

## The IS curve

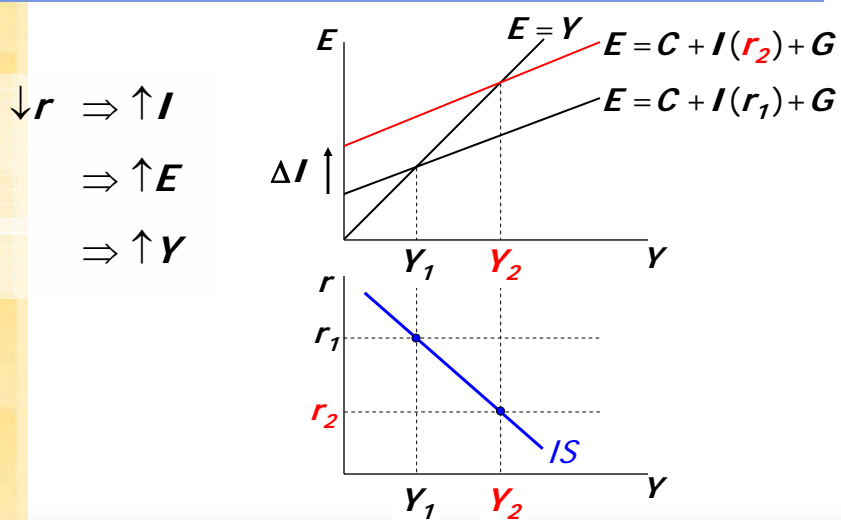
def: a graph of all combinations of  $r$  and  $Y$  that result in goods market equilibrium,

*i.e.* actual expenditure (output)  
= planned expenditure

The equation for the IS curve is:

$$Y = C(Y - \bar{T}) + I(r) + \bar{G}$$

## Deriving the IS curve

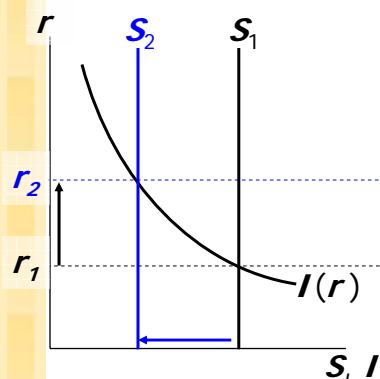


## Understanding the *IS* curve's slope

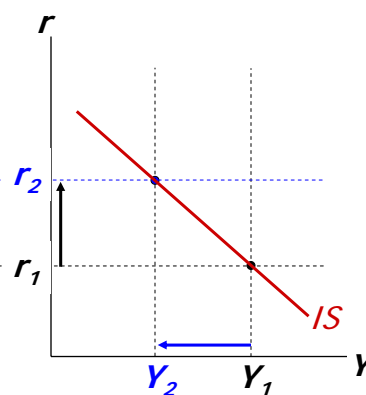
- The *IS* curve is negatively sloped.
- Intuition:  
A fall in the interest rate motivates firms to increase investment spending, which drives up total planned spending ( $E$ ).  
To restore equilibrium in the goods market, output (a.k.a. actual expenditure,  $Y$ ) must increase.

## The *IS* curve and the Loanable Funds model

(a) The L.F. model



(b) The *IS* curve



## Fiscal Policy and the *IS* curve

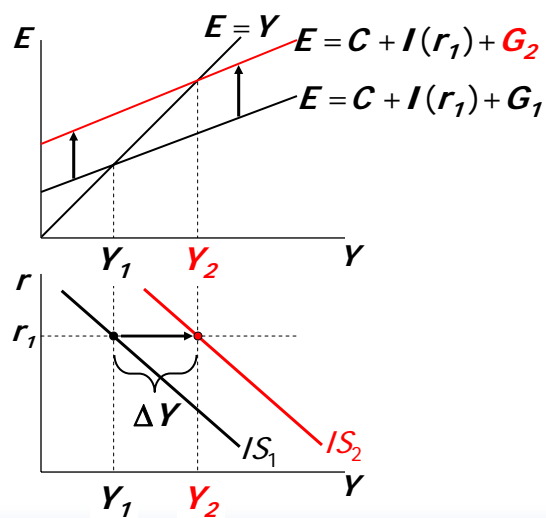
- We can use the *IS-LM* model to see how fiscal policy ( $G$  and  $T$ ) can affect aggregate demand and output.
- Let's start by using the Keynesian Cross to see how fiscal policy shifts the *IS* curve...

## Shifting the *IS* curve: $\Delta G$

At any value of  $r$ ,  
 $\uparrow G \Rightarrow \uparrow E \Rightarrow \uparrow Y$   
 ...so the *IS* curve  
 shifts to the right.

The horizontal  
 distance of the  
*IS* shift equals

$$\Delta Y = \frac{1}{1-MPC} \Delta G$$



## ***Exercise: Shifting the IS curve***

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- Use the diagram of the Keynesian Cross or Loanable Funds model to show how an increase in taxes shifts the *IS* curve.

## **The Theory of Liquidity Preference**

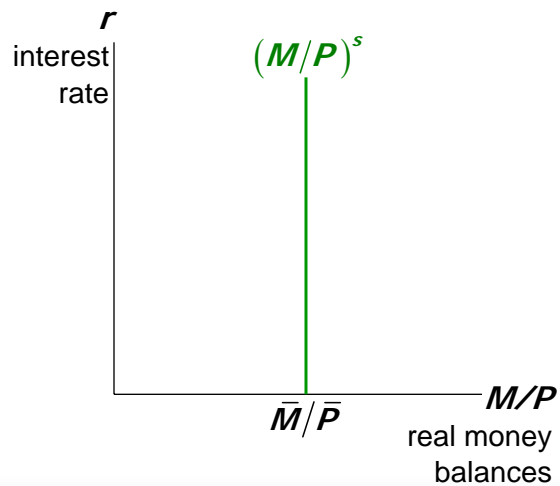
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- due to John Maynard Keynes.
- A simple theory in which the interest rate is determined by money supply and money demand.

## Money Supply

The supply of real money balances is fixed:

$$(M/P)^s = \bar{M}/\bar{P}$$



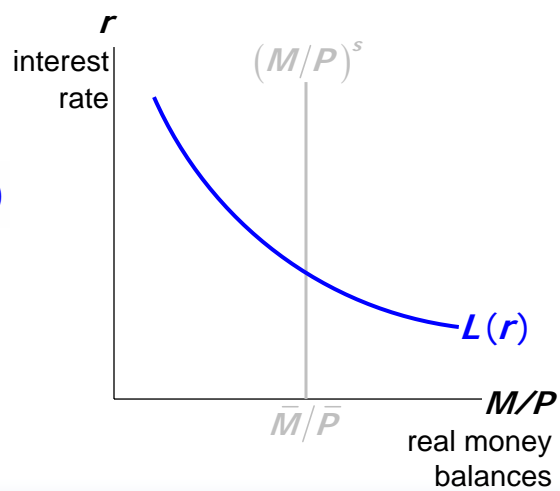
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## Money Demand

Demand for real money balances:

$$(M/P)^d = L(r)$$



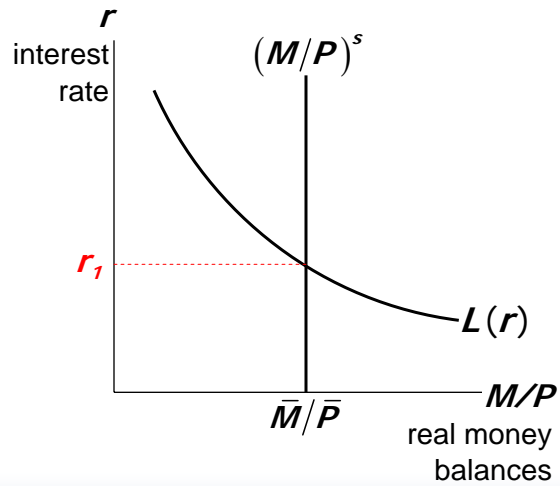
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## Equilibrium

The interest rate adjusts to equate the supply and demand for money:

$$\bar{M}/\bar{P} = L(r)$$

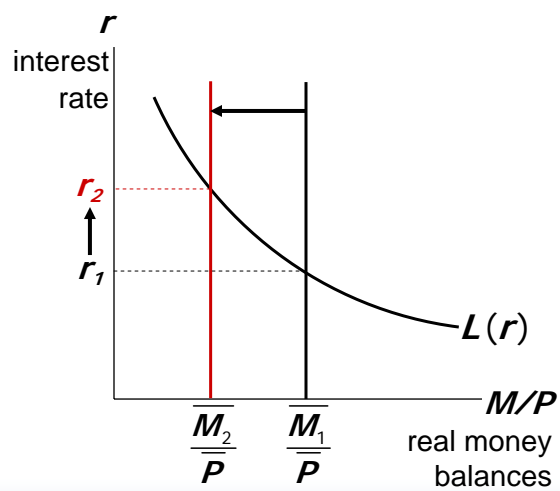


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## How the Fed raises the interest rate

To increase  $r$ ,  
Fed reduces  $M$



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## CASE STUDY Volcker's Monetary Tightening

- Late 1970s:  $\pi > 10\%$
- Oct 1979: Fed Chairman Paul Volcker announced that monetary policy would aim to reduce inflation.
- Aug 1979-April 1980: Fed reduces ***M/P*** 8.0%
- Jan 1983:  $\pi = 3.7\%$

*How do you think this policy change would affect interest rates?*

## Volcker's Monetary Tightening, cont.

The effects of a monetary tightening on nominal interest rates		
	short run	long run
model	Liquidity Preference <i>(Keynesian)</i>	Quantity Theory, Fisher Effect <i>(Classical)</i>
prices	sticky	flexible
prediction	$\Delta i > 0$	$\Delta i < 0$
actual outcome	8/1979: $i = 10.4\%$ 4/1980: $i = 15.8\%$	1/1983: $i = 8.2\%$

## The LM curve

Now let's put  $Y$  back into the money demand function:

$$(M/P)^d = L(r, Y)$$

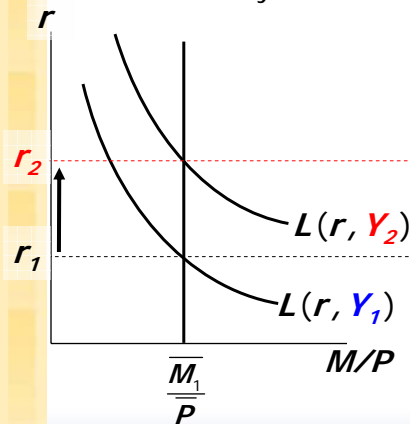
The **LM curve** is a graph of all combinations of  $r$  and  $Y$  that equate the supply and demand for real money balances.

The equation for the LM curve is:

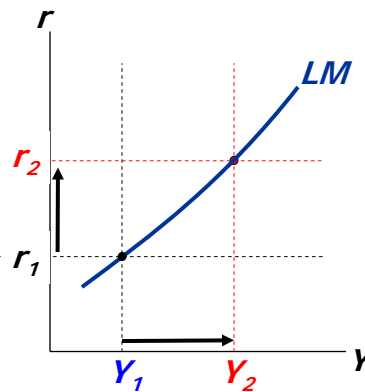
$$\bar{M}/\bar{P} = L(r, Y)$$

## Deriving the LM curve

(a) The market for real money balances



(b) The LM curve





## Understanding the *LM* curve's slope

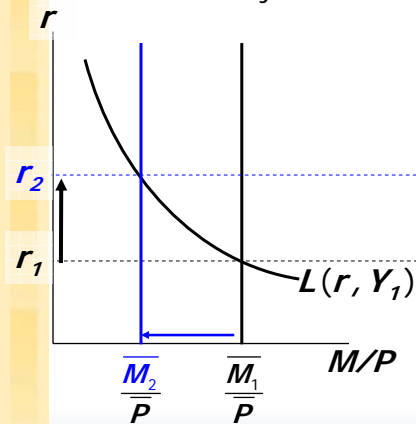
- The *LM* curve is positively sloped.
- Intuition:  
An increase in income raises money demand.  
Since the supply of real balances is fixed, there is now excess demand in the money market at the initial interest rate.  
The interest rate must rise to restore equilibrium in the money market.

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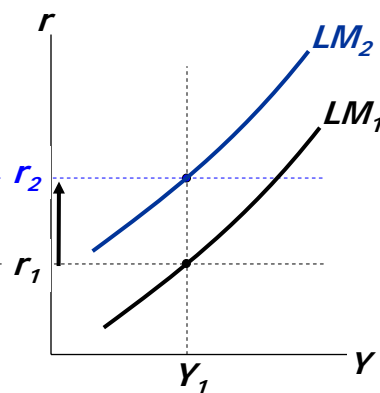
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## How $\Delta M$ shifts the *LM* curve

(a) The market for real money balances



(b) The *LM* curve



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## Exercise: Shifting the LM curve

- Suppose a wave of credit card fraud causes consumers to use cash more frequently in transactions.
- Use the Liquidity Preference model to show how these events shift the  $LM$  curve.

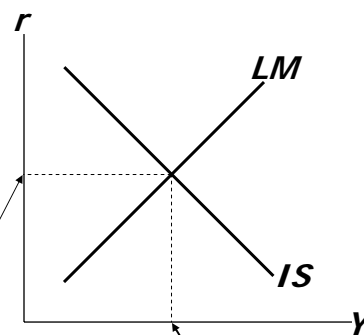
## The short-run equilibrium

The short run equilibrium is the combination of  $r$  and  $Y$  that simultaneously satisfies the equilibrium conditions in the goods & money markets:

$$Y = C(Y - \bar{T}) + I(r) + \bar{G}$$

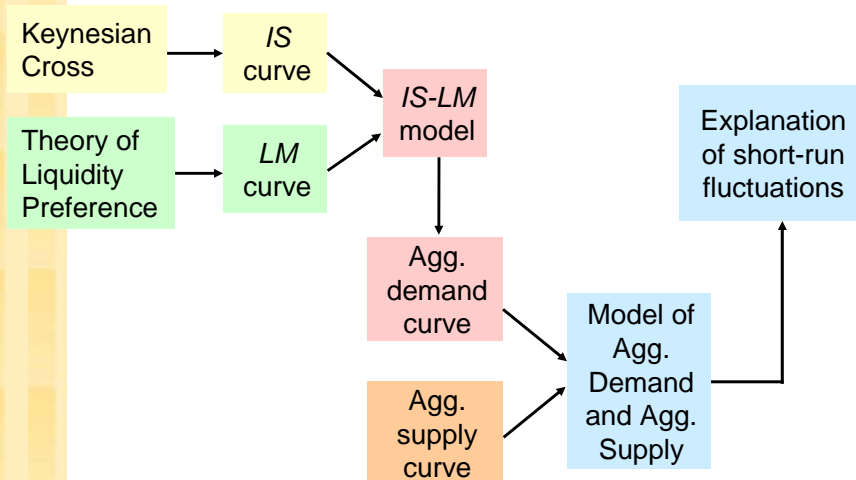
$$\bar{M}/\bar{P} = L(r, Y)$$

Equilibrium  
interest  
rate



Equilibrium  
level of  
income

## The Big Picture



## Chapter summary

1. Keynesian Cross
  - basic model of income determination
  - takes fiscal policy & investment as exogenous
  - fiscal policy has a multiplied impact on income.
2. *IS* curve
  - comes from Keynesian Cross when planned investment depends negatively on interest rate
  - shows all combinations of  $r$  and  $Y$  that equate planned expenditure with actual expenditure on goods & services

## Chapter summary

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### 3. Theory of Liquidity Preference

- basic model of interest rate determination
- takes money supply & price level as exogenous
- an increase in the money supply lowers the interest rate

### 4. $LM$ curve

- comes from Liquidity Preference Theory when money demand depends positively on income
- shows all combinations of  $r$  and  $Y$  that equate demand for real money balances with supply

## Chapter summary

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### 5. $IS-LM$ model

- Intersection of  $IS$  and  $LM$  curves shows the unique point  $(Y, r)$  that satisfies equilibrium in both the goods and money markets.

## ***Preview of Chapter 11***

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In Chapter 11, we will

- use the *IS-LM* model to analyze the impact of policies and shocks
- learn how the aggregate demand curve comes from *IS-LM*
- use the *IS-LM* and *AD-AS* models together to analyze the short-run and long-run effects of shocks
- learn about the Great Depression using our models