CHAPTER

26

ECONOMIC POLICY IN THE OPEN ECONOMY

Fixed Exchange Rates

INTRODUCTION

In this chapter, we examine how economic policy operates in the open economy when exchange rates are fixed. Since the effects of discretionary policy are different under a flexible exchange rate system compared to a fixed-rate system, we then consider economic policy under flexible exchange rates in the following chapter. Although the major industrial countries tend to have flexible rate systems today, many countries still peg their currencies and thus have to contend with the effects of fixed rates when carrying out monetary and fiscal policy. This is true even among the major industrial countries in the European Union, which have relatively fixed rates within the EU but have flexible rates against the rest of the world.

Prior to current monetary arrangements (discussed in detail in the last chapter in the book), the international monetary system was characterized by fixed exchange rates, and there is continual pressure on the part of a good many individuals to return to some sort of fixed standard. In our consideration of economic policy under fixed rates, we first examine a fixed-rate model that separates monetary policy from fiscal policy and that provides some guidance in the selection of appropriate policy instruments. We then introduce a macroeconomic framework that specifically incorporates the money markets, the real sector, and the foreign sector (the *IS/LM/BP* model), which we use to examine the effects of alternative policy actions under fixed exchange rates (in this chapter) and under flexible exchange rates (in the next chapter). Command of this material should help you understand both the impact of various policy actions within a broad and rigorous macroeconomic framework and the effects of the exchange rate system on macroeconomic policy actions. Consideration of possible price effects accompanying these policy actions will be discussed in the chapter "Prices and Output in the Open Economy: Aggregate Supply and Demand."

TARGETS, INSTRUMENTS, AND ECONOMIC POLICY IN A TWO-INSTRUMENT, TWO-TARGET MODEL

As an introduction to policy analysis in the open economy, we begin by developing a very basic framework that will allow us to examine the interaction between policies aimed at attaining external balance and those aimed at other domestic targets such as full employment and price stability. One of the early models that differentiated the effects of monetary and fiscal policy on the open economy was developed by Robert Mundell

(1962). The separation of monetary and fiscal policy was accomplished by extending the current account analysis of that time to include capital flows as well. "External balance," or "balance-of-payments equilibrium," was thus defined by Mundell to mean a zero balance in the official reserve transactions balance.[1] The attainment of the external balance target is influenced by both monetary policy and fiscal policy. For example, an increase in the money supply will reduce interest rates, leading to a reduction in short-term capital inflows or an increase in short-term capital outflows and to a BOP deficit. Expanding government spending will lead to increased income and an increase in imports and also to a BOP deficit.[2] Since expansionary monetary policy and fiscal policy are assumed to affect the balance of payments in a similar fashion, one concludes that maintaining balance-of-payments equilibrium for a given exchange rate requires an opposite use of monetary and fiscal policy in this model; that is, expansionary fiscal policy must be accompanied by contractionary monetary policy and vice versa.

There is a similar policy relationship with respect to the internal balance target. Increases in the money supply tend to lower the interest rate and thus to stimulate real investment. If this is not to be expansionary and/or inflationary, the increase in investment must be offset by a decrease in government spending or by an increase in taxes that will reduce consumption spending. Similarly, maintenance of a given domestic internal balance target indicates that any increase in government spending (or any increase in consumption spending via a decrease in taxes) must be offset by some decrease in domestic investment through monetary policy actions if inflationary pressures are not to ensue.

The policy problem in this instance is demonstrated graphically in Figure 1 using a **Mundell-Fleming diagram.** The effects of monetary policy are captured through the use of different rates of interest on the vertical axis. Fiscal policy is represented through the levels of net government spending $(G - T)$ plotted on the horizontal axis. The inverse relationship between the two policy instruments is shown by upward-sloping curves, since higher interest rates reflect, *ceteris paribus,* a smaller money supply. Internal balance is represented by the *IB* curve and external balance by the *EB* curve. In this case, each curve shows combinations of monetary and fiscal policy [i and $(G - T)$] that bring about internal and external balance, respectively.

Although both curves slope upward for the reasons given above, the *EB* curve is drawn flatter than the *IB* curve because changes in the money supply (and hence the interest rate) are assumed to have a greater relative effect on external balance than on internal balance. This is generally thought to be the case because changes in the interest rate affect the balance of payments through both the capital and the current accounts. A rise in the interest rate causes not only an increase in net short-term capital inflows but also reduced domestic real investment and income, which acts to reduce imports. Changes in the interest rate thus exert both a direct and an indirect impact on the balance of payments, whereas they affect the internal balance target only through the direct impact on real investment. This assumption allows us to reach a conclusion about the appropriate assignment of policy instruments to the *IB* and *EB* targets (i.e., effective policy classification).

In Figure 1 it is clear that only one combination of monetary policy and fiscal policy will allow the simultaneous attainment of both targets, that of i^* and $(G - T)^*$. Any other combination will lead to one or both of the targets not being met. All points to the left of or above the *IB* curve reflect combinations of the two instruments where the interest rate is too high given the fiscal policy stance, resulting in low income and in unemployment. Similarly, all points to the right of or below the *IB* curve lead to real investment levels that are too high, contributing to inflation. Points to the left of or above the *EB* curve reflect interest rates that are higher than necessary to bring the balance of payments into equilibrium at the given exchange rate, and hence generate a surplus in the balance of payments due to capital inflows. Points to the right of or below the *EB* curve reflect a balance-of-payments deficit. The policy space can thus be divided into four quadrants, each reflecting a different combination of missed targets:

I. Unacceptably high unemployment; balance-of-payments surplus
II. Unacceptably rapid inflation; balance-of-payments surplus
III. Unacceptably rapid inflation; balance-of-payments deficit
IV. Unacceptably high unemployment; balance-of-payments deficit

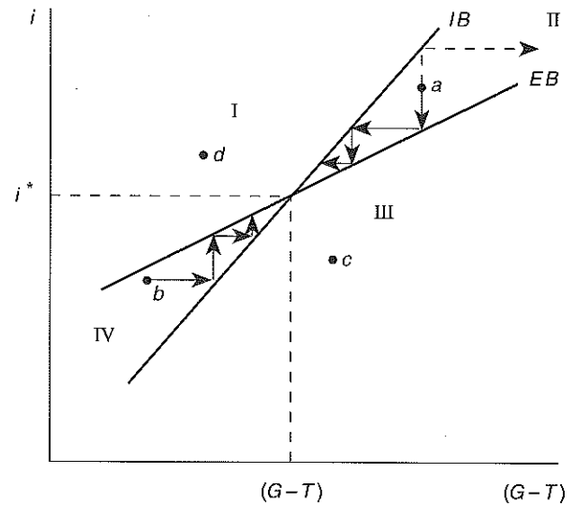
Again we see that the simultaneous attainment of the two targets can take place only by careful choice of the two instruments involved. For example, if the economy is at point *a,* altering one instrument will permit the attainment of one target but not both. To reach equilibrium, both instruments must be utilized.

A further important point needs to be made relating to the assignment of instruments to targets. Given the nature of the *IB* and *EB* functions, it will be more efficient to assign

[1]Note that this definition of external balance differs from the definition in the Swan model in the preceding chapter, where the term referred to balance in the current account.

[2]In this Mundell model, it is assumed that expansionary fiscal policy worsens the balance of payments. As we see later, expansionary fiscal policy can improve the balance of payments under certain circumstances.

FIGURE 1 **Internal Balance, External Balance, and Policy Instrument Classification in a Mundell-Fleming Diagram**



The *IB* curve reflects all combinations of interest rates i (monetary policy) and net government spending $(G - T)$ that lead to the attainment of domestic targets, that is, internal balance. Similarly, the flatter *EB* curve reflects all combinations of i and $(G - T)$ that generate equilibrium in the balance of payments for a given exchange rate. Points above the *IB* curve reflect unacceptably high unemployment, and points below reflect unacceptably rapid inflation. Similarly, points above the *EB* curve represent a surplus in the balance of payments, and points below represent a deficit. It is clear that internal balance and external balance are obtained simultaneously only at i^* and $(G - T)^*$. Finally, if the economy is not at i^* and $(G - T)^*$, monetary policy should be pursued to reach external balance and fiscal policy to reach internal balance.

the monetary policy instrument to pursue *EB* and fiscal policy instruments to pursue *IB* targets. This becomes obvious when one considers the possible sequence of policy decisions that could take place at point *a*. If monetary policy is directed toward the *IB* target, a decrease in the money supply (an increase in the interest rate) is required. If the fiscal policy instrument is then directed toward the *EB* target, expansionary fiscal action is required. These steps (shown by the dashed arrow in region II of Figure 1) would move the economy even farther away from i^* and $(G - T)^*$, not closer. On the other hand, devoting monetary policy to the *EB* target and fiscal policy to the *IB* target[3] leads to a sequence of policy steps that drives the economy closer to the desired levels of i^* and $(G - T)^*$ (indicated by the solid arrows in region II). A similar conclusion would be reached for points *b*, *c*, or *d*. This model thus suggests that effective policy classification of policy instruments and targets is an important element in the successful administration of economic policy in the open economy under fixed exchange rates.

ONCEPT CHECK

1. What is the difference between internal balance and external balance?
2. If the economy is operating at *c* in Figure 1, what policy actions should be carried out to reach the internal balance target? Why?
3. Which policy tool should be used to attain external balance in the Mundell-Fleming model? Why?

ENERAL EQUILIBRIUM IN THE OPEN ECONOMY: THE *IS/LM/BP* MODEL

Building on the introduction to policymaking in the open economy provided by the Mundell-Fleming model, we now turn to a broader general equilibrium construct that specifically incorporates the money market relationships developed in the chapter "The Monetary and Portfolio Balance Approaches to External Balance" and the real sector or income effects discussed in the chapter "National Income and the Current Account." In addition, the model specifically incorporates the effects of international trade and international capital flows on equilibrium in the open-economy model.

eneral Equilibrium the Money arket: The *LM* rve

Equilibrium in the money market occurs when the supply of money is equal to the demand for money. In the chapter "The Monetary and Portfolio Balance Approaches to External Balance," we covered both the supply of and the demand for money in considerable detail, and we presented the concept of money market equilibrium conceptually and algebraically in the following general manner:[4]

$$M_s = L$$

or

$$\underset{+}{a}(\underset{-}{DR} + \underset{+}{IR}) = \underset{+}{a}(\underset{-}{BR} + \underset{?}{C}) = f[\underset{+}{Y}, \underset{-}{i}, \underset{+}{P}, \underset{+}{W}, \underset{-}{E(\dot{p})}, \underset{?}{O}] \qquad [1]$$

[3]The reader may recall from other courses that fiscal policy has an effect on interest rates, since an expansionary policy, for example, will raise income, raise money demand, and therefore raise interest rates (given a fixed money supply). In the Mundell model, the monetary authorities are assumed to recognize this impact when implementing policy to meet any interest rate target.

[4]See expressions [1], [2], and [5] in that chapter.

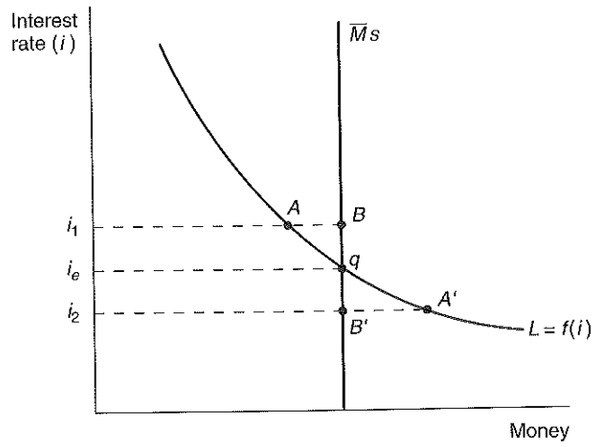
where: M_s = money supply
L = money demand
a = money multiplier
DR = domestic reserves held by the central bank
IR = international reserves held by the central bank
BR = reserves of commercial banks and other depository institutions
C = currency held by the nonbank public
Y = level of real income in the economy
i = domestic interest rate
P = price level
W = level of real wealth
$E(\dot{p})$ = expected percentage change in the price level
O = all other variables that can influence the amount of money balances the country's citizens wish to hold (e.g., the foreign interest rate, expected changes in the exchange rate if the exchange rate is not fixed, risk premium for holding foreign assets)

The nature of the impact of changes in the principal independent variables on money demand is indicated above each demand variable in equation [1]. Since the income level and the interest rate are thought to be the two major influences on the demand for money, we focus our attention on these two variables with regard to money market equilibrium. Holding the variables other than Y and i constant, there will be a transactions demand for money fixed by a given level of income and an asset demand for money determined by the domestic interest rate (given the foreign interest rate, the foreign risk premium, and other financial considerations). Further, for any given income level, a graph of the demand for money can be portrayed as the downward-sloping L curve in Figure 2. This graph enables us to focus on the inverse relationship between the interest rate and the demand for money, holding other things constant. You will recall the various explanations for the inverse relationship; for example, a higher interest rate means an increase in the opportunity cost of holding non-interest-bearing money assets and reduces the amount of money that people wish to hold. If any of the "other things" besides the interest rate change, the L curve will shift (e.g., a rise in income shifts the L curve to the right since greater transactions demand for money would exist at each interest rate).

Having looked at the demand for money, let us comment briefly on the supply of money. For the time being, we assume that the supply of money at any given point in time is *fixed*. The money supply is presumed to be under the control of the monetary authorities (such as the Board of Governors of the Federal Reserve System in the United States). The specification of a fixed money supply (call it amount $\overline{M}_s$) is represented by the vertical line in Figure 2. Increases (decreases) in the supply of money shift this line to the right (left). The demand and supply of money jointly determine the **equilibrium interest rate,** at rate i_e.

Interest rate i_e is the equilibrium rate because, at any other rate, there is either an excess supply of or an excess demand for money. For example, at interest rate i_1, the amount of money demanded (represented by the horizontal distance i_1A) is less than the money supply (represented by the distance i_1B). The excess supply of money AB indicates that people hold more of their wealth in the form of money (distance i_1B) than they wish to hold (distance i_1A) at this relatively high interest rate. In response, the money holders will purchase other assets such as bonds with their excess cash balances. These asset purchases drive up the price of bonds and drive down the interest rate. (Remember the

FIGURE 2 **Equilibrium in the Money Market**



The fixed money supply is indicated by the vertical line $\overline{M}_s$. The demand for money is represented by the L curve, and the equilibrium interest rate is i_e. Above i_e at interest rate i_1, the demand for money is equal to horizontal distance i_1A, which is less than the supply of money i_1B. With an excess supply of money, people purchase bonds, which drives up bond prices and reduces the interest rate—a process that continues until i_e is reached. Below i_e, there is an excess demand for money. People sell bonds in order to obtain money, bond prices fall, and the interest rate rises until i_e is attained.

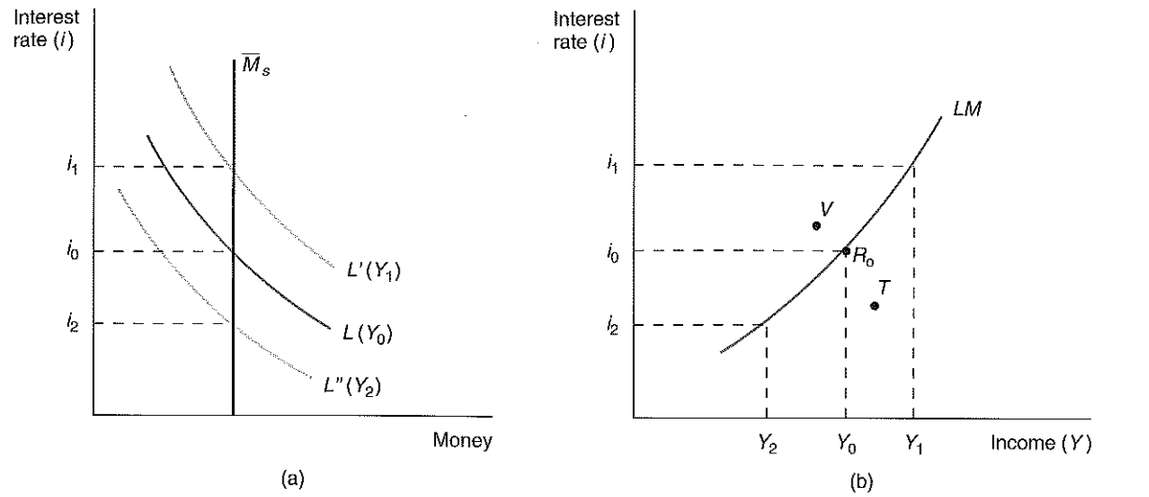
inverse relationship between bond prices and interest rates.) This process continues until the interest rate falls to the level at which the existing money supply is willingly held (at interest rate i_e). In the opposite situation, at low interest rate i_2, there is an excess demand for money of $B'A'$. People sell bonds and other assets to build up their money balances, and this action drives down the price of bonds and other assets and drives up the interest rate until the equilibrium rate is reached.

In light of Figure 2, consider what will happen when there are changes in the demand and supply of money. If the monetary authorities increase the supply of money, then line $\overline{M}_s$ shifts to the right (not shown). The resulting excess supply of money at old equilibrium interest rate i_e causes the interest rate to fall to the level corresponding to the intersection of demand curve L with the new money supply line. Going in the other direction from $\overline{M}_s$, a decrease in the supply of money shifts $\overline{M}_s$ to the left. Excess demand for money at old interest rate i_e causes the interest rate to rise to a new equilibrium level. Considering shifts in the demand curve, an increase (decrease) in the demand for money would shift the L curve to the right (left) and generate an excess demand for (supply of) money, given the money supply $\overline{M}_s$; the interest rate will rise (fall).

To this point, we have focused on the interest rate and equilibrium between the demand for and supply of money. But this is only a partial analysis because it has neglected the other main determinant of the demand for money—the level of income in the economy. We now introduce the role of income in money market equilibrium.

When we obtained the equilibrium interest rate in Figure 2, the interest rate was the only explicit determinant of the demand for money. Suppose that this is not so and that the level of Y in the economy goes up. Remembering expression [1], the level of income is positively associated with the demand for money. Consider Figure 3, panel (a). The L curve is the one we have been using, and we indicate by the parenthetical expression that this L curve is associated with income level Y_0. If income rises to Y_1, then we *generate a*

FIGURE 3 **Income and the Interest Rate: The *LM* Curve**



In panel (a), an increase in income from Y_0 to Y_1 increases the demand for money from L to L' and results in a rise in the interest rate from i_0 to i_1. A decrease in income from Y_0 to Y_2 decreases the demand for money from L to L'' and leads to a fall in the interest rate from i_0 to i_2. This positive relationship between Y and i is portrayed by the LM curve in panel (b), which shows the various combinations of income and the interest rate that yield equilibrium in the money market. To the right of the LM curve, such as at point T, there is an excess demand for money; to the left of the LM curve, such as at point V, there is an excess supply of money. In either case, movement will take place to the LM curve.

new L curve indicated by L' and by the Y_1 in parentheses. More money is demanded at this higher income level, and the equilibrium interest rate rises from i_0 to i_1. Similarly, a fall in income from Y_0 to Y_2 leads to a fall in the demand for money curve to L'', with the lower level of income Y_2 indicated in parentheses. The decrease in the income level has thus led to a lower equilibrium interest rate (i_2).

This discussion of the relationship between the income level, the interest rate, and money market equilibrium leads us to a graphical construct, the LM curve. The ***LM* curve** shows the various combinations of income and the interest rate that produce equilibrium in the money market.[5] Such a curve is illustrated in Figure 3, panel (b). At each point on this curve, for the particular income level on the horizontal axis, the associated interest rate on the vertical axis is the interest rate that makes the demand for money equal to the *fixed* supply of money. Thus, at point R_0, the income level Y_0 and the interest rate i_0 together give equilibrium in the money market when the money supply is $\overline{M}_s$.

Why does the LM curve slope upward? Suppose that the level of income rises from Y_0 to Y_1. As indicated above, the increase in income will generate an increase in the demand for money as L in Figure 3(a) shifts to L'; the interest rate thus rises from i_0 to i_1. Once the interest rate has risen to i_1, the excess demand for money has been eliminated and the money market is again in equilibrium. Similarly, if income falls from Y_0 to Y_2, the decrease in the demand for money to L'' lowers the equilibrium interest rate to i_2. From this discussion, we can see that any point to the right of the LM curve, such as point T, is

[5]Note that all variables (and especially the price level) influencing the demand for money other than the interest rate and income are being held constant along any given LM curve. The relationship of the price level to the LM curve is developed in detail in the chapter "Prices and Output in the Open Economy: Aggregate Supply and Demand."

associated with an excess demand for money. At point *T*, the interest rate is too low for the income level; equilibrium in the money market requires a higher *i*. (Alternatively, the income level is too high for the given interest rate; equilibrium requires a lower income and thus a lower demand for money in order to be at the interest rate associated with *T*.) Similarly, any point to the left of the *LM* curve, such as point *V*, involves an excess supply of money. For the income level associated with *V*, the interest rate needs to be lower in order to have equilibrium in the money market (or the income level needs to be higher for the interest rate associated with *V*).

A final point to make at this juncture is that increases in the demand for money (due to other things besides a rise in income) or decreases in the supply of money will shift the *LM* curve to the *left*. In either situation, the interest rate rises for any given income level, which is analogous to saying that the income level must fall in order to maintain the same interest rate. Thus, each interest rate is plotted against a lower income level than before the increase in the demand for money or the decrease in the supply of money. By reverse reasoning, decreases in the demand for money (due to other things besides a fall in income) and increases in the supply of money will shift the *LM* curve to the *right*.

CONCEPT CHECK

1. What impact will an increase in income have on the demand for money? The *LM* curve? Why?
2. Explain why the *LM* curve slopes upward.
3. If bank reserves increase, what happens to the supply of money ? The *LM* curve? Why?

General Equilibrium in the Real Sector: The *IS* Curve

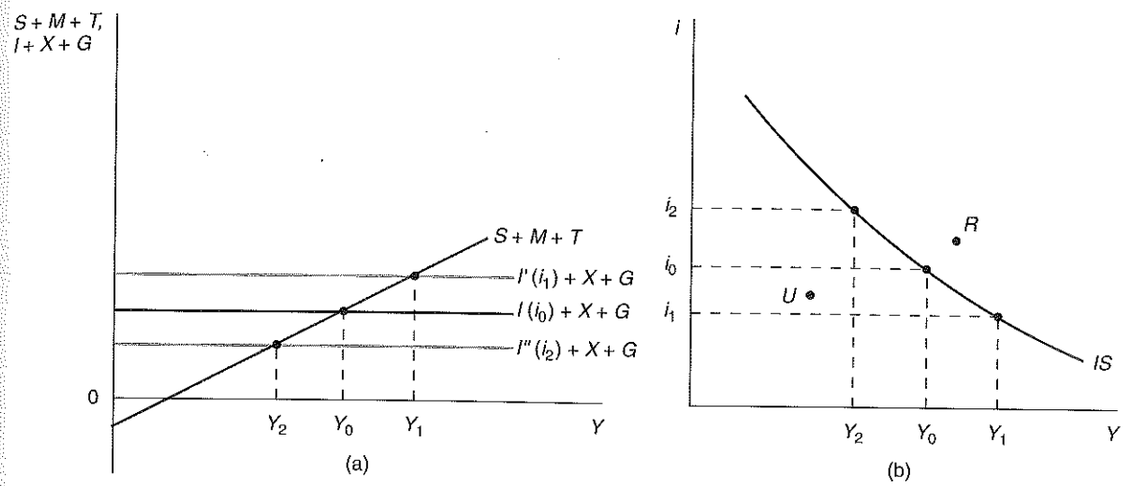
In the preceding chapter we examined the goods and services markets, or the real sector of the economy. We indicated that, in income equilibrium, the "leakages" of saving, imports, and taxes were equal to the "injections" of investment, exports, and government spending on goods and services. However, a key feature was that the monetary sector was neglected in that real-sector analysis, meaning that we were assuming that the *interest rate was constant.* It is now time to relax that assumption! In Figure 4(a), the i_0 in parentheses indicates that the interest rate is held constant at some interest rate i_0 when we consider the $I(i_0) + X + G$ line. With this interest rate, the equilibrium level of income is Y_0. What if we reduce the interest rate from i_0 to i_1? Investors will want to undertake greater amounts of investment because borrowing costs have been lowered, and some investment projects that were previously unprofitable because their return was less than the borrowing costs are now profitable. (Remember that "investment" in the real sector refers to plant and equipment spending by firms, residential construction, and changes in inventories, *not* to the purchase of financial assets.) Empirical studies have indeed shown that residential construction spending is particularly sensitive to the rate of interest, but plant and equipment also responds to the interest rate (albeit to a smaller degree).[6]

Because of the responsiveness of investment to the interest rate, the lower interest rate i_1 is associated with an investment line (and therefore $I + X + G$ line) that is higher. The line $I(i_0) + X + G$ shifts upward to $I'(i_1) + X + G$, and the result is an intersection with the $S + M + T$ line at a *higher* equilibrium level of income Y_1. Similarly, a rise in the interest rate from i_0 to i_2 causes the $I(i_0) + X + G$ line to shift vertically downward to $I''(i_2) + X + G$. Thus i_2 is associated with a lower level of income Y_2.

This relationship between the interest rate (reflecting the importance of monetary variables), investment, and the resulting equilibrium level of income gives us the

[6]It is also possible that exports may increase with a lower interest rate if financing is thus easier.

FIGURE 4 **Income and the Interest Rate: The *IS* Curve**



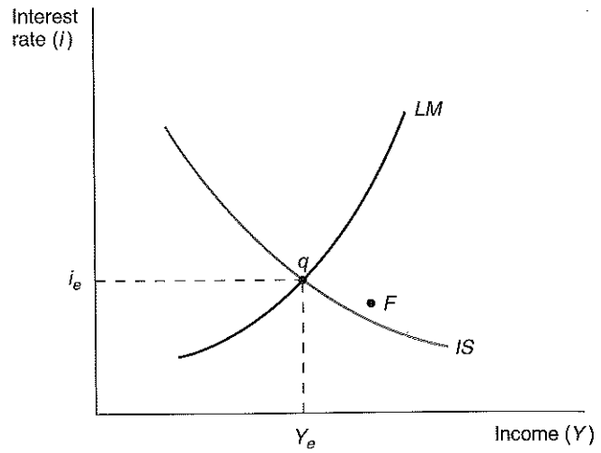
In panel (a), with interest rate i_0, equilibrium income is at level Y_0 since leakages equal injections at that income level. However, a lower interest rate i_1 will increase investment spending and shift $I(i_0) + X + G$ to $I'(i_1) + X + G$; income will rise from Y_0 to Y_1. Similarly, a higher interest rate i_2 will cause $I(i_0) + X + G$ to shift downward to $I''(i_2) + X + G$, resulting in a lower income level Y_2. The inverse relationship between the interest rate and income is plotted on the *IS* curve in panel (b), which shows the various combinations of i and Y that produce equilibrium in the real sector. To the right of the *IS* curve, such as at point *R*, $S + M + T > I + X + G$ and there is downward pressure on the income level. To the left of the *IS* curve, such as at point *U*, $I + X + G > S + M + T$ and there is upward pressure on the income level. Points off the *IS* curve thus generate movement to the *IS* curve.

information needed to generate the *IS* curve. The ***IS* curve** shows the various combinations of income and the interest rate that produce equilibrium in the real sector of the economy. In our model, this is equivalent to saying that the *IS* curve shows the combinations of income and the interest rate that make investment plus exports plus government spending equal to saving plus imports plus taxes. Thus, in Figure 4, panel (b), interest rate i_0 is plotted against income level Y_0, since this is one combination of the interest rate and income that generates equality between $(S + M + T)$ and $(I + X + G)$. The lower interest rate i_1 is plotted against the higher income level Y_1; in the opposite direction, the higher interest rate i_2 is associated with the lower income level Y_2.

If the economy is situated to the right of the *IS* curve, such as at point *R* in panel (b), then disequilibrium exists because saving plus imports plus taxes exceeds investment plus exports plus government spending. The income level is "too high" for the associated interest rate, and the high income level gives "too much" saving, taxes, and imports. (Alternatively, for the income level at *R*, the interest rate is "too high" and is thus choking off investment.) Income falls until the *IS* curve is reached through cutbacks of production because of unintended inventory accumulation at the higher levels of income. To the left of the *IS* curve, investment plus exports plus government spending exceeds saving plus imports plus taxes, and there is expansionary pressure due to unintended inventory depletion. For the given interest rate at point *U*, income is too low to generate enough saving, taxes, and imports to match investment, exports, and government spending. [Alternatively, for a given income level, the "too low" interest rate makes desired $(I + X + G)$ exceed desired $(S + M + T)$.]

What causes shifts in the *IS* curve? Clearly any change in autonomous investment, exports, government spending, saving, taxes, or imports will do so. An increase in

FIGURE 5 **Simultaneous Equilibrium in the Real and Monetary Sectors**



Only at point q is there equilibrium in both the real and monetary sectors of the economy. If the economy is situated away from q at point F, saving plus imports plus taxes exceeds investment plus exports plus government spending; in addition, there is an excess demand for money. Movement occurs (by any of a number of different paths) to point q. Any other point away from point q also sets forces in motion to move the economy to point q.

autonomous investment (due to something other than a fall in the interest rate), autonomous exports, and government spending or an autonomous *decrease* in saving, taxes, and imports will shift the *IS* curve to the right. On the other hand, an autonomous decrease in *I, X* or *G* or an autonomous increase in *S, M,* and *T* will shift the *IS* curve to the left.

Simultaneous Equilibrium in the Monetary and Real Sectors

The simultaneous determination of income and the interest rate when both sectors of the economy are considered involves plotting the *IS* curve and the *LM* curve on the same diagram, as in Figure 5. Equilibrium occurs where the two curves intersect at point q, giving the income level Y_e and the interest rate i_e. This is the only combination of income and the interest rate that simultaneously gives equilibrium in both sectors of the economy.

If the economy has not settled at Y_e and i_e, forces are set in motion to move to this equilibrium position. For example, suppose that the economy is at point *F.* Since we are to the right of the *IS* curve, then $(S + M + T)$ is greater than $(I + X + G)$, so there is contractionary pressure on the level of income. But, since we are also to the right of the *LM* curve, the demand for money exceeds the supply of money and therefore the interest rate rises. These forces eventually move the economy to point q. However, various *paths* of adjustment might actually be taken, depending on the speed of adjustment in each sector. For example, from point *F,* the economy might first move vertically to a position on the *LM* curve; the monetary sector would then be in equilibrium but the real sector would not. We could then move horizontally to the *IS* curve where real sector equilibrium is attained, but then the economy would be to the left of the *LM* curve and would have an excess supply of money. This would drive interest rates downward and move us vertically to the *LM* curve. However, we would now be below the *IS* curve. The process of adjustment would continue.

Equilibrium in the Balance of Payments: The *BP* Curve

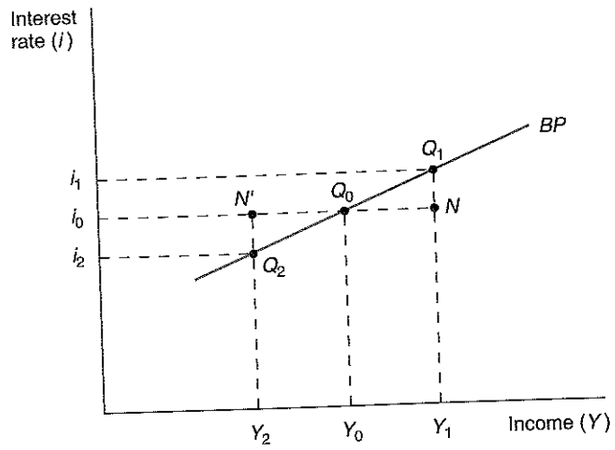
We need to introduce a further construct to describe the balance of payments in an open economy. This analytical device, the ***BP* curve,** shows the various combinations of income and the interest rate that produce equilibrium in the balance of payments. In this context, we are including both the current account and international financial capital flows in the balance of payments. In terms of the balance-of-payments accounting categories, not only category I (the current account) but also category II (long-term capital flows) and category III (short-term private capital flows) are considered (see the chapter "The Balance of Payments Accounts"). We are *not* dealing with category IV (official reserve short-term capital flows). The focus is on all items in the balance of payments besides government official reserve asset and liability changes. Balance-of-payments equilibrium in this sense means a zero balance in the official reserve transactions balance.

For the purpose of obtaining the *BP* curve, we consider how the income level and the interest rate affect a country's balance of payments. It is important to note that a given *BP* curve is constructed under the assumption of a *fixed* exchange rate. In addition, a number of other variables such as the foreign interest rate, foreign price level, expected exchange rate, and foreign wealth are assumed to be constant. Income in this analysis is presumed primarily to influence the current account through the impact of income on imports. Other things being equal, a rise in income induces more imports (by the marginal propensity to import times the change in income). With exports independent of income, this rise in imports means that the current account tends to deteriorate (move toward deficit) by the amount of the rise in imports. These changes would be reversed for a decline in income. On the other hand, the interest rate is assumed to have its primary influence on the capital account, and particularly on category III (short-term private capital flows). If the interest rate rises, liquid short-term financial capital from overseas comes into the home country in order to earn the higher interest rate, and some domestic short-term capital will "stay home" rather than be sent overseas. The inflow of foreign short-term capital and the reduced outflow of home capital move the capital account toward a surplus. If the interest rate declines, these responses are in the opposite direction.

With this background, examine the *BP* curve in Figure 6. Since the curve shows the various combinations of income and the interest rate that produce balance-of-payments (BOP) equilibrium, point Q_0 is one such point. The income level associated with this point is Y_0 and the interest rate is i_0. Why does the *BP* curve slope upward? Consider a starting point of Q_0 and introduce a rise in income. This rise in income (with no change in the interest rate) will move us horizontally to the right of Q_0, say, to point *N.* The balance of payments will move into deficit because the higher income level will have generated more imports. If the interest rate is then increased from i_0 to i_1, this will eliminate the BOP deficit. Why? Because the rise in the interest rate will generate net short-term capital inflows that will have a positive impact on the BOP and will completely offset the negative impact in the current account when we reach point Q_1. The current account deterioration is offset by the (private) capital account improvement, since Q_1 has a zero BOP deficit or surplus by definition. Thus point Q_1 illustrates that income level Y_1 and interest rate i_1 also combine to produce BOP equilibrium.

It is clear that point Q_2 with an income level (Y_2) lower than Y_0 and an interest rate (i_2) lower than i_0 shows another combination of Y and i that yields BOP equilibrium. If income falls from Y_0 to Y_2, this means reduced imports, a movement to point N', an improvement in the current account, and a BOP surplus. However, a reduction in the interest rate from i_0 to i_2 will cause the short-term private capital account to deteriorate by enough to offset the improvement in the current account. The capital account deteriorates because short-term funds seeking a higher rate of interest now leave the country and fewer foreign funds come into the country. With this reduction in the interest rate, movement takes place from point N' to point Q_2, another point on the *BP* schedule.

FIGURE 6 **Income and the Interest Rate: The *BP* Curve**



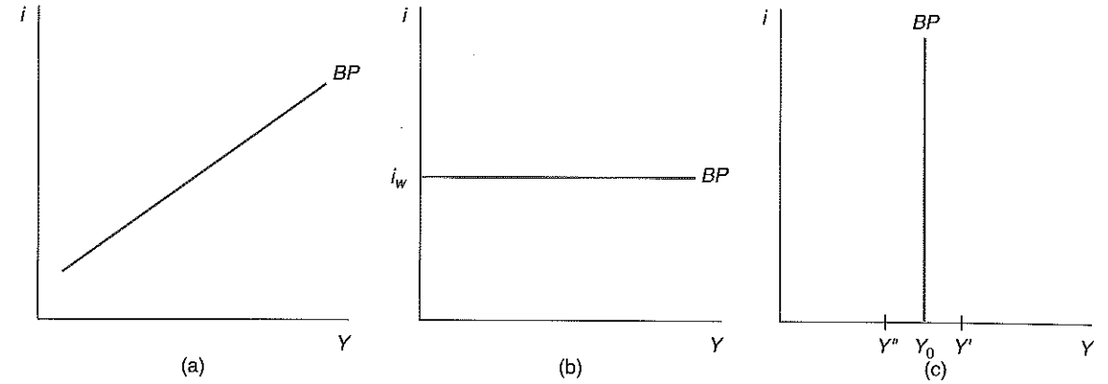
The *BP* curve shows the various combinations of income and the interest rate that yield equilibrium in the balance of payments. The curve slopes upward because a higher income level induces more imports and worsens the current account; a rise in the interest rate is then necessary in order to increase short-term capital inflows (and to reduce short-term capital outflows), which in turn improve the capital account and offset the worsening of the current account. A movement from point Q_0 to point N worsens the current account and must be offset by a rise in the interest rate from i_0 to i_1 in order to improve the capital account sufficiently to move the economy back to BOP equilibrium. Points to the right of the *BP* curve are associated with a BOP deficit; points to the left of the curve are associated with a BOP surplus.

If the economy is located to the right of the *BP* curve, then there is a BOP *deficit* because, for any given interest rate, the income level is leading to an "excessive" amount of imports, and the interest rate is "too low" to attract a capital inflow sufficient to match the current account's movement toward deficit. The result is that the balance of payments as a whole (official reserve transactions balance) is in deficit. For the reverse reasons, if the economy is located to the left of the *BP* curve, there is a BOP *surplus*. Later in the chapter we discuss the process by which an economy that is not located on its *BP* curve adjusts in order to attain balance-of-payments equilibrium (i.e., the process by which the economy reaches equilibrium on the *BP* curve).

An additional point about the *BP* schedule is that the precise value of the upward slope of the *BP* curve importantly depends on the degree of responsiveness of the short-term private capital account to changes in the interest rate. To demonstrate this point, consider the horizontal movement from point Q_0 to point N in Figure 6. This movement generated a movement toward current account deficit, and a return to BOP equilibrium required a rise in the interest rate. Other things being equal, if short-term capital flows are very responsive to changes in i, then a small rise from i_0 to i_1 will generate the requisite capital inflow. However, if capital flows are *not* very responsive to changes in the interest rate, a much larger rise in i_0 will be needed to return the economy to BOP equilibrium. The conclusion is that the less (more) responsive short-term capital flows are to the interest rate, the *steeper* (flatter) the *BP* curve will be.[7]

[7]The slope of the *BP* curve also depends on the extent to which changes in the interest rate affect real investment (plant and equipment, residential construction, changes in inventories) and, in turn, by the extent to which such real investment responses affect income and imports. However, the international short-term capital flow responses are the most crucial in practice.

FIGURE 7 **The *BP* Curve under Different Capital Mobility Assumptions**



In panel (a), the upward-sloping *BP* curve indicates that capital is imperfectly mobile. In this case, capital moves between countries in response to changes in relative interest rates, but not so easily that domestic interest rates become identical to world interest rates. In panel (b), the horizontal *BP* curve reflects perfect capital mobility, and the domestic interest rate is always equal to the world interest rate. Any slight changes in the domestic interest rate will lead to sufficiently large movements of short-term capital so that the domestic rate will become equal again to the world rate. In panel (c), the *BP* curve is vertical, indicating that the barriers to capital movements are such that there is no short-term capital response to changes in the domestic interest rate; that is, there is perfect capital immobility. In this case, there is only one level of income (and imports) consistent with the level of exports and the controlled net capital inflows.

Although up to now it has been assumed that equilibrium in the foreign sector is described by an upward-sloping *BP* curve, this is not always the case. The upward-sloping relationship between i and Y in the open economy results whenever there are some impediments to the flow of short-term capital between countries (or the country is financially a "large country," able to influence the international level of interest rates; that is, the country is not a price taker with respect to the interest rate). Thus, the case where the *BP* curve slopes upward is referred to as the case of **imperfect capital mobility.** It is assumed that short-term capital is not completely restricted from moving between countries in response to changes in the interest rate but that the movement of short-term capital is not so complete as to remove all differences between the domestic interest rate and the international interest rate [see Figure 7, panel (a)]. This result also occurs in the context of a portfolio balance model, even with uncovered interest parity. As you will recall, the imperfect substitutability between foreign and domestic assets means that there is a risk premium associated with holding assets other than those of an investor's own country. Thus, in this case, the domestic interest rate will be above the foreign interest rate because the net capital inflow means that foreign investors' risk premium has increased since they are now holding relatively more domestic assets.

The upward-sloping *BP* curve can be contrasted with the case of **perfect capital mobility**, where the *BP* curve is fixed horizontally at the level of the world interest rate, i_w [panel (b) of Figure 7]. In this case, any slight deviation of the domestic interest rate away from the international rate leads to a movement of short-term capital sufficient to return the domestic rate to the level of the international rate. For example, suppose that an increase in the domestic money supply leads to a reduction in the domestic interest rate. This action causes financial investors to immediately move their short-term capital out of the country as they adjust their portfolios to include more foreign assets. This outward capital flight and resultant BOP deficit will reduce the holdings of international reserves (as such reserves are used to purchase domestic currency to maintain the fixed exchange rate) and hence the money supply, and it will continue until the domestic interest rate is

once again at the international level. An increase in the domestic interest rate above the international level would trigger an inflow of short-term capital and a BOP surplus, which would increase the international reserves of the country and the money supply. This would take place until the domestic rate was once again at the level of the international rate. In this situation, there is perfect substitutability between foreign and domestic financial assets, and any interest rate differences are instantaneously removed by international capital flows.

Since the interest rate does not change with perfect capital mobility, what effect do changes in other economic variables have on the foreign sector? Remember that the BOP is influenced by variables such as the exchange rate, relative prices of traded goods, expected prices, and the expected profit rate in both countries as well as the level of Y and i. Suppose that there is an increase in the expected domestic profit rate that stimulates an inflow of long-term real investment (improvement in the capital account), which in turn stimulates income. To maintain the pegged exchange rate e, the central bank will purchase a sufficient quantity of foreign exchange with domestic currency, thereby increasing the domestic money supply and facilitating the expansion of income. The increase in domestic income will stimulate an increase in imports, causing a deterioration in the current account that exactly offsets the improvement in the capital account.

Changes in exogenous economic factors thus ultimately stimulate changes in the domestic money supply until the economy is once again in equilibrium. As this adjustment takes place, it can lead to a different composition in the balance of payments. More specifically, holding everything but domestic income constant, movements from left to right along the BP curve reflect a transition in the composition of the balance of payments from one of surplus in the current account (on the left) to one of deficit in the current account (on the right). In similar fashion, the capital account is changing from that of deficit (on the left) to a position of surplus (on the right) over the same income range. It must be emphasized that when there is perfect mobility in the capital markets in the open economy, the horizontal BP curve remains fixed at the level of the international interest rate. Changes in exogenous factors simply bring about movement in the domestic equilibrium along the BP curve concomitant with appropriate changes in the composition of the balance of payments. The country wishing to attain *current account* balance is thus forced to accept the level of income that is consistent with that particular composition in the balance of payments.

It is not uncommon to find countries with a pegged exchange rate strictly controlling the foreign sector both in the commodity markets and in the capital markets. This is often the result of having an overvalued exchange rate, which the governments ultimately maintain by strict foreign exchange control. (To get an idea of the prevalence of various exchange restrictions, see Case Study 1.) In this case, the BP relationship is characterized by **perfect capital immobility** [Figure 7(c)]. When short-term capital flows are strictly controlled and not permitted to respond to changes in the interest rate, the BP curve is *vertical* at the level of income that is consistent with the controlled use of foreign exchange (and the corresponding composition in the balance of payments) pursued by government policymakers. Given the control on the capital accounts, only one level of income (and hence imports) is consistent with the given exchange rate. Should income rise, for example, from Y_0 to Y', the level of induced imports would be too high and there would be a BOP deficit, putting upward pressure on the exchange rate (pressure toward depreciation of the domestic currency). To maintain the value of the domestic currency, the government would have to purchase it in the exchange market with foreign exchange reserves. In so doing, the domestic money supply would decline, raising domestic interest rates and reducing domestic investment and income until the domestic economy was once again back in equilibrium on the BP curve. Similarly, a fall in income from Y_0 to Y'' would lead to downward pressure on the exchange rate and hence to an expansion of the money supply, until the economy was once again in equilibrium on the BP curve. The requisite changes in the money supply will thus automatically keep the economy on the BP curve.

In sum, the slope of the BP curve reflects the nature of capital mobility in the country under analysis. The more capital flows are restricted and short-term capital movements are not permitted to respond to changes in the domestic interest rate, the steeper the slope of the BP curve. Similarly, the less restricted are movements of capital and the more the country in question is financially a small country, the flatter the BP curve will be.

Finally, remember that the BP curve is drawn for a *specific exchange rate.* If the home country is the United States, for example, and if the exchange rate between the dollar and other currencies changes, then a different BP curve emerges. The simple rule is this: A depreciation of the home currency against foreign currencies shifts the BP curve to the right, and an appreciation of the home currency against foreign currencies shifts the BP curve to the left. To grasp this rule, consider an existing BP curve such as that shown in

CASE STUDY 1 THE PRESENCE OF EXCHANGE CONTROLS IN THE CURRENT FINANCIAL SYSTEM

Although few countries exercise complete exchange control, a surprising number of restrictions are in place around the world on access to foreign exchange and the uses to which it can be applied. Table 1 summarizes the degree to which various foreign exchange controls are in place within the membership of the International Monetary Fund. A cursory examination seems to suggest that capital is indeed somewhat, if not perfectly, immobile for many countries of the world. Relatively mobile capital conditions probably exist only for the major trading countries of the world whose financial markets have become increasingly integrated in recent years. Even in those cases, however, many different circumstances cause capital not to be perfectly mobile.

TABLE 1 **Foreign Exchange Restrictions in 179 IMF Member Countries, 1996***

Type of Restriction	*Number of Countries*	*Percent of Countries*
A. Multiple exchange rates		
1. For some or all capital transactions and/or some or all invisibles	28	15.6%
2. More than one rate for imports	22	12.3
3. More than one rate for exports	22	12.3
4. Import rates different from export rates	21	11.7
B. Payments restrictions		
1. For current transactions	59	33.0
2. For capital transactions	126	70.4
C. Cost-related import restrictions		
1. Import surcharges	43	24.0
2. Advance import deposits	10	5.6
D. Surrender or repatriation requirements for export proceeds	123	68.7
E. Country use intensity of the nine above-listed restrictions		
0–1 restrictions†	56	31.3
2–3 restrictions	85	47.5
4–5 restrictions	18	10.1
6–7 restrictions	14	7.8
8–9 restrictions	6	3.4

*Restrictions in place as of December 31, 1995.

†Thirty-eight countries, including the United States, Canada, and Germany, employ none of the above restrictions.

Source: International Monetary Fund, *Exchange Arrangements and Exchange Restrictions: Annual Report 1996* (Washington, DC: IMF, 1996), pp. 546–51.

Figure 6 earlier. If the home currency depreciates, then the home country's current account balance will improve, assuming that the Marshall-Lerner condition is met. For any given interest rate on the "old" *BP* curve, there is now a surplus in the balance of payments. Hence, a larger level of Y is needed for each i in order to have BOP equilibrium, since the larger Y will induce more imports and eliminate the BOP surplus. Each interest rate must now be plotted against a higher level of income in order to show the combinations of the interest rate and the income level that produce BOP equilibrium. This means that the "new" *BP* curve (not shown) will be to the right of the "old" *BP* curve.[8]

In addition, changes in a number of other variables will also shift the *BP* curve. Because changes in these factors can influence equilibrium in the open economy, it is useful to mention several of them before proceeding further with the general equilibrium analysis. For example, an autonomous increase in exports will cause the *BP* curve to shift to the right or downward since a lower rate of interest will now be sufficient to maintain BOP equilibrium with the stronger balance on current account. This would also be the case with an autonomous decrease in home country imports. Such a downward shift could also result from changes in monetary variables such as a fall in the foreign interest rate. Also, changes in expectations can influence equilibrium in the foreign sector and hence the *BP* curve. Further discussion of these and other factors and their impact on the *BP* curve is presented in the next chapter.

uilibrium in the pen Economy: The multaneous Use of e *LM, IS,* and P Curves

As a final step for preparing for the discussion of economic policy in the open economy, we bring together the *LM, IS,* and *BP* curves in Figure 8. There is simultaneous equilibrium in the money market, the real sector, and the balance of payments at point *E*, where all three schedules intersect. The income level associated with this three-way equilibrium is Y_E and the interest rate is i_E. However, this equilibrium position may not be optimal in terms of a country's economic objectives. In such cases, there is a role for macroeconomic policy in order to attain the objectives.

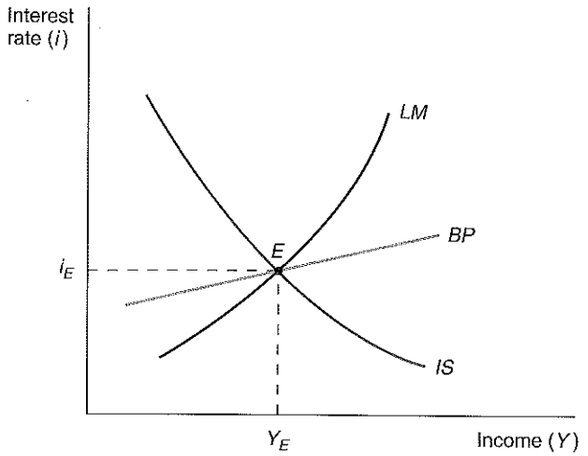
Having established general equilibrium in the *IS/LM/BP* framework, we now turn to a discussion of the nature of this equilibrium and the adjustment processes that move the system to that point.[9] To begin our analysis, we first examine the automatic BOP adjustment mechanism under a fixed-rate system. To do this, we begin with the economy in equilibrium at point E (Y^*, i^*) in Figure 9 and examine what happens when a shock to the system takes place. For example, suppose that there is an increase in foreign income, which increases the level of exports in the home economy. This exogenous change in exports shifts the *BP* curve to the right to BP' since any given level of the interest rate can now be associated with a higher income level and still have BOP equilibrium. A surplus in the balance of payments will now begin to occur as long as the domestic economy remains at the initial equilibrium at point *E*. However, the domestic equilibrium will no longer remain at Y^* and i^* since the expansion of exports also causes the *IS* curve to shift outward to IS', raising the level of income and the interest rate to E' (Y', i').

Given the surplus that will occur in the balance of payments at E', the economy will not remain at this point. Since the country is operating under a fixed-rate system, it has committed itself to keep constant the value of its currency. Under such a system, the central bank must stand ready to purchase the surplus foreign currency in the exchange market to prevent the appreciation of the domestic currency. Because the foreign exchange is purchased by the central bank with domestic currency, there is expansion of the domestic

[8] In the case of perfect capital mobility, changes in the exchange rate simply lead to movements along the *BP* curve, since the height of the horizontal *BP* curve is determined by the international rate of interest.

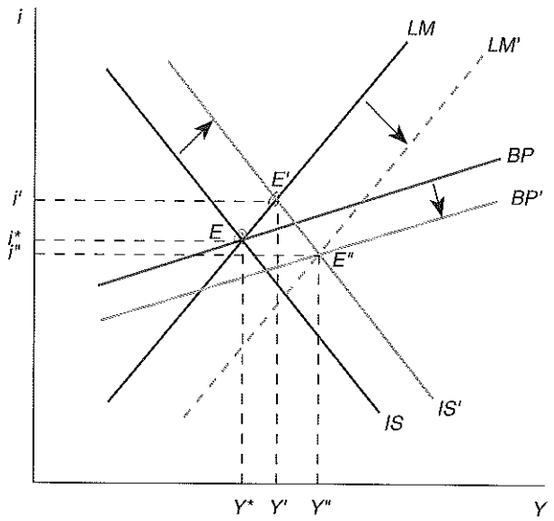
[9] Remember that the basic *IS/LM/BP* framework assumes that the price level remains fixed. This assumption will be dropped in the chapter "Prices and Output in the Open Economy: Aggregate Supply and Demand."

FIGURE 8 **Simultaneous Equilibrium in the Real and Monetary Sectors and in the Balance of Payments**



Only at point *E* is there equilibrium between saving plus imports plus taxes and investment plus exports plus government spending, between the demand and supply of money, and in the balance of payments. With the schedules as drawn, Y_E and i_E are thus the economywide equilibrium levels of income and the interest rate. Any other combination of Y and i is associated with disequilibrium in at least one part of the economy.

FIGURE 9 **Automatic Adjustment under Fixed Rates**



Starting with the economy in equilibrium at i^* and Y^*, an increase in foreign income leads to an autonomous increase in exports, causing the *IS* curve to shift to the right and the *BP* curve to shift to the right. A balance-of-payments surplus now occurs due to both the increase in exports (which improves the current account) and the higher domestic interest rate i' (which improves the capital account). Assuming that the government does not intervene to sterilize the effects on the money supply, the BOP surplus leads to an expansion in the money supply, causing the *LM* curve to shift to the right. The BOP surplus and the expansion of the money supply continue (the *LM* curve continues to shift to the right) until a new equilibrium is reached at Y'' and i''.

money supply. In our *IS/LM/BP* analysis, this has the effect of shifting the *LM* curve to the right. This **automatic monetary adjustment** will continue until there is no longer a surplus in the balance of payments. This will occur when the *IS, LM,* and *BP* curves again intersect at a common point E'' (Y'', i'') consistent with the new higher level of exports.

Under a fixed exchange rate, the automatic adjustment mechanism is the change in the domestic supply of money brought about by an underlying surplus or deficit in the balance of payments at the pegged exchange rate. (Any shock producing a deficit in the balance of payments leads to a reduction in the money supply as the domestic economy seeks out the new equilibrium.) Since the exchange rate cannot be changed under a pegged rate system, equilibrium combinations of i and Y (where *IS* and *LM* intersect) must necessarily lie on the *BP* curve dictated by underlying international economic considerations. As long as the exchange rate remains fixed, domestic policymakers may be faced with choosing between hitting a target interest rate (for example, to reach a particular growth target) and a target level of income (and hence employment). It should be emphasized, however, that the economy will automatically adjust to the new equilibrium levels as long as the central bank does nothing to interfere with the adjustment process by **sterilization,** or the offsetting of the effects of maintaining the fixed value of the currency in the foreign exchange market. Sterilization would be accomplished in Figure 9 by the central bank selling government securities in the open market (leading to a relative change in the composition of its portfolio away from domestic assets and toward foreign assets), causing a shift from *LM′* back to *LM*. Such sterilization, however, will perpetuate the balance-of-payments disequilibrium. Further, given the huge volume of capital flows across country borders in today's world, the question arises as to whether foreign central banks have enough international reserves to permit the continual acquisition of them by the domestic central bank for any length of time and in sufficient size to offset the intense exchange rate pressure.

Finally, it should be noted that nothing yet has been said about changes in prices. The above automatic adjustment process relies solely on monetary and income effects. The incorporation of price effects that might accompany this kind of adjustment are discussed in the chapter "Prices and Output in the Open Economy: Aggregate Supply and Demand."

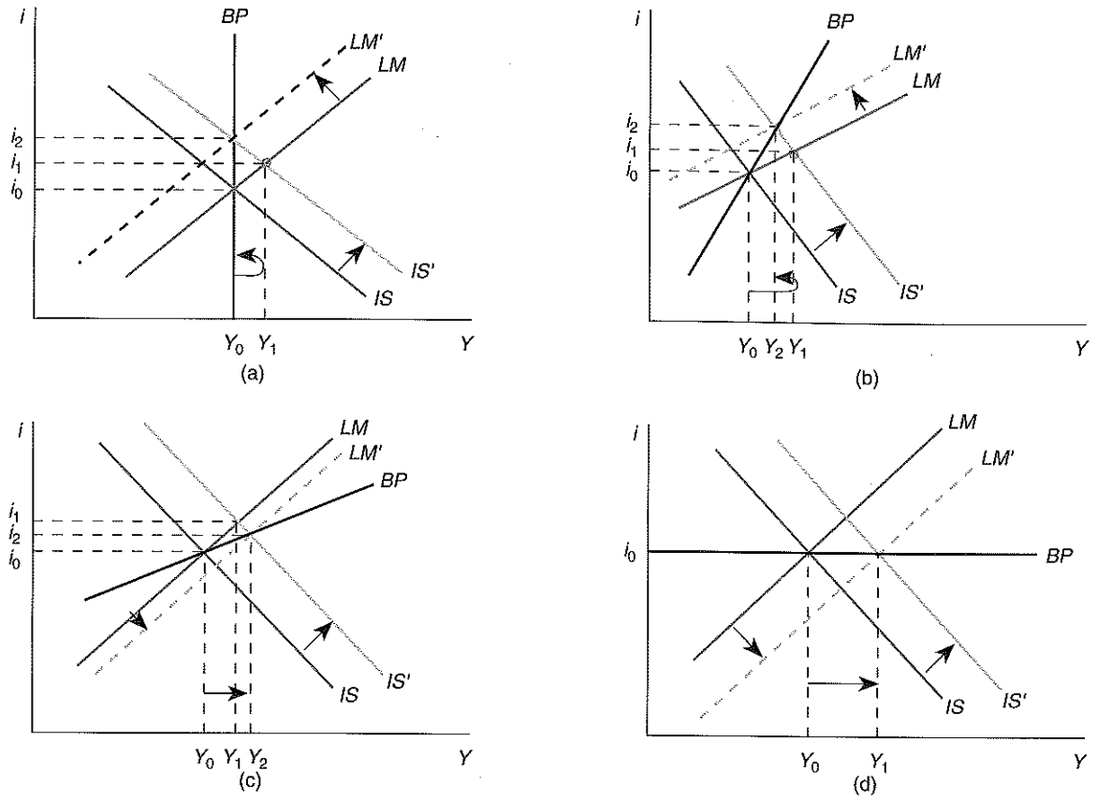
CONCEPT CHECK

1. Ignoring the *LM* curve, suppose that the economy is located at a point to the left (right) of the *IS* curve. Why is there pressure for the economy to expand (contract)?
2. In Figure 5, suppose that the economy is located to the left of the *IS* curve and also to the left of the *LM* curve. Is $(S + M + T)$ greater or less than $(I + X + G)$? Is there an excess demand or excess supply of money? What will happen to income and why?
3. Explain the rationale for an upward-sloping *BP* curve.
4. Explain how the degree of capital mobility affects the degree of slope of the *BP* curve.

THE EFFECTS OF FISCAL POLICY UNDER FIXED RATES

The impact of expansionary fiscal policy under various international capital mobility assumptions is presented in Figure 10. First, consider the impact of fiscal policy under conditions of perfect capital immobility, as shown in panel (a). Beginning at Y_0 and i_0 an increase in government spending or a decrease in taxes shifts the *IS* curve to the right, putting upward pressure on domestic income and interest rates. As the economy begins to

FIGURE 10 **Fiscal Policy with Fixed Rates under Different Capital Mobility Assumptions**



With perfect capital immobility [panel (a)], an increase in government spending (or a decrease in autonomous taxes) shifts the *IS* curve right, leading to increased income and imports. Since there is no short-term capital movement, a BOP deficit occurs. This leads to a fall in the domestic money supply, shifting the *LM* curve left and increasing i until there is once again equilibrium at Y_0. The increase in G has led to an equivalent crowding out of domestic investment. A similar result takes place in panel (b), with relative capital immobility, although the presence of some responsiveness of short-term capital to changes in the interest rate means that the crowding out of investment is not complete and there is a slight expansion of income. With relative capital mobility [panel (c)], the expansionary fiscal policy and the accompanying increase in domestic interest rates lead to a BOP surplus and an expansion of the money supply, causing income to increase even more to Y_2 since the crowding out of domestic investment is considerably reduced. Finally, with perfectly mobile capital there is no change in the interest rate with the expansionary policy, since there is a sufficient inflow of short-term capital (and increase in the domestic money supply) to finance the increase in net G without reducing domestic investment.

expand, there is an increase in desired imports and an increase in demand for foreign exchange. To maintain the exchange rate, the central bank sells foreign exchange for home currency, thus reducing the money supply. This leads to a leftward shift in the *LM* curve, which continues until the domestic interest rate has risen sufficiently to bring about a decrease in domestic investment, exactly offsetting the increase in government spending. The only impact of increased government spending under conditions of perfectly immobile capital is a **crowding out** of an equivalent amount of domestic investment; that is, the increased G has raised i and has decreased I by the same amount that G increased. Income and employment remain at their initial equilibrium levels. Fiscal policy is thus ineffective in stimulating income and employment in the case of perfectly immobile capital.

Figure 10, panel (b) reflects a situation with some degree of capital mobility, but where international capital flows are fairly unresponsive to changes in the interest rate so that the *BP* curve is steeper than the *LM* curve. We designate this situation as one of **relative capital immobility**. Starting from Y_0 and i_0, an increase in net government spending leads to a new domestic equilibrium at Y_1 and i_1. However, since this new equilibrium is below the *BP* curve, there is a deficit in the balance of payments. With the exchange rate fixed, the government must provide the necessary foreign exchange to meet the deficit and to maintain the value of the domestic currency. When this happens, the money supply declines and the *LM* curve shifts to the left until levels of income and the interest rate are reached that are consistent with BOP equilibrium. This new equilibrium is represented by Y_2 and i_2. We see that fiscal policy is somewhat effective in expanding income and employment in this case, although some of the expansionary effect has been offset by crowding out of domestic investment because of the new, higher equilibrium interest rate. Clearly, the less mobile capital is (and hence the steeper the *BP* curve), the less effective fiscal policy is in altering the level of income.

Figure 10, panel (c) demonstrates a case in which capital shows some degree of immobility because the *BP* curve is upward-sloping, but where the balance of payments is more responsive to changes in the interest rate than is the domestic money market (the *LM* curve). This is a situation of **relative capital mobility**. From Y_0 and i_0, an expansionary fiscal policy causes the domestic economy to seek a new equilibrium at Y_1 and i_1, which produces a surplus in the balance of payments. This comes about because the increase in the inflow of short-term capital more than offsets the increase in imports at the higher levels of Y and i. With a BOP surplus, the central bank is forced to purchase the surplus foreign exchange to maintain the exchange rate, which causes the money supply to expand and the *LM* curve to shift to the right. The expanding money supply causes a further expansion of the economy to Y_2 and i_2.[10] In this case, fiscal policy is complemented by the monetary effects associated with the automatic adjustments under a fixed exchange rate system.

We now turn to the final case, that of perfectly mobile capital, which is illustrated in Figure 10, panel (d). This case is similar to the previous case except for the fact that there is no crowding out of domestic investment because the interest rate remains fixed at the international level. This results from the fact that short-term capital movements instantaneously respond in large-scale fashion to the slightest movement of the interest rate on either side of the international rate since domestic and foreign financial assets are perfect substitutes. With an increase in net government spending, there is immediate upward pressure on the domestic interest rate, which stimulates an inflow of short-term capital and a surplus in the balance of payments. To keep the domestic currency at the pegged rate, the central bank purchases the surplus foreign currency in exchange for domestic currency. This expands the money supply, and this expansion continues until the interest rate effects due to the increase in government spending have been exactly offset by the inflow of short-term capital and the concomitant increase in the domestic money supply. This adjustment is shown by the rightward shift in the *LM* curve until it intersects the new *IS'* at a point on the horizontal *BP* curve. Expansionary fiscal policy is thus totally effective in the case of perfectly mobile capital, in that the economy suffers no offsetting crowding-out effects through increases in the interest rate. With perfectly mobile capital, the full expansion of income is facilitated by the inflow of short-term capital.

[10]Portfolio balance considerations would suggest that this may not be the final equilibrium. If the capital inflow was part of a portfolio stock adjustment shift, the capital flows would fall off after completion of the stock adjustment. This would shift the *BP* curve to the left, setting off further changes. See Willett and Forte (1969, pp. 242–62).

The above analysis of fiscal policy under fixed rates leads to the conclusion that, to varying degrees, fiscal policy is effective in influencing income under fixed exchange rates except when capital is perfectly immobile. The greater the mobility of capital, the greater the effectiveness of fiscal policy. Although the above discussion focused only on expansionary policy, the arguments are symmetric in nature; thus, a reduction in government spending or an increase in taxes will move the *IS* curve to the left and will generate the opposite effects in terms of ultimate changes of the money supply in response to capital flows resulting from the pressures on the interest rate.

THE EFFECTS OF MONETARY POLICY UNDER FIXED EXCHANGE RATES

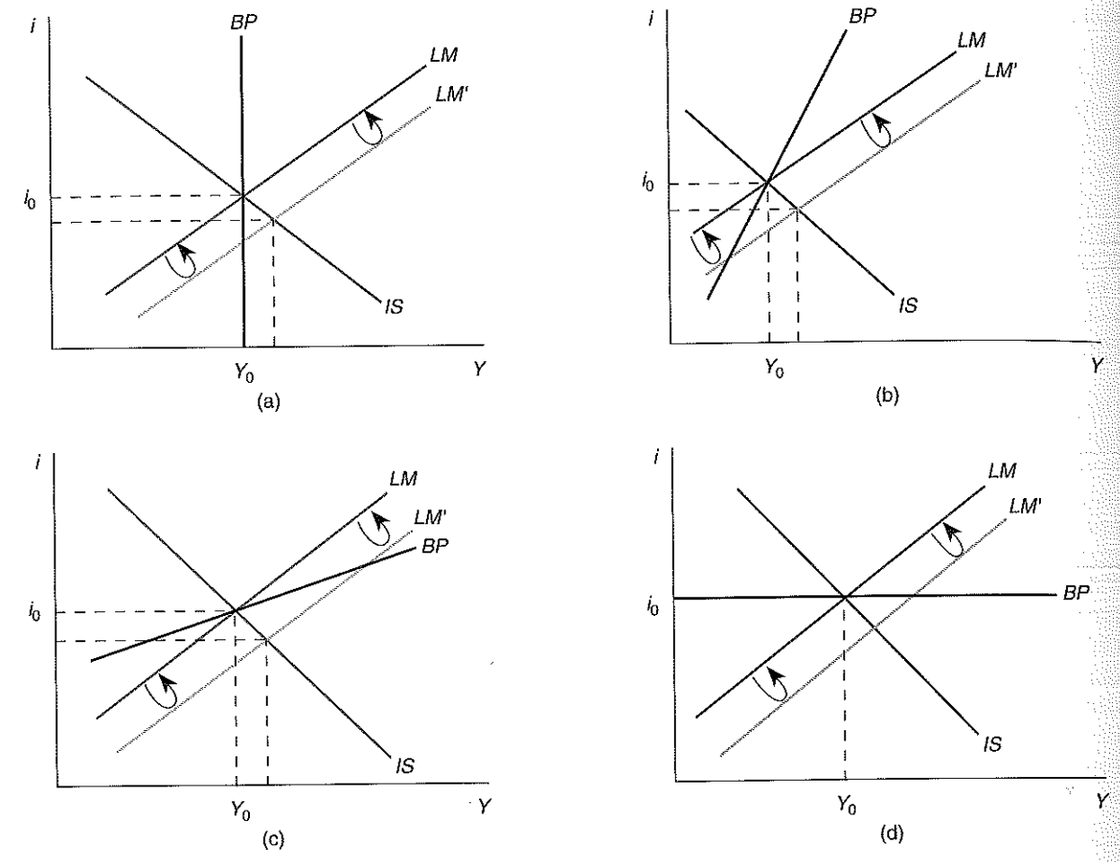
The effects of expansionary monetary policy under the different assumptions of capital mobility are demonstrated in Figure 11. Beginning with the system in equilibrium at Y_0 and i_0, we examine the effects of rightward shifts in the *LM* curve brought about by increases in the money supply. Figure 11, panel (a), describes the situation with perfect capital immobility, with each successive graph demonstrating cases of greater and greater international capital mobility.

An increase in the money supply shifts the *LM* curve to the right. In every instance, there is a new intersection of the *IS* and *LM* curves at a combination of i and Y that lies below or to the right of the *BP* curve and thus is associated with a BOP deficit. The result of a deficit in the balance of payments is, of course, a loss of international reserves, as the central bank intervenes to provide the needed foreign currency. In the process of selling the desired foreign exchange, home currency is acquired by the central bank and the money supply falls. The effect is exactly analogous to that of selling short-term government bonds under open-market operations. The reduction in the money supply has the effect of shifting the *LM* curve back to the left. Since this will continue until *IS* and *LM* again intersect on the *BP* curve, one sees immediately that monetary policy is completely ineffective for influencing income under a system of fixed exchange rates, regardless of the degree of capital mobility. This is demonstrated in Figure 11 by the pair of arrows in each figure, which indicate that the *LM* curve first shifts to the right and then shifts back to the original position due to the automatic adjustment mechanism under fixed rates. It should be noted that the shift back to the original position can be delayed if the monetary authorities undertake open-market purchases of domestic securities, that is, sterilization operations (thus shifting the composition of the central bank's portfolio toward domestic assets and away from foreign assets). This postponement cannot be sustained indefinitely, however, because the country may soon decrease its stock of foreign exchange reserves below a target level. Thus, in the end under a fixed-rate system, a country loses the use of discretionary monetary policy to pursue economic targets. Alternatively, the country may weaken its commitment to the fixed-rate system. (See Case Study 2.)

THE IMPACT OF OFFICIAL CHANGES IN THE EXCHANGE RATE

Although changing the exchange rate cannot be an active tool of discretionary policy under a fixed-rate system, it is useful to examine briefly the macroeconomic effects of an official decision to change the pegged value of the home currency under the various capital mobility scenarios above. Since structural changes may at times require the devaluation/upward revaluation of a currency, it is important to understand how such changes would affect the economy. We proceed in the same manner as above. The four different market conditions are described in Figure 12.

GURE 11 **Monetary Policy with Fixed Rates under Different Capital Mobility Assumptions**



tarting with the economy in equilibrium at Y_0 and i_0, expansionary monetary policy leads to a rightward shift in the *LM* curve, lowering omestic interest rates and stimulating income. When capital is perfectly immobile [panel (a)], the increase in income stimulates imports and reates a deficit in the balance of payments. As the central bank sells foreign exchange to maintain the pegged rate, the money supply eclines, causing the *LM* curve to shift leftward until the initial equilibrium point is again attained. When capital is imperfectly mobile anels (b) and (c)], the increase in the money supply leads to a deficit in the BOP as imports increase *and* net short-term capital inflows ecline or become negative. As before, attempts by the central bank to maintain the fixed exchange rate lead to a decline in the money upply, bringing the economy again to Y_0 and i_0. Finally, in the case of perfectly mobile capital [panel (d)], the slightest drop in domestic nterest rate i instantaneously leads to a large-scale outflow of short-term capital. Again, the central bank must provide the desired foreign xchange to support the exchange rate, and the money supply declines. This continues until there is no further downward pressure on i, that s, at Y_0.

Changes in the exchange rate lead to expenditure switching between foreign and domestic goods and hence will affect both the *IS* curve and the *BP* curve. For example, as the currency is devalued or depreciates,[11] imports become more expensive to domestic residents and exports become cheaper to trading partners. Consequently, depreciation will generate an expansion of exports and a contraction of imports, leading to a rightward shift

[11]Changes in an official pegged exchange rate are usually called devaluations (for a rise in e) or upward revaluations (for a fall in e). The terms *depreciation* or *appreciation* represent the actual market rate movements of the currency's value.

CASE STUDY 2 INTERDEPENDENT MONETARY POLICIES UNDER FIXED EXCHANGE RATES: THE EUROPEAN COMMUNITY

The difficulties of implementing effective monetary policy with fixed exchange rates were illustrated in the early 1990s by experience in the European Community (which became the European Union in November 1993). The scenario began in 1990 when the German Democratic Republic (GDR, East Germany) merged with the Federal Republic of Germany (FRG, West Germany). The first order of business of the new country was to build up the economic strength of the former GDR. This part of the newly united Germany was considerably poorer than the former FRG. (For example, average household income in the East was only one-third of that in the West, and only 7 percent of East German households possessed a telephone while 98 percent of West German households did.)* To stimulate the East, fiscal authorities undertook large-scale expenditures but, fearful of the inflation that the resulting budget deficits might cause, the German Bundesbank (central bank) instituted tight money and high interest rates.

From the standpoint of this chapter, the most important point is that the restrictive monetary policy caused, in succeeding years, considerable consternation and resentment in other countries of the European Community (EC). Under the Exchange Rate Mechanism (ERM) of the European Monetary System at the time, most EC currencies were tied together with only 2.25 percent deviations permitted around their respective specified "central rates." With almost-fixed rates and highly mobile short-term capital among the countries, the other members of the ERM besides Germany were in a bind on monetary policy. If they tried to stimulate their economies by expansionary policy so as to recover from the slow growth of the 1980s and the severe recession that began in 1990, they would lose short-term capital to Germany and suffer BOP deficits and large losses of international reserves. In terms of the *IS/LM/BP* diagram, a shift to the right of the *LM* curve would soon be followed by a shift back to the original position, with no impact on income. Fiscal stimulus, which might have been useful under the almost-fixed-rate system, was also difficult to implement because governments had large budget deficits that were thought necessary to keep under control to facilitate entry into the planned monetary union of the countries at the end of the decade. (This monetary union is discussed in the last chapter of this book.)

The consequence of the inability to undertake effective macro policy was that unemployment rates remained high. In July 1993, the unemployment rate was 9.5 percent in Belgium, 11.7 percent in France, 10.9 percent in Italy, and 22.3 percent in Spain.† When Germany resisted pressure to reduce its interest rates in that month, the non-German currencies fell in value and large-scale intervention was temporarily undertaken.‡ Finally, the finance ministers of the EC agreed that seven of the nine ERM members' currencies (all except the deutsche mark and the Dutch guilder against each other) could now be allowed to move ± 15 percent from the central rates.§ (Indeed, the United Kingdom had withdrawn entirely from the ERM a year earlier in order to stimulate its economy by letting the pound depreciate.) Thus, in the EC, the lack of ability of countries to conduct independent, effective monetary policy because of an almost-fixed-rate structure led to a significant modification of that structure.

*"The Spontaneous Union: A Survey of the New Germany," *The Economist,* June 30, 1990, pp. 6, 9, 11.

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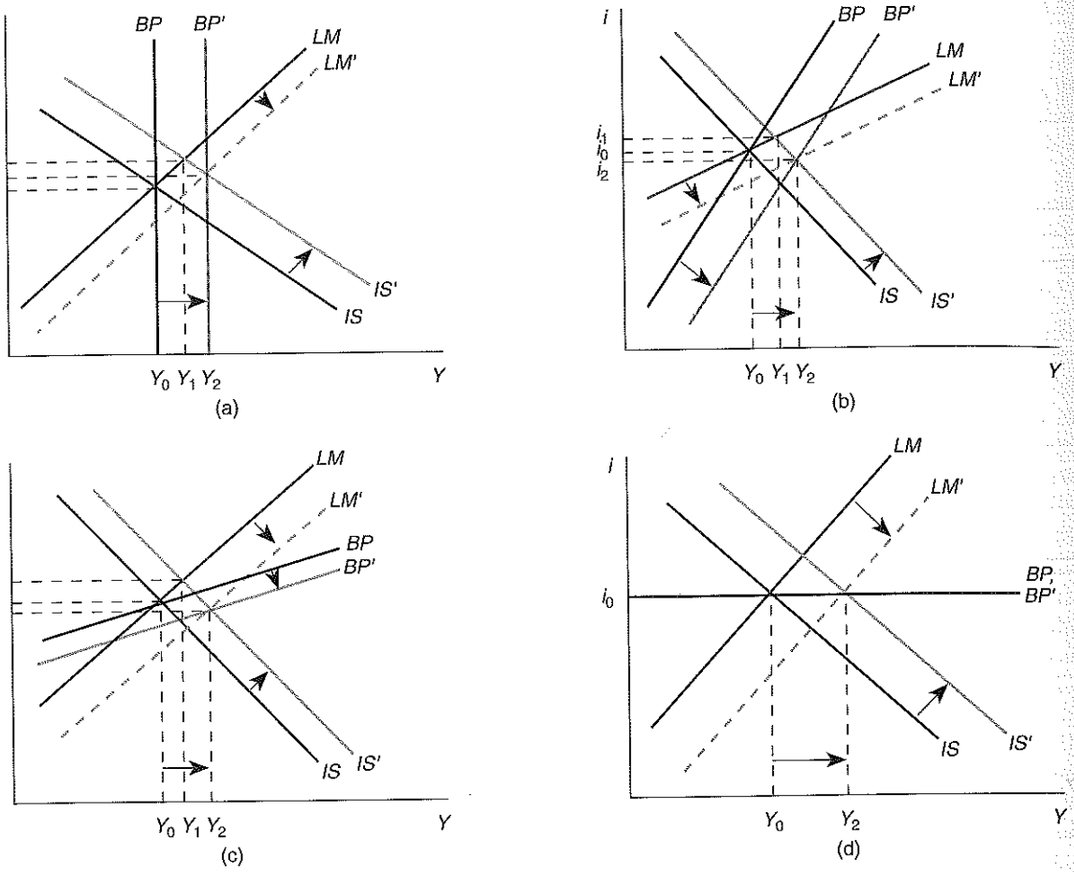
§Michael R. Sesit, "EC to Allow Currencies to Fluctuate Widely," *The Wall Street Journal,* Aug. 2, 1993, pp. C1, C13.

in the *IS* curve.[12] An appreciation of the currency would do the opposite. The impact of changing the exchange rate on the *BP* curve will depend on the nature of international capital mobility.

Consider first the case of perfectly immobile capital in panel (a) of Figure 12. Beginning at Y_0 and i_0, depreciation of the currency shifts the *BP* curve to the right (*BP'*).

[12]Again we are assuming that the Marshall-Lerner condition is satisfied.

RE 12 **Expenditure Switching with a Pegged-Rate Change under Different Capital Mobility Assumptions**



g at equilibrium at Y_0 and i_0, a depreciation of the currency leads to increased exports and decreased imports, shifting both the *IS* and curves to the right and raising the level of income and the interest rate. With imperfect capital mobility [panels (b) and (c)], the vement in the current account balance coupled with the higher relative domestic interest rate produces a surplus in the balance of nts. There is then an expansion in the money supply (rightward shift of the *LM* curve) as the central bank buys foreign exchange to in the pegged exchange rate, and a further increase in income to Y_2. A similar but less strong expansion in income occurs in panel (a) capital is perfectly immobile, since there are no short-term capital movements taking place as the domestic interest rate rises. However, perfect capital mobility [panel (d)], the upward pressure on the interest rate generates very large inflows of short-term capital. As the bank purchases foreign exchange to maintain the new exchange rate, the money supply expands until there is no longer any upward re on the interest rate (at Y_2).

Exports increase and imports decrease because of the depreciation, causing the *IS* curve to shift to the right (*IS'*). Once the real expenditure changes have taken effect, any additional adjustment required will take place through automatic changes in the money supply (in the absence of sterilization). For example, if the *IS* shift moves the domestic economy to Y_1 and i_1, domestic equilibrium (the intersection of *LM* and *IS'*) is to the left of the *BP'* curve, indicating a surplus in the balance of payments. This surplus will cause the central bank to purchase the foreign exchange necessary to hold the new value of the currency, and, in the process, increase the money supply. The increase in the money

supply will show up as a rightward shift in the *LM* curve and continue until the *LM'* and *IS'* intersect at a point on the new *BP'* curve at Y_2. Under perfect capital immobility, expenditure switching does have an impact on income (and prices).

Under imperfect capital mobility [panels (b) and (c)], depreciation again leads to a rightward shift in both the *BP* and the *IS* curves. The expansionary effects associated with expenditure switching lead to higher levels of income and the interest rate and a surplus in the balance of payments. Central bank intervention to peg the new value of the currency leads to an expansion of central bank holdings of international reserves and, consequently, an expansion of the money supply. The increase in the money supply leads to a rightward shift in the *LM* curve, which continues until the economy is again in equilibrium at the level of Y_2 and i_2 where the three new curves intersect. Devaluation has altered the locus of points that produce equilibrium in the balance of payments, and the economy has found levels of income and the interest rate compatible with the new exchange rate. From a policy perspective, we again see that devaluation has had an expansionary effect on the economy. An upward revaluation of the domestic currency would have the opposite effect since it would stimulate imports and reduce exports, leading to a lower level of income.

The final case [panel (d)], that of perfect capital mobility, is slightly different in that altering the value of the currency does not change the position of the *BP* curve. With perfectly mobile capital, *BP* remains fixed at the level of the international interest rate. What does take place, as indicated earlier in this chapter, is that altering the value of the currency leads to a movement along the *BP* curve. For example, a devaluation (depreciation) of the currency again leads to a rightward shift in the *IS* curve due to the expansion of exports and the contraction of imports that will accompany it. As the economy expands in response to the increase in demand for domestic goods, the rise in the domestic interest rate will precipitate an inflow of short-term capital, putting upward pressure on the home currency. As the central bank purchases the excess foreign exchange (at the new pegged rate) the money supply increases, shifting *LM* to the right. The net short-term capital position will continue to improve (and the money supply to expand) until the *IS* and the *LM* curves again intersect on the *BP* line. This new equilibrium will necessarily be at a higher level of income.[13] Thus, we conclude that changing the exchange rate under a fixed-rate regime will influence the level of economic activity, regardless of the mobility of capital. As with fiscal policy, the effect will be the greatest under conditions of perfect capital mobility where there are no crowding-out effects to offset the expansion in demand for domestic goods and services brought about by the change in value of the currency.

CONCEPT CHECK

1. What will be the state of the balance of payments if the *IS-LM* intersection is below the *BP* curve? What then takes place in the economy under fixed exchange rates? Why?
2. Is monetary or fiscal policy more effective under fixed rates? Why?

[13]Remember that prices are held constant in this analysis and that income is not necessarily at the full employment level. We are also assuming that the foreign countries do not match the initial devaluation with devaluation of their own currencies.

MMARY

chapter has examined macroeconomic policy under a n of fixed exchange rates. With prices and exchange rates it became evident very early that there was no guarantee nternal balance targets and external balance targets would sarily be reached simultaneously. We then introduced a , general equilibrium model incorporating the monetary r, real sector, and the balance of payments (the *IS/LM/BP* l). The effectiveness of domestic monetary and fiscal y under fixed exchange rates was then analyzed under ent international capital mobility assumptions. Monetary y was generally ineffective in influencing income, whereas fiscal policy had varying degrees of effectiveness depending on the degree of capital mobility. Only when capital was perfectly immobile was fiscal policy totally ineffective in stimulating output and employment. Official changes in the exchange rate (to the extent permitted) were also effective in stimulating economic activity. However, since changing the exchange rate is often difficult under a pegged-rate system, countries may find themselves with an incorrectly valued exchange rate and therefore unable to meet their internal and external balance targets.

Y TERMS

matic monetary adjustment
curve
ding out
librium interest rate
imperfect capital mobility
IS curve
LM curve
Mundell-Fleming diagram
perfect capital immobility
perfect capital mobility
relative capital immobility
relative capital mobility
sterilization

ESTIONS AND PROBLEMS

Explain carefully why a country settles in equilibrium at the intersection of the *IS, LM,* and *BP* curves.

Why is domestic monetary policy ineffective in an open economy under a fixed exchange rate regime?

What will happen to the relative holdings of foreign and domestic assets by the home country if there is an increase in the money supply and capital is perfectly mobile? Why?

Explain why a developing country with a fixed exchange rate and foreign exchange controls in place (perfectly immobile capital) may find itself dependent on growth in exports, foreign investment, or foreign aid in order to attain economic growth.

Under what capital flow conditions is fiscal policy least effective in a fixed-rate regime? Most effective? Why?

Why does devaluing the domestic currency have an expansionary effect on the economy? Does this expansionary effect take place if capital is perfectly immobile? Why or why not?

Suppose you were instructed to construct a *BP* curve of one state in the United States with another, such as New York's *BP* curve with Illinois. What general slope would you expect for this curve and why?

8. Why must countries, especially those prone to balance-of-payments deficits, maintain relatively large holdings of foreign exchange reserves in a fixed exchange rate system?

9. Japan has been running huge current account surpluses in the last decade. Because of concern over this surplus (and over the associated U.S. current account deficit with Japan), U.S. government officials for several years urged the Japanese government to adopt a more expansionary fiscal policy stance. Using an *IS/LM/BP* diagram (assuming that the *BP* curve is flatter than the *LM* curve) and starting from a position of equilibrium, explain how the adoption of such a policy stance would affect Japan's national income, current account, capital account, and money supply. Would your conclusions be different if the *BP* curve were steeper than the *LM* curve? Why or why not? (Note: Assume throughout your answer that Japan does not allow the value of the yen to change.)

10. If financial capital is relatively mobile between countries (such as is the case in the European Union), what difficulties emerge if the various countries have different interest rate targets for attaining domestic inflation and/or growth objectives? (Assume fixed exchange rates.)

CHAPTER 27

ECONOMIC POLICY IN THE OPEN ECONOMY

Flexible Exchange Rates

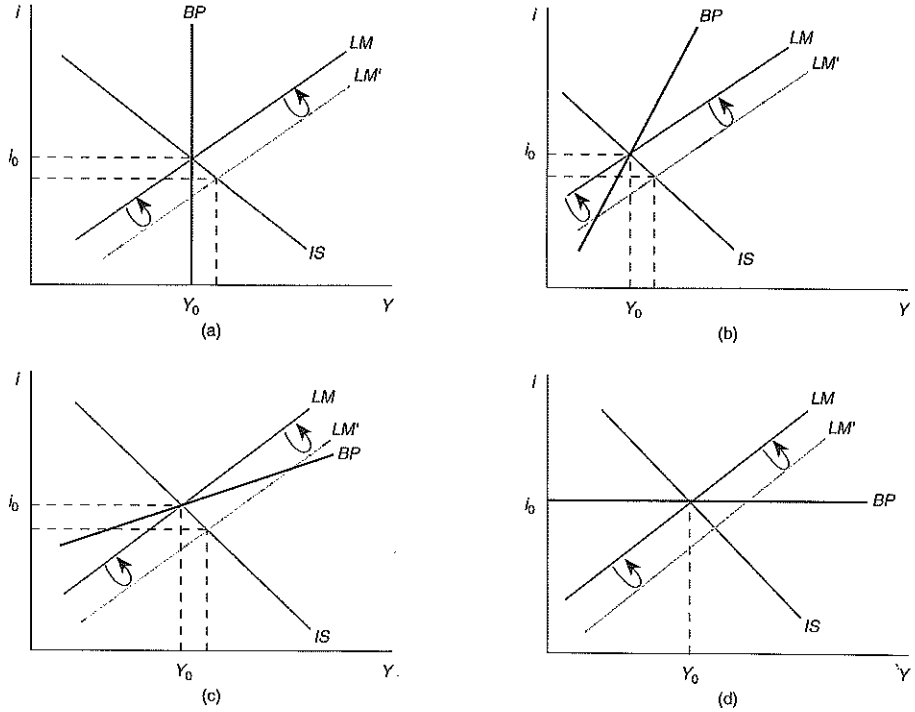
INTRODUCTION

In the preceding chapter we examined how economic policy was affected by trade and capital flows in the open economy in a fixed-rate regime. It was determined that monetary policy was ineffective in altering the level of income but that fiscal policy was effective in all cases except when capital was perfectly immobile, and that specific adjustments in the exchange rate were effective in all instances. Since 1973, major trading countries of the world have no longer been pegging their currencies and have been letting them float. (See the last chapter in the book.) If the exchange rate continuously adjusts to maintain equilibrium in the foreign exchange market, there is no longer a need for central banks to intervene to remove any excess supplies or demands for foreign exchange. Consequently, the monetary authorities regain control over the money supply and can use it to pursue domestic targets. A system of flexible rates thus significantly alters the policy environment and the effects of policy actions. We now examine the effects of monetary policy and fiscal policy under a flexible-rate regime, comparing and contrasting the effects of policy actions under different capital mobility assumptions. It will again be assumed that the Marshall-Lerner condition is satisfied in the foreign exchange market. By the end of the chapter, you will have learned why both monetary policy and fiscal policy differ markedly in their ability to influence national income under flexible exchange rates, and why the impacts of each are different when compared to a fixed-rate system.

THE EFFECTS OF FISCAL AND MONETARY POLICY UNDER FLEXIBLE EXCHANGE RATES WITH DIFFERENT CAPITAL MOBILITY ASSUMPTIONS

In this section, we examine the effects of economic policy under flexible rates using the *IS/LM/BP* model employed in the last chapter. The only difference in the analysis is that domestic responses to combinations of income and interest rates that lie off the *BP* curve will produce disequilibrium situations in the foreign exchange market, which will lead to an adjustment in the exchange rate that brings the foreign exchange market back into equilibrium. As this happens, the *BP* curve will shift, reflecting the new equilibrium exchange rate. Consider, for example, the *BP* curves in Figure 1. Because the exchange rate is now subject to change, we denote a specific *BP* equilibrium by an exchange rate subscript, for example, BP_0 for initial exchange rate e_0. Suppose that the domestic economy moves to a point below the BP_0 curve. At this point, the domestic interest rate is too low

FIGURE 11 **Monetary Policy with Fixed Rates under Different Capital Mobility Assumptions**



Starting with the economy in equilibrium at Y_0 and i_0, expansionary monetary policy leads to a rightward shift in the *LM* curve, lowering domestic interest rates and stimulating income. When capital is perfectly immobile [panel (a)], the increase in income stimulates imports and creates a deficit in the balance of payments. As the central bank sells foreign exchange to maintain the pegged rate, the money supply declines, causing the *LM* curve to shift leftward until the initial equilibrium point is again attained. When capital is imperfectly mobile [panels (b) and (c)], the increase in the money supply leads to a deficit in the BOP as imports increase *and* net short-term capital inflows decline or become negative. As before, attempts by the central bank to maintain the fixed exchange rate lead to a decline in the money supply, bringing the economy again to Y_0 and i_0. Finally, in the case of perfectly mobile capital [panel (d)], the slightest drop in domestic interest rate i instantaneously leads to a large-scale outflow of short-term capital. Again, the central bank must provide the desired foreign exchange to support the exchange rate, and the money supply declines. This continues until there is no further downward pressure on i, that is, at Y_0.

Changes in the exchange rate lead to expenditure switching between foreign and domestic goods and hence will affect both the *IS* curve and the *BP* curve. For example, as the currency is devalued or depreciates,[11] imports become more expensive to domestic residents and exports become cheaper to trading partners. Consequently, depreciation will generate an expansion of exports and a contraction of imports, leading to a rightward shift in the *IS* curve.[12] An appreciation of the currency would do the opposite. The impact of changing the exchange rate on the *BP* curve will depend on the nature of international capital mobility.

Consider first the case of perfectly immobile capital in panel (a) of Figure 12. Beginning at Y_0 and i_0, depreciation of the currency shifts the *BP* curve to the right (*BP'*).

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From the standpoint of this chapter, the most important point is that the restrictive monetary policy caused, in succeeding years, considerable consternation and resentment in other countries of the European Community (EC). Under the Exchange Rate Mechanism (ERM) of the European Monetary System at the time, most EC currencies were tied together with only 2.25 percent deviations permitted around their respective specified "central rates." With almost-fixed rates and highly mobile short-term capital among the countries, the other members of the ERM besides Germany were in a bind on monetary policy. If they tried to stimulate their economies by expansionary policy so as to recover from the slow growth of the 1980s and the severe recession that began in 1990, they would lose short-term capital to Germany and suffer BOP deficits and large losses of international reserves. In terms of the *IS/LM/BP* diagram, a shift to the right of the *LM* curve would soon be followed by a shift back to the original position, with no impact on income. Fiscal stimulus, which might have been useful under the almost-fixed-rate system, was also difficult to implement because governments had large budget deficits that were thought necessary to keep under control to facilitate entry into the planned monetary union of the countries at the end of the decade. (This monetary union is discussed in the last chapter of this book.)

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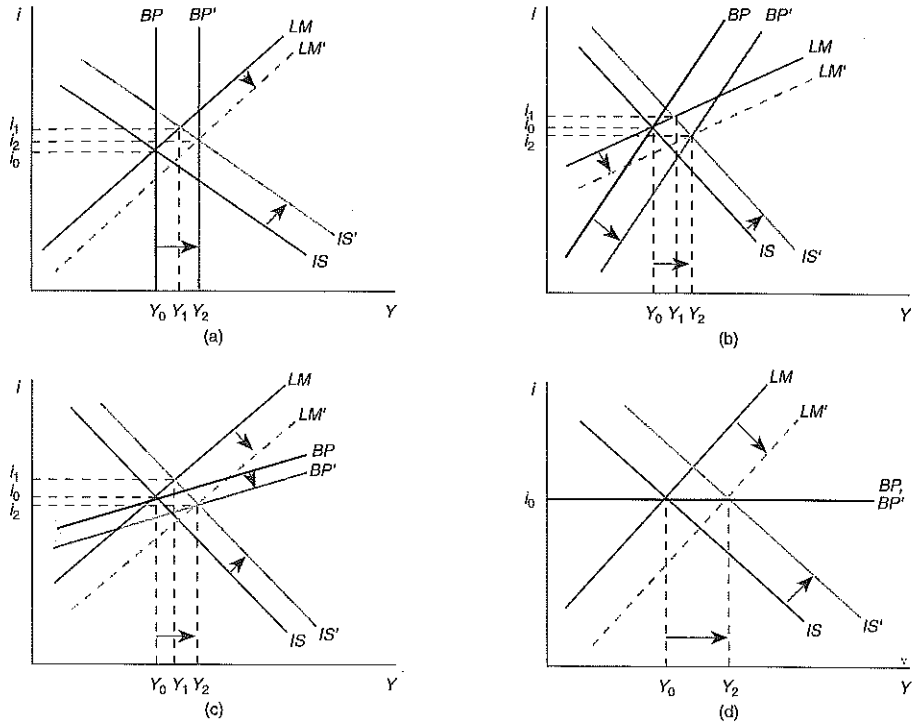

Starting at equilibrium at Y_0 and i_0, a depreciation of the currency leads to increased exports and decreased imports, shifting both the *IS* and the *BP* curves to the right and raising the level of income and the interest rate. With imperfect capital mobility [panels (b) and (c)], the improvement in the current account balance coupled with the higher relative domestic interest rate produces a surplus in the balance of payments. There is then an expansion in the money supply (rightward shift of the *LM* curve) as the central bank buys foreign exchange to maintain the pegged exchange rate, and a further increase in income to Y_2. A similar but less strong expansion in income occurs in panel (a) when capital is perfectly immobile, since there are no short-term capital movements taking place as the domestic interest rate rises. However, under perfect capital mobility [panel (d)], the upward pressure on the interest rate generates very large inflows of short-term capital. As the central bank purchases foreign exchange to maintain the new exchange rate, the money supply expands until there is no longer any upward pressure on the interest rate (at Y_2).

Exports increase and imports decrease because of the depreciation, causing the *IS* curve to shift to the right (*IS'*). Once the real expenditure changes have taken effect, any additional adjustment required will take place through automatic changes in the money supply (in the absence of sterilization). For example, if the *IS* shift moves the domestic economy to Y_1 and i_1, domestic equilibrium (the intersection of *LM* and *IS'*) is to the left of the *BP'* curve, indicating a surplus in the balance of payments. This surplus will cause the central bank to purchase the foreign exchange necessary to hold the new value of the currency, and, in the process, increase the money supply. The increase in the money

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Under imperfect capital mobility [panels (b) and (c)], depreciation again leads to a rightward shift in both the *BP* and the *IS* curves. The expansionary effects associated with expenditure switching lead to higher levels of income and the interest rate and a surplus in the balance of payments. Central bank intervention to peg the new value of the currency leads to an expansion of central bank holdings of international reserves and, consequently, an expansion of the money supply. The increase in the money supply leads to a rightward shift in the *LM* curve, which continues until the economy is again in equilibrium at the level of Y_2 and i_2 where the three new curves intersect. Devaluation has altered the locus of points that produce equilibrium in the balance of payments, and the economy has found levels of income and the interest rate compatible with the new exchange rate. From a policy perspective, we again see that devaluation has had an expansionary effect on the economy. An upward revaluation of the domestic currency would have the opposite effect since it would stimulate imports and reduce exports, leading to a lower level of income.

The final case [panel (d)], that of perfect capital mobility, is slightly different in that altering the value of the currency does not change the position of the *BP* curve. With perfectly mobile capital, *BP* remains fixed at the level of the international interest rate. What does take place, as indicated earlier in this chapter, is that altering the value of the currency leads to a movement along the *BP* curve. For example, a devaluation (depreciation) of the currency again leads to a rightward shift in the *IS* curve due to the expansion of exports and the contraction of imports that will accompany it. As the economy expands in response to the increase in demand for domestic goods, the rise in the domestic interest rate will precipitate an inflow of short-term capital, putting upward pressure on the home currency. As the central bank purchases the excess foreign exchange (at the new pegged rate) the money supply increases, shifting *LM* to the right. The net short-term capital position will continue to improve (and the money supply to expand) until the *IS* and the *LM* curves again intersect on the *BP* line. This new equilibrium will necessarily be at a higher level of income.[13] Thus, we conclude that changing the exchange rate under a fixed-rate regime will influence the level of economic activity, regardless of the mobility of capital. As with fiscal policy, the effect will be the greatest under conditions of perfect capital mobility where there are no crowding-out effects to offset the expansion in demand for domestic goods and services brought about by the change in value of the currency.

CONCEPT CHECK

1. What will be the state of the balance of payments if the *IS-LM* intersection is below the *BP* curve? What then takes place in the economy under fixed exchange rates? Why?
2. Is monetary or fiscal policy more effective under fixed rates? Why?

[13] Remember that prices are held constant in this analysis and that income is not necessarily at the full employment level. We are also assuming that the foreign countries do not match the initial devaluation with devaluation of their own currencies.

SUMMARY

This chapter has examined macroeconomic policy under a system of fixed exchange rates. With prices and exchange rates fixed, it became evident very early that there was no guarantee that internal balance targets and external balance targets would necessarily be reached simultaneously. We then introduced a broad, general equilibrium model incorporating the monetary sector, real sector, and the balance of payments (the *IS/LM/BP* model). The effectiveness of domestic monetary and fiscal policy under fixed exchange rates was then analyzed under different international capital mobility assumptions. Monetary policy was generally ineffective in influencing income, whereas fiscal policy had varying degrees of effectiveness depending on the degree of capital mobility. Only when capital was perfectly immobile was fiscal policy totally ineffective in stimulating output and employment. Official changes in the exchange rate (to the extent permitted) were also effective in stimulating economic activity. However, since changing the exchange rate is often difficult under a pegged-rate system, countries may find themselves with an incorrectly valued exchange rate and therefore unable to meet their internal and external balance targets.

KEY TERMS

automatic monetary adjustment
BP curve
crowding out
equilibrium interest rate
imperfect capital mobility
IS curve
LM curve
Mundell-Fleming diagram
perfect capital immobility
perfect capital mobility
relative capital immobility
relative capital mobility
sterilization

QUESTIONS AND PROBLEMS

1. Explain carefully why a country settles in equilibrium at the intersection of the *IS*, *LM*, and *BP* curves.
2. Why is domestic monetary policy ineffective in an open economy under a fixed exchange rate regime?
3. What will happen to the relative holdings of foreign and domestic assets by the home country if there is an increase in the money supply and capital is perfectly mobile? Why?
4. Explain why a developing country with a fixed exchange rate and foreign exchange controls in place (perfectly immobile capital) may find itself dependent on growth in exports, foreign investment, or foreign aid in order to attain economic growth.
5. Under what capital flow conditions is fiscal policy least effective in a fixed-rate regime? Most effective? Why?
6. Why does devaluing the domestic currency have an expansionary effect on the economy? Does this expansionary effect take place if capital is perfectly immobile? Why or why not?
7. Suppose you were instructed to construct a *BP* curve of one state in the United States with another, such as New York's *BP* curve with Illinois. What general slope would you expect for this curve and why?
8. Why must countries, especially those prone to balance-of-payments deficits, maintain relatively large holdings of foreign exchange reserves in a fixed exchange rate system?
9. Japan has been running huge current account surpluses in the last decade. Because of concern over this surplus (and over the associated U.S. current account deficit with Japan), U.S. government officials for several years urged the Japanese government to adopt a more expansionary fiscal policy stance. Using an *IS/LM/BP* diagram (assuming that the *BP* curve is flatter than the *LM* curve) and starting from a position of equilibrium, explain how the adoption of such a policy stance would affect Japan's national income, current account, capital account, and money supply. Would your conclusions be different if the *BP* curve were steeper than the *LM* curve? Why or why not? (Note: Assume throughout your answer that Japan does not allow the value of the yen to change.)
10. If financial capital is relatively mobile between countries (such as is the case in the European Union), what difficulties emerge if the various countries have different interest rate targets for attaining domestic inflation and/or growth objectives? (Assume fixed exchange rates.)

CHAPTER 27

ECONOMIC POLICY IN THE OPEN ECONOMY

Flexible Exchange Rates

INTRODUCTION

In the preceding chapter we examined how economic policy was affected by trade and capital flows in the open economy in a fixed-rate regime. It was determined that monetary policy was ineffective in altering the level of income but that fiscal policy was effective in all cases except when capital was perfectly immobile, and that specific adjustments in the exchange rate were effective in all instances. Since 1973, major trading countries of the world have no longer been pegging their currencies and have been letting them float. (See the last chapter in the book.) If the exchange rate continuously adjusts to maintain equilibrium in the foreign exchange market, there is no longer a need for central banks to intervene to remove any excess supplies or demands for foreign exchange. Consequently, the monetary authorities regain control over the money supply and can use it to pursue domestic targets. A system of flexible rates thus significantly alters the policy environment and the effects of policy actions. We now examine the effects of monetary policy and fiscal policy under a flexible-rate regime, comparing and contrasting the effects of policy actions under different capital mobility assumptions. It will again be assumed that the Marshall-Lerner condition is satisfied in the foreign exchange market. By the end of the chapter, you will have learned why both monetary policy and fiscal policy differ markedly in their ability to influence national income under flexible exchange rates, and why the impacts of each are different when compared to a fixed-rate system.

THE EFFECTS OF FISCAL AND MONETARY POLICY UNDER FLEXIBLE EXCHANGE RATES WITH DIFFERENT CAPITAL MOBILITY ASSUMPTIONS

In this section, we examine the effects of economic policy under flexible rates using the *IS/LM/BP* model employed in the last chapter. The only difference in the analysis is that domestic responses to combinations of income and interest rates that lie off the *BP* curve will produce disequilibrium situations in the foreign exchange market, which will lead to an adjustment in the exchange rate that brings the foreign exchange market back into equilibrium. As this happens, the *BP* curve will shift, reflecting the new equilibrium exchange rate. Consider, for example, the *BP* curves in Figure 1. Because the exchange rate is now subject to change, we denote a specific *BP* equilibrium by an exchange rate subscript, for example, BP_0 for initial exchange rate e_0. Suppose that the domestic economy moves to a point below the BP_0 curve. At this point, the domestic interest rate is too low