

MARY

Chapter has examined macroeconomic policy under a fixed exchange rate. With prices and exchange rates became evident very early that there was no guarantee internal balance targets and external balance targets would be reached simultaneously. We then introduced a general equilibrium model incorporating the monetary real sector, and the balance of payments (the *IS/LM/BP*). The effectiveness of domestic monetary and fiscal under fixed exchange rates was then analyzed under international capital mobility assumptions. Monetary 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.

TERMS

autonomous monetary adjustment
 domestic monetary adjustment
 domestic monetary expansion
 domestic monetary contraction
 domestic monetary 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?
 4. Explain why a developing country with a fixed exchange rate and foreign exchange controls in place (perfectly mobile capital) may find itself dependent on growth in exports, foreign investment, or foreign aid in order to maintain 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 a 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

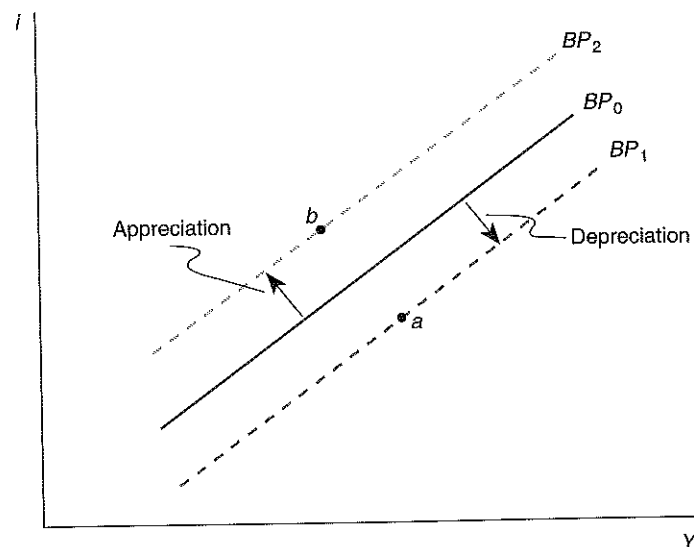
INTRODUCTION

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 1 The Effects of Changes in the Exchange Rate on the BP Curve



Initial balance-of-payments equilibrium at the exchange rate e_0 is depicted by the BP_0 curve. A depreciation of the currency leads to an expansion of exports and a contraction of imports. Thus, for any given level of income, a larger amount of net capital outflows, and thus a lower rate of interest, is required to balance the balance of payments. The BP curve thus shifts down (to the right) with currency depreciation to BP_1 . In analogous fashion, an appreciation of the currency leads to greater imports and fewer exports, thus requiring a smaller amount of net capital outflows (or larger net capital inflows) to obtain external balance. A higher interest rate is therefore required at all levels of income, causing the BP curve to shift up (or leftward) to BP_2 .

to attain equilibrium in the balance of payments for any level of income in question, and the economy begins experiencing a balance-of-payments deficit under the exchange rate e_0 . However, since we have a flexible-rate system, as the economy begins to experience the deficit pressure, the home currency depreciates. Consequently, the country never experiences the deficit but, rather, observes a depreciation of the currency instead.

The initial disequilibrium in the foreign sector at point a , brought about by the new level of income and interest rate, is often referred to as an **incipient BOP deficit**, since it is not observed as a deficit per se but triggers a depreciation of the currency and a shift in the BP curve to BP_1 . The lower BP curve reflects the fact that at the new, depreciated value of the home currency, any given income level (with its now more favorable current account position due to the enhanced exports and reduced imports caused by the depreciation) is associated with a lower interest rate (which worsens the capital account through additional net capital outflows that exactly offset the more favorable current account). Alternatively, any given interest rate is, in BOP equilibrium with the now-depreciated home currency, consistent with a higher level of income on BP_1 than on the original BP_0 . Analogously, a combination of domestic income and the interest rate at point b , which lies above the initial BP curve, will trigger an **incipient BOP surplus** that causes the exchange rate to appreciate and shifts the BP curve to BP_2 . It is important to emphasize the difference between the adjustment mechanisms under flexible and fixed rates. Under flexible rates, any disequilibrium leads to a change in the exchange rate and a shift in the BP curve. Under fixed rates, a disequilibrium in the foreign sector leads to a change in the money supply and a shift in the LM curve.

BOX 1

REAL AND FINANCIAL FACTORS THAT INFLUENCE THE BP CURVE

A number of different factors influence the nature of the current account and the capital account in the balance of payments in addition to the domestic level of income, the domestic interest rate, and the current (spot) exchange rate. The level of exports is influenced by domestic and foreign price levels, the level of income in the rest of the world, and foreign tastes and preferences. Home country imports are also influenced by the level of foreign and domestic prices as well as by tastes and preferences. Capital flows depend on foreign interest rates, expected profit rates in both the home and foreign countries, expected future exchange rates, and the perceived risk associated with the investment alternatives.

All of these additional considerations are being held constant for a specific external balance (BP) curve. Should any of the factors change, the BP curve will shift to offset the effects of the changing condition and thus continue to reflect external balance. For example, an increase in foreign income will increase home country exports, thus permitting a higher level of domestic income to obtain balance-of-payments equilibrium for every interest rate. The BP curve will therefore shift to the right. A decrease in the foreign

price level would have the opposite effect, leading to an increase in home country imports, a higher necessary rate of interest to balance the balance of payments, and hence a leftward shift in the BP curve.

Changes in financial variables will also shift the BP curve. For example, an increase in the foreign interest rate will stimulate an increase in short-term capital outflows from the home country. A higher domestic interest rate will therefore be required to balance the balance of payments for every given level of income, and the BP curve shifts to the left. A similar adjustment would take place for an increase in the expected profit rate abroad or a decrease in the expected profit rate at home. Finally, if investors' expectations regarding the future value of the exchange rate change—for example, there is an increase in the expected appreciation of the home currency—this would lead to a shift in the BP curve. An increase in the expected appreciation of the home currency leads to an inflow of short-term capital and hence to a rightward shift in the BP curve, since it now takes a lower rate of interest for each level of income to maintain external balance. These effects are summarized in Table 1.

TABLE 1 Exogenous Factors and Shifts in the BP Curve

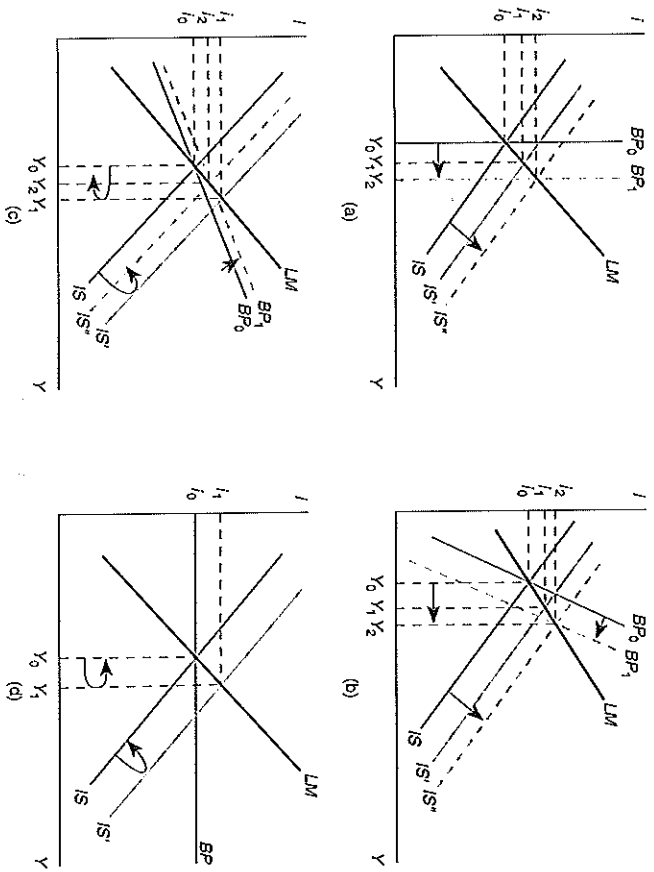
Increase in foreign income	BP curve shifts right (down)
Increase in foreign prices	BP curve shifts right
Increase in domestic prices	BP curve shifts left (up)
Increase in the expected profit rate	
—foreign	BP curve shifts left
—domestic	BP curve shifts right
Increase in the foreign interest rate	BP curve shifts left
Increase in expected home currency appreciation (depreciation)	BP curve shifts right (left)

Finally, it must be noted that a number of different factors influence the position of the BP curve in addition to the exchange rate. These factors are assumed to be unchanged in our analysis, but they can, and often do, change. Changes in any one of these factors can cause the BP curve to shift, triggering a macroeconomic response. For a brief overview of several of the more important factors and the manner in which they affect the BP curve, see Box 1.

The Effects of Fiscal Policy under Different Capital Mobility Assumptions

Now we can turn to consideration of the effects of fiscal policy under the various international capital mobility assumptions. Expansionary fiscal policy is represented by a rightward shift in the IS curve, and its impacts are shown in Figure 2. Each of the four diagrams again reflects a different assumption about capital mobility. In each case, we

FIGURE 2 Fiscal Policy in the Open Economy with Flexible Exchange Rates under Alternative Capital Mobility Assumptions



Starting at equilibrium i_0 and Y_0 , an expansionary fiscal policy shifts the IS curve right (IS'). This causes income and imports to rise, leading to an incipient deficit when capital is perfectly immobile (panel (a)) or relatively immobile (panel (b)), and a depreciation of the currency. Currency depreciation shifts the BP curve right (BP_1), and increases exports and decreases imports, which generates an additional shift in the IS curve (IS''). A new, higher equilibrium, i_2 and Y_2 , results. However, when capital is relatively mobile (panel (c)), the effectiveness of fiscal policy is reduced. In this case, expansionary fiscal policy (IS') produces an incipient surplus and currency appreciation. The BP curve thus shifts up and the IS curve shifts left as imports increase and exports decrease. The trade adjustment offsets some of the expansionary effect of the fiscal policy, and the expansionary effect on income is reduced, not enhanced as it was when capital was immobile or relatively immobile. Finally, note that with perfectly mobile capital (panel (d)), fiscal expansion sets in motion a currency appreciation that continues until the current account effect ($-dX_c + dM$) completely offsets the initial fiscal policy, leaving income at Y_0 .

begin with the economy in equilibrium at Y_0 and i_0 , and then examine the impact of an increase in government spending (or a decrease in taxes), which is captured by a shift in the IS curve to IS' .

Beginning with panel (a), an increase in government spending increases domestic demand for goods and services (IS'), leading to higher equilibrium income and a higher interest rate. Since capital is perfectly immobile, the increase in income creates an incipient deficit and causes the currency to depreciate. With depreciation of the currency, BP_0 shifts to the right to BP_1 . At the same time, the depreciation of the currency causes exports to increase and imports to decrease, resulting in a further rightward shift of the IS curve to IS'' . These adjustments stop when the IS , LM , and BP curves again intersect at a common point (Y_2, i_2). In the case of perfectly immobile capital, the adjustment in the

foreign sector produces a secondary expansionary impulse through the increase in net exports. Note that, because the adjustment in the foreign sector is taking place through the exchange rate, there is no change in the money supply and hence no change in the LM curve.

Figure 2, panel (b) illustrates the situation of relative capital immobility, where international short-term capital movements are less responsive to changes in the interest rate than are the domestic financial markets. In this case, the BP curve is steeper than the LM curve. Increases in government spending again have an expansionary effect on the economy, leading to an incipient deficit in the balance of payments. The deficit pressure is less than it was when capital was perfectly immobile, since there is some degree of short-term capital response to changes in the domestic interest rate. An incipient deficit arises because induced imports from the higher Y outweigh the increased net capital inflow, and the resulting depreciation of the currency leads to a rightward shift of the BP curve to BP_1 . An additional rightward shift of the IS curve to IS'' occurs as net exports increase with the depreciating currency. While the effects are smaller than those under perfect capital immobility, fiscal policy is still effective in expanding national income, and the adjustment of the foreign sector supplements the initial effect of the increase in government spending.

In panel (c), we have the case of relative mobility of international short-term capital, where the BP curve is flatter than the LM curve. While there is still imperfect mobility of capital in this instance, the foreign sector is seen to be more responsive to changes in the interest rate than the domestic money markets. An increase in government spending leads to an incipient surplus in the balance of payments due to net capital inflows more than offsetting the current account deficit and, hence, appreciation of the currency. With the currency appreciation, the BP curve moves to the left. The deterioration in the current account has an impact on aggregate demand as well, shifting the IS curve to the left. Consequently, the system comes to rest at a level of income Y_2 instead of Y_1 . This takes place because part of the expansionary effects of the increase in government spending is offset by the deterioration in the current account that accompanies the appreciation of the currency. In this case, the foreign sector adjustment dampens the initial expansionary effect of the increase in government spending.

In the final scenario in panel (d), that of perfect capital mobility, we see that the shift in the IS curve to IS' due to the increase in government spending again causes an incipient surplus in the balance of payments (X_1, i_1). This, of course, triggers an appreciation of the home currency (due to large-scale capital inflows), which continues until the current account balance deteriorates sufficiently to offset exactly the initial increase in government spending. When this occurs, the IS curve will be in the same position as before the increase in G . Thus, the principal real result of the increase in G is that it leads to a reduction in exports and an increase in imports, that is, to a change in the composition of GDP and the balance of payments. Since income has not expanded, the increase in government spending has essentially been facilitated by an increase in imports and a decrease in exports. Thus, exports have been "crowded out" and the imported goods have been no crowding out of real investment since, with perfectly mobile capital, the interest rate remains fixed at the international rate.

As you will have noted, in the circumstance where capital is neither perfectly mobile nor perfectly immobile, the effect of expansionary fiscal policy on the exchange rate is indeterminate without knowledge of the relative slopes of the BP and LM curves. If the BP curve is steeper than the LM curve (relative capital immobility), the home currency depreciates; if BP is flatter than LM (relative capital mobility), the home currency

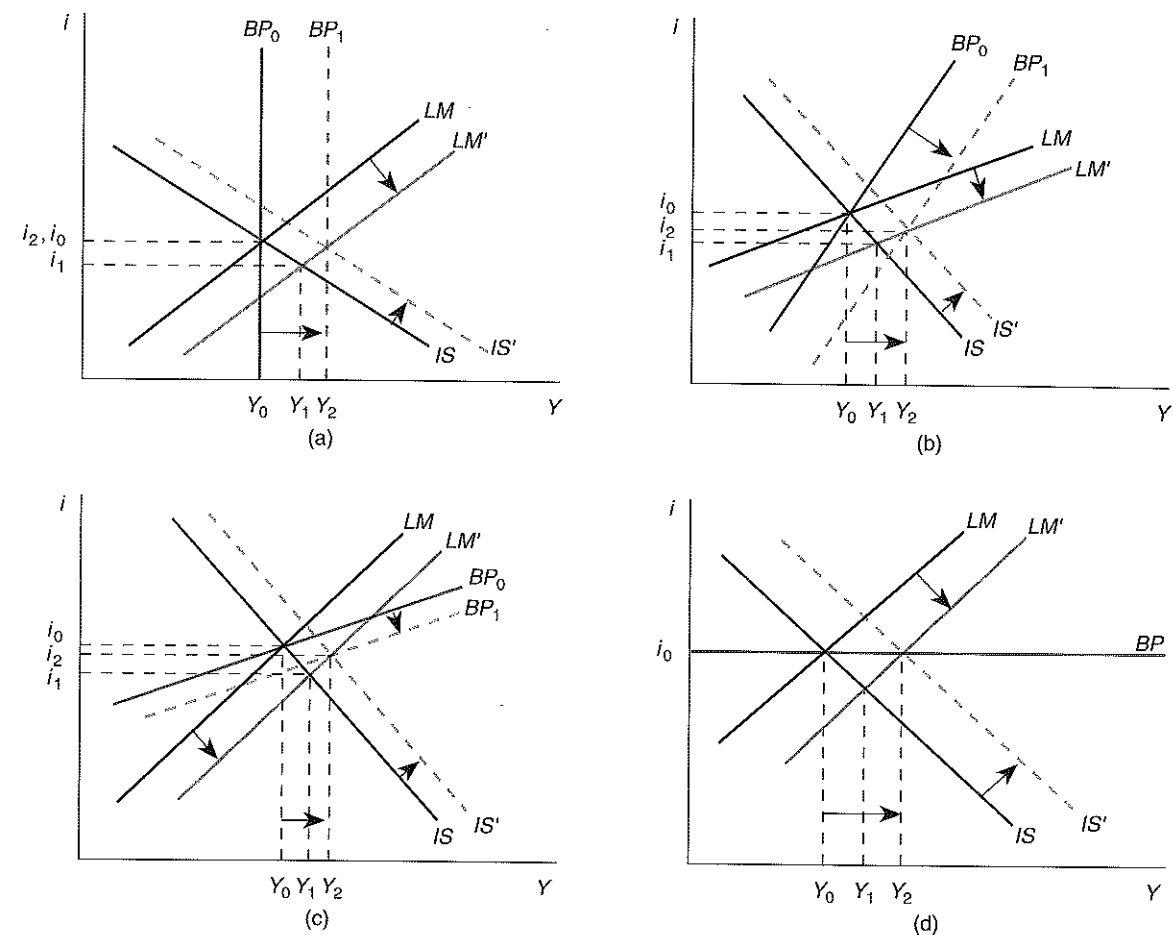
appreciates. Likewise, from a portfolio balance perspective, there is indeterminacy regarding the impact of the expansionary fiscal policy on the exchange rate. For example, if the expansionary policy involves a government budget deficit and the consequent issuance of new government bonds, then home country bonds may become more risky to foreign portfolio owners because there is now a greater supply of the home bonds. A depreciation of the domestic currency would then occur in order to induce foreign bondholders to buy the new bonds. This increase in riskiness is tantamount to making the *BP* curve steeper, approaching or becoming steeper than the *LM* curve (i.e., becoming the relative capital immobility case). On the other hand, if the expansionary fiscal policy did not involve issuing new bonds (i.e., there is no government budget deficit), the home currency would appreciate because of the short-term capital inflow response to the higher domestic interest rate. Finally, if deficit spending occurred but the deficit was financed by printing money rather than by issuing government bonds, the money supply increase would cause the home currency to depreciate. (As we see in the next section, increasing the money supply leads to depreciation.) Hence, portfolio balance considerations also yield uncertainty regarding the impact of the expansionary fiscal policy on the exchange rate.

An overview of the effects of fiscal policy under flexible rates thus indicates that the effectiveness of fiscal policy depends strongly on the degree of international mobility of capital. When capital is completely or relatively immobile, fiscal policy is effective in moving the economy to income and employment targets, and more so than under fixed exchange rates because of the extra income stimulus provided by the currency depreciation. On the other hand, as capital becomes more and more mobile, fiscal policy becomes less and less effective. In the case where capital is relatively mobile (*LM* steeper than *BP*), fiscal policy is less effective under flexible rates than under fixed rates because of the income-depressing effect of the currency appreciation. For the extreme case of perfect capital mobility, fiscal policy is totally ineffective. As financial capital becomes more and more mobile in our shrinking world, fiscal policy will become less and less effective for influencing the level of income and employment. While a flexible-rate system thus severely weakens the fiscal instrument in a world of mobile capital (since the adjustments in the foreign exchange markets can severely offset the effects of discretionary fiscal policy), it does free up the monetary policy instrument, as will be seen in the following section.

The economic response to increases in the money supply is straightforward and consistent across the different capital mobility scenarios (see Figure 3). Increases in the money supply shift the *LM* curve to the right and in all four cases expand domestic income from the initial Y_0 , put downward pressure on the domestic interest rate from the initial i_0 , and produce an incipient deficit in the balance of payments. Under a system of flexible rates, expansionary monetary policy leads to a depreciation of the domestic currency, accompanied by an increase in exports and a decrease in imports. With the depreciation, both the *BP* curve and the *IS* curve shift to the right. The end result is an increase in equilibrium income and a strengthening of the trade balance.

Looking more closely at each case, in the situation of perfectly immobile capital [panel (a)], the incipient deficit is caused by the increase in imports that accompanies the higher level of domestic income. Since capital flows are completely insensitive to changes in the interest rate, there is no capital-flow response to the monetary policy action. Consequently, the currency needs to depreciate only enough to offset the income effect on imports. As the currency depreciates, the *BP* curve shifts to the right from BP_0 to BP_1 and the increase

FIGURE 3 Monetary Policy in the Open Economy with Flexible Exchange Rates under Alternative Capital Mobility Assumptions



Starting at equilibrium at Y_0 and i_0 , expansionary monetary policy shifts the *LM* curve to the right (LM'), lowering the interest rate and increasing income (Y_1, i_1). The lower interest rate reduces a net capital inflow or worsens a net capital outflow [except in case (a)], and the higher income level increases imports. Consequently, there is an incipient deficit in the balance of payments, resulting in a depreciation of the home currency and a rightward shift in the *BP* curve (BP_1). However, depreciation increases exports and decreases imports, causing a rightward shift of the *IS* curve (IS'). Depreciation (rightward shift of the *BP* curve) and improvements in the trade balance (rightward shift of the *IS* curve) continue until all three curves again intersect at a common point and equilibrium is obtained (Y_2 and i_2). In the case of perfect capital mobility [panel (d)], all the adjustments take place along the *BP* curve, since it remains horizontal at the world rate of interest. With flexible exchange rates, expansionary monetary policy is effective in influencing income regardless of the degree of capital mobility, and the current account effects complement the monetary policy in all cases.

in net exports also shifts the *IS* curve to the right to *IS'*. The system will eventually come to rest at a new equilibrium with a higher level of income Y_2 , a depreciated currency, and a lower interest rate.¹ Note that the expenditure effects associated with the depreciation further enhance the initial effects of the monetary expansion.

The expansion of the money supply under imperfect capital mobility [panels (b) and (c)] leads to a fall in the domestic interest rate and in turn stimulates a short-term capital outflow, worsening the short-term capital account. Thus, both short-term capital movements and the increase in domestic income put downward pressure on the value of the home currency. The more responsive international capital flows are to changes in the domestic interest rate (the flatter the *BP* curve), the greater the additional pressure will be. Consequently, the more interest-elastic the *BP* curve is, the greater the depreciation that will take place to maintain equilibrium in the balance of payments. Since the expansion in net exports is greater with a greater depreciation, the overall expansionary effects of monetary policy are larger the more mobile international capital is. This is verified in the last case, panel (d), where capital is perfectly mobile and the *BP* curve is horizontal. Since capital is very responsive to the slightest change in the domestic interest rate, expansion of the money supply generates a very large capital outflow and a depreciation of the home currency. This depreciation leads to a large expansion of net exports (exactly offsetting the capital outflow), which in turn stimulates national income.

The more mobile international capital is, the more effective monetary policy is. However, the more mobile international capital is, the greater the degree to which expansionary monetary policy depends on the adjustment in the foreign trade sector to bring about the increase in income and employment. If the interest rate does not initially change, or changes very little with respect to changes in the money supply, then investment may not respond and the income expansion must come about through shifts in the *IS* function via changes in exports and imports. With all mobility assumptions, however, the subsequent adjustments in the foreign trade sector strengthen the initial impact of the growth in the money supply. One concludes, therefore, that, in general,

¹The interest rate falls unambiguously because the *BP* curve shifts to the right to a greater extent than does the *IS* curve at any given interest rate. Remembering the autonomous spending multiplier from the chapter "National Income and the Current Account," the change in income at each interest rate is the depreciation-induced improvement in the trade balance (the net addition to spending in the economy at each interest rate) times the multiplier. This income change equals the size of the horizontal shift in the *IS* curve; that is,

$$\Delta Y_{IS} = \Delta(X - M) \cdot \{1/[1 - MPC(1 - t) + MPM]\} \quad [1]$$

On the other hand, the *BP* curve shifts to the right at any given interest rate by the amount of increase in income needed to generate sufficient imports to restore balanced trade after the currency depreciation. In other words, imports must rise by the amount necessary to match the initial improvement in the trade balance; that is, imports must change by $MPM \cdot \Delta Y$. Hence,

$$\Delta M = MPM \cdot \Delta Y \quad [2]$$

or the necessary rightward shift in the *BP* curve at each given interest rate is

$$\Delta Y_{BP} = \Delta M/MPM \quad [3]$$

Since trade balance is restored after the *BP* shift, this means that ΔM associated with the *BP* shift is equal to $\Delta(X - M)$ associated with the *IS* shift. Letting $\Delta M = \Delta(X - M) = a$ in expressions [3] and [1], we see that $\Delta Y_{BP} = a/MPM$ and $\Delta Y_{IS} = a/[1 - MPC(1 - t) + MPM]$. Since $[1 - MPC(1 - t)]$ is a positive number, the denominator in the ΔY_{IS} expression is larger than the denominator in the ΔY_{BP} expression, and hence with an identical numerator, ΔY_{BP} is greater than ΔY_{IS} . In other words, the *BP* curve shifts farther to the right than does the *IS* curve at any given interest rate.

monetary policy is more effective under flexible exchange rates than under fixed exchange rates.

Policy Coordination under Flexible Exchange Rates

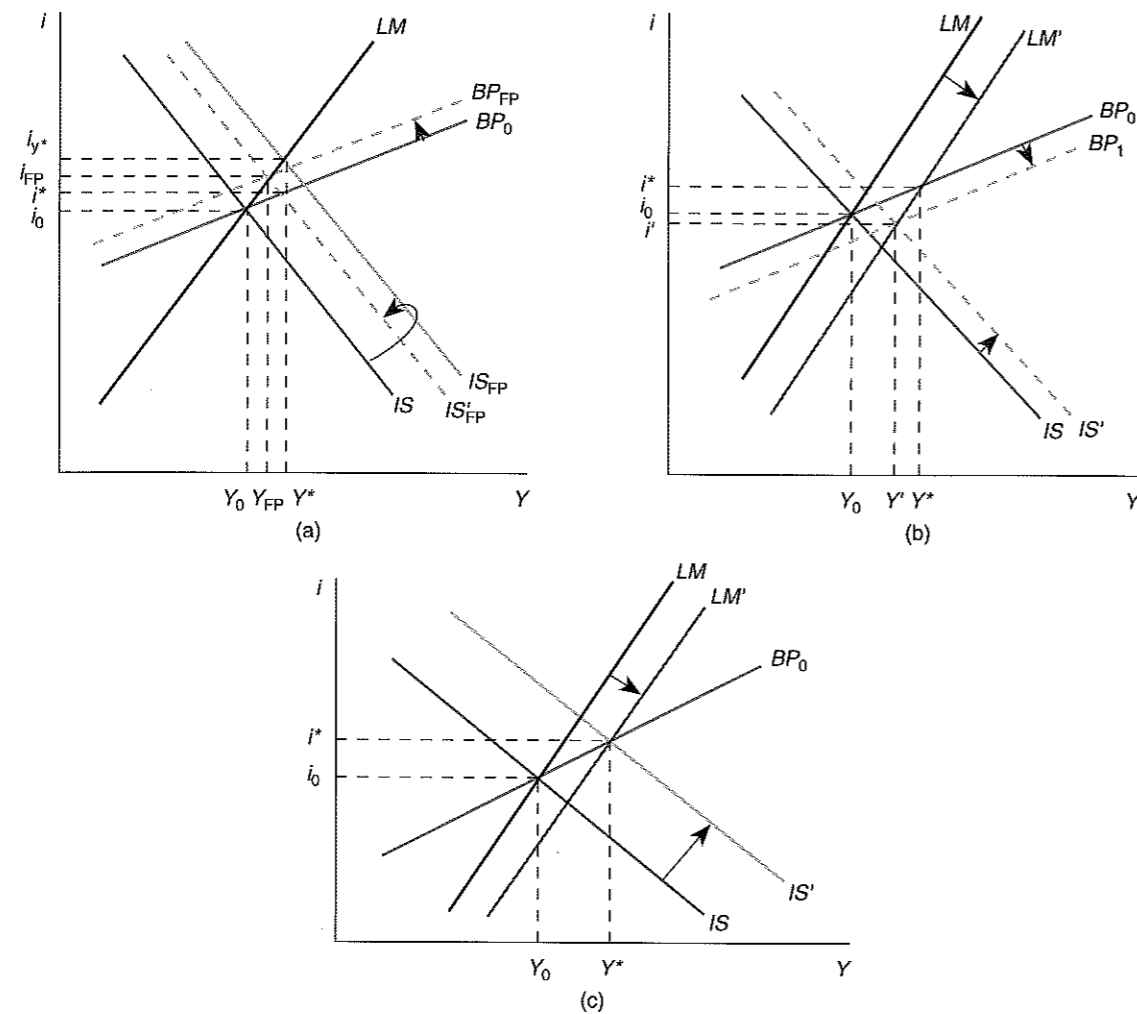
A general conclusion reached in the above analysis of fiscal and monetary policy is that monetary policy is consistently effective in influencing national income under flexible rates and that it is stronger the more mobile international short-term capital is. Fiscal policy is less effective under flexible rates than under fixed rates when capital is relatively or perfectly mobile. This results from the fact that the expenditure-switching effects can work against fiscal policy, whereas they complement monetary policy. It is not surprising, then, that policymakers may find it desirable to use both instruments in a coordinated fashion to achieve domestic targets. **Monetary policy-fiscal policy coordination** will permit policymakers to strive for other targets besides income, such as an interest rate target, stability of the foreign exchange rate, or a desired combination of government spending, export production/employment, and output/employment in the import-competing sector. Joint use of monetary and fiscal policies will allow the policymaker some control over the nature of the structural adjustment and over the distribution of the economic effects of the policies adopted.

This point can be seen in Figure 4. Let us start with the economy initially in equilibrium at Y_0 and i_0 . Suppose that a target of Y^* and i^* is set, which would permit the expansion of the economy without affecting the exchange rate and hence relative prices. Turning first to panel (b), let us examine how attempts to reach that point using monetary policy alone will fare. Expanding the money supply alone (LM') leads to depreciation of the domestic currency (a rightward shift of *BP*) and an expansion of net trade in the foreign sector (a rightward shift of *IS*). Since the new equilibrium must lie on LM' with a depreciated currency (a lower *BP*), the equilibrium rate of interest will be less than i^* . Such an equilibrium interest rate is illustrated by i' , occurring at the intersection of IS' , LM' and BP_1 . In this instance, both targets would be missed since Y' is less than Y^* and i' is less than i^* . In addition, exporters and import competitors would be rewarded and the nontraded sector would be harmed by the change in relative prices brought about by the change in the exchange rate.

If, on the other hand, government officials attempted to attain Y^* using only fiscal policy and they were successful, interest rates would be driven up to i_{y^*} , as demonstrated in panel (a), clearly missing the target i^* . In all likelihood, it would prove difficult to attain Y^* with only fiscal policy, since expansionary fiscal policy (that is, a rightward shift in the *IS* curve to IS_{FP}) will create an incipient surplus, causing the currency to appreciate (a leftward shift of the *BP* curve). With the currency appreciating, exports decrease and imports increase, and the *IS* curve shifts back leftward to IS'_{FP} . The system thus moves to a new equilibrium on the *LM* curve, for example, the intersection of IS'_{FP} and BP_{FP} , which misses both targets. The use of fiscal policy alone will lead to an interest rate that is too high and in all likelihood a level of income below Y^* . Attempts to reach Y^* by additional government spending will simply drive the interest rate higher. Further, in this process, exporters and producers of import substitutes would be hurt and the nontraded sector would gain.

The only way to obtain the two targets in question without causing exchange rate changes and affecting relative prices—and therefore, the structure of the economy—is to rely on both of the instruments. In Figure 4 (c), Y^* and i^* are obtained by the joint use of monetary and fiscal policies (IS' and LM'), which allows the economy to expand to Y^* without stimulating any expenditure-switching effects. For similar reasons, policymakers will likely find it effective to use both policy instruments to respond to exogenous shocks should they feel that a policy response is appropriate.

FIGURE 4 Monetary-Fiscal Policy Coordination under Flexible Exchange Rates



With the economy in equilibrium at Y_0 and i_0 , policymakers decide that it would be desirable to be at Y^* and i^* . However, it is possible to reach this combination only by the coordinated use of monetary and fiscal policies as shown in panel (c). Turning to panel (a), attempts to use only fiscal policy (a rightward shift in the IS curve to IS_{FP}) will lead to an incipient surplus and appreciation of the home currency. Consequently, the BP curve starts shifting left, and at the same time exports decrease and imports increase, causing the IS curve to shift left. The new equilibrium that must be on the LM curve will either miss the interest rate target at Y^* (i.e., i_{FP} will exist instead of i^*) or miss both targets such as at Y_{FP} and i_{FP} (IS_{FP} , BP_{FP} , LM). Attempts to use only monetary policy (a rightward shift in the LM curve to LM'), as demonstrated in panel (b), will lead to an incipient deficit and depreciation of the currency. Consequently, the BP curve will start shifting right (toward BP_1) and, as exports increase and imports decrease, the IS curve will also start shifting to the right. The new equilibrium will occur on LM' , but with a depreciated currency and hence with the IS' and BP_1 curves. Consequently, attempts to attain Y^* will lead to an interest rate less than i^* , or to a new equilibrium at i' and Y' , which misses both targets. Hence, the only way to attain the two targets simultaneously is with coordinated use of the two instruments.

CONCEPT CHECK

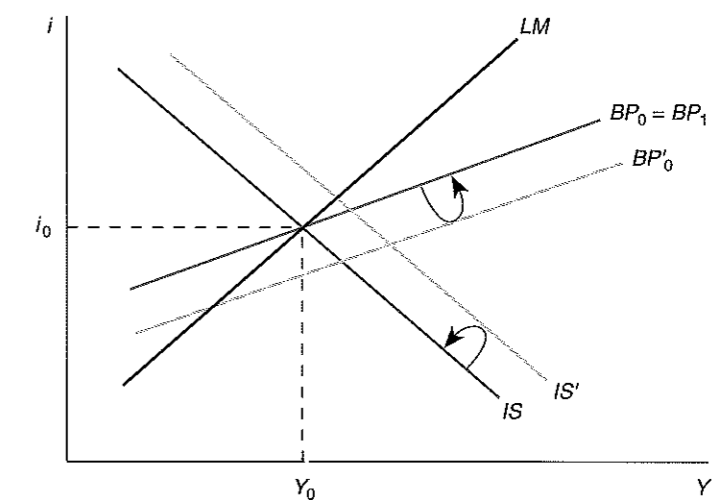
1. Under what capital mobility conditions is fiscal policy effective in pursuing an income target in a flexible exchange rate system? When is it totally ineffective? Why?
2. Why is it said that the effectiveness of monetary policy in altering income is enhanced by induced changes in the foreign sector in a flexible exchange rate system?

THE EFFECTS OF EXOGENOUS SHOCKS IN THE IS/LM/BP MODEL WITH IMPERFECT MOBILITY OF CAPITAL

The analysis to this point has focused on the impact of monetary and fiscal policy, holding a number of important variables constant. These include such variables as the level of prices at home, the level of prices abroad, and the interest rate abroad, as well as the expected profit rates at home and abroad, the expected exchange rates, and the trade policies and economic institutions at home and abroad. Because these variables can, and often do, change abruptly or unexpectedly, it is useful to examine briefly the effects of changes in selected variables through comparative statics to get some idea of how economic "shocks" are transmitted in an interdependent world under flexible exchange rates.

Suppose that there is a sudden increase in the level of foreign prices, that is, a **foreign price shock** (see Figure 5). There will be an expansionary effect (a shift of the IS curve to the right) on the home economy as exports increase and imports decrease in response to the price change in question. In addition, there will be a rightward shift in the BP curve (from BP_0 to BP'_0) since the expenditure-switching effect of the increase in foreign prices means that a higher level of domestic income is consistent with BOP equilibrium for each given home interest rate. With the increased spending (IS') on the country's products, income and the interest rate begin to rise. The rise in the domestic interest rate generates upward pressure on the value of the home currency (appreciation) because of short-term capital inflows, as has the improvement in the current account, and the BP curve will begin to shift back up. As the currency continues to appreciate, exports fall and imports rise, shifting the IS curve back toward its initial position. The final result is a return to the original Y_0, i_0 equilibrium position. Thus, we see that under (completely) flexible rates the economy is insulated from price shocks originating outside the country. This case is

FIGURE 5 Foreign Price Shocks and Macroeconomic Adjustment in the Open Economy

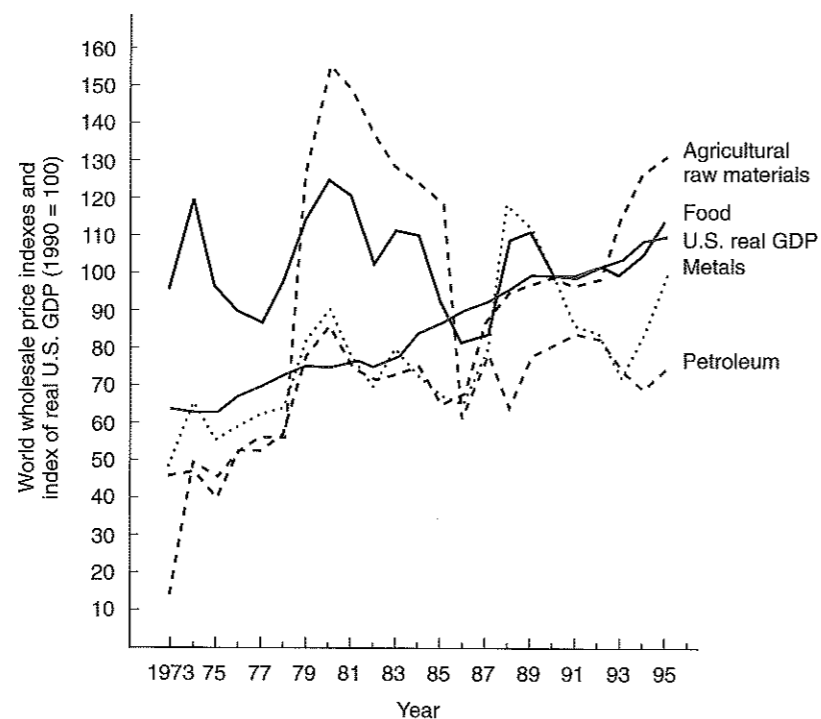


An increase in foreign prices causes the BP curve to shift out to BP'_0 and exports to rise and imports to fall. The improved current account shifts IS right to IS' , putting upward pressure on income and the interest rate. The improved current account and the higher domestic rate of interest produce an incipient balance-of-payments surplus, and the home currency begins to appreciate. With currency appreciation, the BP curve begins moving upward and the IS curve starts moving leftward. Equilibrium is again reached at Y_0 and i_0 as the appreciating currency offsets the foreign price shock.

CASE STUDY 1 COMMODITY PRICES AND U.S. REAL GDP, 1973-1995

Price shocks can originate in a number of ways, for example, increases in the money supply, fiscal expansion, simultaneous expansion of several key industrial countries, sudden increases in wages, and changes in real commodity prices. Figure 6 focuses on commodity price changes and portrays the movement of world wholesale prices of food, agricultural raw materials, metals, and petroleum over the period 1973-1995. Oil prices almost quadrupled from 1973 to 1974 and then virtually tripled from 1978 to 1980, before falling about 60 percent from 1980 to 1986. There was clearly considerable price variability during this period in the other, broader commodity categories as well.

FIGURE 6 Wholesale Prices and U.S. GDP, 1973-1995



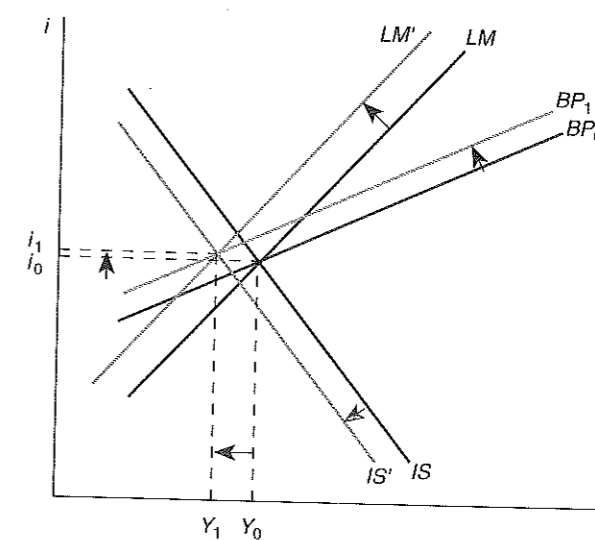
Sources: International Monetary Fund, *International Financial Statistics Yearbook 1996* (Washington, DC: IMF, 1996), pp. 108-9, 166-67; *Economic Report of the President*, February 1997 (Washington, DC: U.S. Government Printing Office, 1997), p. 302.

relevant to the period since 1973, when considerable price variability occurred in major commodity groups. (see Case Study 1).

Suppose on the other hand that there is a sudden increase in domestic prices, that is, a **domestic price shock** (see Figure 7). In this case, equilibrium in all three sectors will be affected. An increase in domestic prices will reduce the real money supply, shifting the *LM* curve to the left. At the same time, increased domestic prices will reduce the competitiveness of home exports and make imports more attractive to domestic consumers.

However, despite these major price shocks, real GDP in the United States demonstrated *relatively* steady growth over these years. Since major countries' exchange rates became more flexible in 1973, this relative stability of GDP is consistent with the notion that flexible rates tend to insulate an economy from external price shocks. Nevertheless, we do not wish to minimize the impact of the shocks, because unemployment and inflation in industrial countries were affected in particular by the OPEC price hikes in 1973-1974. The insulation from exogenous forces that was expected to accompany flexible exchange rates has not been complete (although exchange rates were and still are not completely flexible).

FIGURE 7 Open-Economy Adjustment to Domestic Price Shocks in a Flexible-Rate Regime

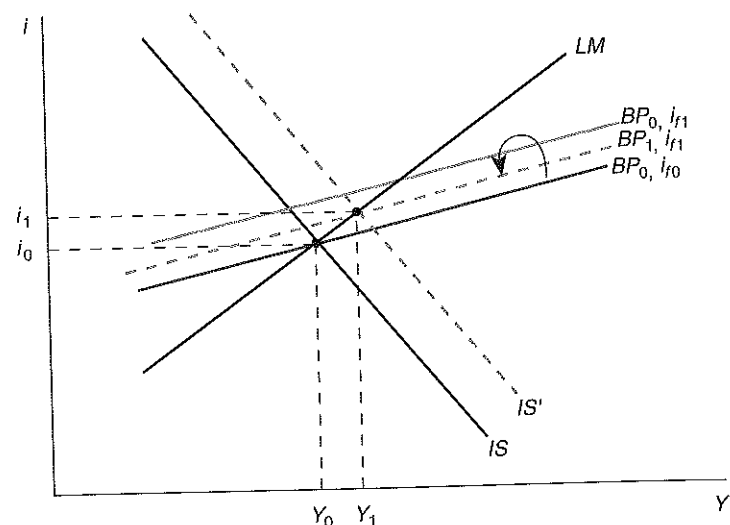


Assume that the economy is in equilibrium at Y_0 and i_0 . An increase in the domestic price level will affect equilibrium in all three sectors. The *LM* curve will shift to the left to LM' as the real supply of money falls. The *IS* curve will shift to the left as exports fall and imports rise. Finally, the *BP* curve will shift upward as the deteriorating trade balance requires a higher rate of interest for every level of income to balance the balance of payments. Equilibrium will occur on LM' at a lower level of income (Y_1) and a new rate of interest (i_1).

Consequently, the *IS* curve will shift to the left. Finally, these same trade effects will lead to an upward shift of the *BP* curve, since it will now take a higher interest rate to attract sufficient short-term capital to bring the balance of payments into balance at every level of income. These adjustments are shown in Figure 7 by LM' , IS' , and BP_1 . The new equilibrium will lie along LM' at a higher interest rate (i_1) and a lower level of income (Y_1) than the initial equilibrium (i_0, Y_0), although i_1 could be less than i_0 . Should the initial shifts in the *IS* and *BP* curves not lead to a simultaneous equilibrium point with LM' , an appropriate change in the exchange rate will occur, since an *IS/LM* equilibrium point that does not lie on the *BP* curve will bring about the requisite exchange rate adjustment.

Next, from an initial i_0, Y_0 , suppose that there is an increase in the foreign interest rate, that is, a **foreign interest rate shock** (see Figure 8). Since this will make foreign short-term investments more attractive and cause portfolio adjustments, one would expect an increased outflow (or decreased inflow) of short-term capital. With the new, higher interest rate abroad and the same exchange rate, a higher domestic interest rate is now required to balance the balance of payments at all income levels. Consequently, there is an upward shift in the *BP* curve from BP_0, i_0 to BP_0, i_1 . With the new *BP* curve, the previous equilibrium level of interest (i_0) is too low for attaining domestic balance-of-payments equilibrium, and an incipient deficit appears. The domestic currency begins to depreciate (shifting BP_0, i_1 to BP_1, i_1), and this depreciation stimulates exports and decreases imports. This current account impact (driven by the capital account developments) leads to a rightward shift in the *IS* curve to IS' . Eventually, a new equilibrium is reached on the *LM* curve with the new *BP* and *IS* curves. Both the interest rate (i_1) and the income level (Y_1) have increased. Thus, the initial rise in the foreign interest rate has led

FIGURE 8 Foreign Interest Rate Shocks and Macroeconomic Adjustment in a Flexible-Rate Regime



From the starting point of Y_0 and i_0 , the increase in the foreign interest rate makes short-term foreign investments more attractive. It therefore takes a higher domestic rate of interest to maintain external balance for all levels of income, and the BP curve shifts up to BP_0, i_1 . As domestic investors increase their short-term financial investments abroad, there is an incipient deficit and the home currency begins to depreciate (the BP curve moves downward). Depreciation stimulates exports and discourages imports, causing the IS curve to shift to the right. A new equilibrium results at a higher level of income (Y_1) and interest rate (i_1) at the intersection of LM , IS' , and BP_1, i_1 . In addition, if the higher foreign interest rate reduces the home demand for money, LM will shift farther to the right and income will rise even further.

to an increase in the domestic interest rate as well as to a depreciation of the home currency.

An additional consideration relates to portfolio adjustments. Because the foreign interest rate has risen, home country asset holders will also reduce their demand for domestic money as they rearrange their portfolios to take advantage of the higher foreign interest rate. With a decrease in home money demand, the LM curve of Figure 8 will shift to the right. The initial incipient BOP deficit will be even larger than discussed in the previous paragraph, and the depreciation of the home currency will be even greater. The simultaneous intersection of the final BP , LM , and IS curves will, as before, be at a higher income level than Y_1 . In the extreme case where home money demand is very responsive to the foreign interest rate, the LM curve could shift considerably to the right, and conceivably the new equilibrium interest rate could be lower than the original i_0 . We think that this result is very unlikely. However, it cannot be determined a priori whether the final interest rate will be above, below, or the same as i_1 . Finally, while there is no a priori way to discern whether the domestic adjustment to foreign interest rate shocks occurs relatively more via the exchange rate rather than via the domestic interest rate, some empirical evidence suggests that the exchange rate in practice carries the bulk of the adjustment between the United States and its major trading partners, with the possible exception of Canada (see the chapter "The Foreign Exchange Market").

As a last example of a shock, consider the case of a **shock to the expected exchange rate**. Suppose that, because of some exogenous event (such as the election of a foreign

government that is expected to stabilize its country economically), there is now an expected greater appreciation of the foreign currency (or, alternatively, an expected greater depreciation of the home currency). Recall the uncovered interest parity (UIP) expression from earlier chapters (and ignore any risk premium):

$$i_d = i_f + xa$$

where i_d = the domestic interest rate, i_f = the foreign interest rate, and xa = the expected percentage appreciation of the foreign currency. From an initial UIP equilibrium, the rise in xa will now make the term $(i_f + xa)$ greater than i_d and there will thus be a short-term capital outflow from the home country to the foreign country. This change in the expected exchange rate has the same impacts in the $IS/LM/BP$ diagram as did the foreign interest rate shock considered above, and Figure 8 can also be used to interpret this case. In terms of the figure, the rise in xa shifts the BP curve upward (to the left) since a higher domestic interest rate is now needed for home country BOP equilibrium at each income level. There is an incipient deficit at the old equilibrium income level Y_0 , and depreciation of the domestic currency thus takes place, moving the IS curve to the right and also causing the BP curve to move back to the right. The end result (as at Y_1 and i_1) is a higher income level and, as the UIP expression also suggests, a higher domestic interest rate.²

In overview of external shocks, it is important to note that the greater the economic interdependence among countries, the greater the general likelihood that foreign shocks (other things equal) will have an impact on domestic interest rates and/or the exchange rate. Domestic policymakers are forced to make decisions that take into account both domestic variables and foreign economic variables, so policymaking becomes more difficult.

For example, in the foreign interest rate shock case, a rise in the foreign rate led to an increase in the domestic interest rate. However, the domestic economy may be in such a state that domestic authorities do not wish to have a higher domestic interest rate. To offset the rise in the domestic rate, suppose the monetary authorities increase the money supply. From i_1, Y_1 in Figure 8, this shifts LM to the right (not shown) and generates an incipient deficit. The BP curve shifts to the right, as will the IS curve due to the currency depreciation. The income level rises above Y_1 and the interest rate falls below i_1 , perhaps all the way to i_0 . The country has thus negated to at least some extent the original effects of the foreign interest rate increase, but it has also generated depreciation of the home currency. The foreign country in turn has now experienced an appreciation of its currency to a greater extent than it originally expected. Consequently, its income level may fall, and it may consider taking appropriate policy actions to counter these effects. Note, of course, that changes in the exchange rate are important actors in this scenario.

To reduce the degree of instability in exchange rates and domestic variables caused by this kind of sequence of policy reactions, a case can be made that there should be greater **international macroeconomic policy coordination** in a regime of flexible exchange rates. Such coordination of macro policy is currently being fostered (see Case Study 2). The most obvious examples of such joint consultations in practice consist of the annual economic summits held each summer by leaders of the Group of 7 or **G-7 countries** (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States).

²Again, were the LM curve in Figure 8 to shift to the right because of a reduced home country money demand, the conclusions would be that there would be a greater initial incipient BOP deficit, a greater depreciation of the home currency, a greater expansion in domestic income, and a likely final domestic interest rate above i_0 .

❖ CASE STUDY 2 MACROECONOMIC POLICY COORDINATION, THE IMF, AND THE G-7

According to an IMF task force report, "Improving international coordination of national economic policies should be a major objective of industrial countries."^a The director of the task force, Robert Solomon, pointed out that, because the world had become increasingly integrated both with respect to trade and capital mobility, policymakers must take into account that their policy actions have spillover effects in other countries:

The failure to coordinate policies can be "dramatic," Solomon argued. He suggested that economic policy coordination among the major industrial countries could have averted at least some of the very sharp run up in inflation that followed the adoption of expansionary fiscal and monetary policies in 1972-73. Similarly, he observed, the 1981-82 downturn might have been less severe.

Policy coordination among industrial countries, Solomon contended, should aim to harmonize targets. Industrial countries should also seek to maintain consistency in the goals and targets that they pursue and in the instruments that they utilize. The Group of 7 generally aims for high levels of employment and growth and for relative price stability. Its instruments are primarily monetary and fiscal policy.^b

Because of the increased interdependency, the task force urged that governments become more flexible in their fiscal policy and that fiscal policy be focused more on medium-term targets instead of on short-term fine-tuning exercises.

In keeping with the greater focus on international coordination, the G-7 countries issued the following typical statement after their January meeting in New York in 1991:

The finance ministers and central bank governors of Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States met on January 20 and 21, 1991, in New York City for an exchange of views on current international economic and financial issues. The Managing Director of the IMF [Michel Camdessus] participated in the multilateral surveillance discussions.

The ministers and governors reviewed their economic policies and prospects and reaffirmed their support for economic policy coordination at this critical time.

^a"Task Force Backs Macroeconomic Policy Coordination," *IMF Survey*, Feb. 4, 1991, p. 33.

^b*Ibid.*, p. 41.

^c*Ibid.*

^d"G-7 Leaders Urge Strong IMF-Supported Policies in States of Former U.S.S.R.," *IMF Survey*, July 20, 1992, p. 226.

^eDavid Wessel and Jeffrey Birnbaum, "U.S. Lines Up Aid for Russia at G-7 Meeting," *The Wall Street Journal*, July 9, 1993, pp. A3-A4.

^fSee "G-7 Offers Proposals to Strengthen Bretton Woods Institutions," *IMF Survey*, July 3, 1995, pp. 201-5.

They noted that although growth in all their economies had slowed, expansion of the world economy continues, and the pace of activity could be expected to pick up later this year.

They noted that growth remains particularly strong in Germany and Japan.

Implementation of sound fiscal policies, combined with stability-oriented monetary policies, should create conditions favorable to lower global interest rates and a stronger world economy. They also stressed the importance of a timely and successful conclusion of the Uruguay Round.

The ministers and governors also discussed the situation in global financial markets in light of uncertainties arising from the Gulf war and developments in the Soviet Union. They agreed to strengthen cooperation and to monitor developments in exchange markets.

The ministers and governors are prepared to respond as appropriate to maintain stability in international financial markets.^c

This emphasis on policy coordination has become a permanent feature of the world policymaking environment. For example, in July 1992, the G-7 leaders pledged to continue to promote monetary and fiscal policies that would support economic recovery without reigniting inflation and that would permit lower interest rates by reducing members' budget deficits and government spending.^d In July 1993, the G-7 also demonstrated interest in specific country policies by encouraging Japan to implement macroeconomic policies that would reduce Japan's trade surplus and by praising President Bill Clinton for his efforts toward reducing the U.S. federal government budget deficit. Increasingly, other economic actions have also been agreed to by the G-7, such as the 1993 commitment of \$3 billion of financial aid to Russia for assistance in the privatization of government enterprises.^e Further, in June 1995, the G-7 countries introduced measures to reduce the likelihood of future crises similar to that of Mexico in late 1994 and early 1995,^f when huge amounts of foreign capital exited the country and the value of the peso dropped precipitously in currency markets.

❖ CASE STUDY 2 (CONTINUED)

In a recent book, Bergsten and Henning^g reviewed and assessed the record of the G-7. They indicated (p. 17) that there are five critical areas of international policy concern for the group: (1) world growth and stability, (2) exchange rates, (3) current account imbalances, (4) the stance of G-7 members toward other countries, and (5) the design of the international economic system. Bergsten and Henning pointed out, for example, the great success of the group in implementing the Plaza agreement in 1985 for correcting the overvaluation of the dollar (p. 21) and in devising arrangements

for sharing the financial burden of the conduct of the Gulf war in 1991 (p. 24). On the other hand, the G-7 failed to work out a coordinated growth strategy for recovery from the high unemployment and slow growth of industrialized countries in the early 1990s (pp. 27, 29), and the group failed to design an acceptable set of currency arrangements in a world where, according to Bergsten and Henning (p. 39), "the polar extremes of both fixed and flexible exchange rates have been tried and found wanting."

^gC. Fred Bergsten and C. Randall Henning, *Global Economic Leadership and the Group of Seven* (Washington, DC: Institute for International Economics, 1996).

CONCEPT CHECK

1. Explain the impact that a decrease in foreign prices has on the open economy under a flexible exchange rate system.
2. Using the *IS/LM/BP* framework, explain how an increase in the foreign interest rate influences the home country interest rate in the open economy under flexible exchange rates.

SUMMARY

This chapter has examined the automatic adjustment process under flexible exchange rates and the effects of discretionary economic policy under different capital mobility assumptions. It was found that monetary policy is effective in influencing income under flexible exchange rates, whereas it was ineffective under fixed rates. Further, the degree of effectiveness under flexible rates increases with the degree of capital mobility. Fiscal policy, on the other hand, was found to be much less effective under flexible rates than under fixed rates as capital becomes very mobile internationally, since expenditure-switching effects dampen initial expansionary effects. The

impacts of fiscal policy on national income are the strongest when capital is immobile. The flexible-rate system does, however, give the country more policy options than a fixed-rate system since the external sector is always in balance. If a country wishes to attain several domestic targets, the coordinated use of monetary and fiscal policies can be helpful. The chapter concluded with a discussion of automatic adjustment to exogenous shocks under a flexible-rate system. The realization that a number of these shocks are often taking place simultaneously makes one keenly aware of the difficulties surrounding effective policymaking in a system of flexible rates.

KEY TERMS

domestic price shock
foreign interest rate shock
foreign price shock
G-7 countries

incipient BOP deficit
incipient BOP surplus
international macroeconomic
policy coordination

monetary policy-fiscal policy
coordination
shock to the expected exchange
rate

QUESTIONS AND PROBLEMS

1. What will happen under flexible rates if the intersection of the *IS* and *LM* curves is below (or to the right) of the *BP* curve? Why?
2. What exogenous real and financial factors influence the position of the *BP* curve?
3. Under what capital mobility conditions is fiscal policy totally ineffective in influencing income? Explain why this result occurs.
4. One strong argument for a flexible exchange rate system is that it frees up monetary policy for use in pursuing domestic targets. Explain why this is so.
5. Why does monetary policy get a boost from the external sector under a flexible-rate system?
6. Suppose that policymakers decide to expand the economy by increasing the money supply. Based on the trade effects, who do you expect to favor such a policy? Who is likely to be against this policy? Why?
7. If short-term capital is neither perfectly immobile nor perfectly mobile internationally, why is the predicted impact of expansionary fiscal policy on the exchange rate ambiguous?
8. Explain, using the *IS/LM/BP* model, how a rise in the expected appreciation of the foreign currency can lead to an increase in domestic interest rates.
9. Why might it be argued that recent changes in international prices of food and energy have had a smaller impact on the U.S. economy than would have been the case under the pre-1973 pegged rate system?
10. "A sudden increase in interest rates in the European Union would likely lead to both depreciation of the U.S. dollar and upward pressure on U.S. interest rates." Agree? Disagree? Why?

P RICES AND OUTPUT IN THE OPEN ECONOMY

Aggregate Supply and Demand

INTRODUCTION

The analysis of trade and finance in the open economy up to this point has proceeded under the assumption that expansion and contraction of the macroeconomy would take place without affecting the level of prices. Although the comparative statics of a change in prices were examined in terms of the macroeconomic adjustment that would accompany such an exogenous shock in the previous chapter, no attempt was made to incorporate price changes endogenously into the analysis. Since changes in prices are a very important aspect of economic activity in the open economy, it is imperative to consider the interaction between the foreign sector and the domestic price level in the open macroeconomy. We will pursue this line of analysis using an aggregate demand and supply framework that incorporates the effects of trade and financial flows. The presentation begins by reviewing the concepts of aggregate demand and supply in the closed economy, taking into account differences between short-run and long-run effects. We will then open the economy and examine the effects of international transactions on the aggregate demand and supply curves under fixed exchange rates and flexible exchange rates. The chapter will conclude with a discussion of monetary and fiscal policy in the open-economy demand and supply framework and of the responsiveness of the economy to various shocks. This chapter should bring home to you the point that consideration of the price level complicates policy problems and, consequently, the design of effective macroeconomic policy. Also, you should note that, in the long run, measures that increase aggregate supply are paramount for increasing national income.

AGGREGATE DEMAND AND SUPPLY IN THE CLOSED ECONOMY

Aggregate Demand in the Closed Economy

We begin by reviewing the link between aggregate demand and prices in the closed macroeconomy. In the chapter "Economic Policy in the Open Economy: Fixed Exchange Rates," income and interest rate equilibrium was described using the *IS* and *LM* curves to portray equilibrium in the real sector and the money market, assuming that prices were constant. From the demand perspective, macroeconomic equilibrium takes place at the level of income and the interest rate determined by the intersection of the *IS* and *LM* curves. What happens to equilibrium in this model when prices change? Since equilibrium in the goods sector is measured in real terms, price changes do not directly affect the *IS* curve. Changes in price do, however, affect the size of the real money supply, M_r/P . As the price level rises, the real money supply declines; a decline in the real money supply