Economics 442
Macroeconomic Policy
Lecture 4
9/16/2020

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UW Madison
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Outline

- Recap: IS-LM equations/terms
- Recap: Policy and multipliers
- What determines policy efficacy?

Recap: Real Side

- "Real" means widgets or in "2012$"
- Supply responds passively to changes in demand => "demand determined"

1. The Real Side of the Economy

Endogenous variable

Eq.No.	Equation	Description
(1)	$Y \equiv Z$	Output equals aggregate demand, an equilibrium condition
(2)	$Z \equiv C + I + G$	Definition of aggregate demand
(3)	$C \equiv c_o + c_1 Y_D$	Consumption function, c_1 is the mpc
(4)	$Y_D \equiv Y - T$	Definition of disposable income
(5)	$T \equiv t_0 + t_1 Y$	Tax function; t_0 is lump sum taxes, t_1 is marginal tax rate.
(6)	$I \equiv b_0 + b_1 Y - b_2 i$	Investment function ***(revised)***
(7)	$G \equiv GO_0$	Government spending on goods and services, exogenous

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parameter

Autonomous spending

Recap: Financial Side

- Money yields no return, Bonds (everything else) yields non-zero return
- Only government assets count (outside assets)

2. The Financial Side of the Economy

Eq.No.	Equation	Description
(14)	$\frac{M^d}{P} = \frac{M^s}{P}$	Equilibrium condition
(15)	$\frac{M^s}{P} = \frac{M_0}{P}$	Money supply

For money demand:

(16)	$\frac{M^d}{P} = \mu_0 + Y - hi$	Money demand

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For money demand: parameter

(16)	$\frac{M^d}{P} = u_0 + Y - h$	Money demand

Recap: IS-LM Eq'm Income

(12) $$Y = \left(\frac{1}{1-c_1(1-t_1)-b_1}\right)[\Lambda_0 - b_2 i]$$ <IS curve>

(17) $$i = \left(\frac{\mu_0}{h}\right) - \left(\frac{1}{h}\right)\left(\frac{M_0}{P}\right) + \left(\frac{1}{h}\right)Y$$ <LM curve>

(21) $$\boxed{Y_0 = \hat{\gamma}\left[\Lambda_0 + \frac{b_2}{h}\left(\frac{M_0}{P}\right) - \frac{b_2\mu_0}{h}\right]}$$ <equilibrium income>

Where

$$\hat{\gamma} \equiv \frac{1}{1-c_1(1-t_1)-b_1+\frac{b_2}{h}}$$

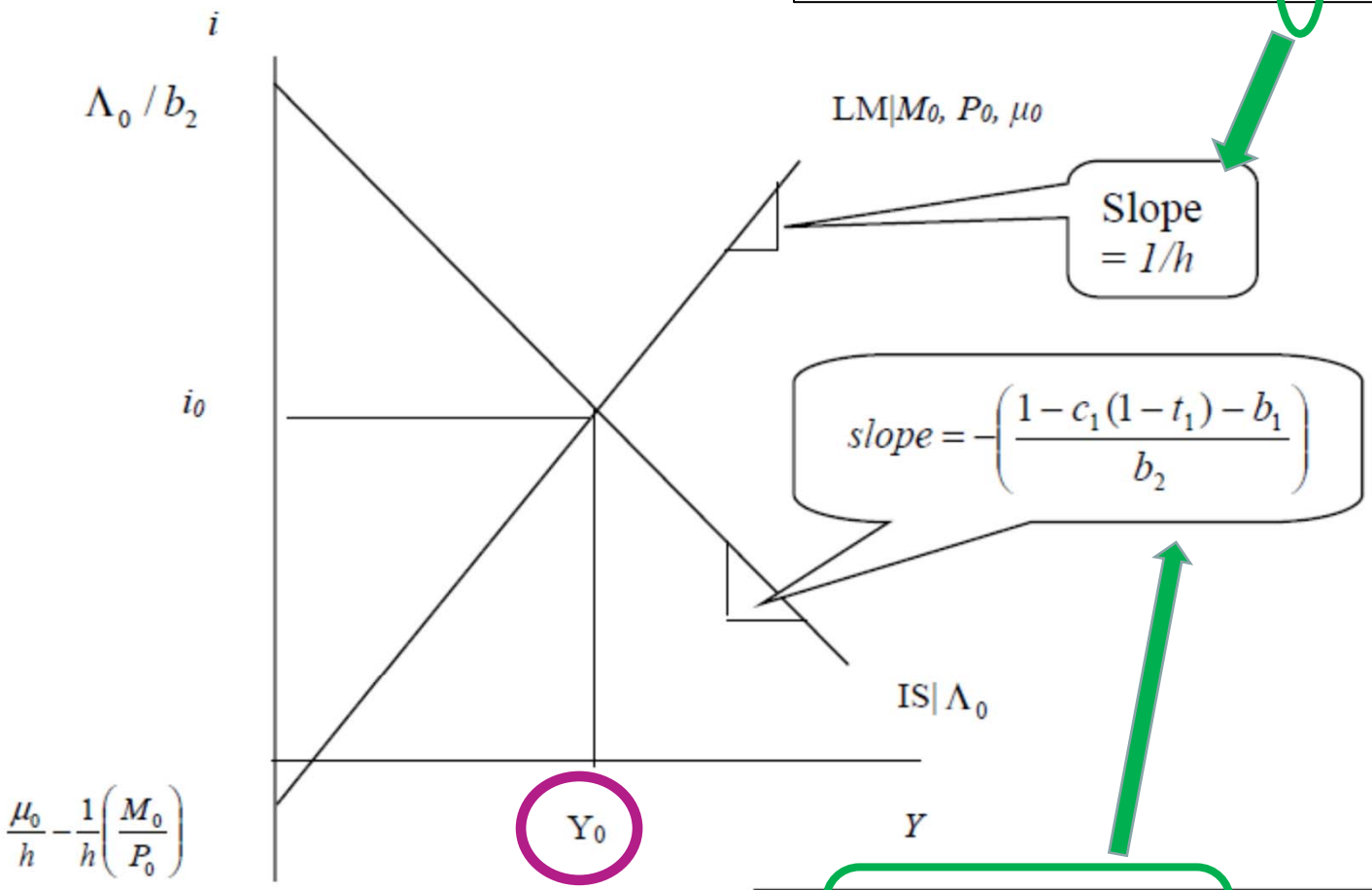
Recap: IS-LM Eqm Interest Rate

(12) $$Y = \left(\frac{1}{1 - c_1(1 - t_1) - b_1} \right) [\Lambda_0 - b_2 i]$$ <IS curve>

(17) $$i = \left(\frac{\mu_0}{h} \right) - \left(\frac{1}{h} \right) \left(\frac{M_0}{P} \right) + \left(\frac{1}{h} \right) Y$$ <LM curve>

Graphical Depiction

$$(17) \quad i = \left(\frac{\mu_0}{h}\right) - \left(\frac{1}{h}\right)\left(\frac{M_0}{P}\right) + \left(\frac{1}{h}\right)Y \qquad \text{<LM curve>}$$



$$(13) \quad i = -\left(\frac{1 - c_1(1 - t_1) - b_1}{b_2}\right)Y + \left(\frac{1}{b_2}\right)\Lambda_0 \qquad \text{<IS curve>}$$

Figure 1: Equilibrium in IS-LM

Policy

Solve for equilibrium, level is function of levels, then take total differential

$$(21) \qquad Y_0 = \hat{\gamma}\left[\Lambda_0 + \frac{b_2}{h}\left(\frac{M_0}{P}\right) - \frac{b_2\mu_0}{h}\right]$$

<equilibrium income>

$$(22) \qquad \Delta Y = \hat{\gamma}\left[\Delta\Lambda + \frac{b_2}{h}\Delta\left(\frac{M}{P}\right) - \frac{b_2}{h}\Delta\mu\right]$$

The "Multiplier"

A "multiplier" is a parameter which summarizes the change in one variable for a one unit change in another (typically exogenous) variable. There are different multipliers, but the most common is for government spending; there is also one for (lump sum) taxes

$$\Delta Y = \hat{\gamma}\Delta GO \Rightarrow \frac{\Delta Y}{\Delta GO} = \hat{\gamma} \qquad \Delta Y = -\hat{\gamma}c_1\Delta t_0 \Rightarrow \frac{\Delta Y}{\Delta t_0} = -\hat{\gamma}c_1$$

Monetary Policy Multiplier

Hold constant all fiscal policy (changes in G, T). Then if the central bank can change the real stock of money…

$$\Delta Y = \hat{\gamma}\frac{b_2}{h}\Delta\left(\frac{M}{P}\right) \Rightarrow \frac{\Delta Y}{\Delta(M/P)} = \hat{\gamma}\frac{b_2}{h}$$

This requires (1) that when M is increased, P does not change proportionately, and (2) output responds passively to demand

Graphical Depiction of Fiscal Policy

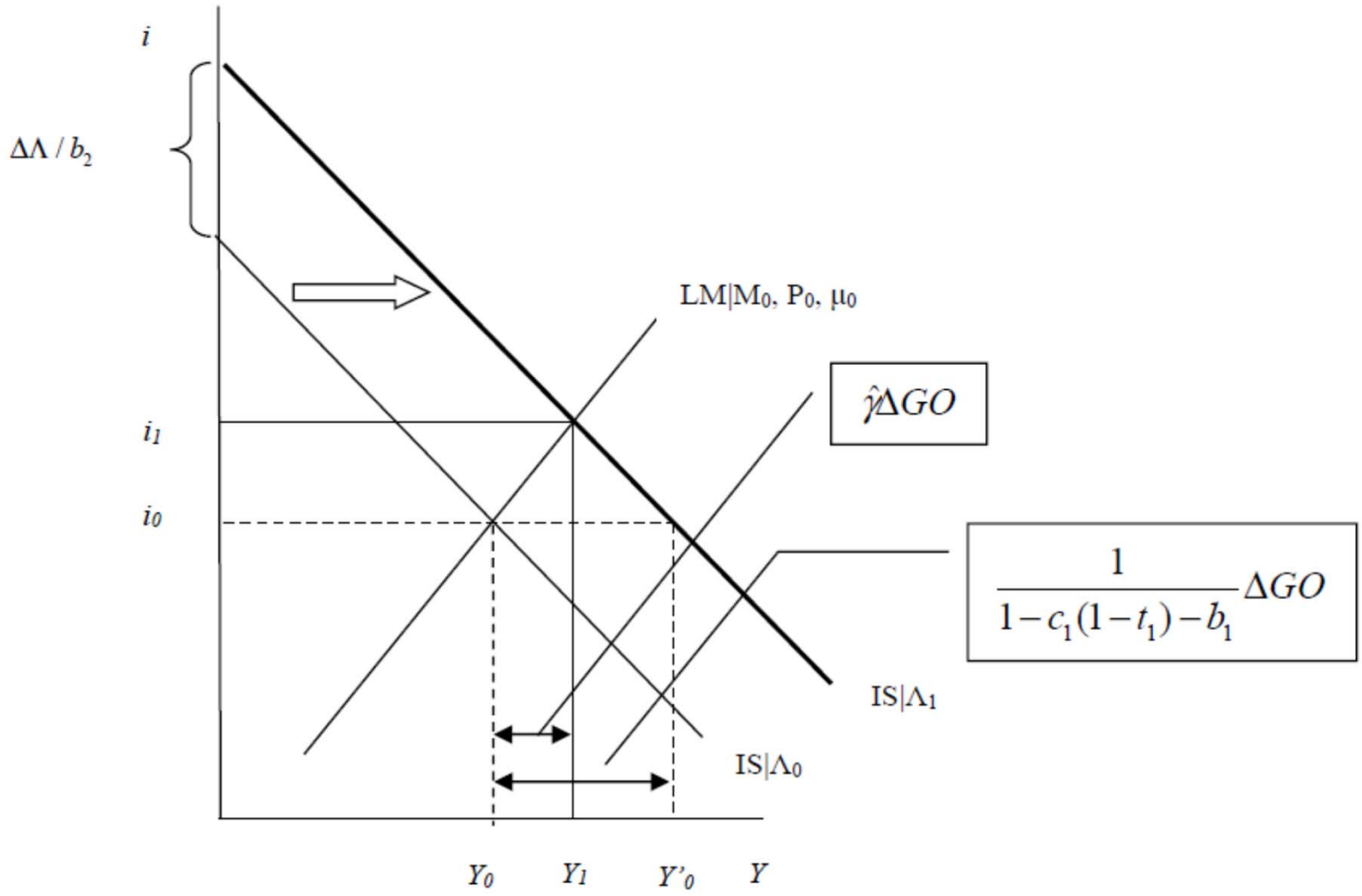


Figure 2: Fiscal (Govt. spending) Policy

Monetary Policy in Basic Model…

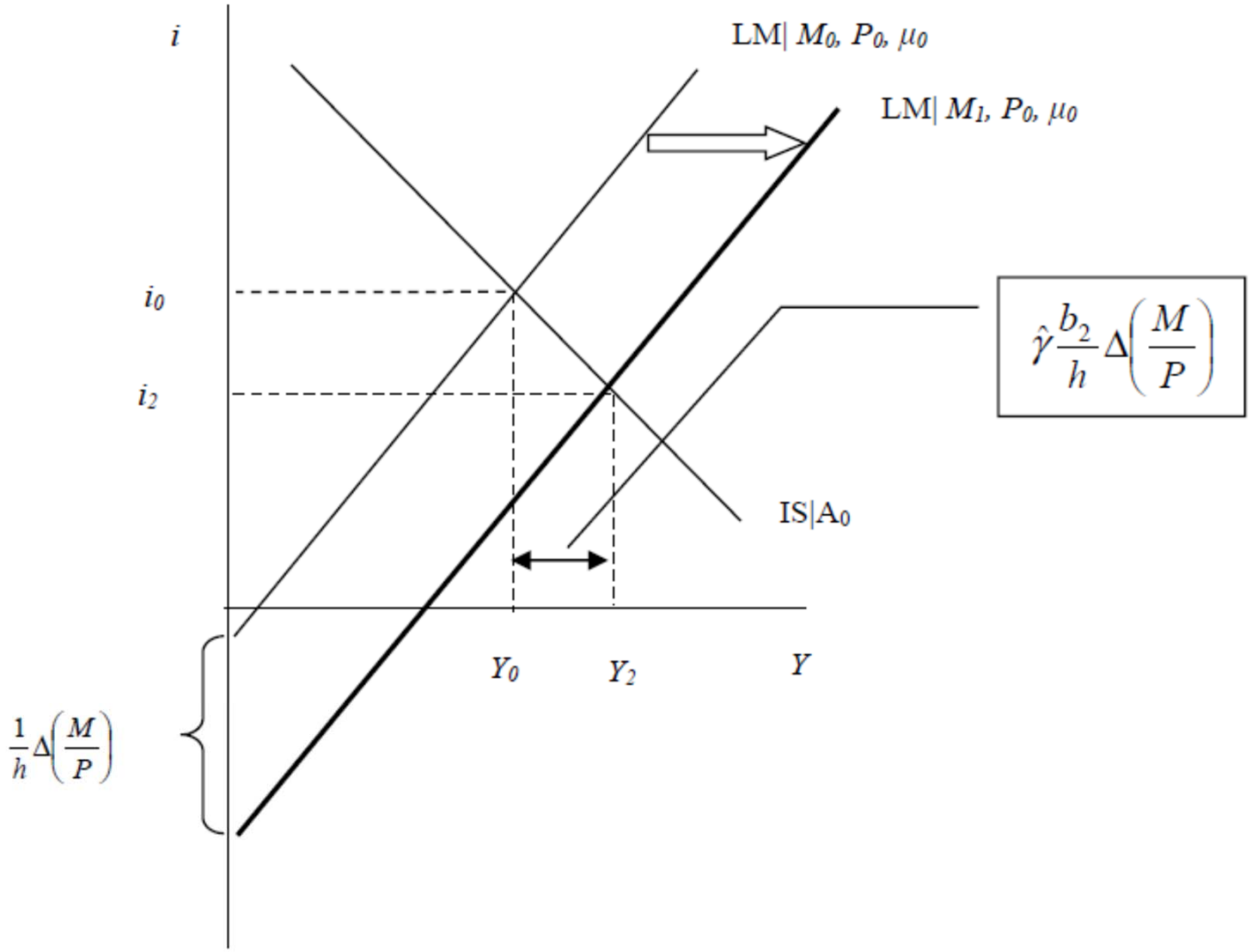


Figure 3: Monetary Policy

And Monetary Policy in Practice (until 2008)

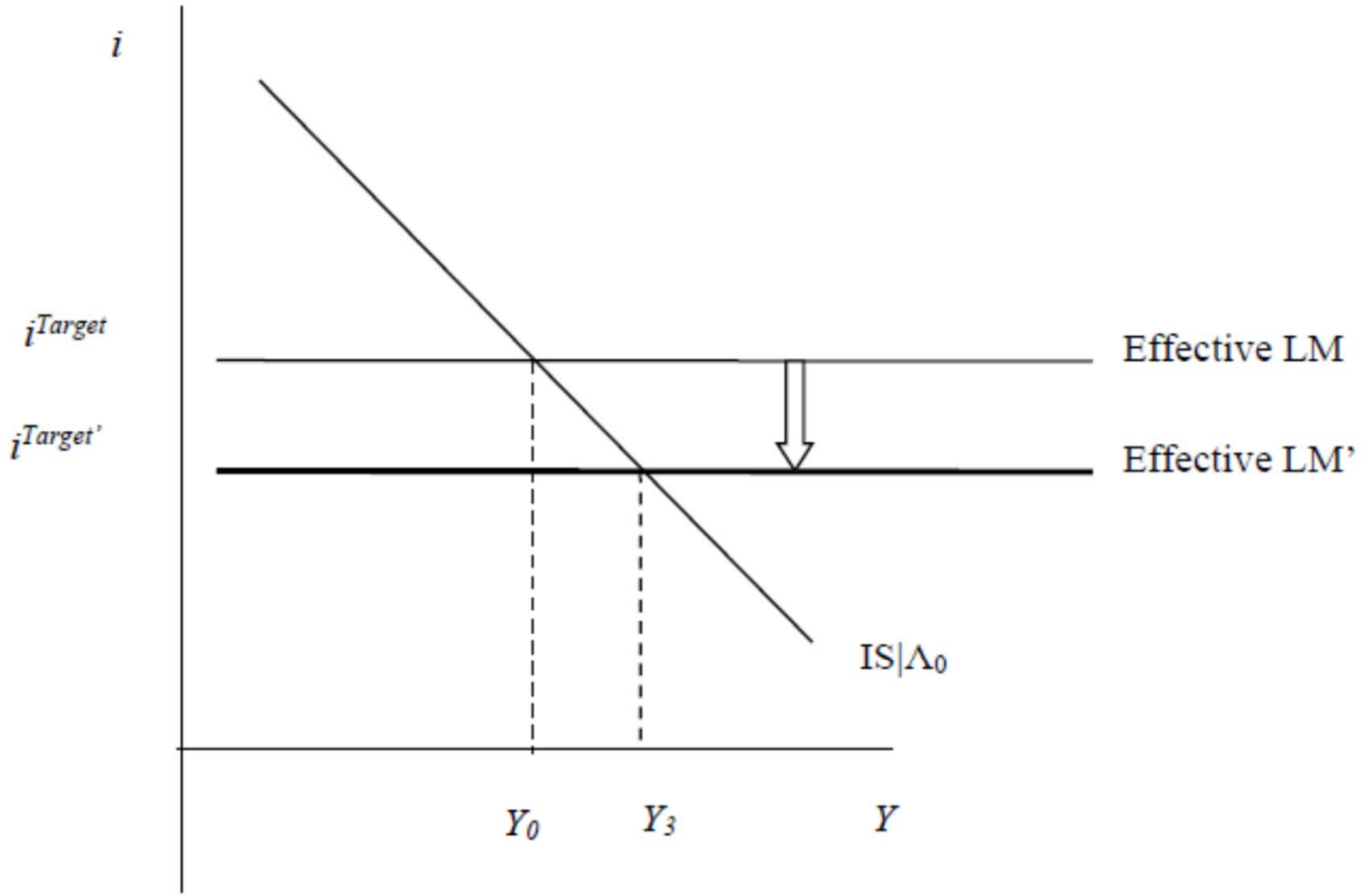
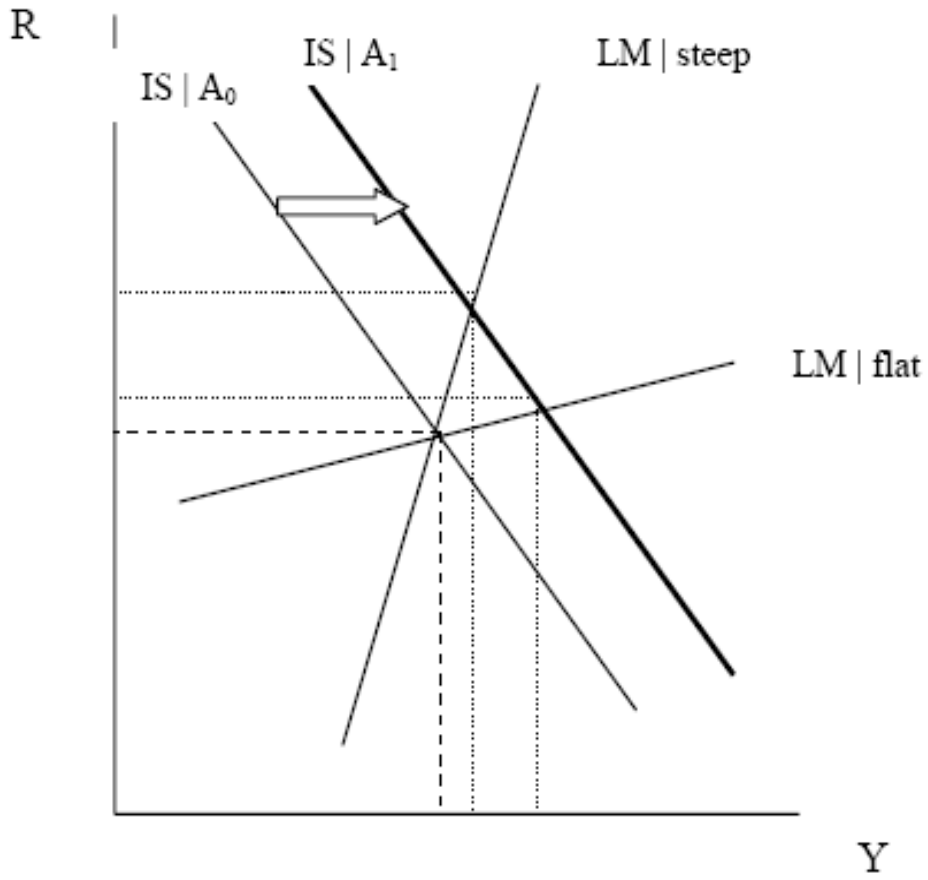


Figure 5. Monetary Policy with Effective LM Curve

What Determines Policy Efficacy?

- Sometimes fiscal policy is relatively effective, sometimes monetary policy is relatively effective.
- There are (at least) two ways of thinking about this problem; both are aids to thinking about the economics.
- The first is algebraic (which is of limited help when Central Bank targets interest rate)
- The second is graphical.

Fiscal (When CB Targets M)



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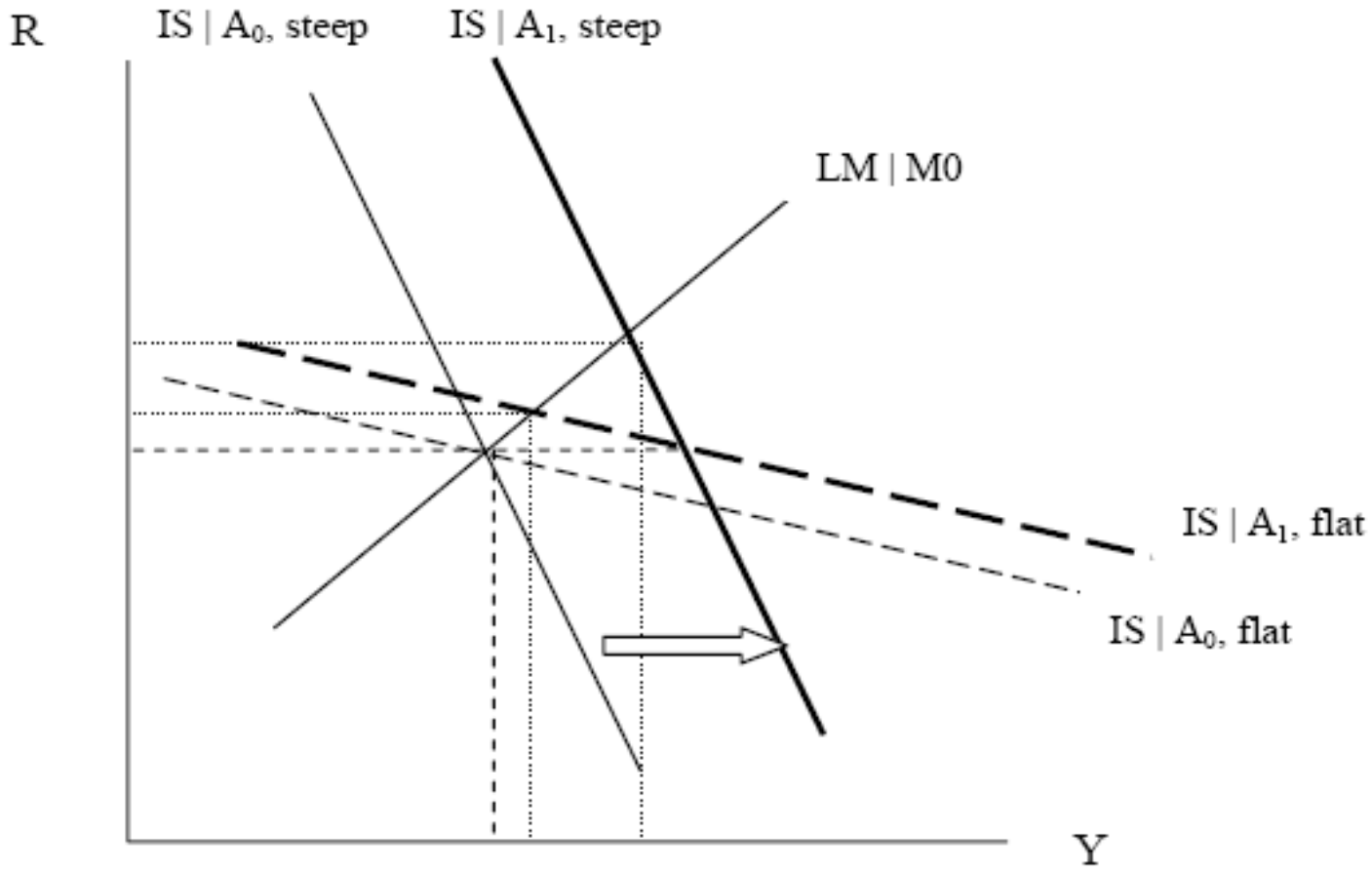
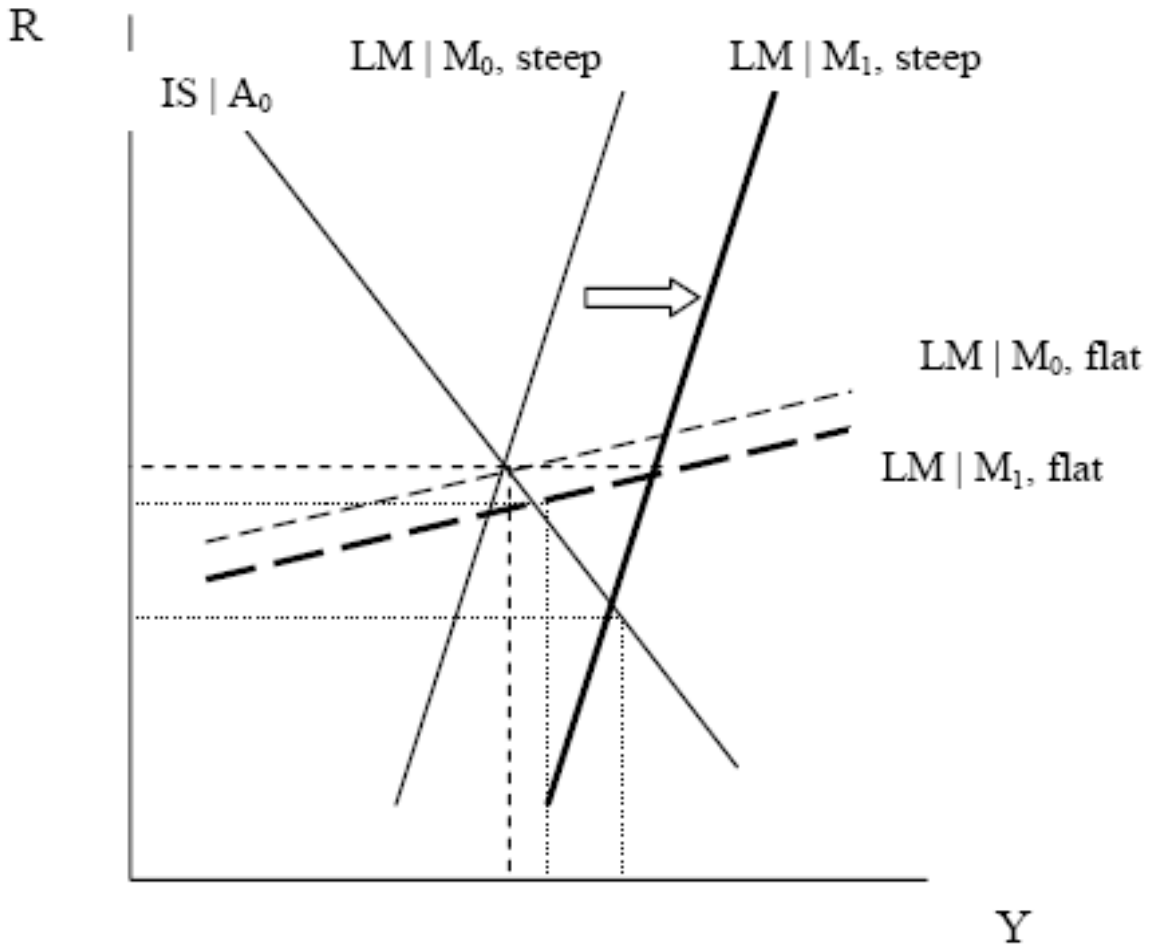
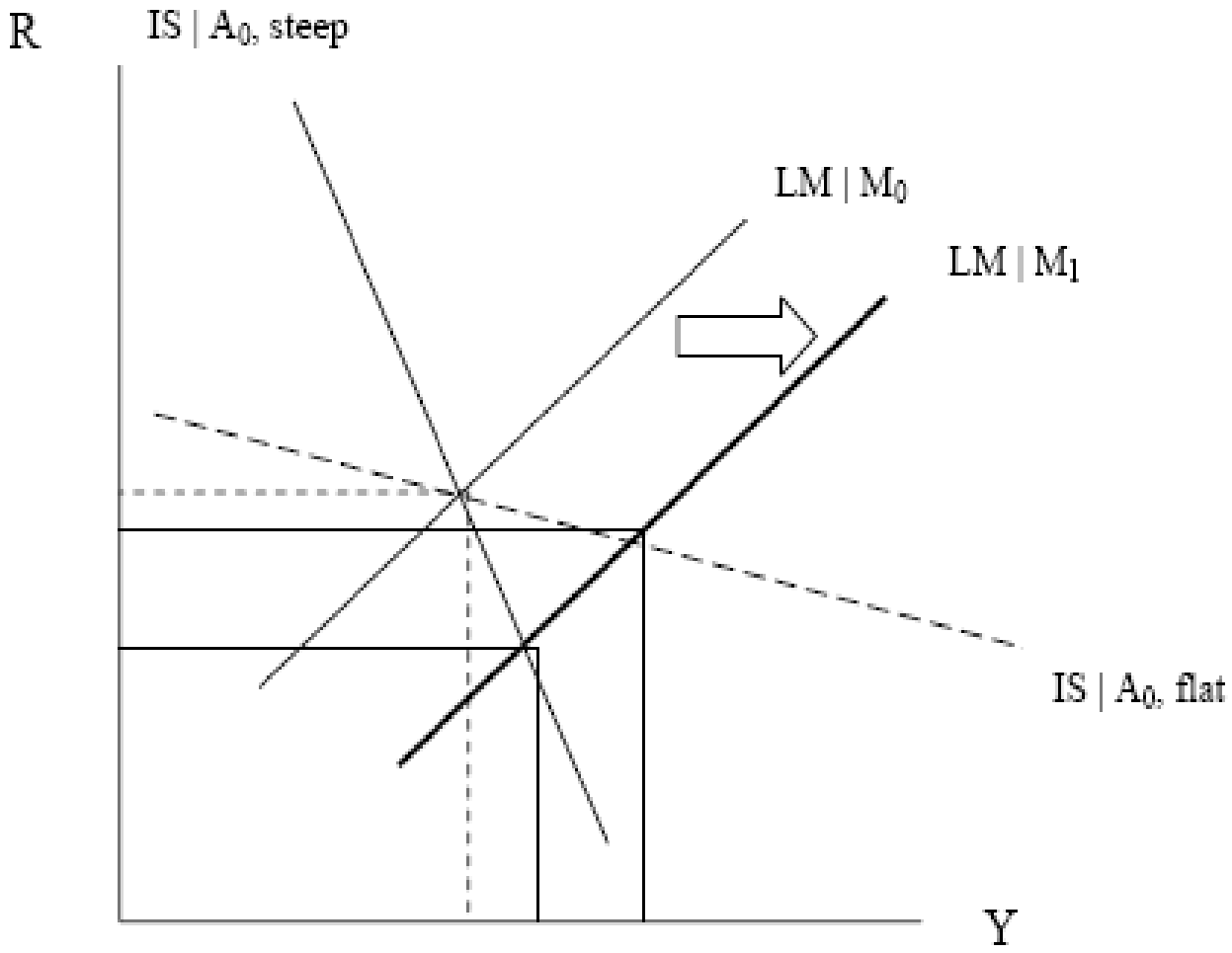


Monetary (When CB Targets M)

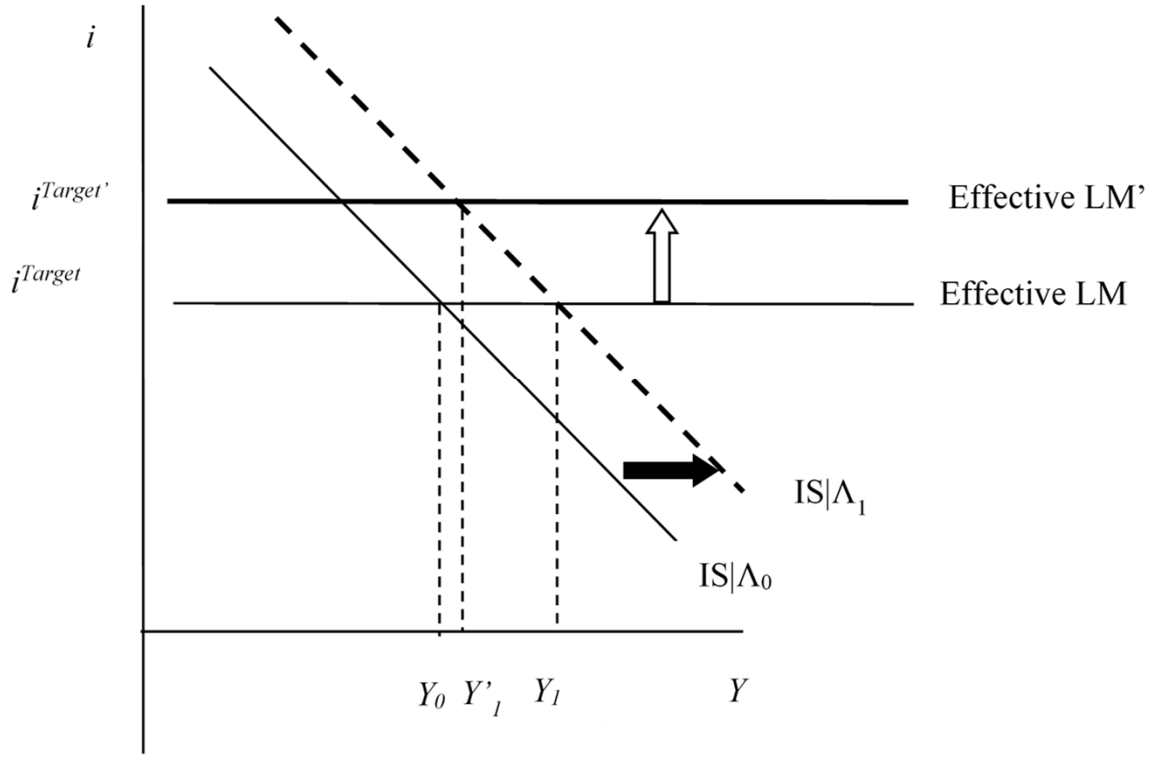


Monetary (When CB Targets M)



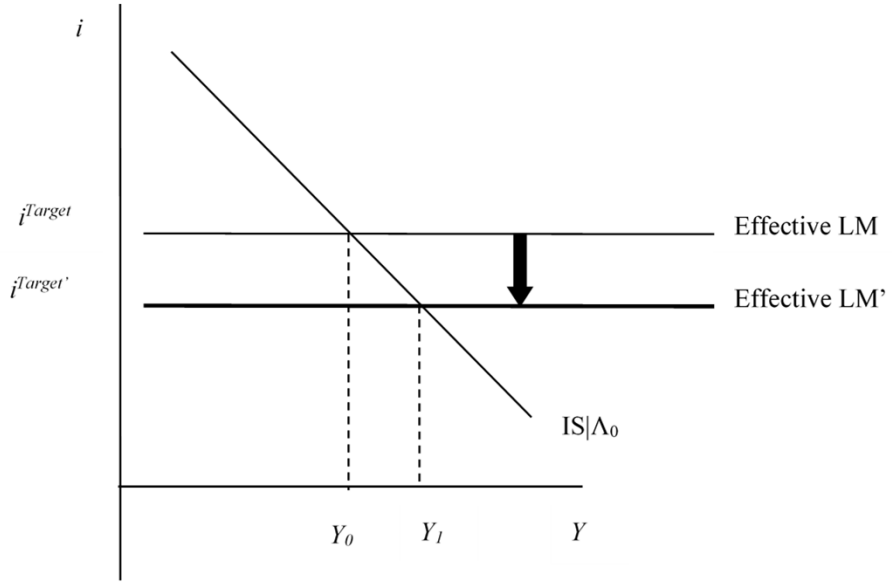
Fiscal (When CB Targets Interest Rate)

Question: Will Fed raise interest rate (white arrow) in response to expansionary fiscal policy (black arrow)? If not, it's like LM is flat.



Monetary (When CB Targets Interest Rate)

When Fed drops interest rate (black arrow), it's like LM is vertical



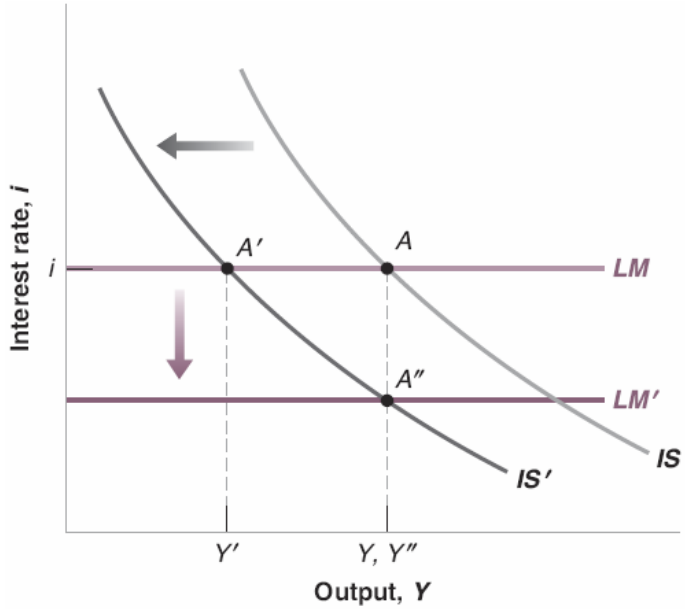
5.4 Using a Policy Mix (3 of 3)

Figure 5.9 The Effects of a Combined Fiscal Consolidation and a Monetary Expansion

The fiscal consolidation shifts the *IS* curve to the left.

A monetary expansion shifts the *LM* curve down.

This allows for the reduction in the deficit without a recession.



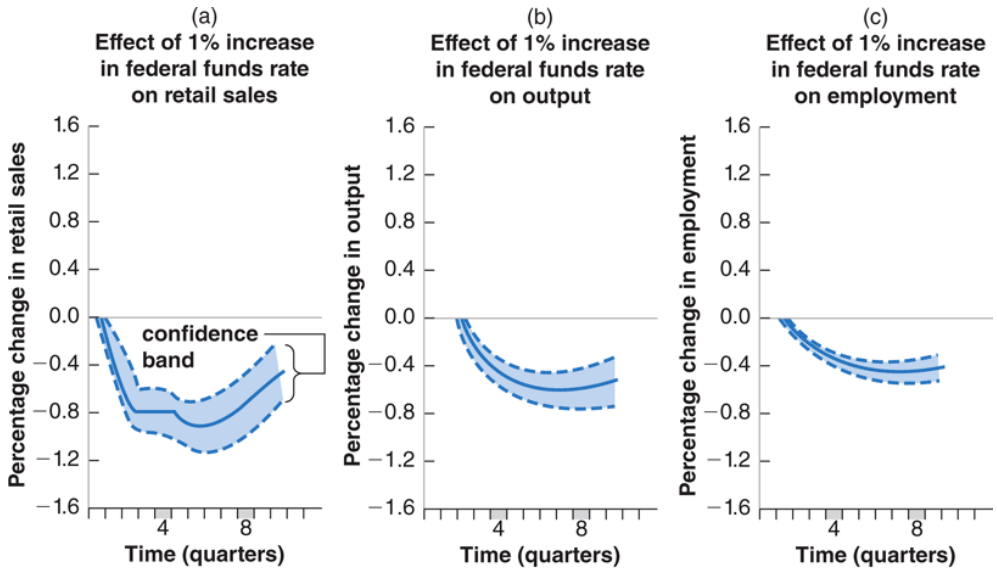
5.5 How Does the *IS-LM* Model Fit the Facts? (1 of 3)

- Because the adjustment of output takes time, we need to reintroduce dynamics:
  - Consumers are likely to take time to adjust their consumption following a change in disposable income.
  - Firms are likely to take time to adjust investment spending following a change in their sales.
  - Firms are likely to take time to adjust investment spending following a change in the interest rate.
  - Firms are likely to take time to adjust production following a change in their sales.

5.5 How Does the *IS-LM* Model Fit the Facts? (2 of 3)

Figure 5.10 The Empirical Effects of an Increase in the Federal Funds Rate

In the short run, an increase in the federal funds rate leads to a decrease in output and to an increase in unemployment, but it has little effect on the price level.



Source: Lawrence Christiano, Martin Eichenbaum, and Charles Evans, "The Effects of Monetary Policy Shocks: Evidence

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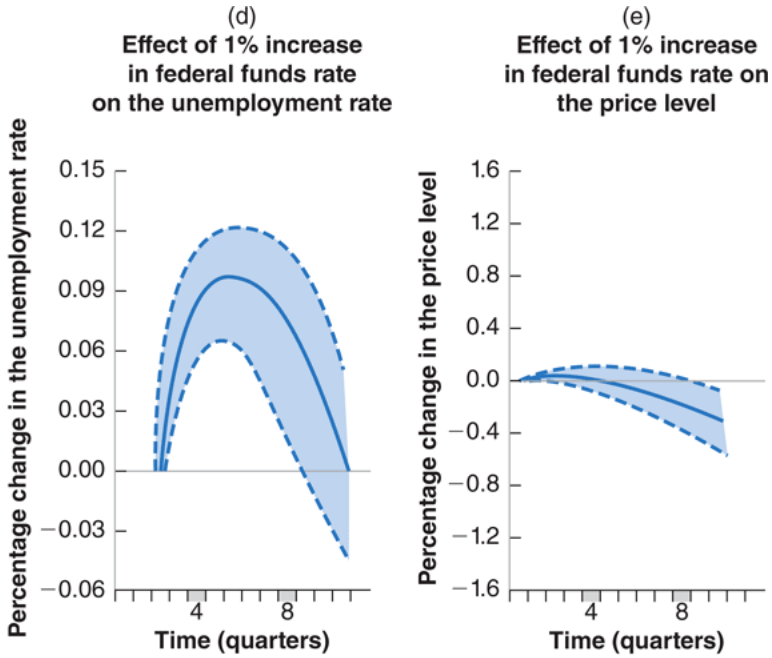

Source: Lawrence Christiano, Martin Eichenbaum, and Charles Evans, "The Effects of Monetary Policy Shocks: Evidence From the Flow of Funds," *Review of Economics and Statistics*. 1996, 78 (February): pp. 16–34.