Income-expenditure model

1. Suppose
$$C = 2000 + 0.8Y_d$$
$$I = 1000$$
Calculate the equilibrium income.
2. Calculate the consumption.
3. We add the public sector:
$$G = 500, \quad T_r = 300, \quad T_x = 200, \quad t = 0.1$$
What is the government spending multiplier?
4. Calculate the equilibrium income and the fiscal surplus.
5. Suppose we want to balance the public accounts: By how much should G be increased or decreased to achieve a fiscal surplus of zero?
6. Using the results from the previous parts, calculate the increase in income with the multiplier and verify that it is equal to the increase in income found:
7. We add the external sector:
$$X = 500, \quad M = 200 + 0.1Y$$
Calculate the equilibrium Y.
8. What is the balance of trade?

Solution

1. $$Y = C + I$$
$$Y = 2000 + 0.8Y + 1000 = 0.8Y + 3000$$
Solving for Y:
$$Y = 15000$$

2. $$C = 2000 + 0.8 \times 15000 = 14000$$

3. $$k = \frac{1}{1 - b + c \cdot t} = \frac{1}{1 - 0.8 + 0.8 \cdot 0.1} = \frac{1}{0.28}$$

4. $$Y = C + I + G = 2000 + 0.8 * (Y + T_r - T_x - tY) + 500$$
Solving for Y:
$$Y \approx 12785.71$$
Calculating the fiscal surplus:
$$FS = T_x + t \cdot Y - T_r - G = 678.57$$

5. $$FS = 0$$
$$T_x + t \cdot Y - T_r = G$$
Replacing in the formula:
$$Y = C + I + G = 2000 + 0.8 * (Y + T_r - T_x - tY) + T_x + t \cdot Y - T_r$$
Solving for Y:
$$Y = 16555.556$$
Finding G:
$$T_x + t \cdot Y - T_r = G = 1555.5556$$
Therefore, it should be increased by:
$$1555.5556 - 500 = 1055.555$$

6. The increase in income resulted in an income of 16555.556 from a previous income of 12785.71. With the multiplier:
$$\frac{1}{0.28} \cdot 1055.55555 + 12785.71 = 16555.556$$

7.

$$Y = I + C + G + X - M$$

$$Y = 1000 + 2000 + 0.8\,(Y + 300 - 200 - 0.1 \cdot Y) + 500 + 500 - 200 - 0.1Y$$

Solving for Y:

$$Y = 10210.526$$

8.

$$X - M = 500 - 200 - 0.1 \cdot 10210.526 = -721.0526$$