Chapter 10: Goods Market and IS / LM Model

Consider the IS / LM model.
Consumption function:

$$C = 200 + 0.25(Y - T) \tag{1}$$

Investment function:

$$I = 150 + 0.25Y - 1000i \tag{2}$$

Fiscal policy:

$$G = 250 \tag{3}$$

$$T = 200 \tag{4}$$

Real money demand:

$$(\frac{M}{P})^d = 2Y - 8000i \tag{5}$$

Real money supply:

$$\frac{M}{P} = 1600 \tag{6}$$

Given the information above, please answer the following questions:

a) Derive the IS curve.

Use the market-clearing condition for the goods market. Alternatively, this is just the GDP accounting equation (expenditure approach).

$$AE = C + I + G = Y$$

We want to graph the IS curve in i versus Y space, so write i as a function of Y.

$$200 + 0.25(Y - T) + 150 + 0.25Y - 1000i + 250 = Y$$

$$1000i = 600 + 0.5Y - 0.25(200) - Y = 550 - 0.5Y$$

$$i = 0.55 - \frac{1}{2000}Y$$

b) Derive the LM curve.

Use the market-clearing condition for the money market.

$$(\frac{M}{P})^d = \frac{M}{P}$$

We want to graph the LM curve in i versus Y space, so write i as a function of Y.

$$2Y - 8000i = 1600$$

$$8000i = 2Y - 1600$$

$$i = \frac{1}{4000}Y - 0.2$$

c) Solve for Y^*.

For (c) and (d), solve for the intersection point (i^*, Y^*) of the IS and LM curves.

$$0.55 - \frac{1}{2000}Y^* = \frac{1}{4000}Y^* - 0.2$$

$$\frac{3}{4000}Y = 0.75$$

$$Y^* = 1000$$

d) Solve for i^*.

$$i^* = 0.55 - \frac{1}{2000}Y^* = 0.55 - \frac{1}{2000}(1000) = 0.55 - 0.5 = 0.05 = 5\%$$

e) Solve for C^*, I^*.

$$C^* = 200 + 0.25(Y^* - T) = 200 + 0.25(1000 - 200) = 400$$

$$I^* = 150 + 0.25Y^* - 1000i^* = 150 + 0.25(1000) - 1000(0.05) = 150 + 250 - 50 = 350$$

f) Let $\frac{M}{P} = 1840$ ($\frac{M}{P} \uparrow$); repeat parts (a) through (e). Comment on the direction of movement for equilibrium variables relative to the initial case $\frac{M}{P} = 1600$.

IS curve:

$$i = 0.55 - \frac{1}{2000}Y$$

LM curve:

$$(\frac{M}{P})^d = \frac{M}{P}$$

$$2Y - 8000i = 1840$$

$$i = \frac{1}{4000}Y - 0.23$$

This equation is consistent with the LM curve shifting to the right (down).
Equilibrium:

$$0.55 - \frac{1}{2000}Y^* = \frac{1}{4000}Y^* - 0.23$$

$$\frac{3}{4000}Y = 0.78$$

$$Y^* = 1040$$

$$i^* = 0.55 - \frac{1}{2000}Y^* = 0.55 - \frac{1}{2000}(1040) = 0.55 - 0.52 = 0.03 = 3\%$$

$$C^* = 200 + 0.25(Y^* - T) = 200 + 0.25(840) = 410$$

$$I^* = 150 + 0.25Y^* - 1000i^* = 150 + 0.25(1040) - 1000(0.03) = 150 + 260 - 30 = 380$$

Direction of movement of equilibrium quantities: $Y^* \uparrow$, $i^* \downarrow$, $C^* \uparrow$, $I^* \uparrow$.

g) Let $\frac{M}{P} = 1600$, $G = 400$ ($G \uparrow$); repeat parts (a) through (e). Comment on the direction of movement for equilibrium variables relative to the initial case $G = 250$.

IS curve:

$$AE = C + I + G = Y$$

$$200 + 0.25(Y - T) + 150 + 0.25Y - 1000i + 400 = Y$$

$$1000i = 750 + 0.5Y - 0.25(200) - Y = 700 - 0.5Y$$

$$i = 0.7 - \frac{1}{2000}Y$$

This equation is consistent with the IS curve shifting to the right (up).
LM curve:

$$i = \frac{1}{4000}Y - 0.2$$

Equilibrium:

$$0.7 - \frac{1}{2000}Y^* = \frac{1}{4000}Y^* - 0.2$$

$$\frac{3}{4000}Y = 0.9$$

$$Y^* = 1200$$

$$i^* = 0.7 - \frac{1}{2000}Y^* = 0.7 - \frac{1}{2000}(1200) = 0.7 - 0.6 = 0.10 = 10\%$$

$$C^* = 200 + 0.25(Y^* - T) = 200 + 0.25(1000) = 450$$

$$I^* = 150 + 0.25Y^* - 1000i^* = 150 + 0.25(1200) - 1000(0.10) = 150 + 300 - 100 = 350$$

Direction of movement of equilibrium quantities: $Y^* \uparrow$, $i^* \uparrow$, $C^* \uparrow$, I^* *unchanged.*