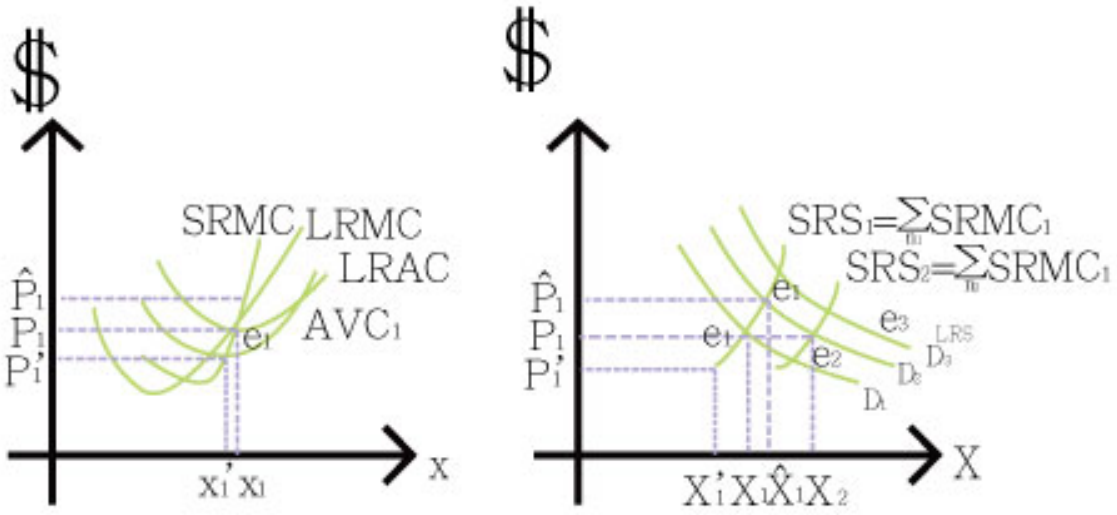
$\boldsymbol{\pi}(X^*) = 0 \Rightarrow P = LRAC(X^*)$

Each firm in the market: $P = LRMC(X^*) = LRAC(X^*)$ (X^* is at min of LRAC(X))



F igure 98:

Starts with an equilibrium $P_1, n_1, x_1 \quad X = n_1 x_1$



F igure 99:

Neither external economy or diseconomy of scale → constant cost industry (不管 demand 怎麼改變,不會影響廠商的 cost structure)

Before entry and exit, existing firms(n_1 firms) adjust output to match demand

Industry output X changes 分為下列兩個 case:

$$\rightarrow \begin{cases} \text{factor demand changes} \\ \text{technology changes} \end{cases} \rightarrow \text{factor price changes}$$

$$\rightarrow \text{individual firm}'\text{s cost changes}$$

Industry output↑ $\Rightarrow$ demand for input↑

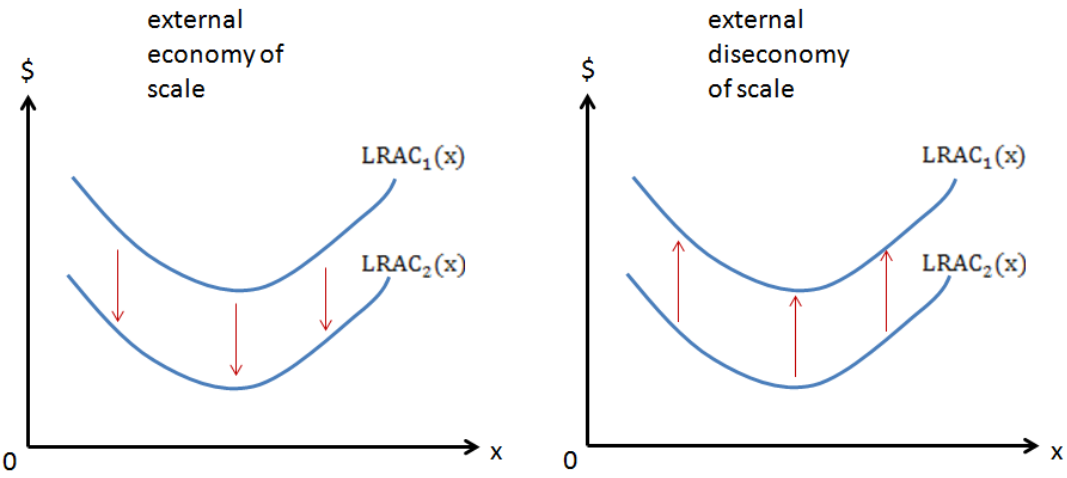
$\Rightarrow$ price of input↑

$\Rightarrow$ firm's cost curves change↑ (LRAC shifts upward)

Industry output $\Rightarrow$ (new) technology changes $\Rightarrow$ firm's cost curves shift

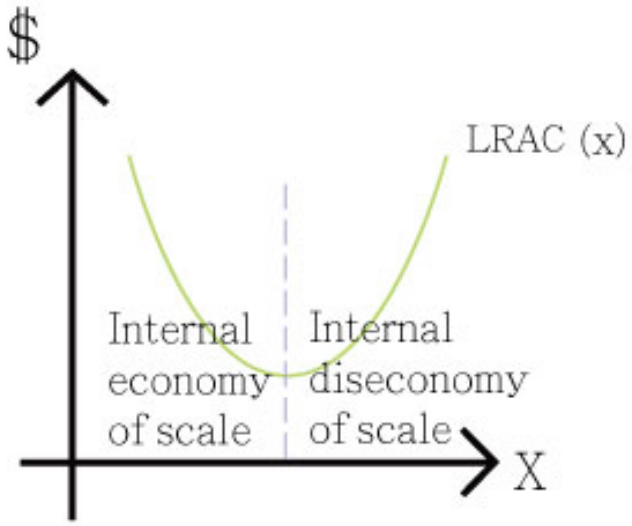
External economy of scale, X↑ $\Rightarrow$ $LRAC_{(X)}$↓ for each X

External diseconomy of scale, X↑ $\Rightarrow$ $LRAC_{(X)}$ ↑shifts upward



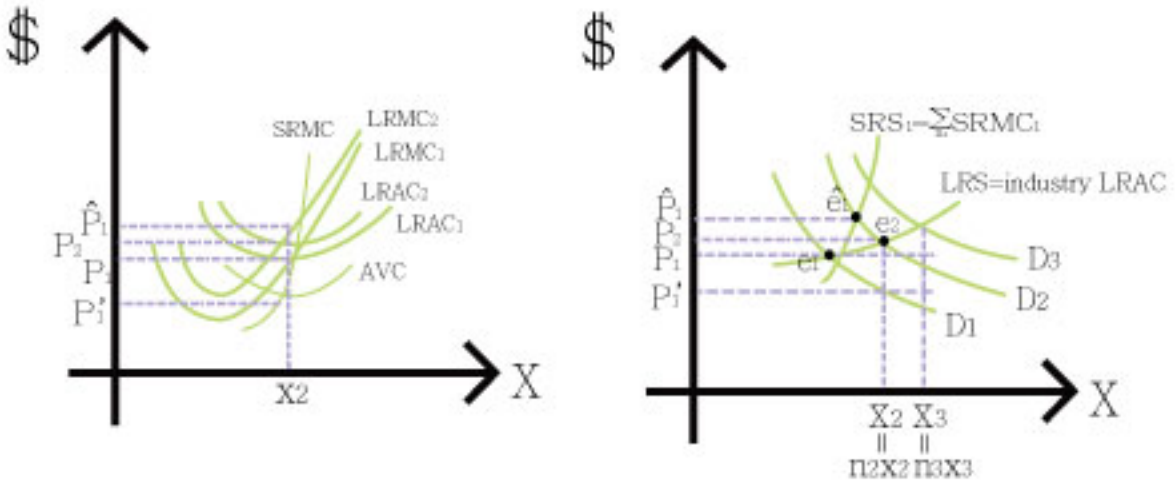
Internal economy of scale , X↑ $\Rightarrow$ $LRAC_{(X)}$↓

Internal diseconomy of scale , X↓ $\Rightarrow$ $LRAC_{(X)}$↑



F igure 101:

Increasing cost industry (external diseconomy of scale)



F igure 102:

Heterogeneous producers

SR: n_l Low cost firm , $SRTC_l$, $SRAC_l$, AVC_l , $SRMC_l$

n_h High cost firm , $SRTC_h$, $SRAC_h$, AVC_h , $SRMC_h$

$SRTC_l(x) < SRTC_h(x)$

$SRAC_l(x) < SRAC_h(x)$

$$AVC_l(x) \begin{matrix} > \\ = \\ < \end{matrix} AVC_h(x) \ ?$$

$$SRMC_l(x) \begin{matrix} > \\ = \\ < \end{matrix} SRMC_h(x) \ ?$$

High cost firm: h

Low cost firm: l

In the SR: TVC

AVC

Short run market equilibrium:

n_h : # of high cost firms.

n_l : # of low cost firms

→ fixed in the SR

TVC_h : Total variable cost of high cost firms.

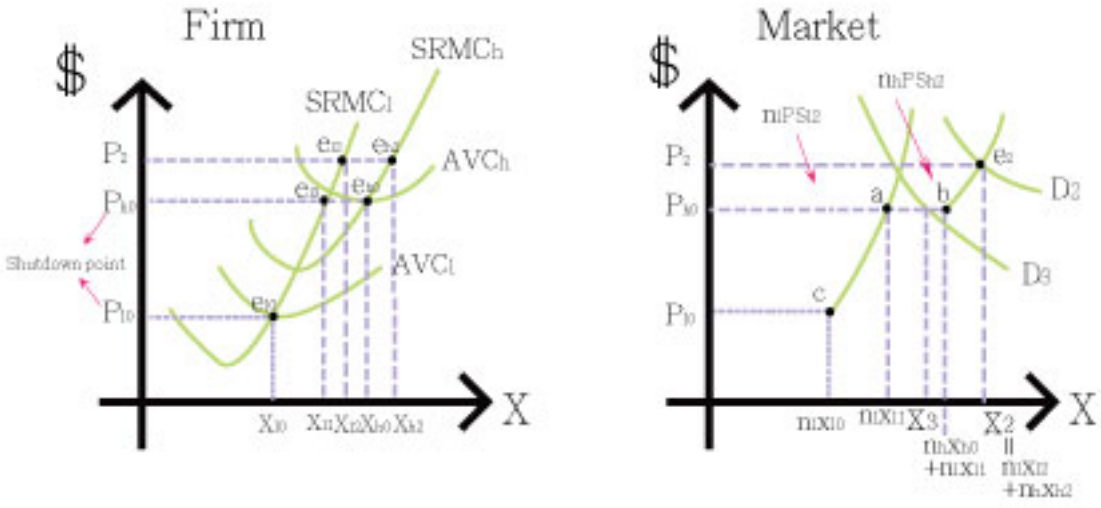
TVC_l : Total variable cost of low cost firms.

AVC_h : Average variable cost of high cost firms.

AVC_l : Average variable cost of low cost firms.

$SRMC_h$: Short run marginal cost of high cost firms.

$SRMC_l$: Short run marginal cost of low cost firms.

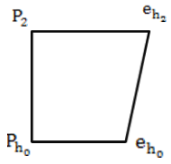


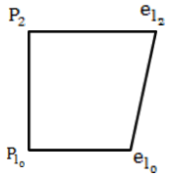
F igure 103:

D_2 = market demand curve $\Longrightarrow$ market equilibrium. $e_2(P_2, X_2)$

high cost firm equilibrium : $e_{h_2}(X_{h_2})$

low cost firm equilibrium : $e_{l_2}(X_{l_2})$

PS_h =  = profit(X_{h_2}) + TFC_h

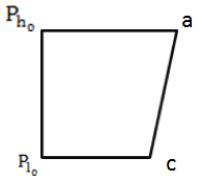
PS_l=  = profit(X_{l2}) + TFC_l

Market PS=圖形$P_2e_2bacP_{l_0}$ = $n_l PS_{l_2}$ + $n_h PS_{n_2}$

D_3 = market demand curve $\Longrightarrow$ market equilibrium. $e_3(P_{h_0}, X_3)$

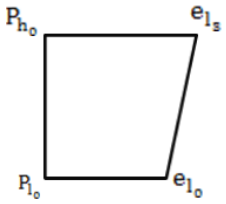
high cost firm equilibrium : $e_{h_0}(X_{h_0}$ or 0)

low cost firm equilibrium : $e_{l_3}(X_{l_1})$

Market PS = 

$$X_3 = n_l X_{l_1} + n_{h_3} X_{h_0} \quad \text{where } n_{h_3} = \frac{X_3 - n_l X_{l_1}}{X_{h_0}}$$

$PS_h = 0$

PS_l = 

Long Run Equilibrium.

n_l : # of low cost firms. (fixed)

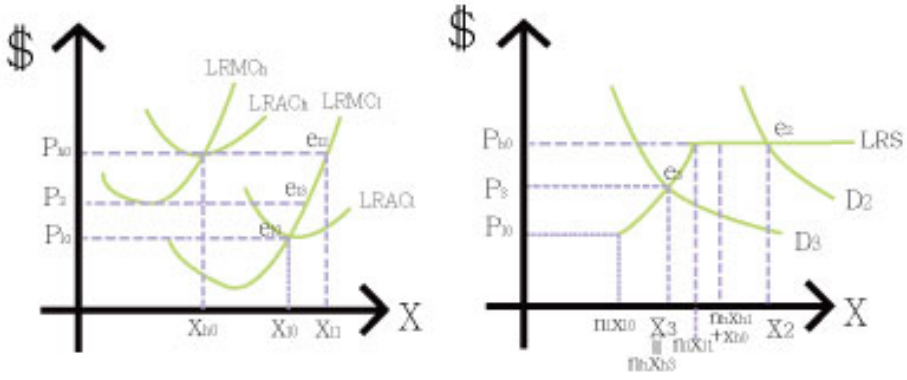
n_h: # of high cost firm (variable) Free entry.

$LRTC_h > LRTC_l$

$LRAC_h > LRAC_l$

$LRMC_h \gtreqless LRMC_l$?

Assume : constant cost industry (no external economy or diseconomy of scale)



F igure 104:

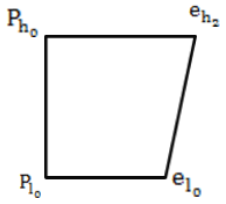
$\pi > 0 \Rightarrow$ entry $\Rightarrow$ P↓ until $P=P_{h_0}$

$\pi < 0 \Rightarrow$ exit $\Rightarrow$ P↑

D_2 = market demand $\Rightarrow$ market equilibrium. $e_2(P_{h_0}, X_2)$

low cost firm equilibrium : $e_{l_2}(X_{l_1})$

high cost firm equilibrium : $e_{h_0}(X_{h_0})$ (free entry)

PS_l = 

= profit (X_{l_1})

$PS_h = 0$ = profit (X_{h_0})

n_h = ?

X_2 — $n_l X_{l_1}$ (n_l fixed)

$n_h X_{h_0}$

$$n_h = \frac{X_2 - n_l X_{l_1}}{X_{h_0}}$$

rent = 0 marginal land

rent > 0 for land which is better (lower producing cost)

than the marginal land earns positive rent.

$\Rightarrow$ Differentiate rent

Economic rent. (non land)