Economics 302
Intermediate Macroeconomic Theory and Policy
(Spring 2010)

Lecture 7

Wednesday, Feb. 10, 2010

Outline

- Recap: IS-LM equations
- Recap: Solution and multipliers
- What determines policy efficacy?

Recap: Real Side

Eq.No.	Equation	Description
(1)	$Y = AD$	Output equals aggregate demand, an equilibrium condition
(2)	$AD = C + I + G + X$	Definition of aggregate demand
(3)	$C = a_o + bY_d$	Consumption function, b is the mpc
(4)	$Y_d \equiv Y - T$	Definition of disposable income
(5)	$T = TA_0 + tY$	Tax function; TA_0 is lump sum taxes, t is marginal tax rate.
(6)	$I = e_0 - dR$	Investment function *(revised)*
(7)	$G = GO_0$	Government spending on goods and services, exogenous
(8)	$X = g_0 - mY - \tilde{n}R$	Net Exports *(revised)*

Recap: Financial Side

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

Recap: IS-LM equations

(13) $$\boxed{R = -\left(\frac{1-b(1-t)+m}{d+\tilde{n}}\right)Y + \left(\frac{1}{d+\tilde{n}}\right)A_0}$$ <IS curve>

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

Graphical Depiction

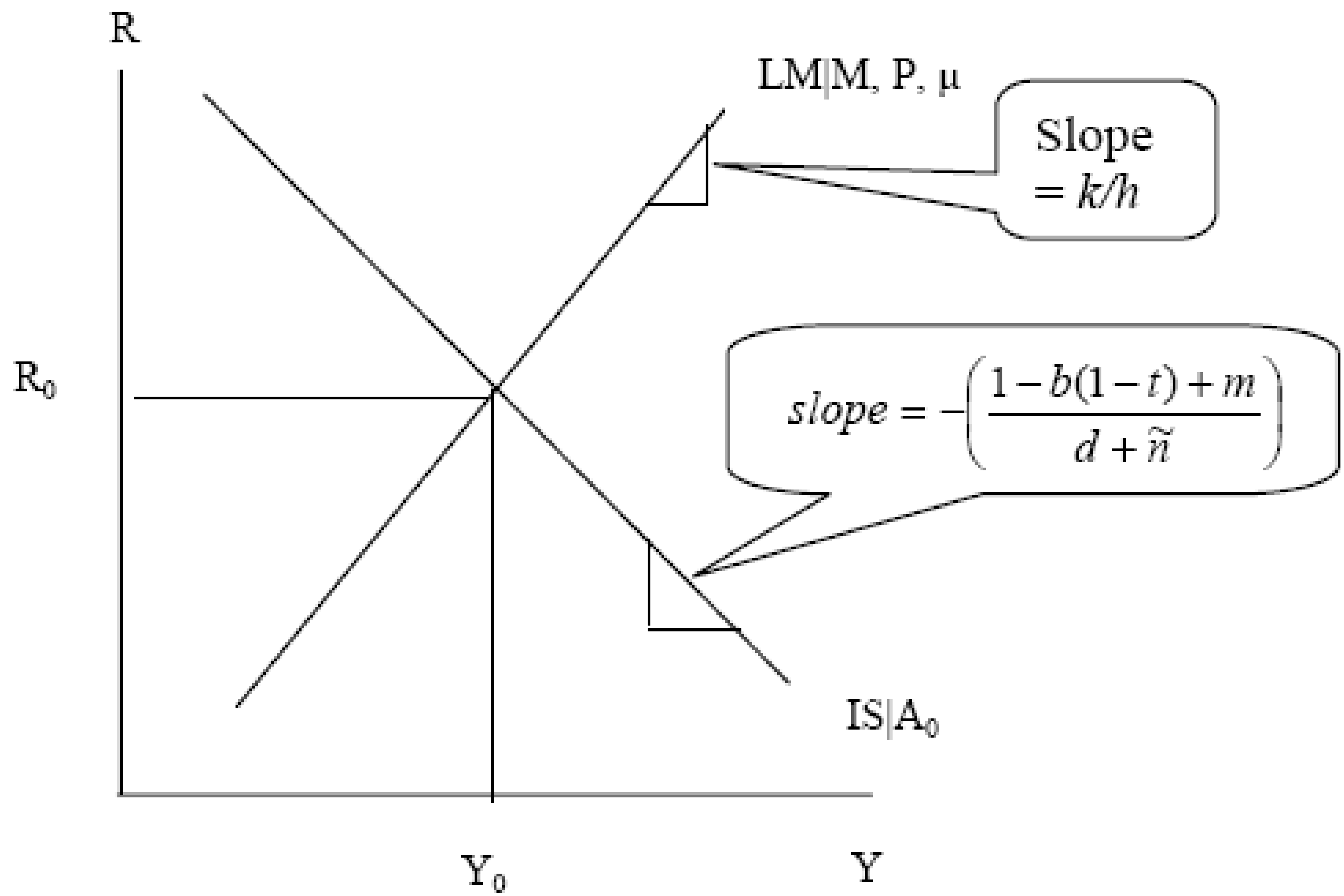


Figure 2: Equilibrium in IS-LM

Solving for Equilibrium (I)

One way to solve this system is to substitute is to (17) in for R in (12).

$$(18) \qquad Y = \left(\frac{1}{1-b(1-t)+m}\right)[A_0 - (d+\tilde{n})\left\langle \frac{\mu_0}{h} - \frac{1}{h}\frac{M_0}{P} + \frac{k}{h}Y \right\rangle]$$

Notice that this can be solved for Y, by bringing the term in the (.) to the left hand side.

$$(19) \qquad Y(1-b(1-t)+m) = A_0 - (d+\tilde{n})\left\langle \frac{\mu_0}{h} - \frac{1}{h}\frac{M_0}{P} \right\rangle - (d+\tilde{n})\frac{k}{h}Y$$

Collect up the last term on the right hand side involving "Y" to the left hand side:

$$(20) \qquad Y[1-b(1-t)+m+\frac{(d+\tilde{n})k}{h}] = A_0 + (d+\tilde{n})\left\langle \frac{1}{h}\frac{M_0}{P} - \frac{\mu_0}{h} \right\rangle$$

Dividing both sides by the term in [.] to obtain:

$$(21) \qquad Y = \hat{\alpha}\left[A_0 + \frac{(d+\tilde{n})}{h}\left(\frac{M_0}{P}\right) - \frac{(d+\tilde{n})\mu_0}{h}\right]$$ <equilibrium income>

Where

$$\hat{\alpha} \equiv \frac{1}{1-b(1-t)+m+\dfrac{(d+\tilde{n})k}{h}}$$

The "Multiplier"

- A "multiplier" is a parameter which summarizes the change in one variable for a one unit change in another (typically exogenous) variable. Hence, as the model changes, the "multiplier" for fiscal policy changes.

$$\frac{1}{1-b(1-t)+m+\dfrac{(d+\tilde{n})k}{h}} \equiv \hat{\alpha} \leq \overline{\alpha} \equiv \frac{1}{1-b(1-t)+m}$$

Solving for Multipliers, in general

$$(21) \qquad Y_0 = \hat{\alpha}\left[A_0 + \frac{(d+\tilde{n})}{h}\left(\frac{\overline{M}}{P}\right) - \frac{(d+\tilde{n})\mu}{h}\right]$$ <equilibrium income>

$$(22) \qquad \Delta Y = \hat{\alpha}\left[\Delta A + \frac{(d+\tilde{n})}{h}\Delta\left(\frac{\overline{M}}{P}\right) - \frac{(d+\tilde{n})}{h}\Delta\mu\right]$$

$$\Delta Y = \hat{\alpha}\Delta GO \Rightarrow \frac{\Delta Y}{\Delta GO} = \hat{\alpha}$$

If it is lump sum taxes:

$$\Delta Y = -\hat{\alpha}b\Delta TA \Rightarrow \frac{\Delta Y}{\Delta TA} = -\hat{\alpha}b$$

Graphical Depiction of Fiscal Policy

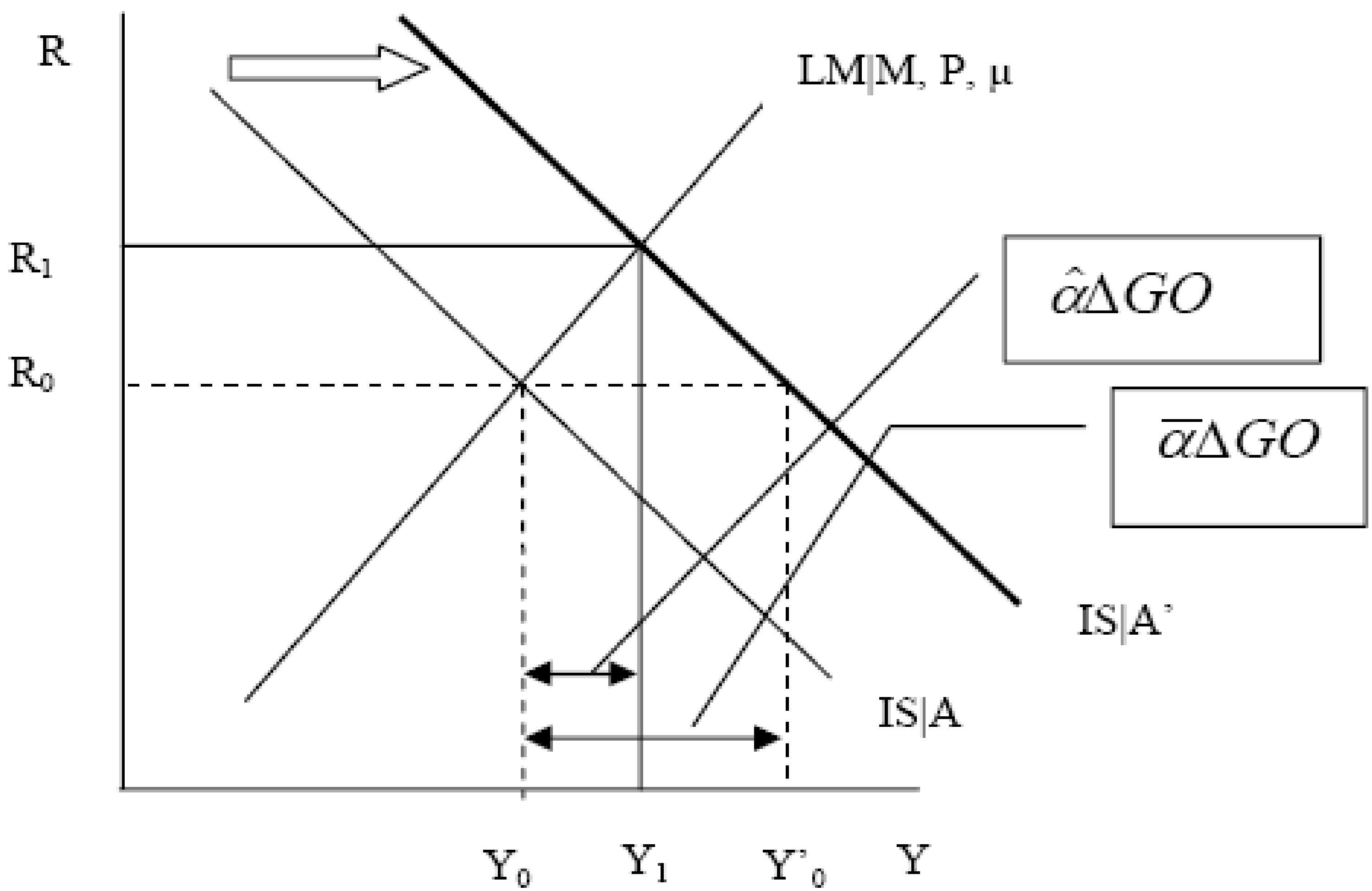


Figure 3: Fiscal (Govt. spending) Policy

Monetary Policy

If monetary policy is being used, the $\Delta A = 0$, so:

$$\Delta Y = \hat{\alpha}\left(\frac{d + \tilde{n}}{h}\right)\Delta\left(\frac{M}{P}\right) \Rightarrow \frac{\Delta Y}{\Delta(M/P)} = \hat{\alpha}\left(\frac{d + \tilde{n}}{h}\right)$$

- Notice this is a new “multiplier”: the change in real GDP for a one unit change in the price-deflated money stock (or “real money stock” for short).
- Critical to understand how monetary policy works.

Graphical Depiction of Monetary Policy

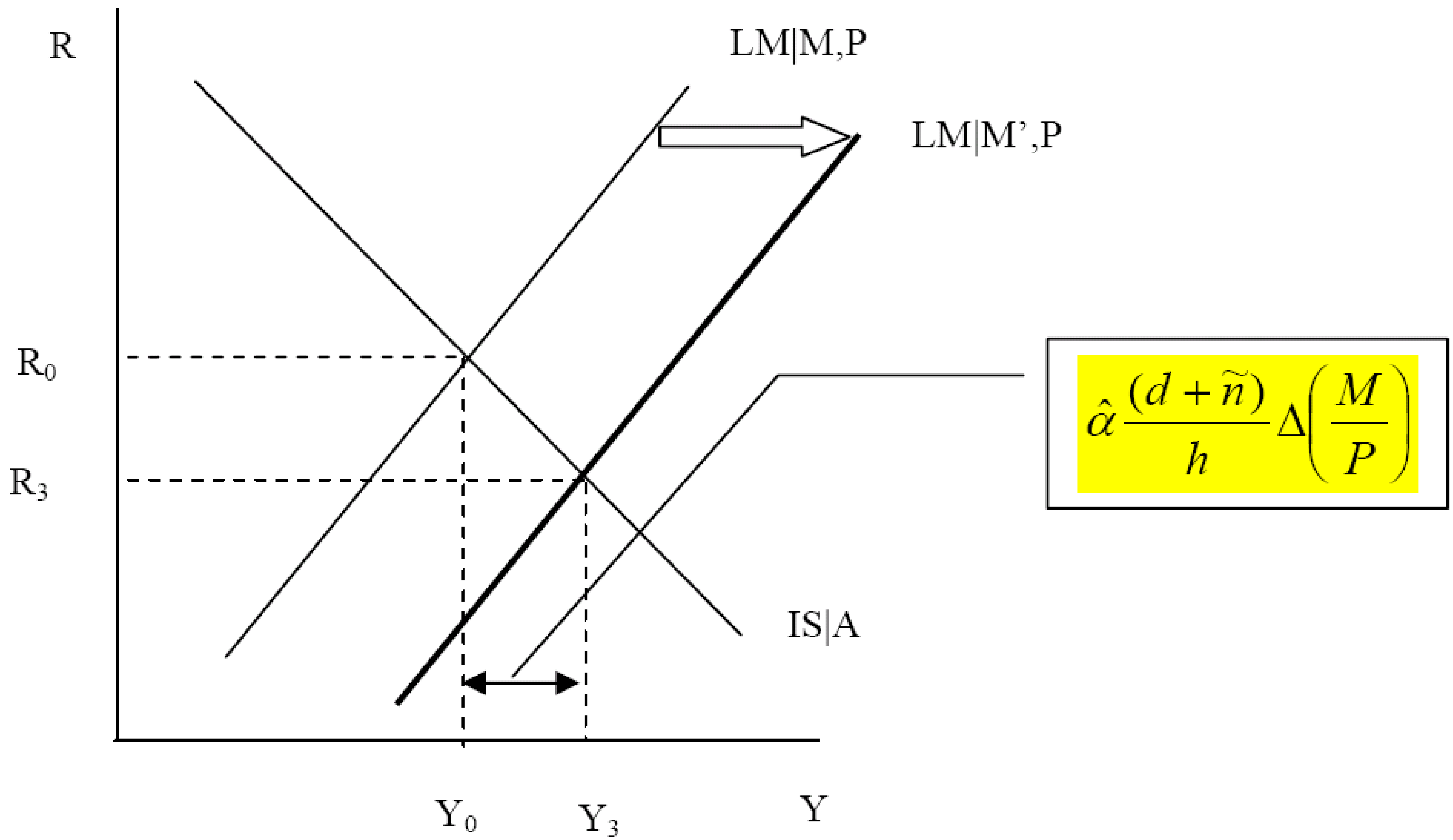
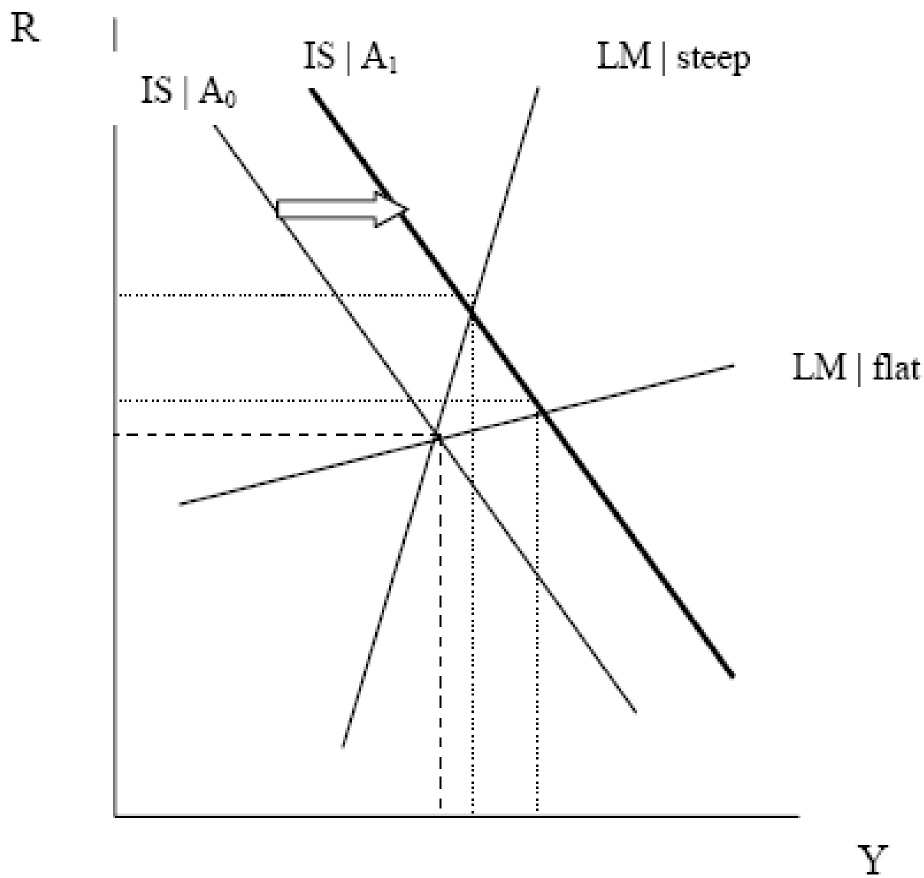


Figure 4: Monetary Policy

What Determines Policy Efficacy?

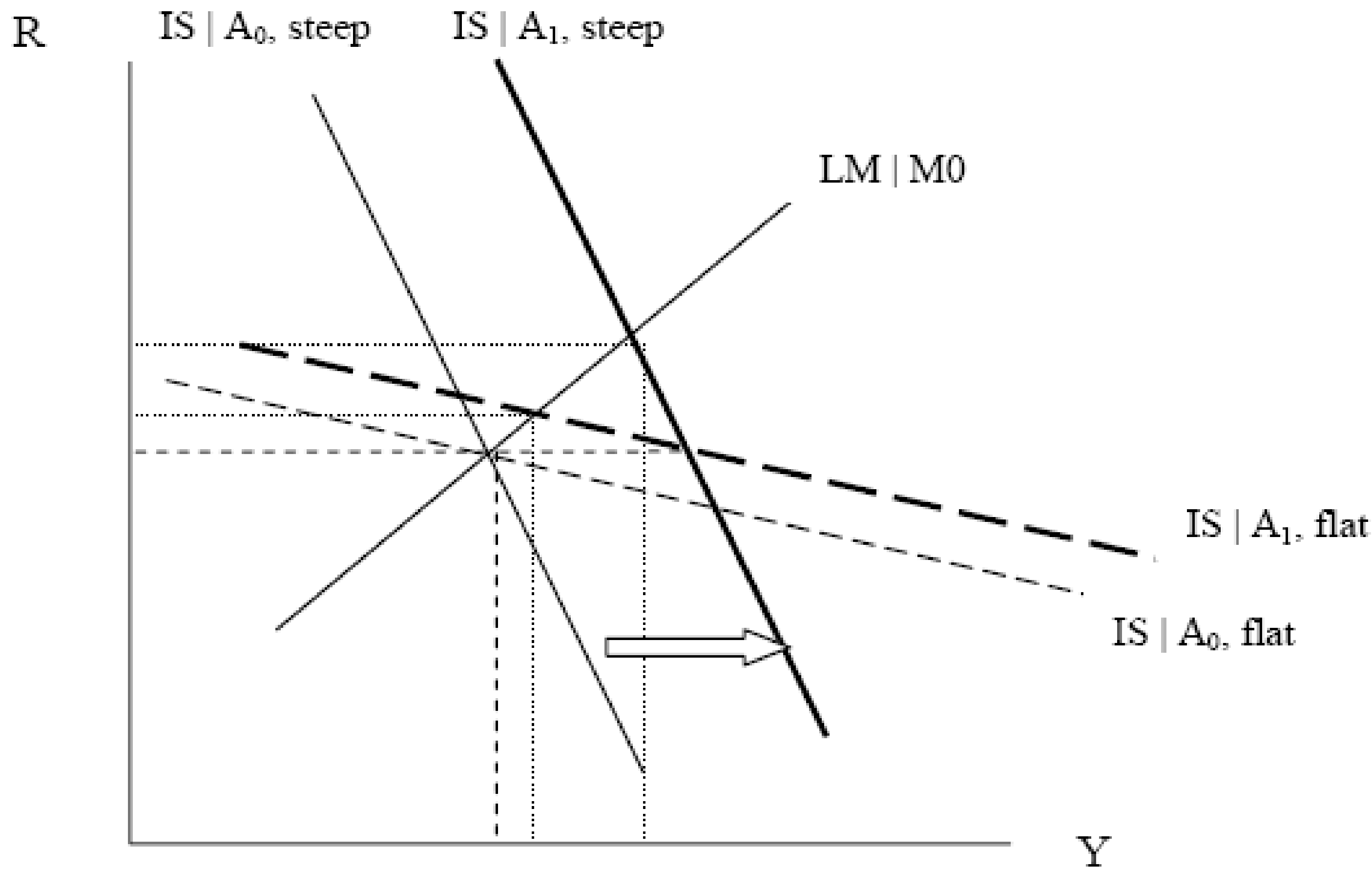
- Sometimes fiscal policy is relatively effective, sometimes monetary policy is relatively effective.
- There are (at least) two ways of thinking about this problem; both are aids to thinking about the economics.
- The first is algebraic.
- The second is graphical.

Fiscal (LM steep vs. flat)

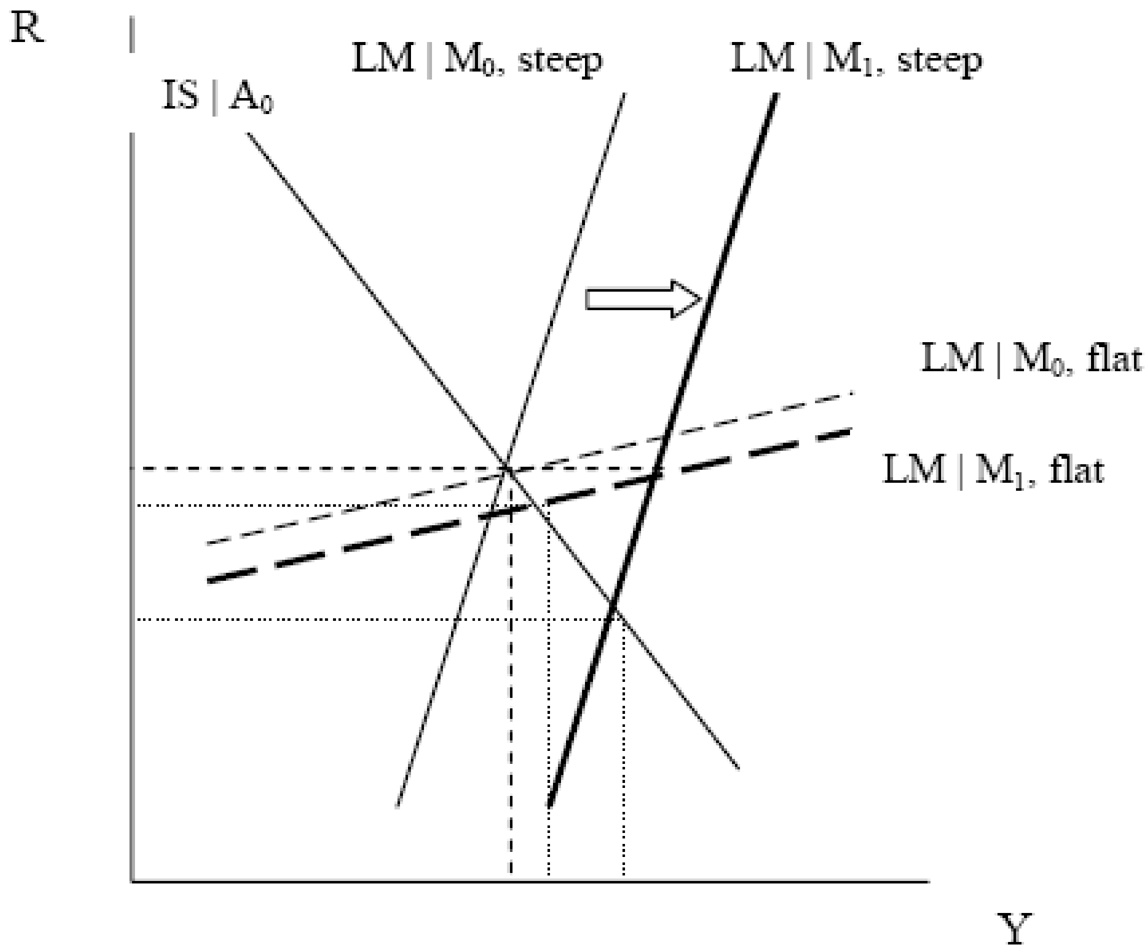


$$\hat{\alpha} \equiv \frac{1}{1 - b(1-t) + m + \frac{(d+\tilde{n})k}{h}}$$

Fiscal (IS steep vs. flat)



Monetary (LM flat vs. steep)



$$\frac{\Delta Y}{\Delta(M/P)} = \hat{\alpha}\left(\frac{d+\tilde{n}}{h}\right)$$

Monetary (IS steep vs. flat)