

# IS-LM Model

## Part 2

# EXTRA – Say’s Law

- Jean-Baptiste Say: “...as the value we can buy is equal to the value we can produce, the more men can produce, the more they will purchase.”
- **Say's law** states that “**supply creates its own demand**”.
- It also gives rise to **supply-side economics**, which is about boosting Aggregate Supply to boost the economy.
- Both Say’s law and supply-side economics are cornerstones of **Classical Economics**.
- Supply-side policies: lower producers’ tax, decrease regulation, promote R&D, subsidize production.

# EXTRA

## Demand-side vs Supply-side

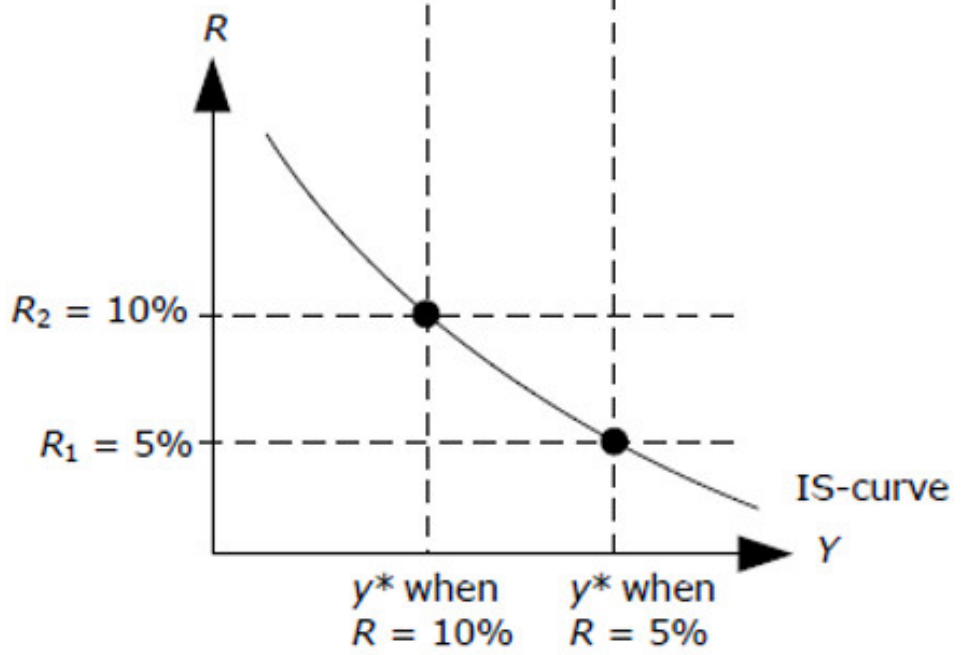
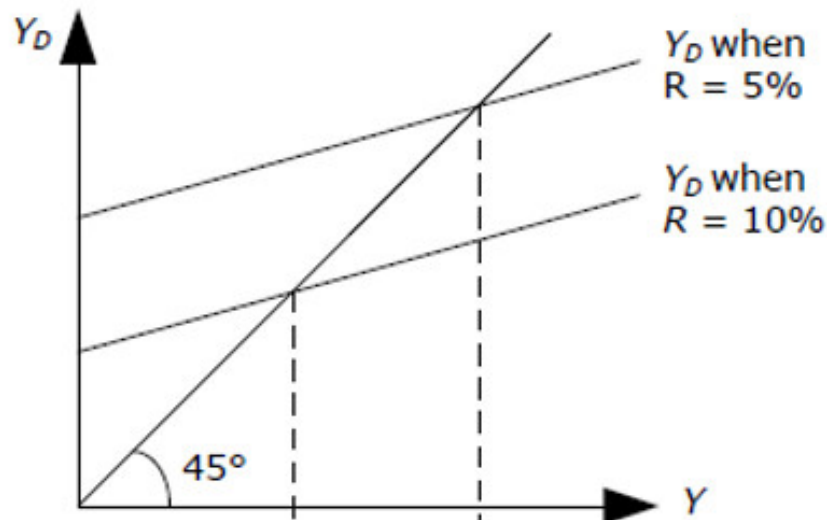
- In Keynesian Economics, Say's law no longer applies.
- **Keynes' law: "demand creates its own supply"**.
- You can see this concept in Keynesian Cross:
  - first, we find AE which represents aggregate demand;
  - then, we set  $Y = AE$ , meaning that we produce what we demand.
- So, Keynesian is demand-side economics, which is about boosting Aggregate Demand to boost the economy.
- Demand-side policies: lower consumers' tax, increase government spending, lower interest rate.
- Thus, expansionary Fiscal and Monetary policies are demand-side policies, aiming to boost aggregate demand.

# EXTRA – Inverse Say's Law

- **Inverse Say's law** states that  
“**lack of demand creates lack of supply**”.

# Movement along the IS curve

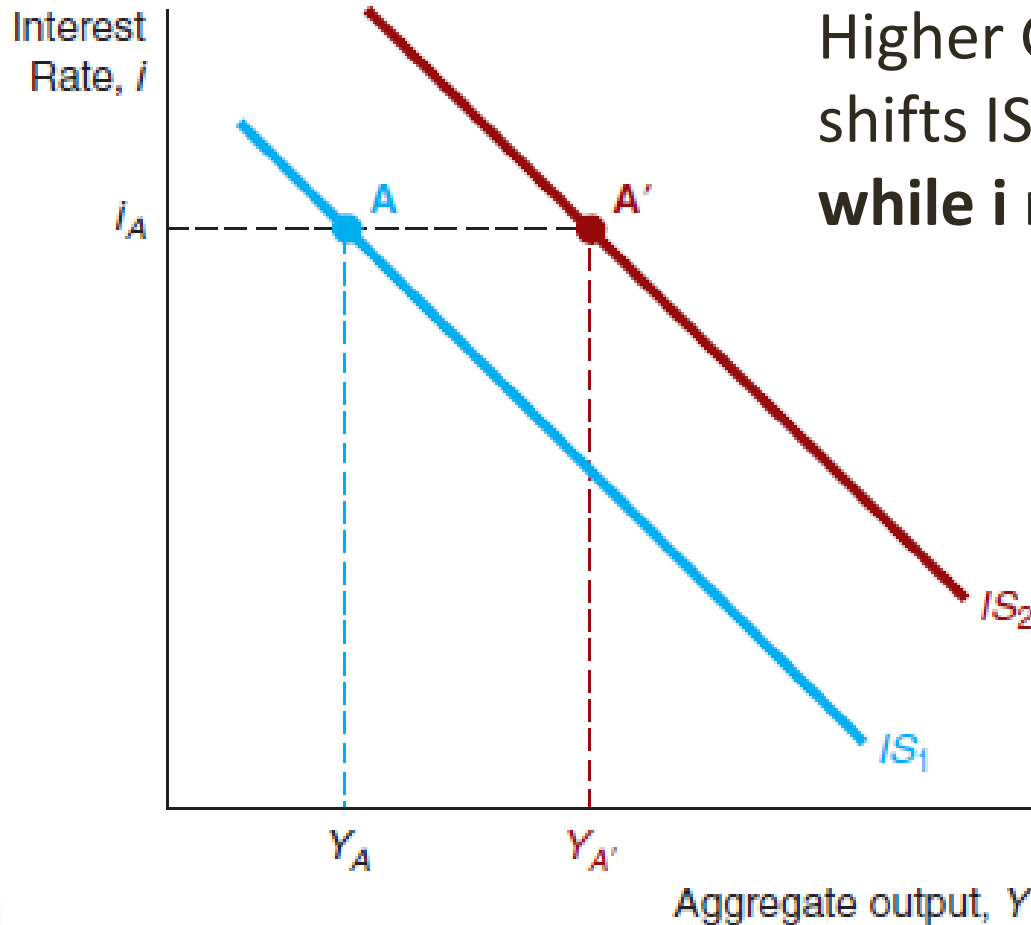
- IS equation:  $Y = C(Y - T) + I(i) + G$
- Movement along the curve is due to the change in  $i$ , **while keeping  $G$  and  $T$  constant.**
- Higher interest rate discourages investors.
- As a result, investment falls, and output falls.
- $i \uparrow \gg I \downarrow \gg AE \downarrow \gg Y \downarrow$  (negative relationship)
- However, when  $G$  or  $T$  changes, we have shift in IS curve.



# Shift in the IS curve

- Shift in the curve is due to the change in  $G$  or  $T$ , while **keeping  $i$  constant.**
- When the government increases its spending, this increases demand in the economy. Production increases to match the higher demand.
- $G \uparrow \gg AE \uparrow \gg Y \uparrow$  (higher  $G \gg$  IS shifts to the right)
- When the government lowers net taxes, this increases demand in the economy. Production increases to match the higher demand.
- $T \downarrow \gg AE \uparrow \gg Y \uparrow$  (lower  $T \gg$  IS shifts to the right)

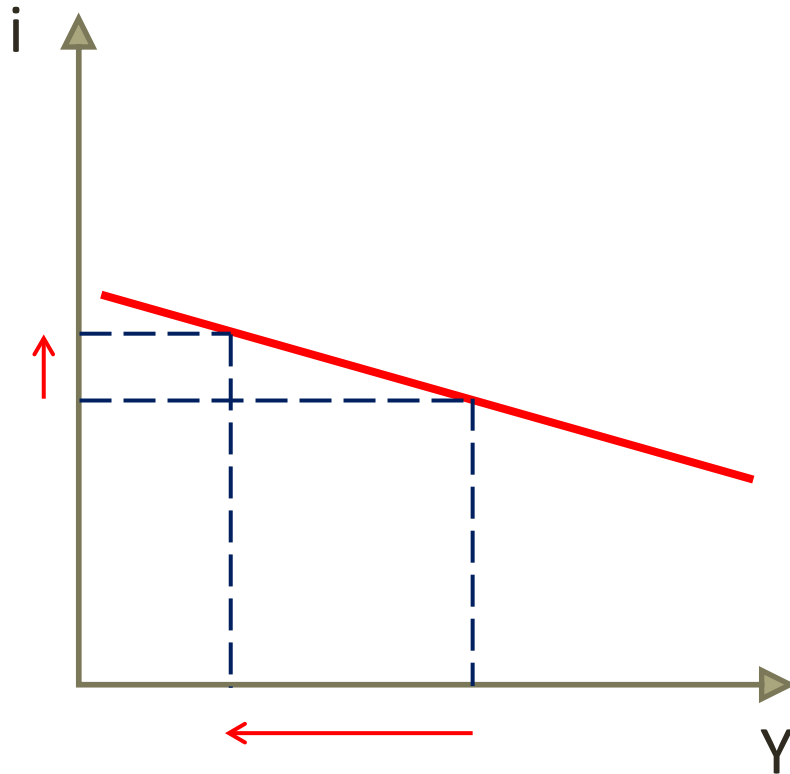
# Shift in the IS curve



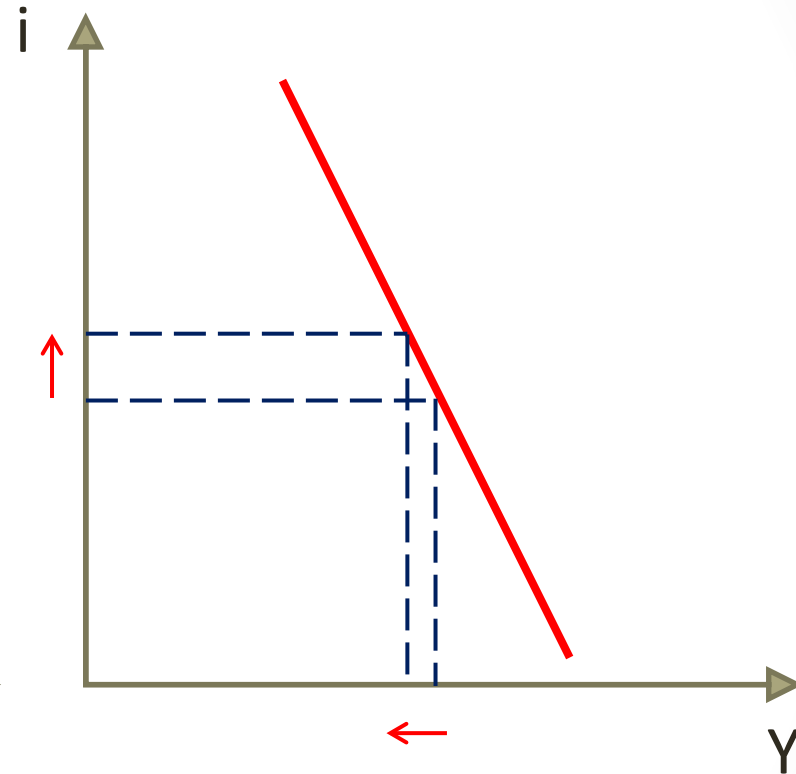
Higher  $G$  or Lower  $T$  shifts IS curve to the right, while  $i$  remains the same.

(a) Shift of the IS curve

# Slope of the IS curve



An increase in  $i$  causes  
large reduction in  $Y$   
>> FLAT IS curve



An increase in  $i$  causes  
small reduction in  $Y$   
>> Steep IS curve

# Slope of the IS curve

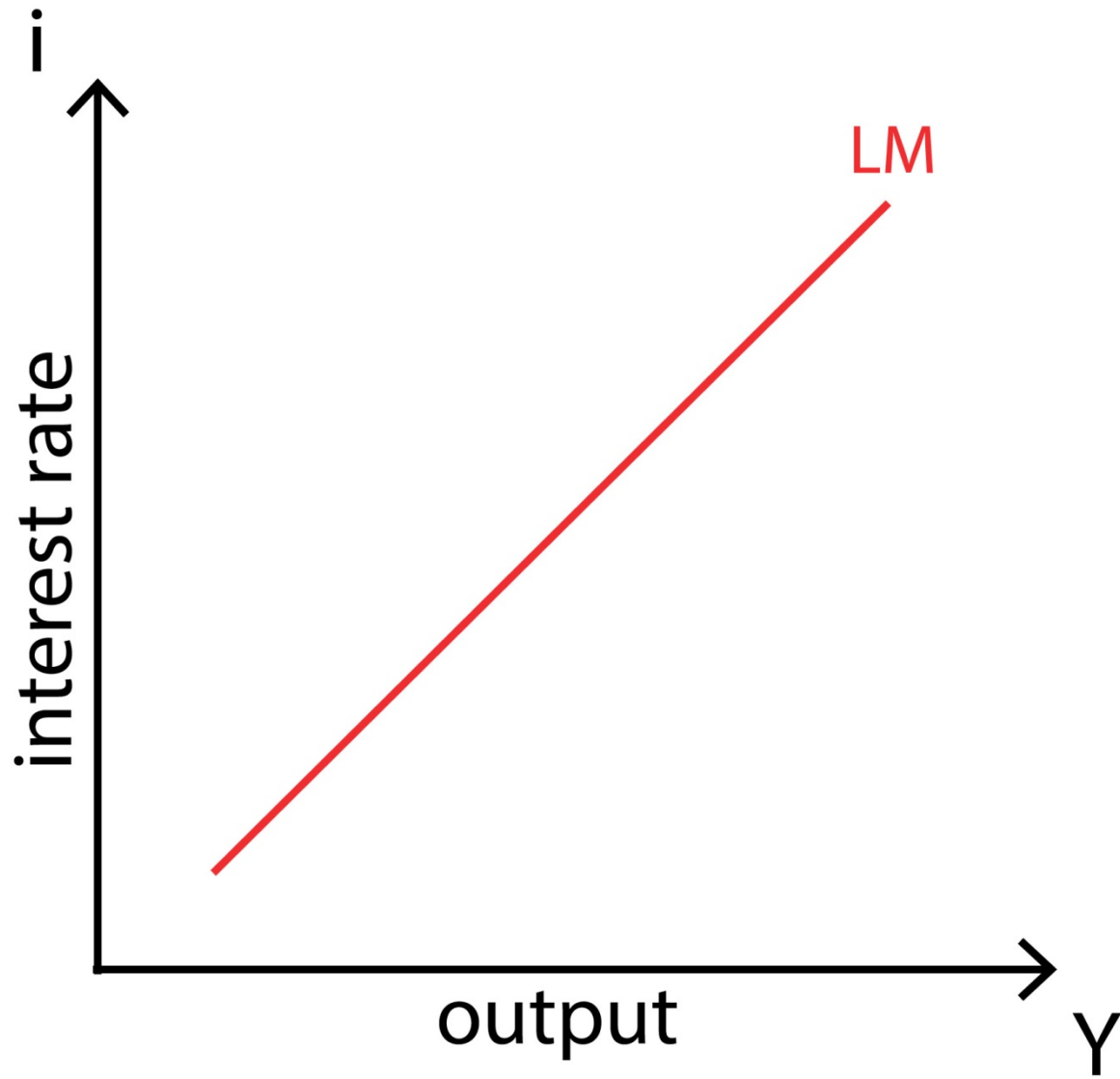
- The slope depends on 1.) the sensitivity of investment to changes in interest rate, and 2.) the multiplier.
- If investment is sensitive to changes in interest rate, then a decrease in interest rate causes a LARGE increase in investment (and hence output). That is, IS will be flat.
- If the multiplier is large, then an increase in investment causes a LARGE increase in output. That is, IS will be flat.

# Extra – Investment Function

- $I = E_0 - E_1(i)$
- $E_0$  denotes autonomous investment.
- $-E_1$  denotes the slope of the investment function, and the sensitivity of investment to changes in interest rate.
- This is because  $\frac{dI}{di} = -E_1$ , meaning that when  $i$  increases by 1 units,  $I$  will decrease by  $E_1$ .
- e.g.  $I = 10 - 100(i)$
- When  $i = 1\%$ ,  $I = 9$ . When  $i = 2\%$ ,  $I = 8$ .
- Larger  $|E_1|$  implies that investment is sensitive to interest rate. In this case, the IS curve will be flat.

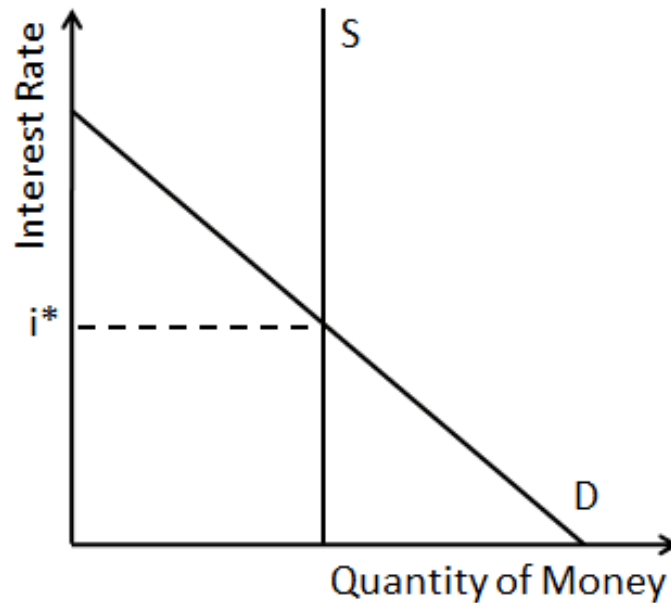
# The LM Curve

- The LM curve shows a **positive** relationship between  $i$  and  $Y$  in the money market.
- Like the IS curve, the LM curve is a LOCUS of “points”.
- Here, each point/coordinate,  $(i, Y)$ , constitute an equilibrium in the money market.
  
- The intuition behind the positive relationship of  $i$  and  $Y$  is as follows:
- At higher level of  $Y$ , people have more demand for money to buy goods and services. Higher demand for money drives up interest rate.



# Deriving the LM Curve

- To derive the LM curve, we start with the equilibrium condition in the money market:
- **REAL** money demand ( $M_d$ ) = **REAL** money supply ( $M_s$ ).
- We shall look at  $M_d$  and  $M_s$  separately.



# Deriving the LM Curve

- Recall that  $M_s$  is determined by the central bank and is constant (hence, it is a vertical line).
- $M_s$  is given by  $M/P$  (real amount of money),
  - where  $M$  = nominal amount, and  $P$  = price level.
- \*\*\* The reason that that we introduced  $P$  here is because we will need it for the next AD/AS model. \*\*\*
- $M_d$  is determined by the liquidity preference theory.

# Deriving the LM Curve

- Recall that people demand money for 3 reasons:
  - Transaction demand:  $Y \uparrow \gg M_d \uparrow$
  - Precautionary demand:  $Y \uparrow \gg M_d \uparrow$
  - Speculative demand:  $i \uparrow \gg M_d \downarrow$
- Therefore, we can write  $M_d = L(Y, i)$
- To illustrate,  $L$  can take the form  $L(Y, i) = n \cdot Y - m \cdot i$ .

- **The equilibrium of the money market is**

$$M_s = M_d$$

$$M/P = L(Y, i).$$

# Deriving the LM Curve

- Now, we can use the equilibrium condition of the money market  $M/P = L(Y, i)$  to draw the LM curve.
- Note that  $M/P$  is constant. Therefore, **when  $i$  changes,  $Y$  has to change too** in order for the equality to hold.
- So, whenever  $i$  goes up,  $Y$  has to go up as well, because
  - When  $i \uparrow \gg Md \downarrow$       AND      When  $Y \uparrow \gg Md \uparrow$
- Here, **the TWO changes in  $Md$  cancel out each other**, so that  $Md$  remains the same and equal to  $M_s$ .
- The LM curve is drawn from this positive relationship between  $i$  and  $Y$ .

# Deriving the LM Curve

