Page No. 1
Date :

Q- 1.B

$C = 100 + 0.6Y$; $I = 100$; $G = 150$; $T = 100$

$t = 0.2Y$

(i)

Equilibrium level of income

$Y = AD$

$Y = C + I + G$

$Y = 100 + 0.6(Y - 100 - 0.2Y) + 100 + 150$

$Y = 100 + 0.6Y - 60 - 0.12Y + 250$

$Y = 0.48Y + 290$

$Y - 0.48Y = 290$

$Y(1 - 0.48) = 290$

$Y = \frac{1}{1 - 0.48} 290 = 557.69$

or use equilibrium equation

$$\boxed{Y = \frac{1}{1 - b(1-t)} \bar{A}} \quad \text{——— (1)}$$

$\bar{A} = \bar{a} - b\bar{T} + \bar{G} + \bar{I}$

$$Y = \frac{1}{1 - 0.6(1-0.2)} (290)$$

$$Y = \frac{1}{1 - 0.48} 290$$

$Y = 1.923 (290) = 557.69.$

level of consumption at equilibrium.

$$C = \bar{a} + b(Y - T - tY)$$

$$C = 100 + 0.6(Y - 100 - 0.2Y)$$

$$C = 100 + 0.6(558 - 100 - 0.2(558))$$
$$= 100 + 334.8 - 60 - 66.96$$
$$= 307.84$$

(ii) value of tax multiplier.

$$\alpha_T = \frac{-b}{1-b(1-t)} \quad \text{——— (2)}$$

or

$$\Delta Y = \frac{-b}{1-b(1-t)} \Delta T$$

So,

$$= \frac{-0.6}{1-0.6(1-0.2)}$$

$$\alpha_T = \frac{-0.6}{1-0.48}$$

$$= \frac{-0.6}{0.52} = -1.154$$

(c) if G increase to 200, what is new equilibrium income?

↳ you can calculate this using G = 200 instead of 150 as first part of the question, where

$$Y = \frac{1}{1-0.48}(340)$$

$$Y = 1.923\,(340) = 653.85$$

or you can calculate ΔY due to ΔG

$$\Delta Y = \alpha_G \, \Delta G$$

$$\Delta Y = \frac{1}{1-b(1-t)} \, \Delta G$$

$$\Delta Y = 1.923\,(50)$$

$$\Delta Y = 96.1538$$

Thus new equilibrium income is.

$$Y_2 = Y_1 + \Delta Y$$

$$= 557.69 + 96.154 = 653.85$$

You can avoid decimal points.

Q. 2. B

$C = 100 + 0.8 Y_d$; $I = 70$; $G = 200$

$TR = 150$; $t = 0.2$.

(a) Equilibrium level income.

$$Y = \frac{1}{1-b(1-t)} \bar{a} + b\bar{TR} + \bar{I} + \bar{G}$$

$$Y = \frac{1}{1-.8(1-.2)} 100 + .8(150) + 70 + 200$$

$$Y = \frac{1}{1-0.64} (490)$$

$$Y = 2.778 (490) = 1361$$

Multiplier

$$\alpha_G = \frac{1}{1-b(1-t)} = 2.778$$

(b) Budget Surplus.

$$BS = tY - G - TR$$

$$= 0.2 (1361) - 200 - 150$$

$$= 272.2 - 350$$

$$= -77.8 \quad \text{(Deficit)}$$

(c) new equilibrium income if t increases to 0.25?

↳ Consider part a of the question.

where

$$Y = \frac{1}{1-0.8(1-0.25)}(490)$$

$$Y = 2.5\,(490) \quad = 1225$$

and new multiplier is 2.5, it indicates that value of multiplier decreases as t increases.

Q. 3-B.

$C = 100 + 0.8\,Y_d$; $t = 0.25$, $I = 300 - 40i$

$G = 120$; $NX = -0.20$; $M/P = 250$

$M_d = 0.25Y - 100\,i$.

(ii) Determine equilibrium level of income and interest-rate.

IS equation $\boxed{Y = \frac{1}{1-b(1-t)}\bar{A} - di}$ ——— (3)

$$Y = \frac{1}{1-.8(1-.25)}\,100 + 300 + 120 - 0.20 - 40i$$

IS equation → $\boxed{Y = \frac{1}{0.4}(519.8 - 40i)}$ ——— (4)

LM equation

$$i = \frac{1}{h}\left(kY - \frac{\bar{M}}{\bar{P}}\right) \quad \text{——} (5)$$

$$i = \frac{1}{100}(0.25Y - 250)$$

$$i = \frac{1}{100}(0.25Y - 250)$$

LM equation →

$$i = 0.0025Y - 2.50 \quad \text{——} (6)$$

You need to substitute this equation into equation 4.

$$Y = \frac{1}{0.4}(519.8 - 40[0.0025Y - 2.50])$$

$$Y = 2.5(519.8 - 0.1Y + 100)$$

$$Y = 1299.5 - 0.25Y + 250$$

$$Y + 0.25Y = 1549.5$$

$$Y(1 + 0.25) = 1549.5$$

$$Y = \frac{1}{1.25}(1549.5)$$

$$Y^* = 1239.6$$

For equilibrium i^*, we can substitute equilibrium value of Y into equation 6

$$i^* = 0.0025\,Y - 2.5$$
$$i^* = 0.0025\,(1239.6) - 2.5$$
$$= 3.099 - 2.5$$
$$i^* = 0.599.$$

Instead of this long process, you can simply use the equations for equilibrium income and interest rate.

For example,

$$\boxed{Y^* = \alpha_G \left[\bar{A} - \frac{d}{h}\left(kY - \frac{\bar{M}}{\bar{P}}\right)\right]} \quad \text{— (7)}$$

$$Y^* = 2.5\left[519.8 - \frac{40}{100}(0.25Y - 250)\right]$$

$$Y = 2.5\left[519.8 - .4\,(0.25Y - 250)\right]$$

$$Y = 2.5\left[519.8 - 0.1Y + 100\right]$$

$$Y = 1299.5 - 0.25Y + 250$$

$$Y + 0.25Y = 1549.5$$

$$\boxed{Y^* = 1239.6}$$

Similarly Equilibrium equation for i.

$$\boxed{i^* = \frac{1}{h}\left[K(\alpha_G(\bar{A} - di)) - \frac{\bar{M}}{\bar{P}}\right]} \quad \text{— (8)}$$

$$i = \frac{1}{100}\left[0.25(2.5(519.8 - 40i)) - 250\right]$$

$$= \frac{1}{100}\left[.25(1299.5 - 100i) - 250\right]$$

$$= \frac{1}{100}\left[324.875 - 25i - 250\right]$$

$$= 3.24875 - .25i - 2.50$$

$$i + 0.25i = 0.74875$$

$$i = \frac{1}{1.25}(0.74875) = 0.599$$

(iii) What is level of consumption at equilibrium

$$C = a + b(Y - tY)$$

$$C = 100 + 0.8(1239.6 - 0.25(1239.6))$$

$$= 100 + 0.8(1239.6 - 309.9)$$

$$= 100 + 991.68 - 247.92$$

$$C = 843.76$$

→ What is money demand at equilibrium.

$$M^d = 0.25Y - 100i$$

$$= 0.25(1239.6) - 100(0.599)$$
$$= 309.9 - 59.9$$
$$= 250$$

At equilibrium M^d is equal to supply of money.

Q. 4-B.

$C = 50 + 0.8Y_d$; $t = 0.20$; $G = 200$
$I = 70 - 20i$, $T = 50$; $M/P = 100$
$M^d = 0.2Y - 50i$

(i) Equations describe the IS and LM curves.

IS equation.

$$\boxed{Y = \alpha_G(\bar{A} - di)} \quad \text{——— (9)}$$

$$Y = \frac{1}{1-0.8(1-0.2)}(50 - .8(50) + 200 + 70 - 20i)$$

$$Y = 2.78(280 - 20i)$$

IS equation → $\boxed{Y = 2.78(280 - 20i)}$ → (10)

LM equation.

$$i = \frac{1}{h}(ky - \frac{\bar{m}}{p})$$

LM equation → $$\boxed{i = \frac{1}{50}(0.2Y - 100)} \quad \text{——} (11)$$

(ii) Determine equilibrium level of income.

For this substitute equation 11 into 10.

$$Y = 2.75\left(280 - 20\left[\frac{1}{50}(0.2Y - 100)\right]\right)$$

$$= 2.75\left(280 - 20[0.004Y - 2]\right)$$

$$= 2.75\left(280 - 0.08Y + 40\right)$$

$$= 770.4 - 0.222Y + 111.2$$

$$Y + 0.222Y = 809.6$$

$$Y = \frac{1}{1.222}(809.6)$$

$$Y^* = 728$$

→ equilibrium interest rate

For this you can substitute value of equilibrium income in LM equation 11.

$$i^* = \frac{1}{50}(0.2(728) - 100)$$

$$= \frac{1}{50}(145.6 - 100)$$

$$= 2.912 - 2$$

$$i^* = 0.912$$

(iii) Determine the value of money policy multiplier.

Recall equation 11, 4 from previous draft

$$\frac{\Delta Y}{\Delta(\bar{M}/P)} = \frac{d}{h}$$

$$= \frac{d\,dG}{h + Kd\,dG}$$

$$= \frac{20(2.78)}{50 + 0.2(20)(2.78)}$$

$$= \frac{55.6}{50 + 11.12}$$

$$= \frac{55.6}{61.12} = 0.909.$$

→ Fiscal Policy multiplier.

$$\frac{\Delta Y}{\Delta G} = \gamma = \frac{h \alpha_G}{h + K d \alpha_G}$$

$$= \frac{50\,(2.78)}{50 + (0.2)(20)(2.78)}$$

$$= \frac{139}{61.12}$$

$$= 2.27$$

Thus, fiscal policy multiplier is smaller than simple govt exp. multiplier.