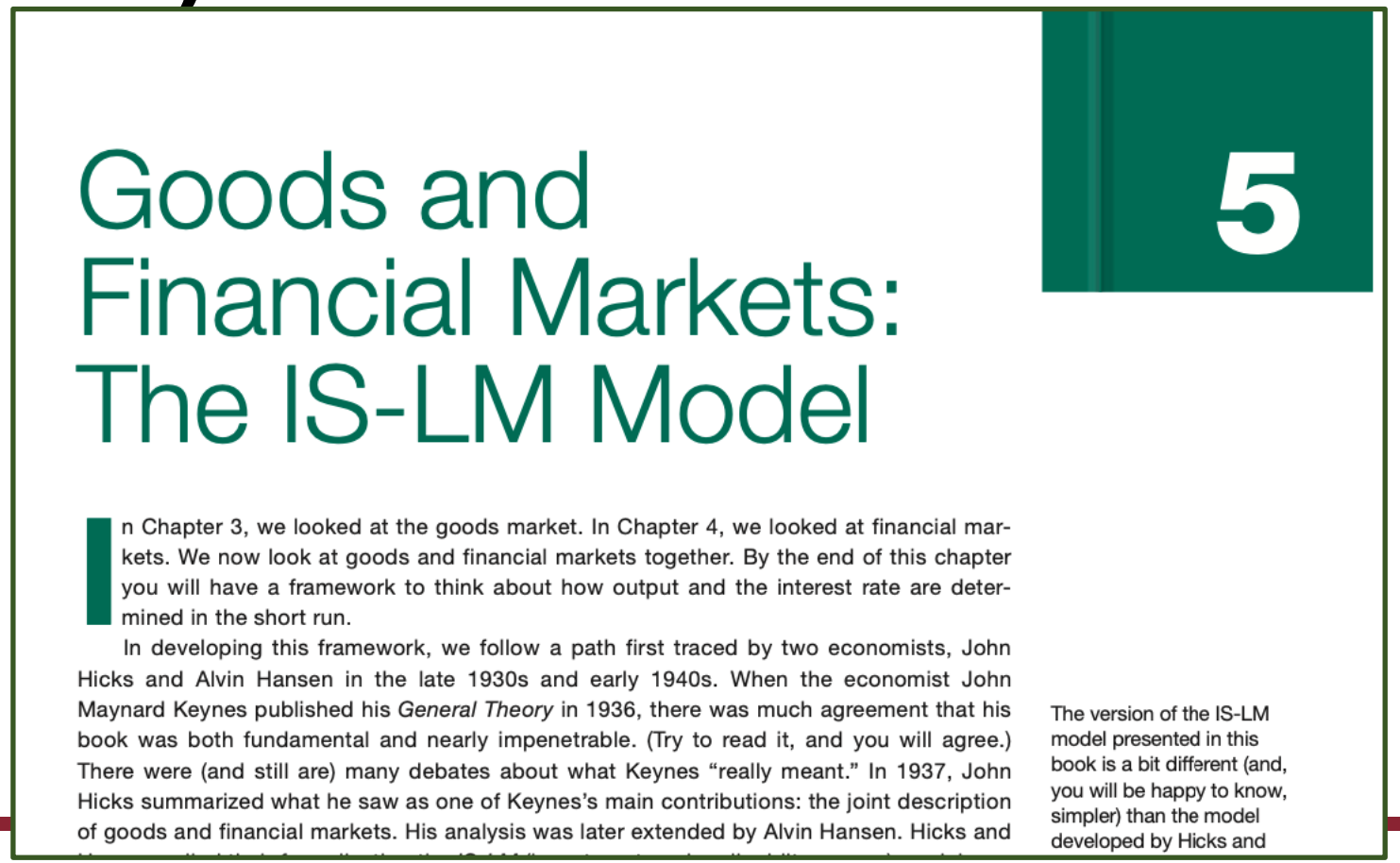
INTERMEDIATE MACROECONOMICS

4 – THE IS-LM MODEL

University of Massachusetts Amherst

Share 3 take-aways from the reading (textbook Chapter 5)



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Goods and Financial Markets: The IS-LM Model

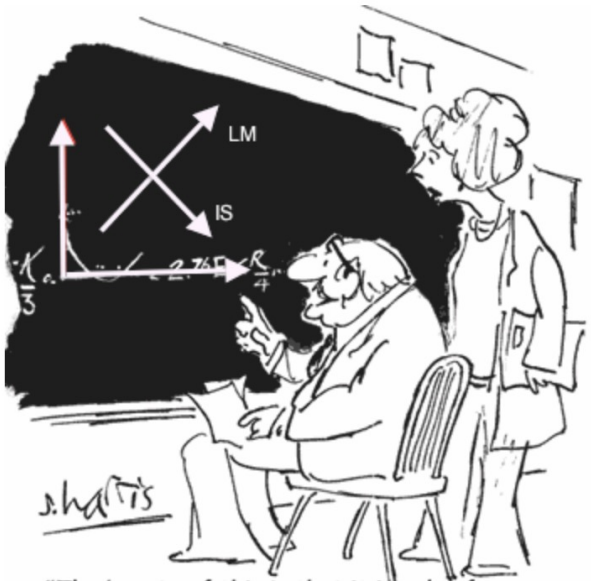
In Chapter 3, we looked at the goods market. In Chapter 4, we looked at financial markets. We now look at goods and financial markets together. By the end of this chapter you will have a framework to think about how output and the interest rate are determined in the short run.

In developing this framework, we follow a path first traced by two economists, John Hicks and Alvin Hansen in the late 1930s and early 1940s. When the economist John Maynard Keynes published his *General Theory* in 1936, there was much agreement that his book was both fundamental and nearly impenetrable. (Try to read it, and you will agree.) There were (and still are) many debates about what Keynes "really meant." In 1937, John Hicks summarized what he saw as one of Keynes's main contributions: the joint description of goods and financial markets. His analysis was later extended by Alvin Hansen. Hicks and

The version of the IS-LM model presented in this book is a bit different (and, you will be happy to know, simpler) than the model developed by Hicks and

4 – The IS-LM Model

- Weeks 2-3: we learned that *Y = AD * multiplier.*
- Week 4: we learned how the Central Bank sets the interest rate.
- Now: add the effect of the interest rate on demand & put the pieces together.
- IS-LM model (John Hicks, Alvin Hansen)



Section 4: The roadmap

1. Refresher: functions & graphs.
2. The investment function & the IS curve.
3. The IS-LM model.
4. Policy evaluation using IS-LM.

Section 4: The take-aways

- A higher interest rate reduces aggregate demand.
- Therefore, equilibrium output is a negative function of the interest rate (*decreasing IS Curve*).
- The interest rate is set by the Central Bank (*horizontal LM curve*).
- By setting the interest rate, the Central Bank can influence the level of output (IS-LM model).

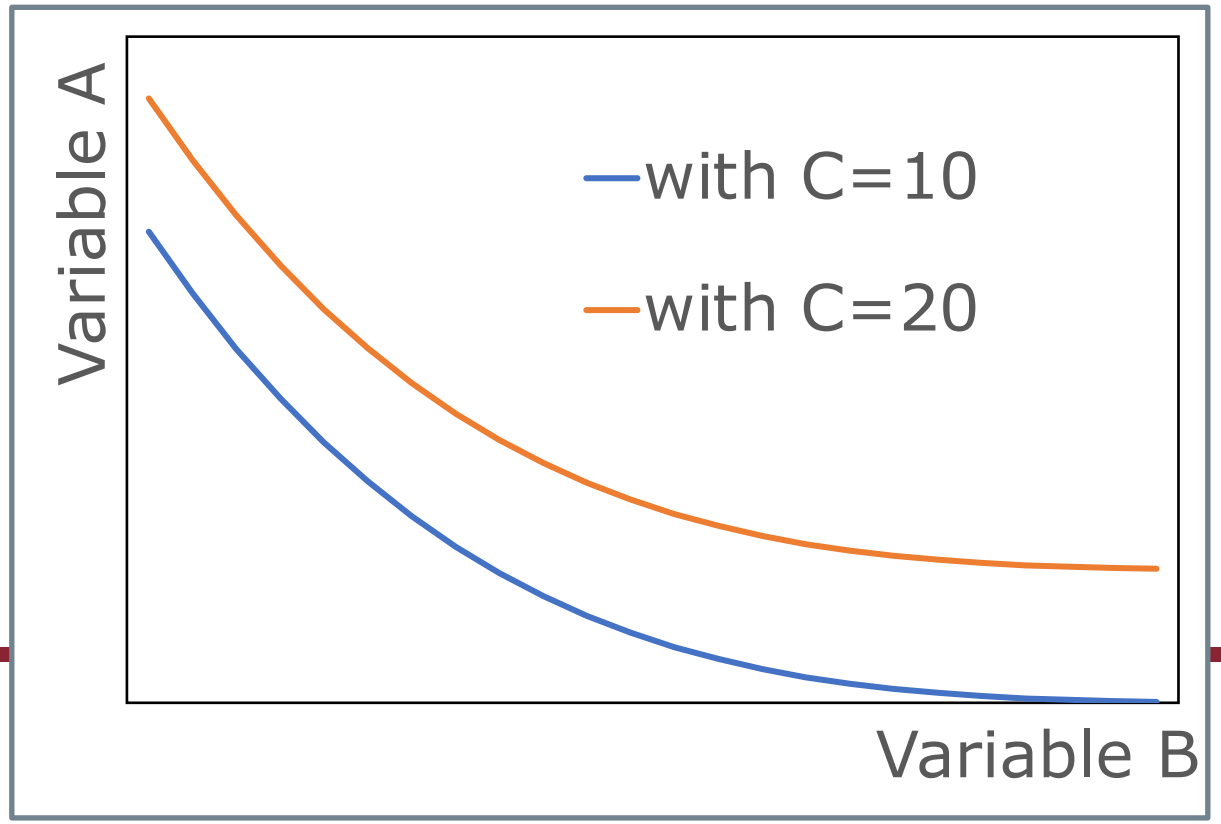
4.1 REFRESHER: FUNCTIONS & GRAPHS

Intermediate Macroeconomics (ECON 204) – Fall 2022
Instructor: Daniele Girardi

Example 1: A is a function of B and C.

$$A = A(B, C)$$

$$(-, +)$$



- Figure: Relation between A and B *for any given level of C*
- Changes in B cause movements *along the curve.*
- Changes in C *shift* the curve.

Example 2: A does not depend on B.

$$A = \bar{A}$$

- The relation between A & B is a horizontal line.

4.2 THE INVESTMENT FUNCTION & THE IS CURVE

Intermediate Macroeconomics (ECON 204) – Fall 2022
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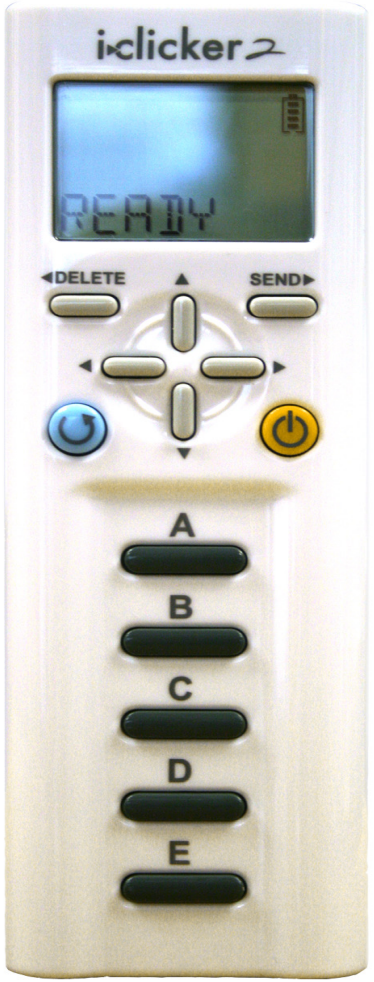
Clicker question

What have we assumed so far about investment (in the model of Section 2)?

A. Investment was assumed to be exogenous.
B. Investment was assumed to depend on taxes.
C. Investment was assumed to depend on consumption.
D. Investment was assumed to depend on government spending.



Our first model of the economy from Sec 2

Aggregate demand: $Z = C + I + G$

Behavioral equations: $C = c_0 + c_1(Y - \bar{T})$

$I = \bar{I}$

$T = \bar{T}$

$G = \bar{G}$

Let's now change this piece.

Equilibrium: $Y = Z \rightarrow Y = c_0 + c_1(Y - \bar{T}) + \bar{I} + \bar{G}$

The investment function

- $I = \bar{I}$ not very realistic.
- What affects (housing & business) investment?
  - ✓ Sales (= output = income).
  - ✓ The interest rate.

Investment function:

$$I = I(Y, i)$$

$$(+, -)$$

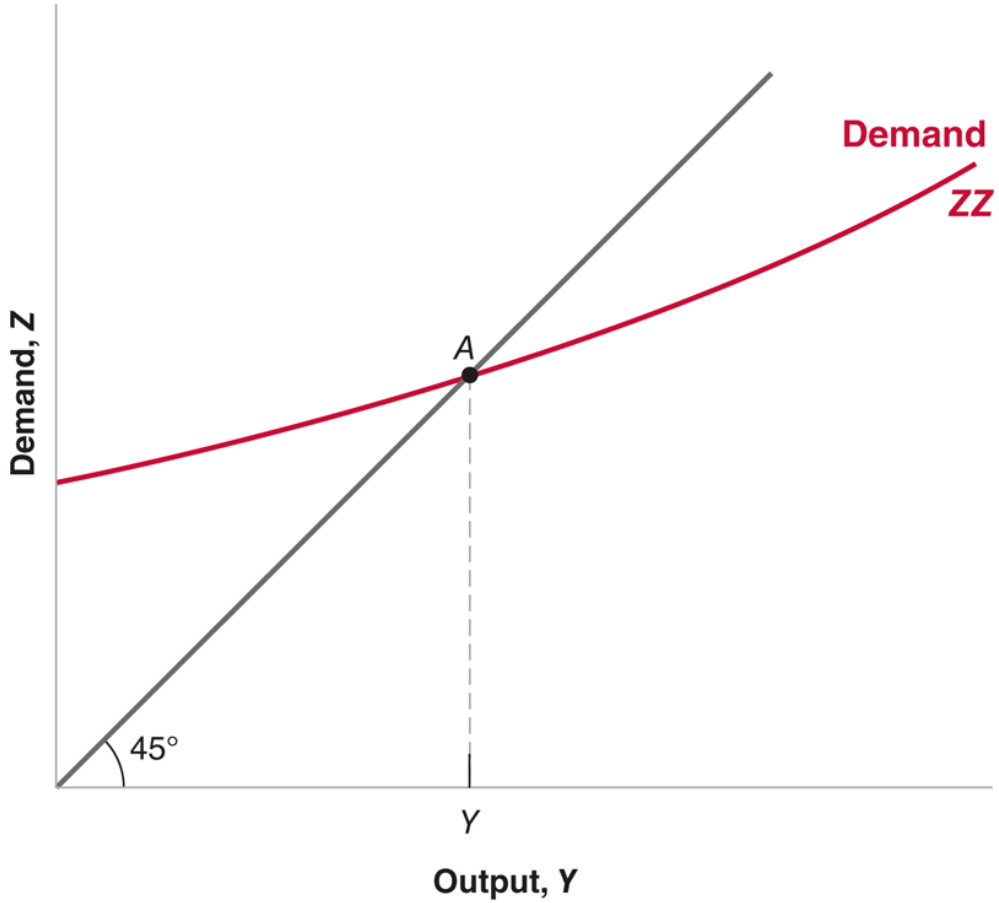
Determining output

- Goods market equilibrium becomes:

$$Y = C(Y - \bar{T}) + I(Y, i) + \overline{G}$$

- Now equilibrium output depends on:
  - *Autonomous demand* $[c_0, \bar{G}, \bar{T}]$
  - *The interest rate* $[i]$

Equilibrium in the goods market



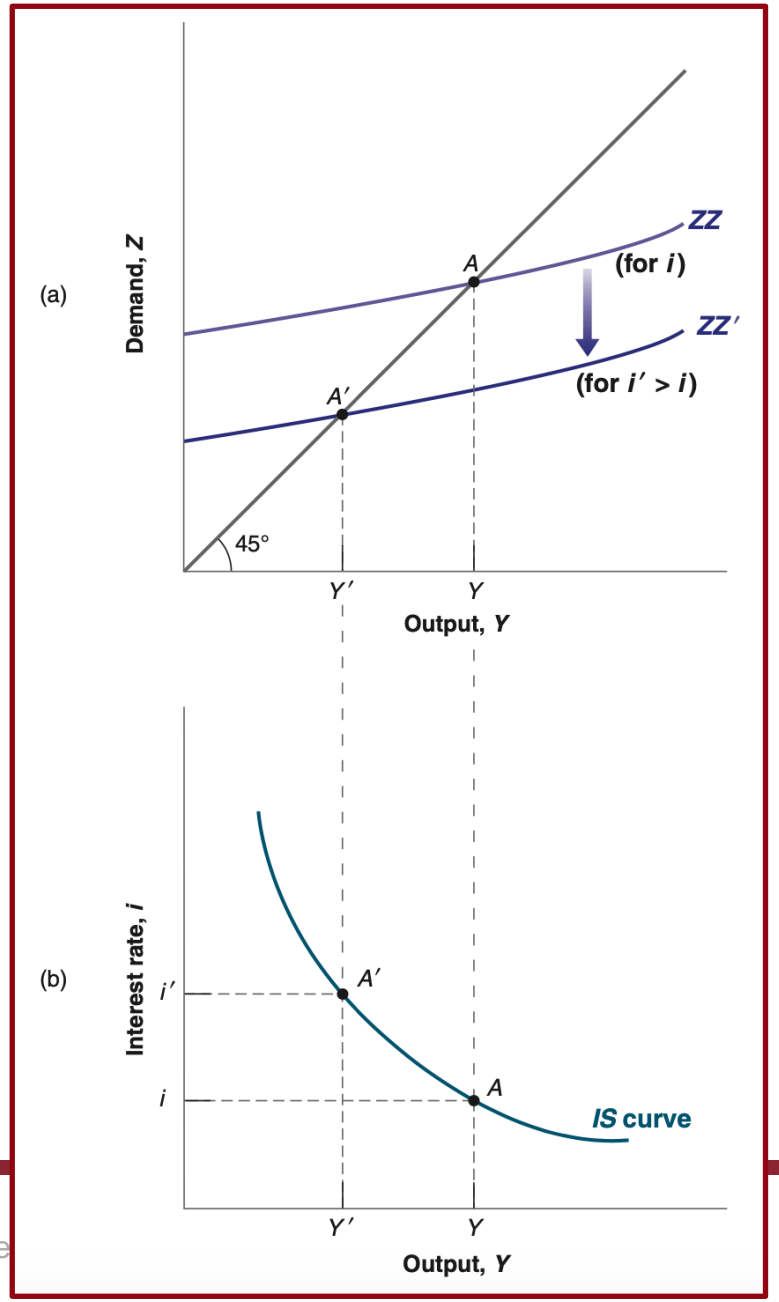
- Equilibrium: intersection of 45-degree line & ZZ curve.
- ZZ curve now upward-sloping for two reasons:
  - Higher Y → higher C.
  - Higher Y → higher I.
- We are taking i as given.
- What happens if i changes?

The IS Curve

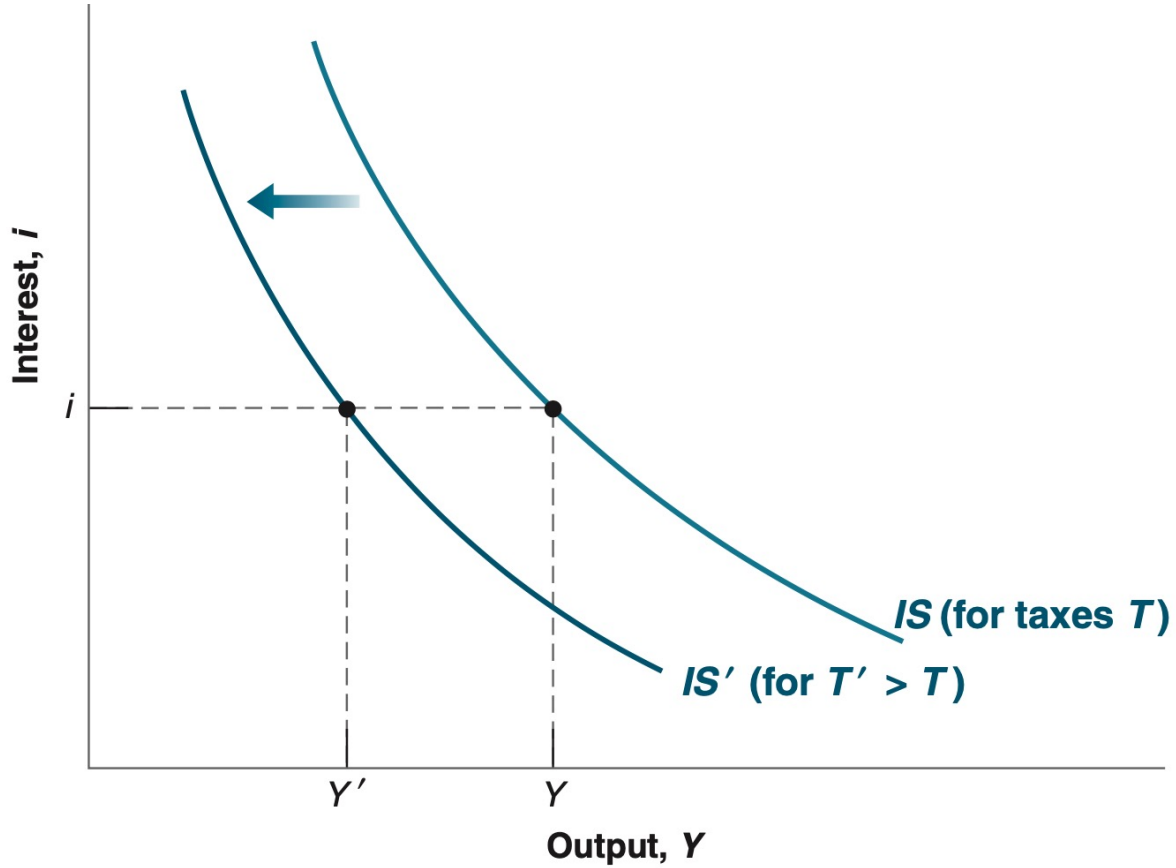
(a)Increase in the interest rate shifts down the demand line.

(b)The higher the interest rate, the lower equilibrium output.

→ Downward sloping *IS Curve*



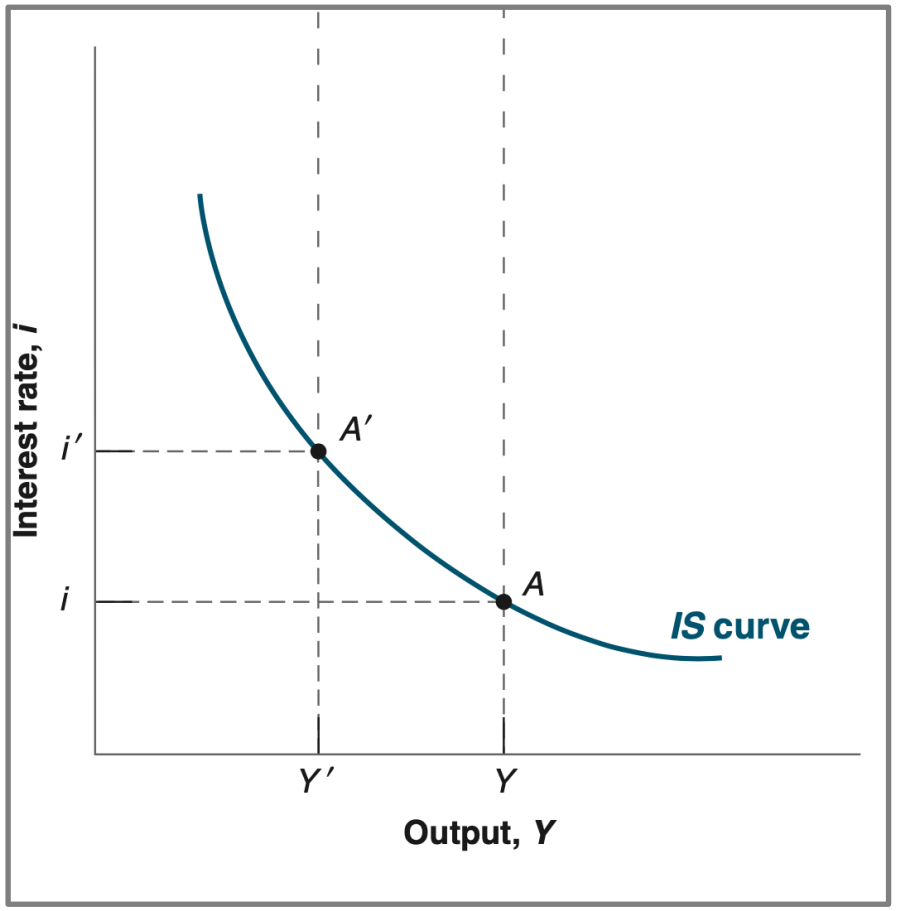
Shifts of the IS Curve

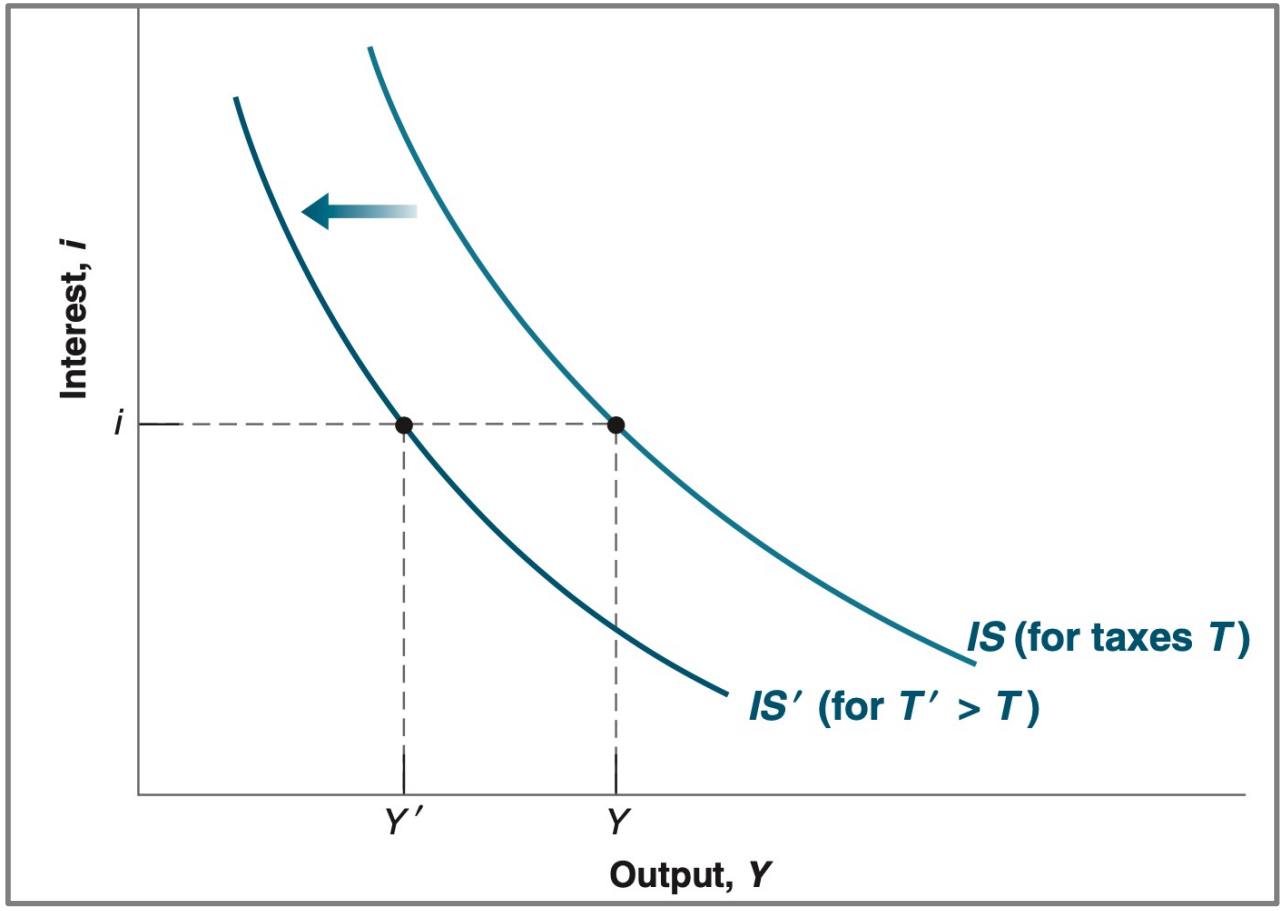


Increase in T shifts the *IS* curve down.

Increase in G shifts the IS curve up.

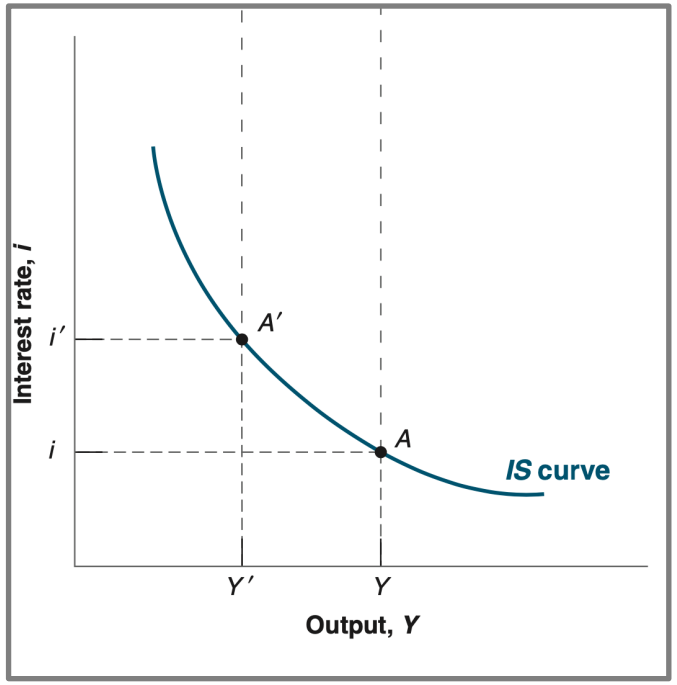
IS Curve: summing up

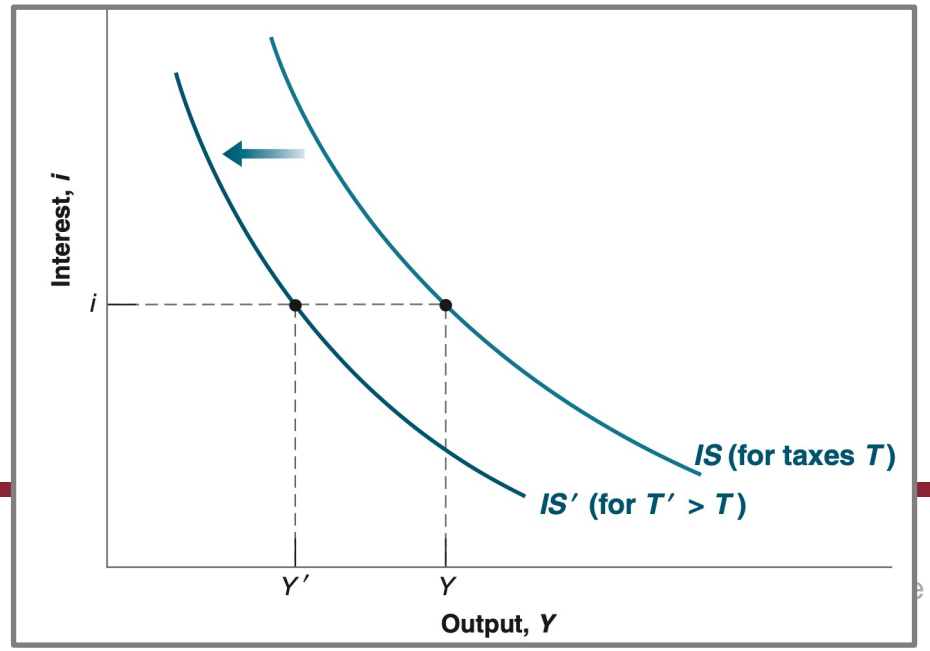




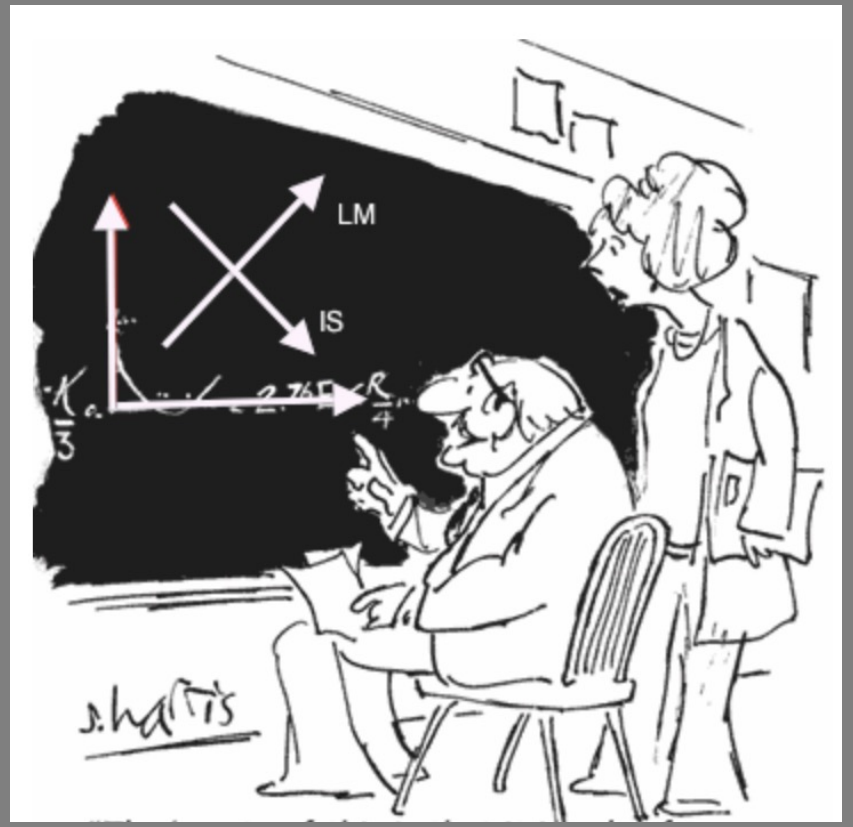
Previously on Econ 204…

- Investment function: $I = I(Y, i)$
- Downward sloping IS curve.
- Changes in i cause movements *along* the IS curve.
- Changes in c_0, G, T cause the IS curve to *shift* up or down.



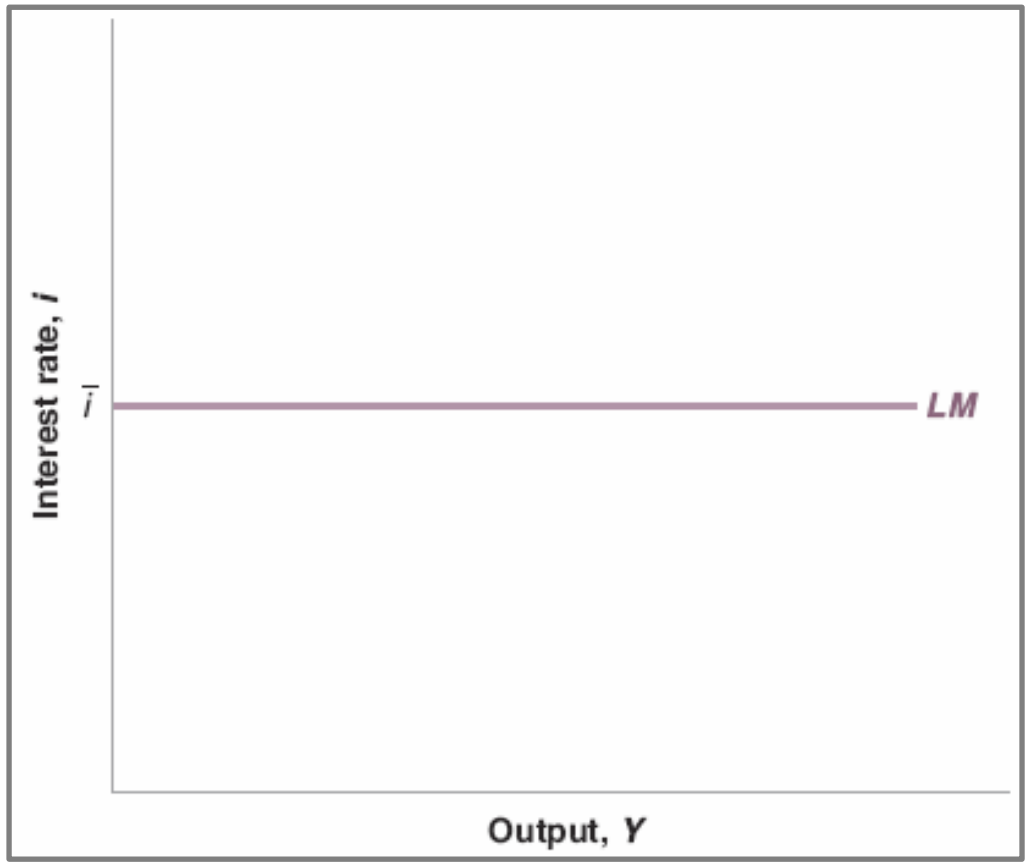


4.3 THE IS-LM MODEL



The LM "curve"

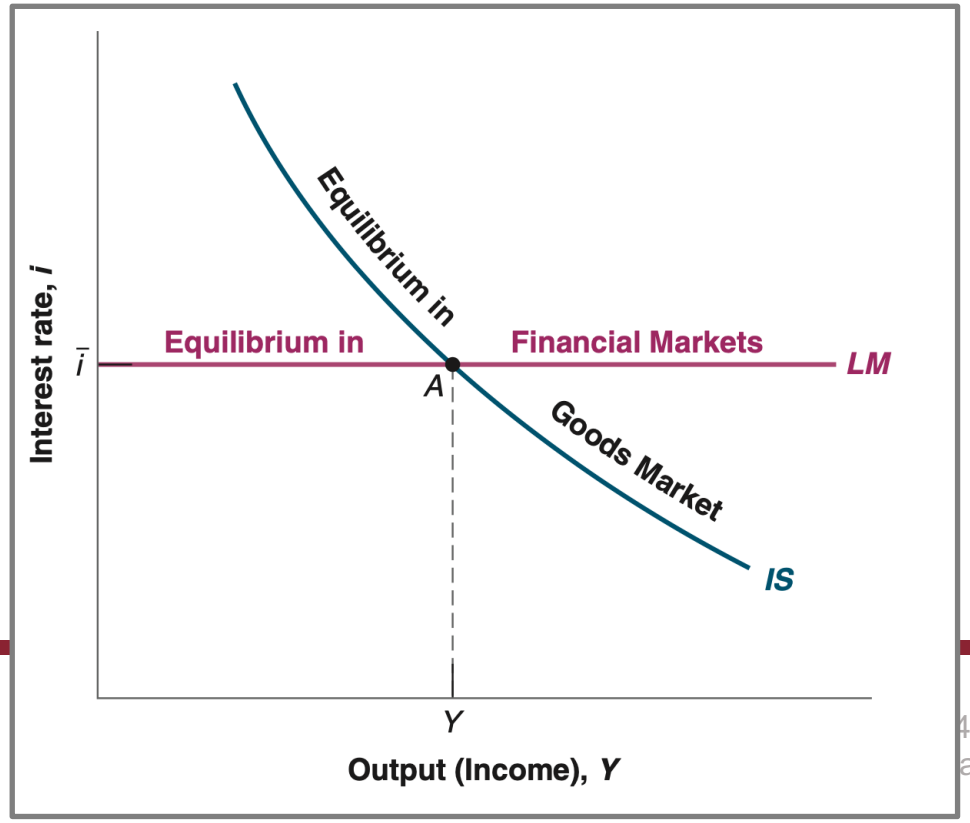
- The Central Bank sets the riskless interest rate.
- → the equilibrium interest rate is exogenous: $i = \bar{\imath}$
- Horizontal line: *i* does not depend on *Y.*



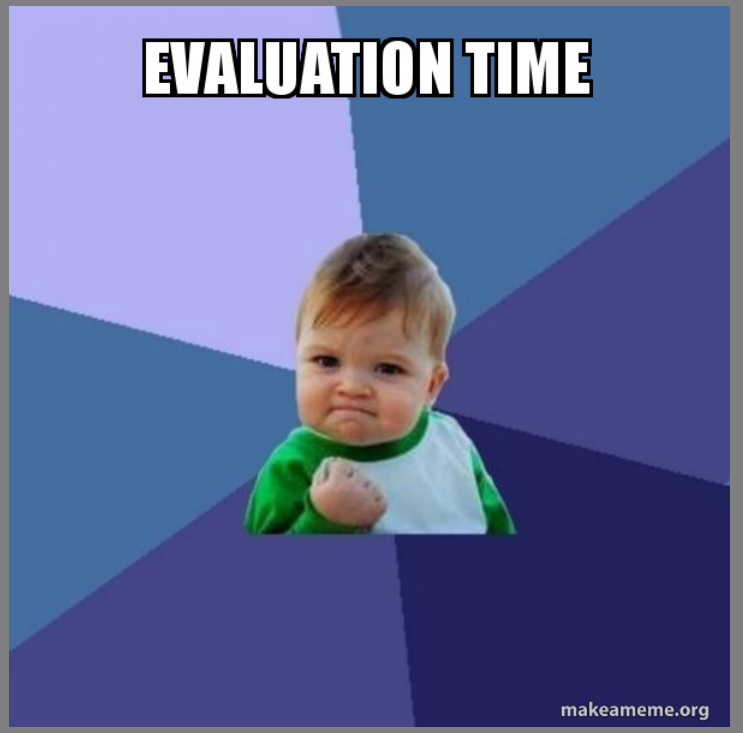
Putting the IS and LM curves together: The IS-LM Model

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

LM relation: $i = \bar{i}$



4.4 POLICY EVALUATION USING THE IS-LM MODEL



Fiscal and monetary policy: The basics.

Fiscal Policy

- Decrease in $\bar{G} - \bar{T}$ = fiscal contraction (or fiscal consolidation)
- Increase in $\bar{G} - \bar{T}$ = fiscal expansion

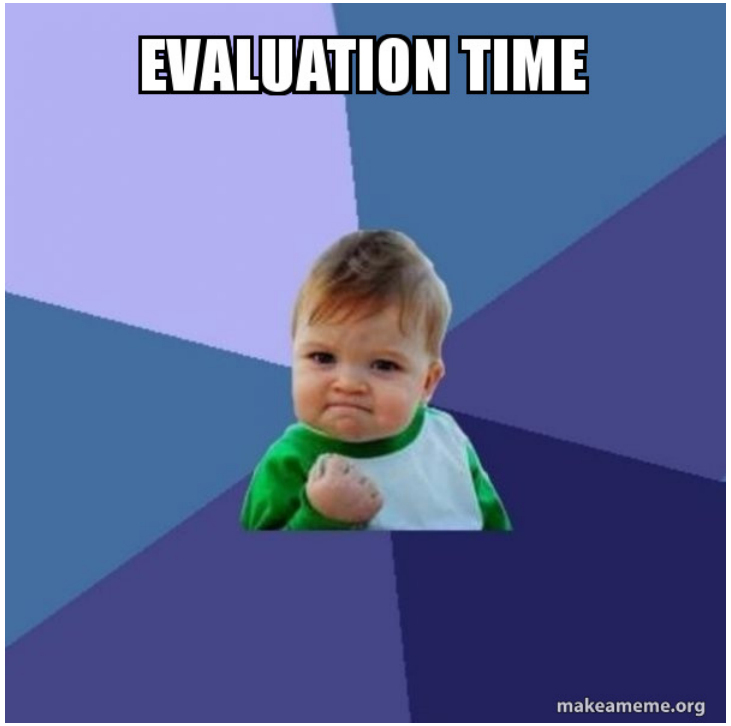
Monetary Policy

- Decrease in $\bar{\imath}$ = monetary expansion
- Increase in $\bar{\imath}$ = monetary contraction (or monetary tightening)

Policy evaluation using the IS-LM model

3 Steps:

1. Does it shift the *IS* curve and/or the *LM* curve?
2. What does this do to equilibrium output?
3. What are the mechanisms? Describe the effects in words



Fiscal contraction

It means a decrease in G or an increase in T

Clicker question

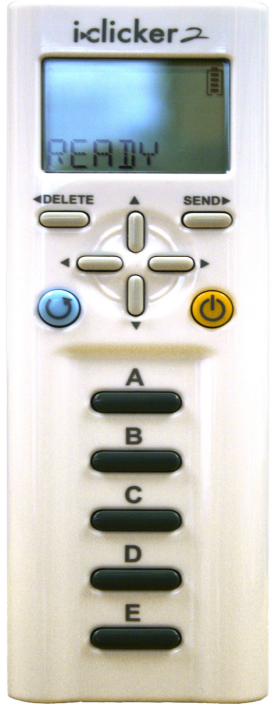
What is the effect on the IS-LM diagram?

A. IS curve shifts down.

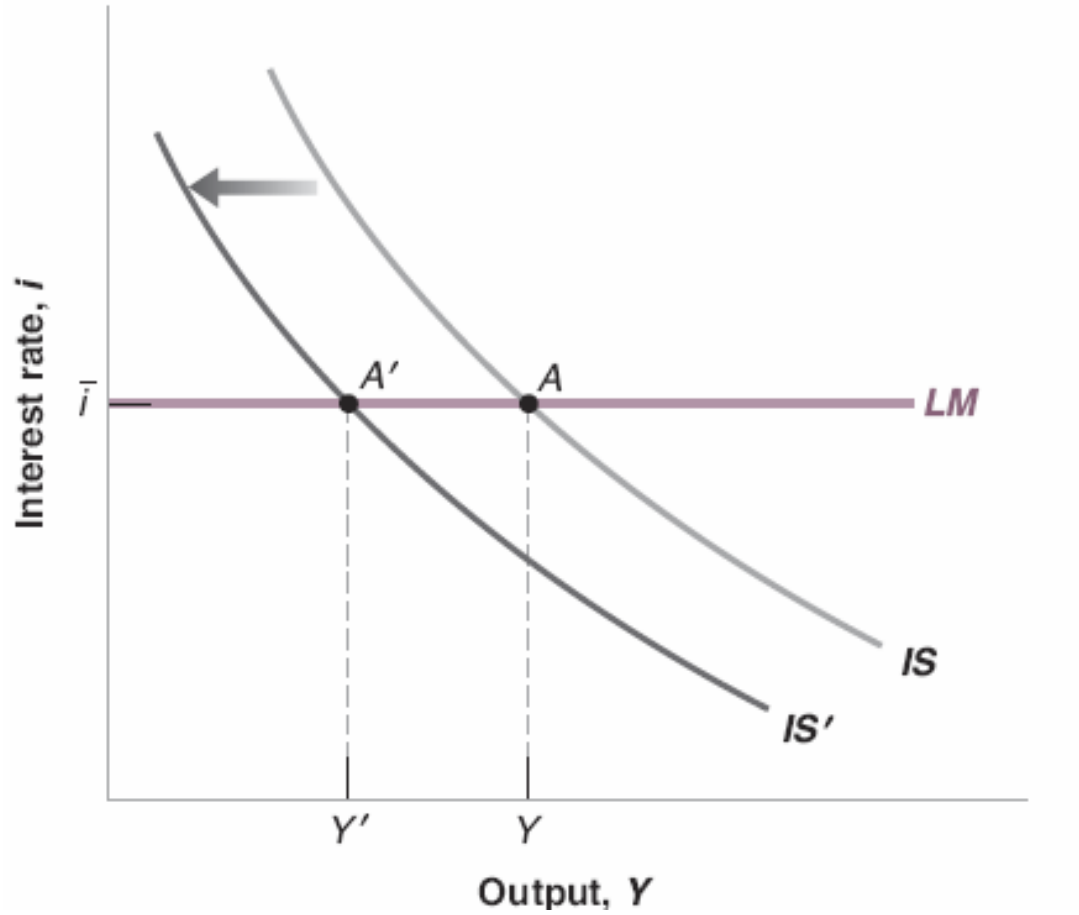
B. IS curve shifts up.

C. LM curve shifts down.

D. LM curve shifts up.



Fiscal contraction



- Shifts the IS curve downwards.
- LM curve unaffected.
- Decrease in equilibrium output (from Y to Y').
- The multiplier process is what produces this result.
- Movement along the LM curve.

Monetary expansion

It means a decrease in i

Clicker question

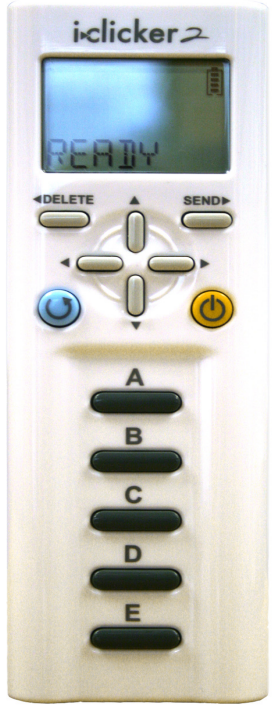
What is the effect on the IS-LM diagram?

A. IS curve shifts down.

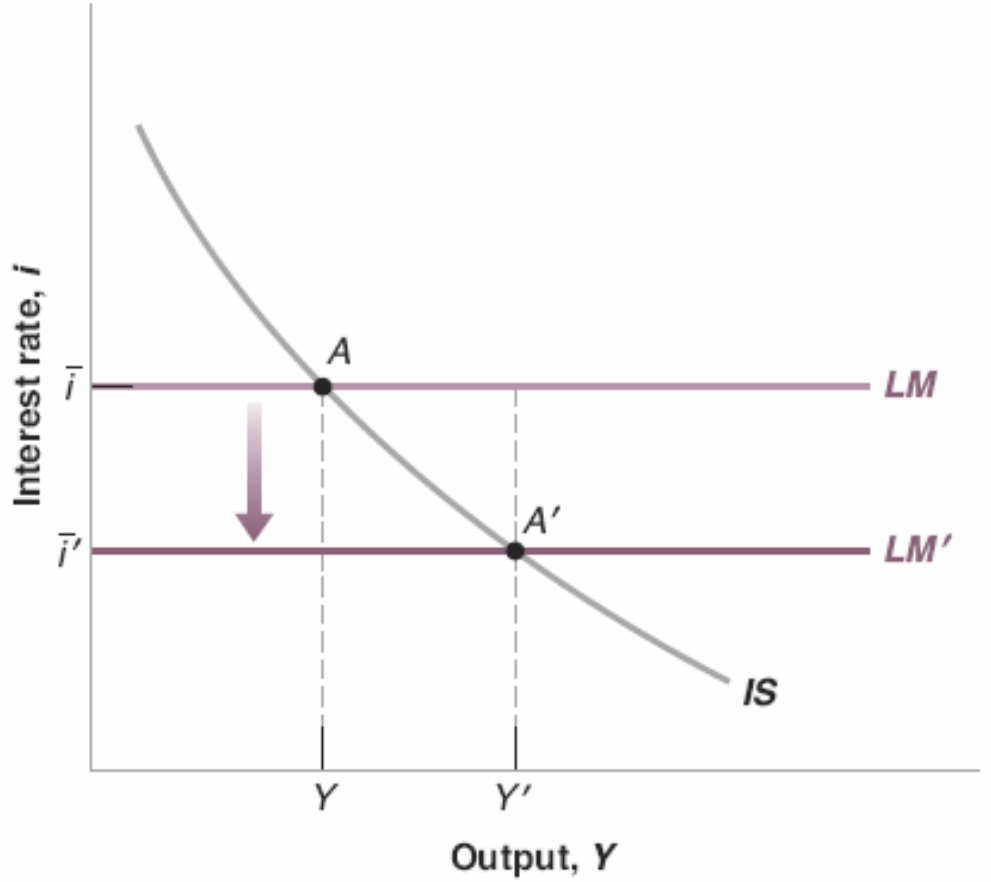
B. IS curve shifts up.

C. LM curve shifts down.

D. LM curve shifts up.



Monetary expansion



- Shifts the LM curve downwards.
- IS curve unaffected.
- Equilibrium output increases.
- The decrease in $\bar{\imath}$ increases investment, which in turn increases output through multiplier process.
- Movement along the IS curve.

Combined fiscal & monetary expansion

It means a decrease in i and an increase in G.

Clicker question

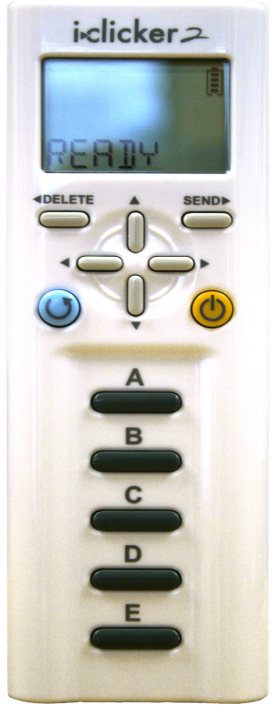
What is the effect on the IS-LM diagram?

A. IS curve shifts down. LM curve shifts up;

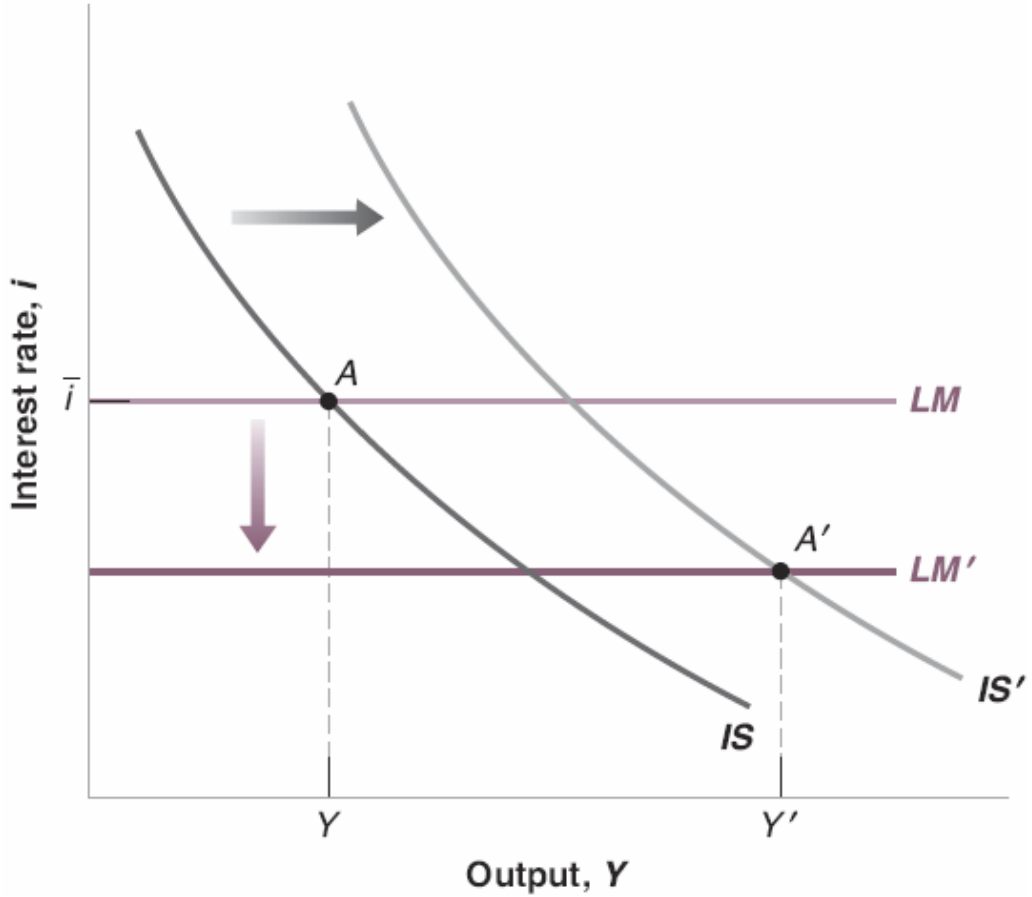
B. IS curve shifts up. LM curve shifts down;

C. IS and LM curves both shift up;

D. IS and LM curves both shift down;



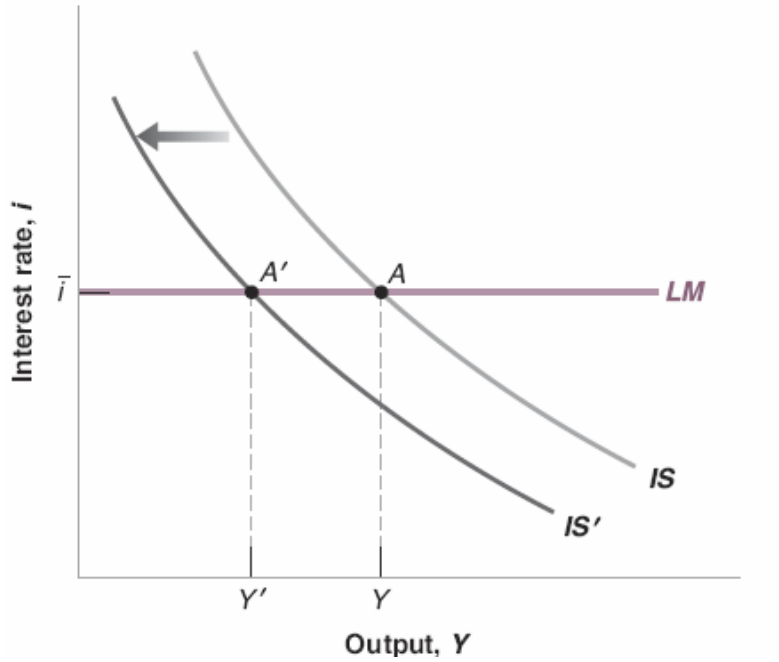
Combined fiscal & monetary expansion



- *IS* curve shifts up.
- *LM* curve shifts down.
- Both increase equilibrium output.
- Fiscal expansion increases Government demand.
- Monetary expansion increases private investment.
- They both increase Y through multiplier process.

The US economy today through the IS-LM lens

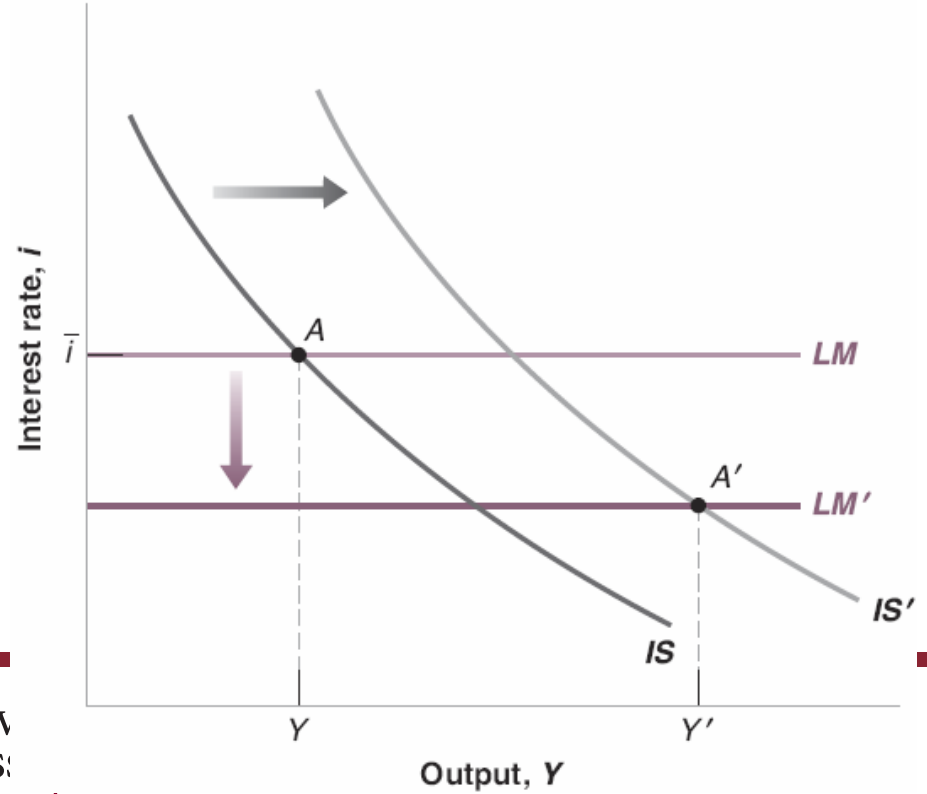
- What was the effect of the COVID crisis in Spring 2020?



It can be seen as a downward shift in the IS curve

The US economy today through the IS-LM lens

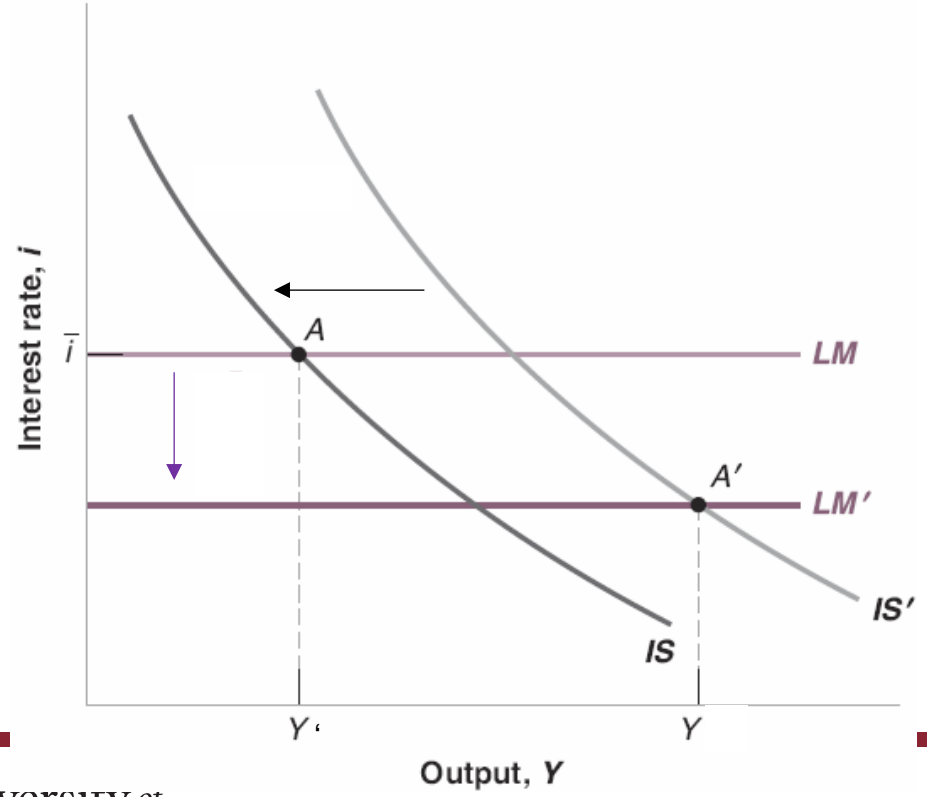
- How did US policy makers react to the COVID crisis in 2020-2021?



They reacted with a combined fiscal & monetary expansion.

The US economy today through the IS-LM lens

- What are policy-makers doing now in 2022?



Combined fiscal & monetary contraction. Why?