

Monetary and fiscal policy

Macroeconomics

Monetary control

- The central bank can control the money supply by using open market operations to determine the monetary base, and by using reserve requirements and the discount rate to determine the money multiplier.
- Easy in theory but not in practice.
- It is hard for the central bank to control the monetary base because it is also the lender of last resort. The **lender of last resort** lends to banks when financial panic threatens the financial system. When the commercial banks wish to increase lending and deposits they can always get extra cash from the central bank.

Monetary control (2)

- Nor is the money multiplier easily manipulated. To affect it, reserve requirements must force banks to hold reserves they would not otherwise have held.
- This is a tax on banks, hurting their profits. Modern banks operating in global markets find ways around these controls.
- Precise control of the money supply is difficult. Most central banks no longer try. Instead they set interest rates.

Interest rates and monetary control

The money demand schedule LL is drawn for a given level of real income. If the central bank can fix the real money supply at L_0 the equilibrium interest rate will be r_0 . Alternatively, if the central bank sets the interest rate r_0 and provides whatever money is demanded, the money supply will again be L_0 .

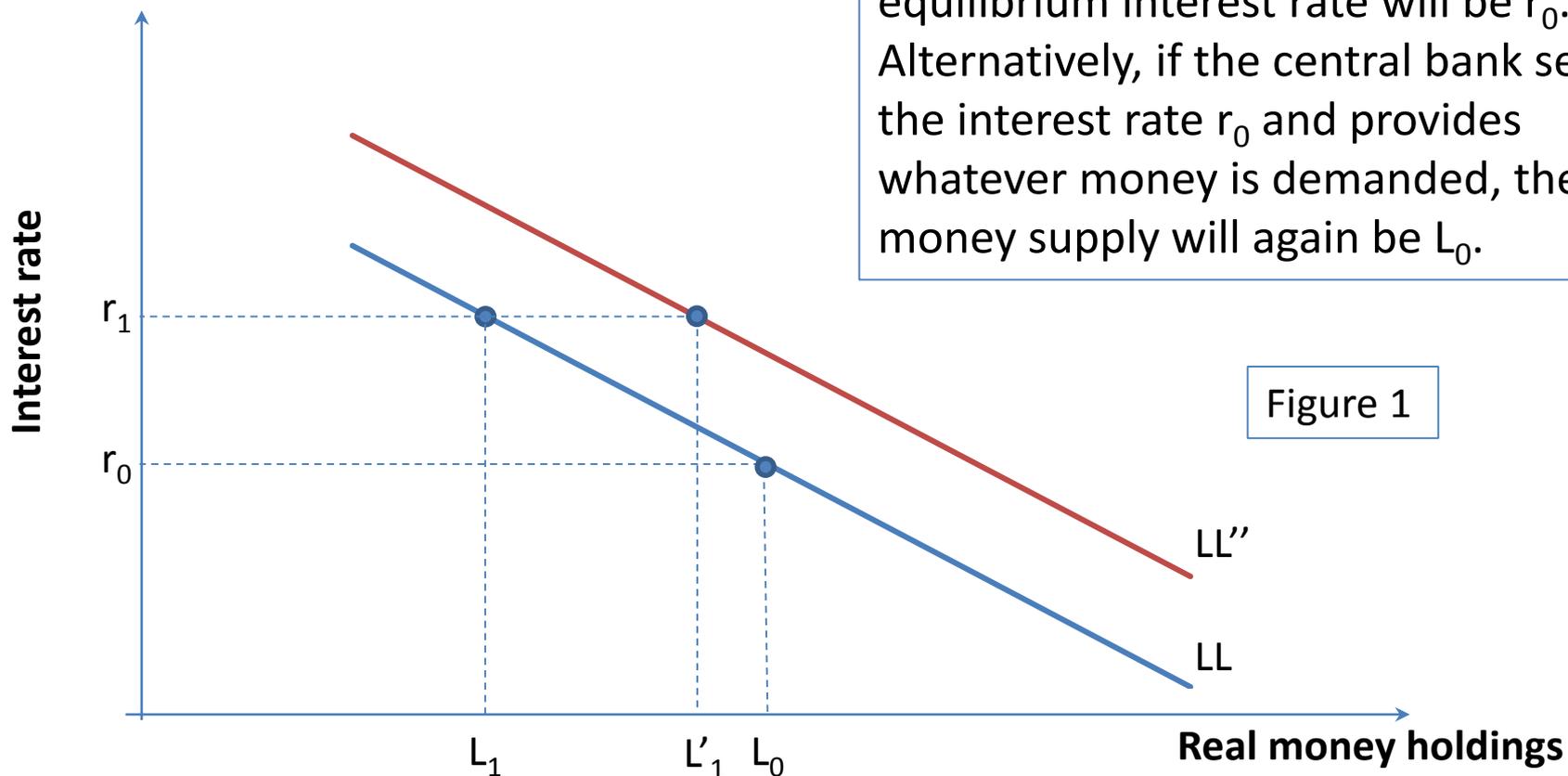


Figure 1

To control the money supply by using interest rates, the central bank must know the position of the demand schedule. Fixing an interest rate r_1 , the resulting money supply will be L_1 if the demand schedule is LL but will be L'_1 if the demand schedule is LL'.

A Taylor rule

- What economic variables are correlated with the interest rate decisions of central banks?
- Professor John Taylor of Stanford University found that most central banks adjust interest rates in response to two variables, expected output (relative to potential output) and inflation.
- Following a **Taylor rule**, a central bank raises (lowers) interest rates if inflation and output are expected to be above (below) their target levels.
- Alternatively, an **inflation target** implies interest rates are adjusted to keep inflation within a narrow range.

Interest rates in a simple Taylor rule

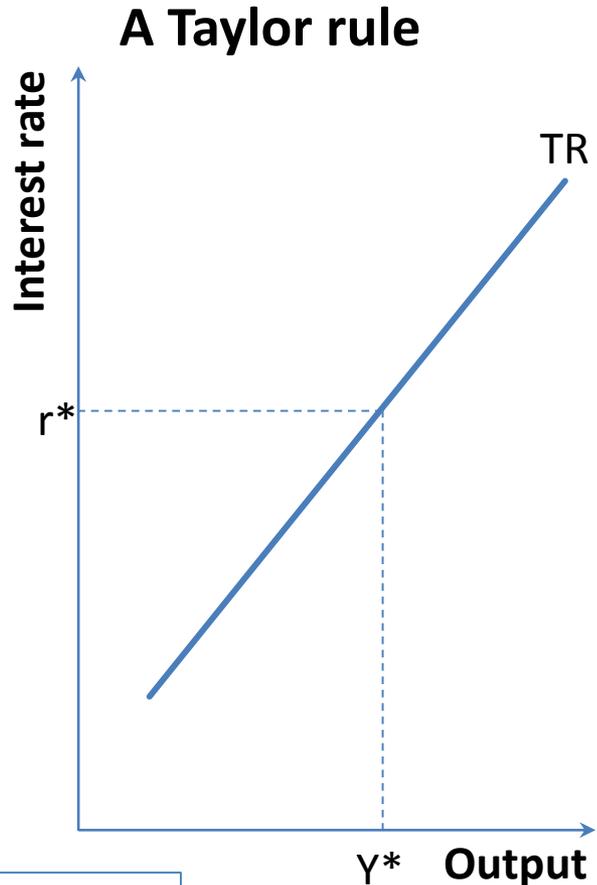


Figure 2

- When output equals potential output Y^* , the central bank sets the interest rate at r^* .
- Higher output leads to interest rates above r^* , and lower output leads to interest rates below r^* .
- The steeper the slope of Taylor rule TR the more the central bank is prepared to alter interest rates in order to stabilize output.

Interaction of the markets for goods and for money

- We now examine the interaction of the markets for goods and for money.
- Interest rates affect the demand for goods and the level of income and output, but income and output affect the demand for money and interest rates set by the central bank.
- We need to think about both markets at once.
- In so doing, we explain how equilibrium income and interest rates are simultaneously determined.

The IS-LM model

- We consider combinations of income and interest rates that lead to equilibrium in each of the two markets, goods and money, and thus determine the unique combination of income and interest rates yielding equilibrium in both markets.
- First, we will examine the behaviour of the economy under given policies. A given fiscal policy means a given path of government spending, and a given path of tax rates that eventually raise enough tax revenue to pay for this spending.
- A given monetary policy must specify the implicit decision rule by which interest rates are set. This could be to achieve a monetary target (interest rates are adjusted to keep the nominal money stock on a specified path), an inflation target or a Taylor rule.

The IS schedule

- The goods market is in equilibrium when aggregate demand equals actual income.
- In the simplest model, without government or foreigners, this occurs when planned investment I equals planned savings S .
- Hence, as shorthand, the combinations of interest rates and income compatible with short-run equilibrium in the goods market is called the IS schedule. The **IS schedule** shows combinations of income and interest rates at which aggregate demand equals actual output.

The IS schedule

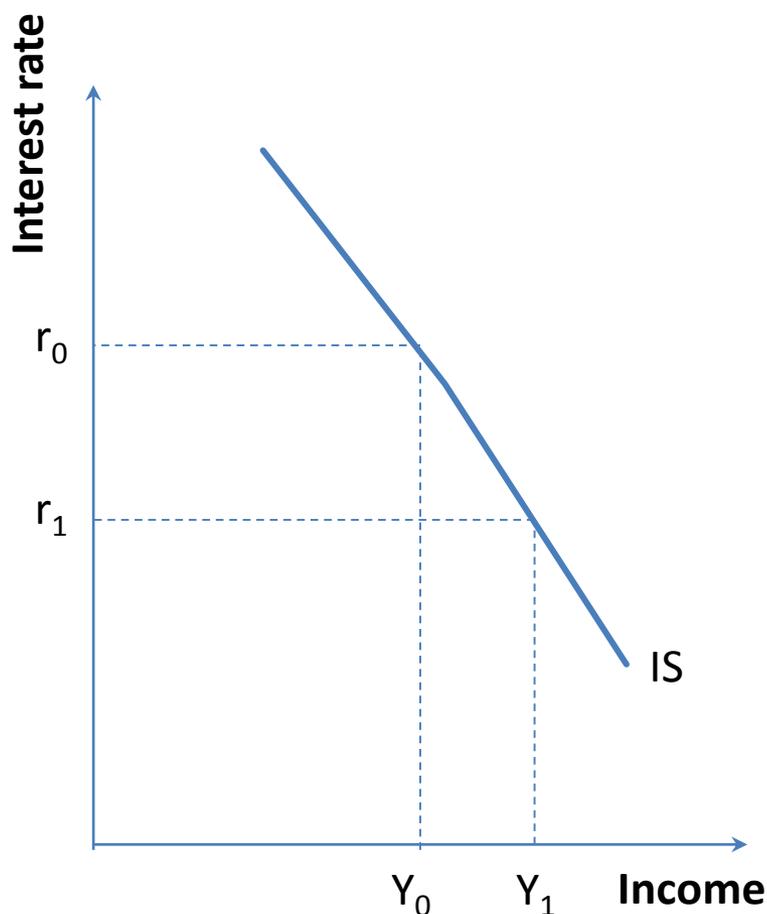


Figure 3

- The IS schedule shows how a change in interest rates affects aggregate demand and short-run equilibrium output.
- A lower interest rate boosts demand and output.
- Anything else affecting aggregate demand shifts the IS schedule.

The IS schedule

- The IS schedule is drawn for a given level of present and future government spending, a given level of present and future taxes, and given present beliefs about future output and income.
- Holding these constant, lower interest rates increase both investment and consumption demand.
- At an interest rate r_1 , aggregate demand and short-run equilibrium output Y_1 are higher than their level Y_0 when the interest rate is r_0 .

The slope of the IS schedule

- The IS schedule slopes down. Lower interest rates boost aggregate demand and output.
- The slope of the IS schedule reflects the sensitivity of aggregate demand to interest rates.
- If demand is sensitive to interest rates, the IS schedule is flat. Conversely, if output demand is insensitive to interest rates, the IS schedule is steep.

Shifts in the IS schedule

- Movements along the IS schedule show how interest rates affect aggregate demand and equilibrium output. Other changes in aggregate demand shift the IS schedule.
- For a given interest rate, more optimism about future profits raises investment demand. Higher expected future incomes raise consumption demand. Higher government spending adds directly to aggregate demand. Any of these, by raising aggregate demand at a given interest rate, raises equilibrium output at any interest rate, causing an upward shift in the IS schedule.

The LM schedule

- Having studied short-run equilibrium in the goods market, we now examine money market equilibrium.
- The **LM schedule** shows combinations of interest rates and income yielding money market equilibrium.
- Along the LM schedule, the demand for real money (or for liquidity, denoted by L) equals the supply of real money (denoted by M). Hence the shorthand LM. The exact position and slope of the LM schedule depends on the monetary policy in operation.

The LM schedule

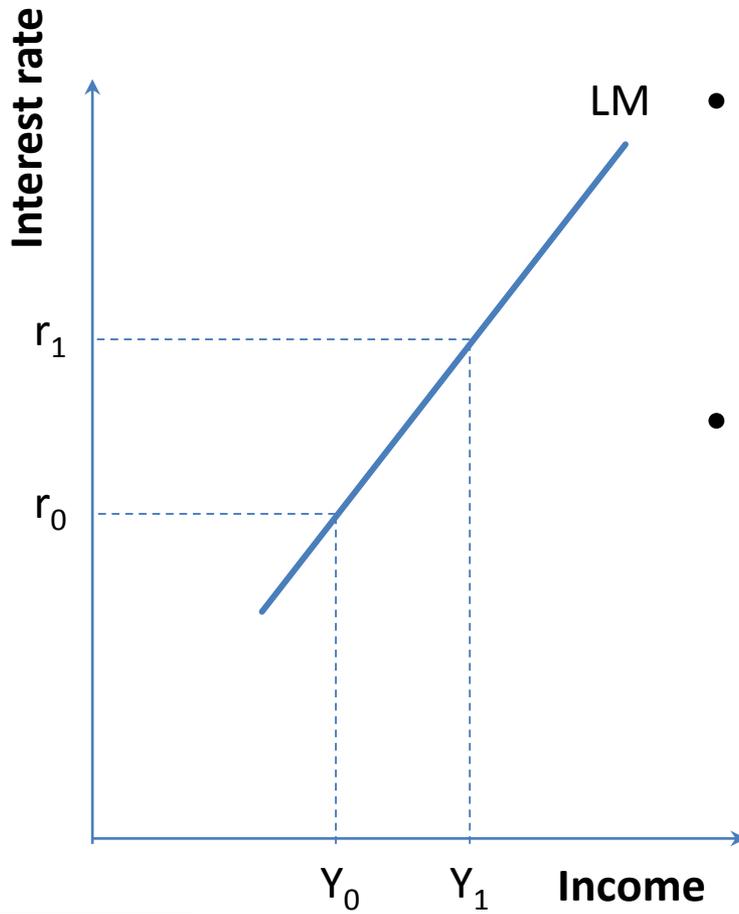


Figure 4

- The LM schedule shows money market equilibrium. With a nominal money target, the real money supply is fixed.
- Higher output raises real money demand, but higher interest rates reduce money demand back in line with real money supply.
- If instead monetary policy follows a Taylor rule, the LM schedule is simply the TR of Figure 2. Now the central bank chooses to raise interest rates when output is higher, and passively adjusts the money supply to equal money demand at this combination of output and interest rate.

The slope of the LM schedule

- The LM schedule slopes up. Following a Taylor rule, the LM schedule is steeper when the central bank stabilizes output more aggressively. Any rise (fall) in output induces a large rise (fall) in interest rates.
- Following a monetary target, higher output induces a higher interest rate to keep money demand in line with money supply. The more sensitive is money demand to income and output, the more the interest rate must change to maintain money market equilibrium, and the steeper is the LM schedule.

The slope of the LM schedule (2)

- Similarly, if money demand is not responsive to interest rates, it again takes a big change in interest rates to offset output effects on money demand, and the LM schedule is steep.
- Conversely, the more money demand responds to interest rates and the less it responds to income, the flatter is the LM schedule.

Movements along and shifts in the LM schedule

- A given LM schedule always reflects a given monetary policy.
- Movements along the schedule indicate interest rate changes to implement the existing policy as output changes.
- Shifts in the schedule reflect a change in monetary policy.

Shifts in the LM schedule under a Taylor rule

- Under a Taylor rule, r^* is the target interest rate when output is at potential output Y^* .
- In figure 2, actual interest rates obey $r = r^* + a(Y - Y^*)$.
- A more expansionary monetary policy at each output level means a reduction in the long-run interest rate r^* .
- In figure 2 this implies a lower interest rate r at each output level Y , and hence a shift down and to the right in the Taylor rule TR . In figure 4 this would imply a rightward shift in the LM schedule.
- Conversely, a tighter monetary policy at each output level is shown by a rise in r^* and a leftward shift in the TR and LM schedules.

Shifts in the LM schedule under a nominal money target

- If, instead, monetary policy uses a nominal money target, we draw an *LM* schedule for a given nominal money target. With prices fixed, this implies a given supply of real money.
- A rise in the target money supply raises the real money supply. Money demand must rise to maintain money market equilibrium. This implies a rightward shift in the *LM* schedule. Output is higher, or interest rates lower, raising money demand in line with the rise in real money supply.

Shifts in the LM schedule under a nominal money target (2)

- Conversely, a lower monetary target shifts the LM schedule to the left. An equal fall in real money demand requires a higher interest rate at each income level.
- To sum up, moving along the LM schedule, higher interest rates need higher income to keep real money demand equal to this fixed supply. A higher (lower) monetary target shifts the LM schedule to the right (left)

IS-LM model

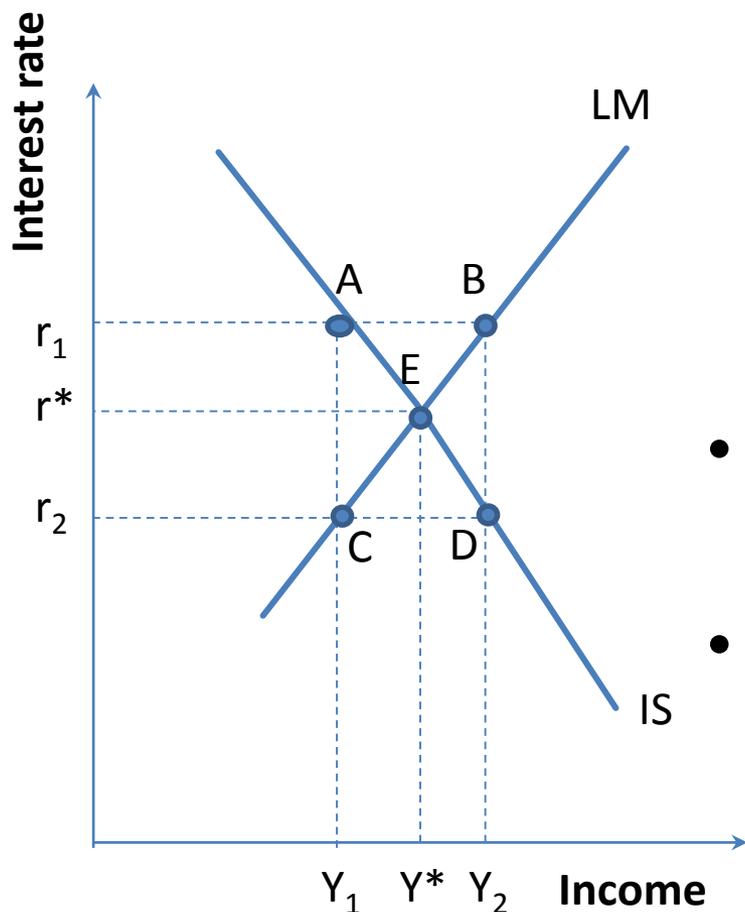


Figure 5

- The IS-LM model lets us view both markets in one diagram.
- The figure to the left plots the IS schedule (goods market equilibrium) and the LM schedule (money market equilibrium).
- Only at E are both markets in equilibrium.
- Goods and money markets jointly determine the equilibrium interest rate r^* and equilibrium income Y^*

Fiscal policy: shifting the IS schedule

- Other than a fall in interest rates, anything that raises aggregate demand also shifts the IS schedule up.
- The figure on the next slide shows a rise in government spending, but it could also be an upward shift in consumption or investment demand.

Fiscal expansion shifts the IS schedule

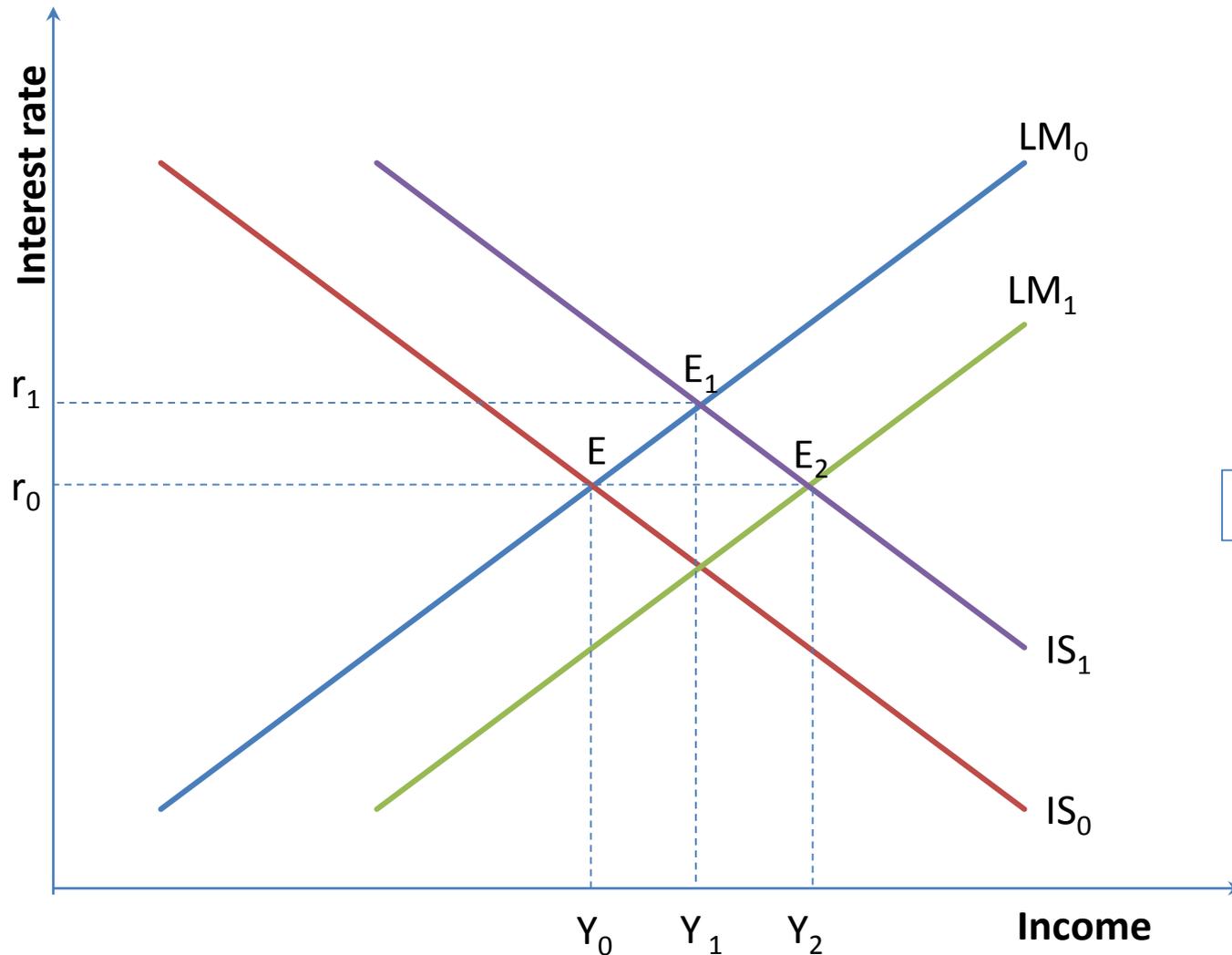


Figure 6

Higher government spending

- The economy begins with IS_0 and LM_0 . Initial equilibrium is at E.
- Suppose higher government spending is financed by borrowing, but monetary policy, and hence LM_0 , is unaltered.
- Higher government spending shifts the IS schedule up, from IS_0 to IS_1 . At each interest rate, equilibrium income is higher.
- The fiscal expansion raises aggregate demand.

Interest and output with a Taylor rule

- Given IS_1 and LM_0 , the new equilibrium is at E_1 .
- The fiscal expansion raises equilibrium output from Y_0 to Y_1 . This bids up interest rates.
- With a Taylor rule, interest rates rise with higher output. The rise in interest rates partly reduces consumption and investment spending, but higher government spending is not completely offset by crowding out. Equilibrium income increases.
- A stimulus to aggregate demand crowds out some private spending. Higher output induces a rise in interest rates that dampens the expansionary effect on demand.

A vertical LM schedule

- Crowding out is complete only if the LM schedule is vertical. Then, an upward shift in the IS schedule raises interest rates but not income, because the vertical LM schedule reflects a policy of total stabilization of output. Then higher government spending makes private spending (consumption and investment) fall by the same amount, leaving total demand unaltered.
- In practice, the LM schedule is never completely vertical. Generally, fiscal expansion raises demand and output despite the induced rise in interest rates.

Fiscal expansion and looser monetary policy

- Figure 6 shows what happens if fiscal expansion is *accompanied* by a looser monetary policy.
- Fiscal expansion shifts IS to the right, but monetary expansion shifts LM to the right.
- It is possible to loosen monetary policy just enough to keep interest rates at their original level when income expands.
- Fiscal expansion then leads to a new equilibrium at E_2 , with interest rates unchanged at r_0 .

Fiscal and monetary policies

- Hence, the output effect of a fiscal expansion depends on the monetary policy in force.
- The steeper the LM schedule, the more monetary policy raises interest rates as output rises, and the smaller is the output effect of a given change in fiscal policy.
- The flatter the LM schedule, the larger is the output effect of a change in fiscal policy.

Automatic stabilizers

- An upward-sloping LM schedule is the monetary equivalent of the automatic stabilizers in fiscal policy. With no change in the policy rule, the consequence is to dampen output fluctuations in response to aggregate demand shocks.
- For fiscal policy this occurs without any change in tax rates. For monetary policy, the central bank has actually to change interest rates as economic conditions alter. However, for a given Taylor rule, the central bank is merely implementing the policy that it has already adopted.

Monetary expansion shifts the LM schedule

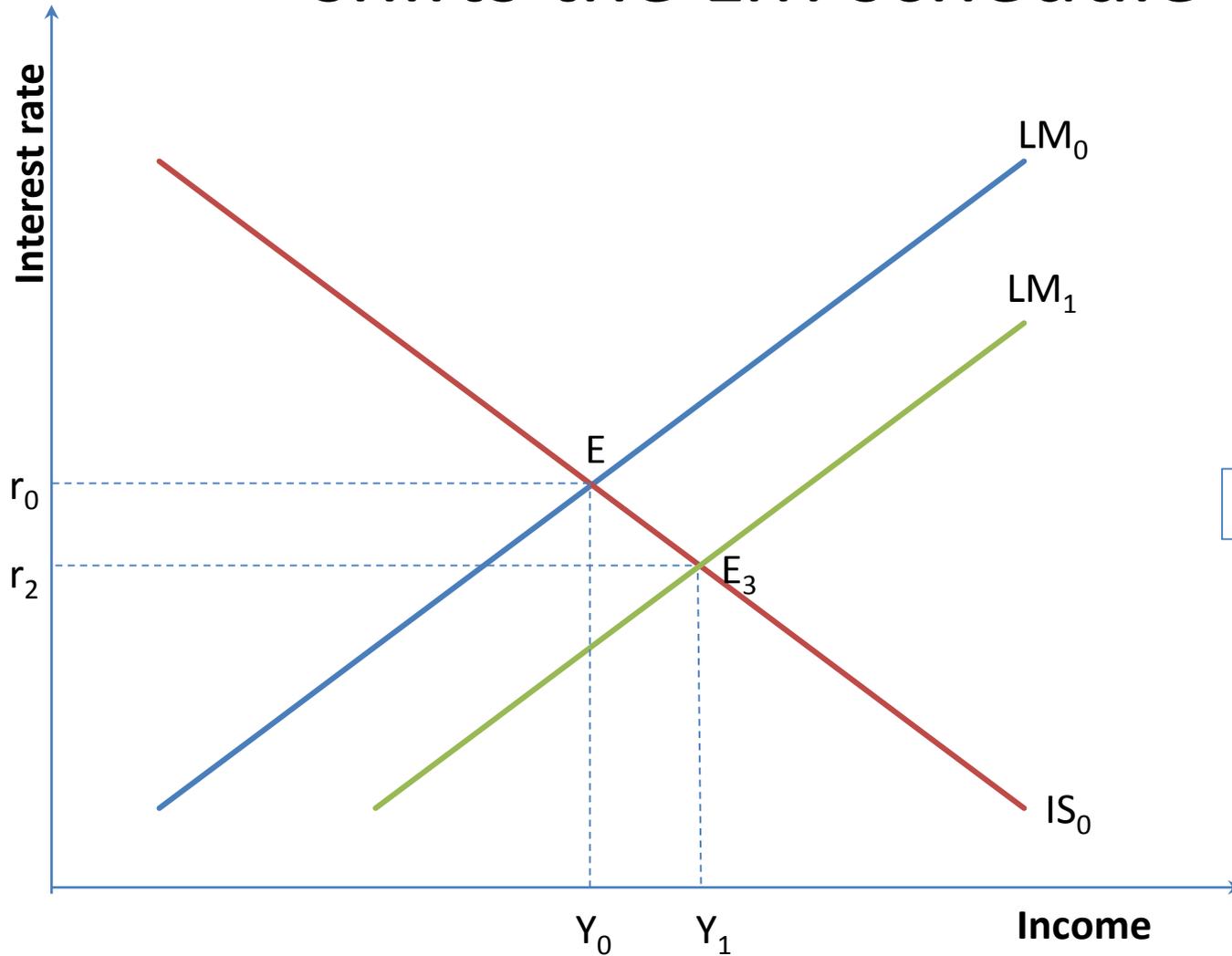


Figure 7

Monetary policy: shifting the LM schedule

- Figure 7 can be used to discuss monetary policy. Suppose fiscal policy is constant and the IS schedule is IS_0 .
- For the initial monetary policy, the LM schedule is LM_0 and the equilibrium is at E.
- A looser monetary policy shifts the LM schedule to the right, say to LM_1 . Figure 7 shows the new equilibrium at E_3 .

A looser monetary policy

- With a Taylor rule, looser monetary policy means a lower target interest rate r^* .
- Since this is accomplished by raising the money supply, this is similar to a rise in the nominal money target when the central bank uses monetary targets instead of a Taylor rule.

A looser monetary policy (2)

- Either way, the money supply rises and interest rates fall. Overnight, before income can change, there is a big drop in interest rates.
- If the money market is continuously in equilibrium, in figure 7 the economy moves from E to the point on LM_1 vertically below E.
- But this point is not on IS_0 . Lower interest rates raise aggregate demand, boost income, and thus raise interest rates a bit. The new equilibrium is at E_3 .

- Figure 7 summarizes the transmission mechanism through which a looser monetary policy reduces interest rates, increases consumption and investment demand, and thus raises equilibrium income.
- Despite higher output and income, interest rates are lower in the new equilibrium than in the original one.
- Without a lower interest rate, there is nothing to boost aggregate demand and equilibrium income in the first place.

The new equilibrium

- Figure 7 confirms that the new equilibrium at E_3 is to the south-east of the original equilibrium at E .
- An expansionary monetary policy raises equilibrium income but reduces the equilibrium interest rate.