CH13 Monopoly

1. There is only one producer.
2. no entry in the long run.
3. Buyers are price takers

max profits = $\underline{px} - C_{(x)}$

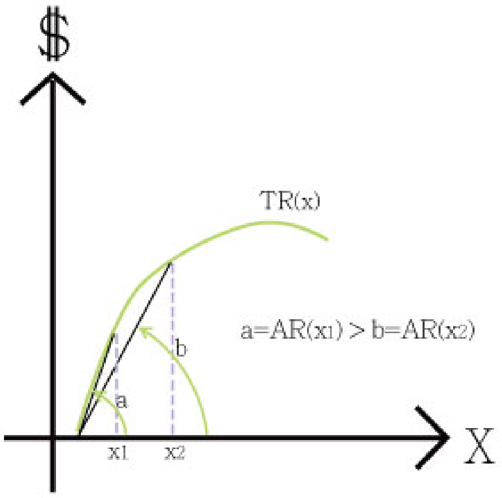
→ Not a constant

p(x) ---- market inverse demand curve.

$\pi(x) = TR(x) - TC(x)$

$= \underline{P(x)} \cdot x - C(x)$

→ downward sloping



⇨

$e_x > 1$ ⇨ $dTE/dP_x < 0$

$e_x = 1$ ⇨ $dTE/dP_x = 0$

$e_x < 1$ ⇨ $dTE/dP_x > 0$

Figure 105:

$$TR(x) = P(x) \cdot x$$

$$\begin{cases} AR(x) = TR(x) / x = P(x) \downarrow \text{ with } x \\ TR(0) = 0 \end{cases}$$

$\Rightarrow$ TR(x) concave

$x \uparrow$, $P(x) = AR \downarrow$

$TR = P(x)\downarrow \cdot x\uparrow$

$P\downarrow < X\uparrow \Rightarrow TR\uparrow$

% change in P < % change in X $\Rightarrow$ $\varepsilon_p > 1$

$X\uparrow < P\downarrow \Rightarrow TR\downarrow$ $\varepsilon_p < 1$

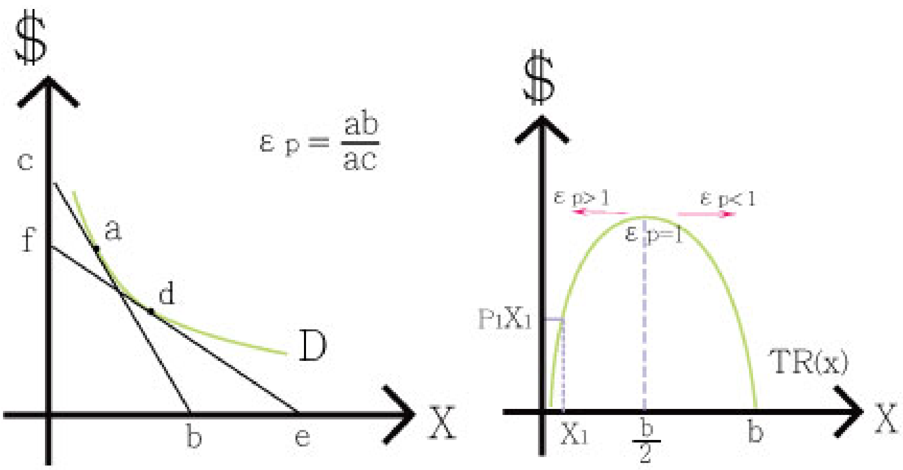


Figure 106:

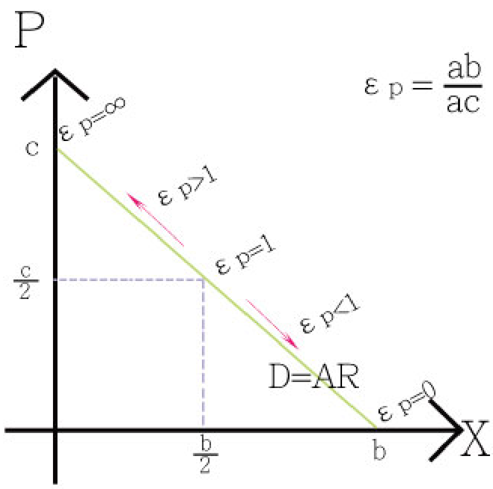


Figure 107:

$MR(X) = d\,TR(X) / d\,X$

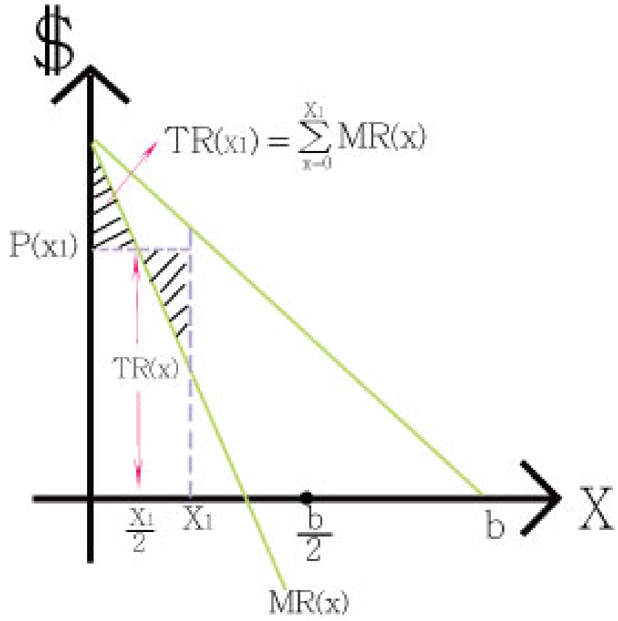


Figure 108:

TR(X) concave $\Longrightarrow$ MR(X)↓with x

TR''(X) < 0 MR'(X) < 0

$\varepsilon_p > 1$ MR(X)> 0

$\varepsilon_p = 1$ MR(X) = 0

$\varepsilon_p < 1$ MR(X) < 0

∗ Special case

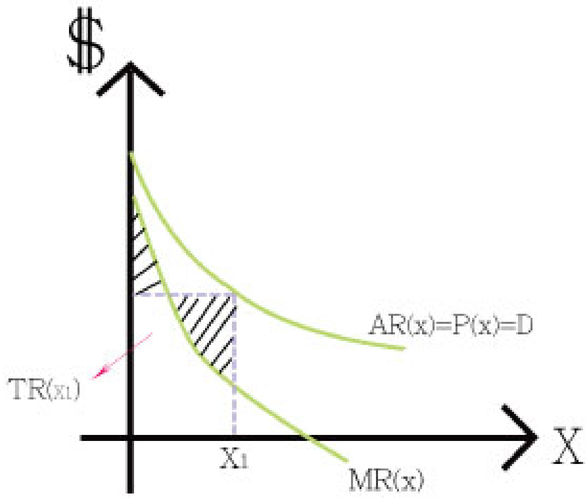


Figure 109:

$$\left.\begin{array}{l} x = A / P \\ \text{or} \quad P(x) = A / X \end{array}\right\} P(X) \cdot X = A$$

$\varepsilon_p = 1$ at all x

TR(X) = A at all x fixed.　水平線

MR(X) = 0　　　AR 遞減

∗ Monopolist Problem

$\pi(x) = P(x) \cdot x - C(x) = TR(x) - \pi(x)$

Foc. MR(x) = MC(x)

$P = AR(x) \neq MR(x)$

$MR(x) < AR(x) = P(x)$　　　AR↓ with x ⟺ MR < AR

$P(x) = AR(x) > MR(x) = MC(x)$ in equilibrium

$MR(x) = d\,TR(x) / d\,x$

$= d\,(P_{(X)} \cdot X) / d\,x$

$= P(x) + x(d\,(P_{(X)}) / d\,x)$

$= P(x)\,(1 + \frac{x}{P(x)} \times \frac{dP(X)}{dx})$

$= P(x)\,(1 - \frac{1}{\varepsilon_P})$

in equilibrium ,

$P(x)(1 - \frac{1}{\varepsilon_P}) = MC(x)$

$\varepsilon_P > 0 \Rightarrow MR(x) < P(x) = AR(x)$

Soc. $\pi''(x) < 0$

$\pi(x) = TR - TC$

$\pi'(x) = MR - MC$

$\pi''(x) = MR'(x) - MC'(x) < 0 \Rightarrow MR'(x) < MC'(x)$

(MR'(x)= 0 in perfect competition)

Since $MR(x)$ ↓ with X ⟹ $MR'(x) < 0$

$MC'(x) > 0$ ok

$MC'(x) < 0$ needs $MC'(x) > MR'(x)$

Since $MR = MC$ in equilibrium

$MC > 0 \Rightarrow MR > 0$ in equilibrium

$\Rightarrow \varepsilon_p > 1$

monopoly equilibrium output = X_m

market demand curve at X_m is elastic

∗ **Monopoly Equilibrium**

market demand curve = monopoly's demand curve = AR(x)

$$MR = p\,(1 - \frac{1}{\varepsilon_P}) = MC$$

SR. $P(x) \geq AVC(x)$

LR. $P(x) \geq LRAC(x)$

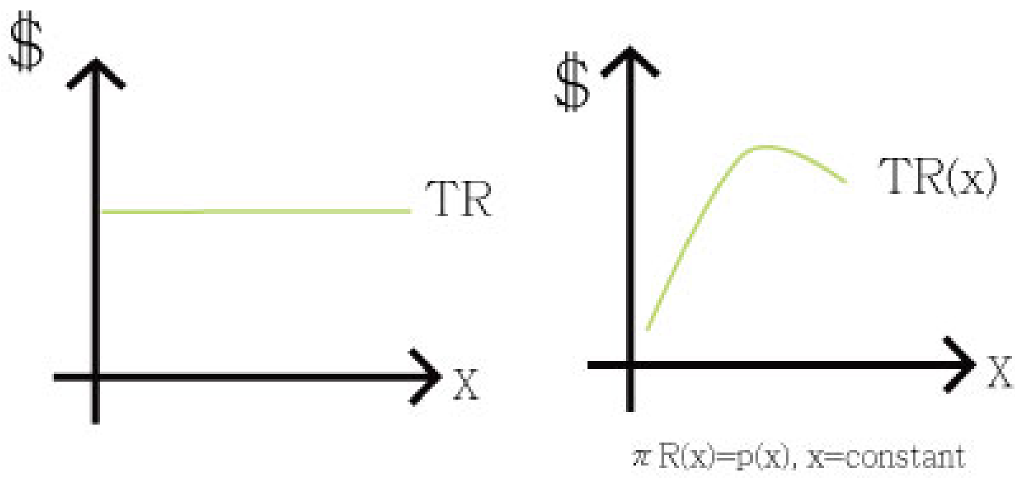


Figure 110:

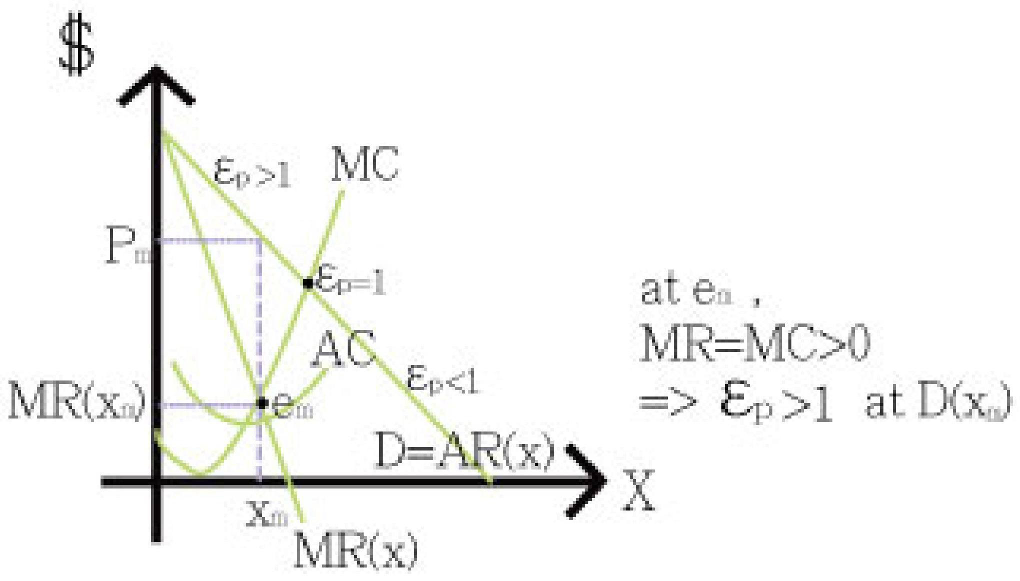


Figure 111:More on perfcet competition

∗ Consumer equilibrium

$$MRS_{xy} = \frac{P_x}{P_y}$$

Good X , Good Y : other goods y : expenditure on other goods, $P_y = 1$

$$MRS_{xy} = \frac{Mu_x}{Mu_y} \xrightarrow{Mu_y = 1} Mu_x = P_x$$

∗ In perfect competition : P = MR = AR = MC = AC (in the LR)

TS = CS + PS at e , TS is maximized

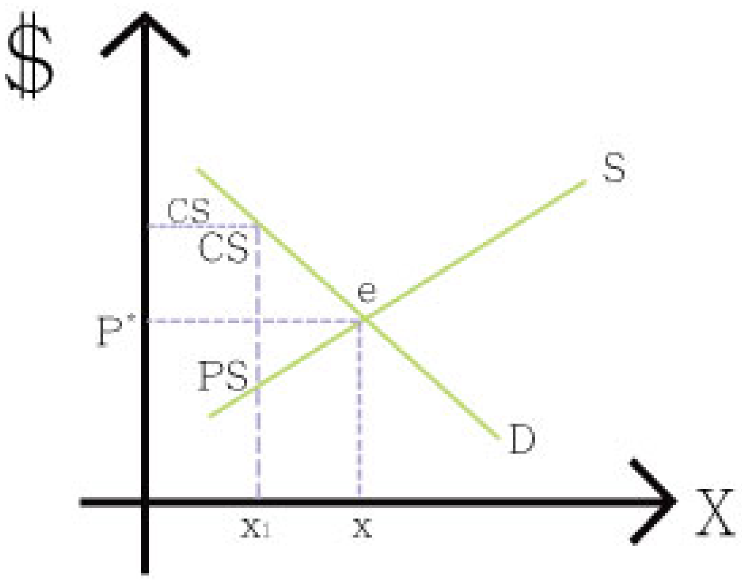


Figure 112:

TS at X_1 TS at X_s which is maximized

$P_1^d = Mu_x(x_1)$

$P^* = P_s$

$P_1^s = MC_x(x_1)$

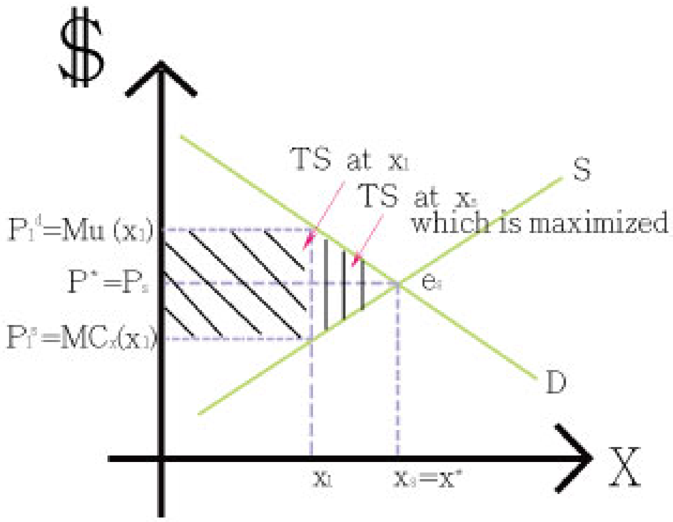


Figure 113:

∗ Price Control

price ceiling(價格上限) vs. price floor(價格下限、保證價格)

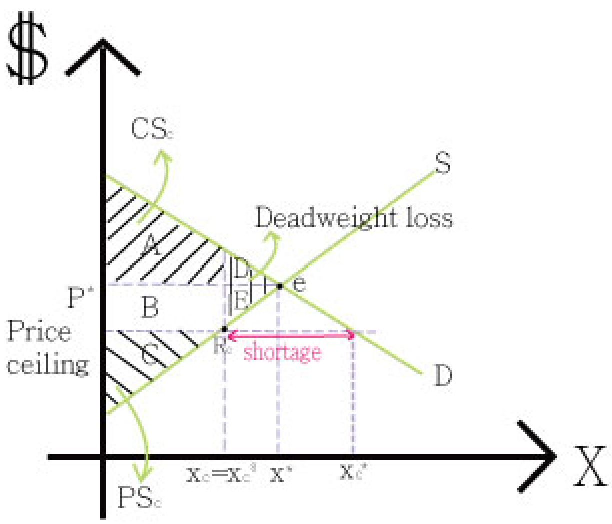


Figure 114:

∗ without price ceiling

CS at e = A+D

PS at e = B+C+E

TS = A+B+C+D+E

with price ceiling

CS at e_c = A + B

PS at e_c = C

TS = A+B+C

deadweight loss = D+E

∗ Shortage ➡ Black Market

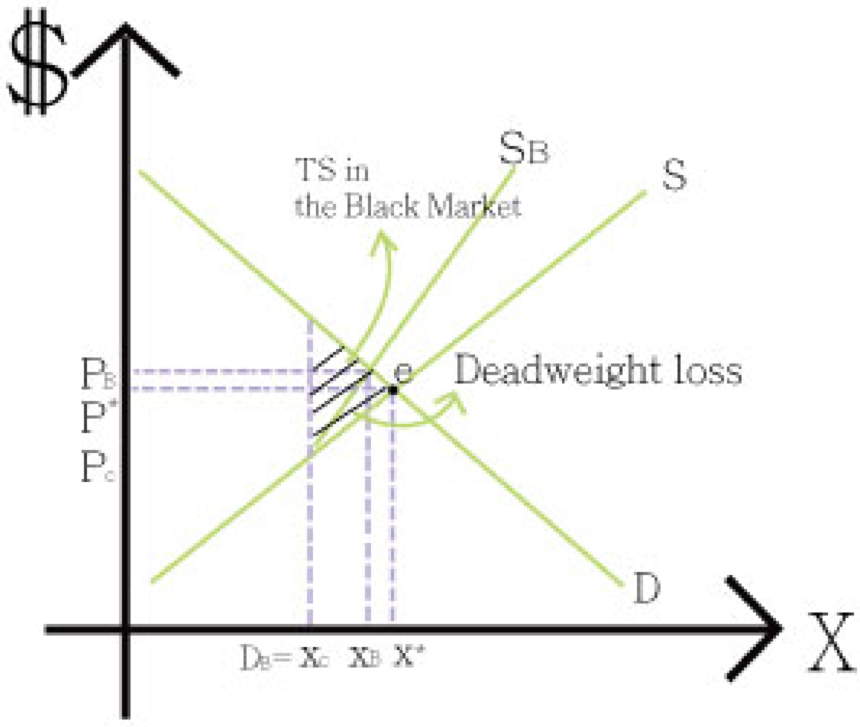


Figure 115:

P_B : equilibrium price in the black market.

$X_B - X_C$ = quantity traded in the black market

$$\text{MRTS}_{LK} = \frac{\frac{\varepsilon}{\rho}(L^{\rho}+K^{\rho})^{\frac{\varepsilon}{\rho}-1}\times\rho L^{\rho-1}}{\frac{\varepsilon}{\rho}(L^{\rho}+K^{\rho})^{\frac{\varepsilon}{\rho}-1}\times\rho K^{\rho-1}} = \left(\frac{K}{L}\right)^{1-\rho}$$

$$\ln \text{MRTS}_{LK} = \ln\left(\frac{K}{L}\right)^{1-\rho} = (1-\rho)\ln\frac{K}{L}$$

$$\frac{d \ln MRTS_{LK}}{d \ln(\frac{K}{L})} = 1 - \rho$$

$$\sigma = \frac{1}{1-\rho} \Rightarrow \rho = 0, \sigma = 1 \text{ cobb} - \text{Douglas}$$

$$\rho \to 1, \sigma \to \infty \text{ perfect substitute}$$