W 07

- Consumers are identical.
- Government : $G_0 = 60$

  $G_1 = 150$
- Interest rate : $r$ (Each bond pays interest rate $r$).
- Consumers' optimal decisions (given $r$):

$$C_0^*(r) = \frac{2}{3}(Y_0 - T_0) + \frac{2}{3}(Y_1 - T_1) \cdot \frac{1}{1+r}$$

- $Y_0 = 300$ , $Y_1 = 300$ .

① (1) Given $r$, consumers choose $c_0, c_1$ to maximize utility subject to their lifetime budget constraint :

$$\max_{(c_0, c_1)} U(c_0, c_1)$$

$$\text{s.t.} \quad c_0 + \frac{1}{1+r} c_1 = y_0 - t_0 + \frac{1}{1+r}[y_1 - t_1]$$

(2) Given $r$, the government chooses $T_0$ and $T_1$ that satisfies its budget constraint:

$$G_0 + \frac{1}{1+r} G_1 = T_0 + \frac{1}{1+r} T_1$$

(3) $r$ is such that the credit market clears :

i.e. $S_0^p(r) + S_0^G = 0$

(or $S_0^p(r) - B_0 = 0$

$S_0^p(r) = B_0$ )

② (1) give us:

$$C_0^* = \frac{2}{3}(Y_0 - T_0) + \frac{2}{3} \cdot \frac{1}{1+r}[Y_1 - T_1]$$

$$= \frac{2}{3}\left[Y_0 + \frac{1}{1+r} Y_1\right] - \frac{2}{3}\left[\underline{T_0 + \frac{1}{1+r} T_1}\right]$$

(2) give us:

$$T_0 + \frac{1}{1+r} T_1 = G_0 + \frac{1}{1+r} G_1$$

$$\Rightarrow \boxed{C_0^* = \frac{2}{3}\left[Y_0 + \frac{1}{1+r} Y_1\right] - \frac{2}{3}\left[\underline{G_0 + \frac{1}{1+r} G_1}\right]}$$

(3) $S_0^P(r) + S_0^G = 0$

$$Y_0 - \cancel{T_0} - C_0^* + [\cancel{T_0} - G_0] = 0$$

$$Y_0 - C_0^* - G_0 = 0$$

$$\boxed{Y_0 = C_0^* + G_0}$$

Then, $Y_0 = \frac{2}{3}\left[Y_0 + \frac{1}{1+r} Y_1\right] - \frac{2}{3}\left[G_0 + \frac{1}{1+r} G_1\right] + G_0$

$$\boxed{Y_0 = \frac{2}{3} Y_0 + \frac{2}{3} \frac{1}{1+r}[Y_1 - G_1] + \frac{1}{3} G_0}$$

(3)

- Use values to solve for r.
- or show that:

$$\frac{2}{3} Y_0 + \frac{2}{3} \frac{1}{1+r} [ Y_1 - G_1 ] + \frac{1}{3} G_0 \text{ is indeed } = Y_0,$$

if $r = 0.25$.

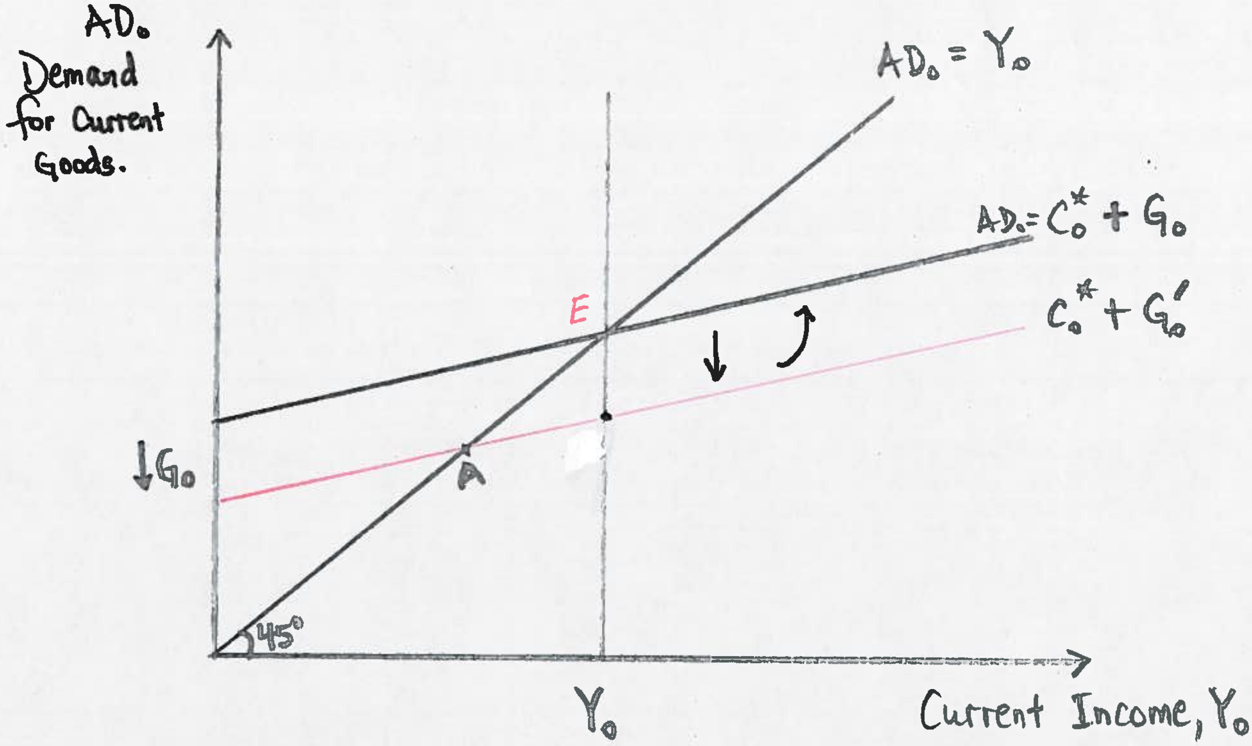
so, $\frac{2}{3} \cdot 300 + \frac{2}{3} \cdot \frac{1}{1.25} [300 - 150] + \frac{1}{3} \cdot 60$

$$= 200 + \underbrace{\frac{100}{1.25}}_{=80} + 20$$

$$= 300$$

$$= Y_0$$

④ $G_0 \downarrow$



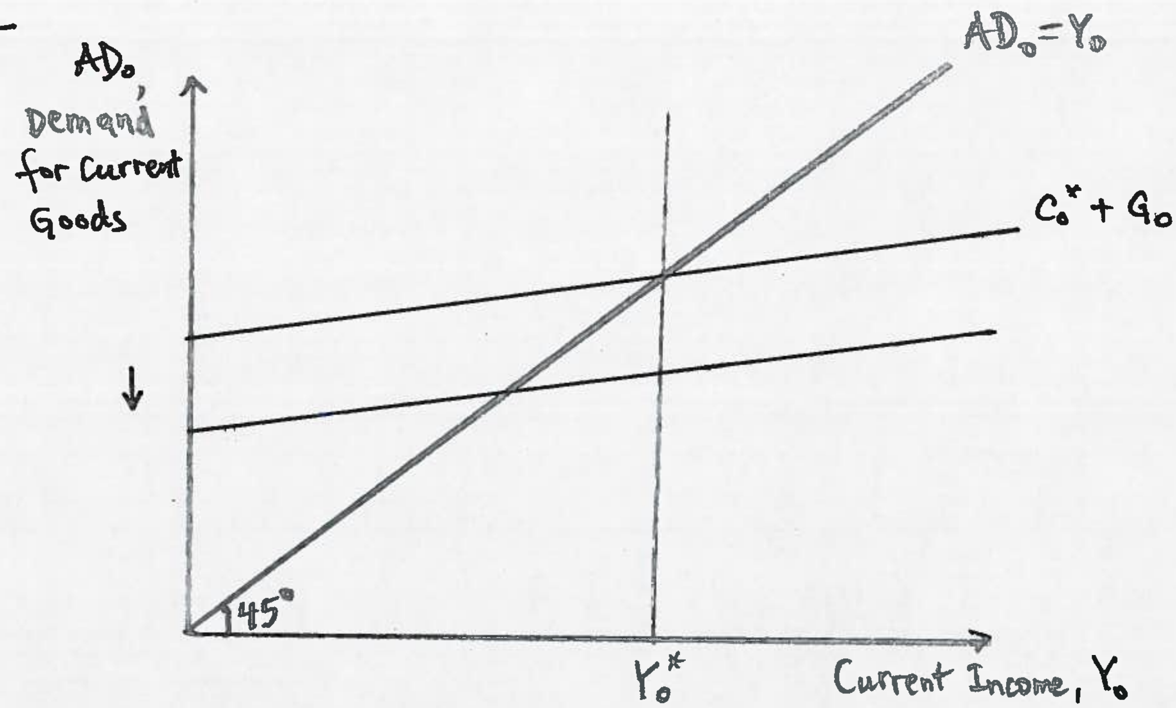

Holding r constant, $\downarrow G_0 \rightarrow \downarrow AD_0$

@ A, $AD_0 < Y_0$, i.e. Saving would be too high.

r must ↓ to reduce incentives to save (until curve goes back to initial level E).

@ E, now r is lower, but $C_0$ is higher.

⑤ $Y_1^e \downarrow$




$\downarrow Y_1^e$ → $\downarrow$ lifetime wealth

→ $\downarrow C_0$ and $\downarrow C_1$ because $C_0$ and $C_1$ are normal goods

→ A $\downarrow$ in $C_0$ means that $AD_0 < Y_0$

→ r must fall discourage saving and encourage that $C_0$ be kept at the same level

→ Economy stays at $E_0$ with lower interest rate r, but same $C_0$ as before.

⑥ The Ricardian Equivalence Theorem says that: holding constant $G_0$ and $G_1$, the timing of taxes (the respective value of $T_0$ and $T_1$) does not matter as long as the government's budget constraint is satisfied.

A change in $G_0$ changes consumer's lifetime wealth, and so changes its decisions.
The Ricardian Equivalence Theorem is not contradicted, it is simply not applicable here since $G_0$ and $G_1$ are <u>not</u> kept constant.

(7)

$\uparrow$ sales tax (in period 1),

~~th~~ $\Rightarrow$ Then $\uparrow$ price of consuming in period 1 compared to period 0.

i.e. $\frac{P_{c_0} \; -}{P_{c_1} \; \uparrow}) \Rightarrow \downarrow$

$$\Rightarrow \frac{P_{c_0}}{P_{c_1}} < 1+r .$$

- Before the announcement,

  Consumers set $MRS_{(c_0, c_1)} = 1+r = \frac{P_{c_0}}{P_{c_1}}$

- After the announcement,

  $MRS_{(c_0, c_1)} > \frac{P_{c_0}}{P_{c_1}}$ for the same $c_0$ and $c_1$

  value of $c_0$ (in terms of $c_1$) exceeds the price of $c_0$.

  $\Rightarrow$ Buy more $c_0$. ($\uparrow c_0$ and $\downarrow c_1$)
  (if the $r$ stays the same).

However, in equilibrium,

$$AD_0 (= C_0 + G_0) = Y_0$$

if $C_0 \uparrow$, $AD_0 > Y_0$, which is not possible,

$\Rightarrow r \uparrow$ to prevent this happening.

$\Rightarrow r \uparrow$ and $C_0$ must stay the same.