



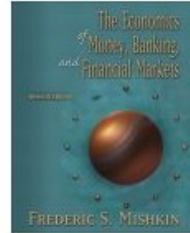
# Money and Banking

ECON 354

Professor Yamin Ahmad

Lecture 11:

- Effects of Policy Actions in IS-LM framework
- Fiscalism vs. Monetarism
- Shocks in the IS-LM model



## Equilibrium in the IS-LM model

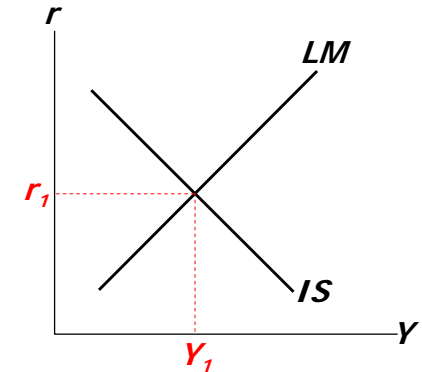
The IS curve represents equilibrium in the goods market.

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

The LM curve represents money market equilibrium.

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

The intersection determines the unique combination of  $Y$  and  $r$  that satisfies equilibrium in both markets.



Note: These lecture notes are incomplete without having attended lectures



## Equilibrium With Fixed Prices

### IS Curve

$$S(Y;G,T)=I(r) \left( \text{or } Y = \frac{c_0 + I_0 + G - c_1 T}{1 - c_1} - \frac{br}{1 - c_1} \right)$$

(+)(-)(+)

### LM Curve

$$\frac{M}{P} = L(r, Y) \quad (\text{or } \frac{M}{P} = m_0 + kY - hr)$$

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Solve for  $Y$  and  $r$  in terms of  $G, T, M$  and  $P$ .

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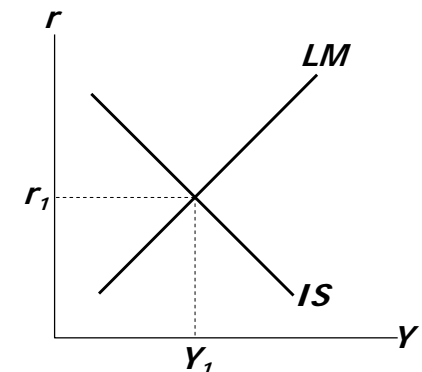
## Policy analysis with the IS-LM model

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

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

We can use the IS-LM model to analyze the effects of

- Fiscal policy:  $G$  and/or  $T$
- Monetary policy:  $M$

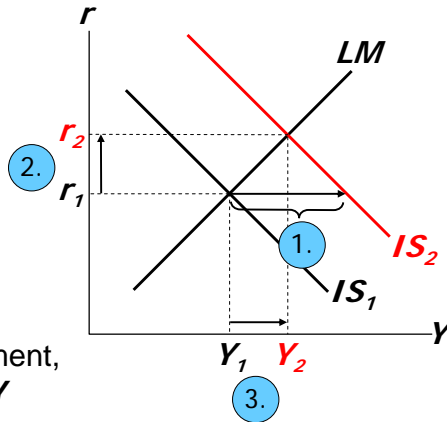


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## An increase in government purchases

1.  $IS$  curve shifts right  
by  $\frac{1}{1-MPC} \Delta G$   
causing output & income to rise.
2. This raises money demand, causing the interest rate to rise...
3. ...which reduces investment, so the final increase in  $Y$  is smaller than  $\frac{1}{1-MPC} \Delta G$



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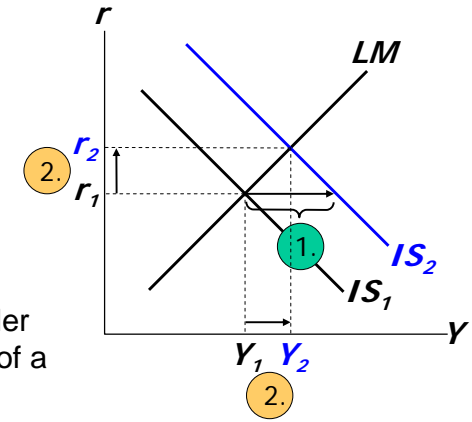


## A tax cut

The  $IS$  curve shifts by

$$1. \quad \frac{-MPC}{1-MPC} \Delta T$$

2. ... $r$  rises so the final increase in  $Y$  is smaller than the direct effect of a tax cut.

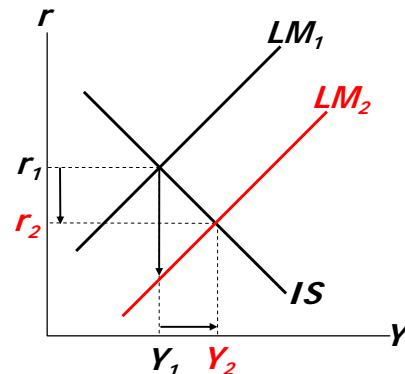


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## Monetary policy: An increase in $M$

1.  $\Delta M > 0$  shifts the  $LM$  curve down (or to the right)
2. ...causing the interest rate to fall
3. ...which increases investment, causing output & income to rise.



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## Using a Policy Mix

- The combination of monetary and fiscal policies is known as the **monetary-fiscal policy mix**, or simply, the **policy mix**.

The Effects of Fiscal and Monetary Policy.				
	Shift of $IS$	Shift of $LM$	Movement of Output	Movement in Interest Rate
Increase in taxes	left	none	down	down
Decrease in taxes	right	none	up	up
Increase in spending	right	none	up	up
Decrease in spending	left	none	down	down
Increase in money	none	down	up	down
Decrease in money	none	up	down	up

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## Effectiveness of Monetary vs. Fiscal Policy

- Consider the IS curve:  $Y = \frac{C_0 + I_0 + G - cT}{1 - c} - \frac{b}{1 - c} r$
- Consider the LM curve:  $\left(\frac{M^S}{P}\right) = m_0 + kY - hr$
- Question: What is the relative impact of monetary versus fiscal policy on GDP?

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## Fiscalism vs. Monetarism

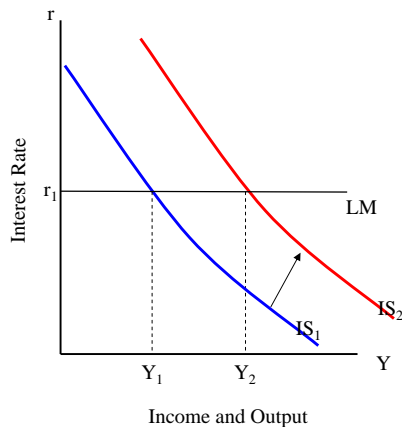
- In the *General Theory*, Keynes argued that:
  - The main source of fluctuations in demand was  $I_0$  due to changes in “animal spirits”;
  - The demand for money was highly interest elastic ( $h \rightarrow \infty$ ; the “liquidity trap”);
  - Hence neither expansionary monetary policy, (nor a fall in prices) could maintain demand;
  - Instead fiscal policy should be used.
- Post war Keynesians also argued that investment was insensitive to  $r$  ( $b \rightarrow 0$ ).

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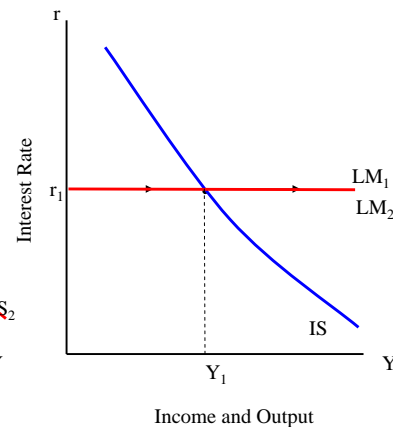


## Liquidity Trap ( $h = \infty$ )

Fiscal Expansion



Monetary Expansion

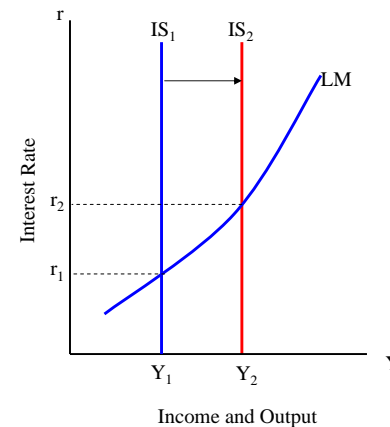


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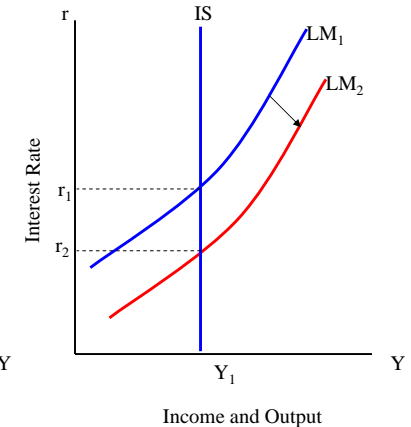


## Investment Interest-Insensitive ( $b = 0$ )

Fiscal Expansion



Monetary Expansion



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## Monetarism

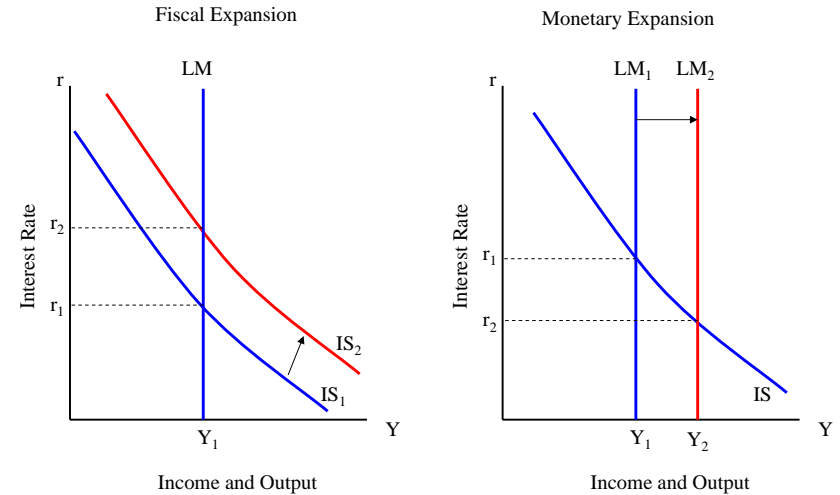
Monetarists (led by Friedman) argued that:

- the main source of fluctuations in demand was changes in  $M$  due to misguided policy making
- the demand for money was not excessively interest elastic ( $h \rightarrow 0$ );
- demand was sensitive to interest rates ( $b \neq 0$ );
- hence Fiscal policy was not very effective;
- whilst monetary policy was potent, the aim should be to avoid destabilizing the economy by keeping  $M$  growing at a steady rate.

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## Quantity Theory ( $h=0$ )



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	Fiscal Policy	Monetary Policy
Liquidity Trap ( $h=\infty$ ) (Keynesian Case I)	Yes	No
Autonomous Investment ( $b=0$ ) (Keynesian Case II)	Yes	No
Quantity Theory ( $h=0$ ) (Monetarist Case)	No	Yes

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## The Monetarists Strike Back!

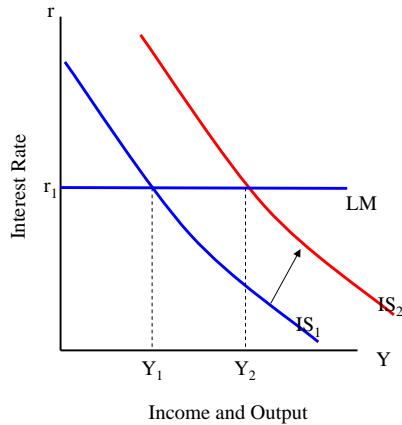
- Friedman also argued that the demand for money depends on “permanent” income, not just current income (i.e.  $M/P=L(i, Y)$ , or  $k=0$ ).
- LM is flat, but monetary policy still works.

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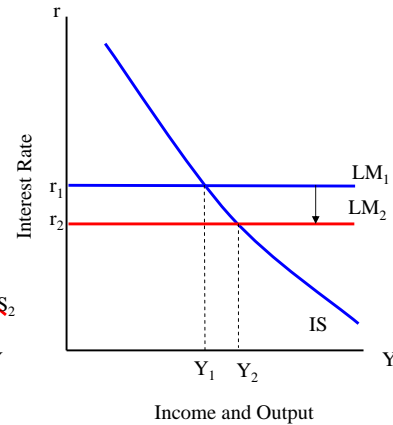


## “Friedman” Case (k=0)

Fiscal Expansion



Monetary Expansion



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## Return of the ...

- Note:  $c_1$ ,  $k$  do not affect the relative efficacy of fiscal vs. monetary policy which depends only on  $b, h$ :

$$\frac{\Delta Y / \Delta G}{\Delta Y / (\Delta M / P)} = \frac{h}{b}$$

- Today the big difference between economists is in explanations of supply rather than demand:
  - New Keynesian Theories
  - New Neoclassical Theories

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## Interaction between Monetary & Fiscal policy

- Model:** Monetary & fiscal policy variables ( $M$ ,  $G$ , and  $T$ ) are exogenous.
- Real world:** Monetary policymakers may adjust  $M$  in response to changes in fiscal policy, or vice versa.
- Such interaction may alter the impact of the original policy change.

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## The Fed's response to $\Delta G > 0$

- Suppose Congress increases  $G$ .
- Possible Fed responses:
  - hold  $M$  constant
  - hold  $r$  constant
  - hold  $Y$  constant
- In each case, the effects of the  $\Delta G$  are different:

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### Response 1: Hold $M$ constant

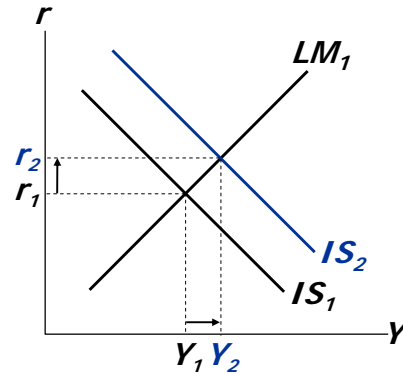
If Congress raises  $G$ , the  $IS$  curve shifts right.

If Fed holds  $M$  constant, then  $LM$  curve doesn't shift.

Results:

$$\Delta Y = Y_2 - Y_1$$

$$\Delta r = r_2 - r_1$$



### Response 2: Hold $r$ constant

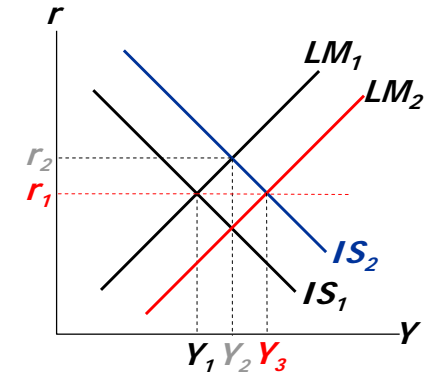
If Congress raises  $G$ , the  $IS$  curve shifts right.

To keep  $r$  constant, Fed increases  $M$  to shift  $LM$  curve right.

Results:

$$\Delta Y = Y_3 - Y_1$$

$$\Delta r = 0$$



### Response 3: Hold $Y$ constant

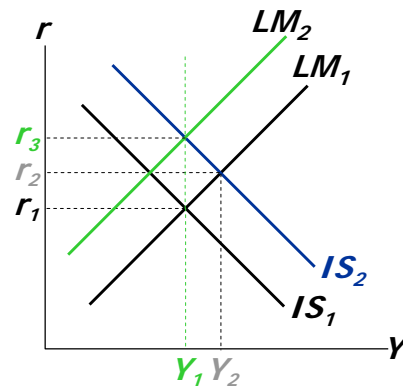
If Congress raises  $G$ , the  $IS$  curve shifts right.

To keep  $Y$  constant, Fed reduces  $M$  to shift  $LM$  curve left.

Results:

$$\Delta Y = 0$$

$$\Delta r = r_3 - r_1$$



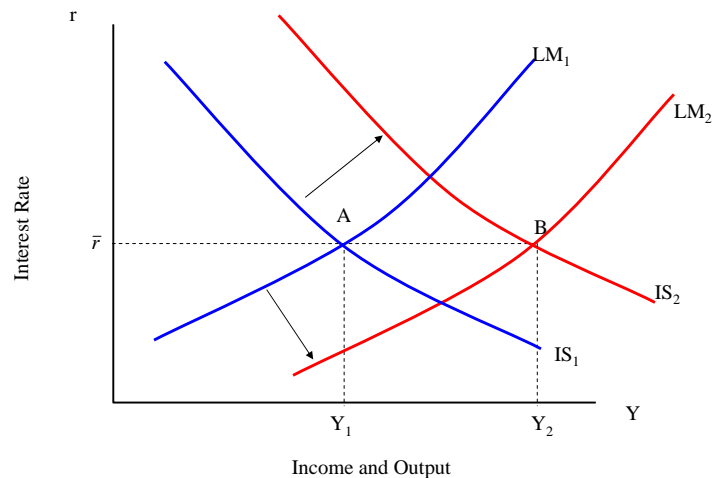
### Balanced Budget Combination Policy

- Balanced budget fiscal expansion + monetary expansion to keep  $r$  fixed ( $r = \bar{r}$ ):

$$\bullet \text{ IS: } Y = \frac{C_0 + I_0 + G - cT - b\bar{r}}{1 - c_1} \Rightarrow \Delta Y = \frac{\Delta G - c_1 \Delta T}{1 - c_1} = \Delta G$$

$$\bullet \text{ LM: } \frac{M}{P} = m_0 + kY - h\bar{r} \Rightarrow \frac{\Delta M}{P} = k\Delta Y = k\Delta G$$

## Balanced Budget Combination Policy



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## Shocks in the *IS-LM* model

**IS shocks:** exogenous changes in the demand for goods & services.

Examples:

- stock market boom or crash
  - ⇒ change in households' wealth
  - ⇒  $\Delta C$
- change in business or consumer confidence or expectations
  - ⇒  $\Delta I$  and/or  $\Delta C$

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## Shocks in the *IS-LM* model

**LM shocks:** exogenous changes in the demand for money.

Examples:

- a wave of credit card fraud increases demand for money.
- more ATMs or the Internet reduce money demand.

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### EXERCISE:

*Analyze shocks with the IS-LM model*

Use the *IS-LM* model to analyze the effects of

1. a boom in the stock market that makes consumers wealthier.
2. after a wave of credit card fraud, consumers using cash more frequently in transactions.

For each shock,

- a. use the *IS-LM* diagram to show the effects of the shock on  $Y$  and  $r$ .
- b. determine what happens to  $C$ ,  $I$ , and the unemployment rate.

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## CASE STUDY: The U.S. recession of 2001

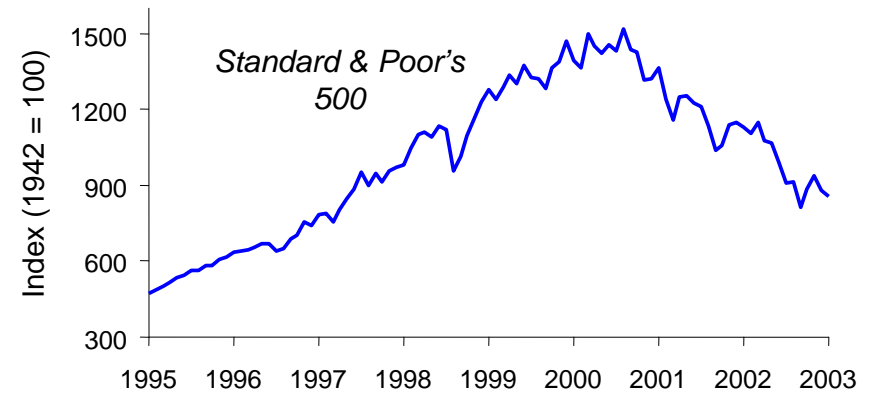
- During 2001:
  - 2.1 million people lost their jobs, as unemployment rose from 3.9% to 5.8%.
  - GDP growth slowed to 0.8% (compared to 3.9% average annual growth during 1994-2000).

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## CASE STUDY: The U.S. recession of 2001

- Causes: 1) Stock market decline  $\Rightarrow \downarrow C$



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## CASE STUDY: The U.S. recession of 2001

- Causes: 2) 9/11
  - increased uncertainty
  - fall in consumer & business confidence
  - result: lower spending, *IS* curve shifted left
- Causes: 3) Corporate accounting scandals
  - Enron, WorldCom, etc.
  - reduced stock prices, discouraged investment

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## CASE STUDY: The U.S. recession of 2001

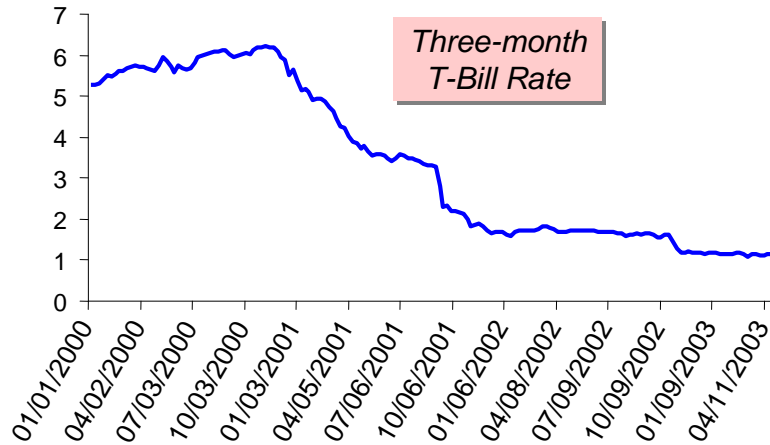
- Fiscal policy response: shifted *IS* curve right
  - tax cuts in 2001 and 2003
  - spending increases
    - airline industry bailout
    - NYC reconstruction
    - Afghanistan war

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## CASE STUDY: The U.S. recession of 2001

- Monetary policy response: shifted *LM* curve right



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## What is the Fed's policy instrument?

- The news media commonly report the Fed's policy changes as interest rate changes, as if the Fed has direct control over market interest rates.
- In fact, the Fed **targets** the *federal funds rate* – the interest rate banks charge one another on overnight loans.
- The Fed changes the money supply and shifts the *LM* curve to achieve its target.
- Other short-term rates typically move with the federal funds rate.

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## What is the Fed's policy instrument?

Why does the Fed target interest rates instead of the money supply?

- 1) They are easier to measure than the money supply.
- 2) The Fed might believe that *LM* shocks are more prevalent than *IS* shocks. If so, then targeting the interest rate stabilizes income better than targeting the money supply.

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## What is the Fed's policy instrument?

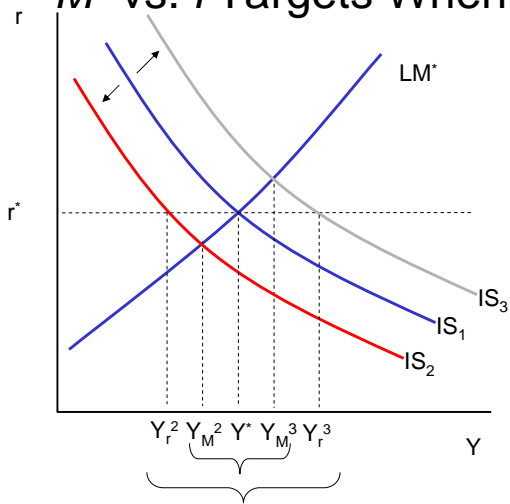
- Recall issue of intermediate targets for monetary policy (lecture 8).
- What intermediate target should monetary policy target?
  - Money supply
  - Interest Rates
- We can re-examine this issue in the context of the IS-LM framework with shocks to the goods and money markets

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## $M^S$ vs. $i$ Targets When $IS$ Unstable



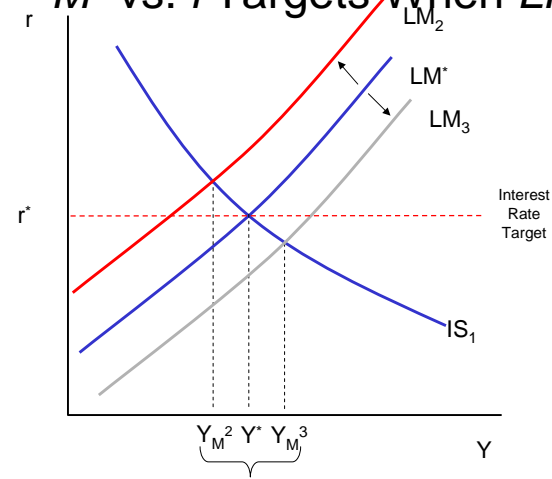
1.  $IS$  unstable: fluctuates from  $IS_1$  to  $IS_2$
2.  $M$  target,  $LM = LM^*$ :  $Y$  fluctuates from  $Y_M^2$  to  $Y_M^3$
3.  $r$  target at  $r^*$ :  $Y$  fluctuates from  $Y_r^2$  to  $Y_r^3$
4.  $Y$  fluctuation is less with  $M$  target

**Conclusion:** If  $IS$  curve is more unstable than  $LM$  curve,  $M$  target is preferred

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## $M^S$ vs. $i$ Targets When $LM$ Unstable



1.  $LM$  unstable: fluctuates from  $LM_2$  to  $LM_3$
2.  $M$  target:  $Y$  fluctuates from  $Y_M^2$  to  $Y_M^3$
3.  $i$  target at  $r^*$ :  $Y = Y^*$
4.  $Y$  fluctuation is less with  $i$  target

**Conclusion:** If  $LM$  curve is more unstable than  $IS$  curve,  $i$  target is preferred

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