①

$$Qd = 3 - p^2$$
$$Qs = 6p - 4$$

$$Qd = Qs$$
$$3 - p^2 = 6p - 4$$
$$p^2 + 6p - 7 = 0$$
$$(p+7)(p-1) = 0$$
$$p = 1, -7$$

p cannot be negative number.

$$Q = 3 - (1)^2 = 2 \quad \#$$

② $Qd_1 = Qs_1$

$$18 - 3P_1 + P_2 = -2 + 4P_1$$

$$7P_1 - P_2 = 20 \quad -①$$

$Qd_2 = Qs_2$

$$12 + P_1 - 2P_2 = -2 + 3P_2$$

$$P_1 - 5P_2 = -14 \quad -②$$

$$① \times 5 \rightsquigarrow 35P_1 - 5P_2 = 100 \quad -③$$

$$③ - ② \Rightarrow 34P_1 = 114$$

$$P_1 = \frac{57}{17}$$

$$P_2 = \frac{59}{17}$$

$$Q_1 = \frac{194}{17} \; ; \; Q_2 = \frac{143}{17}.$$

(3) $Q^d = Q^s$

Note P_1 = Price of Producer

$P_1 + t$ = Price of Consumer.

That is, tax on consumer.

$\Rightarrow$ Exo is "t"

$\Rightarrow$ Endo are P_1, Q

Solve

$$120 - (P_1 + t) = 2P_1$$

$$3P_1 = 12 - t$$

$$P_1 = 40 - \frac{1}{3}t$$

$\therefore$ $t \uparrow$; $P_1 \downarrow$; $t=0 \rightarrow P_1 = 40$

Pd ? ; $Pd = P_1 + t = 40 + \frac{2}{3}t$

$\therefore$ $t \uparrow$; $Pd \uparrow$

As $Q = 2P_1 = 2\left(40 - \frac{1}{3}t\right) = 80 - \frac{2}{3}t$

$\therefore$ $t \uparrow \Rightarrow Q \downarrow$

4

$$y = C + I_0 + G$$
$$C = a + b(y - T_0)$$
$$G = gY$$

G is now endo!

a) Endo : Y, C, G

Exo : I_0, T_0

b) Marginal ~~propensotity~~ propensity of government spending

c) $y = a + b(y - T_0) + I_0 + gY$

$$y(1 - b - g) = a + I_0 - bT_0$$

$$y = \frac{1}{1-b-g}(a + I_0 - bT_0)$$

d) $1 - b - g > 0$

$a + I_0 - bT_0 > 0$; $bT_0 < a + I_0$ #

These two ensure that $Y > 0$.

⑤ $Y = C + I_0 + G_0$

$= 25 + 6 \cdot Y^{\frac{1}{2}} + 16 + 14$

$Y = 25 + 30 + 6 \cdot \sqrt{y}$

$Y = 55 + 6\sqrt{y}$

Let $\sqrt{Y} = X$; $(\sqrt{Y})^2 = Y = X^2$.

$\therefore \quad X^2 - 6X - 55 = 0$

$(X - 11)(X+5) = 0$

$X = 11, -5$

$\sqrt{Y} = 11$; $\sqrt{y} = -5$
No

$Y = (11)^2$

$= 121$

$C = 25 + 6\sqrt{y}$

$= 25 + 6 \cdot 11$

$= 25 + 66 = 91$

• anyone curious why coefficient attached to "y" is greater than 1 ?
• Isn't this violating that mpc < 1 ? **Think!**

6

$$P_1 = Q_1^{-\frac{2}{3}} Q_2^{\frac{1}{3}} \quad - ①$$

$$P_2 = Q_1^{\frac{1}{3}} Q_2^{-\frac{2}{3}} \quad - ②$$

a - Write demand equatiō. $Q = D'(P_1, P_2)$

$$\frac{①}{②} \Rightarrow \frac{P_1}{P_2} = \frac{Q_1^{-\frac{2}{3}} Q_2^{\frac{1}{3}}}{Q_1^{\frac{1}{3}} Q_2^{-\frac{2}{3}}}$$

$$= \frac{Q_2^{\frac{1}{3}} \cdot Q_2^{\frac{2}{3}}}{Q_1^{1/3} \cdot Q_1^{2/3}} = \frac{Q_2}{Q_1}$$

$$\therefore \quad Q_2 = \frac{P_1}{P_2} \cdot Q_1 \quad - ③$$

pluge ③ into ① ~~and~~

$$P_1 = Q_1^{-\frac{2}{3}} \cdot \left(\frac{P_1}{P_2}\right)^{\frac{1}{3}} Q_1^{\frac{1}{3}}$$

$$P_1^{2/3} P_2^{-\frac{1}{3}} = Q_1^{-2/3 + \frac{1}{3}} = Q_1^{-\frac{1}{3}}$$

$$\therefore \quad Q_1 = P_1^{-2} \cdot P_2^{-1} \quad - (+) - ④$$

Put ④ into ③

$$Q_2 = P_1^{-1} \cdot P_2^{-2} \quad - ⑤$$

b) Solve equ^{n}

$$Q_1^d = Q_1^s$$

$$P_1^{-2} \cdot P_2^{-1} = a^{-1} \cdot P_1 \quad — ①$$

$$Q_2^d = Q_2^s$$

$$P_1^{-1} P_2^{-2} = P_2 \quad — ②$$

$$\frac{①}{②} \Rightarrow \frac{P_1^{-2} P_2^{-1}}{P_1^{-1} \cdot P_2^{-2}} = a^{-1} \cdot \frac{P_1}{P_2}$$

$$\frac{P_2}{P_1} = a^{-1} \cdot \frac{P_1}{P_2}$$

$$\therefore P_2^2 = \frac{1}{a} \cdot P_1^2$$

$$P_2 = \sqrt{\frac{1}{a}} \cdot P_1 \quad — ③$$

Put ③ back into ②

$$P^{-1} = \left(\sqrt{\frac{1}{a}} \cdot P_1\right)^3 \Rightarrow \left.\begin{array}{l} P_1 = (\sqrt{a})^{3/4} \\ P_2 = (\sqrt{a})^{-1/4} \end{array}\right\} \checkmark$$