MACROECONOMICS 2

National Income Review

Micro vs. Macro

- ***Microeconomics***:
  The study of how individual households and firms make decisions, interact with one another in markets.
- ***Macroeconomics***:
  The study of the economy as a whole.
- We begin our study of macroeconomics with the country's total income and expenditure.

Income and Expenditure

- **Gross Domestic Product (GDP)** measures total income of everyone in the economy.
- GDP also measures total expenditure on the economy's output of g&s.

For the economy as a whole,

income equals expenditure

because every dollar a buyer spends

is a dollar of income for the seller.

The Circular-Flow Diagram

- a simple depiction of the macroeconomy
- illustrates GDP as spending, revenue, factor payments, and income
- Preliminaries:
  - **Factors of production** are inputs like labor, land, capital, and natural resources.
  - **Factor payments** are payments to the factors of production (*e.g.*, wages, rent).

The Circular-Flow Diagram

Households:

- own the factors of production, sell/rent them to firms for income
- buy and consume goods & services

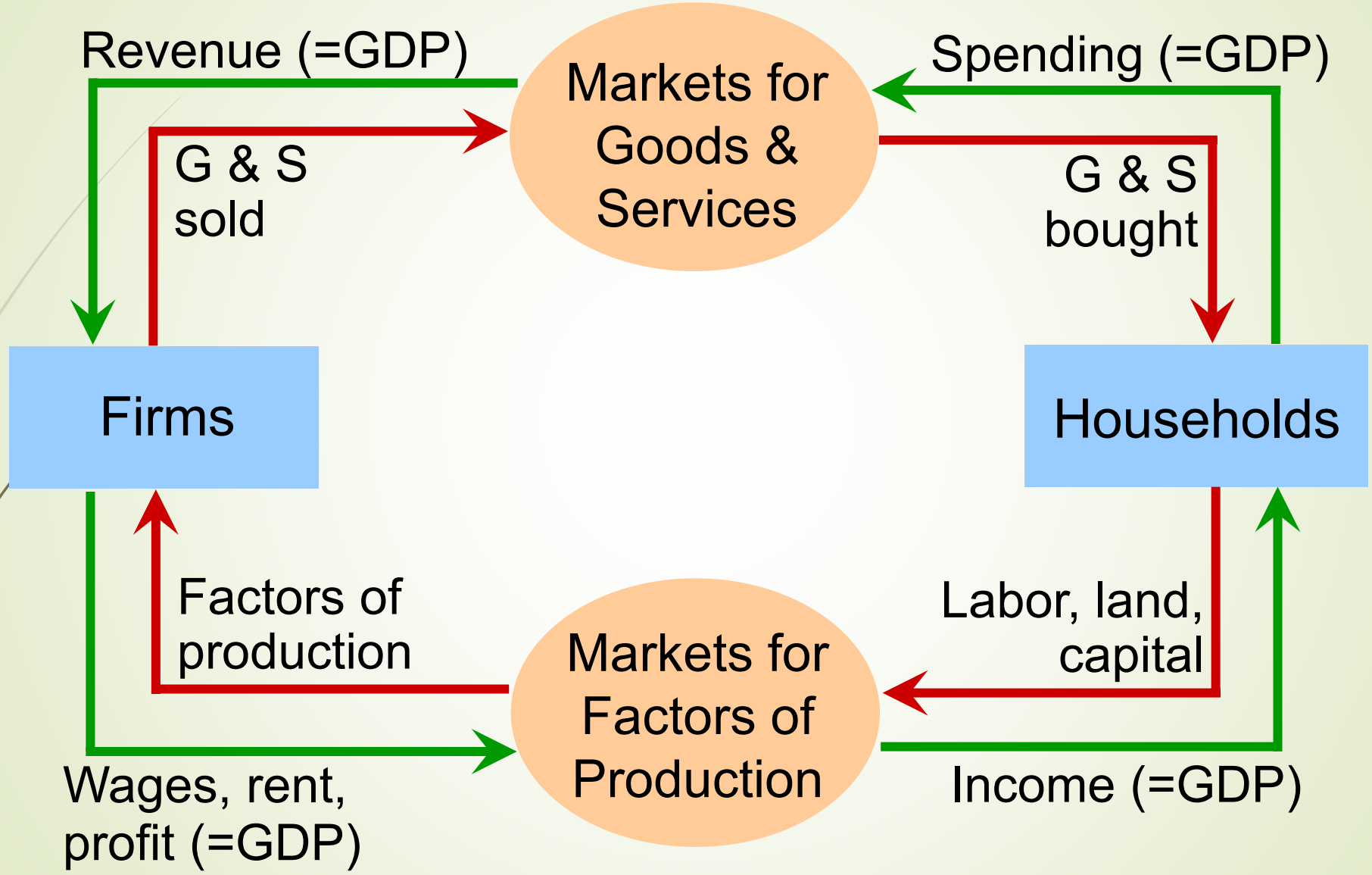
Firms

Households

Firms:

- buy/hire factors of production, use them to produce goods and services
- sell goods & services

The Circular-Flow Diagram



What This Diagram Omits

- The government
  - collects taxes, buys g&s
- The financial system
  - matches savers' supply of funds with borrowers' demand for loans
- The foreign sector
  - trades g&s, financial assets, and currencies with the country's residents

Gross Domestic Product (GDP) Is…

…the market value of all final goods & services produced within a country in a given period of time.

Goods are valued at their market prices, so:

- *All goods measured in the same units (e.g., dollars in the U.S.)*
- *Things that don't have a market value are excluded, e.g., housework you do for yourself.*

Gross Domestic Product (GDP) Is…

…the market value of all final goods & services produced within a country in a given period of time.

***Final goods**: intended for the end user*

***Intermediate goods**: used as components or ingredients in the production of other goods*

GDP only includes final goods – they already embody the value of the intermediate goods used in their production.

Gross Domestic Product (GDP) Is…

…the market value of all final goods & services produced within a country in a given period of time.

GDP includes tangible goods (like DVDs, mountain bikes, beer)

and intangible services (dry cleaning, concerts, cell phone service).

Gross Domestic Product (GDP) Is…

…the market value of all final goods & services produced within a country in a given period of time.

GDP includes currently produced goods, not goods produced in the past.

Gross Domestic Product (GDP) Is…

…the market value of all final goods & services produced within a country in a given period of time.

GDP measures the value of production that occurs within a country's borders, whether done by its own citizens or by foreigners located there.

Gross Domestic Product (GDP) Is…

…the market value of all final goods & services produced within a country in a given period of time.

Usually a year or a quarter (3 months)

The Components of GDP

- Recall: GDP is total spending.
- Four components:
  - Consumption (**C**)
  - Investment (**I**)
  - Government Purchases (**G**)
  - Net Exports (**NX**)
- These components add up to GDP (denoted **Y**):

$$Y = C + I + G + NX$$

Consumption (C)

- is total spending by households on g&s.
- Note on housing costs:
  - For renters,
    consumption includes rent payments.
  - For homeowners,
    consumption includes the imputed rental value of the house, but not the purchase price or mortgage payments.

Investment (I)

- is total spending on goods that will be used in the future to produce more goods.
- includes spending on
  - capital equipment (*e.g.*, machines, tools)
  - structures (factories, office buildings, houses)
  - inventories (goods produced but not yet sold)

*Note: **"Investment"** does not mean the purchase of financial assets like stocks and bonds.*

Government Purchases (G)

- is all spending on the g&s purchased by govt at the federal, state, and local levels.
- **G** excludes **transfer payments**, such as Social Security or unemployment insurance benefits. They are not purchases of g&s.

Net Exports (NX)

- **NX** = exports – imports
- Exports represent foreign spending on the economy's g&s.
- Imports are the portions of **C**, **I**, and **G** that are spent on g&s produced abroad.
- Adding up all the components of GDP gives:

$$\mathbf{Y = C + I + G + NX}$$

Real versus Nominal GDP

- Inflation can distort economic variables like GDP, so we have two versions of GDP:
  One is corrected for inflation, the other is not.
- **Nominal GDP** values output using current prices. It is not corrected for inflation.
- **Real GDP** values output using the prices of a ***base year***. Real GDP is corrected for inflation.

EXAMPLE:

	A		B	
year	***P***	***Q***	***P***	***Q***
2020	$10	400	$2.00	1000
2021	$11	500	$2.50	1100
2022	$12	600	$3.00	1200

Compute nominal GDP in each year:

Increase:

2020: $10 x 400 + $2 x 1000 = $6,000

2021: $11 x 500 + $2.50 x 1100 = $8,250 — 37.5%

2022: $12 x 600 + $3 x 1200 = $10,800 — 30.9%

EXAMPLE:

	A		B	
year	***P***	***Q***	***P***	***Q***
2020	$10	400	$2.00	1000
2021	$11	500	$2.50	1100
2022	$12	600	$3.00	1200

Compute real GDP in each year, using 2020 as the base year:

Increase:

2020: $10 x 400 + $2 x 1000 = $6,000

2021: $10 x 500 + $2 x 1100 = $7,200 — 20.0%

2022: $10 x 600 + $2 x 1200 = $8,400 — 16.7%

EXAMPLE:

year	*Nominal GDP*	*Real GDP*
2020	$6000	$6000
2021	$8250	$7200
2022	$10,800	$8400

In each year,

- nominal GDP is measured using the (then) current prices.
- real GDP is measured using constant prices from the base year (2020 in this example).

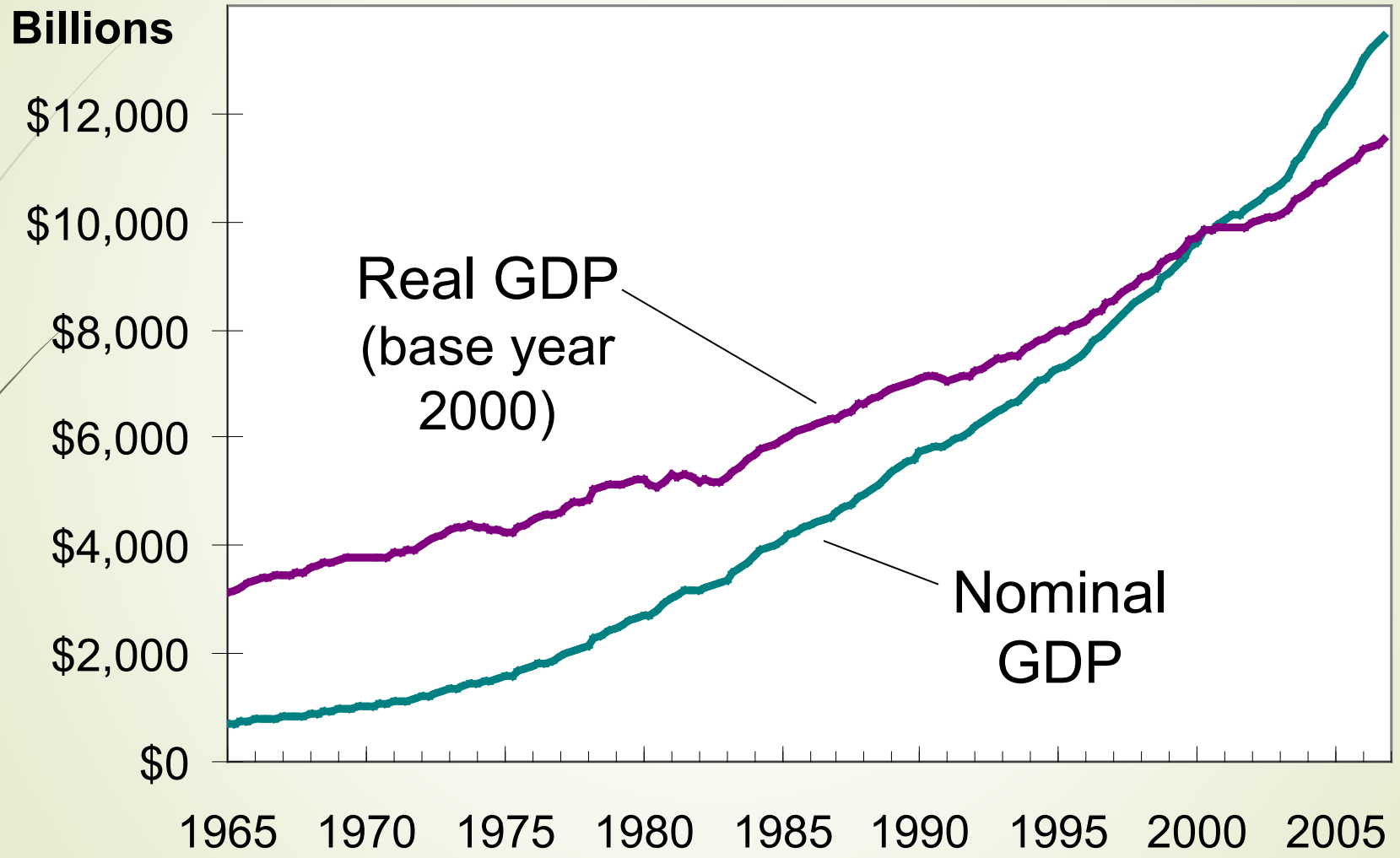
EXAMPLE:

year	*Nominal GDP*		*Real GDP*	
2020	$6000		$6000	
		37.5%		20.0%
2021	$8250		$7200	
		30.9%		16.7%
2022	$10,800		$8400	

- The change in nominal GDP reflects both prices and quantities.
- The change in real GDP is the amount that GDP would change if prices were constant (*i.e.,* if zero inflation).

Hence, real GDP is corrected for inflation.

Nominal and Real GDP in the U.S., 1965-2007



The GDP Deflator

- The GDP deflator is a measure of the overall level of prices.
- Definition:

$$\text{GDP deflator} = 100 \times \frac{\text{nominal GDP}}{\text{real GDP}}$$

- One way to measure the economy's **inflation rate** is to compute the percentage increase in the GDP deflator from one year to the next.

EXAMPLE:

year	*Nominal GDP*	*Real GDP*	*GDP Deflator*	
2020	$6000	$6000	100.0	14.6%
2021	$8250	$7200	114.6	12.2%
2022	$10,800	$8400	128.6	

Compute the GDP deflator in each year:

2020: 100 x (6000/6000) = 100.0

2021: 100 x (8250/7200) = 114.6

2022: 100 x (10,800/8400) = 128.6

The IS-LM model

The IS-LM model

- The IS-LM model translates the General Theory of Keynes into neoclassical terms (often called the *neoclassic synthesis*)
- It was proposed by John Hicks in 1937 in a paper called "Mr Keynes and the "Classics": A Suggested Interpretation" and enhanced by Alvin Hansen (hence it is also called the Hicks-Hansen model).

- The model examines the combined equilibrium of two markets :
  - The goods market, which is at equilibrium when investments equal savings, hence IS.
  - The money market, which is at equilibrium when the demand for liquidity equals money supply, hence LM.
  - Examining the joint equilibrium in these two markets allows us to determine two variables : output Y and the interest rate i.

The IS-LM model

- The model rests on two fundamental assumptions
  - All prices (including wages) are fixed.
  - There exists excess production capacity in the economy
- This is a complete change in perspective compared to classical economics:
  - The level of demand determines the level of output and employment.
  - There can be an equilibrium level of involuntary unemployment.
- Why can there be insufficient demand ?
  - Criticism of Say's law: Uncertainty can lead to precautionary saving rather than consumption.
  - Monetary criticism: the preference for liquidity can lead to under-investment as savings are kept in the form of liquidity.

The IS-LM model

- The IS-LM model has become the "standard model" in macroeconomics.
- Its essential contribution (linked to that of Keynes) is this potential equilibrium unemployment:
  - Such a situation is impossible in earlier neoclassic models, as the price of labour (like all prices) is assumed to adjust naturally until supply and demand for labour are balanced.
- This is why IS-LM (1937!!) remains central to modern macroeconomics, and has been extended to explain more markets/ variables:
  - The AS-AD model adds inflation into the problem
  - The Mundell-Fleming model deals with international trade

The IS-LM model

The IS curve

The LM curve

Macroeconomic equilibrium and policy

The IS curve

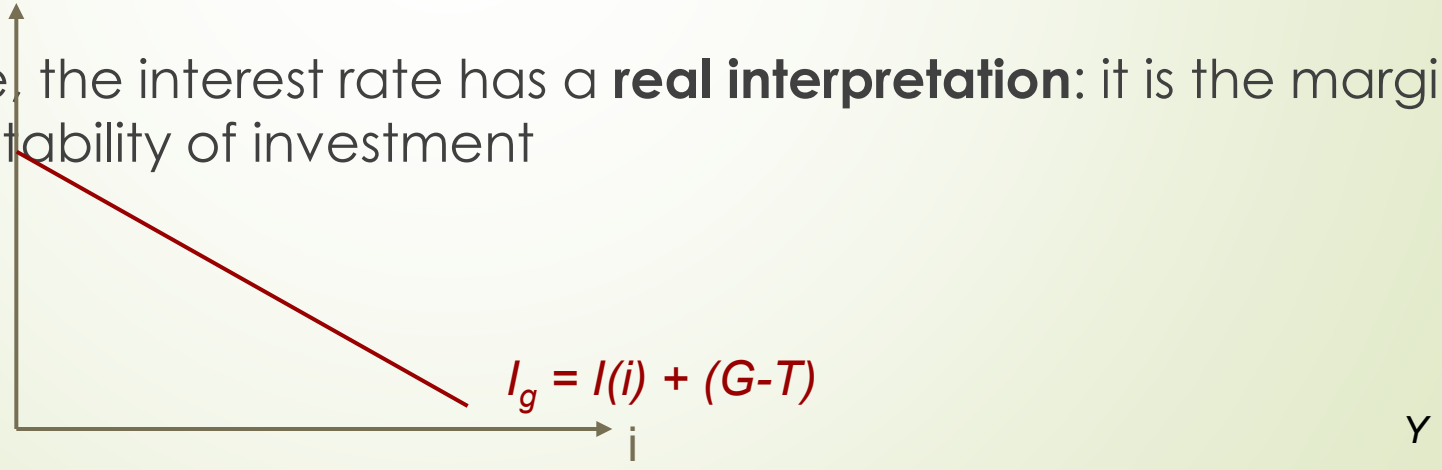
- The IS curve shows all the combinations of interest rates *i* and outputs *Y* for which the goods market is in equilibrium
  - It is based on the goods market equilibrium we have examined in the first two weeks
- However, a simplifying assumption we made initially was that investment *I* was exogenous
  - We know that investment actually depends negatively on the level of interest

The IS curve

- The Investment function
  - Is the sum of private investment (endogenous) and public investment (exogenous)

$$I_g = I\left(\underset{-}{i}\right) + \left(G - T\right)$$

  - Here, the interest rate has a **real interpretation**: it is the marginal profitability of investment

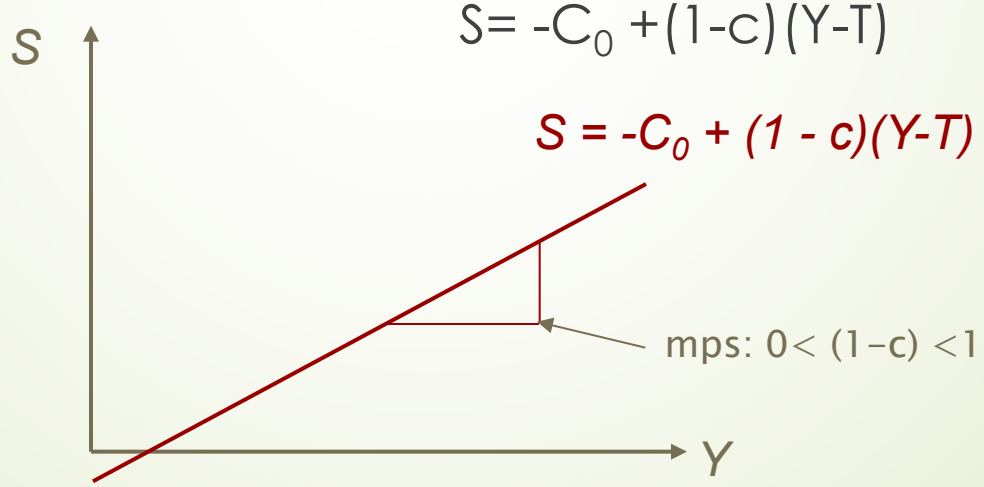


The IS curve

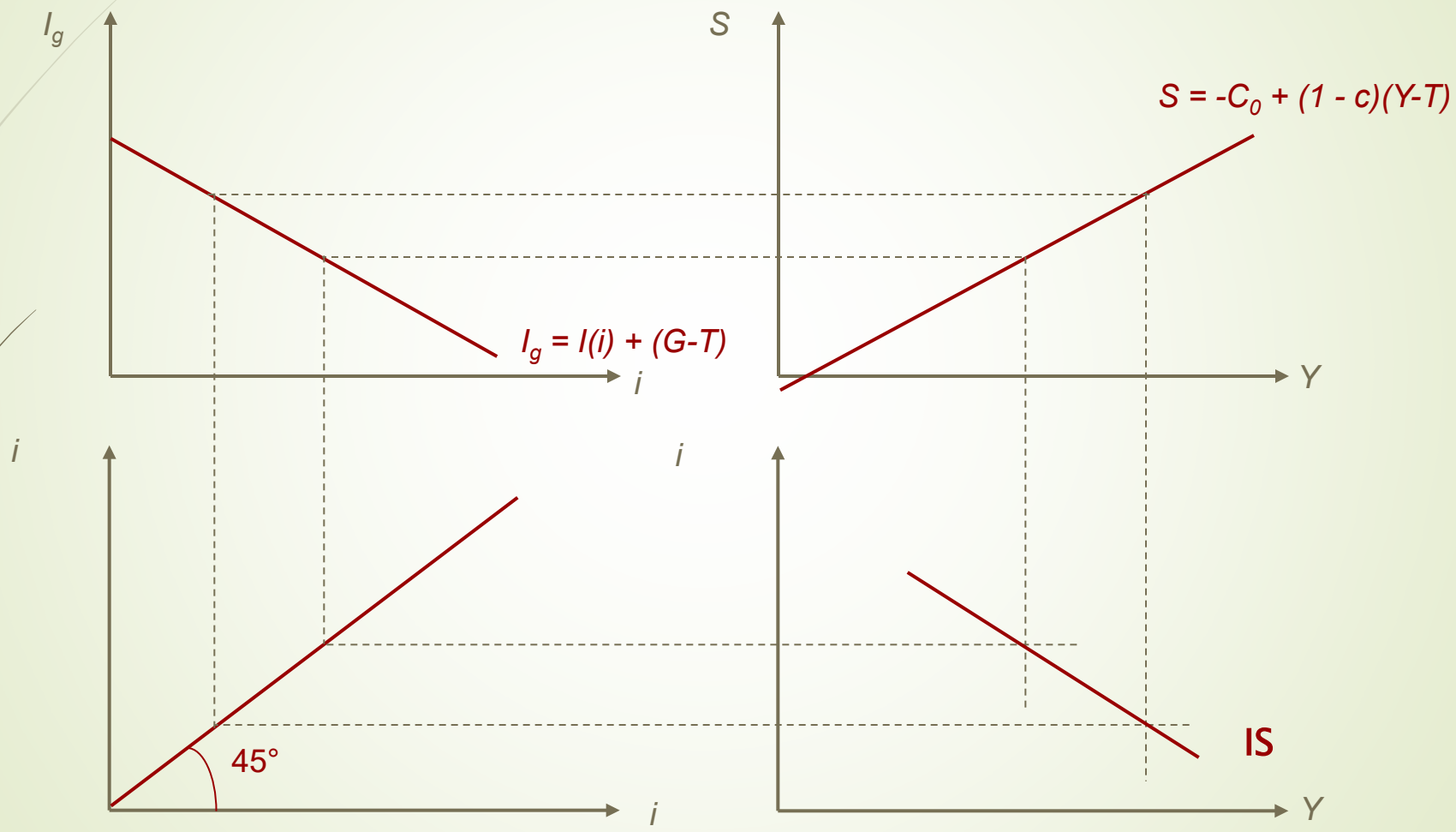
- The Savings function
  - Is obtained from the aggregate demand equation, subtracting investment and consumption:

$$S=Y-C-T$$

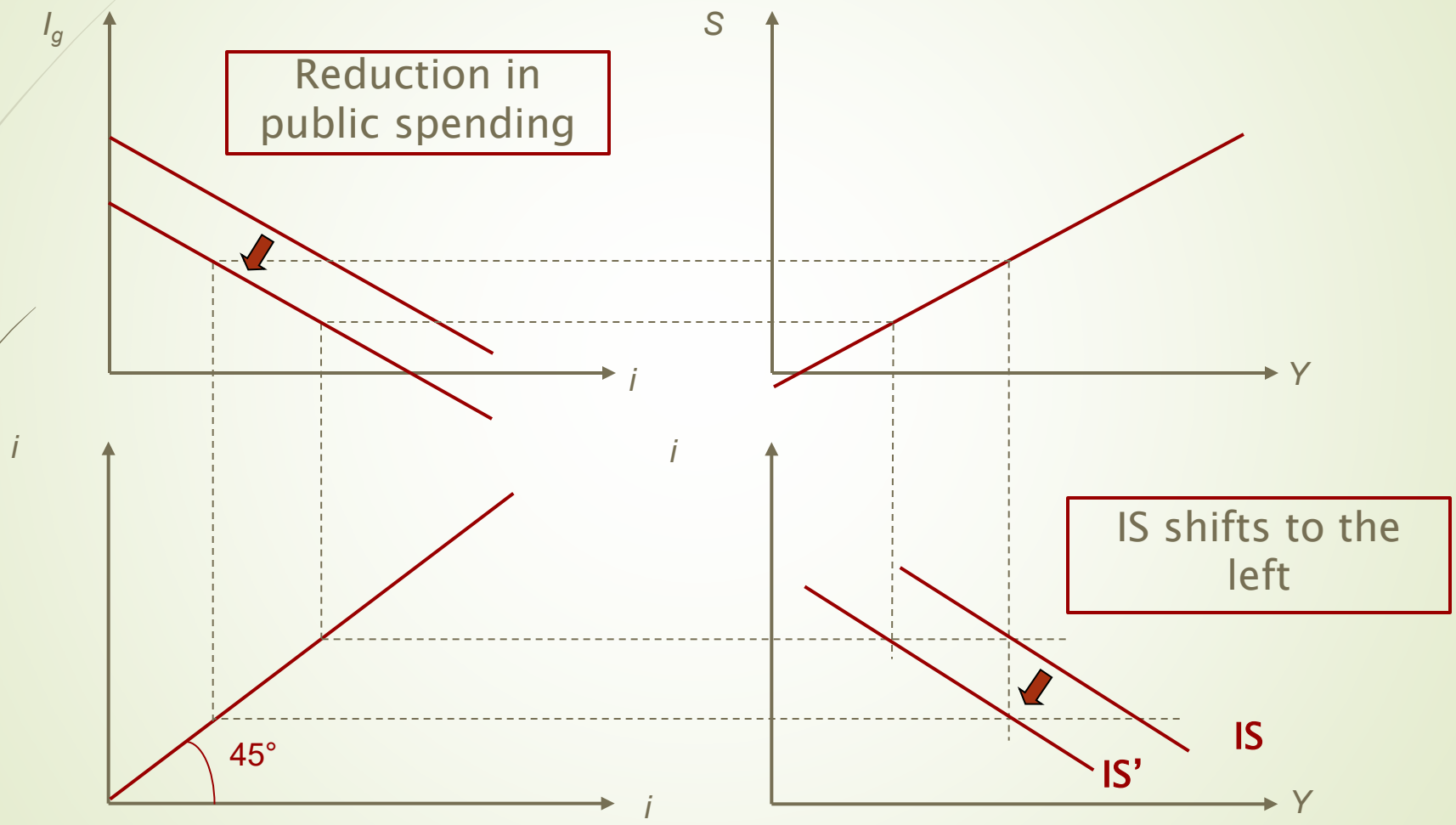
$$S= -C_0 +(1-c)(Y-T)$$



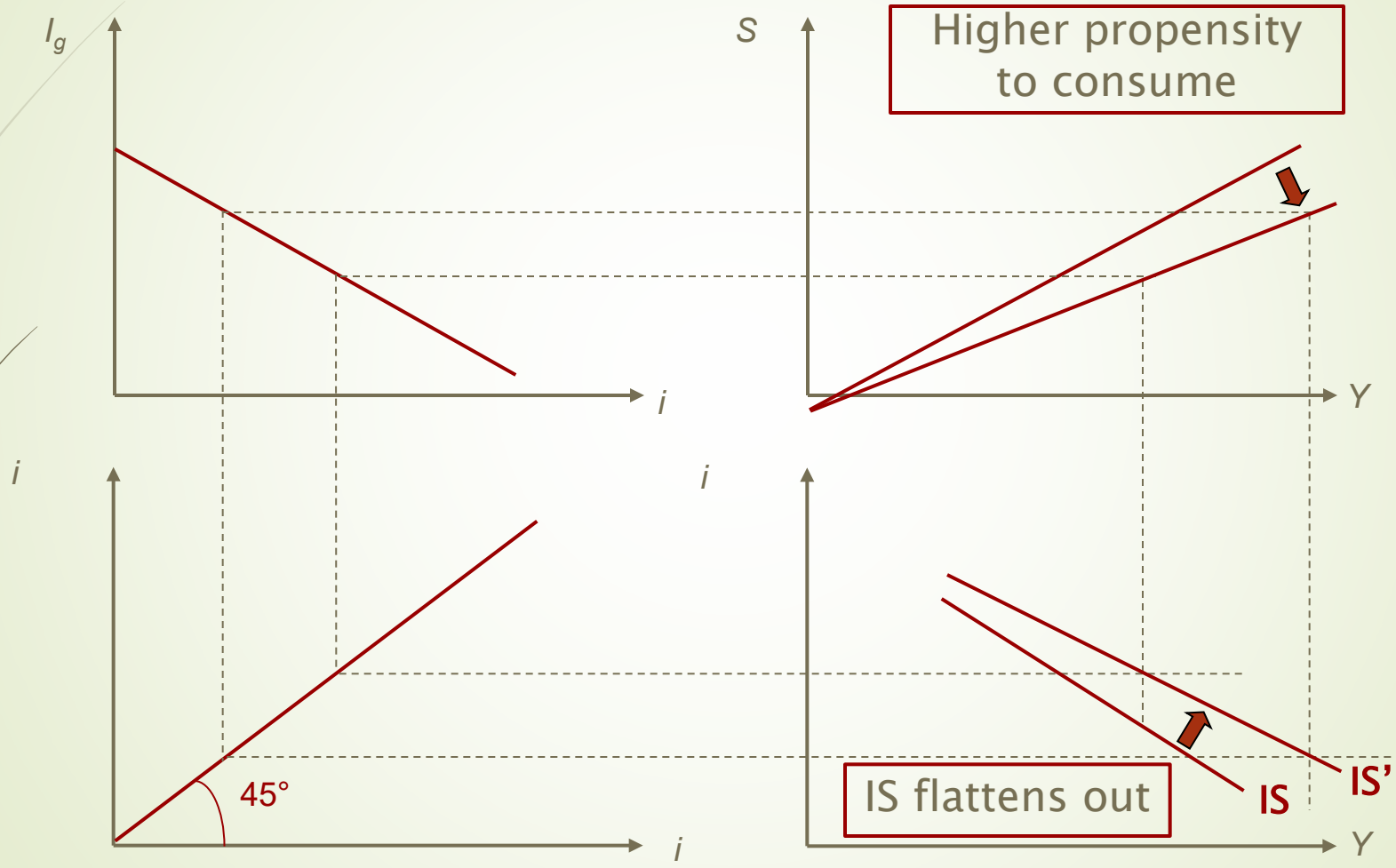
The IS curve



The IS curve


I_g
Reduction in public spending
i
S
Y
i
45°
i
i
IS
IS'
Y
IS shifts to the left

The IS curve


I_g
i
S
Y
Higher propensity to consume
i
45°
i
i
IS flattens out
IS
IS'
Y

The IS-LM model

The IS curve

The LM curve

Macroeconomic equilibrium and policy

The LM curve

- The LM curve shows all the combinations of interest rates *i* and outputs *Y* for which the money market is in equilibrium
  - It is based on the money market equilibrium we have examined last two weeks

- This time the interest rate *i* has a **monetary interpretation**:
  - It is the opportunity cost of money, in other words the payment made for renouncing liquidity (preference for liquidity)

The LM curve

- Liquidity preference: Given a level of output *Y*, the level of interest *i* adjusts so that the demand for money (given by the liquidity function L) equals the exogenous supply:

$$\frac{\overline{M}}{\overline{P}} = L\left(\underset{+}{Y}, \underset{-}{i}\right)$$

- M = Money supple (exogenous)
- P = Level of prices (exogenous by assumption)

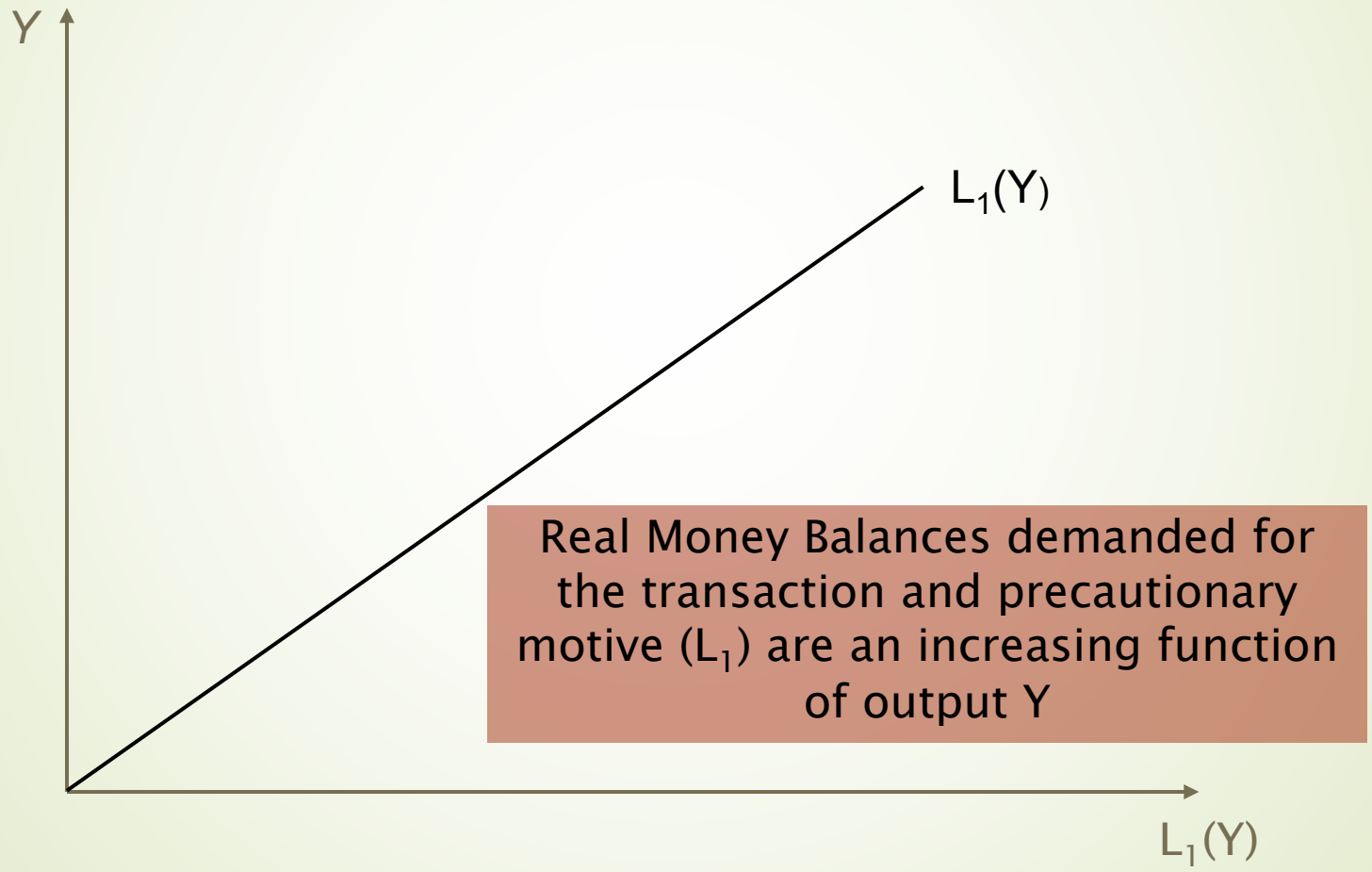
The LM curve

- Simplifying assumption: The liquidity function, which gives the demand for real money balances, can be decomposed depending on the type of demand

$$L(Y,i) = L_1\underset{+}{(Y)} + L_2\underset{-}{(i)}$$

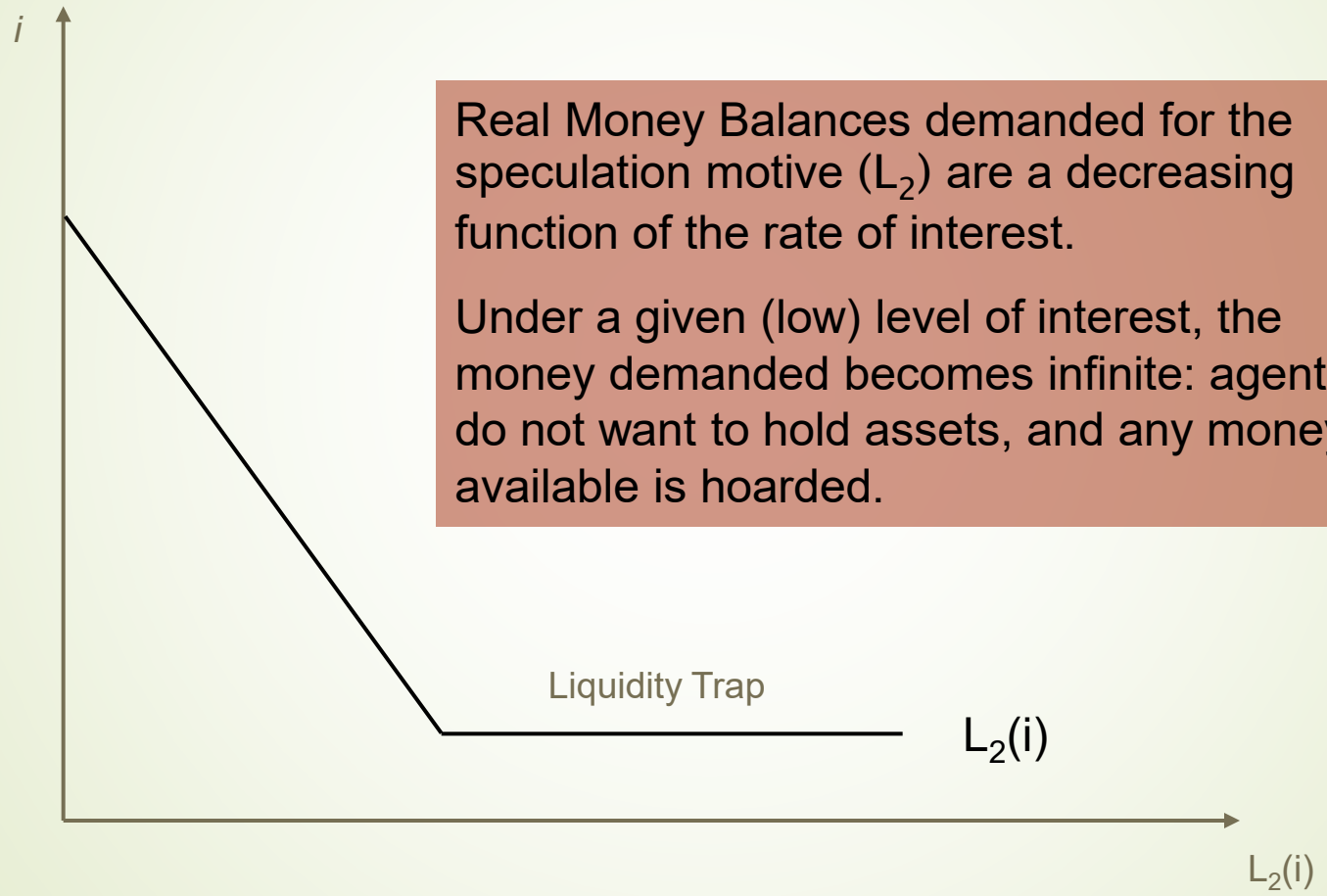
- There are two motives for demanding real money balances:
  - **The transaction and precautionary motive $L_1(Y)$** : The money demanded in order to be able to transact in the future (function of the level of output)
  - **The speculation motive $L_2(i)$** : The money demanded for purposes of speculation (opportunity cost of the interest rate). When interest is high, people don't want to hold money, whereas when the rates are low, money demanded increases.

The LM curve



Real Money Balances demanded for the transaction and precautionary motive (L_1) are an increasing function of output Y

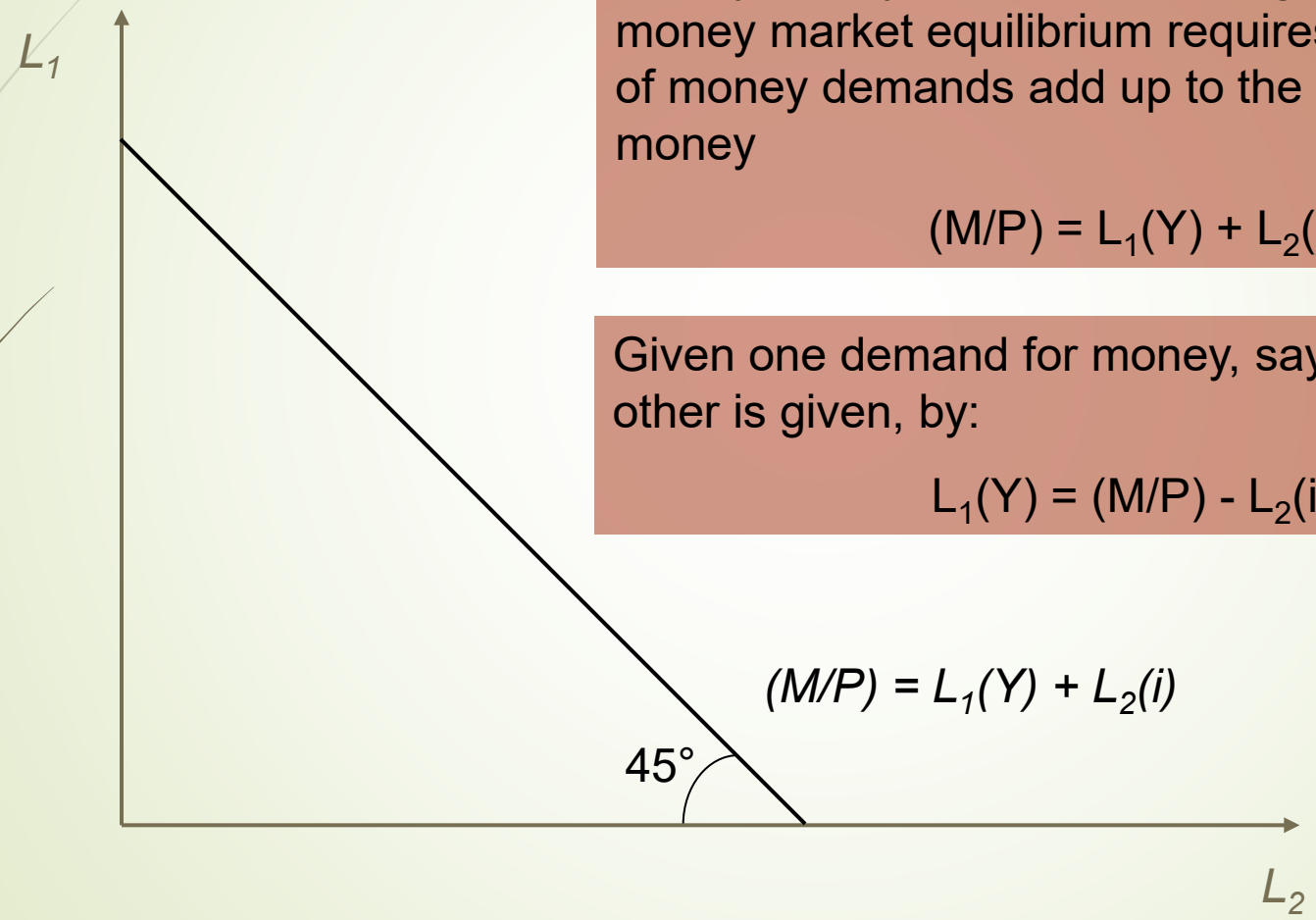
The LM curve



Real Money Balances demanded for the speculation motive (L_2) are a decreasing function of the rate of interest.

Under a given (low) level of interest, the money demanded becomes infinite: agents do not want to hold assets, and any money available is hoarded.

The LM curve



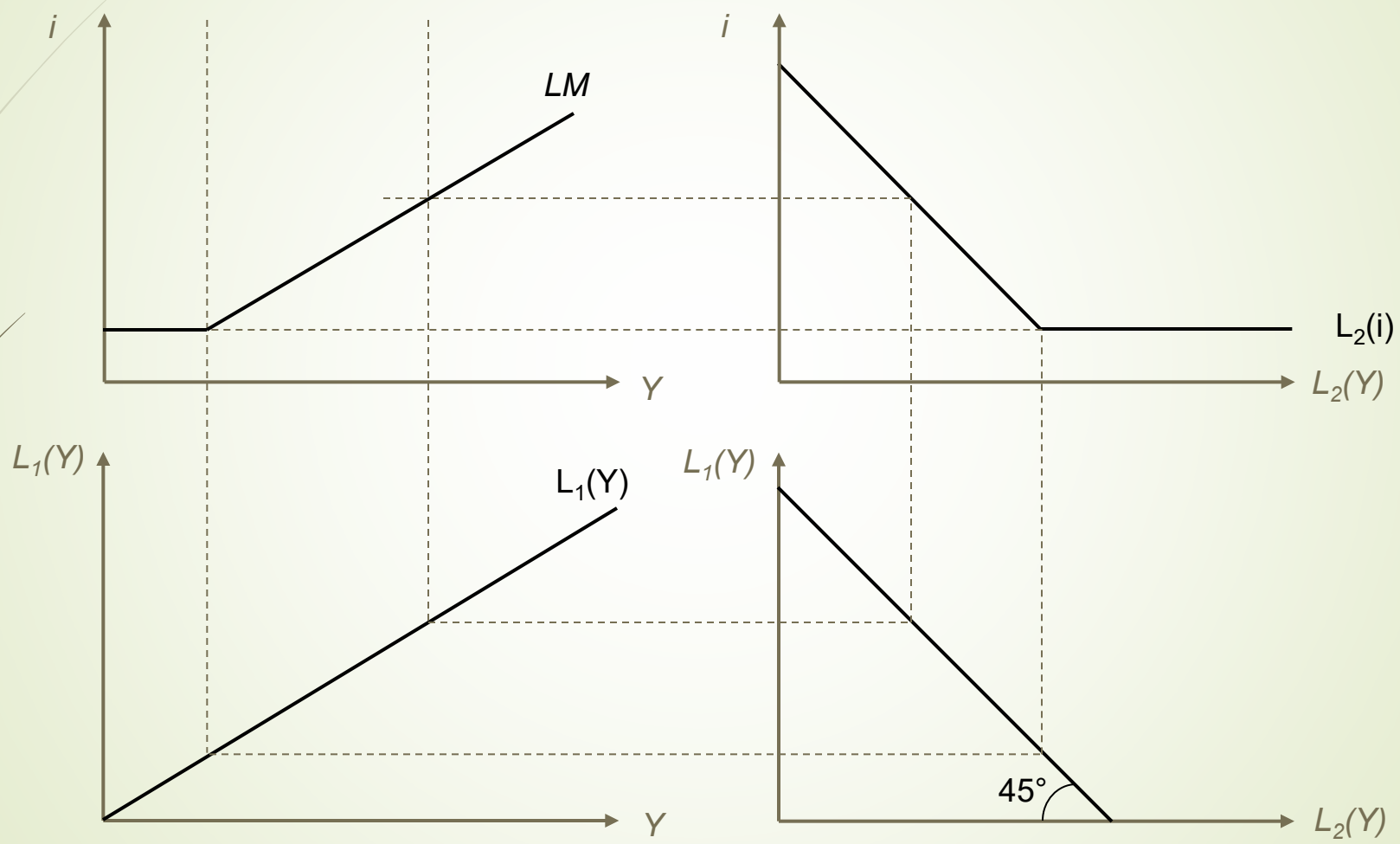
Money supply M is fixed and exgogenous. The money market equilibrium requires that the sum of money demands add up to the supply of money

$$(M/P) = L_1(Y) + L_2(i)$$

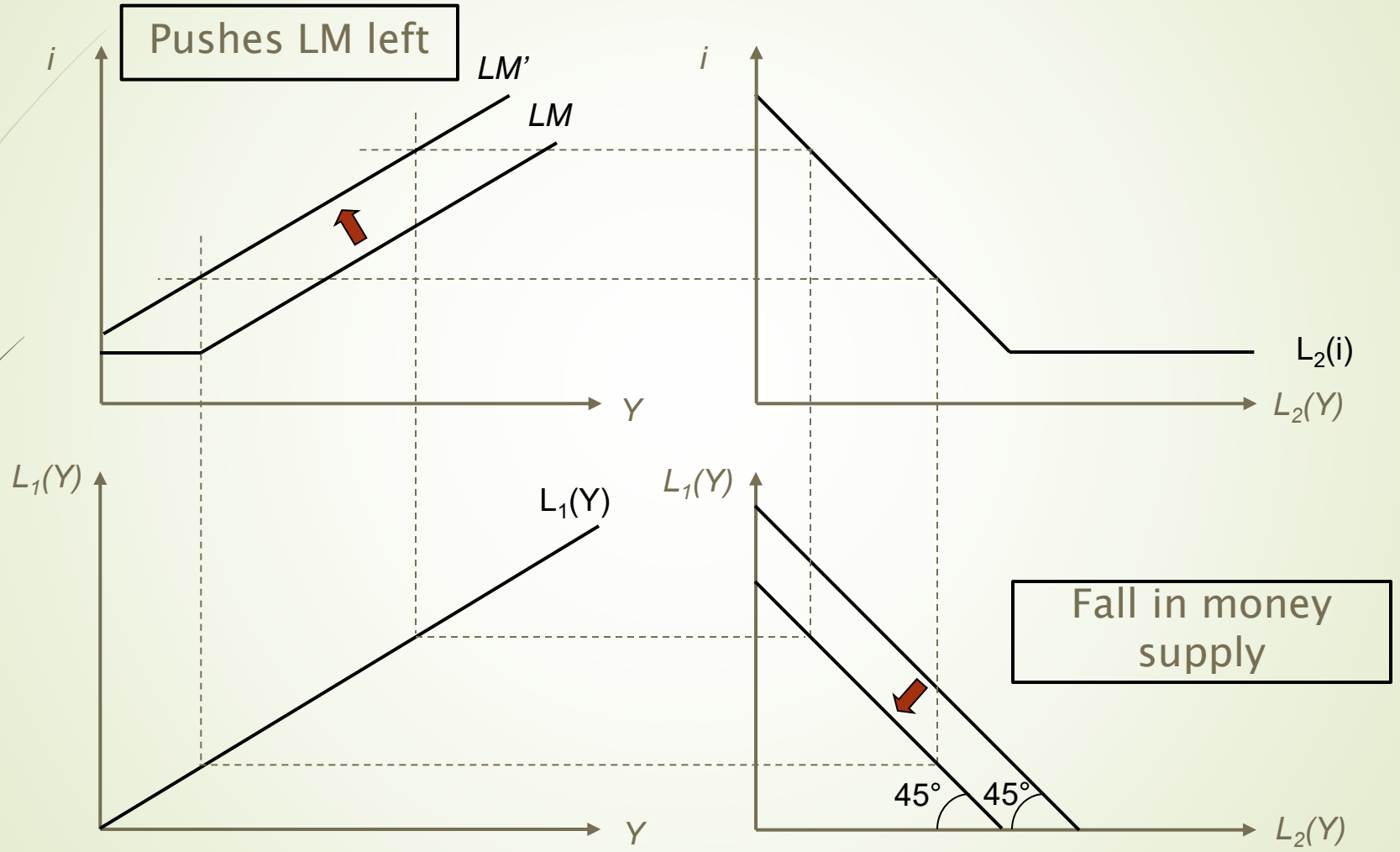
Given one demand for money, say $L_2(i)$, then the other is given, by:

$$L_1(Y) = (M/P) - L_2(i)$$

The LM curve



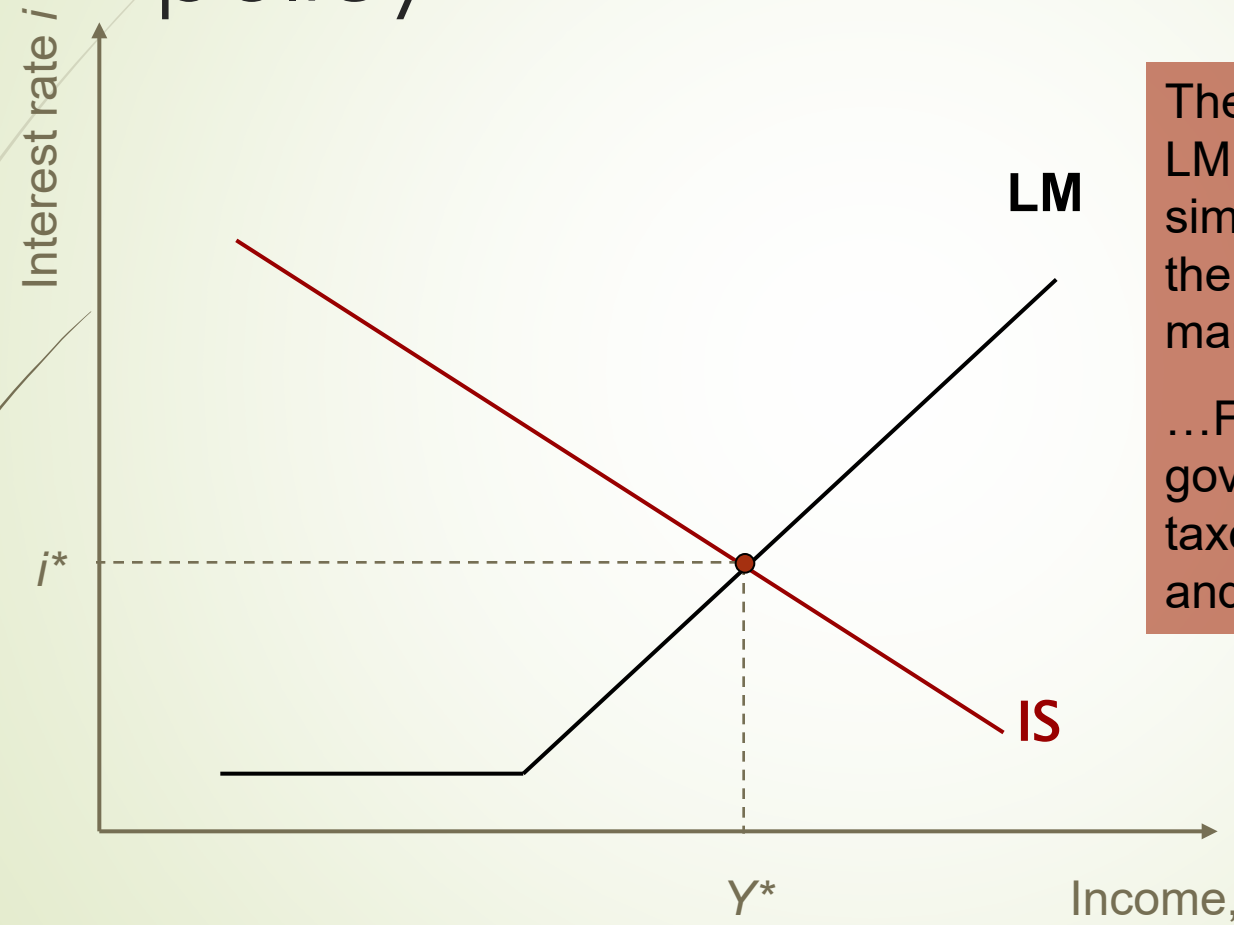
The LM curve


Pushes LM left
i
LM'
LM
Y
i
L2(i)
L2(Y)
L1(Y)
L1(Y)
Y
L1(Y)
Fall in money supply
45°
45°
L2(Y)

The IS-LM model

Macroeconomic equilibrium and policy

Macroeconomic equilibrium and policy



The intersection of IS and LM represents the simultaneous equilibrium on the goods and the money market…

…For a given value of government spending G, taxes T, money supply M and prices P

Macroeconomic equilibrium and policy

- IS-LM can be employed to assess the impact of exogenous shocks on the endogenous variables of the model (interest rates and output)

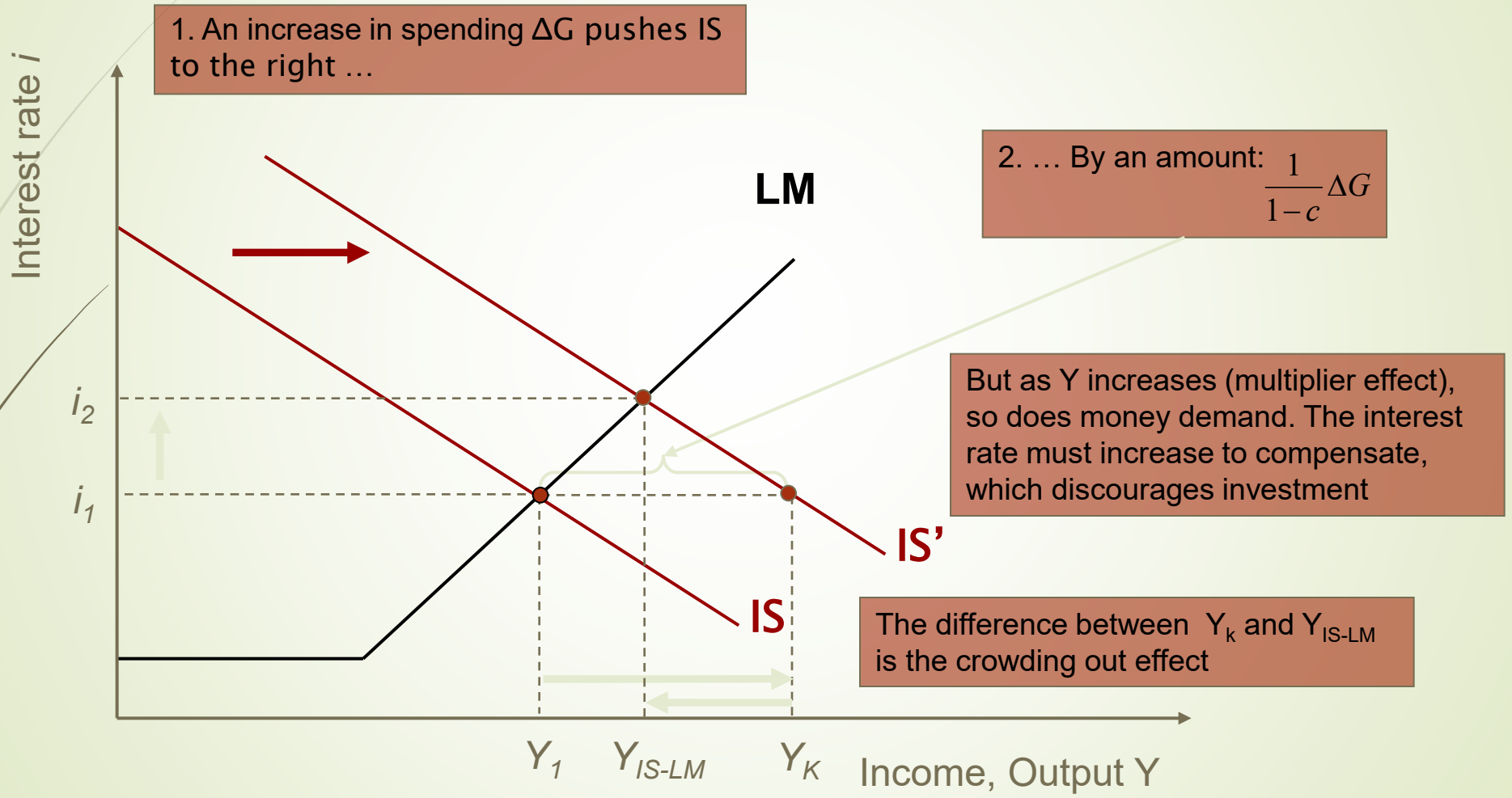
- A way can also evaluate the effectiveness of the policy mix, i.e. the combination of:
  - Fiscal policy: changes to government spending and taxation
  - Monetary policy: changes to money supply

Macroeconomic equilibrium and policy

- Fiscal policy affects the equilibrium in the goods market, *via* changes in G and T.
  - We've seen that this influences the IS curve.

- The shift in IS affects both endogenous variables (output and interest rate)
  - In the previous weeks, we assumed that investment was exogenous (There was no interest rate in the basic model)
  - *I* did not change when *G* or *T* were changed
  - This is no longer the case with IS-LM : there is a crowding out effect

Macroeconomic equilibrium and policy



Macroeconomic equilibrium and policy

- Remember that the equilibrium condition of the economy could be expressed as:

$$G - T = S(Y) - I(i)$$

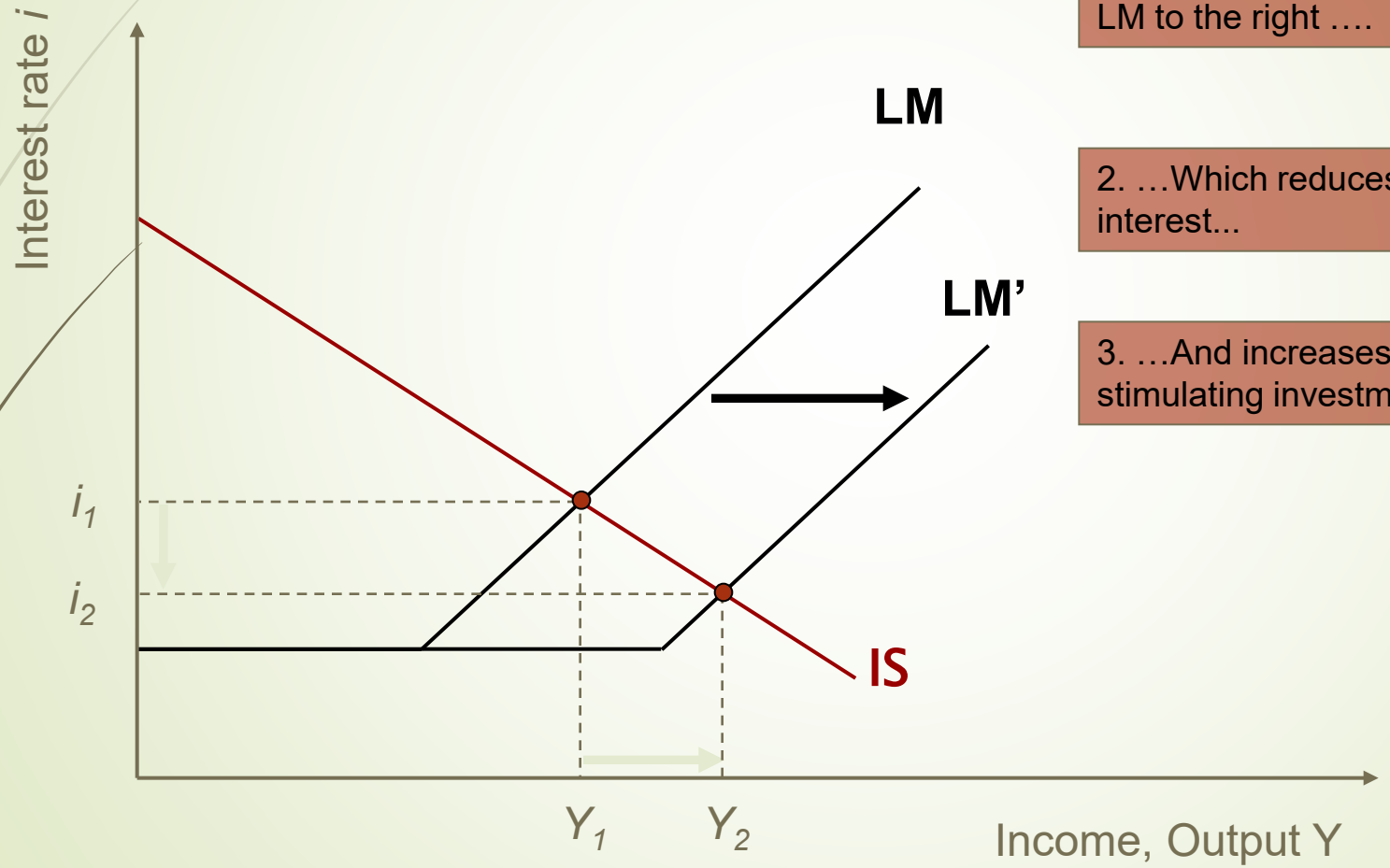
- Now that we have integrated interest rates...
- If G-T increases (fiscal policy), the economy attempts to correct the disequilibrium by:
  - Increasing S (multiplier effect on output)
  - Reducing I (crowding out on private investment)

Macroeconomic equilibrium and policy

- Monetary policy affects the equilibrium in the money market, *via* changes in M.
  - We've seen that this influences the LM curve.

- As for fiscal policy, the shift in LM affects both endogenous variables (output and interest rate)
  - Money is not neutral !!
  - This is one of the central contributions of Keynes
  - This conclusion will change somewhat when we examine AS-AD (IS-LM with inflation)

Macroeconomic equilibrium and policy



1. An increase in money supply shifts LM to the right ….

2. …Which reduces the rate of interest...

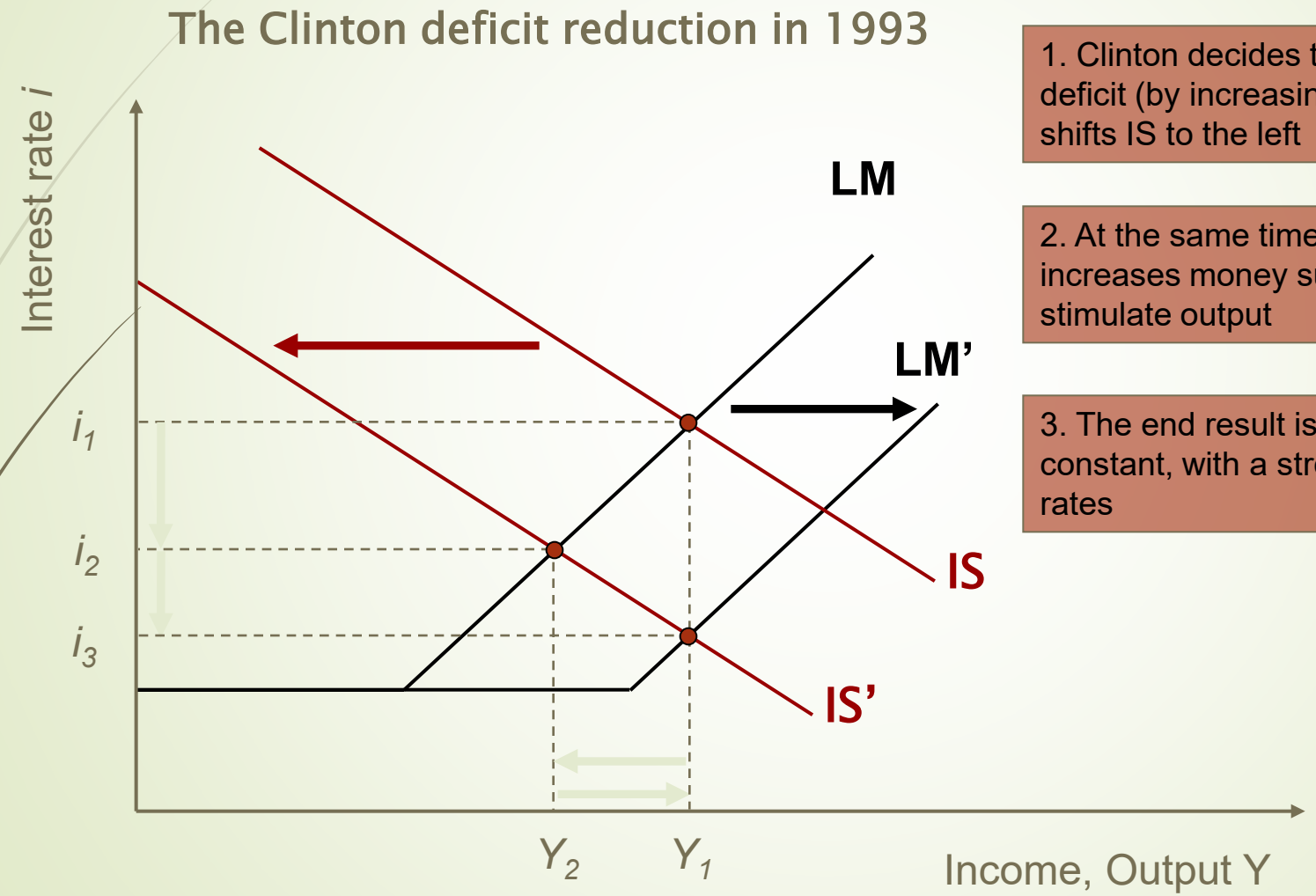
3. …And increases output by stimulating investment.

Macroeconomic equilibrium and policy

- The two policies are not independent, as they *both* affect the endogenous variables:
  - The interest rate i
  - Income Y
  - Hence the idea of a *policy mix*…

- **3 examples of policy mix issues**
  - The good: the Clinton deficit reduction in 1993,
  - The bad: the German reunification in 1992,
  - The ugly : the current debate on the "liquidity trap".

Macroeconomic equilibrium and policy

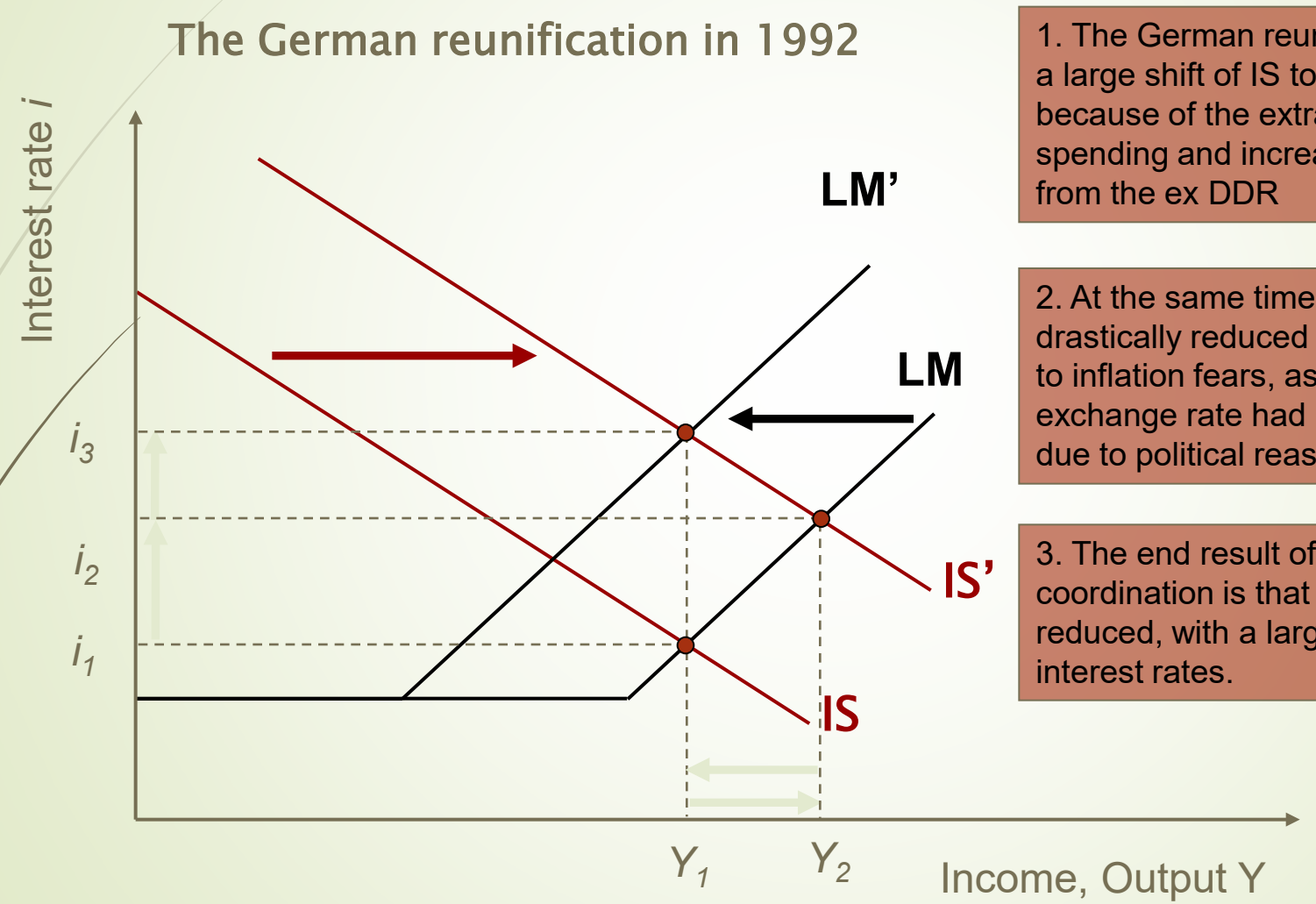


1. Clinton decides to reduce the US deficit (by increasing taxes) , which shifts IS to the left

2. At the same time, Alan Greenspan increases money supply in order to stimulate output

3. The end result is that output is held constant, with a strong fall in interest rates

Macroeconomic equilibrium and policy

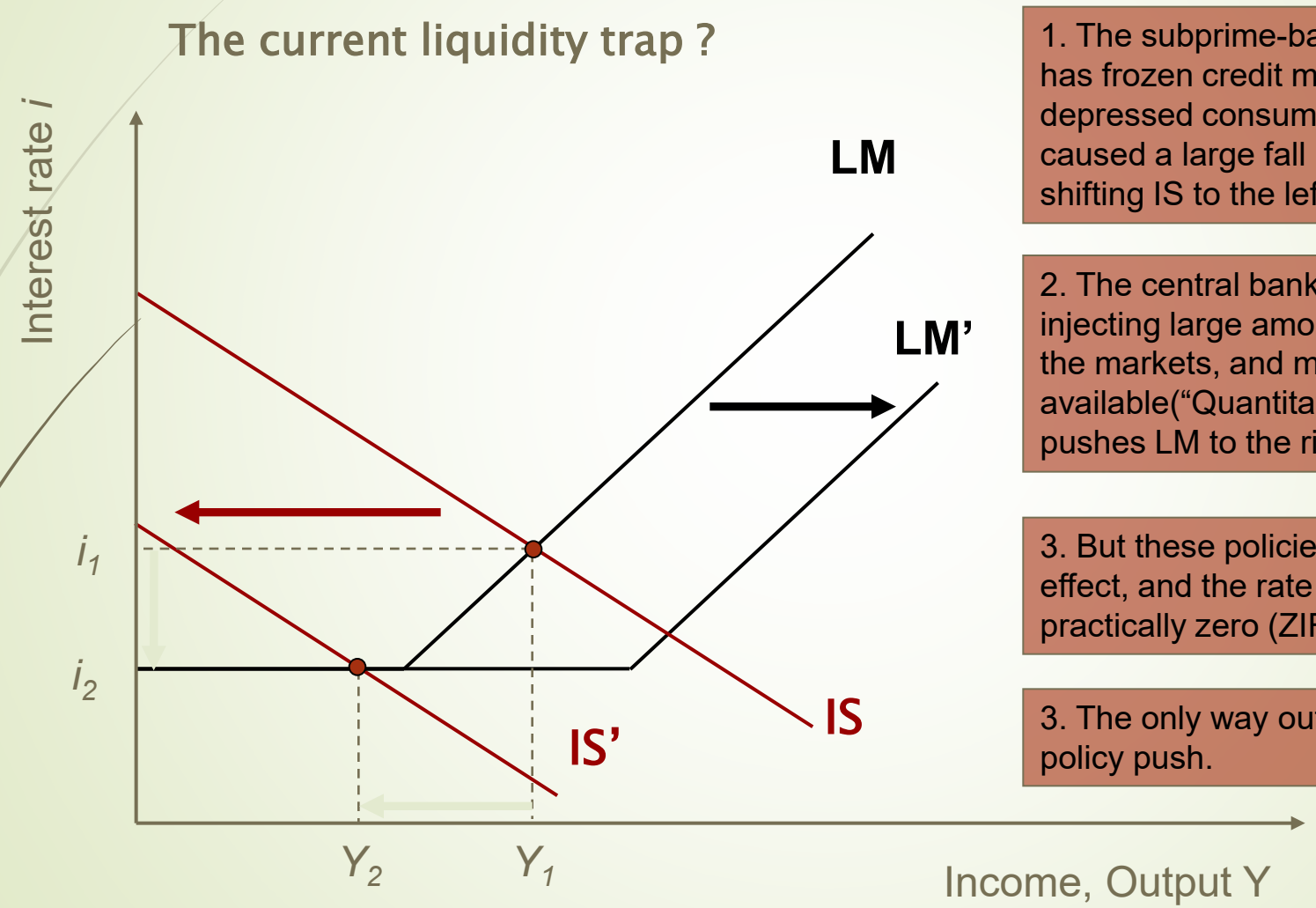


1. The German reunification resulted in a large shift of IS to the right, mainly because of the extra government spending and increase in consumption from the ex DDR

2. At the same time, the Bundesbank drastically reduced money supply due to inflation fears, as the ostmark/DM exchange rate had been set at 1 for 1 due to political reasons

3. The end result of this lack of coordination is that output was slightly reduced, with a large increase in interest rates.

Macroeconomic equilibrium and policy



1. The subprime-based financial crisis has frozen credit markets as well as depressed consumption. This has caused a large fall in investment, shifting IS to the left

2. The central bank have responded by injecting large amounts of liquidity in the markets, and making credit easily available("Quantitative easing"). This pushes LM to the right.

3. But these policies have had no effect, and the rate of interest is practically zero (ZIRP!)

3. The only way out is a large fiscal policy push.

Thank you

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