The (Neo-)Classical Model

Economy in the Long Run

Assumptions of the Model

- Prices and wages are perfectly flexible:
- $Q_i^s = Q_i^d$ in all markets
- Output (= supply of goods and services) depends on:
- the quantity of factors of production - for simplicity just Labor (L) and Capital (K)
- the ability to turn these inputs into output.
- Factors of production are fully utilized (i.e. no unemployment).
- These assumptions imply classical AS

Supply **of Goods and Services**

- We will <u>assume</u> that the economy has a fixed amount of capital and a fixed amount of labor (and given technology A).

- $Y = F(K_{fixed}, L_{fixed})$;

- Hence, also the total output is fixed.

$$Y^* = F(\bar{K}, \bar{L})$$

The Demand for Goods and Services

- Closed economy and three sectors:
- $Y = C + I + G$
- The <u>given</u> output (Y^*) of the economy can either be purchased:
- by consumers (C) as consumption goods,
- by firms in creating new capital (I),
- or as government purchases (G).

The Demand for Goods and Services

- **Consumption (C):**
- <u>Households</u> receive income (Y) from their labor and their ownership of capital.
- Pay taxes to the government (TA) and receive transfers from the government(TR).
- Yd (disposable income)= Y – TA + TR
- Decide how much of their after-tax income to consume(C) and how much to save(S).
- Yd = C + S
- $C=C(Yd,r)$; $C_{Yd}>0$ $C_r<0$;???

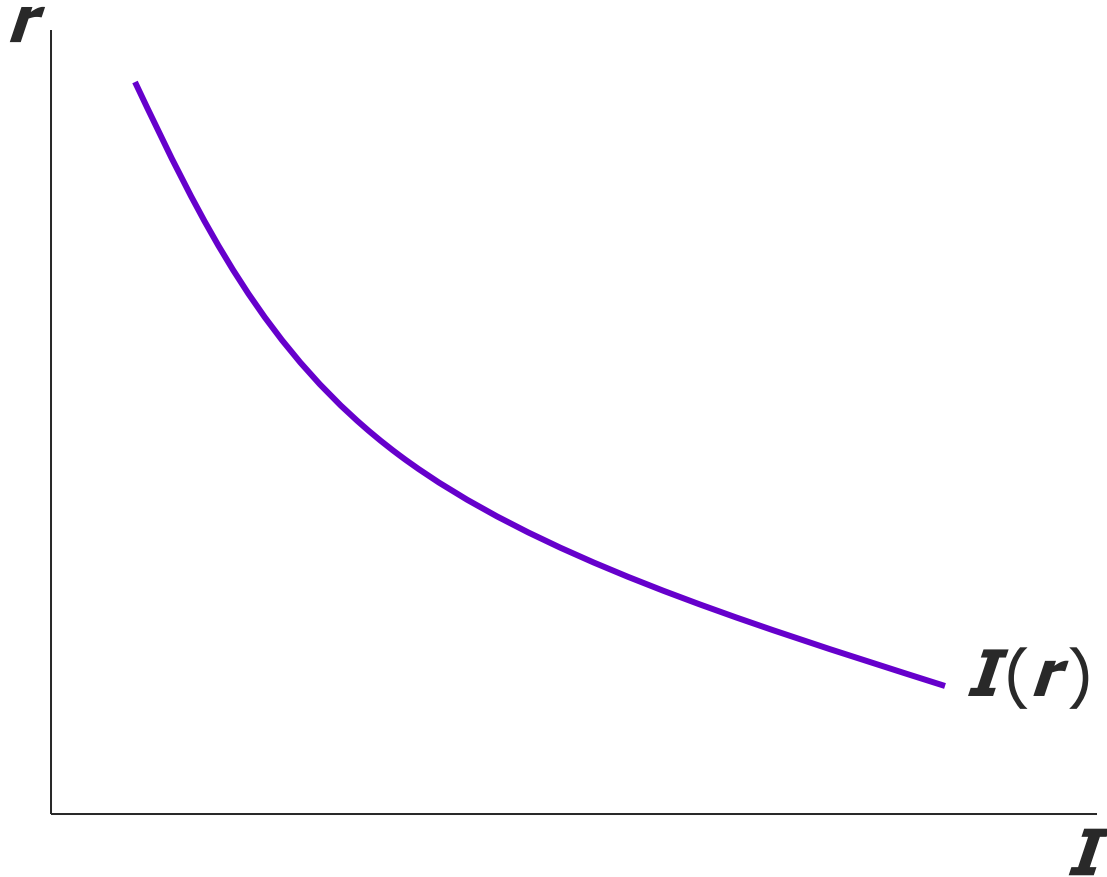# The Demand for Goods and Services

- **<u>Investment (I)</u>:**
- Firms buy investment goods to replace existing capital as it wears out and to add to their stock of capital.
- Households buy new houses.
- Quantity of investment goods demanded depends on the **<u>real</u>** interest rate (r).
- **r** measures the cost of the funds used to finance investment.

The Investment Function

- For an investment project to be profitable:
- ➢ Its return must exceed its cost.
- ➢ Return - the revenue from increased future production of goods and services.
- ➢ Cost - the payments for borrowed funds (i.e. interest)
- If the interest rate rises, fewer investment projects are profitable, and the quantity of investment goods demanded falls.
- $I=I(r);$ $I_r<0$

The Investment Function

r

$I(r)$

I

The Demand for Goods and Services

- **<u>Government Purchases (G):</u>**
- The government buys guns, missiles, library books, it builds schools, hires teachers etc.
- Public saving(BS)= TA-TR-G
- All will be exogenous in this simple model.
- BS>0… gov. runs a budget surplus
- BS=0… gov. has a balanced budget
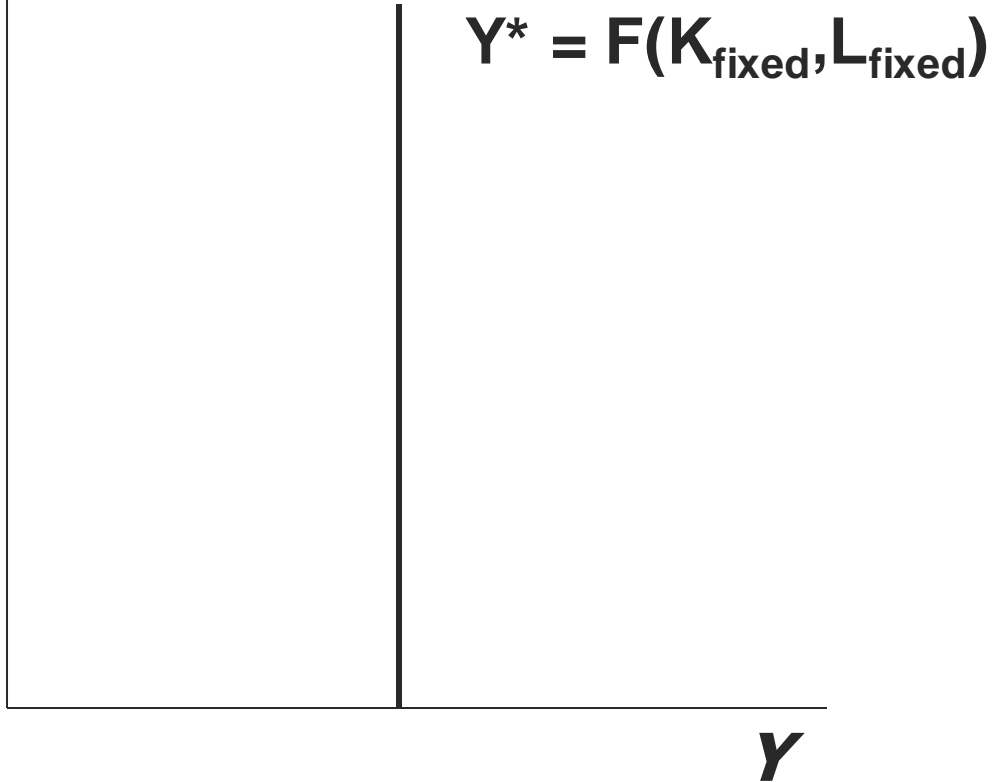- BS<0 …gov. runs a budget deficit

The Classical Model

- What ensures that the sum of consumption, investment, and government purchases equals the amount of output produced (i.e. that Demand equals Supply)?

- $Y^* = F(K_{fixed}, L_{fixed})$

- $Y = C + I + G$

- Answer: The interest rate **r**

The Supply and Demand for the Economy's Output
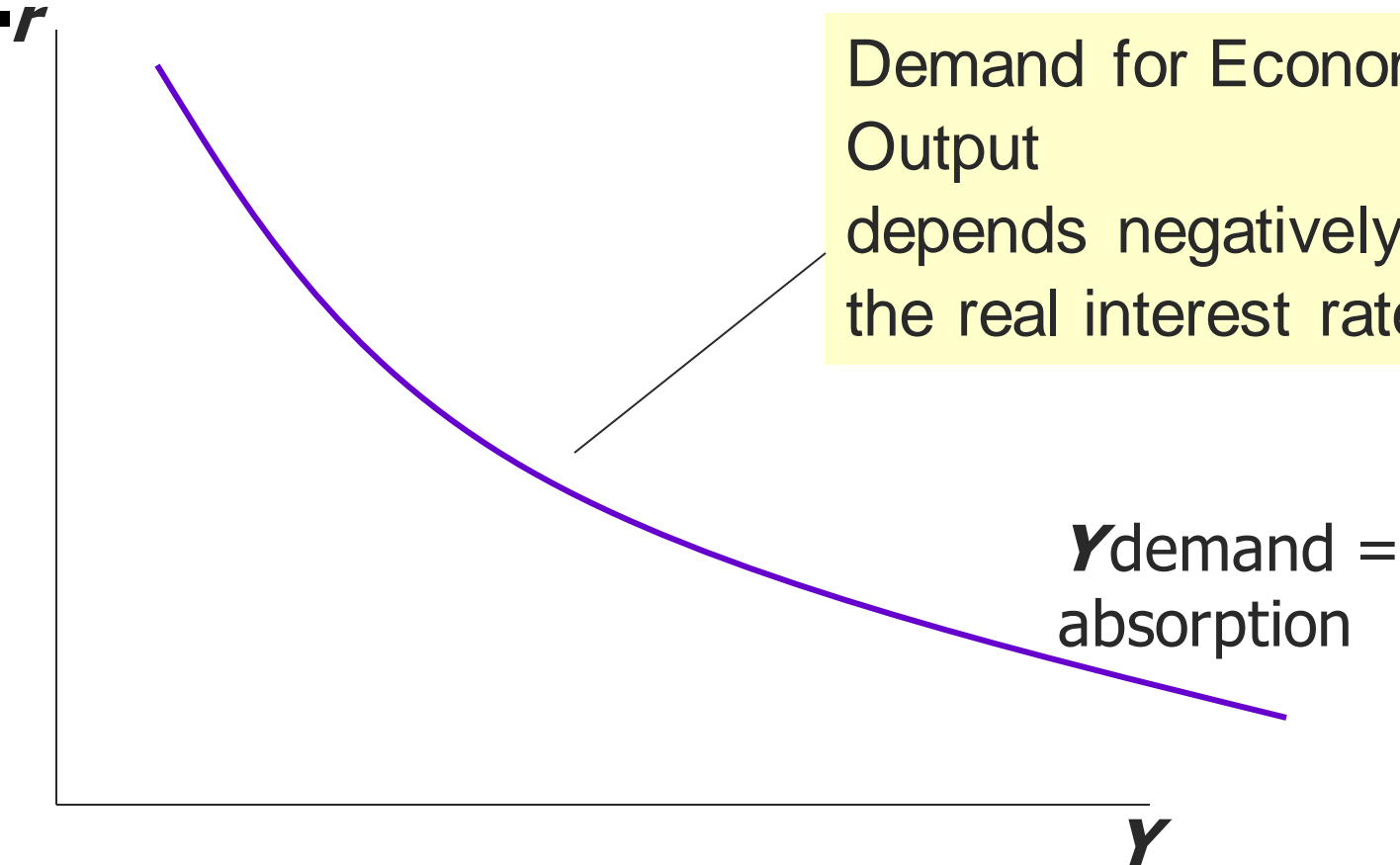
- Aggregate supply: $Y^* = F(K_{fixed}, L_{fixed})$
- Aggregate demand: $Y = C(Yd, r) + I(r) + G$
- $Yd = Y - TA + TR$
- TA, TR, G are exogenous
- $C_r < 0$; $I_r < 0$
- $Y = C(Y - TA + TR, r) + I(r) + G$
- Equilibrium: $Y^* = C(Yd, r) + I(r) + G$
- $Y^* = C(Y^* - TA + TR, r) + I(r) + G$
- Only **r** can bring the system into the equlibrium.

Supply of Economy´s Output

The supply of economy´s output does not depend on r, so the supply curve is vertical.
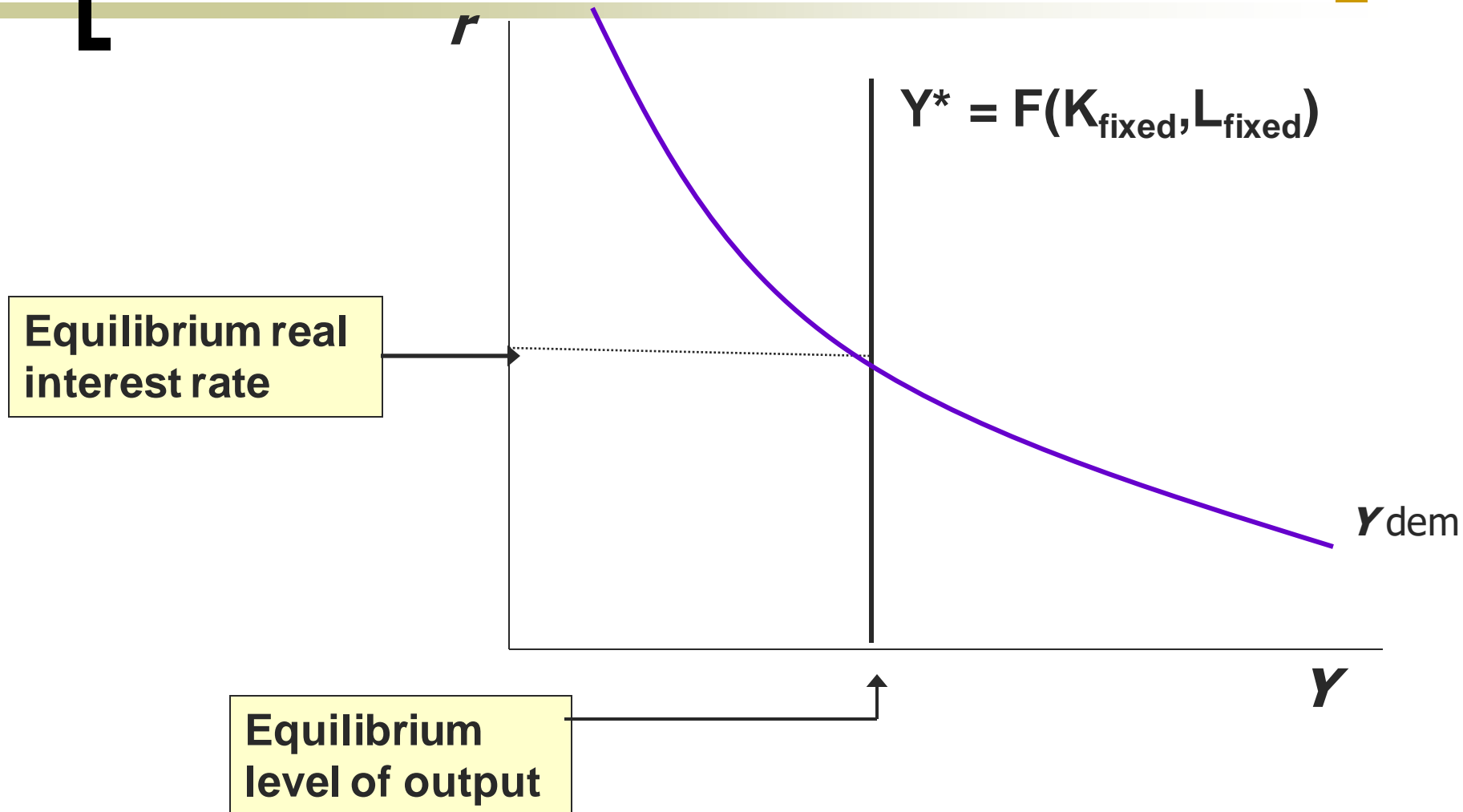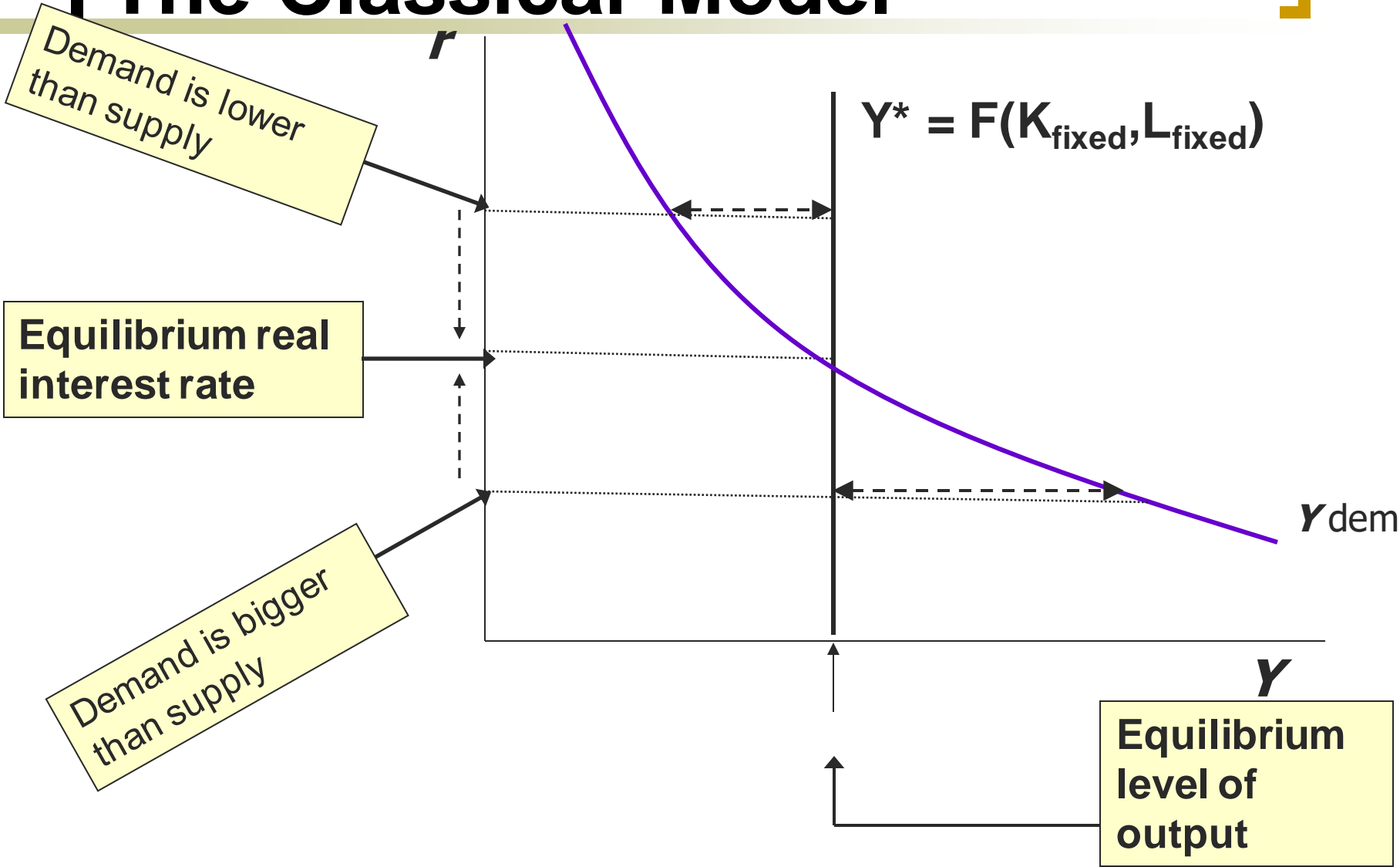
$$Y^* = F(K_{fixed}, L_{fixed})$$

r

Y

Demand for Economy´s Output

Demand for Economy´s Output
depends negatively on the real interest rate.

Ydemand = absorption

$Y=C(Y-TA+TR,r) + I(r) + G$

$C_r<0; I_r<0$

The Classical Model

$Y^* = F(K_{fixed}, L_{fixed})$

r

Equilibrium real interest rate

Ydem

Equilibrium level of output

Y

The Classical Model

Demand is lower than supply

$Y^* = F(K_{fixed}, L_{fixed})$

Equilibrium real interest rate

r

Ydem

Demand is bigger than supply

Equilibrium level of output

Y

The Classical model: Loanable funds representation

- We know that: $Yd = C + S$

- We know that: $Y = C + I + G$

➢ $\Rightarrow Y - C - G = I$

➢ $(Y - TA + TR - C) + (TA - TR - G) = I$

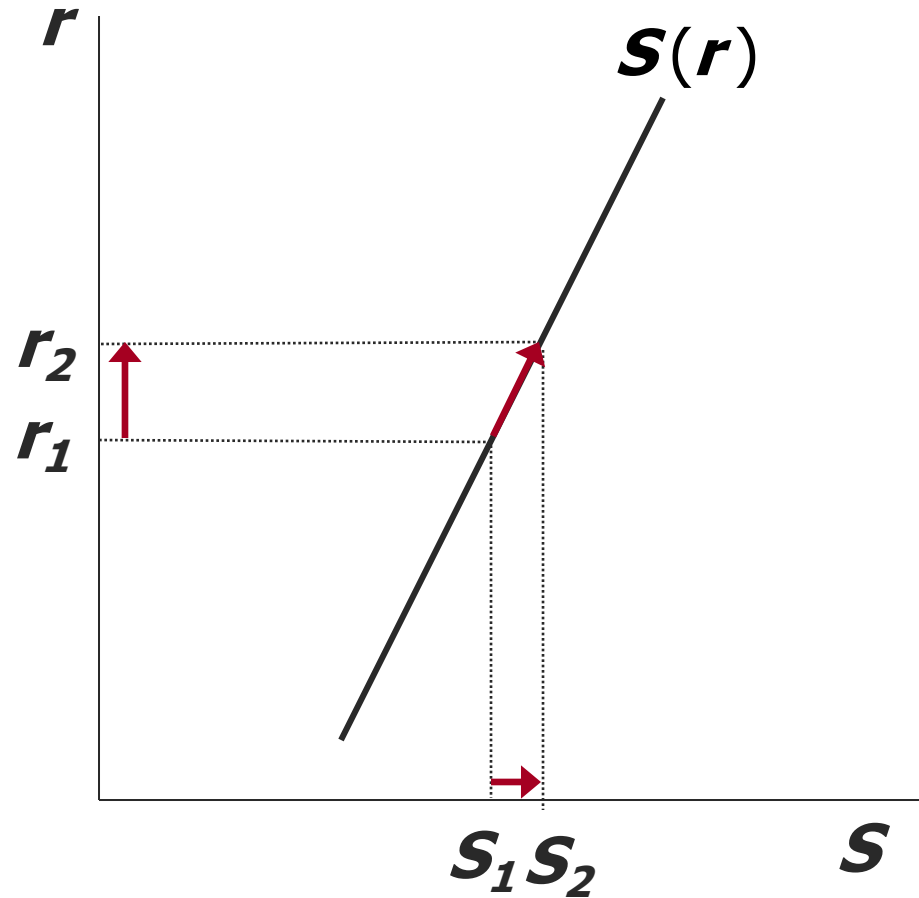➢ $(Yd \quad - \quad C) + \quad BS \quad = I$

➢ $S \quad + \quad BS \quad = I$

The Classical model: Loanable funds representation

- $Yd = C + S$

- $\Rightarrow S = Yd - C$

- $\uparrow r \Rightarrow \downarrow C \Rightarrow \uparrow S$ **(Irving Fisher)**

- $\Rightarrow S = S(Yd, r);$ $S_r > 0$ $S_{Yd} > 0$

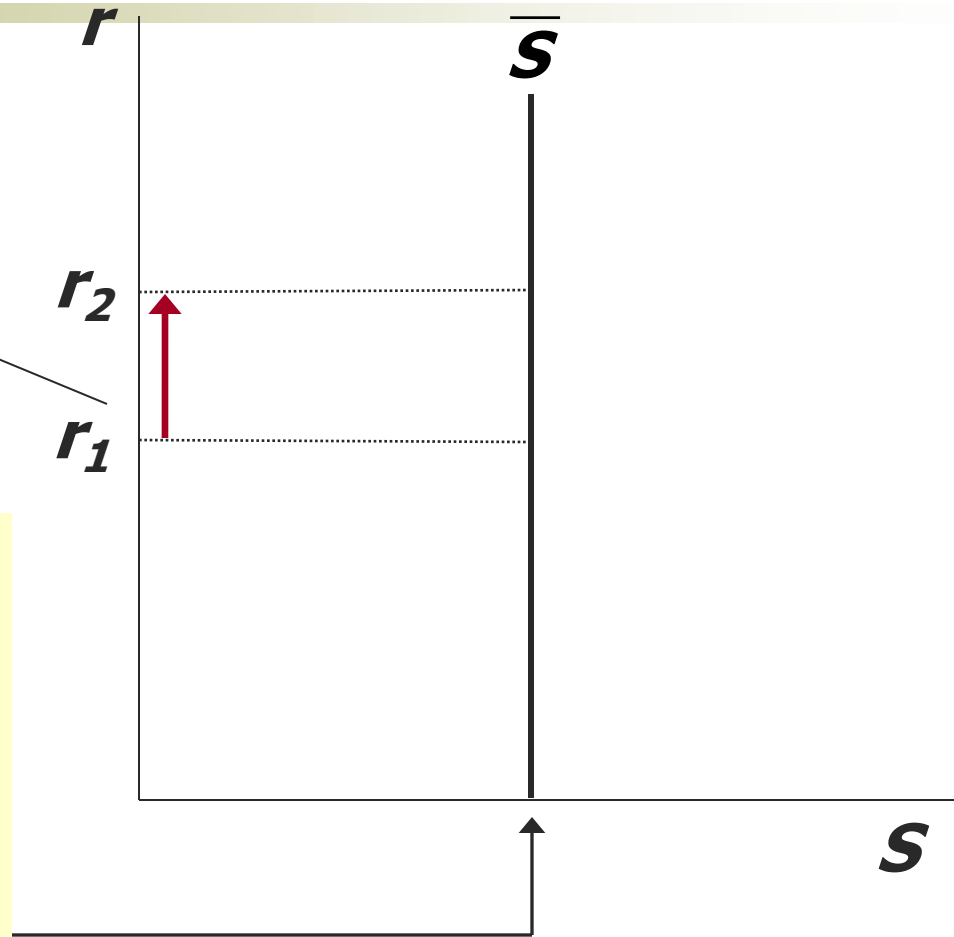- x J.M. Keynes: $C_r = 0 \Rightarrow S_r = 0$

The Saving Function

For the given Yd, a rise in r induces an increase in the quantity of saving. (Irving Fisher; $S_r > 0$)

The Saving Function: Keynesian vision

r

$\overline{S}$

A *rise in the interest rate…*

r_2

r_1

…does not affect the supply of saving. ($S_r=0$)

S

The Classical model: Loanable funds representation (Mankiw)

- $S(r)+BS=I(r)$
  - private saving + public saving = (n.) investment
- $NS(r)=I(r)$
  - national saving = national investment
  - (Note: There is no NX in a closed economy)
- The flows into the financial markets (private and public saving) must balance the flows out of the financial markets (investment).
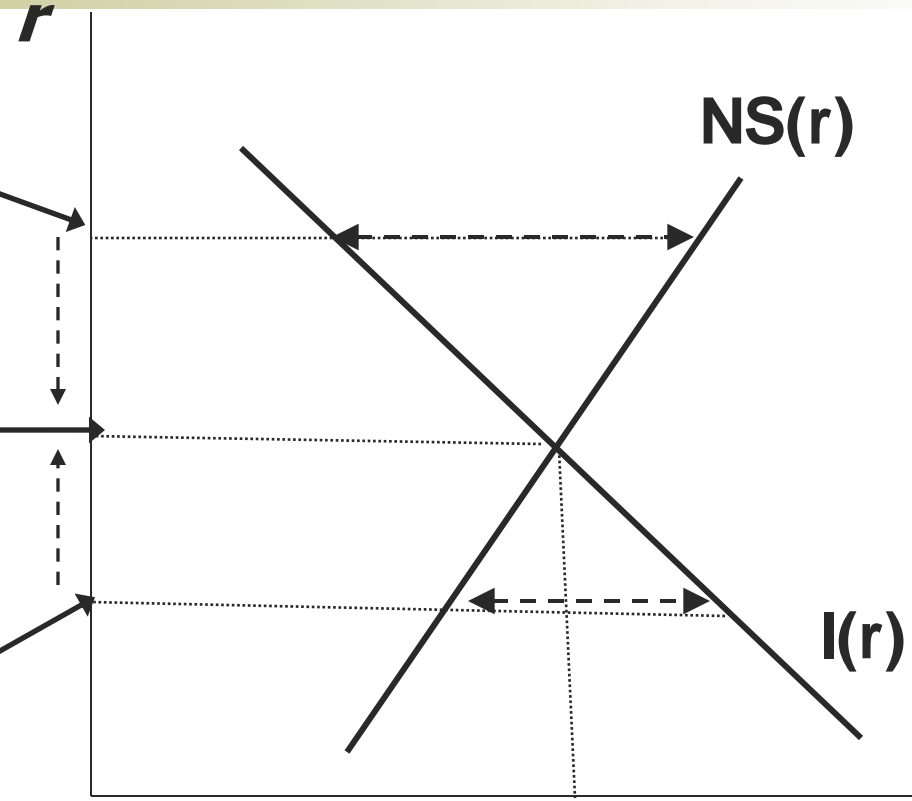
The Loanable funds Market

r

$NS(r)=S(r)+BS$

Equilibrium real interest rate

I(r)

Equilibrium saving and investment

NS, I
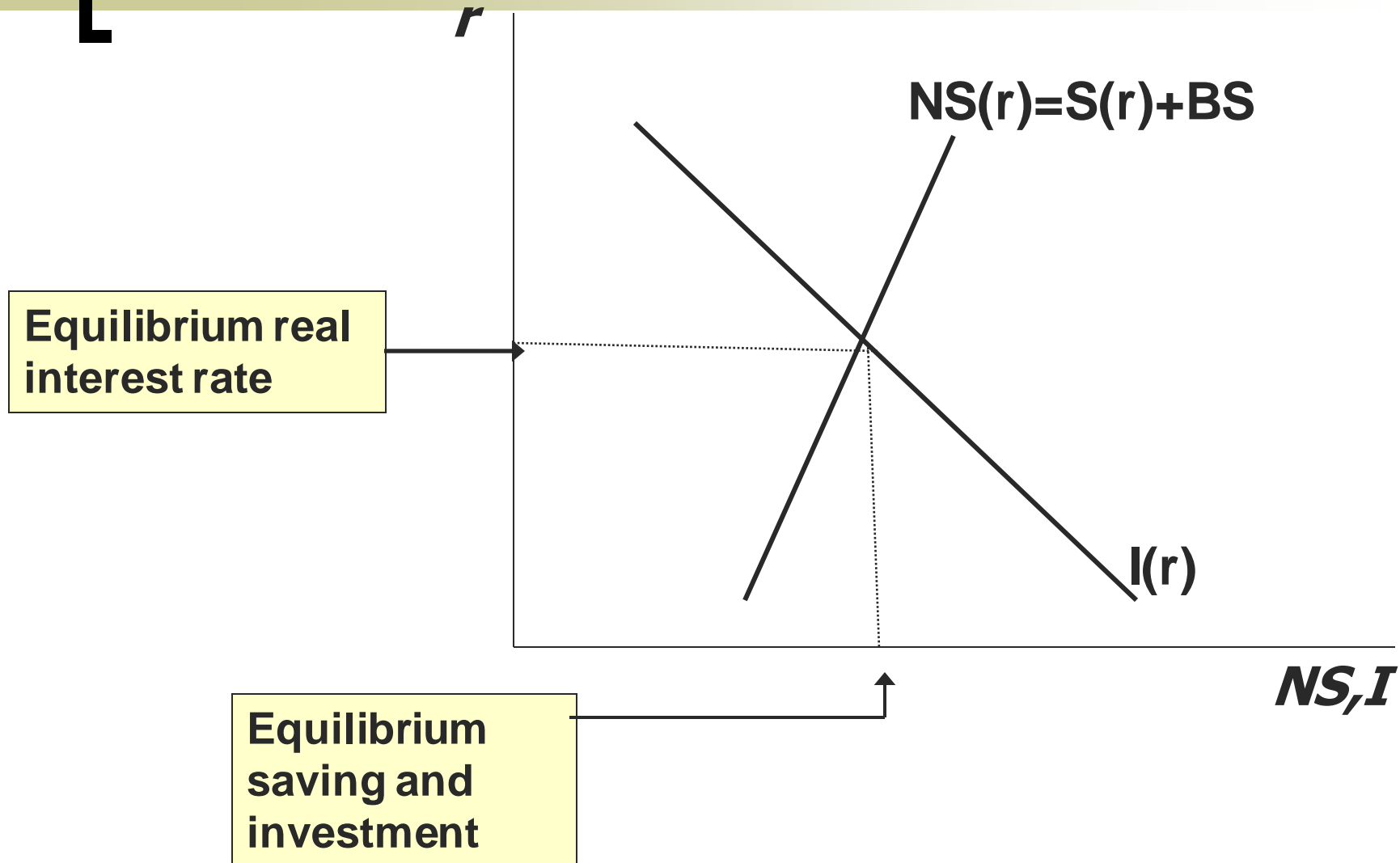
The Loanable funds Market

Saving exceeds investment (and supply of output is greater than demand for output)

Equilibrium real interest rate

Investment exceeds saving (and demand for output is greater than supply of output)

NS(r)

I(r)

Equilibrium level of loanable funds

r

The Loanable funds Market

- *At the equilibrium interest rate:*
- *Households' desire to save balances firms' desire to invest,*
- *And the quantity of loanable funds supplied equals the quantity demanded.*

The Effects of Fiscal Policy

- Consider an increase in government purchases (without an increase in TA): $\uparrow G$.

$$\uparrow G \Rightarrow \downarrow BS \Rightarrow \downarrow NS \Rightarrow \uparrow r \Rightarrow \downarrow I \text{ and } \uparrow S_{(because \downarrow C)}$$

$$\uparrow G \Rightarrow ... \Rightarrow \downarrow I \quad \textbf{CROWDING OUT EFFECT}$$
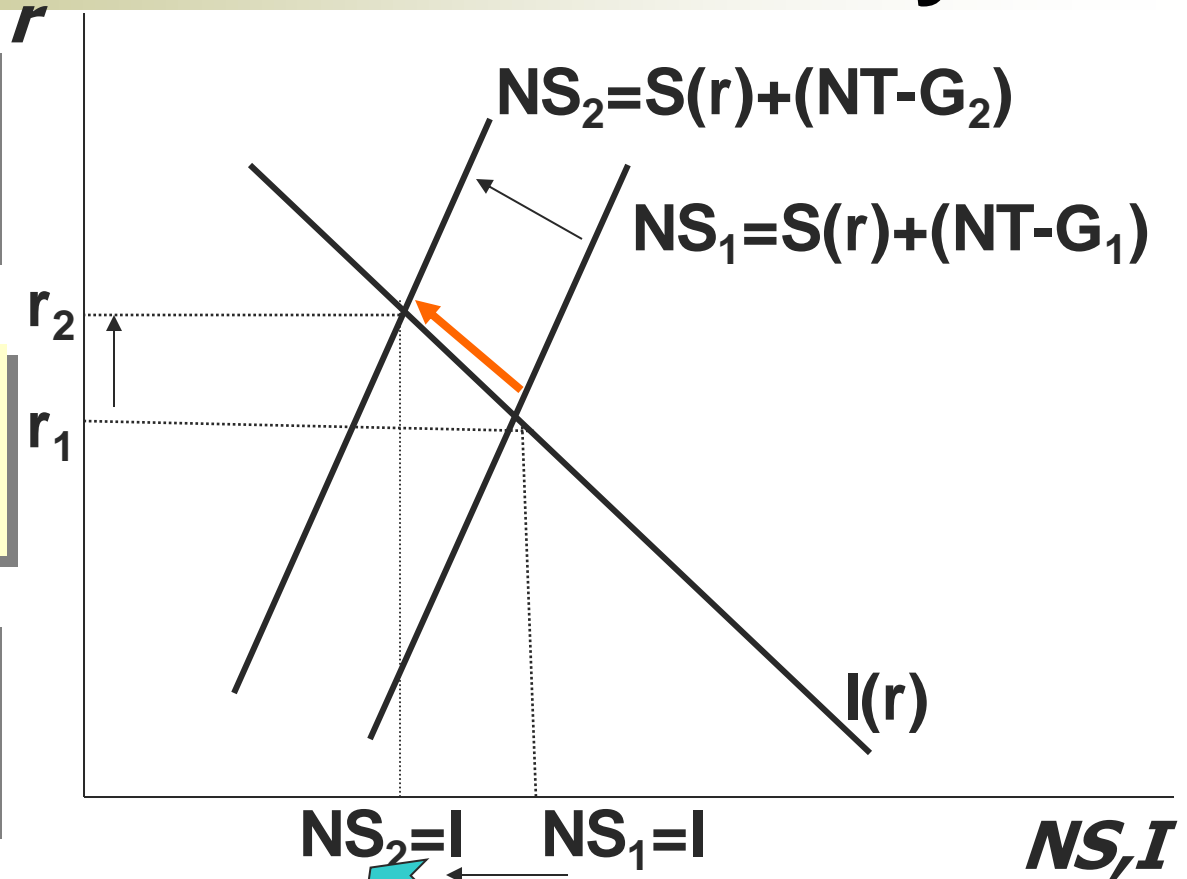
What is the eventual effect on NS?

The Effects of Fiscal Policy

The increase in G reduces the national saving…

… which causes the real interest to rise…

… which reduces the level of investment.

r

$NS_2=S(r)+(NT-G_2)$

$NS_1=S(r)+(NT-G_1)$

r_2

r_1

$I(r)$

$NS_2=I$ $NS_1=I$

NS,I

Notice that we move along the investment curve…

…National saving is lower (although private saving went up - not visible in the graph)