

investment subsidy

Note

$t = \text{tax}$

$-t = \text{subsidy}$

$\Delta t < 0$

- tax cut
- increased subsidy

• immediate result

• IS shifts to the right

application

→ • investment subsidy

An Investment Subsidy

Both an income tax cut and an increase in government spending raise the interest rate and reduce investment spending. However, it is possible for the government to raise investment spending through an *investment subsidy*, shown in Figure 11-3. In the United States, the government has sometimes subsidized investment through the *investment tax credit*, whereby a firm's tax payments are reduced when it increases its investment spending. For instance, President Clinton proposed an investment tax credit in his 1993 fiscal package.

CHAPTER 11

After
tax
rate
of
return

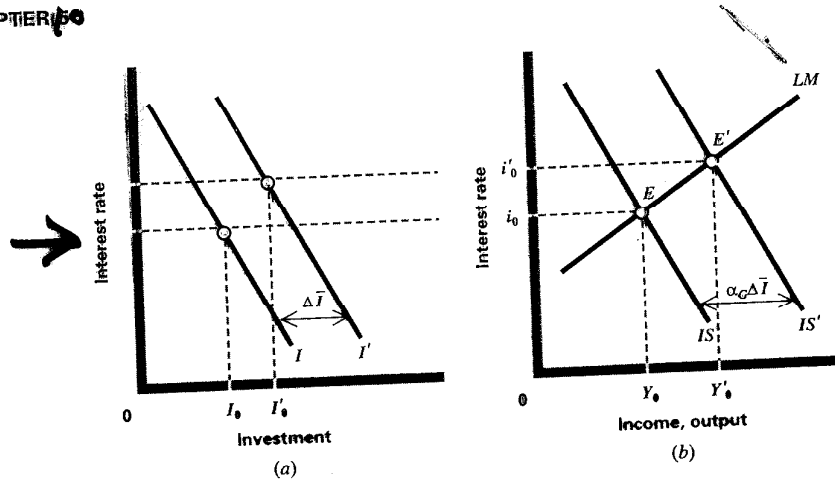


FIGURE 11-3
 AN INVESTMENT SUBSIDY. An investment subsidy shifts the investment schedule in panel (a) at each interest rate out and to the right. The increase in planned investment shows in panel (b) as a shift of the IS curve. Equilibrium income rises to Y'_0 , and the interest rate increases to i'_0 . At the higher interest rate, investment is still higher, I'_0 , than it was initially. Thus an investment subsidy raises interest rates, income, and investment.

Government Expenditure Constraint

- annual basis
- intertemporal basis
 - fixed horizon
 - infinite horizon

$$G \equiv T + \Delta \text{Net Debt} + \Delta M$$

$$G \equiv T + \Delta \text{Net Debt} + \Delta M$$

- constraint
- choosing 2 variables determines the 3rd variable

Example

investment subsidy

$$\Delta T < 0$$

$$\Delta G = 0$$

$$\Delta \text{Net Debt} = 0$$

$$\Delta M > 0$$

- an attractive scenario for investors \equiv borrowers



1973-1980

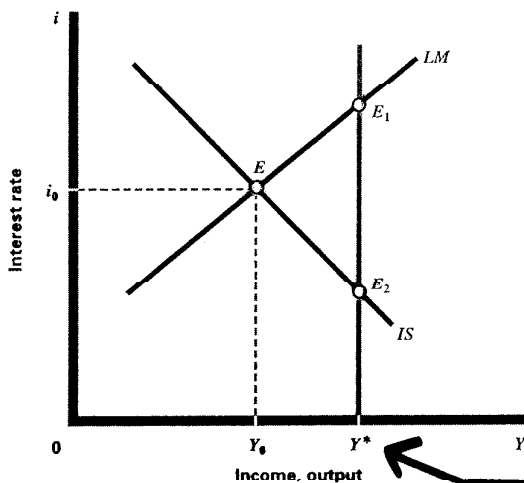
The Policy Mix

In Figure 11.10 we show the policy problem of reaching full-employment output, Y^* , for an economy that is initially at point E with unemployment. Should we choose a fiscal expansion, moving to point E_1 with higher income and higher interest rates? Or

MONETARY AND FISCAL POLICY

TABLE 11.10
ALTERNATIVE FISCAL POLICIES

	interest rate	consumption	investment	GDP
Income tax cut	+	+	-	+
Government spending	+	+	-	+
Investment subsidy	+	+	+	+



"We can be whatever we want to be"
T? F?

full employment line

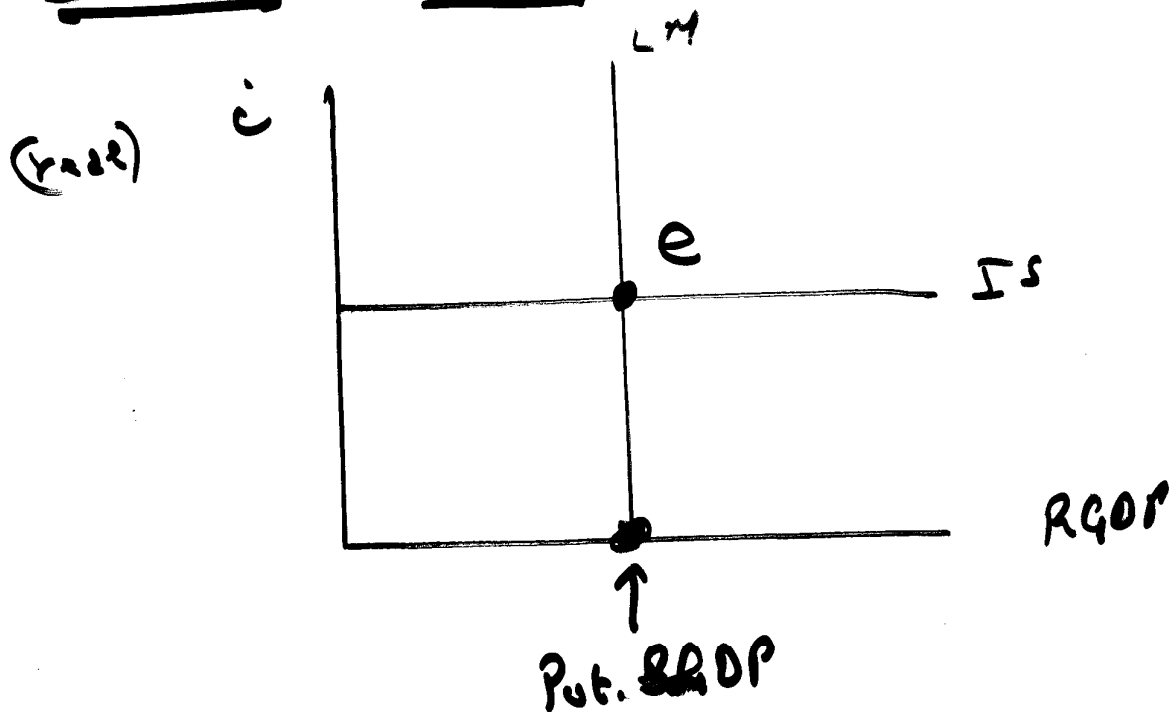
FIGURE 11.10

EXPANSIONARY POLICIES AND THE COMPOSITION OF OUTPUT. In an economy with output Y_0 below the full-employment level, Y^* , there is a choice of using monetary or fiscal expansion to move to full employment. Monetary expansion would move the LM curve to the right, putting the equilibrium at E_2 . Fiscal expansion shifts the IS curve, putting the new equilibrium at E_1 . The expansionary monetary policy reduces the interest rate, while the expansionary fiscal policy raises it. The lower interest rate in the case of monetary policy means that investment is higher at E_2 than at E_1 (except if the IS curve was shifted by an investment subsidy).

- IS-LM
- feasible equilibria

"we can be whatever we want to be" T F

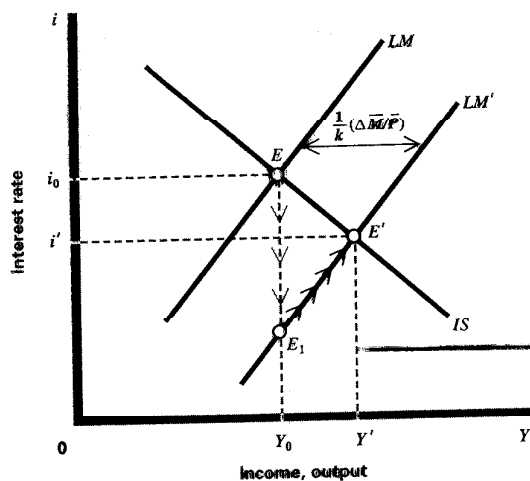
Ricardo: false



* Only one feasible point

Keynesian critique of Ricardo

Ricardo assumed full employment
He did not explain it.



• differential adjustment speeds

FIGURE 18-3
MONETARY POLICY. An increase in the real money stock shifts the *LM* schedule to the right. The asset markets adjust immediately, and interest rates decline between points *E* and *E*₁. The lower interest rates stimulate investment, and spending and income rise until a new equilibrium is reached at point *E*'. Once all adjustments have taken place, a rise in the real money stock raises equilibrium income and lowers equilibrium interest rates.

Question /

- Shift LM
- dis eq. in both markets
- which market reaches eq. first
 - which variable moves fastest
 - i ?
 - Y ?

Causality

$$\Delta \pi_t > 0 \rightarrow \Delta Y_{t+1} > 0$$

current
policy
change \rightarrow future
output
effect

----- therefore

$$\Delta Y_t > 0$$

past
policy
change \rightarrow current
output
effect

----- generalizing

$$\Delta Y_t = f(\Delta \pi_{t-1}, \Delta \pi_{t-2}, \Delta \pi_{t-3} \text{ etc.})$$

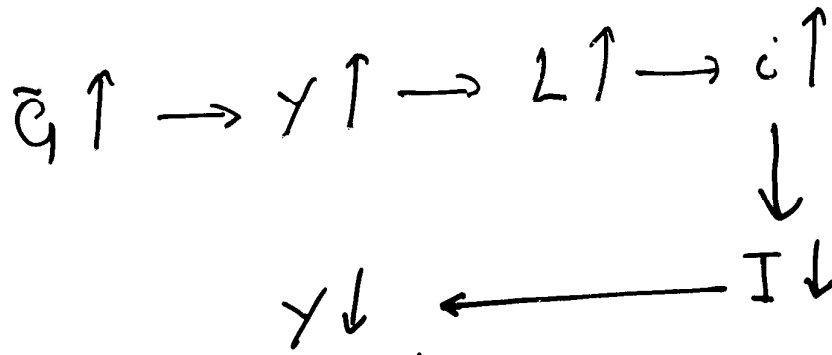
Crowding out

Transmission mechanism

- the transmission mechanism

- feedback effects

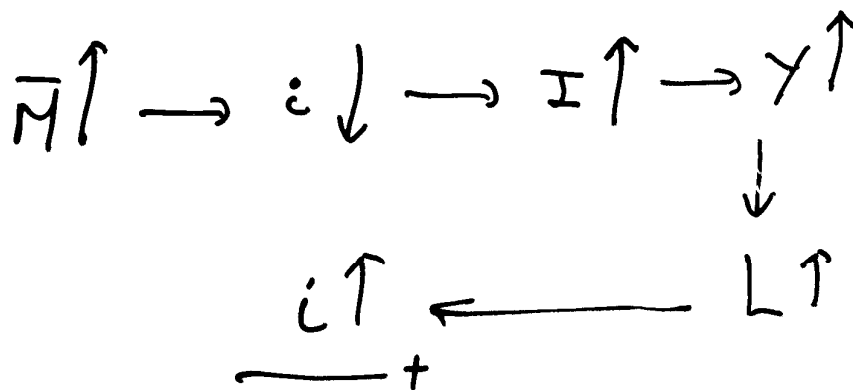
- in relation to fiscal policy



[feed
back
loop

net effect may be close to zero

- in relation to monetary policy



[feed
back
loop

net effect may be close to zero

- An increase in public spending \bar{G} crowds out interest sensitive private spending.

Crowding Out

Comparing E' to the initial equilibrium at E , we see that increased government spending raises both income and the interest rate. But another important comparison is between points E' and E'' , the equilibrium in the goods market at unchanged interest rates. Point E'' corresponds to the equilibrium we studied in Chapter 3, when we neglected the impact of interest rates on the economy. In comparing E'' and E' it becomes clear that the adjustment of interest rates and their impact on aggregate demand dampen the expansionary effect of increased government spending. Income, instead of increasing to the level Y'' , rises only to Y'_0 .

The reason that income rises only to Y'_0 rather than to Y'' is that the rise in the interest rate from i_0 to i' reduces the level of investment spending. We say that the increase in government spending *crowds out* investment spending. Crowding out occurs when expansionary fiscal policy causes interest rates to rise, thereby reducing private spending, particularly investment.

What factors determine how much crowding out takes place? In other words, what determines the extent to which interest rate adjustments dampen the output expansion induced by increased government spending? By drawing for yourself different IS and LM schedules you will be able to show the following:

- Income increases more, and interest rates increase less, the flatter the LM schedule.
- Income increases less, and interest rates increase less, the flatter the IS schedule.
- Income and interest rates increase more the larger the multiplier, α_G , and thus the larger the horizontal shift of the IS schedule.

In each case the extent of crowding out is greater the more the interest rate increases when government spending rises.

To illustrate these conclusions, we turn to the two extreme cases we discussed in connection with monetary policy, the liquidity trap and the classical case.

← done

*

↓
next lecture

$$\frac{\Delta y^e}{\Delta q}$$

Chap. 9

$$i = \bar{i}$$

$$p = \bar{p}$$

Chap. 10 ; 11

$$i = \text{flexible}$$

$$p = \bar{p}$$

$$\frac{y'' - y_0}{\Delta q}$$



$$\frac{y' - y_0}{\Delta q}$$

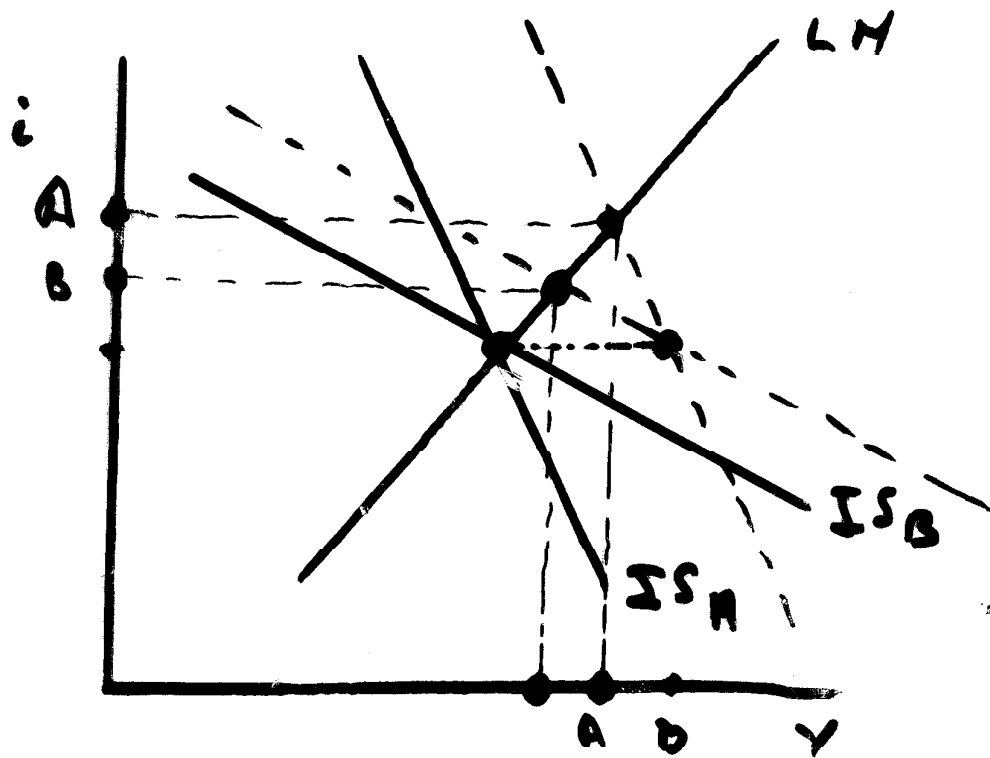
Why: crowding out effect.

for algebra

see last lecture

p. 9

Crowding out : Graphical approach

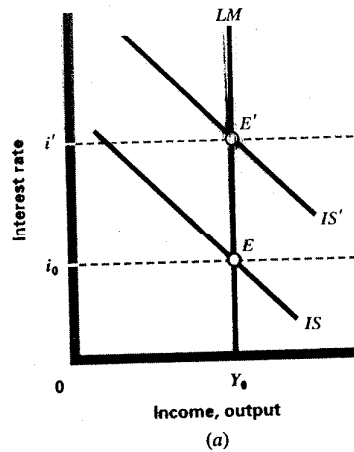


- income increases less, and interest rates increase less, the flatter the IS schedule

The Classical Case and Crowding Out

If the LM curve is vertical, then an increase in government spending has *no* effect on the equilibrium level of income and only increases the interest rate. This case, already noted when we discussed monetary policy, is shown in Figure 5-4a, where an increase in government spending shifts the IS curve to IS' but has no effect on income. If the demand for money is not related to the interest rate, as a vertical LM curve implies, then there is a unique level of income at which the money market is in equilibrium.

Thus, with a vertical LM curve, an increase in government spending cannot change the equilibrium level of income and only raises the equilibrium interest rate. But if government spending is higher and output is unchanged, there must be an offsetting reduction in private spending. In this case, the increase in interest rates



~~11-6~~ 11-6

FULL CROWDING OUT. With a vertical LM schedule, a fiscal expansion, shifting out the IS schedule, raises interest rates, not income. Government spending displaces, or crowds out, private spending, one for one.

$$Y = C + I + \bar{G}$$

$$\boxed{\Delta Y} = \underbrace{\Delta C + \Delta I}_{\text{private spending}} + \underbrace{\Delta \bar{G}}_{\text{public spending}}$$

if $\Delta Y = 0$ then private spending must offset public spending

liquidity trap

The Liquidity Trap

If the economy is in the liquidity trap, so that the LM curve is horizontal, an increase in government spending has its full multiplier effect on the equilibrium level of income. There is no change in the interest rate associated with the change in government spending, and thus no investment spending is cut off. There is therefore no dampening of the effects of increased government spending on income.

• down last
lecture

the government expenditure multiplier

$$\frac{\Delta Y^{ex}}{\Delta \bar{G}}$$

IS-LM model

$$\bullet \frac{\Delta Y^{ex}}{\Delta \bar{G}} = \frac{h}{h[1 - c(1-t)] + h \cdot b} \geq 0$$

also $\bullet L = h \cdot \gamma - h \cdot i$: Demand for \bar{M}/P

$\bullet i = -\frac{1}{h} \cdot \frac{\bar{M}}{P} + \frac{1}{h} \cdot \gamma$: LM curve

Keynes $h \rightarrow \infty$

classical $h \rightarrow 0$

L interest sensitive

L not interest sensitive

LM horizontal

LM vertical

$$\frac{\Delta Y^{ex}}{\Delta \bar{G}} = \frac{1}{1 - c(1-t)} > 0$$

$$\frac{\Delta Y^{ex}}{\Delta \bar{G}} = 0$$

↑

as in chapter 3

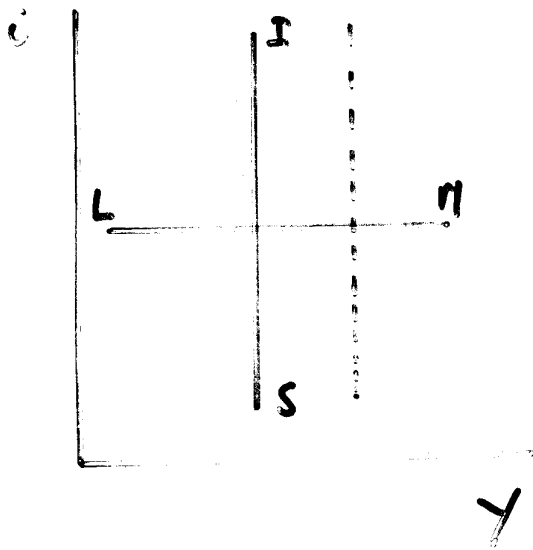
fiscal policy effective

fiscal policy not effective

IS-LM configurations

(31)

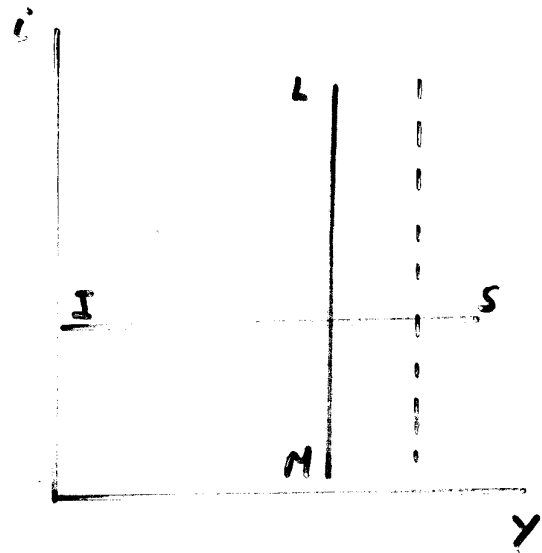
Keynes



Conclusion

to increase Y we must shift IS ; i.e. rely on fiscal policy; monetary policy is not effective

Monetarist



Conclusion

to increase Y we must shift LM , i.e. rely on monetary policy; fiscal policy is not effective

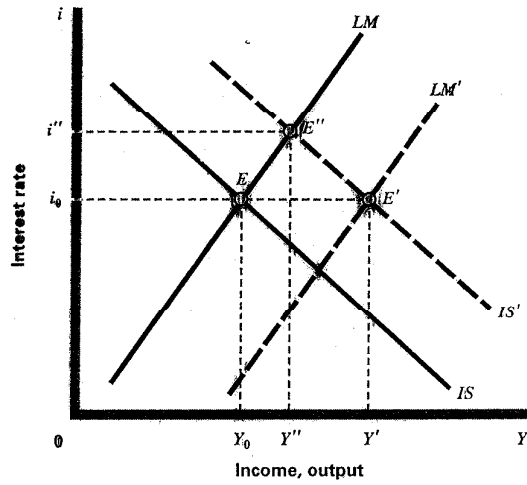


FIGURE 5
MONETARY ACCOMMODATION OF FISCAL EXPANSION. A fiscal expansion shifts the IS curve to IS' and moves the equilibrium of the economy from E to E''. Because the higher level of income has increased the quantity of money demanded, the interest rate rises from i_0 to i'' , thereby crowding out investment spending. But the Fed can accommodate the fiscal expansion, creating more money and shifting the LM curve to LM' and the equilibrium of the economy to E'. The interest rate remains at level i_0 , and the level of output rises to Y' .

MONETARY AND FISCAL POLICY

TABLE
 SUMMARY: POLICY EFFECTS ON INCOME AND INTEREST RATES

policy	equilibrium income	equilibrium interest rate
Monetary expansion	+	-
Fiscal expansion	+	+

monetary accommodation:

given $\Delta \bar{G}$ ΔM changes such that $\Delta i = 0$