

Course in Macroeconomics and Global Economics
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Practice 3

Exercise 1

1. • **IS:** $Y = C(Y_D) + I(Y, i) + G \longrightarrow Y = [c_0 + c_1(Y_D)] + [I + d_1Y - d_2i] + G$
 $Y = (400 + 0.25Y_D) + (300 + 0.25Y - 1500i) + 600$
 $Y = [400 + 0.25(Y - T)] + (300 + 0.25Y - 1500i) + 600$
 $Y = 400 + 0.25Y - 100 + 300 + 0.25Y - 1500i + 600$
 $Y = \frac{1}{1-0.25-0.25}(400 + 300 + 600 - 100) - \frac{1500}{1-0.25-0.25}i$

$$Y = 2400 - 3000i$$

We know that:

$\rightarrow (400 + 300 + 600 - 100)$ is $(c_0 + I + G + c_1T)$ and represents the autonomous spending. Its variation moves the IS curve horizontally.

$\rightarrow \frac{1}{1-0.25-0.25}$ is $\frac{1}{1-c_1-d_1}$ and represents the multiplier of autonomous demand in the case where investment and not only consumption depends on income. It gives the size of displacement of IS curve.

$\rightarrow \frac{1500}{1-0.25-0.25}$ is $\frac{d_2}{1-c_1-d_1}$ where d_2 is the sensitivity of investment demand to the interest rate. If d_2 is high and multiplier $\frac{1}{1-c_1-d_1}$ is large the IS curve is flat; if d_2 is small and multiplier is low, the IS curve will have a greater slope.

• **LM:** $\frac{M}{P} = YL(i)$
 $3000 = 2Y - 12000i$

2. We substitute the expression for Y from the *IS* relation into the *LM* relation to find the corresponding value for i :

$$3000 = 2 * (2400 - 3000i) - 12000i$$

$$3000 = 4800 - 6000i - 12000i$$

$$1800 = 18000i \longrightarrow i = 0.10$$

- 3.
- $Y = 2400 - 3000 * 0.1 \rightarrow Y = 2100$
 - $C = 400 + 0.25Y_D$
 $C = 400 + 0.25(Y - T)$
 $C = 400 + 0.25(2100 - 400) \rightarrow C = 825$
 - $I = 300 + 0.25Y - 1500i$
 $I = 300 + 0.25 * 2100 - 1500 * 0.1 \rightarrow I = 675$

4. **LM:** $4320 = 2Y - 12000i$

- $2(2400 - 3000i) - 12,000i = 4,320$
 $4800 - 6000i - 12000i = 4,320$
 $18000i = 4800 - 4320$
 $i = \frac{480}{18000} \rightarrow i = 0.027$

- $Y = 2400 - 3000(0.027) = 2319$
- $I = 300 + 0.25Y - 1500i$
 $I = 300 + 0.25 * 2319 - 1500 * 0.027$
 $I = 300 + 579.75 - 40.5 = 839.25$

- $C = 400 + 0.25Y_D$
 $C = 400 + 0.25(Y - T)$
 $C = 400 + 0.25(2319 - 400)$
 $C = 400 + 479.75 = 879.75$

- The monetary expansion takes the form of an increase in the money supply. This has the effect of shifting the LM Curve. The new equilibrium gives us a lower interest rate (2.7%, compared to 10% in point 3) and a higher level of output (2320, compared to 2100 in point 2). Consumption rises from 825 to 880 and Investment rises from 675 in to 839.25.

In other words, an increase in money supply creates downward pressure on the interest rate (as people have to increase their demand for money in order to meet the increased supply), which in turn stimulates investment. As a result, Y increases and i decreases.

5. **IS:** $Y = (400 + 0.25Y_D) + (300 + 0.25Y - 1,500i) + 840$
 $Y = [400 + 0.25(Y - 400)] + (300 + 0.25Y - 1,500i) + 840$
 $Y = (400 + 0.25Y - 100) + (300 + 0.25Y - 1,500i) + 840$
 $Y - 0.25Y - 0.25Y = 1,440 - 1,500i$
 $Y - 0.5Y = 1,440 - 1,500i$
 $(1 - 0.5)Y = 1,440 - 1,500i$
 $Y = \frac{1}{1-0.5}(1440 - 1,500i)$

$$Y = 2880 - 3000i$$

$$3000 = 2(2880 - 3000i) - 12000i$$

$$3000 = 5760 - 18000i$$

$$i = \frac{2760}{18000} \longrightarrow i = 0.1533$$

- $Y = 2880 - 3000 * 0.1533 \longrightarrow Y = 2420.1$
- $C = 400 + 0.25Y_D$
 $C = 400 + 0.25(Y - T)$
 $C = 400 + 0.25(2420.1 - 400)$
 $C = 400 + 505.025 \longrightarrow C = 905.025$
- The fiscal expansion takes the form of an increase in government spending (G). This has the effect of shifting the IS Curve up and to the right. The new equilibrium gives us a higher level of output (2420, compared to 2100 in point2) and a higher interest rate (15.33%, compared to 10% in point3). Consumption rises from 825 to 905.
 In other words an increase of Y , pushes consumption up (the *multiplier* effect). In the money market, a higher Y increases M^d . Since M^s does not change, i increases. As a result, both Y and i increase.

Exercise 2

1.
 - **IS:** $Y = 40 + 0.25(Y - 40) + 30 + 0.25Y - 300i + 60$
 $Y - 0.25Y - 0.25Y = 40 - 10 + 30 - 300i + 60$
 $Y = 2(120 - 300i)$
 $Y = 240 - 600i$
 - **LM:** $Y = 150 + 300i$

2. $240 - 600i = 150 + 300i$
 $900i = 90 \longrightarrow i = 0.1$

3. $Y = 240 - 600 * 0.1 \longrightarrow Y = 180$
 $C = 40 + 0.25(180 - 40) \longrightarrow C = 75$
 $I = 30 + 0.25 * 180 - 300 * 0.1 \longrightarrow I = 45$

4. **LM:** $195 = Y - 300i$
 - $195 = 240 - 600i - 300i$
 $900i = 45 \longrightarrow i = 0.05$
 - $Y = 240 - 600 * 0.05 \longrightarrow Y = 210$
 - $C = 40 + 0.25(210 - 40) \longrightarrow C = 82.5$
 - $I = 30 + 0.25 * 210 - 300 * 0.05 = 67.5$

5. **IS:** $Y = 40 + 0.25(Y - 40) + 30 + 0.25Y - 300i + 105$
 $Y = \frac{1}{0.5}(165 - 300i)$
 $Y = 330 - 600i$

LM: $150 = Y - 300i$
 $Y = 150 + 300i$

- $330 - 600i = 150 + 300i \rightarrow i = 0.2$

- $Y = 330 - 600 * 0.2 \rightarrow Y = 210$

- $C = 40 + 0.25(210 - 40) \rightarrow C = 82.5$

- $I = 30 + 0.25 * 210 - 300 * 0.2 \rightarrow I = 22.5$

- The fiscal expansion takes the form of an increase in government spending ($G'=105$ compared to $G=60$ in point 1). This has the effect of shifting the IS Curve up and to the right. The new equilibrium gives us a higher level of output (210, compared to 180 in point 3). In the money market, a higher Y increases M^d . Since M^s does not change but i increases (20%, compared to 10% in point 2). As a result, Y , i and C increase and investment I decreases (22.5 compared to 45 in point 3). The variation of output Y is: $\Delta Y = 30$ is smaller than the variation of public spending that is: $\Delta G = 45$, because the higher interest rate reduced the multiplier effect of public spending. this implies a decrease of investment due to an increase of i .

- Comparing the results of this point 5 (variation of G) with the results of point 4 (variation of M/P) we have:

point 4) $Y = 210, C = 82.5, I = 67.5$ and $i = 0.05$

point 5) $Y = 210, C = 82.5, I = 22.5$ and $i = 0.2$

We observe the same results for Y and C , but higher interest rate i and lower investment I .

6. • $Y = 40 + 0.25(Y - 85) + 30 + 0.25Y - 300i + 105$
 $Y = \frac{1}{0.5}(153.75 - 300i)$

$Y = 307.5 - 600i$

$307.5 - 600i = 150 + 300i \rightarrow i = 0.175$

$Y = 307.5 - 600 * 0.175 \rightarrow Y = 202.5$

$$C = 40 + 0.25(202.5 - 85) \longrightarrow C = 69.375$$

$$I = 30 + 0.25 * 202.5 - 300 * 0.175 \longrightarrow I = 28.125$$

- The variation of output is $\Delta Y = 22.5$ is smaller than the variation of public spending that is: $\Delta G = 45$ (that it is equal to the variation of taxes $\Delta T = 45$) this implies a decrease of investment due to an increase of i .
- Comparing the results of this point 6 (variation of G and T) with the results of point 5 (variation of G) we have:
point 5) $Y = 210, C = 82.5, I = 22.5$ and $i = 0.2$
point 6) $Y = 202.5, C = 69.375, I = 28.125$ and $i = 0.175$
we observe a decrease of Y, C and i but an increase of I .