Chapter 28

Money, Interest Rates, and Economic Activity

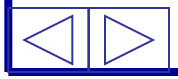
Financial Assets

1. **Money** – currency plus chequable deposits

2. **Bonds** – bought and sold in bond market

Bond is a promise to make payments at dates in the future.

Present value is the current value of one or more payments or receipts made in the future - the (discounted) present value **(PV**) of the bond.



Present Value and the Interest Rate

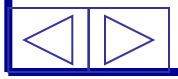
- Asset pays $100 in one year's time
- Interest rate (i) is 6% per year

- Present value of the asset equals

$$PV = \$100/(1 + i)$$

$$PV = \$100/(1.06) = \$93.34$$

The present value of any asset that yields a stream of payments over time is **negatively** related to the interest rate.

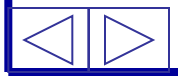


Present Value and Market Price

PV of an asset is the **highest** price someone would pay to own the future stream of payments from the asset.

Any price **lower** than the present value creates excess demand for the asset – drives up the asset's price.

The **equilibrium** market price of an asset is the PV of the income stream that the asset produces.



Formula:

The present value of ***R* dollars**, received ***t* years** in the future, is

$$PV = \frac{R}{(1+i)^t}$$

Thus, **annual** stream of **R** dollars, for **t** years, has **PV** of:

$$PV = \frac{R_1}{(1+i)} + \frac{R_2}{(1+i)^2} + \frac{R_3}{(1+i)^3} + \frac{R_4}{(1+i)^4} \ldots + \frac{R_t}{(1+i)^t}$$

example: in **one year**, **$100 bond** comes due, pays **10% interest** – thus, **pays $110 (R)**

Current interest rate in economy is **5%**

What would you pay for this bond?

Find this by calculating present value of $110:

$$PV = \frac{R}{1+i} = \frac{\$110}{1.05} = \$104.76$$

Check: $104.76, invested at 5% for one year yields $104.76 x 1.05 = $110.

If interest rate in economy was **8%**

- bond would be worth

$$PV = \frac{R}{1+i} = \frac{\$110}{1.08} = \$101.85$$

As **interest rate** in economy **rises** (from 5% to 8%), **PV** of **bond falls**.

Extreme:

- **Perpetuity**
  - never comes due
  - pays interest forever

Assume:

- Perpetuity pays $10 in interest, every year

Bond's worth today (PV) ?

- If interest rate in economy is 10% ⟶ $100
  - $10 interest on $100 is 10%

- If interest rate in economy is 5%
- Bond is worth $200

Formula: PV of perpetuity is $\frac{R}{i}$

- If perpetuity pays $10 per year
- Current interest rate is 5%

$$\text{PV} = \frac{R}{i} = \frac{\$10}{0.05} = \$200$$

The Interest Rate and Market Price

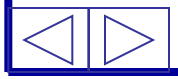
• **Negative relationship** between interest rates and asset prices

1. If interest rate falls

- present value of an asset with a given income stream will rise.

2. A rise in market price of an asset with a given income stream

- is equivalent to a decrease in rate of return earned by the asset.



Stocks and Bonds

Income-earning assets:

- **Bonds** (debt) generate a stream of **interest** payments
- **Stocks** (equity) generate a stream of **dividend** payments

Demand for money:

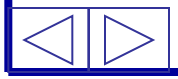
- Lump all income-earning assets as "**bonds**"

"**Bonds**"

- Earn **interest**

"**Money**"

- Earns **no interest**



The Demand for Money

- Money balances you want to hold

Opportunity cost of holding any money balance

- is interest earned if money used to purchase bond

Three motives for holding money:

- **transactions** motive
- **precautionary** motive
- **speculative** motive

The Transactions Motive

Transactions balances

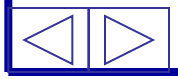
- money balances held to make payments

If **GDP is larger**

- more transactions
- economy holds larger transactions balances

If **interest rate is higher**

- fewer transactions balances held
- interest rate is opportunity cost of holding money



The Precautionary Motive

Precautionary balances

• held to protect against uncertainty of the timing of cash flows

If **interest rate is high**

• fewer precautionary balances are held

• higher opportunity cost

The Speculative Motive

Speculative balances

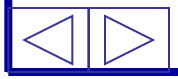
- held because of uncertainty of prices of financial assets
    - bonds

If **interest rates change**

- bond prices change
- rate of return uncertain

Hold money to **diversify**

- financial portfolio
- reduce risks



At **higher interest rates**

- opportunity cost of holding money rises
- HH and firms hold less money

Real vs. Nominal Money

Nominal money [M]

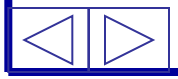
- actual amount of money
- currency plus bank deposits

Real money [M/P]

- nominal money divided by the price level
- it is the purchasing power of the money

If price level rises by 10%

- nominal money rises by 10%
- real money is constant



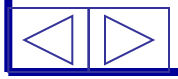
Real and Nominal Money Balances

Change in price level:

- does not change demand for **real** money balances
- does affect demand for **nominal** money balances

Ceteris paribus, nominal demand for money balances

varies in direct proportion to price level



Monetary transmission mechanism:

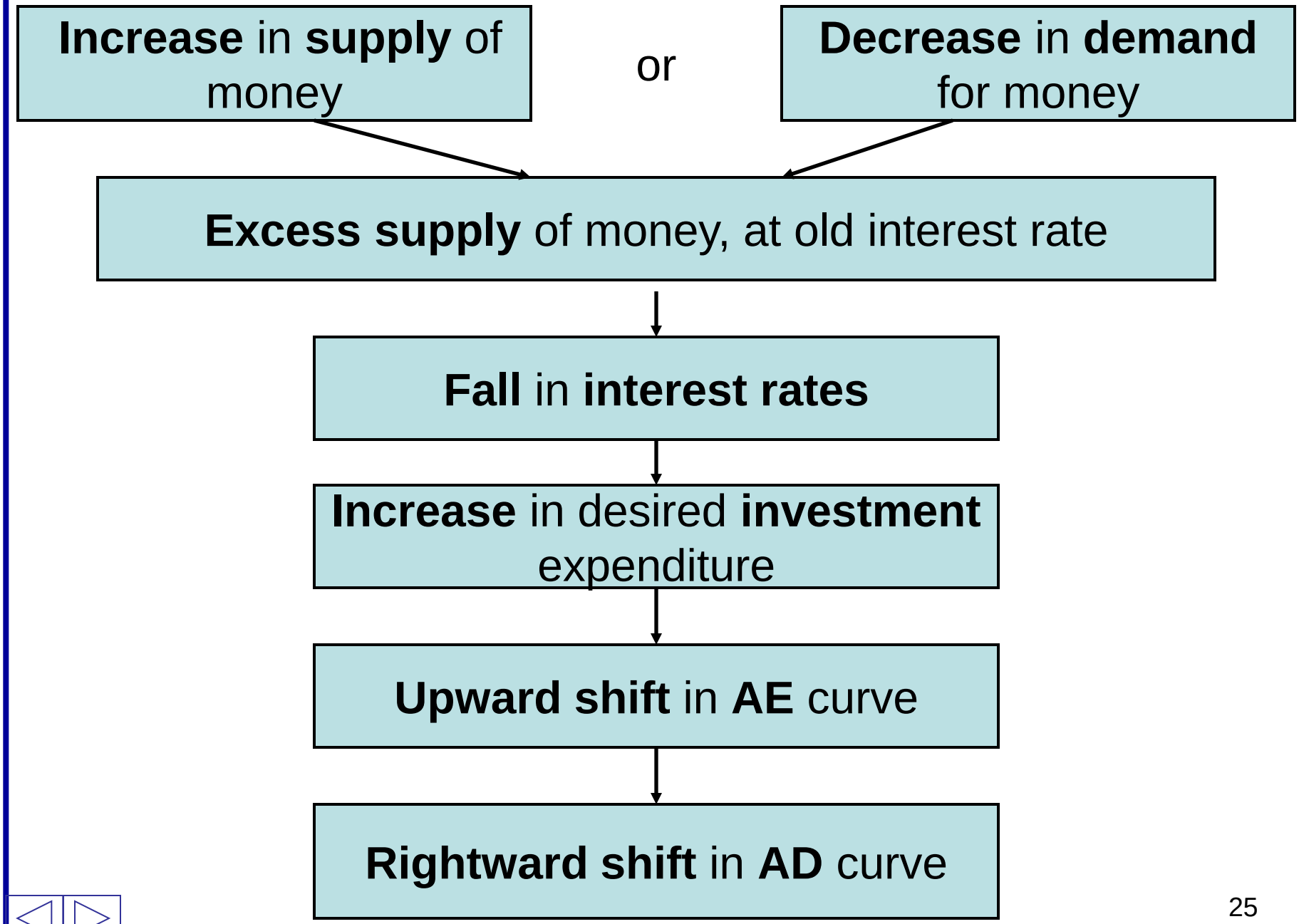
• Changes in **supply and demand for money** affect **aggregate demand**

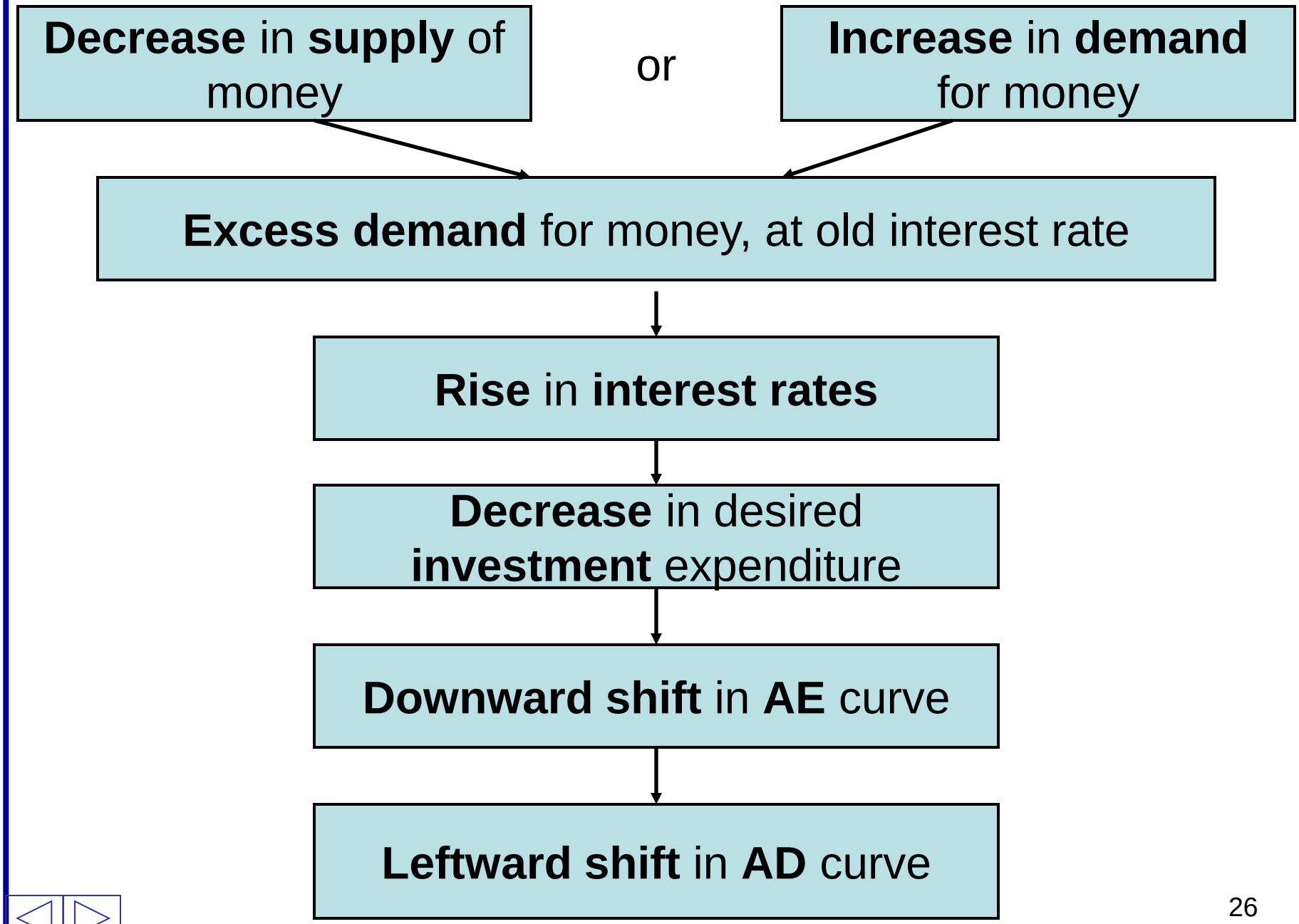
Three stages:

1. Change in **money demand or supply** changes equilibrium **interest rate**.

2. Change in interest rate leads to change in desired **investment expenditure**.

3. Change in investment leads to a change in **aggregate demand**.


Increase in supply of money
or
Decrease in demand for money
Excess supply of money, at old interest rate
Fall in interest rates
Increase in desired investment expenditure
Upward shift in AE curve
Rightward shift in AD curve


Decrease in supply of money
or
Increase in demand for money
Excess demand for money, at old interest rate
Rise in interest rates
Decrease in desired investment expenditure
Downward shift in AE curve
Leftward shift in AD curve

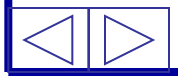
Open-Economy

Monetary transmission mechanism includes

- exchange rate
- capital mobility

Financial capital

- mobile across boundaries



Change in M_S changes **interest rates** lead to:

Capital Flows

- financial capital flows to country with highest interest rates

Exchange-rates

- as funds flow across borders
- currencies bought and sold
- changes exchange rates

Net exports

- as exchange rates change
- prices of imports and exports change
- country's national income (**Y**) changes

Canadian M_S ↑

1. Canadian interest rates **fall**

2. Capital **flows out** of Canada to country with higher interest rates

3. Investors **sell $C [buy foreign $]**

- to buy bonds in other countries
- $C depreciates (falls in value)

4. As **$C fall**

- exports rise
- imports fall
- **net exports** NX = (X – IM) **rise**

Result:

- **AE** line rises
- **AD** curve shifts to rightward
- Canadian National Income [**Y]** increases

Summary: [open economy]

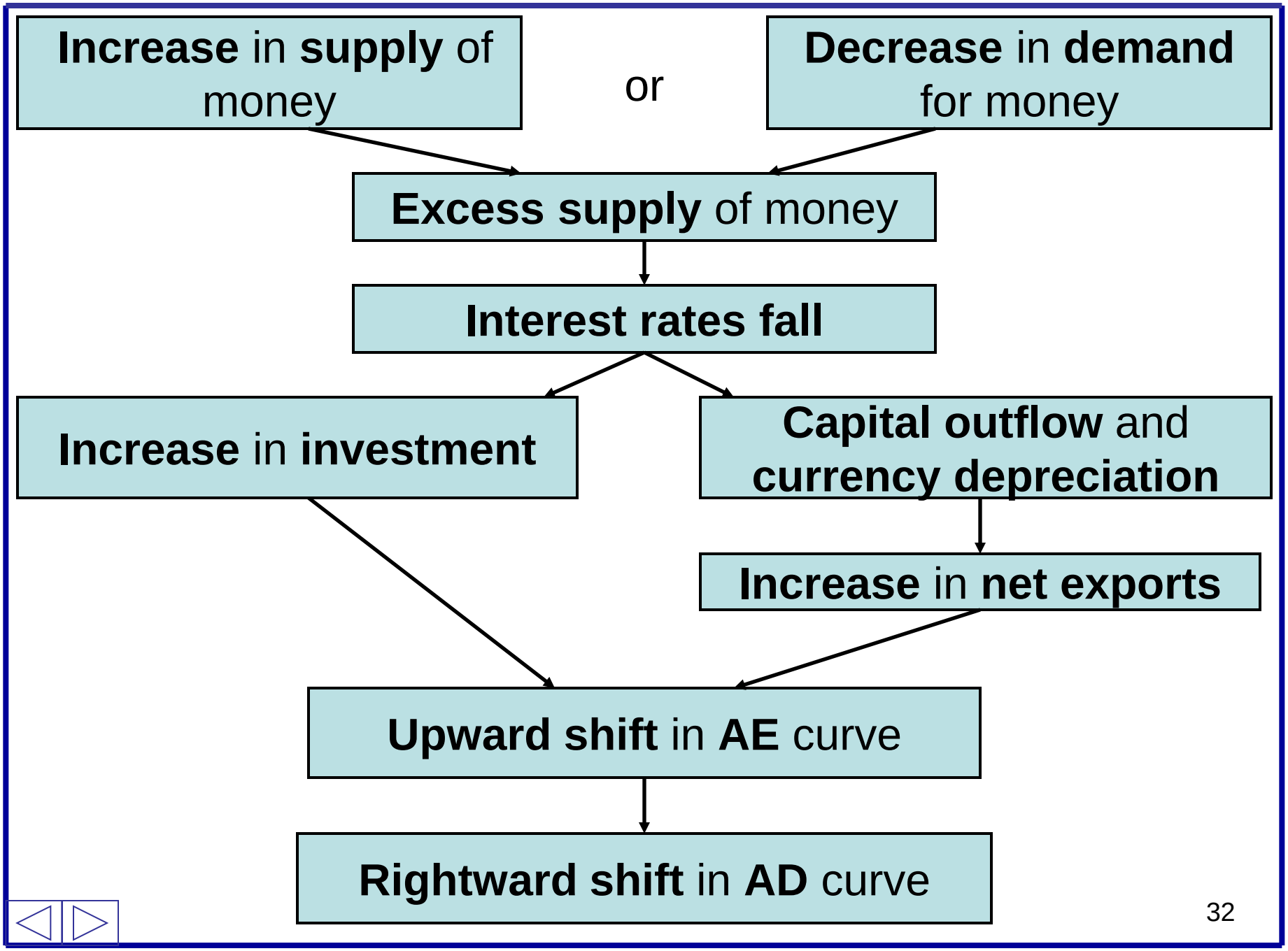
- MS ↑ increases
- AD ↑ increases

1. Investment: [internal]

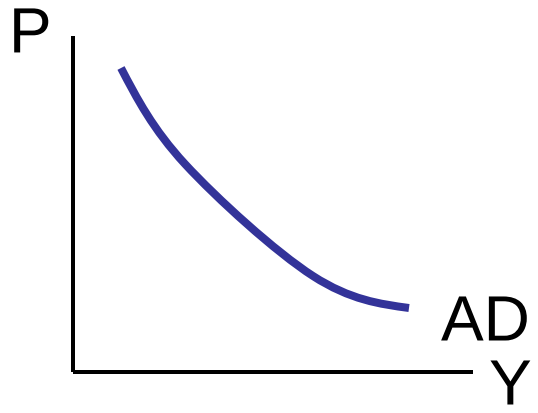
- i ↓ decreases
- I ↑ increases

2. Exchange rate and net exports: [external]

- i ↓ decrease
- capital outflows
- currency depreciation C$ ↓ decreases
- NX ↑ increases


Increase in supply of money
or
Decrease in demand for money
Excess supply of money
Interest rates fall
Increase in investment
Capital outflow and currency depreciation
Increase in net exports
Upward shift in AE curve
Rightward shift in AD curve

Negative Slope of AD Curve

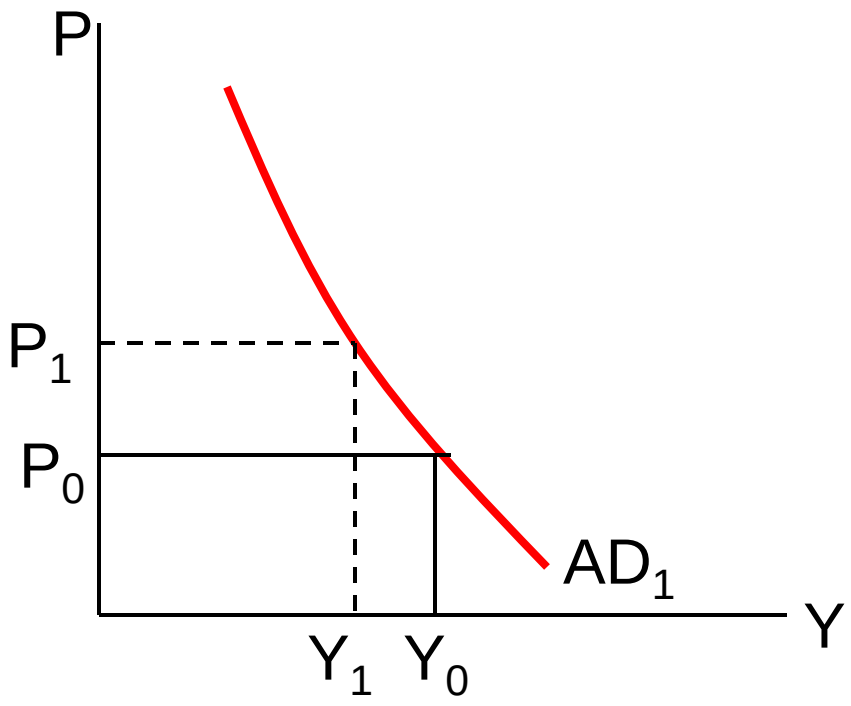


If **P** rises:

- fall in real wealth
- International substitution [foreign for domestic goods]
- Inter temporal substitution

Increase in the price level from P_0 to P_1

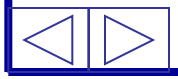
- movement along (reducing) aggregate demand
- decrease in Qty of Real GDP demanded



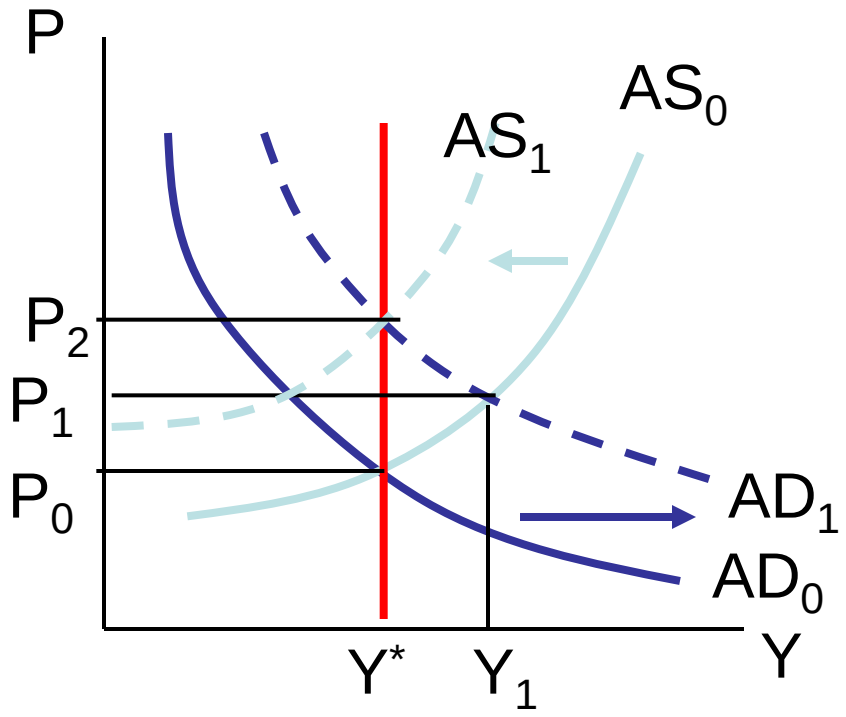
Changes in money supply (monetary forces) affect the economy

Size of effects on i, I, Y ?

Distinguish between long run from short run changes



Long-Run Effects on Real GDP



- Increase in money supply
- lowers i
- raises I
- raises AD
- moves to Y_1 and P_1

In long run:

AS decreases

End:

- at Y* and P_2
- Y same
- Prices rise
- Change in money supply **no effect** on GDP in long run

Short-Run Effects on Real GDP

Effect of change in **M_S** on **AD** depends on **slope of M_D** curve and on **slope of I^D** curve

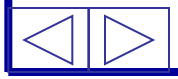
Steeper M_D curve:

- greater change in **interest rates** from a change in **M_S**

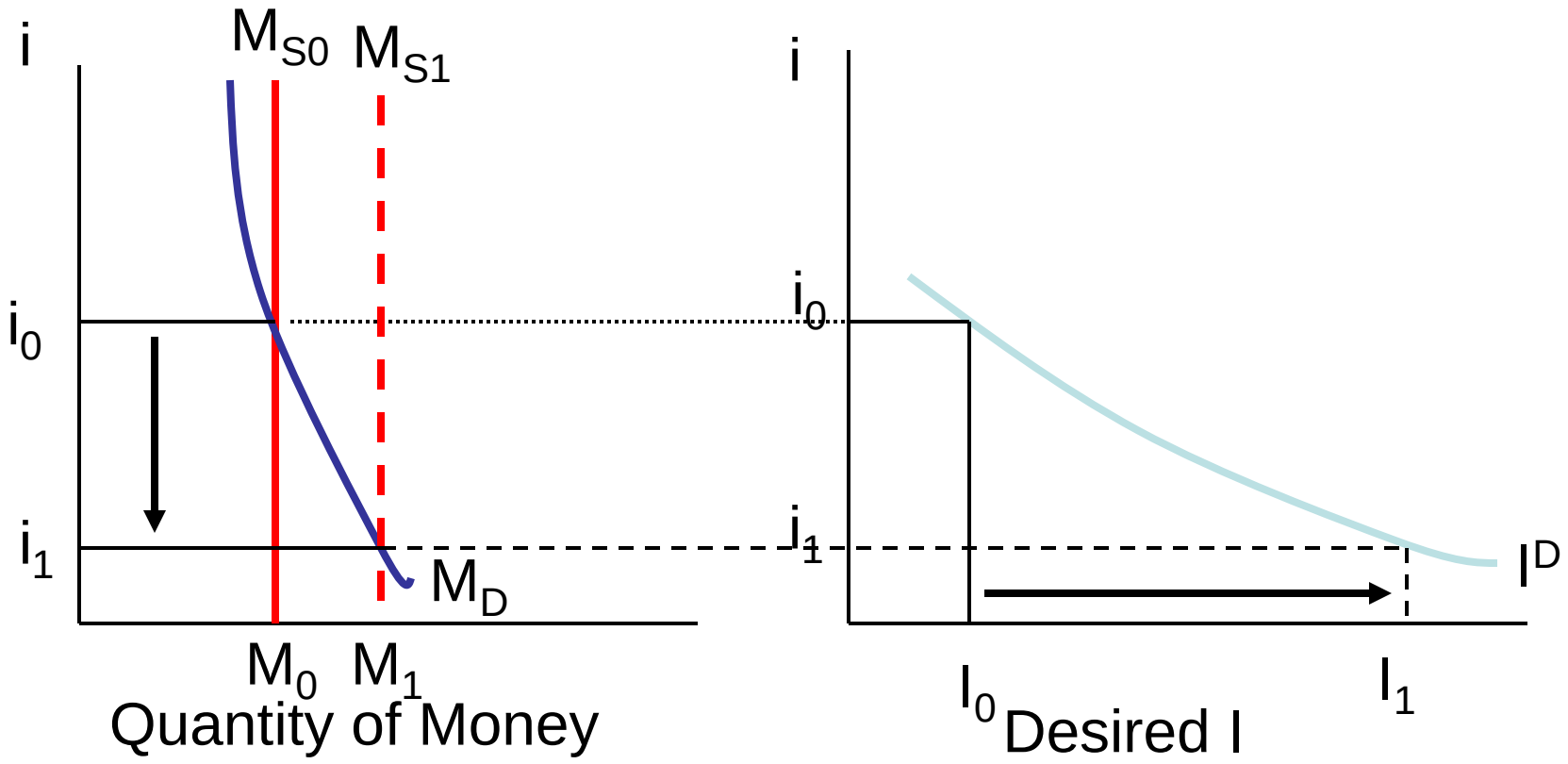
Flatter I^D curve:

- greater change in **Investment** from any given change in **interest rate**

Monetary policy more effective with **steep M_D curve** and **flat I^D curve**



Monetary Policy More Effective (Monetarist View)

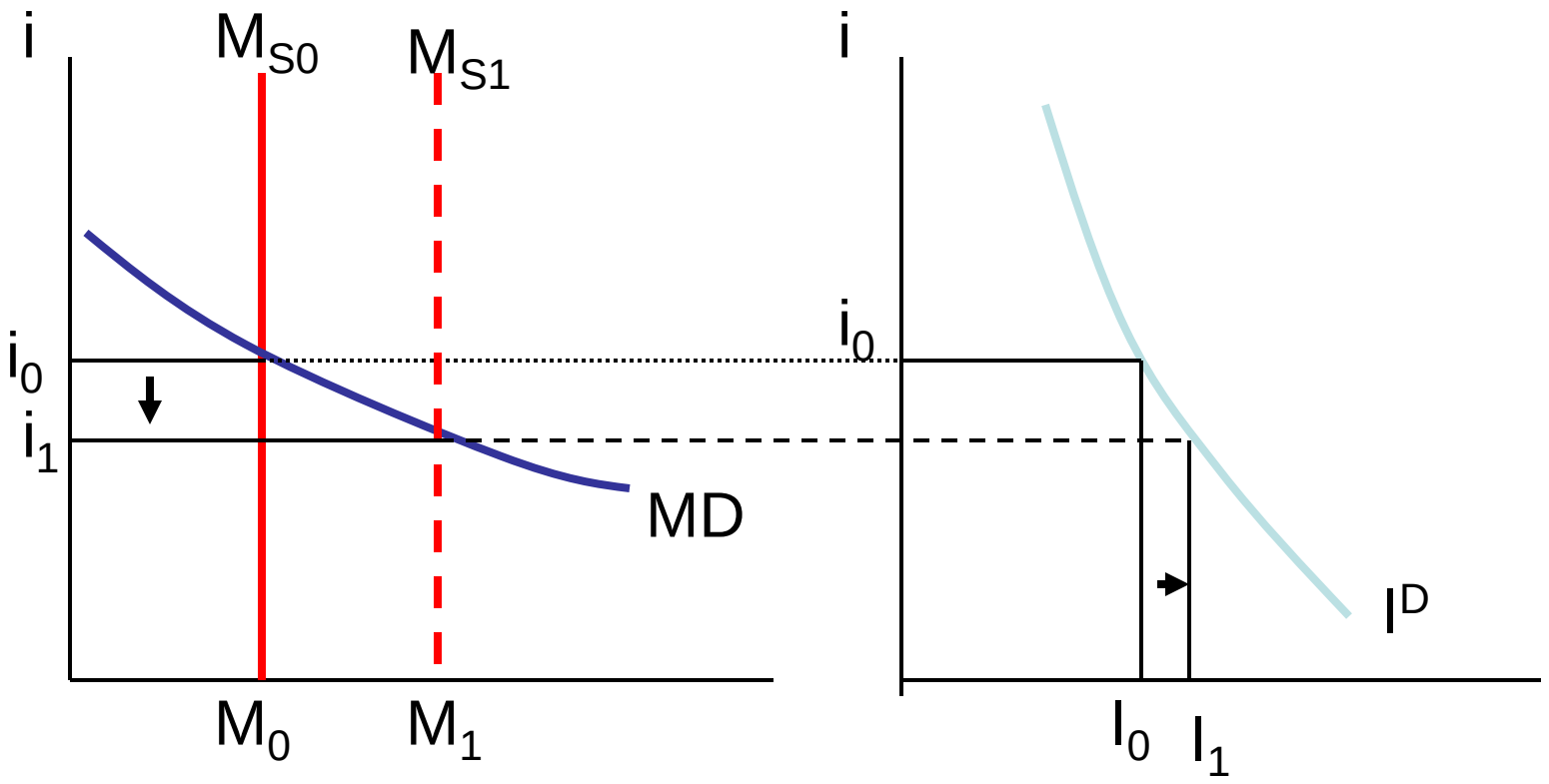


Money supply increases to M_{S1}

interest rates fall to i_1

Investment increases to I_1

Monetary Policy Less Effective (Keynesian View)



Money supply increases ↑

Small change in I to I_1 ↑

small change in i ↓

In 1950s and 1960s, debate about strength of monetary forces - about slopes of the $\mathbf{M_D}$ and $\mathbf{I^D}$ curves

"**Keynesians**" argued:

- $\mathbf{M_D}$ was relatively flat
- $\mathbf{I^D}$ was relatively steep
- Result: monetary policy was not very effective

"**Monetarists**" argued:

- $\mathbf{M_D}$ was relatively steep
- $\mathbf{I^D}$ was relatively flat
- Result: monetary policy was quite effective

Empirical evidence suggests:

- **M_D** curve is steep
  - money supply has strong effect on interest rates
- slope of the **I^D** curve is uncertain
  - business expectations, not just interest rates, effect investment

Result:

Monetary policy may be effective when business expectations are good

- increase M_S
- i falls
- I increases
- GDP rises

Expectations are poor – raise M_S, i falls but little increase in I or GDP.