

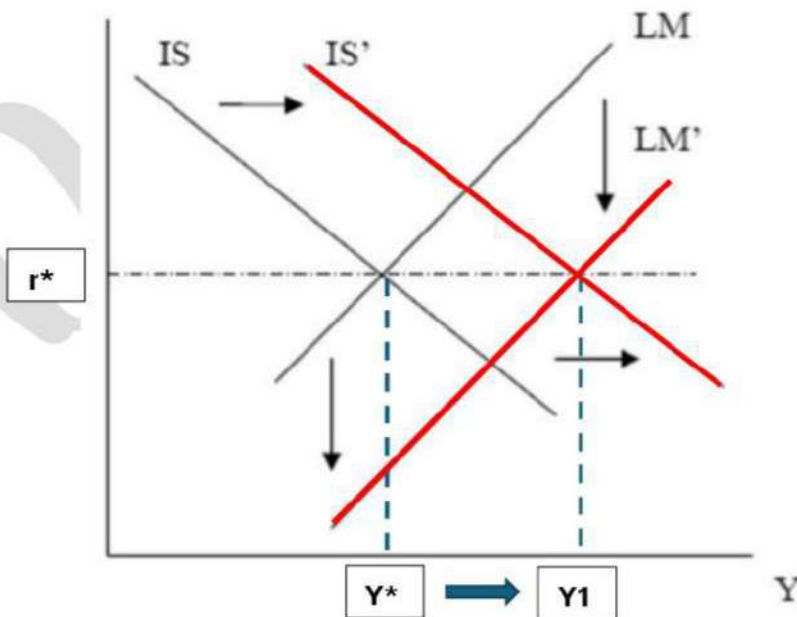
## Lecture 6

### Using a Policy Mix

- The combination of monetary and fiscal policies is known as the monetary-fiscal policy mix, or simply, the policy mix.
- Question: Assume the economy starts at an equilibrium  $(Y^*, r^*)$ . Suggest a policy mix to achieve the following objectives:  
**Increase output ( $Y$ ) while keeping interest rate ( $r$ ) constant.**

**Answer:**

- ⇒ The right mix is an expansionary fiscal policy (increasing  $G$  or decreasing  $T$ ) combined with an expansionary monetary policy.
- ⇒ Both expansionary fiscal policy and expansionary monetary policy leads to higher output (certain effect)
- ⇒ expansionary fiscal policy will lead to increasing interest rate & expansionary monetary policy will lead to decreasing interest rate (uncertain effect)
- ⇒ According to government policy, the final effect **can** be keeping interest rate constant.



## OPEN ECONOMY

→ In open economy: There are four sectors (the participants in the economy):

- 1-household sector,
- 2-business sector,
- 3-government sector and,
- 4- the rest of the world.

→ An open economy interacts with other countries. It buys and sells goods and services in world product markets.

➤ **Exports** are goods and services that are produced domestically and sold abroad. It depend on spending decisions made by foreigners that purchase domestic goods and service. **Exports will not change as a result of change in GDP (Y).**

➤ **Imports** are goods and services that are produced abroad and sold domestically. depend on the spending decisions of domestic buyers. Imports rise with the increase in Y.

▪ **Net exports (NX)** are the value of a nation's exports minus the value of its imports.

**Note:** If  $X > M \rightarrow$  Trade surplus

If  $X < M \rightarrow$  Trade deficit

If  $X = M \rightarrow$  Trade balance



**Problem:**

$$C = 60 + 0.8 Y_d \quad G = 124 \quad T = 15 \quad I = 100 - 5r$$

$$X = 70 \quad M = 12 + 0.2 Y$$

$$\text{Real Money Supply} = (M/P) = MS = 200$$

$$MD = Y - 25r$$

- 1) Derive the IS equation
- 2) Derive the LM equation
- 3) Calculate equilibrium level of interest rate
- 4) Calculate equilibrium level of income
- 5) Calculate net exports at equilibrium level of income

**Solution**

(1) Equilibrium condition in goods market:  $Y = C + I + G + NX$

$$Y = 60 + 0.8(Y - 15) + 100 - 5r + 124 + 70 - 12 - 0.2Y$$

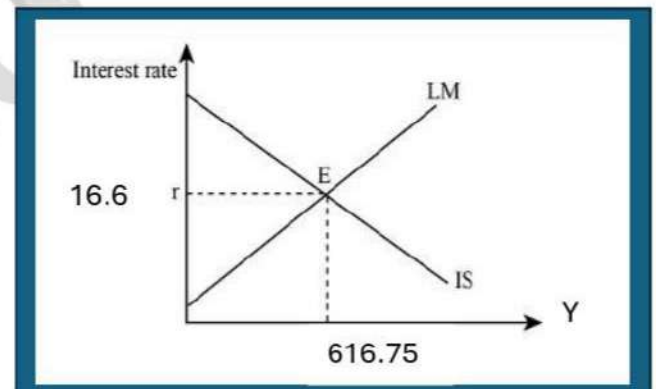
$$Y = 342 + 0.8Y - 12 - 5r - 0.2Y$$

$$Y = 330 + 0.8Y - 5r - 0.2Y$$

$$Y - 0.8Y + 0.2Y = 330 - 5r$$

$$0.4Y = 330 - 5r \quad \text{divided by 0.4}$$

$$Y = 825 - 12.5r \quad \rightarrow \quad \text{IS equation}$$



(2) Equilibrium in money market

$$MD = MS$$

$$Y - 25r = 200$$

$$Y = 200 + 25r \quad \rightarrow \quad \text{LM equation}$$

(3) At equilibrium: IS equation = LM equation

$$825 - 12.5r = 200 + 25r$$

$$625 = 37.5r$$

$$r = 16.67$$

(4) Substitute  $r$  in IS or LM equation:  $Y = 200 + 25(16.67)$

$$Y = 616.75$$

(5) At equilibrium:  $NX = X - M = 70 - [12 + 0.2(616.75)]$

$$= 70 - [12 + 123.35] = 70 - 135.35 = -65.3 \rightarrow \text{Trade deficit}$$

## Second: Review Problems

### Problem 1

Assume that the Savings function is given by  $S = -200 + 0.25 Y_d$

Planned investment is 100; government purchases and taxes are both 100.

- Calculate the aggregate expenditure function
- What is the equilibrium level of income?
- If government purchases increase to 25, what is the new equilibrium income? show graphically
- What level of government purchases is needed to achieve an income of 1,600?

### Solution

- From the saving function, we can get the consumption function

$$C = 200 + 0.75 Y_d$$

$$AE = C + I + G$$

$$= 200 + 0.75(Y - 100) + 100 + 100$$

$$AE = 325 + 0.75Y$$

- $AE = Y$ ;

$$Y = 325 + 0.75Y$$

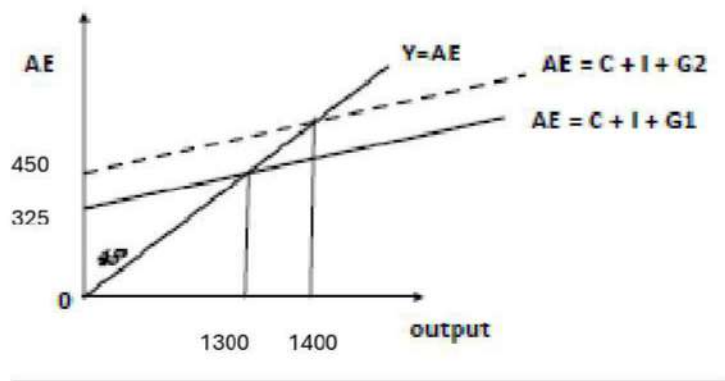
$$Y = 1,300$$

- This effect can be solved using the multiplier.

$$\Delta Y = \frac{1}{1 - 0.75} \Delta G$$

$$\Delta Y = 4 * 25 = 100$$

$$\therefore Y' = Y + \Delta Y = 1,300 + 100 = \boxed{1,400}$$



d) 
$$Y = 200 + 0.75(Y - 100) + 100 + G$$
$$1,600 = 200 + 0.75(1,600 - 100) + 100 + G$$
$$\boxed{G = 175}$$

### Problem 2

Given: Real money demand  $\mathbf{RMD} = Y - 100r$

$$\mathbf{MS} = 1000 \quad \mathbf{P} = 2$$

$$\bar{G} = \bar{T} = 100$$

$$C = 200 + 0.75(Y - T)$$

$$I = 200 - 25r$$

- Find the equilibrium interest rate and the equilibrium level of income  $Y$
- Suppose the government purchases are increased by 50. What are the new equilibrium  $r$  and  $Y$ ?
- Calculate the horizontal shift in IS curve

### Solution

#### a. IS equation

$$Y = C + I + G = 200 + 0.75(Y - 100) + 200 - 25r + 100$$

$$Y(1 - 0.75) = 425 - 25r$$

$$0.25 Y = 425 - 25r$$

$$Y = 1700 - 100r \rightarrow \text{IS equation}$$

LM equation:  $RMS = RMD$

$$500 = Y - 100r$$

$$Y = 500 + 100r \rightarrow \text{LM equation}$$

**NOTE:** Real MS =  $MS/P = 1000/2 = 500$

To find equilibrium

$$1700 - 100r = 500 + 100r$$

$$1200 = 200r \rightarrow r = 6$$

$$Y = 500 + 100(6) \rightarrow Y = 1,100$$

b.

NEW IS equation:

$$Y = C + I + G$$

$$Y = 200 + 0.75(Y - 100) + 200 - 25r + 150$$

$$Y = 550 - 75 + 0.75Y - 25r$$

$$0.25Y = 475 - 25r$$

$$Y = 1900 - 100r$$

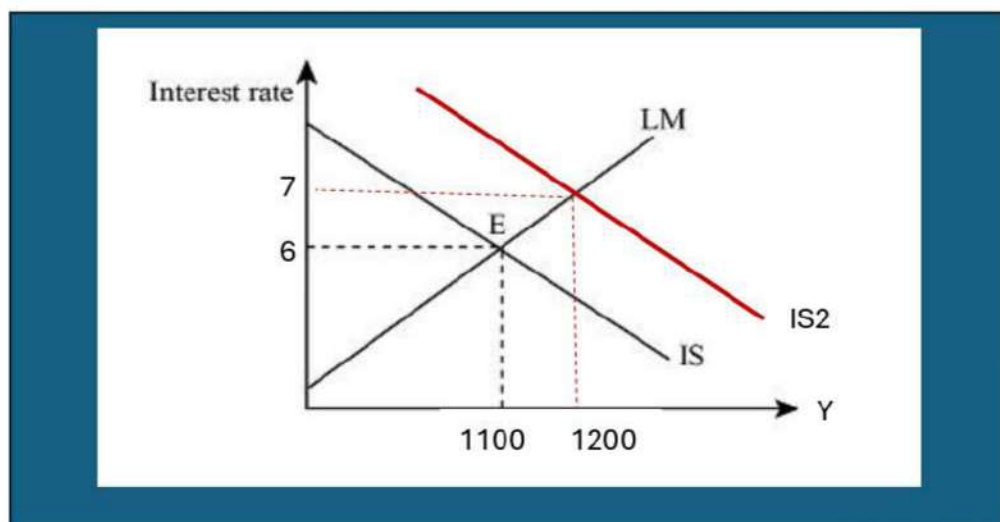
New Equilibrium:

$$1900 - 100r = 500 + 100r$$

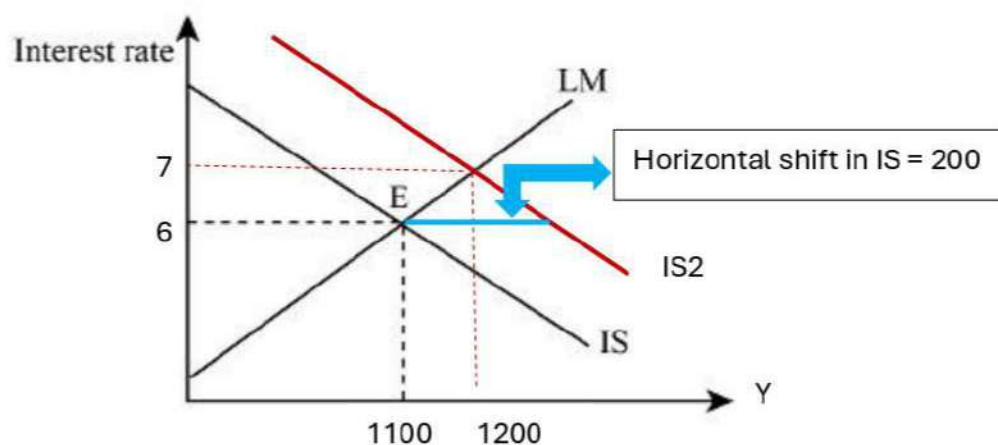
$$200r = 1400 \rightarrow r = 7$$

$$Y = 1900 - 100(7) \rightarrow Y = 1200$$

**Both  $r$  &  $Y$  increase because of expansionary fiscal policy**



c. Horizontal shift in IS =  $\{ 1/(1-b) \} * \Delta G = 4 * 50 = 200$



**NOTE**

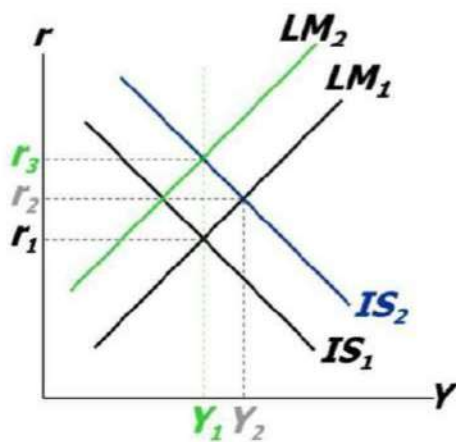
The horizontal shift in the IS curve is greater than the final change in output because of the crowding out effect.

### Question 3

Assume that the economy starts at equilibrium  $Y_1$

Suggest the *policy mix* that would increase the level of interest rate ( $r$ ) & Keep output level  $Y$  constant

**Solution:** expansionary fiscal policy & contractionary monetary policy



### Question 4:

Given

$$C = 160 + 0.6Y_D$$

$$I = 150$$

$$G = 110$$

$$T = 100$$

Calculate

- Public savings
- Private savings at equilibrium income (at equilibrium income)
- National Savings (at equilibrium income)

### Solution

a. Public savings =  $T - G = 100 - 110 = -10 \rightarrow$  **Budget deficit**

b. First calculate equilibrium income & consumption:

$$Y = 160 + 0.6(Y - 100) + 110 + 150$$

$$0.4Y = 160 + 110 + 150 - 60 = 360$$

$$Y = 900$$

$$C = 160 + 0.6Y_D = 160 + 0.6(900 - 100) = 640$$

$$S = Y - T - C = 900 - 100 - 640 = 160$$

Another way to calculate private savings

$$S = -160 + 0.4(Y - T)$$

$$= -160 + 0.4(900 - 100)$$

$$= -160 + 320$$

$$S = 160$$

c. National savings = Private savings + public savings =  $160 - 10 = 150$



*'I find that the harder I work, the more luck I seem to have.'*

Thomas Jefferson

♥ Good Luck

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