



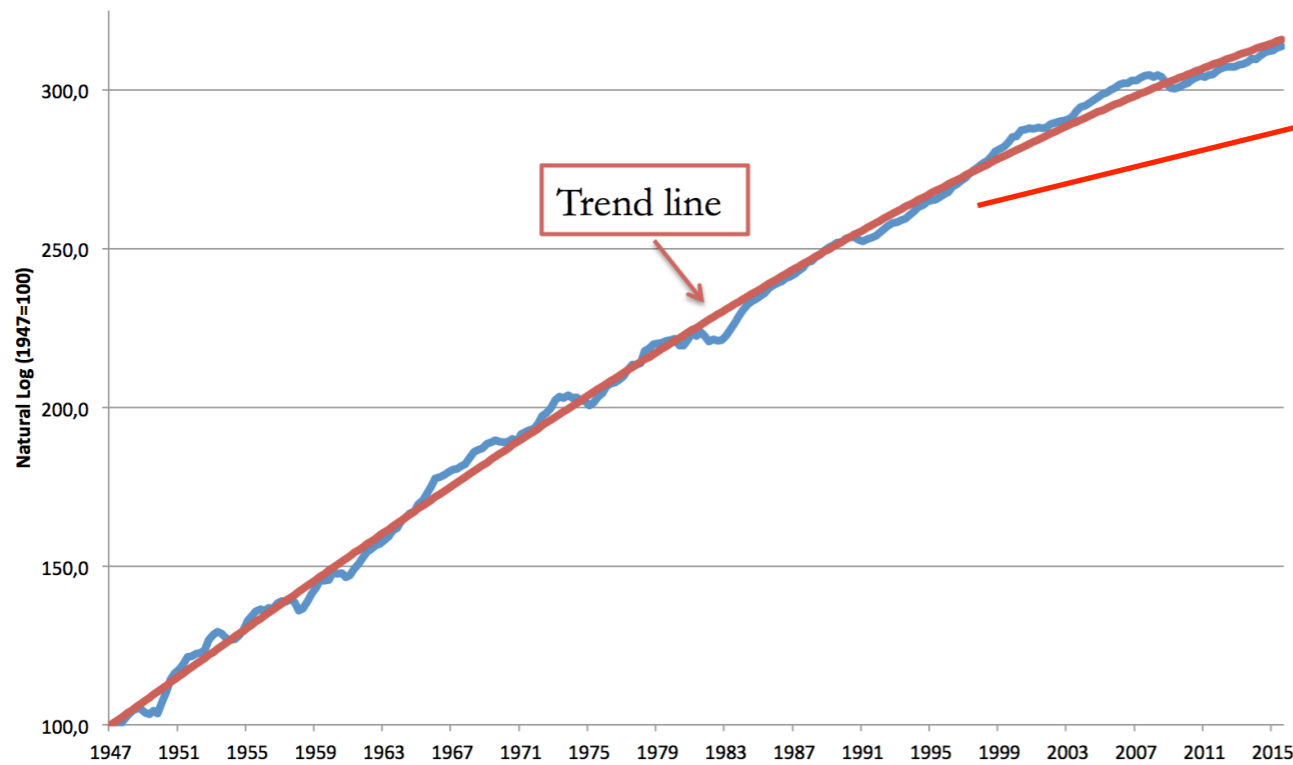
Universitat
Pompeu Fabra
Barcelona

Macroeconomics I
22104, Fall 2017
Isaac Baley

Review of IS-LM
Closed Economy

Long-, medium-, and short-run

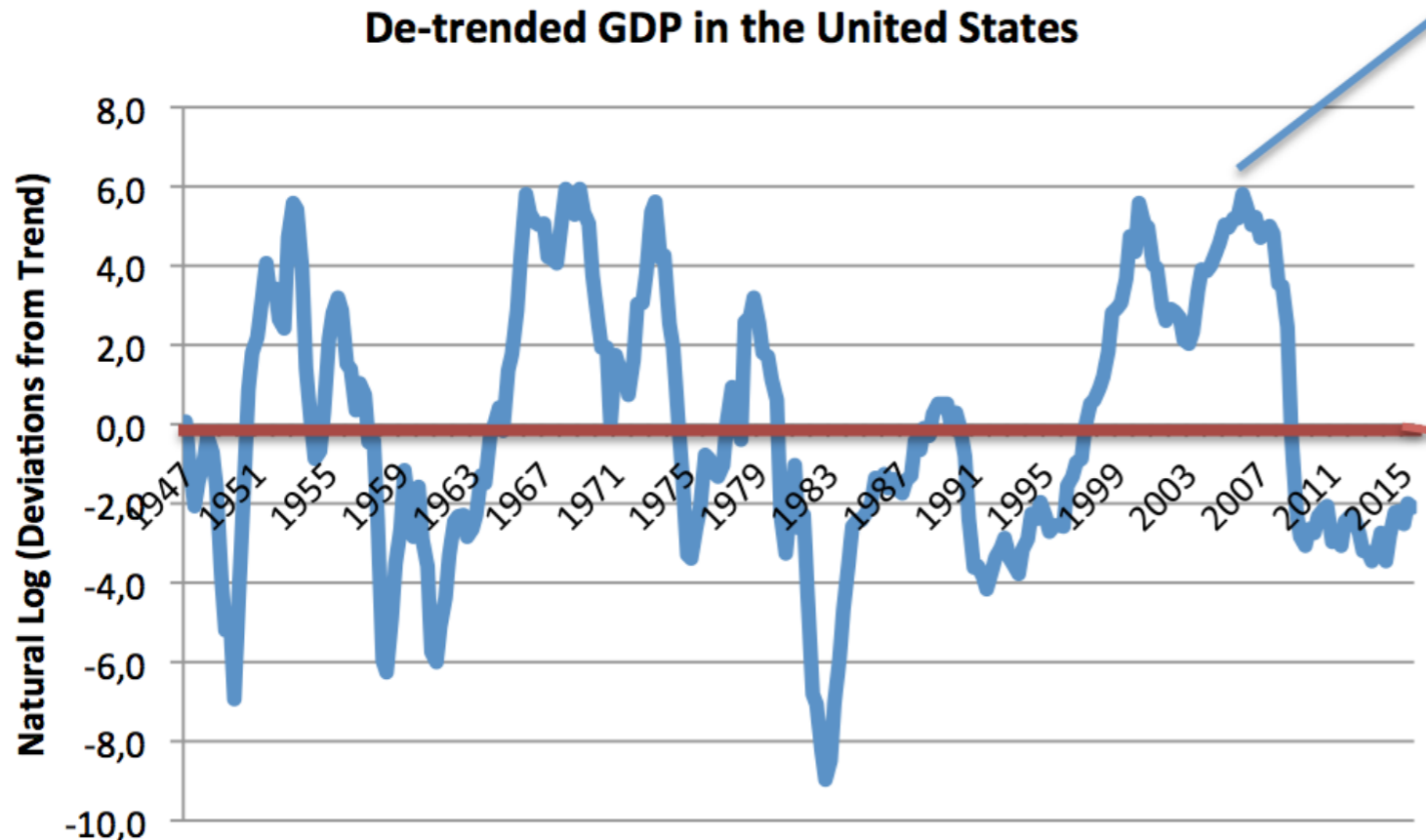
Real GDP in the United States: 1947-2015



Long-run

What affects the trend?

De-trended GDP in the United States



Short-run

Temporary deviations from trend

- Expansions and contractions

Medium-run

When economy is at the trend

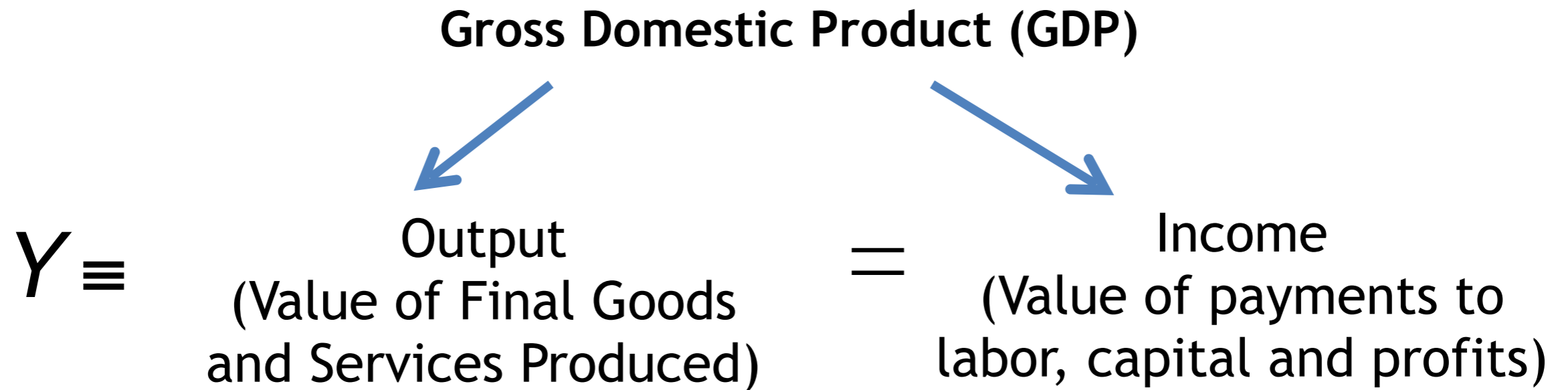
- We normalize trend to a constant

- Call it “natural level” of Y or Y_n

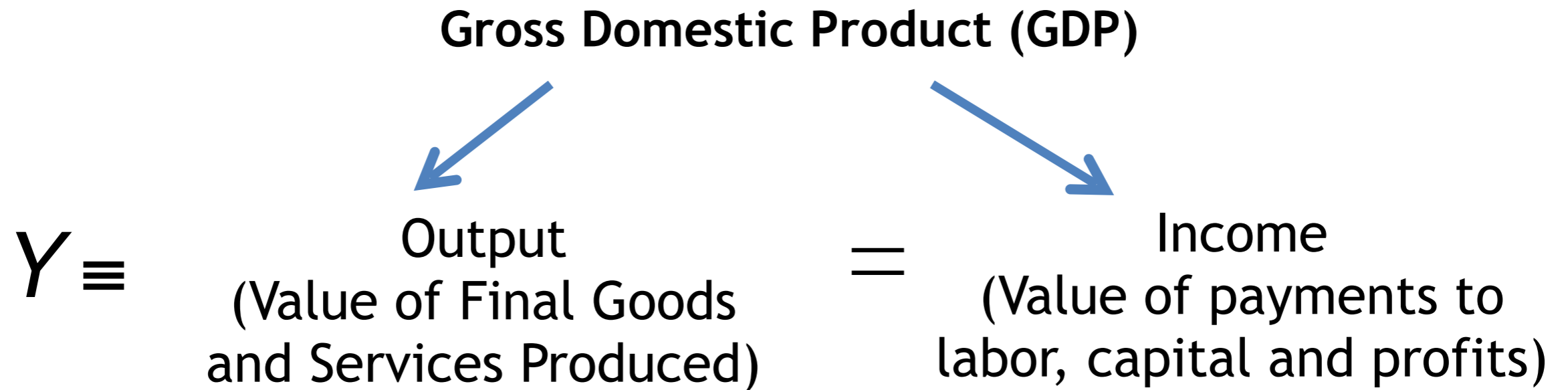
A formal framework: IS-LM Model

- A tool to think about **short-run economic fluctuations**
 - * Short run = Prices are fixed
 - * The **IS equation**: equilibrium in the **goods** market
 - * The **LM equation**: equilibrium in the **financial** market
 - * Together, determine GDP (Y) and interest rate (i)
- Study effects of fiscal and monetary policy choices

IS Equation: Equilibrium in Goods Market



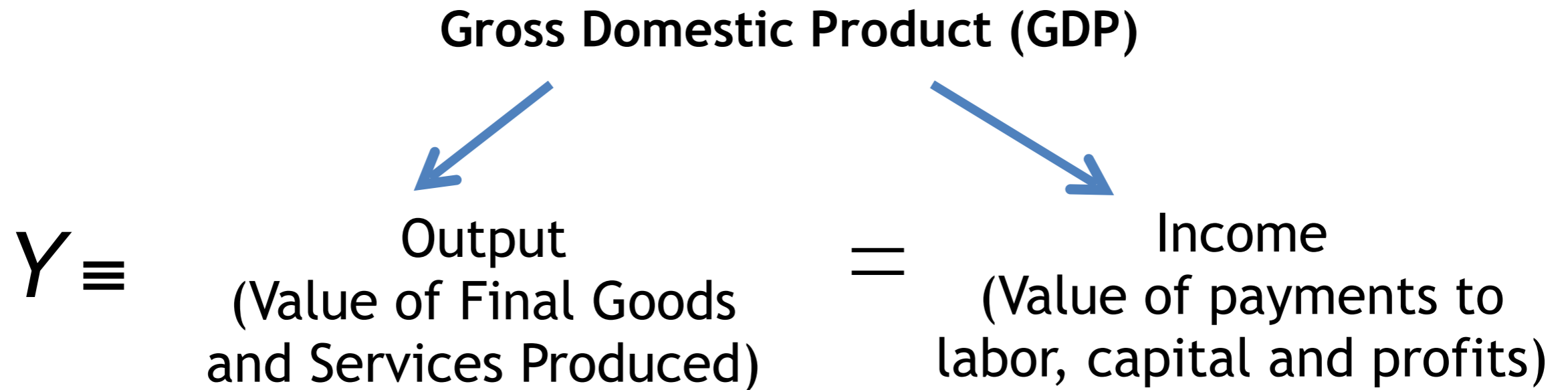
IS Equation: Equilibrium in Goods Market



Demand for Goods (Z)

$$Z = C(Y - T) + I(Y, i) + G$$

IS Equation: Equilibrium in Goods Market



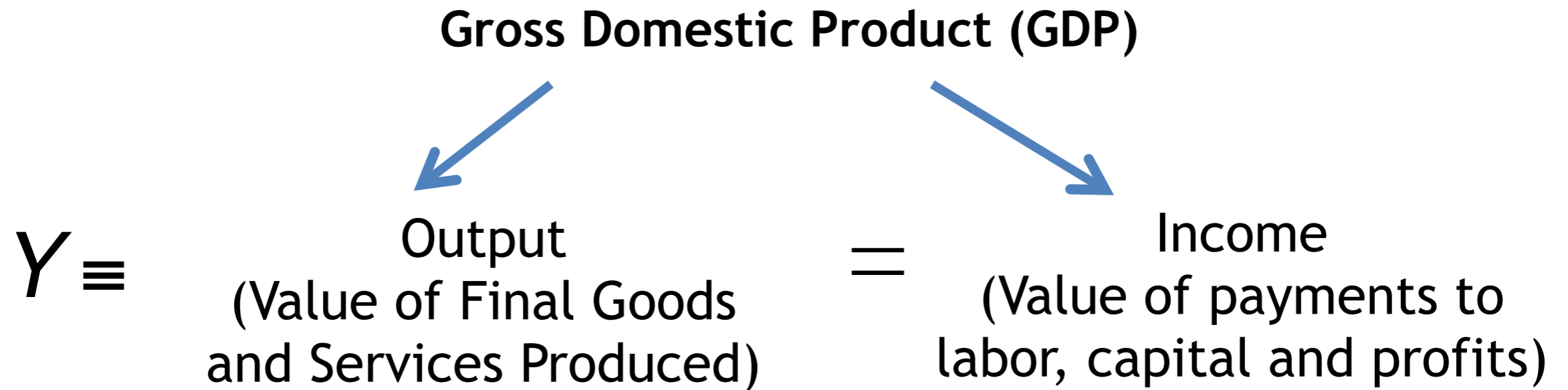
Demand for Goods (Z)

Private Consumption (depends on after-tax income)

$$Z = C(Y - T) + I(Y, i) + G$$

(+)

IS Equation: Equilibrium in Goods Market



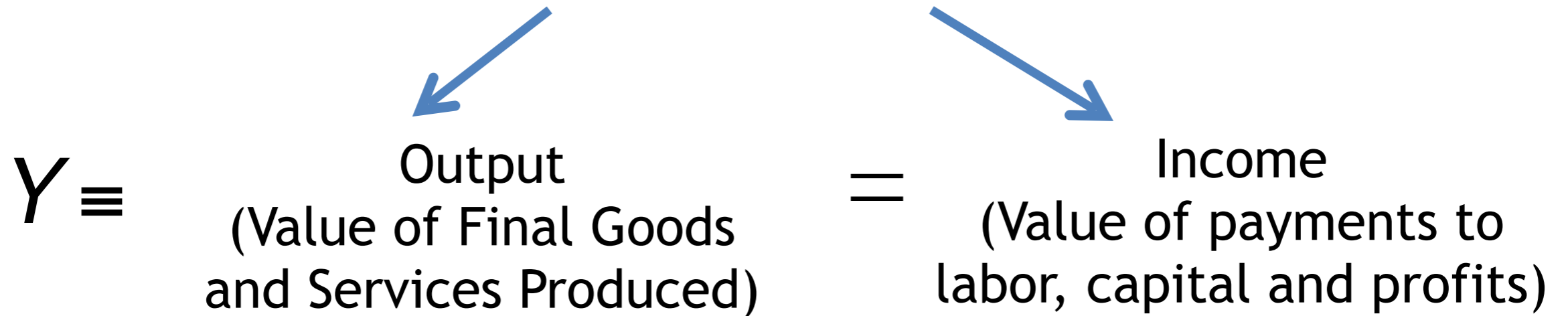
Demand for Goods (Z)

Investment (depends on income and interest rate)

$$Z = C(Y - T) + \overbrace{I(Y, i)}^{(+, -)} + G$$

IS Equation: Equilibrium in Goods Market

Gross Domestic Product (GDP)



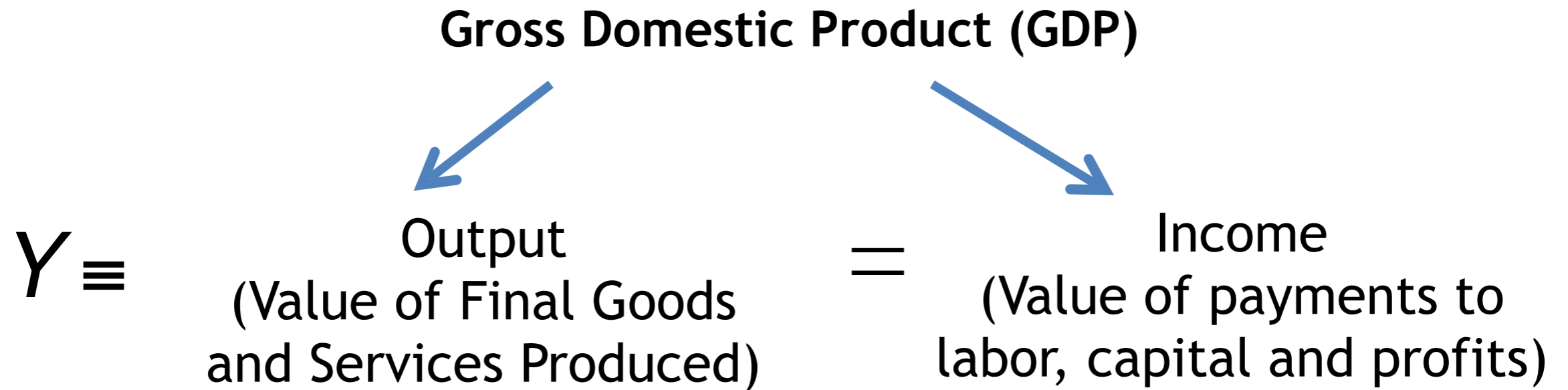
Demand for Goods (Z)

$$Z = C(Y - T) + I(Y, i) + G$$

Government Expenditure

A blue bracket is drawn above the term G in the equation, pointing upwards to the text 'Government Expenditure' located above the equation.

IS Equation: Equilibrium in Goods Market



Demand for Goods (Z)

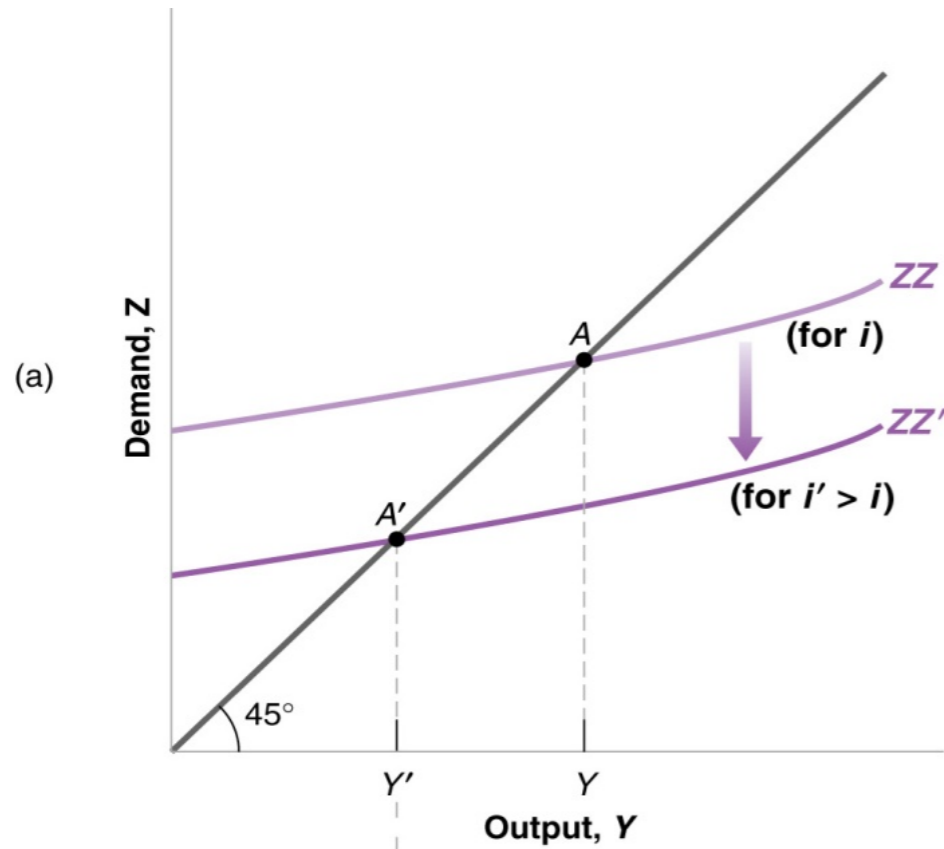
$$Z = C(Y - T) + I(Y, i) + G$$

Equilibrium in Market for Goods (Demand = Production) $Z = Y$

IS CURVE:

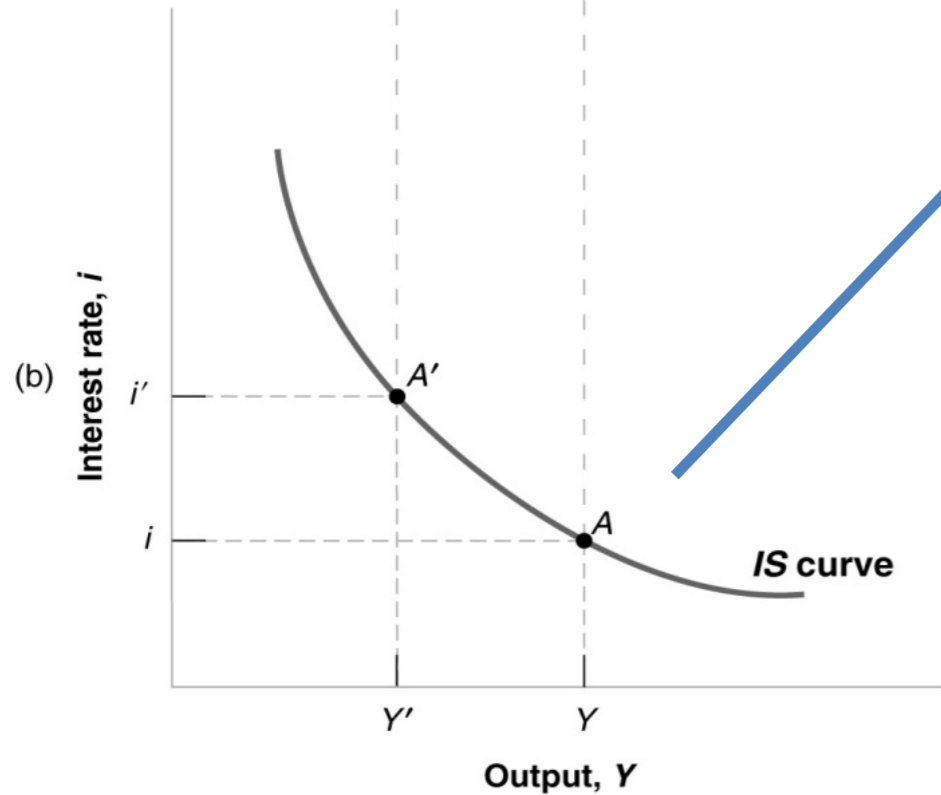
$$Y = C(Y - T) + I(Y, i) + G$$

IS Equation: Equilibrium in Goods Market

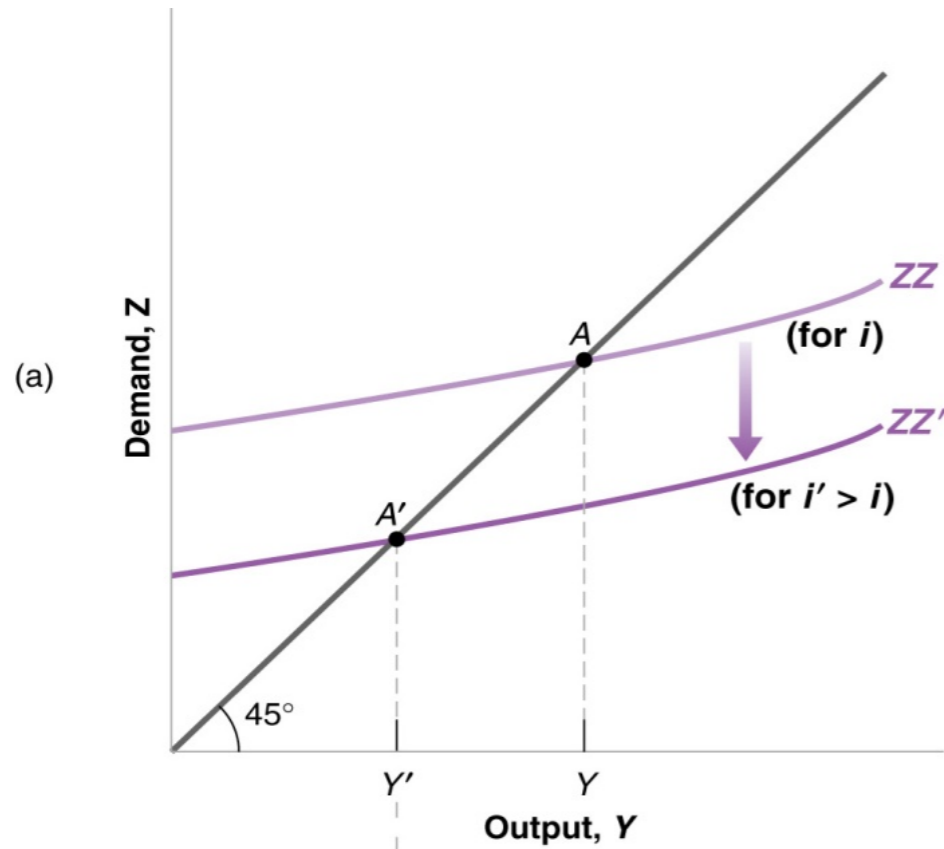


→ $ZZ : Z = C(Y - T) + I(Y, i) + G$

$A : (Y, i)$



IS Equation: Equilibrium in Goods Market

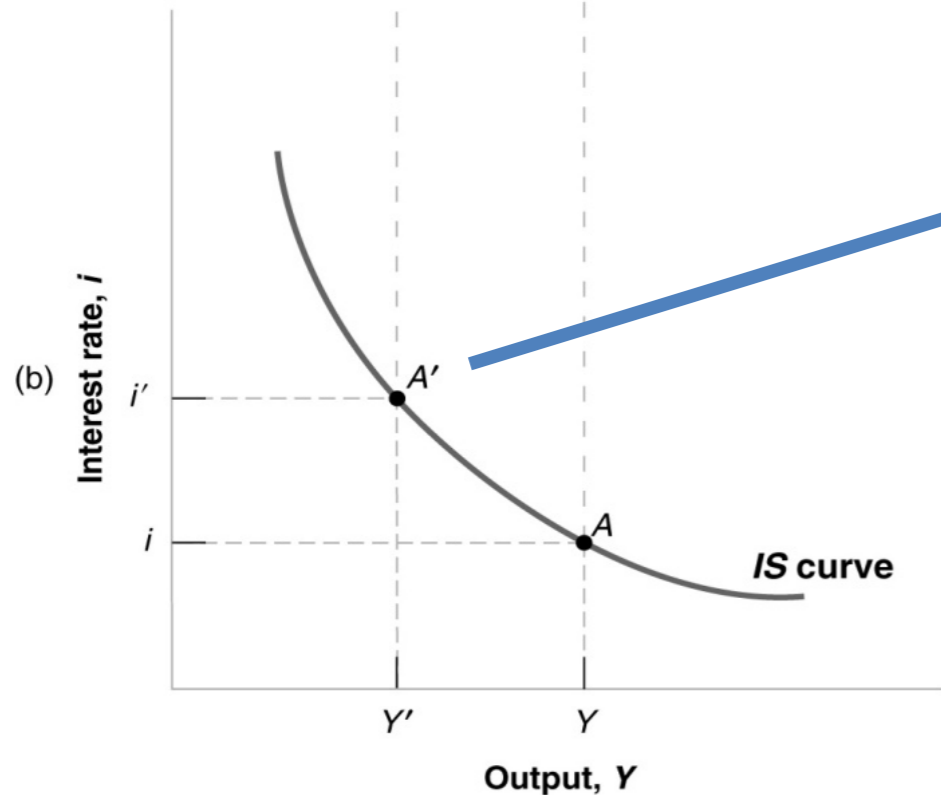


$$ZZ : Z = C(Y - T) + I(Y, i) + G$$

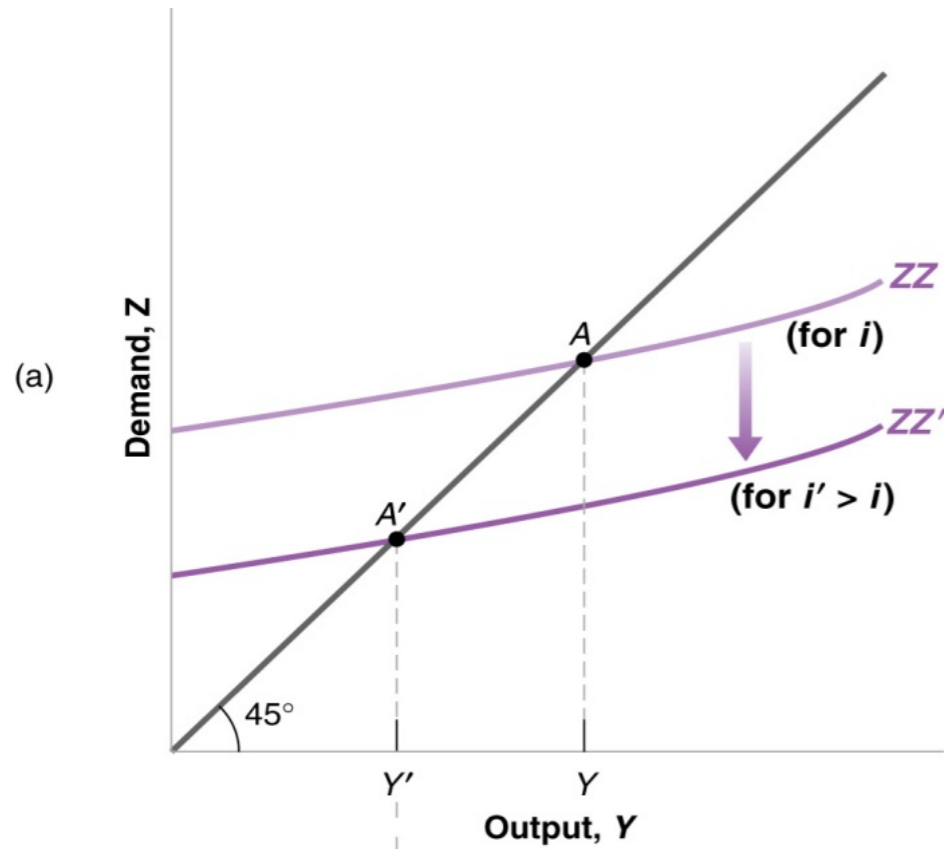
$$ZZ' : Z = C(Y - T) + I(Y, i') + G \quad i' > i$$

$A : (Y, i)$

$A' : (Y', i')$



IS Equation: Equilibrium in Goods Market

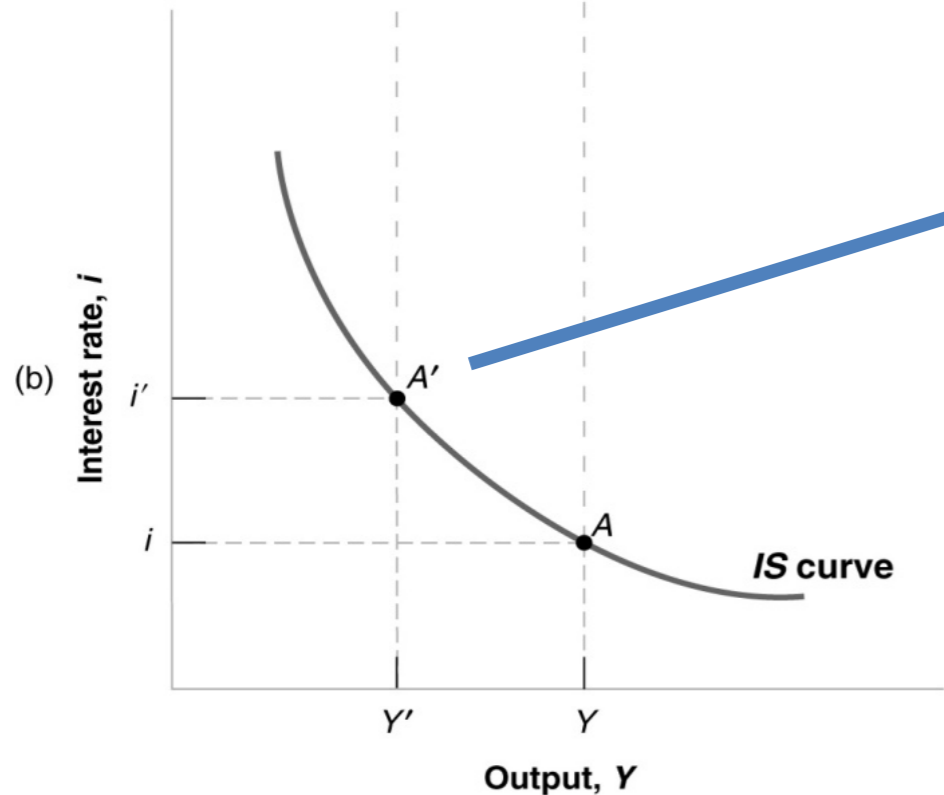


$$ZZ : Z = C(Y - T) + I(Y, i) + G$$

$$ZZ' : Z = C(Y - T) + I(Y, i') + G \quad i' > i$$

$A : (Y, i)$

$A' : (Y', i')$



**In the GOODS market,
there is a NEGATIVE relationship between
OUTPUT and INTEREST RATE**

LM Equation: Equilibrium in Financial Market

Supply of Money (by the Central Bank) M^S

Demand for Money $M^d = PYL(i)$

P : Price Level Y : Real Income $L(i)$: Liquidity Preference

LM Equation: Equilibrium in Financial Market

Supply of Money (by the Central Bank) M^S

Demand for Money $M^d = PYL(i)$

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Key assumption: Prices are constant in the Short-Run (but NOT in the transition to the Medium-Run)

LM Equation: Equilibrium in Financial Market

Supply of Money (by the Central Bank) M^S

Demand for Money $M^d = PYL(i)$

P : Price Level Y : Real Income $L(i)$: Liquidity Preference



i : Interest Rate
Opportunity cost of holding money
rather than Bonds

LM Equation: Equilibrium in Financial Market

Supply of Money (by the Central Bank) M^S

Demand for Money $M^d = PYL(i)$

P : Price Level Y : Real Income $L(i)$: Liquidity Preference

Equilibrium in Market for Money (Demand = Supply)

$$M^d = M^S$$

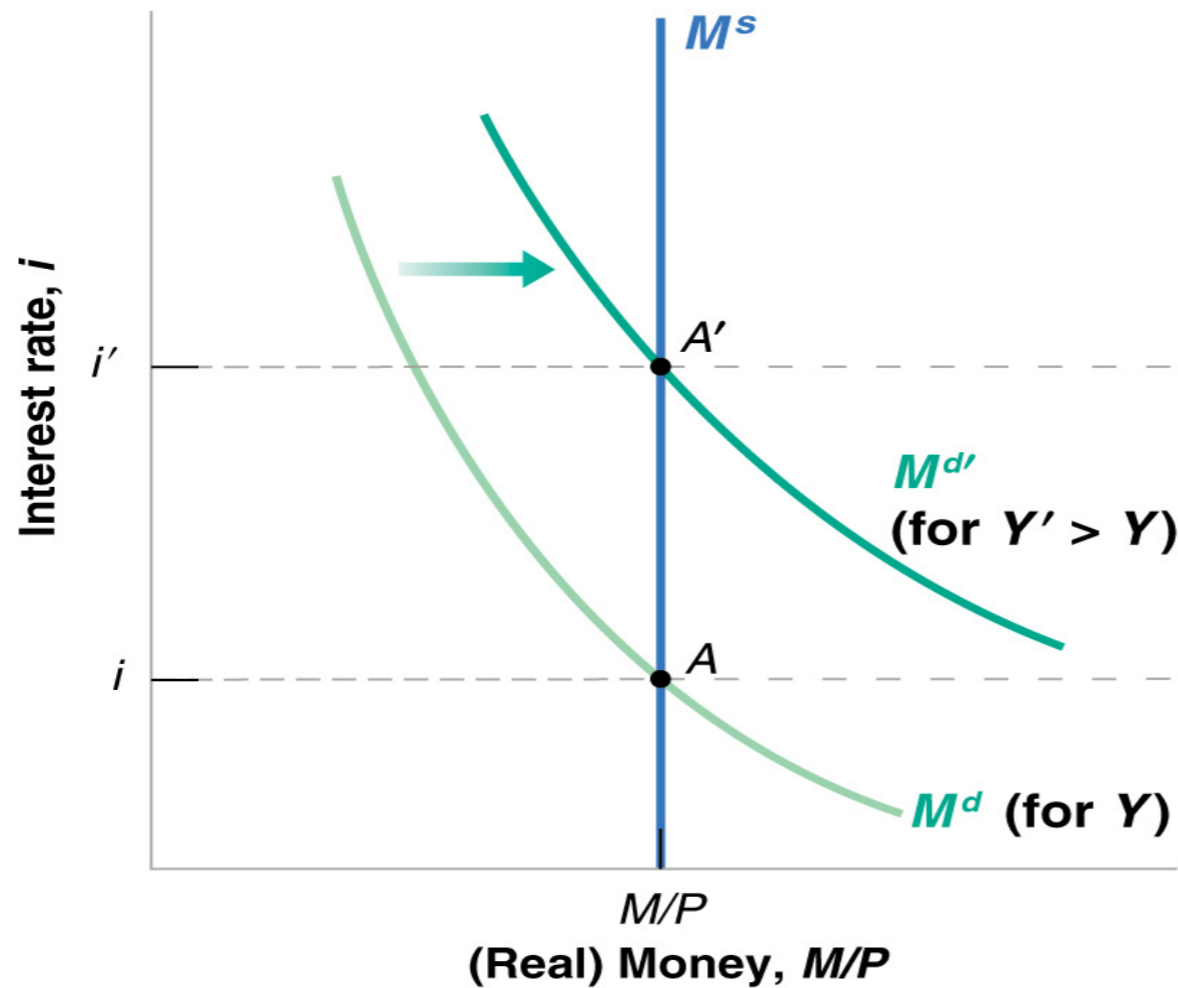


$$M = PYL(i) \quad \text{or} \quad \frac{M}{P} = YL(i)$$

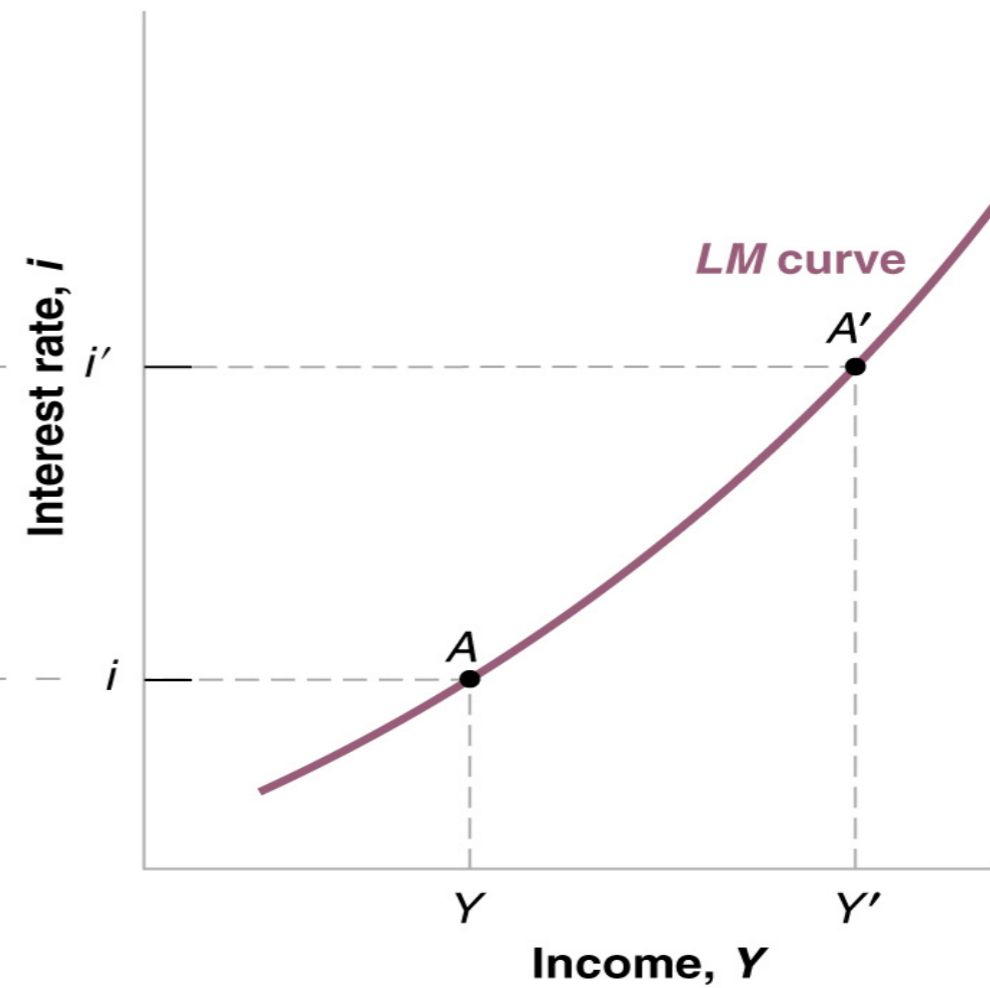
LM Equation: Equilibrium in Financial Market

$$M^d : \frac{M^d}{P} = YL(i) \quad M^{d'} : \frac{M^d}{P} = Y'L(i) \quad Y' > Y$$

$$A : \frac{M^S}{P} = \frac{M^d}{P} \quad A' : \frac{M^S}{P} = \frac{M^{d'}}{P}$$



(a)



(b)

LM Equation: Equilibrium in Financial Market

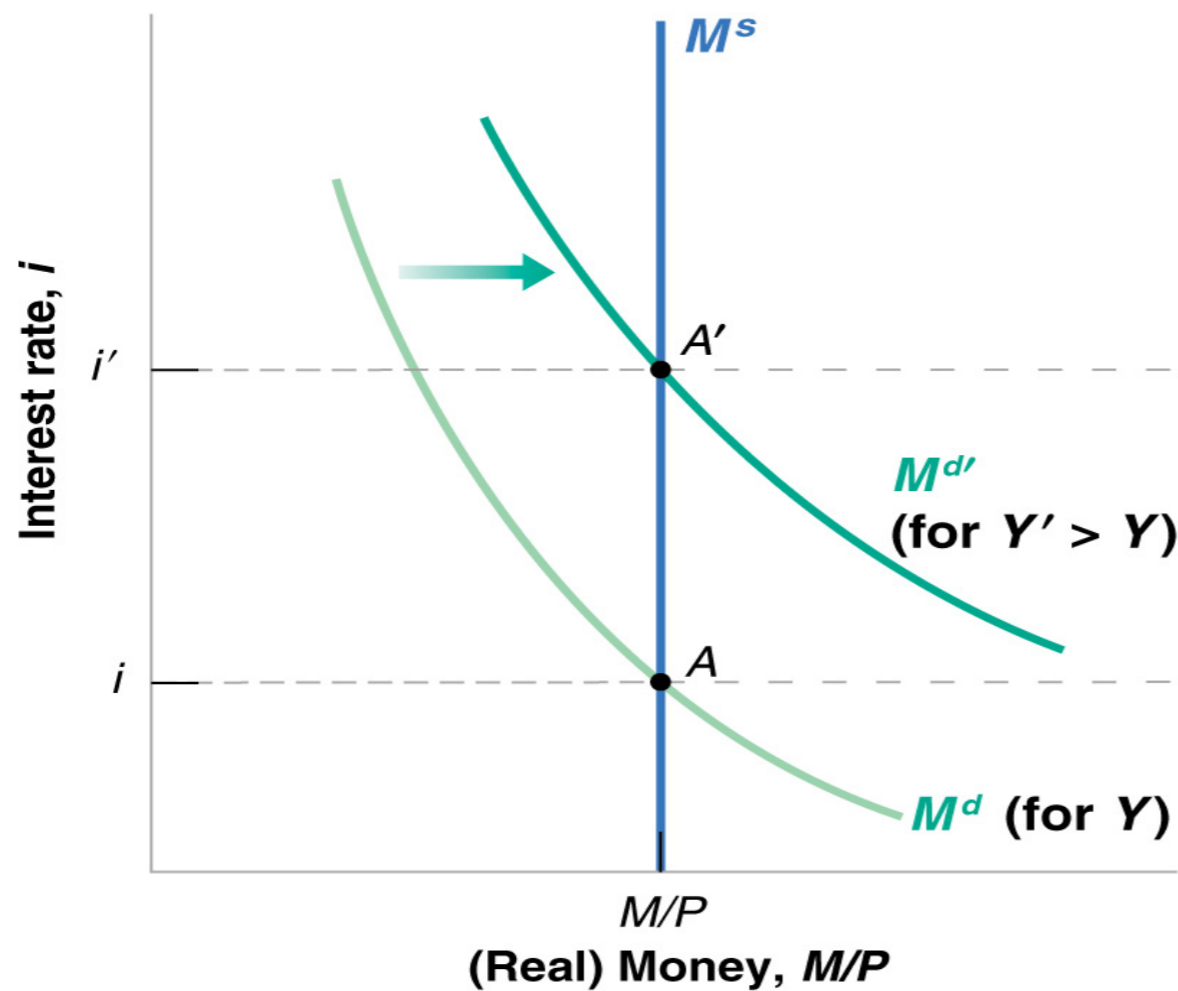
$$M^d : \frac{M^d}{P} = YL(i)$$

$$M^{d'} : \frac{M^{d'}}{P} = Y'L(i) \quad Y' > Y$$

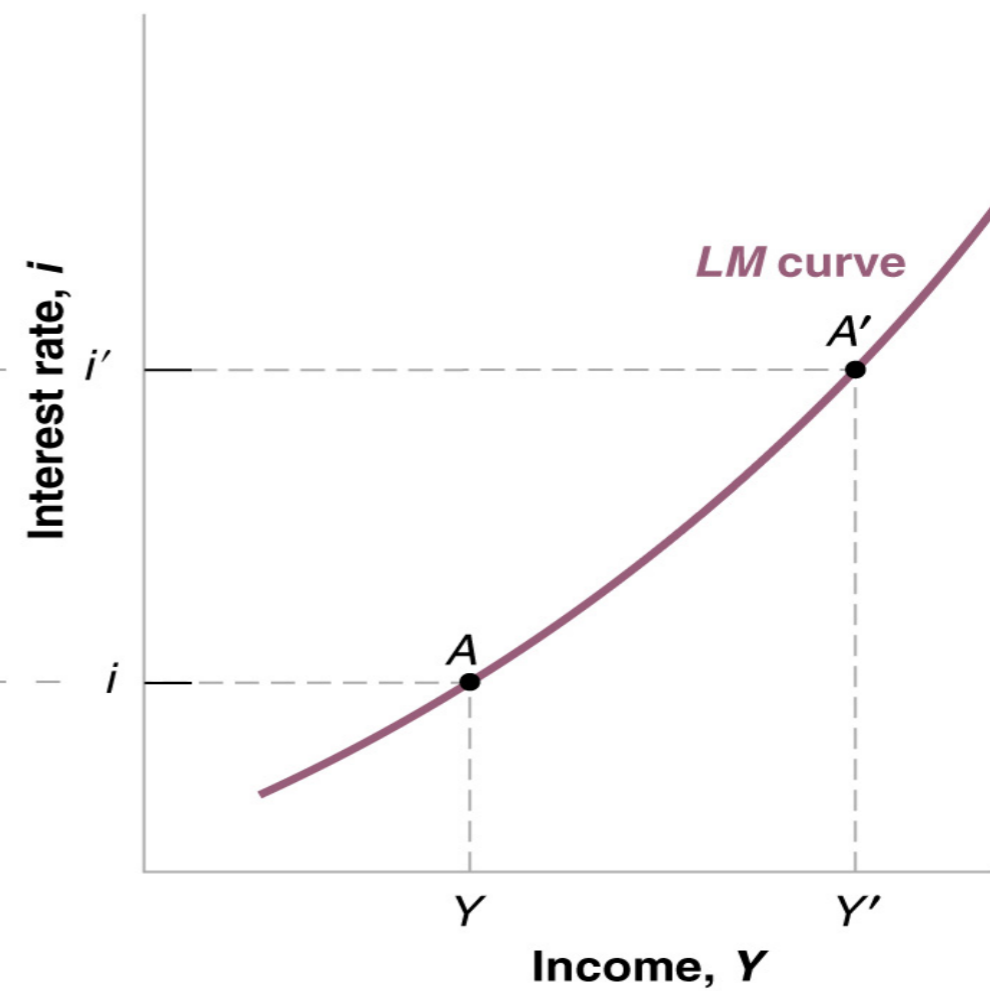
$$A : \frac{M^S}{P} = \frac{M^d}{P}$$

$$A' : \frac{M^S}{P} = \frac{M^{d'}}{P}$$

In the MONEY market, there is a **POSITIVE** relationship between **OUTPUT** and **INTEREST RATE**



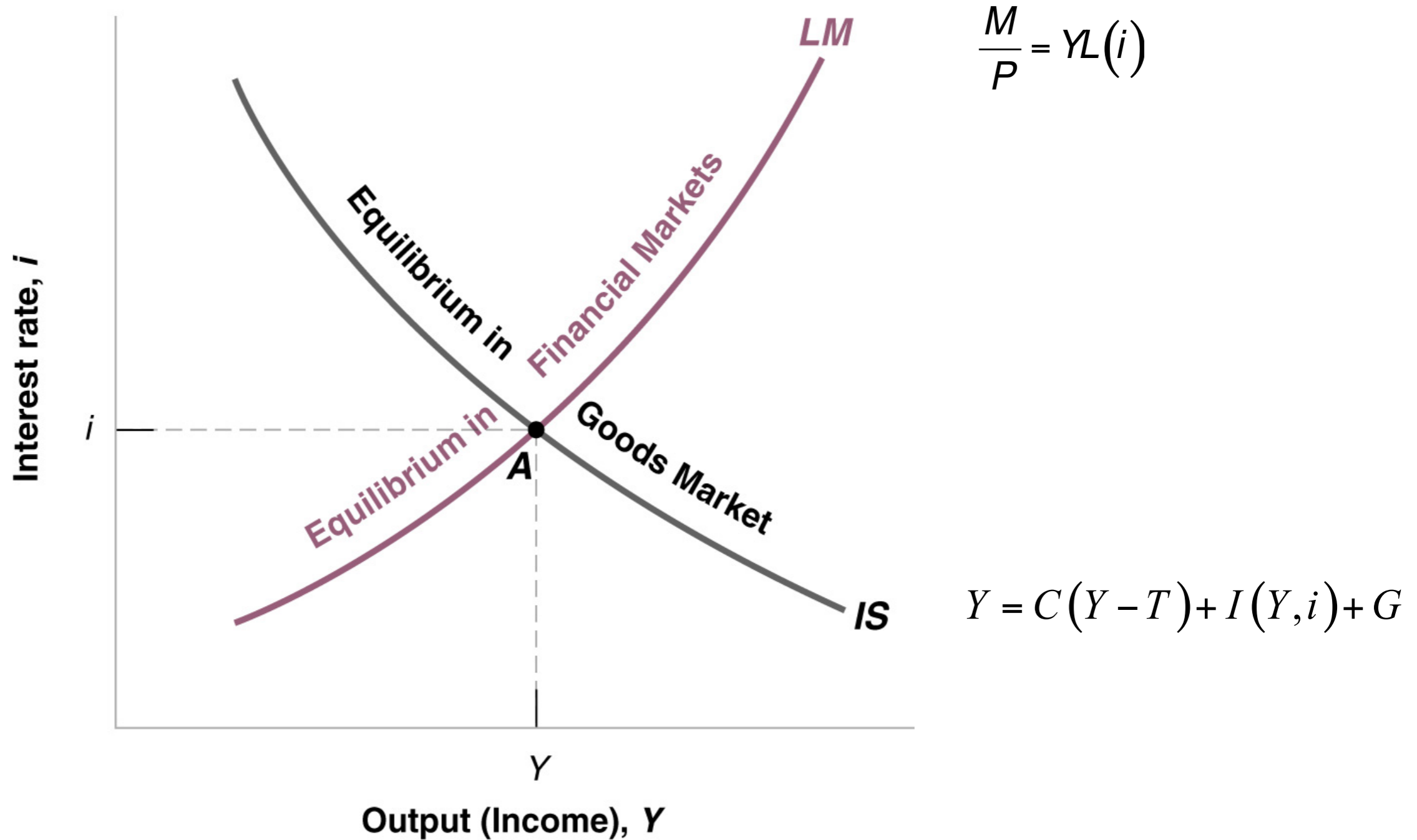
(a)



(b)

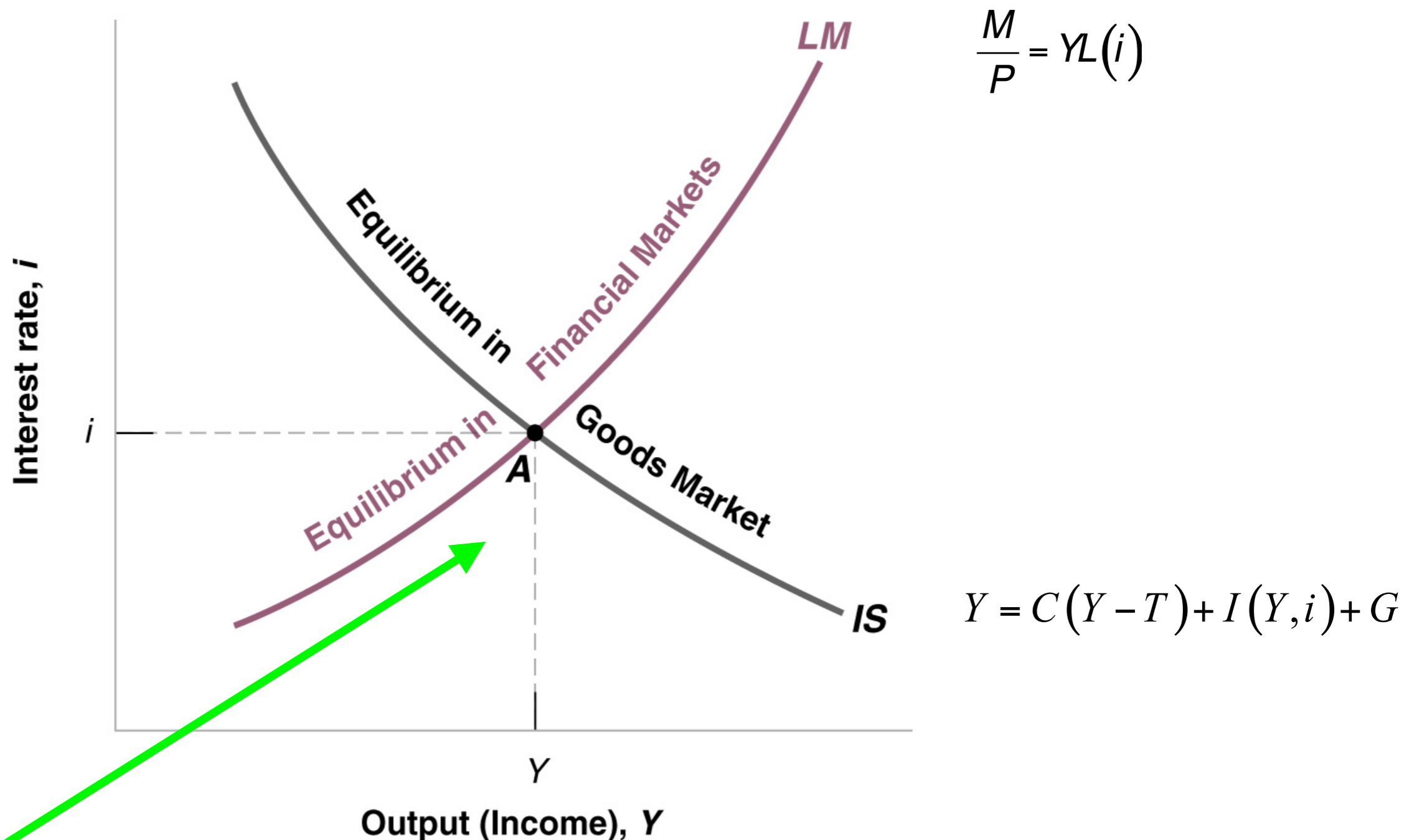
IS-LM Model

Joint equilibrium in Goods Market and Financial Market



IS-LM Model

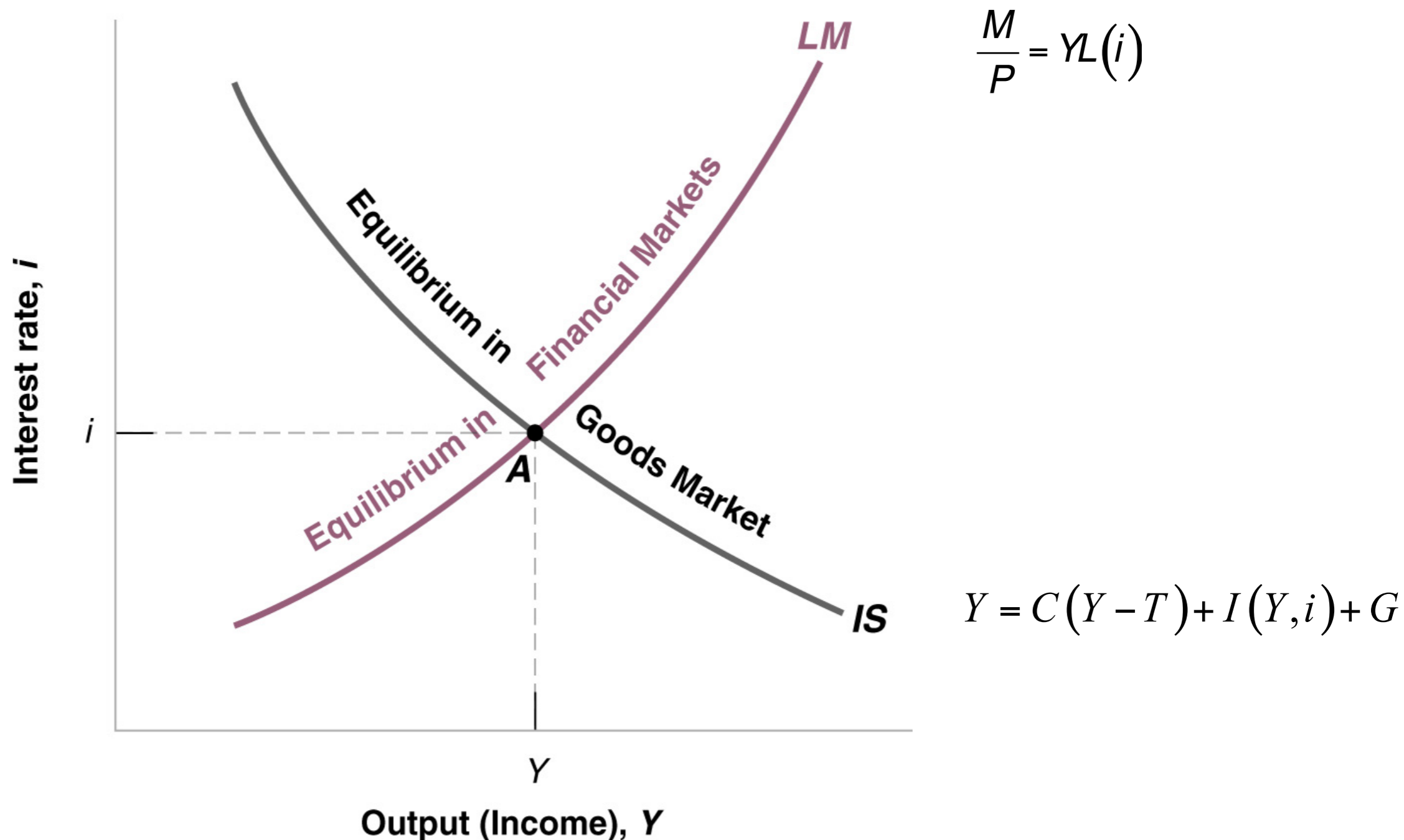
Joint equilibrium in Goods Market and Financial Market



Point A: Income Y and interest rate i at which both the market for goods and the market for money are in equilibrium.

IS-LM Model

Joint equilibrium in Goods Market and Financial Market



Important Distinction: movements *along* a curve VS. *shifts* of a curve

Y, i

M, T, G, P, C_0, I_0

Fiscal and Monetary Policy

Closed Economy

Short-Run

Medium-Run

Fiscal:

Very Powerful

$$G \uparrow \Rightarrow Y \uparrow, r \uparrow$$

- No effect on Y
- Only on r and P

Monetary:

Very Powerful

$$M \uparrow \Rightarrow Y \uparrow, r \downarrow$$

- No effect on Y and r
- Only on P

Fiscal and Monetary Policy

Closed Economy

	Short-Run	Medium-Run
Fiscal:	Very Powerful $G \uparrow \Rightarrow Y \uparrow, r \uparrow$	- No effect on Y - Only on r and P
Monetary:	Very Powerful $M \uparrow \Rightarrow Y \uparrow, r \downarrow$	- No effect on Y and r - Only on P



Q2

Fiscal austerity + Monetary expansion



Q3

Consumer confidence