

LECTURE NOTES

Chapter 7: The Keynesian System (III): Policy Effects in the IS-LM Model

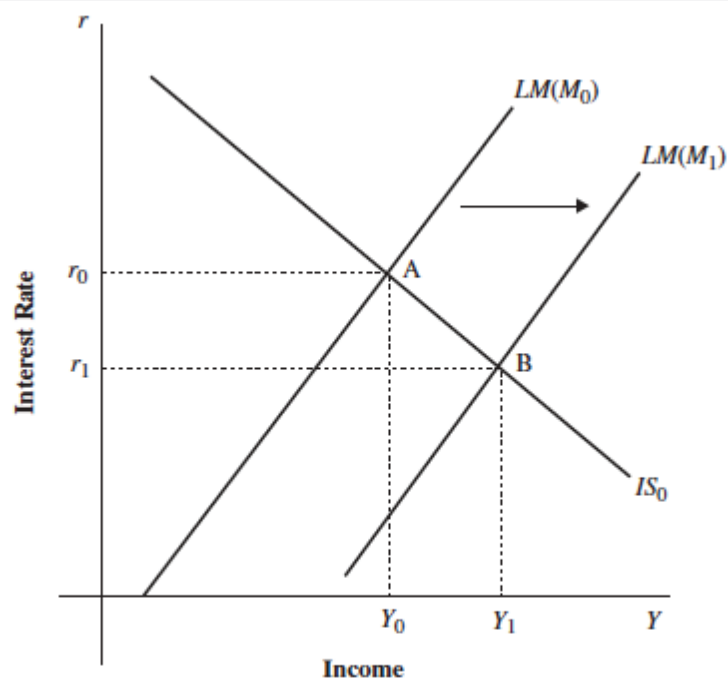
- Remember:

- $$r_{LM} = \frac{c_0 - M_0^S}{c_2} + \frac{c_1}{c_2} Y$$
- $$r_{IS} = \frac{a - bT + \bar{I} + G}{d} - \frac{1-b}{d} Y$$

1. Factors That Affect Equilibrium Income and the Interest Rate

- Monetary Influences: Shifts in the LM Schedule
 - Assume an increase from M_0 to M_1 [money supply shock]
 - The excess of money supply results in buying bonds
 - Buying bonds produces a fall in interest rates
 - Therefore investment increases and so does Y
 - The opposite effect for a decrease in money supply
 - Assume a change in liquidity preference rises from c_0^0 to c_0^1 [money demand shock]
 - An increase in liquidity preference (c_0) means individuals sell bonds to buy money
 - The selling of bonds makes the price (of bonds) fall and the interest rates rise
 - The rise in interest rates reduces investment and so Y falls
 - The opposite effect for an increase in liquidity preference

FIGURE 7-1 Effects of an Increase in the Quantity of Money



The initial equilibrium is at interest rate r_0 and income level Y_0 . An increase in the money supply from M_0 to M_1 shifts the LM schedule to the right from $LM(M_0)$ to $LM(M_1)$. The interest rate falls from r_0 to r_1 , and income rises from Y_0 to Y_1 .

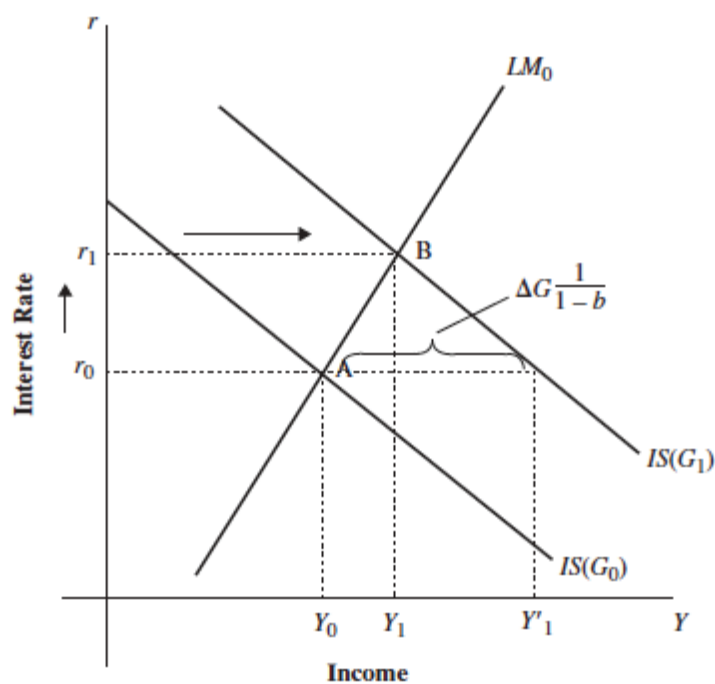
- Real Influences: Shifts in the IS Schedule
 - Assume an increase in government spending from G_0 to G_1
 - The increase in government spending increases income
 - The increase in income increases the demand for bonds (i.e. by the government to finance $(G_1 - G_0) - T$ [the marginal deficit] [Figure 7-2]
 - Two effects:
 - 1) The increase in income increases the demand for money due to more transactions. Then bonds are sold, price of bonds fall and interest rates rise. The increase in interest rates reduces investment and therefore offsets the effect on Y
 - 2) The government sells bonds to finance the marginal deficit. The price of bond fall. The interest rate rises. Investment falls and therefore offsets the effect on Y
 - Assume a decline in investment from I_0 to I_1 [Figure 7-4]
 - Income decreases and so does consumption
 - The demand for money for transaction decreases
 - Money is sold to buy bonds
 - The price of bonds rise and interest rates fall
 - Investment increases offsetting the effect on Y
 - Assume an increase taxes from T_0 to T_1 [Figure 7-3]
 - Disposable income (Y_D) falls and so does consumption
 - Then money demand for transactions decline
 - Then money is sold to buy bonds
 - The price of bonds increase and the interest rate falls
 - Investment increases offsetting the fall in r

TABLE 7-1 Effects of Monetary and Fiscal Policy Variables

<i>Effect of:</i>	<i>M</i>	<i>G</i>	<i>T</i>
<i>on Y</i>	+	+	-
<i>r</i>	-	+	-

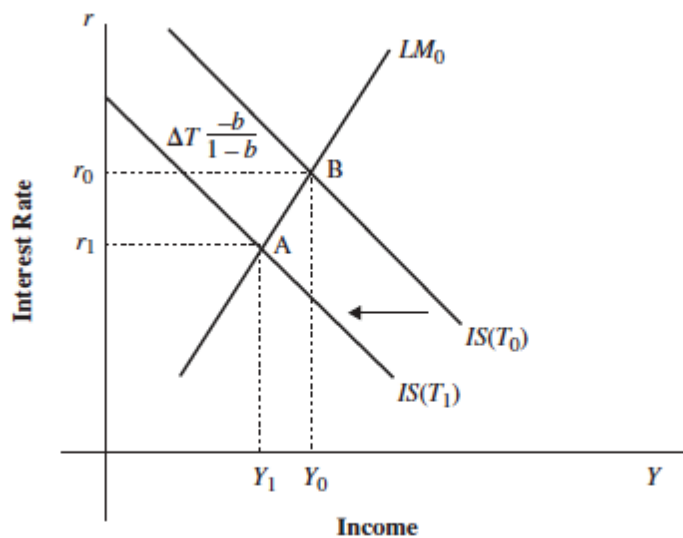
Note: M, money stock; G, level of government spending; T, taxes. A (+) sign indicates that a change in the policy instrument causes the variable in that row (Y, income, or r, the interest rate) to move in the same direction. A (-) sign indicates the reverse.

FIGURE 7-2 Effects of an Increase in Government Spending



An increase in government spending shifts the IS schedule to the right from $IS(G_0)$ to $IS(G_1)$. Income rises from Y_0 to Y_1 ; the interest rate rises from r_0 to r_1 .

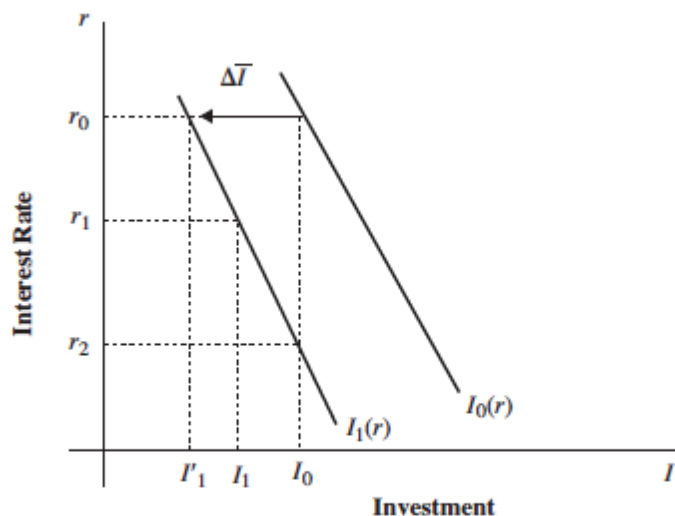
FIGURE 7-3 Effects of an Increase in Taxes



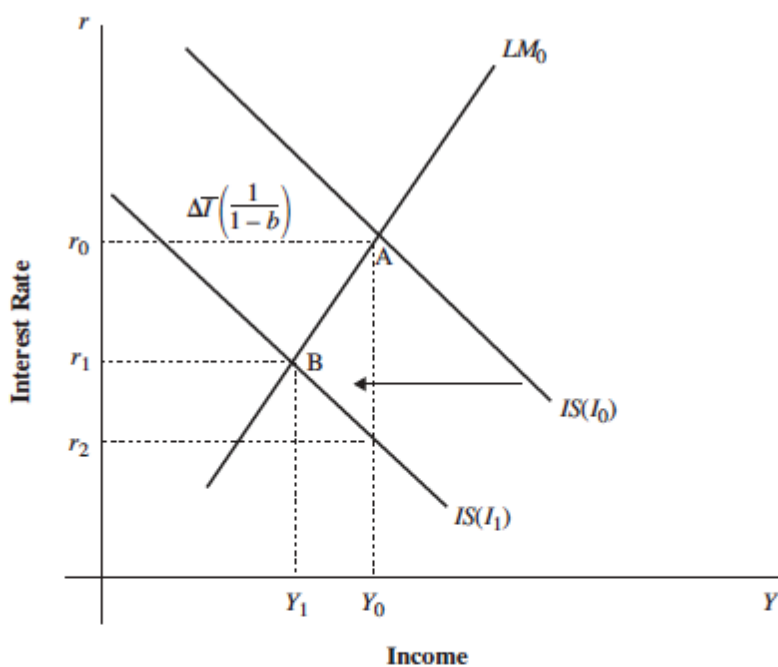
An increase in taxes shifts the IS schedule to the left from $IS(T_0)$ to $IS(T_1)$. Income falls from Y_0 to Y_1 , and the interest rate falls from r_0 to r_1 .

FIGURE 7-4 Effects of an Autonomous Decline in Investment

a. Investment Schedule



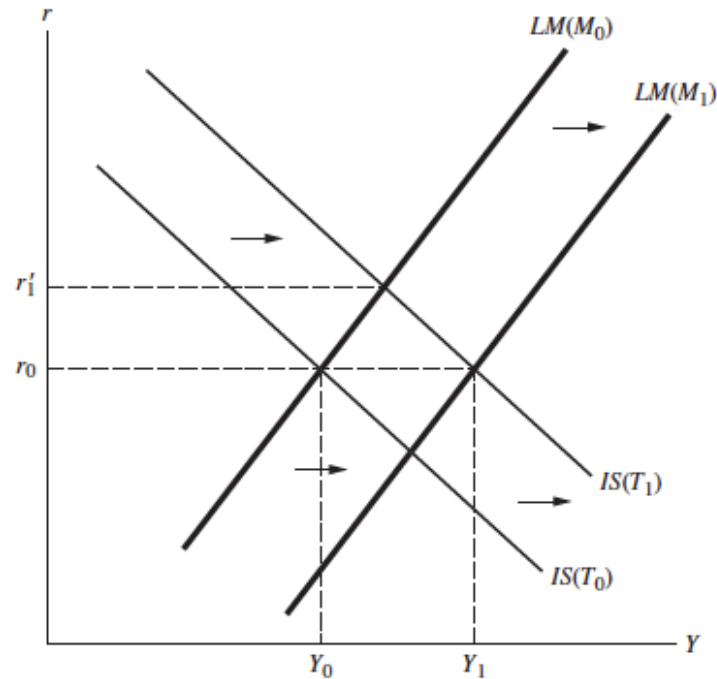
b. Effect on Income and the Interest Rate



An autonomous decline in investment shifts the investment schedule to the left in part *a*. At the initial interest rate r_0 investment falls from I_0 to I_1' . The shift in the investment function causes the IS schedule in part *b* to shift to the left from IS_0 to IS_1 . Equilibrium income falls from Y_0 to Y_1 , and the equilibrium interest rate falls from r_0 to r_1 . As a result of the fall in the interest rate, investment is revived somewhat to I_1 in part *a*.

- Monetary and Fiscal policy to avoid the offset effect of interest rates
 - Reduce taxes
 - Increase money supply
 - Interest rates do not change and so investment remains unaffected

FIGURE 7-5 Monetary–Fiscal Policy Combination



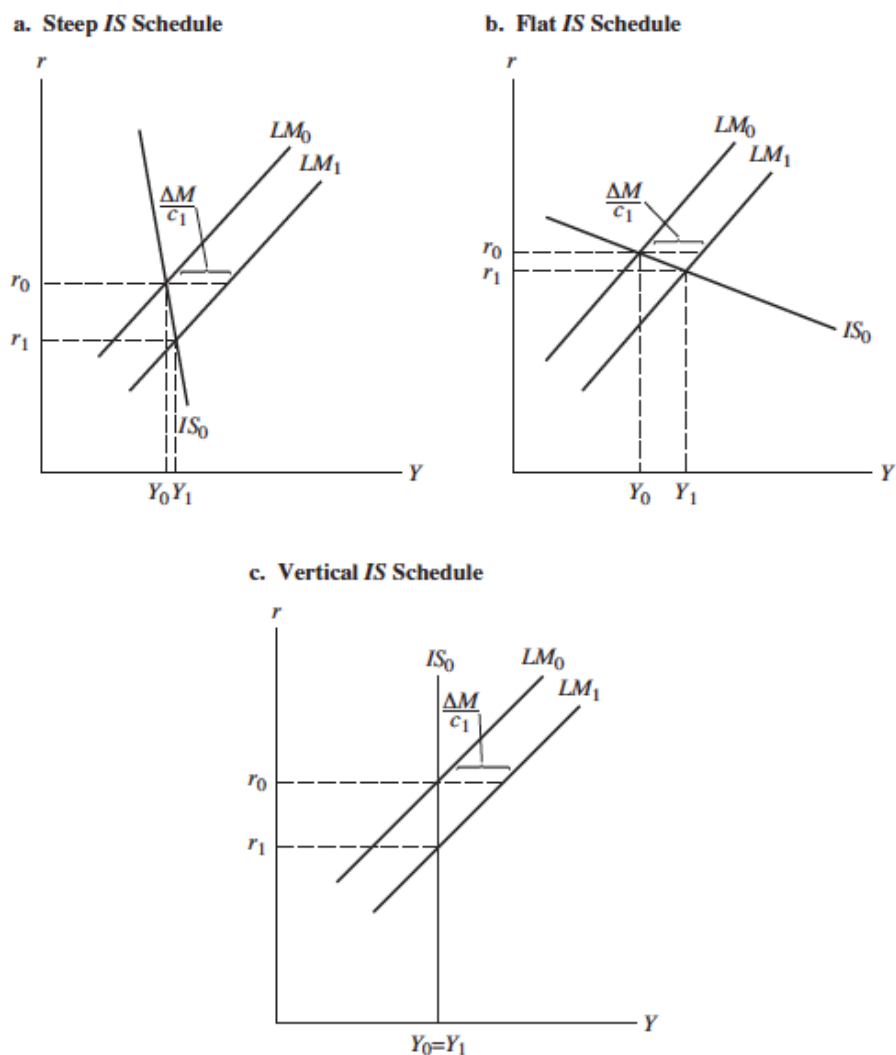
A tax cut from T_0 to T_1 shifts the IS schedule from $IS(T_0)$ to $IS(T_1)$. By itself, this fiscal policy shift would push the interest rate up to r_1' . If the tax cut were accompanied by an increase in the money supply from M_0 to M_1 , the LM schedule would shift to the right from $LM(M_0)$ to $LM(M_1)$. Together, the two policy actions would increase output to Y_1 , with the interest rate remaining at r_0 .

2. The Relative Effectiveness of Monetary Policy and Fiscal Policy

- Policy Effectiveness and the Slope of the IS Schedule

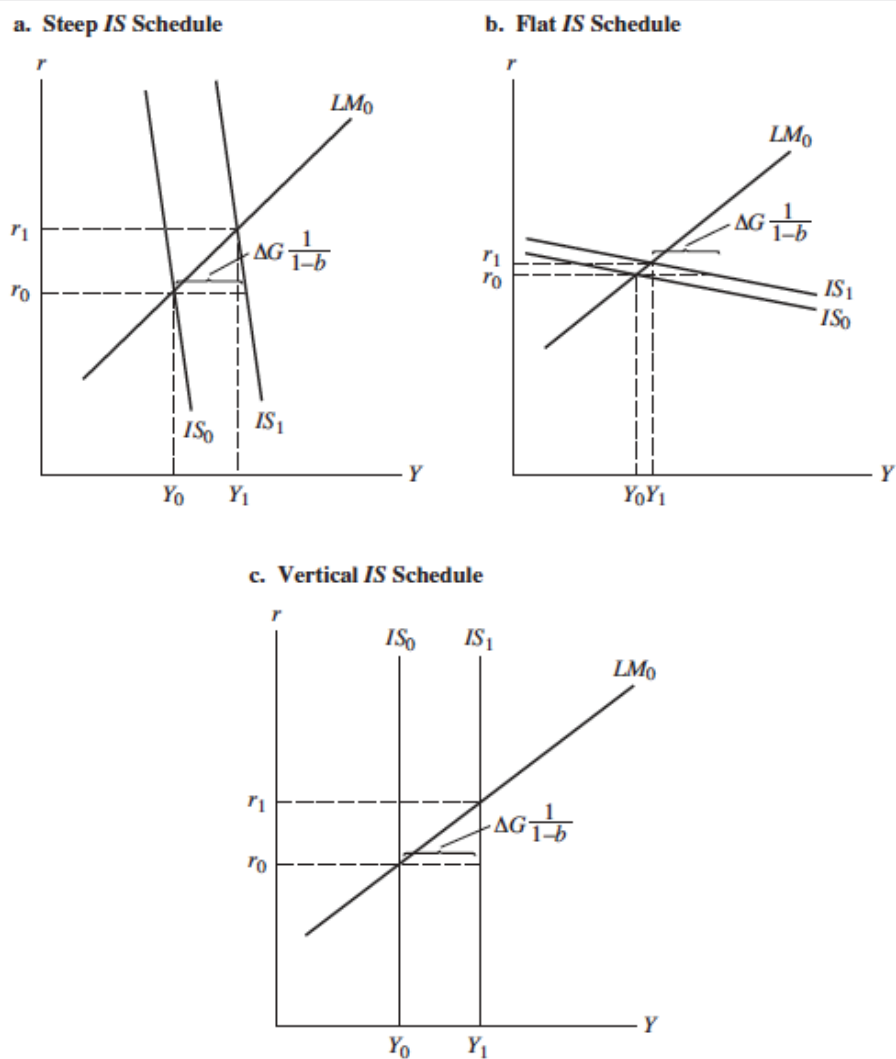
- The slope of the IS depends on the Investment/interest rate elasticity: $\frac{\frac{\Delta I}{I}}{\frac{\Delta r}{r}} = \frac{\Delta I}{\Delta r} \frac{r}{I}$
- The higher the elasticity the flatter the IS schedule
- The higher the interest rate elasticity, the larger the effect of monetary policy (shifts in LM). If the IS schedule is completely inelastic then monetary policy has no effect at all [Figure 7-6]
- The higher the interest rate elasticity, the smaller the effect of fiscal policy (shifts in IS). If the IS schedule is completely inelastic, then the IS-LM model then fiscal policy produces the result than the Keynesian cross (simple Keynesian model) [Figure 7-7]

FIGURE 7-6 Monetary Policy Effects and the Slope of the IS Schedule



An increase in the money supply shifts the LM schedule to the right from LM_0 to LM_1 . This expansionary monetary policy action has only a small effect on output in part *a*, where the IS schedule is steep. It has a much larger effect in part *b*, where the IS schedule is relatively flat. In part *c*, where the IS schedule is vertical, the increase in the money supply has no effect on equilibrium income.

FIGURE 7-7 Fiscal Policy Effects and the Slope of the IS Schedule



In each part of the figure, an increase in government spending shifts the IS schedule to the right from IS_0 to IS_1 . In part *a*, where the IS schedule is steep, this expansionary fiscal policy action results in a relatively large increase in income. This fiscal policy action is much less effective in part *b*, where the IS schedule is relatively flat. Fiscal policy is most effective in part *c*, where the IS schedule is vertical.

- Policy Effectiveness and the Slope of the LM Schedule

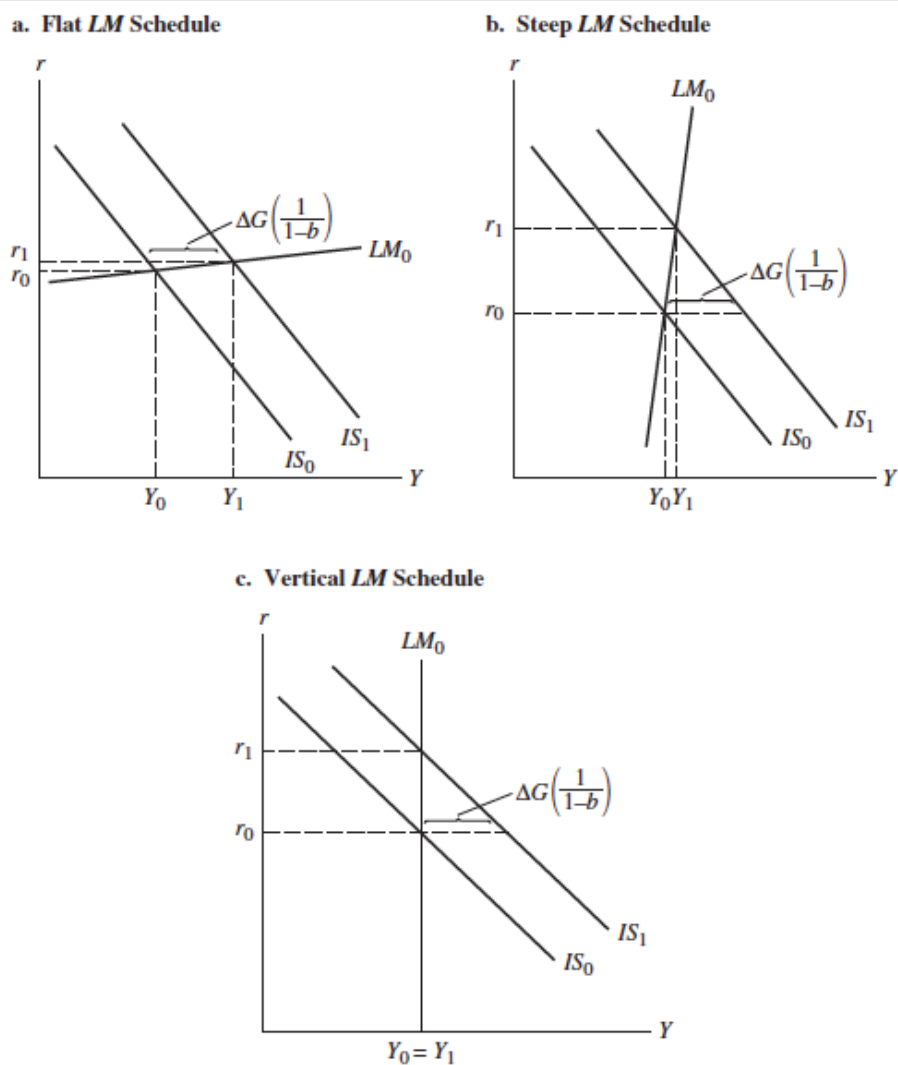
- The slope of the IS depends on the money demand/interest rate elasticity: $\frac{\Delta M^d}{\frac{\Delta r}{r}} = \frac{\Delta M^d}{\Delta r} \frac{r}{M^d}$
- The higher the elasticity the flatter the LM schedule
- The higher the interest rate elasticity, the larger the effect of fiscal policy (shifts in IS). If LM is completely inelastic, then fiscal policy has no effect at all [Figure 7-8]
- The higher the interest rate elasticity, the smaller the effect of monetary policy (shifts in LM). If the LM is completely inelastic, then the result of monetary policy is the same than the Keynesian cross (simple Keynesian model) [Figure 7-9]
- The vertical LM is referred as classical in reference to the classical model
 - In the classical model interest rates do not affect the demand for money (money demand is completely inelastic to interest rates)

- Summary

TABLE 7-2 Monetary and Fiscal Policy Effectiveness and the Slopes of the IS and LM Schedules

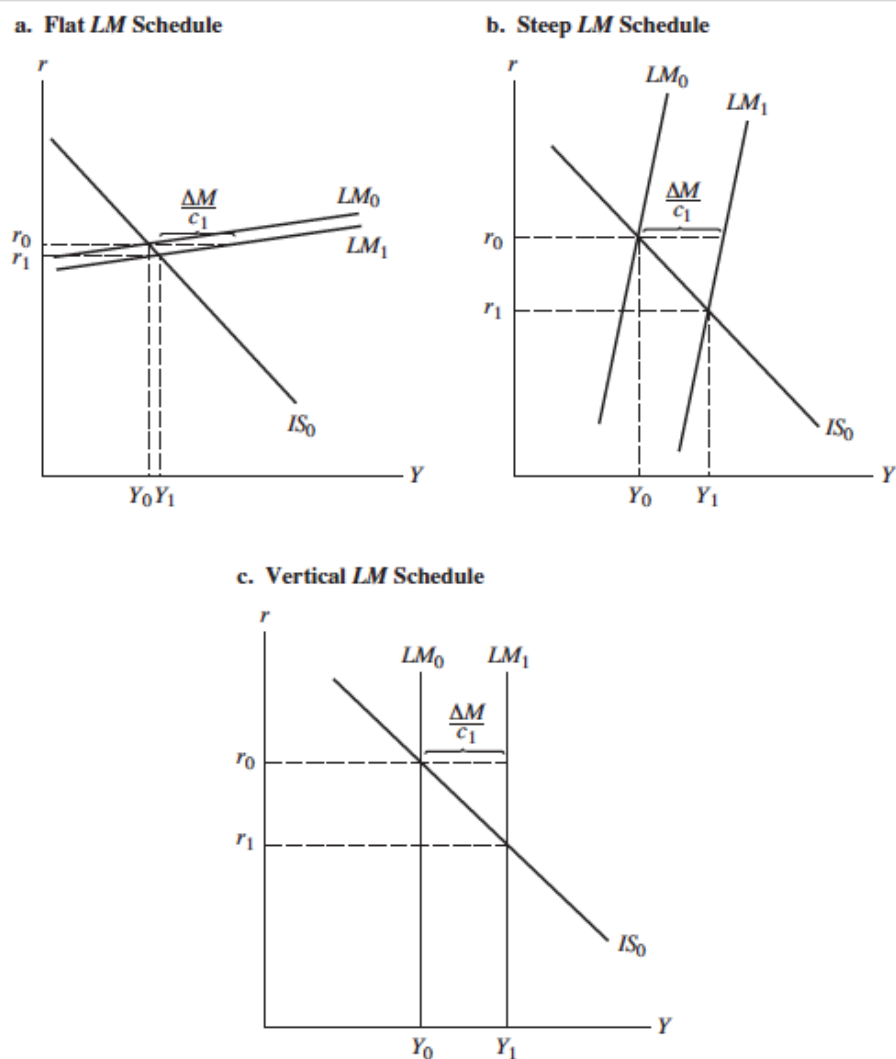
<i>Monetary Policy</i>		
	<i>IS Schedule</i>	<i>LM Schedule</i>
Steep	Ineffective	Effective
Flat	Effective	Ineffective
<i>Fiscal Policy</i>		
	<i>IS Schedule</i>	<i>LM Schedule</i>
Steep	Effective	Ineffective
Flat	Ineffective	Effective

FIGURE 7-8 Fiscal Policy Effects and the Slope of the *LM* Schedule



In each part of the figure, an increase in government spending shifts the *IS* schedule to the right from IS_0 to IS_1 . Fiscal policy is most effective in part *a*, where the *LM* schedule is relatively flat; less effective in part *b*, where the *LM* schedule is steeper; and completely ineffective in part *c*, where the *LM* schedule is vertical.

FIGURE 7-9 Monetary Policy Effects and the Slope of the LM Schedule



In each part of the figure, an increase in the money supply shifts the LM schedule to the right from LM_0 to LM_1 . Monetary policy is least effective in part *a*, where the LM schedule is relatively flat; more effective in part *b*, where the LM schedule is steeper; and most effective in part *c*, where the LM schedule is vertical.