22 INTERNAL AND EXTERNAL BALANCE WITH FIXED EXCHANGE RATES

Fixed exchange rates can reduce the variability of currency values if governments are willing and able to defend the rates. This chapter examines the macroeconomics of a country whose government has chosen a fixed exchange rate.

Many major countries of the world have instead chosen floating rates (albeit with modest amounts of government management). Why study fixed rates? There are three major reasons. First, within the current system a substantial number of countries do fix their exchange rates. A number of developing countries fix their currencies to a single other currency, mostly the U.S. dollar or French franc. A number of other countries fix their currencies to a basket of other currencies. Perhaps most important, a number of members of the European Union have adopted a system of fixed rates among their currencies. Second, in the current system a number of countries have floating rates in name, but the rates are so heavily managed by the governments that they are closer to being fixed rates in many respects. Third, there are continuing discussions about returning to a system of fixed rates among the world's major currencies. Proposals range from target zones that would be a kind of crawling peg with wide bands, to a return to the gold standard. Before we can assess the desirability or feasibility of such proposals, we need to understand how a fixed exchange rate affects both the behavior of a country's economy and the use of government policies to affect the economy's performance.

The analysis of the chapter shows that defense of a fixed exchange rate through official intervention in the foreign exchange market dramatically affects the country's monetary policy. The intervention can change the country's money supply, setting off effects that tend to reduce the payments imbalance. But this process also limits the country's ability to pursue an independent monetary policy. Defending the fixed rate also has an impact on fiscal policy, which actually becomes more powerful if international capital is highly mobile. In addition, intervention to defend the fixed rate affects how the country's economy responds to shocks, both shocks that come from within the country and shocks that are international in origin.

Fixed rates challenge government policymakers who are attempting to guide the country to both external balance (balance in the country's overall international payments) and internal balance (actual production equal to the economy's supply potential, or a high level of employment—"full employment"—without upward pressure on the country's inflation rate). Internal and external balance are often hard to reconcile in the short and medium runs. A government that pursues external balance alone, tidying up its balance of payments while letting inflation or unemployment get out of hand at home, may be thrown out of office. On the other hand, controlling national production alone, with fiscal or monetary policies, may widen a deficit or surplus in the balance of payments, jeopardizing the promise to keep the exchange rate fixed.

One possible solution is a subtle mixture of policies, with monetary policy assigned to reducing international payments imbalances, and fiscal policy assigned to stabilizing national production (GDP). Another possible "solution" is surrender—to change the fixed rate by devaluing, revaluing, or shifting to a floating rate. The chapter looks at both ideas, and concludes by considering the conditions that influence whether a change in the fixed rate will be successful in improving the country's internal and external macroeconomic performance.

From the Balance of Payments to the Money Supply

Once a country's government has decided to have a fixed exchange rate, the government must defend that rate. As discussed in Chapter 20, the first line of defense is official intervention—the monetary authority (central bank) buys or sells foreign currency in the foreign exchange market as necessary to steady the rate within the allowable band around the central value chosen for the fixed rate. Chapter 20 showed that several implications follow from official intervention. First, the holdings of official reserves change as the authority buys or sells foreign currency. Second, the country's money supply may change as the authority sells or buys domestic currency as the other half of its official intervention.

Our goal in this and the next three sections of the chapter is to show how these effects occur and what implications they have for the country's macroeconomy. To begin, let's consider the balance sheet of the country's central bank. For our story, the assets held by the central bank can be divided into two major types: official international reserve assets (R) and domestic assets (D). The domestic assets are not international reserves because they are denominated in domestic currency. Two major types of domestic assets are bonds and similar debt securities issued by the country's government and loans that the central bank has made to (regular) domestic banks or other domestic financial institutions.

On the other side of the balance sheet, the two liabilities of interest to our story are the domestic currency (paper money and coins) issued by the central bank and the deposits that the country's (regular) domestic banks (or other domestic financial institutions) have placed with the central bank. The deposits from regular banks may be required by regulations of the central bank. In addition, the

central bank often uses the deposits from banks in the process of settling payments between domestic banks (for instance, in the process of clearing checks drawn on one bank but payable to another).

The country's money supply consists (mainly) of currency held by the public and various types of deposits (like checking accounts) that the public has at regular banks. The country's central bank has the ability to influence the total amount of these bank deposits from the public because banks are required to hold, or wish to hold, certain assets as bank reserves to "back up" these deposit liabilities. The types of assets that count as bank reserves are a bank's holdings of currency "in its vault" and the bank's holdings of deposits at the central bank. The amount of reserves that a bank is required to hold is typically some fraction of the deposits that the bank owes to its customers, which is called **fractional reserve banking.**[1]

In this setting the central bank controls the country's money supply by controlling its own balance sheet and by setting the reserve requirements that (regular) banks must meet. To see this, consider what happens if the central bank allows its liabilities to increase. This will expand the money supply. If the increase is in the form of an increase in currency that is held by the public, then the money supply increases directly. If the increase is in the form of liabilities that count as bank reserves (either currency in bank vaults or deposits from banks), then banks can increase the value of their deposit liabilities, and they can increase deposits by a multiple amount of the value of the increase in bank reserves. With fractional reserve banking, each dollar of extra bank reserves can back up several dollars of deposits (where *several* is the reciprocal of the reserve requirement fraction). The multiple expansion of the money supply with fractional reserve banking is called the **money multiplier process.**[2]

With this background on the country's central bank and its control of the country's money supply, let's return to the effects of official intervention used to

---

[1]As you can see, the standard terminology seems intended to confuse us. *Bank* shows up in two ways. The country's *central bank* is the official monetary authority that controls monetary policy and also (usually) is the authority that undertakes official intervention in the foreign exchange market. Regular banks, often just called *banks,* conduct regular banking business (making loans, taking deposits, transacting in foreign exchange) with regular customers (for instance, individuals, businesses, and government units) and among themselves (for instance, interbank loans and interbank foreign exchange trading). *Reserves* is an even more dangerous term. A central bank (or the country's relevant monetary authority if it is not exactly a central bank) holds *official reserve* assets. Regular banks hold *bank reserves* as assets, usually in proportion to their deposit liabilities. Part of these bank reserves is usually in the form of deposits that these regular banks have at the central bank. (Just to add to the soup, there is another type of reserve in bank accounting—liability items such as reserves for bad loans—but these are not part of our main story.)

[2]This description of the central bank and the way in which it controls the country's money supply is appropriate for the United States (the Federal Reserve or "Fed") and for many other countries. A number of central banks (including the Bank of Japan) that previously had different procedures have been shifting toward this approach. Still, some countries use different procedures (for instance, implementing monetary policy through limits on the expansion of loans by banks to their customers). Analysis of such countries would need to be modified somewhat to match their procedures, but the major conclusions to be reached in the sections below generally still apply.

defend the fixed exchange rate. If the country has an official settlements surplus, so that the country's currency is experiencing upward pressure (a tendency for the exchange rate r to decrease), the central bank must intervene to buy foreign currency and sell domestic currency. On its balance sheet this is an increase in official international reserve holdings (R) and an increase in its liabilities (as the domestic currency is added to the economy). This increase in liabilities could be in the form of an increase in actual currency outstanding (if the central bank delivers the domestic currency as currency itself). More likely, and more efficiently in terms of the process, the central bank probably delivers the domestic "currency" to a regular bank (the bank with whom it is transacting in the foreign exchange market) by increasing the deposits that the bank has at the central bank. In either case, the country's money supply will increase. If, as is likely, the reserves held by banks increase (because their deposits at the central bank increase or their holdings of vault cash increase), then the money supply can increase by a multiple of the size of the central bank intervention in the foreign exchange market.

If instead the country's official settlements balance is in deficit and the country's currency is under downward pressure (a tendency for r to increase), the central bank must intervene to sell foreign currency and buy domestic currency. On its balance sheet this is a decrease in official international reserve holdings (R) and a decrease in its liabilities (as the domestic currency is removed from the economy). The central bank probably collects the domestic "currency" by decreasing the deposits that the regular bank involved in the foreign exchange transaction has at the central bank. Then the reserves held by banks decline (because their deposits at the central bank decrease), and the money supply must decrease by a multiple of the size of the central bank intervention in the foreign exchange market (the money multiplier in reverse).

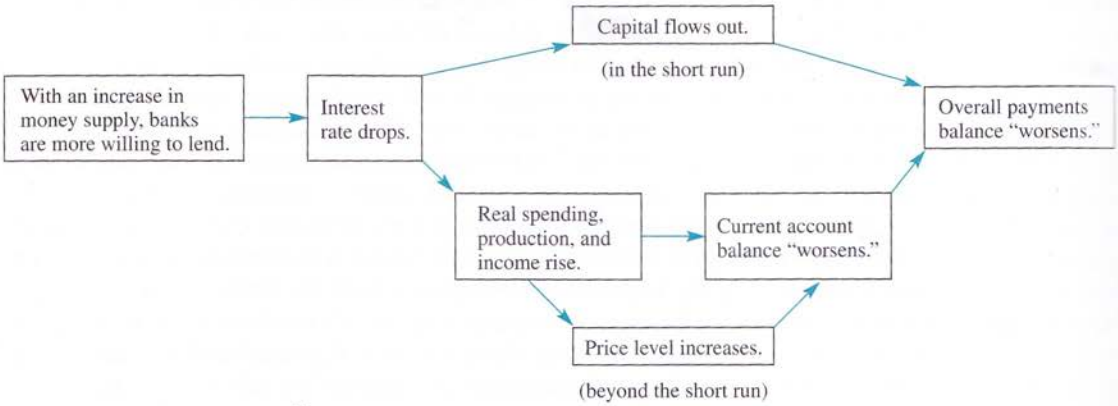
The conclusion here is that official intervention alters the central bank's assets and liabilities in ways that change not only the country's holdings of official international reserve assets but also the country's money supply, unless the central bank does something else to attempt to resist the change in the money supply. Indeed, under fractional reserve banking, the change in the money supply will be a multiple of the size of the intervention.

From the Money Supply Back to the Balance of Payments

If official intervention changes the country's money supply, what are the implications for the country's balance of payments and for the country's macroeconomic performance in general? The change in the money supply sets off several effects that tend to reduce the payments imbalance.

Consider first the case in which the country begins with a surplus in its balance of payments. The surplus requires official intervention in which the central bank buys foreign currency and sells domestic currency. The domestic money supply increases "automatically" as the central bank increases its liabilities when

FIGURE 22.1 *Expanding the Money Supply Worsens the Balance of Payments with Fixed Rates*



For a decrease in the money supply, reverse the direction of all charges.

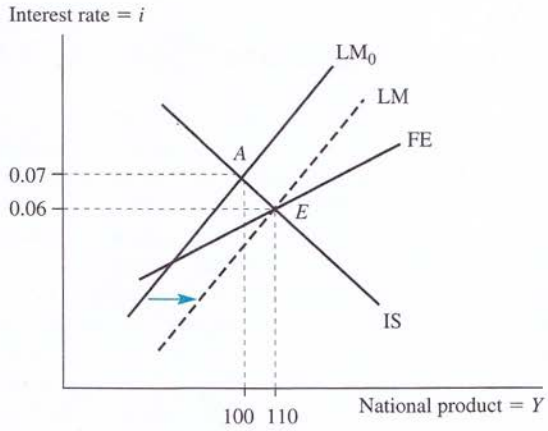
it sells domestic currency. The effects of the increase in the money supply on the balance of payments are clear-cut, as Figure 22.1 shows. As the central bank increases bank reserves, banks are more liquid and want to expand their business. They seek to make more loans. In the process, their competition to lend more is likely to bid down interest rates. The lowering of interest rates in the economy, at least in the short run, has several effects on the balance of payments. One is through the country's capital account. The decline in interest rates causes some holders of financial assets denominated in the foreign currency to seek higher returns abroad. The international capital outflow causes the capital account to "deteriorate" (become less positive or more negative).[3] This effect on the capital account can occur quickly, but it may not last long. Once portfolios are adjusted, any ongoing capital flows are likely to be smaller. In fact, the outflows could reverse when bonds mature or loans come due. (In addition, the extra foreign investment is likely to set up a stream of income payments that the country receives in the future.)

Another effect is on the current account because of changes in real income, in the price level, or in both. The decrease in domestic interest rates encourages interest-sensitive spending—for instance, through more borrowing to support additional new real investment projects. The expansion in spending results in an increase in real national product and income (assuming that there is some availability of resources to expand production in the economy). The rise in income increases imports of goods and services and "worsens" the current account balance. (A smaller surplus or a larger deficit results.) In addition, the extra spending can put upward pressure on the price level in the economy, especially if the

[3]We are assuming that the change in the domestic interest rate lowers the interest differential because foreign interest rates have not changed or have not changed as much. In addition, we are assuming that expectations of future spot exchange rates have not changed. For instance, international investors believe that the fixed rate will be maintained so the expected future spot rate remains about equal to the current spot rate.

FIGURE 22.2

Payments Adjustments for a Surplus Country with Fixed Rates



If the country begins at point A with a payments surplus, intervention to defend the fixed exchange rate results in an increase in the money supply. The LM curve shifts down or to the right, and the surplus falls toward zero as the IS–LM intersection shifts towards point E.

expansion of aggregate demand pushes against the supply capabilities of the economy. If prices and costs in the economy rise, then the country's international price competitiveness deteriorates, and the country's current account worsens. Which of these two effects actually occurs depends on the starting point for the economy and the time frame involved. If the economy begins with unemployed resources, then the effect through real income is likely to be larger. If the economy starts close to full employment, then the effect through the price level is likely to be more important, at least beyond the short-run period when prices are sticky.

Thus, official intervention by a country that initially has a balance-of-payments surplus can increase the money supply, and this increase in the money supply sets off adjustments in the economy that tend to reduce the size of the surplus. Key features of the adjustment can be pictured using an IS–LM–FE diagram. Suppose that the economy is initially in equilibrium at point A in Figure 22.2, the intersection of the initial IS and LM_0 curves. This point is to the left of the FE curve, showing that the country has a surplus in its official settlements balance. Official intervention to defend the fixed rate increases the money supply, shifting the LM curve down or to the right. As the LM curve shifts down, the equilibrium interest rate decreases and national product and income increase. The intersection of the IS curve and the new LM curve is moving closer to the FE curve. If the price level does not change, then full adjustment has occurred (probably over several years) when the LM curve has shifted down to the triple intersection at point E. The equilibrium interest rate has fallen from 7 percent to 6 percent, national product has risen from 100 to 110, and the official settlements balance is zero (because the economy is on the FE curve).[4]

[4]If the price level also increases, then both the FE and IS curves will shift to the left as the country loses international price competitiveness. The LM curve will shift by less, and the triple intersection will occur with a somewhat lower real national product.

Short of Reserves? Call 1-800-IMF-LOAN

The International Monetary Fund (IMF) is considered by some to be the friend of countries in need during their times of large payments deficits. But others think it's a big bully and the front man for the rich countries, as the IMF imposes economic constraints on the world's poorer countries. What view is right?

The IMF was designed as part of the 1944 Bretton Woods agreement that also set up the postwar fixed-rate system. The IMF began operation in 1946 and by 1994 had 178 member countries. On joining the IMF, each member contributes a quota—one-quarter in the form of assets generally recognized as official international reserves, and the other three-quarters in its own currency. The size of the quota is roughly related to the country's economic size, and the size determines the country's voting rights on the Board of Directors. For instance, the United States has about 19 percent of the voting rights. Periodically, the sizes of the countries' quotas are increased to expand the IMF's financial resources. The IMF also borrows from some of its members and receives voluntary contributions from some.

The IMF has several major purposes. It promotes the expansion of international trade and international monetary cooperation among countries. It seeks to maintain orderly foreign exchange arrangements through surveillance of the exchange rate policies of its member countries. Especially, countries should not manipulate their exchange rate to gain unfair competitive advantages. The IMF seeks to establish unrestricted convertibility of currencies for current account payments. It created the special drawing right (SDR) as a new official reserve asset and occasionally makes new allocations to its members (the most recent during 1979–81). The IMF collects, exchanges, and publishes national economic and financial data. And, most important to our purpose here, the IMF lends to its members when appropriate to give them time to correct payment imbalances. In the early years, most such loans were to industrialized countries recovering from wartime destruction and disruptions. In recent decades nearly all IMF loans have been to developing countries.

Most IMF lending is to countries with large payments deficits, countries whose official reserves are declining to low levels. The loans provide additional official reserve assets to the country. The country can use these additional reserves to buy time for the country to make orderly macroeconomic adjustments to reduce the deficit, without resorting to exchange controls or trade restrictions. Ideally, the adjustment can occur without excessive costs or disruptions to the country or to other countries. Loans from the IMF are extended under a number of different programs. The standard loans, made from the country's "credit tranches" linked to the country's quota contributions

If the country instead begins with a deficit in its official settlements balance and downward pressure on the exchange rate value of its currency, then all of these effects work in the reverse direction. The domestic money supply decreases, and domestic interest rates increase, at least in the short run. The rise in interest rates draws a capital inflow, improving the capital account. The rise in interest rates also lowers aggregate demand and real national product, reducing imports and improving the current account. The weak aggregate demand also puts downward pressure on the economy's price level, at least beyond the short-run period in which prices are sticky. This increases the country's international price competitiveness and improves its current account. The overall balance of payments improves—the deficit declines toward zero. The country's IS–LM intersection is initially to the right of the FE curve. The LM curve then shifts up or to the left, and eventually a triple intersection is achieved.

to the Fund, are general-purpose. Other programs target specific purposes or types of countries, including loans to cover temporary shortfalls in export earnings due to declines in world commodity prices, loans to countries making the transition from central planning to freer markets, and loans with very low interest rates to very poor countries. Most IMF loans are to be repaid in 5 years; some are to be repaid in 10 years. Maximum amounts of loans from various programs are in proportion to a country's quota.

The IMF only makes loans that it expects to be repaid. The IMF requires a borrowing country to agree to how it intends to correct its payments imbalance. That is, the IMF imposes **conditionality**—the IMF makes a loan only if the borrowing country commits to and enacts changes in its policies, with quantified performance criteria. The policies should promise to achieve external balance within a reasonable time. The IMF disburses some loans in pieces over time, and it withholds pieces if the performance criteria are not met. The policy changes that are usually included in an IMF adjustment program are not surprising. They include fiscal and monetary restraint, liberalization of restrictions on domestic markets and on international trade, and deregulation.

What is the record for these IMF loans? Do they work? One answer is repayment. Prior to the mid-1980s, nearly all loans had been repaid on time. However, since 1985, rising amounts, reaching over 10 percent of IMF loans outstanding, have not been repaid on time.

Do the loans assist payments adjustment? Evaluation of the effects of the loans and the conditions attached to them is difficult—what would have happened without them? Nonetheless, the programs accompanying IMF loans typically appear to result in increases in a country's exports, but little or no reduction in the payments deficits. Many countries appear to be chronically dependent on IMF loans. Sixty countries have borrowed in almost every year since their first borrowing from the IMF. Many countries also fail to comply with the conditions set in the loan agreements.

The conclusions about IMF loans and the adjustment programs that accompany them suggest that the IMF is neither the great friend nor the outside bully. In fact, the programs seem to be rather ineffective. This does not mean that the IMF policy prescriptions are wrong. In fact, the IMF approach has passed a sort of market test, at least in one part of the developing world, Latin America. Since the late 1980s, many governments of Latin American countries, even those not getting IMF loans, have adopted economic policies of the sort that the IMF usually recommends. While the performance of these countries has not been perfect in the time since they changed their policies, in most countries the performance is an improvement over that of previous years. Perhaps the ineffectiveness of IMF adjustment programs has more to do with the local politics of implementing (or not implementing) them, and less to do with the shortcomings of the programs themselves.

The thrust of the analysis is clear. If an external imbalance exists, intervention to defend the fixed rate changes the domestic money supply. The money supply change causes adjustments that move the country back toward external balance. So what is the problem? Possible problems are of two types. First, the process is based on changes in the country's holdings of international reserve assets. For a country that begins with a payments surplus, the monetary authority will acquire official international reserves assets. For a deficit, the authority will lose official reserves. Officials may view either change as undesirable. However, this may not really be a problem if the authority *accepts* that the money supply must change (and the LM curve must shift). The central bank can simply use its *domestic* operations to speed up the adjustment. For instance, the country can use open market operations in which it buys or sells government securities. In the surplus situation, the country could expand the money supply more quickly,

and lower interest rates more quickly, by buying domestic government securities. This open market operation adds to both the assets and the liabilities of the central bank. In paying for the securities, the central bank increases bank reserves. By changing monetary conditions more quickly, external balance is achieved more quickly. Official reserve assets (R) increase by less because some of the increase in the domestic money supply is the result of the increase in domestic assets (D) held by the central bank. In the deficit situation, the country could contract the money supply by selling domestic government bonds in an open market operation. Bank reserves decrease, the money supply contracts, and interest rates rise more quickly. The payments deficits shrinks more quickly, and external balance is achieved more quickly. Official international reserves do not decrease as much; instead, part of the money supply decrease is the result of a decrease in domestic assets held by the central bank.

A second possible problem with the adjustment toward external balance is that it may not be consistent with internal balance. In the surplus situation, the increase in the money supply can put upward pressure on the country's price level, and this pressure toward a positive (or higher) rate of inflation may be viewed as undesirable—a shift toward internal imbalance. In the deficit situation, the decrease in the money supply can result in a recession (declining real production), with rising unemployment.

Sterilization

Rather than allowing automatic adjustments to proceed (or speeding them up), the monetary authority instead may want to *resist* the change in the country's money supply. One reason for resistance is that the money supply change would tend to create an internal imbalance, as just described. Another is that the authority may believe that the international imbalance is temporary and will soon reverse. This was the case of temporary disequilibrium discussed in Chapter 20.

The central bank can keep the external surplus or deficit from having an impact on the domestic money supply by taking an *offsetting* domestic action. **Sterilization** is the practice of taking an action to reverse the effect of official intervention on the domestic money supply. If the central bank is intervening to defend the fixed rate in a situation of payments surplus by selling its national currency in exchange for foreign currency, the money supply would tend to increase. This can be sterilized if the central bank, for instance, undertakes an open market operation in which the central bank sells domestic government bonds. While the intervention in currency markets tends to expand the money supply, the open market operation tends to reduce it by reducing both the domestic assets held by the central bank and the central bank liabilities that serve as the base for the domestic money supply. In the case of a deficit, the central bank can sterilize the official intervention (buying the nation's currency) by buying domestic government bonds with that same currency in an open market operation.

Sterilized intervention does not change the money supply. Instead, in the case of a surplus, the central bank increases its holdings of official reserve assets

and decreases its holdings of domestic assets like government bonds. (D decreases as R increases.) The changes are on the asset side of the central bank's balance sheet, and thus sum to zero. If the central bank's liabilities do not change after the combination of the two activities, then the money supply should not change either.

Because a sterilized intervention does not change the money supply, the LM curve does not change. In Figure 22.2 the economy's equilibrium remains at point A. There is no adjustment toward external balance. At best this is a wait-and-see or a wait-and-hope strategy. Perhaps something else will shift the FE curve toward point A, or some other source of change will shift the IS–LM intersection toward the FE curve. If nothing else moves the economy toward external balance, there are limits to the ability of the monetary authority to use sterilized intervention to continue to run a payments imbalance. In the case of the payments surplus, the limit may be (1) the unwillingness of the central bank to continue to increase its holdings of official reserve assets or (2) the complaints by other countries about the country's ongoing surplus. Taiwan found itself in this situation in the 1980s, when its intervention resulted in official reserve holdings that grew rapidly to a value equal to about three-quarters of the value of its annual national income. Pressure by the U.S. government then induced Taiwan to allow its currency to appreciate quickly during 1986–87. Or, more concretely, the limit may come when the central bank has decreased its holdings of domestic assets to zero and thus has no domestic assets left to sell in open market operations.

In the case of a payments deficit, the limit is the inability of the central bank to obtain foreign currency to sell in the official intervention. The country's official reserve assets may dwindle toward zero (and it also cannot borrow more foreign currencies because of its precarious international position).[5] This limit can be dramatic—if international investors and speculators believe that the central bank is low in its holdings of official reserves, a currency crisis based on the one-way speculative gamble discussed in Chapter 20 can develop.

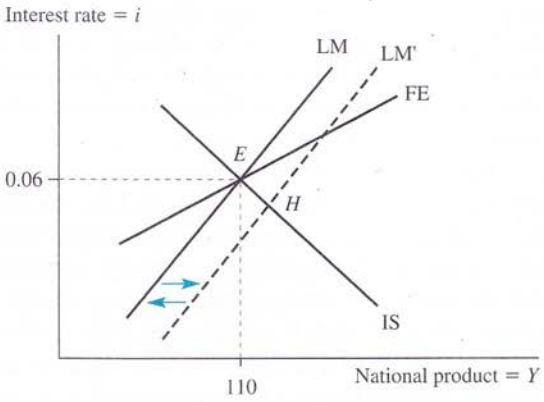
Monetary Policy with Fixed Exchange Rates

The discussion of the preceding two sections has a major implication—*fixed exchange rates greatly constrain a country's ability to pursue an independent monetary policy.* To a large degree the country's monetary policy must be consistent with maintaining the value of the fixed rate. Payments imbalances place pressure for changes in the money supply driven by the intervention to defend the fixed rate. Sterilization can be used to resist these money supply changes, but there are limits to how long the country's central bank can use sterilization, especially if the central bank's holdings of official reserves are declining because of a payments deficit.

[5]In situations like this, the country's government may turn to the International Monetary Fund, as the accompanying box discusses.

FIGURE 22.3

Expansionary Monetary Policy with Fixed Rates

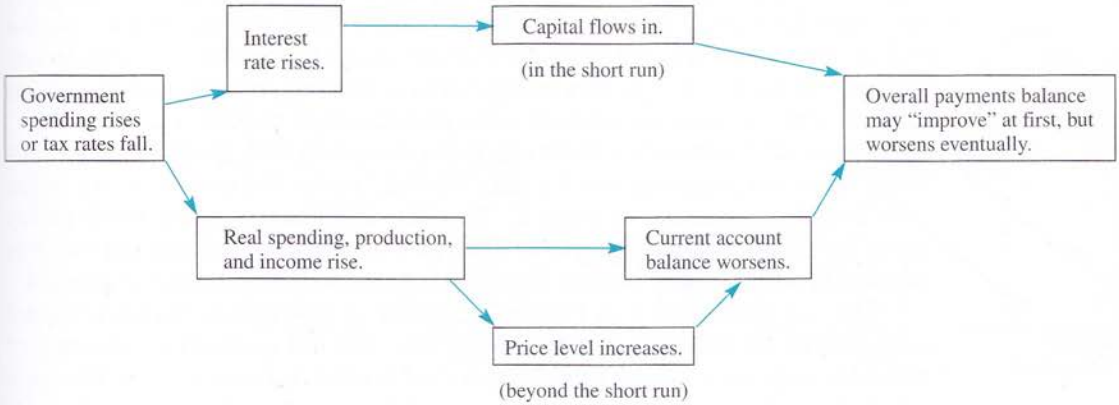


Starting from point *E* with an overall payments balance of zero, the country attempts to implement an expansionary policy. The LM curve shifts down or to the right, but at point *H* the payments balance is in deficit. Intervention to defend the fixed exchange rate decreases the money supply, and the LM curve shifts back up, eventually returning the country to point *E*.

Even if the country begins with a payments balance, its ability to pursue an independent monetary policy is greatly constrained. To see this, consider a country that initially has an official settlements balance of zero. While the country has achieved external balance, the country may believe that it has not achieved internal balance. Specifically, it has a high unemployment rate and wants to expand its national product. To pursue this goal with monetary policy, it attempts to implement an expansionary monetary policy. For a time this policy may increase real product. But the country's official settlements balance will go into deficit through the process shown in Figure 22.1. Both the current account and capital account will go into deficit. The country then must intervene to defend its fixed rate, selling foreign currency and buying domestic currency. This reduces the domestic money supply, effectively forcing the country to abandon its expansionary policy. Even if the central bank resists this for a while using sterilization, it cannot continue to sterilize indefinitely. Eventually, the country must allow its money supply to shrink (or pursue some other adjustment like an exchange rate change).

This process can be seen in Figure 22.3, where the country is initially at point *E*, a triple intersection. The increase in the money supply shifts the LM curve down or to the right. The IS–LM intersection at point *H* indicates that real national product has increased, but the new intersection is to the right of the FE curve, indicating a payments deficit. As the country intervenes, the money supply shrinks and the LM curve shifts back. If nothing else changes, the LM curve shifts back to the original triple intersection. In this example, in contrast to the analysis in the earlier sections, we are starting from payments balance and conducting the analysis as "from the money supply to the balance of payments" and then "from the balance of payments back to the money supply." In the process we conclude that the ability to change the money supply is limited, and eventually stops, because of the feedback from the balance of payments and the need to defend the fixed rate.

FIGURE 22.4 *How Expansionary Fiscal Policy Affects the Balance of Payments with Fixed Rates*



For contractionary fiscal policy, reverse the direction of all changes.

Fiscal Policy with Fixed Exchange Rates

Fiscal policy is implemented by changing government spending and taxes. A change in fiscal policy affects the balance of payments through both the current account and the capital account. Let's examine the case of an expansionary fiscal policy, say a rise in government purchases of goods and services. This case is summarized in Figure 22.4. (Contractionary fiscal policy is analyzed in the same way, with all of the changes occurring in the opposite direction.)

The extra government spending means bigger government budget deficits (or reduced budget surpluses, although budget surpluses seem to be rare these days). The government is borrowing more and driving up interest rates. The higher interest rates should attract a capital inflow, "improving" the country's capital account.

The extra government spending also increases aggregate demand and increases real national product (assuming that some resources are available to expand production).[6] The extra spending spills over into extra import demand, "worsening" our current account balance. In addition, the extra aggregate demand may put upward pressure on the price level once we pass beyond the short-run period in which the price level is sticky. If the price level increases, then the country loses international price competitiveness, another reason that the current account deteriorates.

The effect on the country's overall balance of payments depends on the magnitudes of these changes. Given the worsening of the current account, we can examine the effect on overall balance as a question of how responsive international capital flows are to interest rate changes. If international capital flows are very

[6] In the short run this is true even if there is partial crowding out as interest-sensitive domestic spending decreases somewhat when interest rates increase.

responsive to interest rate changes, then the capital inflows will be large, and the official settlements balance will go into surplus. If the capital flows are unresponsive, then the capital account will improve only a little, and the overall balance will go into deficit. The effect on the overall balance is probably also affected by timing—the capital inflows may be large at first, but they probably will dwindle as international portfolios are adjusted to the new economic conditions.

Figure 22. 5 shows the effects of a fiscal expansion with fixed exchange rates in the short run assuming that the price level is steady. For both cases we begin with a triple intersection at point *E*. The shift to an expansionary fiscal policy shifts the IS curve to the right, to IS'. The new intersection with the LM curve is at point *K*, with a higher interest rate and a higher level of real national product.[7]

The two cases shown in Figure 22.5 differ in how responsive international capital flows are to changes in the interest rate. The left graph shows the case of relatively responsive capital flows so that the FE curve is relatively flat. The right graph shows the case of unresponsive capital flows so that the FE curve is relatively steep. If capital flows are responsive, as in Figure 22.5A, then the new intersection point *K* lies to the left of the FE curve, and the overall payments balance goes into surplus. If they are unresponsive (Figure 22.5B), then point *K* lies to the right of FE, and the overall balance goes into deficit.[8]

The discussion so far has offered conclusions about the effects of a fiscal policy change on the domestic economy and on external balance. It might seem that we can stop here, but we should not. If the official settlements balance shifts into surplus or deficit, then official intervention is needed to defend the fixed exchange rate, and the country's money supply will change (although this effect might be postponed if the intervention is sterilized). If the intervention is not sterilized; then interest rates and national product will be affected further as the money supply changes. The direction of this effect depends on whether the overall balance shifts into surplus or deficit.

If capital flows are very responsive to interest rates, then overall payments go into surplus, and the central bank must intervene by selling domestic currency and buying foreign currency. With no sterilization, the domestic money supply expands, reducing interest rates and supporting a further expansion in national product. In Figure 22.5A, the increase in the money supply shifts the LM curve down or to the right. It will eventually shift to the dashed LM', where a new triple intersection is achieved at point E'. In this case, fiscal policy becomes more powerful in increasing real GDP because the monetary authority expands the money supply as it intervenes to defend the fixed exchange rate.[9]

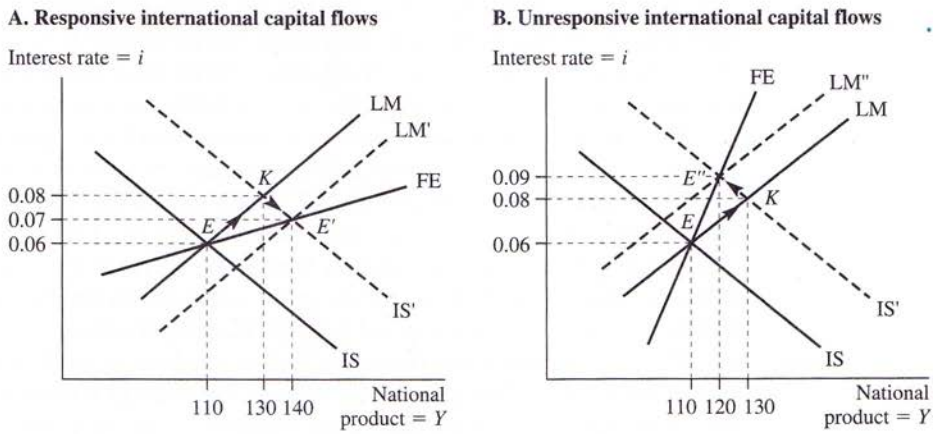
---

[7]Another way to see the pressure for a higher interest rate is to use the direct logic of the IS–LM analysis. The increase in real income and spending increases the transaction demand for money, but there is no increase in the money supply (assuming, at least initially, that the central bank does not permit any increase because of an unwillingness to shift its monetary policy). The extra money demand must be choked off by an increase in interest rates. (All of this represents a movement along the LM curve from *E* to *K*.)

[8]The slope of the FE curve does not matter much in analyzing monetary policy, because there is no ambiguity in the direction of effects on the overall balance for an attempted shift in monetary policy such as that analyzed in Figure 22.3.

FIGURE 22.5

Expansionary Fiscal Policy with Fixed Exchange Rates



Expansionary fiscal policy shifts the IS curve to the right and the IS–LM intersection shifts from E to K. The effects of fiscal policy depend on how strongly international capital flows respond to the interest rate increase. In panel A, the overall payments balance goes into surplus. (K is to the left of FE.) In panel B, the overall payments balance goes into deficit. (K is to the right of FE.) In either case the payments imbalance leads to a change in the money supply (assuming that the central bank does not or cannot "sterilize" it). In panel A, intervention to defend the fixed rate increases the money supply, shifting the LM curve down or to the right, and the economy shifts toward a new full equilibrium at point E'. In panel B, intervention to defend the fixed rate decreases the money supply, shifting the LM curve up, and the economy shifts toward a new full equilibrium at point E''.

If capital flows instead are not that responsive, then the overall payments deficit requires official intervention in which domestic currency is purchased and foreign currency is sold. If the intervention is not sterilized, then the domestic money supply decreases, raising interest rates and reversing some of the increase in real national product. In Figure 22.5B the decrease in the money supply shifts the LM curve up or to the left, eventually to the dashed LM". In this case, expansionary fiscal policy loses some of its power to increase real GDP.

Perfect Capital Mobility

The case of perfect capital mobility is an extreme case of how international movements can alter the effectiveness of monetary and fiscal policies under fixed rates.

> **Perfect capital mobility** means that a practically unlimited amount of international capital flows in response to the slightest change in one country's interest rates.

Perfect capital mobility may be a good basis to analyze countries whose capital markets are open to international activity and whose political and economic situation is considered stable (so that no perceptions of political and economic

[9] If the price level also increases, the FE curve shifts to the left, and the IS curve shifts back somewhat to the left. Real national product does not increase by as much in this case and in the one discussed in the next paragraph.

risks limit capital inflows). Indeed, the success of a system of fixed exchange rates makes perfect capital mobility more likely. If investors are convinced that the exchange rates will remain fixed, they will be more willing to move back and forth between currencies in response to small differences in interest rates.

For a small country (one that is too small to influence global financial markets by itself), perfect capital mobility implies that the country's interest rate must be equal to the interest rate in the larger global capital market. When exchange rates were fixed, this gave substance to the Canadian complaint that "Canadian interest rates are made in Washington." There is evidence that interest rate correlations between countries grew stronger during prolonged periods of fixed rates (the gold standard and Bretton Woods periods).

If international capital flows are highly sensitive to slight temporary interest rate changes, then they practically dictate the country's money supply, even in the short run. Why? Consider what happens if an incipient reduction of the money supply begins to increase the country's interest rates. The slightly higher interest rates draw a large capital inflow. Intervention to defend the fixed exchange rate requires selling domestic currency, thus expanding the money supply. Furthermore, sterilization is nearly impossible under such circumstances because of how large the capital inflows could be. Conversely, a nearly unlimited outflow of capital could occur if the country expanded its money supply and lowered interest rates slightly. The capital outflow forces the money supply back down to its original level to eliminate the slight drop in interest rates. The balance of payments rules the money supply. Perfect capital mobility with fixed exchange rates robs monetary policy of its ability to influence interest rates or the domestic economy.

For fiscal policy, perfect capital mobility actually means enhanced control over the domestic economy in the short run. Expansionary fiscal policies do not raise interest rates because the extra government borrowing is met by a large influx of lending from abroad. Thus, the government borrowing does not crowd out private domestic borrowers with higher interest rates, allowing fiscal policy its full spending multiplier effects on the economy. In other words, with perfect capital mobility and interest rates set outside the country, fiscal expansion cannot be guilty of crowding out private investment from lending markets. This extra potency of fiscal policy under fixed exchange rates and perfect capital mobility may be a poor substitute for the loss of monetary control since government handling of spending and taxes is often crude and subject to the vagaries of politics. Yet this is apparently a fact of life for small countries under truly fixed exchange rates.[10]

Figure 22.6 shows the effect of perfect capital mobility on the IS–LM–FE picture. The FE curve is flat because the tiniest change in interest rates would trigger a potentially infinite international flow of capital. If the global interest rate is 6

[10]With perfect capital mobility, as with the other cases discussed in this chapter, we must remember that any attracted capital must be paid for later with reflows of interest and principal back to the foreign creditors.

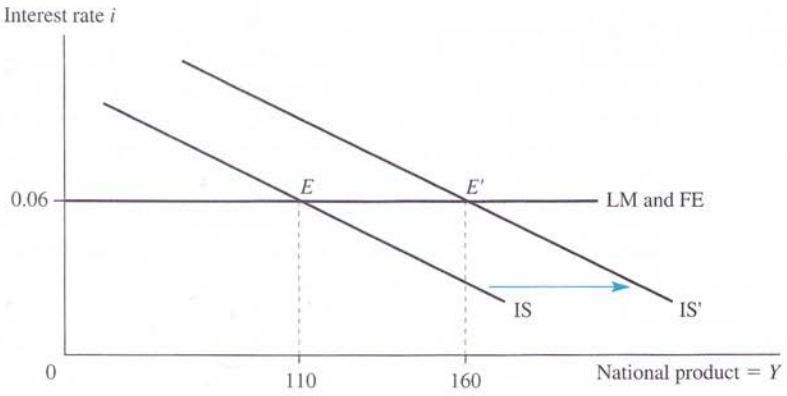


FIGURE 22.6
With Perfect Capital Mobility, Monetary Policy Is Impotent but Fiscal Policy Is Strong

percent, then any point above the flat FE, corresponding to a domestic interest rate greater than 6 percent, results in a massive capital inflow and payments surplus. Any point below results in a massive capital outflow and payments deficit.

With perfect capital mobility the LM curve is also effectively flat and the same as FE. Any flood of international capital swamps any other influence on the nation's money supply. The money supply must be whatever is necessary to keep the domestic interest rate at 6 percent. Only the interest rate of 6 percent, dictated by financial conditions in the world as a whole, is consistent with equilibrium in the country's market for money. Under the conditions shown in Figure 22.6, the country has no independent monetary policy. The monetary authorities cannot change the domestic interest rate or control the money supply.

By contrast, fiscal policy takes on its greatest power under these conditions. Raising government spending or cutting tax rates causes the usual rightward shift of the IS curve to IS'. As soon as the extra government deficit raises the home country's interest rate even slightly, there is a rush of capital inflow, as international investors seek the slightly higher interest rate in this country. The inflow raises the money supply until the interest rate is bid back down to 6 percent. So a rightward shift of the IS curve has a large effect on national product and no effect on the interest rate.[11]

The case of perfect capital mobility shows clearly that monetary policy is subordinated to the defense of the fixed exchange rate, and that fiscal policy can be powerful with fixed exchange rates. For the rest of this chapter we now return to the case of moderate capital mobility and an upward-sloping FE curve. Perfect capital mobility can be considered the limiting case (flat) of the general case (upward-sloping) that we examine.

[11]In fact, fiscal policy's impact on national product fits the Keynesian multiplier formula of Chapter 21. For example, suppose that the country in Figure 22.6 had a marginal propensity to save of 0.2 and a marginal propensity to import of 0.3. This would make the multiplier equal to 2, according to Chapter 21. In this case, the rightward shift of $\Delta Y = 50$ from Point E to Point E' in Figure 22.6 could be achieved by $\Delta G = 25$.

Shocks to the Economy

From time to time a country's economy is hit by major shocks—both shocks that represent changes in basic conditions in the domestic economy and those that arise externally in the international economy. What are the effects of these exogenous forces on an economy that has a fixed exchange rate? To provide a simple base for our analysis, we will usually examine cases in which the country has achieved external balance (a triple intersection in the IS–LM–FE graph) just before the shock hits the economy.

Internal Shocks

One type of internal shock arises in the market for money. A **domestic monetary shock** alters the equilibrium relationship between money supply and money demand because (1) the money supply changes or (2) the way in which people decide on their money holdings changes. The latter can arise, for instance, from financial innovations like money market mutual funds, the spread of credit cards, or automated teller machines (ATMs). A domestic monetary shock causes a shift in the LM curve. Its effect on domestic interest rates or national product is quite limited with fixed rates. As we saw in our analysis of the attempt to run an independent monetary policy, a shift in the LM curve tends to reverse itself as the central bank must intervene to defend the fixed rate. A major effect of a monetary shock instead can be on the country's holdings of official reserve assets if intervention is the basis for the money supply change that shifts the LM curve back toward its initial position.

Another type of domestic shock arises from exogenous changes in domestic spending on goods and services. A **domestic spending shock** alters domestic real expenditure (E) through an exogenous force that alters one of its components (consumption, real investment, or government spending). A change in fiscal policy is one such shock. Another would be a change in the business mood or consumer sentiment, resulting in a change in real investment or consumption spending. The discussion of fiscal policy provides an example of the analysis of this type of shock. In addition, it important to remember that effects on foreign countries will be transmitted through changes in our imports, and that this can have repercussions back to our economy if the induced changes in the foreign economies alter their imports from us (as discussed in the previous chapter).

International Capital-Flow Shocks

One type of external shock arises from unexpected changes in the country's capital account. An **international capital-flow shock** is the unpredictable shifting of internationally mobile funds in response to such events as rumors about political changes or new restrictions (capital controls) on international asset holdings. Let's examine an international capital-flow shock in the form of a shift by international investors and speculators to a belief that the country's government is likely

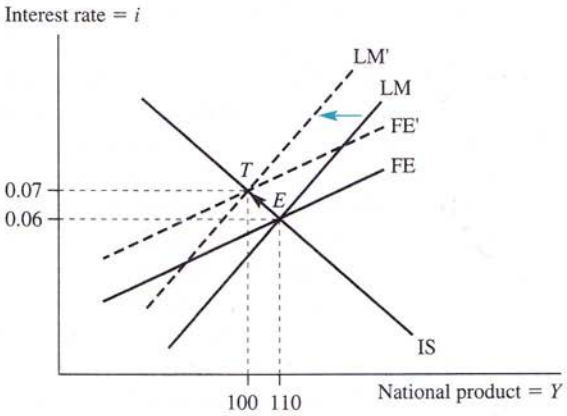
to devalue its currency (raise r) in the near future. Although this is not necessary to the analysis, we begin with a country that has an external balance. (In this case the shift in belief is not related to a payments imbalance today—rather, it may be related to doubts about the political leadership of the country, or to a belief that the country may try to use devaluation to boost international price competitiveness in order to increase net exports and lower domestic unemployment.)

The shift in belief leads to a capital outflow as international investors attempt to reposition their portfolios away from assets denominated in this country's currency *before* the devaluation occurs. This type of capital outflow is a form of "capital flight," in which investors flee a country because of doubts about government policies. If the country begins with an external balance, then the overall balance shifts into deficit as the capital account deteriorates. There is downward pressure on the exchange rate value of the country's currency, and the central bank must intervene to defend the fixed rate. The central bank buys domestic currency and sells foreign currency. If the intervention is not sterilized, then the domestic money supply shrinks. Interest rates increase, and real national product decreases. The increase in interest rates here becomes part of the defense of the fixed exchange rate. If the interest differential shifts in favor of this country, then international investors are more willing to keep investments in this country's financial assets (or are less interested in fleeing) even if there is some risk of devaluation. (Recall our discussions of uncovered financial investments in Part III.) In fact, countries faced with this form of capital outflow often immediately shift policy to raise short-term interest rates dramatically, for instance, from annual rates of less than 10 percent to annual rates of over 100 percent. This is an example of using monetary policy *actively* to reestablish external balance, rather than waiting for the slower effects of intervention on the domestic money supply to move the country toward external balance.

The effects of this shock are pictured in Figure 22.7. The economy begins at point E. The international capital-flow shock causes the FE curve to shift up or to the left. Once the FE curve has shifted, the official settlements balance is in deficit at point E. The central bank must intervene to defend the fixed rate. The central bank may attempt to keep the economy at point E by sterilizing the intervention. The central bank may hope that the disequilibrium in the overall balance is temporary, perhaps because the fears of the international investors will subside and the FE curve will shift back to the right in the near future. If the monetary authority cannot or does not sterilize the intervention, then the LM curve will begin to shift up or to the left. If the new FE curve remains where it is, the LM curve must shift to LM', with a new triple intersection at point T. External balance has been reestablished at point T. However, real national product has declined. The county now has an internal imbalance, in the form of low aggregate demand and higher unemployment, assuming that the country did not begin with the opposite imbalance of excessively strong aggregate demand. Under fixed exchange rates, external capital flow shocks can have powerful impacts on internal balance through the changes in the money supply driven by official intervention to defend the fixed rate.

FIGURE 22.7

An Adverse International Capital-Flow Shock



A shift of international capital flows away from the country causes the FE curve to shift up or to the left, and overall payments balance goes into deficit. Intervention to defend the fixed rate shifts the LM curve up or to the left. The economy shifts toward a new full equilibrium at point *T*.

International Trade Shocks

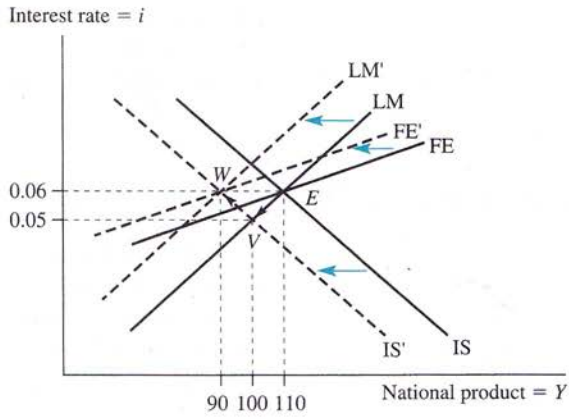
A second type of external shock arises from exogenous changes in the country's current account. An **international trade shock** is a shift in a country's exports or imports that arises from causes other than changes in the real income of the country. For instance, demand for a country's exports can change for many reasons. This variability seems to be largest for countries specializing in exporting a narrow range of products, especially primary commodities for which demand is sensitive to the business cycle in importing countries. Instability has strongly affected exporters of metals, such as Chile (copper), Malaysia (tin), and, to a lesser extent, Canada. Import shocks can occur if our consumers unexpectedly alter their purchases between import products and domestically produced substitutes, for instance, because of changing perceptions of the relative quality of the products. Trade shocks can also occur because of shifts in the prices or availability of domestic and foreign products. An important example of this type of shock is a shock to the supply of a major import, such as oil for most industrialized countries.[12]

An international trade shock alters the country's current account. Thus, it directly affects both the country's overall balance of payments and aggregate

[12]The analysis of a decline in the supply of a major import is a bit complicated. Examples of such supply shocks for crucial imports are the oil shocks of 1973–74 and 1978–79, and the smaller one of 1990. The shock is likely to lower the quantity of imports of this product while raising its price. The analysis is similar to that about to be discussed in the text if the cutback in foreign supply initially raises the total value of imports and lowers national purchasing power (with the higher price acting like a "tax" on the economy imposed by the exporters). These conditions hold if imports of the product take a large share of our national spending and our demand for the product is very price-inelastic (at least in the short run). An additional twist is that the oil price shocks quickly increased the price level *P* so that the LM curve also shifted up or to the left as a result of the shock.

FIGURE 22.8

An Adverse International Trade Shock



A shift of international trade away from the country's products causes the FE and IS curves to shift to the left, and the overall payments balance goes into deficit. Intervention to defend the fixed rate shifts the LM curve up or to the left. The economy shifts toward a new full equilibrium at point *W*.

demand for the country's national production. For instance, a shift of foreign demand away from our exports, or a shift of our demand toward imports (and away from our own products), leads to a worsening of the current account and the overall balance (assuming that there is little effect on international capital flows). It also reduces aggregate demand, lowering real national product.[13] In addition, the country's central bank must intervene to defend the fixed rate by buying domestic currency and selling foreign currency. If the intervention is not sterilized, then the domestic money supply contracts, leading to a further decline in aggregate demand. External balance can be reestablished through these changes, but the internal imbalance of low aggregate demand and high unemployment will be increased.

Figure 22.8 shows the effects of this shock. Beginning at point *E*, the adverse international trade shock shifts the FE curve to the left and the IS curve to the left as well. At the new IS–LM intersection (point *V*), real national product declines (as does the domestic interest rate). With point *V* to the right of the new FE' curve, the country's overall payments are in deficit. Intervention to defend the fixed rate reduces the domestic money supply (assuming that it is not sterilized). The LM curve begins to shift up or to the left. External balance is reestablished at point *W* when the LM curve shifts to the dashed LM'. However, real national product has declined even more.[14]

[13]We are assuming that the current account actually does deteriorate even though the reduction in our real income will offset some of the initial decline by lowering the country's demand for imports through the domestic-income effect on imports. In Figure 22.8 this ensures that point *V* is to the right of the new FE curve even if the FE curve is steeper than the LM curve.

[14]As shown, the interest rate returns to 0.06. This is not the only possibility—the interest rate could be higher or lower, depending on the magnitudes of the curve shifts and the slopes of the curves.

Thus, as with international capital-flow shocks, international trade shocks can have a powerful effect on the country's internal balance. The intervention needed to defend the fixed rate tends to magnify the effect of the shock on domestic production.

Imbalances and Policy Responses

A country wants to achieve both internal balance and external balance. Yet, its actual performance is often short of these goals. In many situations it has imbalances in both its internal and external situations as a result of shocks that hit the economy, or previous government policies that resulted in poor economic performance.

Internal and External Imbalances

Figure 22.9 catalogs the four possible cases in which the country has both internal and external imbalances. With fixed exchange rates a country's policymakers could get lucky and face the straightforward problems represented by the upper-left and lower-right cells. The government of a country experiencing high unemployment and a payments surplus can use expansionary policies to address both problems. Most obviously, an expansion of the domestic money supply can increase aggregate demand and lower unemployment, while also reducing the payments surplus (as summarized previously in Figure 22.1). This shift occurs automatically if the country intervenes to defend the fixed exchange rate and does not sterilize, but the country can also speed it up by using active monetary policy to expand the money supply more quickly. The government of a country experiencing an inflation rate that is viewed as being too high and a payments deficit can use contractionary policies to address both. Again, an obvious choice is a contraction of the money supply (or perhaps more realistically, a reduction of the growth rate of the money supply). Even in these cases the exact policy solution may be tricky because balance in one dimension may be achieved while part of the other imbalance remains. Nonetheless, the initial direction of the desirable policy change that reduces (if not eliminates) both imbalances is clear.

What about the other two cells in Figure 22.9. In broad terms the correct policy response is not clear. The dilemma of having to choose which goal to pursue has been felt most acutely by countries in the lower-left cell, where low aggregate demand has resulted in high unemployment, but the balance of payments is in deficit. This was the near tragedy of Britain after it rejoined the gold standard in 1925 at its prewar gold parity, with the high value for the pound making British products uncompetitive in international trade. This was the problem facing the United States in the early 1960s. France faced a similar problem in the early 1990s, as discussed in the box "A Tale of Three Countries." In these cases, reducing unemployment called for raising aggregate demand with expansionary policies. However, this would worsen the trade balance and tend to worsen the overall balance. The dilemma was not well solved in any of the cases. Britain

FIGURE 22.9
Policies for Internal and External Balance

State of balance of payments	State of the domestic economy: *High unemployment*	State of the domestic economy: *Rapid inflation*
Surplus	Expansionary policy	??
Deficit	??	Contractionary policy

In some situations a policy to change aggregate demand can serve both internal and external goals, but in some cases (marked "??" here) it cannot. To deal with high unemployment and a payments surplus, policymakers should expand aggregate demand (upper-left case). To deal with inflation and a payments deficit, they should cut aggregate demand (lower-right case). But with the other two combinations of imbalances, there is no clear prescription for aggregate-demand policy.

was driven off the gold standard in 1931. The United States reduced its unemployment rate with a series of fiscal policy changes (the tax cut of 1964, domestic "Great Society" spending programs, and Vietnam War spending) but the payments imbalance led toward the breakup of the Bretton Woods fixed-rate system. Through mid-1995, France continued to suffer from high unemployment.

The opposite dilemma faces governments worried about a rising or high inflation rate while the country is running a payments surplus (the upper-right cell of Figure 22.9). This was the sort of position frequently faced by Germany and Switzerland during the Bretton Woods fixed-rate years. The unacceptably high inflation rate calls for restraint on aggregate demand, but the surpluses are likely to be increased as the demand restraint improves the current account balance.

The government of a country in one of the two dilemma cells has three basic choices:

1. It can abandon the goal of external balance, which eventually means that the country will abandon its fixed exchange rate.
2. It can abandon the goal of internal balance, at least in the short run, and set its policies (especially its monetary policy and money supply) to achieve external balance. This is sometimes called the "rules of the game" in a fixed-rate system such as the gold standard. Defending the fixed rate is the highest goal.
3. The government can try to find more policy tools or more creative ways to use the tools that it already has.

Giving up is unpopular, and the natural tendency is to search for more tools and creative solutions.

A candidate for addressing the dilemma of high unemployment and payments deficit is enhancement of the economy's supply capabilities. Why not come up with policies that create more national income by improving our productivity?

Productivity improvements would enhance our ability to compete in international trade, thereby shifting demand to our products, expanding production and employment, and improving our current account balance. It sounds too good to be true. And it probably is. Policymakers usually have no fast, low-cost way of improving the economy's supply capabilities. That comes through sources of growth, such as the advance of human skills and technology, that respond sluggishly, if at all, to government manipulation.

A Short-Run Solution: Monetary–Fiscal Mix

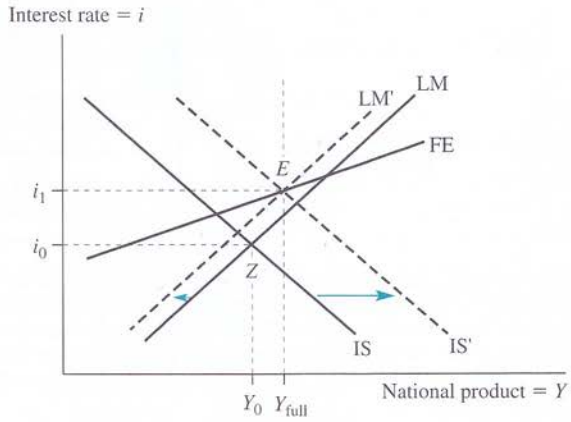
There is a way to buy time and serve both internal and external goals using conventional demand-side policies while staying on fixed exchange rates. Looking more closely at the basic policy dilemma, Robert Mundell and J. Marcus Fleming noticed that monetary and fiscal policies have different relative impacts on internal and external balance. This difference can be the basis for a creative solution.

The key difference between the impacts of fiscal and monetary policies is that easier monetary policy tends to lower interest rates and easier fiscal policy tends to raise them, as noted in Figures 22.1 and 22.4. An expansion of aggregate demand and national product can be achieved with different mixes of fiscal policy and monetary policy, and the mix matters for the resulting level of the interest rate, at least in the short run. Expansion of national product can result in a low interest rate if it is driven mainly by expansionary monetary policy. Expansion can result in a high interest rate if it is driven mainly by expansionary fiscal policy. Because interest rates affect the country's payments balance, the interest rate is important. If the interest rate is lower, the payments balance deteriorates, but if the interest rate is pushed high enough (for instance, by using very expansionary fiscal policy coupled with somewhat contractionary monetary policy), the payments balance improves.

More generally, *monetary and fiscal policies can be mixed so as to achieve any combination of national product and overall payments balance in the short run.* Figure 22.10 illustrates the opportunities for solving one of the four policy challenges posed in Figure 22.9, namely, the case of excessive unemployment and payments deficits, starting at point *Z*. The goal is to raise the economy to full employment, which can be achieved at the level of national product Y_{full}. Shifting only one policy would not work, as we have seen, but shifting both can work. In this case, it is best to shift to tighter (contractionary) monetary policy to attract foreign capital with higher interest rates, and to easier (expansionary) fiscal policy in pursuit of full employment. In the right amounts, the monetary tightening and fiscal easing can bring us exactly to full employment and payments balance. In Figure 22.10, this is achieved by shifting IS to IS' and LM to LM'.[15]

[15]The prospect of mixing tight money with fiscal ease starting from point *Z* raises interest rates, as increased government borrowing and the tightening of the money supply combine to squeeze out private borrowers. It is reasonable to fear that such a jump in interest rates would hold back productive private investment. Something of the sort happened in the early 1980s, when the combination of the Federal Reserve's restraint on money growth and the Reagan administration's tax cuts and deficits seems to have held back U.S. capital formation.

FIGURE 22.10
How Monetary and Fiscal Policy Could Combine to Cure Both Unemployment and a Balance-of-Payments Deficit



At the starting point Z, national income Y_0 is below the full employment level Y_{full} and the balance of payments is in deficit. To reach full employment and payments balance at point E, combine the right amounts of tight monetary policy and easy fiscal policy.

A similar recipe can be used to get from any starting point to internal balance and payments balance. The principle is clear: As long as there are as many different policies as target variables, as in the present case of two policies and two targets, there is a solution.

Furthermore, the pattern of policy prescriptions reveals a useful guideline for assigning policy tasks to fiscal and monetary policy. This is Robert Mundell's **assignment rule:** Assign to fiscal policy the task of stabilizing the domestic economy only, and assign to monetary policy the task of stabilizing the balance of payments only. We can see from Figure 22.11 that such marching orders would guide the two arms of policy toward internal balance and payments balance. Studying the different cases in Figure 22.11, you will find that the assignment rule generally steers each policy in the right direction. There are exceptions, as Figure 22.11 notes, but even in these cases it is likely that following the assignment rule does nothing worse than make the economy follow a less direct route to the goal of internal and external balance.

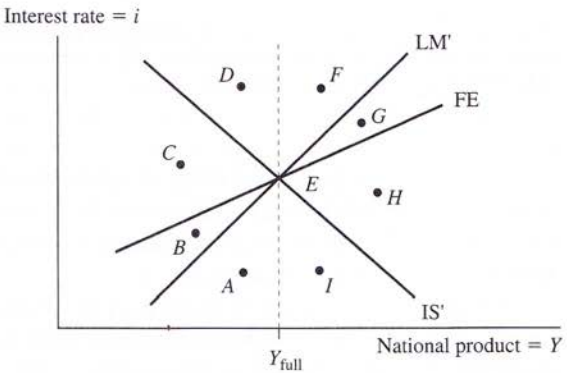
The assignment rule is handy. It allows each arm of policy to concentrate on a single task, relieving the need for perfect coordination between fiscal and monetary officials. It also directs each arm to work on the target it tends to care about more, since the balance of payments (and exchange rate stability) have traditionally been of more concern to central bankers than to elected officials.

The rule might or might not work in practice. We have already mentioned problems with the interest rate effect on capital flows that is supposed to guarantee the existence of a solution. Furthermore, if either branch of policy lags in getting signals from the economy and responding to them, the result could be unstable oscillations that are even worse than having no policy at all. Or, monetary policy may be run largely to accommodate the country's fiscal policy (and the need of the government to fund its deficit spending), so that independent policies are not really possible. In addition, the mix influences both the composition of domestic spending and the level of foreign debt. A policy of high interest rates,

FIGURE 22.11
Monetary–Fiscal Recipes for Internal and External Balance

State of the balance of payments	State of the domestic economy: *High unemployment*	State of the domestic economy: *Rapid inflation*
Surplus	Easier monetary policy, easier fiscal policy	Easier monetary policy, tighter fiscal policy
Deficit	Tighter monetary policy, easier fiscal policy	Tighter monetary policy, tighter fiscal policy

These recipes conform to the **assignment rule:** Assign monetary policy the task of balancing the country's international payments, and assign fiscal policy the task of bringing the domestic economy to full employment without excessive inflation. There are exceptional cases, however, when the assignment rule fails to follow the most direct route to the goal. In the diagram below, the assignment rule is wrong for monetary policy at points like *B* and *G*, and it is wrong for fiscal policy at points like *D* and *I*.



such as that used in Figure 22.10, reduces domestic real investment. This can harm the growth of the economy's supply capabilities by reducing the growth of the capital stock. It also builds up foreign debt, which must be serviced in the future, reducing the amount of national income that the country keeps for itself.[16]

Surrender: Changing the Exchange Rate

If an imbalance in a country's overall balance of payments is large enough or lasts for long enough (a "fundamental disequilibrium"), the country's government may be unwilling to change domestic policies by enough to eliminate the imbalance. The country's government instead may conclude that surrendering the fixed rate is the best choice available. If the payments balance is in deficit, a devaluation may be used; if it's in surplus, revaluation may occur.

[16]Another possible problem might seem to be the case of perfect capital mobility because the country has no control of its money supply. This is not a problem. In fact, the case of perfect capital mobility effectively forces the government to follow the assignment rule. Monetary policy must allow the money supply to be whatever is necessary to achieve external balance on the FE curve. Fiscal policy can then be directed toward achieving internal balance, addressing any problems of domestic unemployment or inflation pressures.

A Tale of Three Countries

In 1992, unemployment in France was high and rising. Inflation was almost nothing. The French government seemed to respond by tightening up on money and raising interest rates.

Madness? Not really, but an example of the policy dilemma that can arise with fixed exchange rates. France was a member of the Exchange Rate Mechanism (ERM) of the European Monetary System (EMS). Membership committed the French government to keep the exchange rates between the French franc and the currencies of the other member countries within small bands around the central rates chosen for the fix.

To understand France we actually need to start with Germany, the largest member of the ERM. The Berlin Wall fell in 1989, and German unification proceeded rapidly over the next year, politically, financially, and economically. German government policy toward unification included support for the eastern part in the form of transfers, subsidies, and other government expenditures on such things as public infrastructure investments. This expansionary fiscal policy increased aggregate demand. National production expanded rapidly in 1990 and 1991, and unemployment fell, but the economy began to overheat as demand exceeded production capabilities, so that the inflation rate increased. German policymakers, especially those at the Bundesbank (Germany's central bank), loathe inflation. History matters—the hyperinflation of the 1920s in Germany is considered to be the economic disaster of the century for Germany.

In response to the rise in inflation, the German monetary authorities tightened up on monetary policy, after a spurt in money growth in 1990–91 resulting from monetary unification. Interest rates rose. This monetary tightening slowed the economy during 1992–93.

We can capture the main elements of the German story in an IS–LM picture. Germany began at point *A*. The fiscal expansion shifted IS_1 to IS_2, and the increased growth rate of the money supply shifted LM_1 to LM_2. At the new equilibrium point *B*, real national product was higher, but the economy was trying to push past its supply capabilities. In response to the internal imbalance of rising inflation, the Bundesbank reduced money growth, shifting LM_2 to LM_3. Interest rates rose (on a nominal basis, although less so on a real basis), and national product declined as the economy moved toward point *C*.

In this way the German government adopted policies that focused almost completely on internal political and economic problems. (In fact, although we could add the FE curve to Germany's picture, we have instead omitted it to emphasize this internal focus of German policy.) Meanwhile, back in France…

In 1990, the French economy was already weak and weakening. The unemployment rate was 9 percent and rising. For internal reasons the French government probably wanted to shift to an expansionary policy. But it had an external problem. Rising interest rates in Germany could set off a capital outflow that would threaten the fixed exchange rate between the franc and DM. France had to respond to this incipient external imbalance by tightening up on money and raising French interest rates. (Given France's low inflation rates, the higher nominal interest rates also were higher real interest rates.) Unfortunately, for political reasons fiscal policy could not turn expansionary. The assignment rule could not be used. Instead, the higher interest rates made the French economy worse. The growth rate of real French GDP declined from 1989 through 1993, and real GDP actually declined in 1993. The French unemployment rate rose from 1990 through 1994.

In France's picture, France began at point *F*, with aggregate demand already weak and unemployment high. The rise in Germany's interest rate shifted France's FE curve up or to the left (FE_1 to FE_2). To avoid capital outflows and a payments deficit, the French monetary authorities responded by tightening money, shifting LM_1 to LM_2. As the economy moved toward point *H*, demand and production weakened and the unemployment rate rose.

However, this was not always enough. International investors and speculators doubted the resolve of the French (and most other non-German members of the ERM) to stick to fixed exchange rates. Major speculative attacks occurred in September 1992,

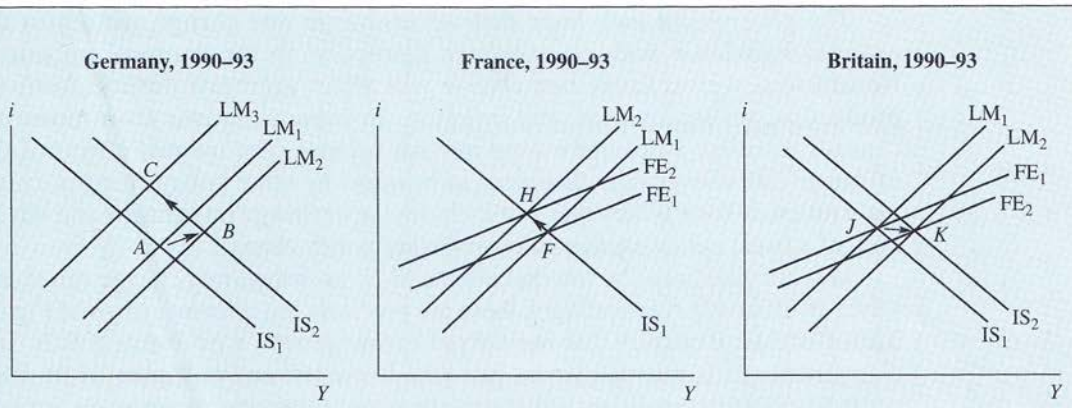
November 1992, and July 1993. In these the FE curve for France shifted sharply up or to the left. The French government responded with massive official intervention, buying francs and selling DM, and with high short-term interest rates to discourage the speculative outflows. Total intervention by all ERM members in September 1992 was over $100 billion, with capital losses of about $5 billion to the central banks that bought currencies of the countries (Britain, Italy, Spain, and Portugal) that then devalued or depreciated anyway. Total intervention in July 1993 was also more than $100 billion, with the French central bank alone selling more than $50 billion of DM in defense of the franc. Official reserve holdings of the French central bank declined close to zero, but the French government was "successful." The franc was not devalued.

The third largest economy in the European Union is Britain. Britain's journey through these years was different. Britain was not a member of the ERM until joining in 1990, when it committed to a pound—DM rate of about 0.35. The next two years were not good for Britain. To defend the fixed rate, the growth rate of the British money supply had to be kept low (although at the same time British interest rates could decline, starting from a high level). A severe recession with two years of decline in real GDP hit, and the unemployment rate rose to over 10 percent. Broadly, this picture is similar to that of France, but the recession was worse.

In 1992, Britain's story diverges. As a result of the speculative attack on non-DM currencies in September 1992, Britain left the ERM. The British government spent close to half of its official reserves defending the pound before surrendering. Britain shifted to a floating exchange rate, and the pound depreciated by over 10 percent against the DM. This improved British price competitiveness. In addition, the British government could allow its money supply to grow more quickly. Interest rates fell sharply in 1993, and real GDP began to grow. Britain's unemployment rate plateaued in 1993 and declined in 1994 (while the unemployment rate was still rising in both France and Germany). After declining in 1993, the inflation rate increased a little in Britain in 1994, but not even close to enough to reverse the gain in price competitiveness from the currency depreciation. Britain's depreciation of 1992 seems to have been successful.

Let's pick up Britain's picture as Britain left the ERM in 1992. (Its picture for 1990–92 is similar to that of France.) The initial situation, just before the departure, was at point *J*. With the depreciation of the pound, the improvement in price competitiveness shifts FE_1 right to FE_2 and moves IS_1 right to IS_2. The money expansion shifts LM_1 right as well to LM_2. The British economy shifts toward point *K*, with higher real national production and a lower interest rate.

Tales have lessons. The lesson of this tale is that countries must choose between fixed exchange rates and control over their internal balance. When large countries choose internal balance, the choice gets tougher for smaller countries. Germany, the largest economy in the EU, ran its policies mainly to satisfy internal objectives (like the United States in the 1960s). This created problems for other ERM members—conflicts for them between internal and external balance. Both France and Britain faced a dilemma: high unemployment and a tendency toward payments deficits. For a while, both responded with tight money that tried to achieve external balance but made the internal imbalance (high unemployment) worse. All of this did not completely convince international investors and speculators. With the speculative attack of September 1992, the paths diverged. France defended the fixed rate, at further cost to internal balance. Britain surrendered, withdrawing from the ERM. This allowed Britain to address its internal imbalance. Expansionary policy and the competitiveness gained from the pound's depreciation rekindled economic growth. The unemployment rate declined. The speculative attack in July 1993 led to a semisurrender even by France and other ERM members. They widened the allowable bands around the central rates from plus or minus 2.25 percent to plus or minus 15 percent. The ERM "fixed" rates then became much more "flexible."



	1988	1989	1990	1991	1992	1993	1994
Growth Rate of Real GDP (%)							
Germany	3.7	4.2	5.5	4.3	1.0	−2.4	2.3
France	4.2	3.9	2.4	0.6	1.2	−1.0	2.3
Britain	4.5	2.2	0.6	−2.1	−0.5	2.0	3.8
Unemployment Rate (%)							
Germany	8.7	8.9	7.2	6.3	6.6	7.3	8.2
France	10.0	9.4	9.0	9.4	10.4	11.7	12.6
Britain	8.4	6.3	5.8	8.7	10.2	10.3	9.3
Inflation Rate (%)							
Germany	1.3	2.8	2.7	3.5	4.0	4.2	2.9
France	2.7	3.5	3.4	3.2	2.4	2.1	1.7
Britain	4.9	7.8	9.5	5.9	3.7	1.6	2.4
Short-Term Interest Rate (%)							
Germany	4.0	6.6	7.9	8.8	9.4	7.5	5.3
France	7.5	9.1	9.9	9.5	10.4	8.8	5.7
Britain	10.3	13.9	14.7	11.8	9.6	5.6	4.8
Money Supply Growth Rate (%)							
Germany	7.5	4.6	8.4	9.4	6.7	8.1	7.8
France	4.1	8.1	3.8	−4.7	−0.2	1.4	4.0
Britain	7.6	5.7	2.6	2.9	2.7	6.0	6.6
Exchange Rate							
Franc/DM	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Pound/DM	0.32	0.32	0.35	0.34	0.36	0.40	0.40

SOURCE: Growth rate of real GDP, unemployment rate, (CPI) inflation rate, and money supply growth rate (M1 for France, M3 for Germany, and M0 for Britain) from Economic Intelligence Unit, *Country Report,* various issues for these three countries. Short-term (money market) interest rates and exchange rates from International Monetary Fund, *International Financial Statistics,* March 1995.

The government may hope that the exchange rate change can adjust the external imbalance without excessive disruption to the domestic economy. Nonetheless, the exchange rate change will affect aggregate demand, national production, unemployment, and inflation. In some situations these domestic changes represent a departure from internal balance. The internal effects of the exchange rate change may then need to be offset by other policy changes, creating a rationale for a policy mix that includes the exchange rate change and one or both of a fiscal policy change and a monetary policy change.

In other situations the internal effects of an exchange rate change can themselves be desirable. Interestingly, these are precisely the dilemma cases of Figure 22.9. Consider a country that has a fixed exchange rate, a payments deficit, and also a rather high unemployment rate (the lower-left cell in Figure 22.9). This country's government is not willing to allow an "automatic" adjustment through a decline in the money supply, because this would raise interest rates, lower demand and production, and increase unemployment further. Instead, the government has been sterilizing its intervention. It is also not capable of following the assignment rule, perhaps because domestic politics precludes adopting the right policy mix.

What happens if this country devalues (or shifts to a floating exchange rate and allows its currency to depreciate)? What effects does this exchange rate surrender (an increase in r) have on external and internal balance?

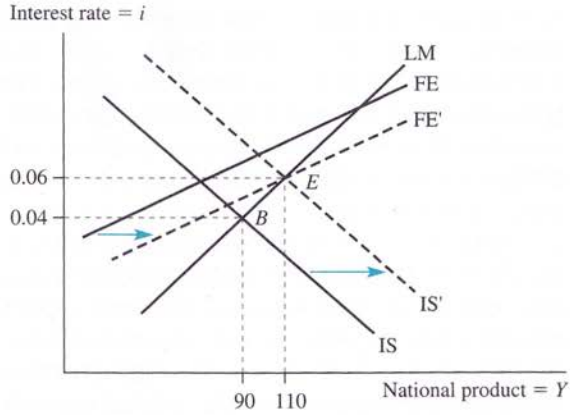
The devaluation should improve international price competitiveness (as long as any changes in the domestic price level or the foreign price level do not offset the exchange rate change). Exports tend to increase as firms from this country can lower the foreign-currency prices of their products (and as higher profits draw resources into producing for export). Imports tend to decrease as the domestic-currency price of imported products rises (and as higher profits in producing domestic products that can now compete more successfully with imports draws resources into producing these import substitutes). Thus, the current account tends to improve. The effects on the capital account are less clear-cut. The capital account may also improve. If some capital was fleeing the country in fear of the impending devaluation, then this flight could stop or even reverse once the devaluation is done. Overall, we expect an improvement in the payments balance (a decrease in the deficit).

If exports increase and imports decrease, then these changes increase aggregate demand and national production, reducing domestic unemployment. However, import prices in local currency increase, and this increase puts some upward pressure on the average price level or inflation rate in the country. The extra demand could also put upward pressure on the price level, but this effect may be small if the economy begins with high unemployment.

Figure 22.12 show these effects in the IS–LM–FE diagram, assuming that the domestic price level is steady. The country begins at point B with a payments deficit, and the (low) level of national production at B results in rather high unemployment. The devaluation improves the current account (and may also improve the capital account), shifting the FE curve down or to the right. The

FIGURE 22.12

Devaluation of the Country's Currency



In response to the payments deficit at point *B*, the country's government devalues its currency. The devaluation improves its international price competitiveness, so it shifts the FE and IS curves to the right. If the devaluation is of the correct size, it can shift the economy toward a new full equilibrium at point *E*.

increase in net exports as a result of the change in price competitiveness shifts the IS curve to the right. The figure shows that a devaluation (of the correct size) can shift the economy to a triple intersection (external balance) with a higher national product (and lower unemployment). The new equilibrium at point *E* may not exactly be internal balance (full employment), but it is a move in the correct direction.[17]

This sounds good—another possible answer to the dilemma of deficit and unemployment. In some cases it seems to work well. (See the discussion of Britain in the box "A Tale of Three Countries.") The comparable analysis, with all the signs reversed, indicates that a revaluation (or appreciation after the government allows the country's currency to float) can be an appropriate policy response to surplus and inflation (the upper-right cell in Figure 22.9) because it can lower a surplus while reducing inflation pressure in the economy by decreasing demand and lowering the local-currency price of imports.

However, there are also times that a devaluation fails to reduce the external imbalance. One possible reason for failure is taken up in the next section—the value of the current account may not actually increase because of low responsiveness of export and import volumes to the exchange rate change. Another possible reason for failure is that the government pursues fiscal or monetary policies that themselves are driving to expand the deficit, and these are so strong that they overwhelm the benefits of the devaluation. For instance, expansionary monetary policy can expand income and import demand, and also increase the price level

[17]If the price level also rises as a result of the devaluation, the FE and IS curves do not shift as much, and the LM curve shifts up or to the left. This reduces the effect on the payments balance and on national product. In fact, if the price level rises by enough, there is no gain in competitiveness, and the benefits of devaluation on external and internal balance are lost.

through extra inflation so that the improved price competitiveness is lost. A third possible reason is that capital flows react in the "wrong" direction. For instance, a devaluation could lead to fears among international investors that the devaluation will not be successful in reducing the deficit (perhaps for one of the first two reasons). They then expect that another devaluation will be needed soon. Capital outflows (capital flight) could deteriorate the capital account and make the payments deficit bigger.

A key to much of this is how other government policies are used with the devaluation. If other government policies (especially monetary policy) can limit any increase in the country's price level or inflation rate, then the devaluation probably will improve the current account balance. International investors, seeing this, are less likely to fear that another devaluation will be needed. If the current account improves and the capital account does not deteriorate, then the devaluation will be successful in reducing the payments deficit.

How Well Does the Trade Balance Respond to Changes in the Exchange Rate?

According to the discussion in the preceding section, a change in the nominal exchange rate r should alter net exports at least as long as it alters international price competitiveness. The conclusion is straightforward for effects on the *volumes* (or quantities) of exports and imports, although we can still wonder about the speed or magnitude of the changes. However, the effect on the *value* of the trade balance is not so obvious because both prices and volumes are changing. Yet, the effect on the value of net exports or current account is what matters for the country's balance of payments and for its FE curve.

Following a devaluation, consider the likely directions of change in a nation's trade quantities and trade prices (measured in foreign currency, here pounds), when its currency (here the dollar) drops in value:

CA (our current account balance, measured in £/year)	$=$	$P_x^{£}$	$\cdot$	X	$-$	$P_m^{£}$	$\cdot$ M
		£ Price of Exports		*Quantity of Exports*		*£ Price of Imports*	*Quantity of Imports*
Effects of a devaluation of the dollar	$=$	$\downarrow$ No change or *down*	$\cdot$	$\uparrow$ No change or *up*	$-$	$\downarrow$ No change or *down*	$\cdot$ $\downarrow$ No change or *down*

As indicated in shorthand here, a dollar devaluation is likely to lower the pound price of exports (if it has any net effect on this price). This is because U.S. exporters are to some extent willing to lower pound prices while still receiving the same (or even higher) dollar prices because pounds are now worth more. If

there is any effect of this price change on export quantities, the change is upward, as foreign buyers take advantage of any lower pound prices of U.S. exports to buy more from the United States. It is already clear that the net effect of devaluation on export value is of uncertain sign since pound prices probably drop and quantities exported probably rise. On the import side, any changes in either pound price or quantity are likely to be downward. The devaluation is likely to make *dollar* prices of imports look higher, causing a drop in import quantities as buyers shift toward U.S. substitutes for imports. If this drop in demand has any effect on the *pound* price of imports, that effect is likely to be negative. The sterling value of imports thus clearly drops, but if this value is to be subtracted from an export value that could rise or fall, it is still not clear whether the value of the net trade balance rises or falls. We need to know more about the underlying price elasticities of demand and supply in both the export and import markets.

How the Response Could Be Unstable

A drop in the value of the dollar (i.e., a rise in r, the price of foreign exchange) actually could worsen the trade balance. It would clearly do so in the case of *perfectly inelastic demand* curves for exports and imports. Suppose that buyers' habits are rigidly fixed so that they will not change the quantities they buy from any nation's suppliers despite changes in price. Examples might be the dependence of a nontobacco-producing country on tobacco imports, or a similar addiction to tea or coffee, or to petroleum for fuels. In such cases of perfectly inelastic demand, devaluation of the country's currency backfires completely. Given the perfect inelasticity of import demand, no signals are sent to foreign suppliers by devaluing the dollar. Buyers go on buying the same amount of imports at the same pound price, paying a higher dollar price without cutting back their imports. No change in the foreign exchange value of imports results. On the export side, the devaluation leads suppliers to end up with the same competitive dollar price as before, but this price equals fewer pounds. U.S. exporters get fewer pounds for each bushel of wheat they export, yet foreigners do not respond to the lower price by buying any more wheat than they would otherwise.

In the case of perfectly inelastic demand curves for exports and imports, the changes in the current account are as follows:

$$\begin{array}{rcccccc} \mathrm{CA}^{£} & = & P_x^{£} & \bullet & X & - & P_m^{£} \bullet M \\ \textit{down} & = & (\textit{down} & \bullet & \textit{no change}) & - & (\textit{no change} \bullet \textit{no change}) \end{array}$$

A numerical illustration of this case is given in Figure 22.13A. There, devaluing the dollar merely lowers the value of foreign exchange the United States earns on exports, from 80 ($= 1.00 \times 80$) to 60 ($= 0.75 \times 80$), worsening the trade balance.

It might seem that this perverse, or unstable, result hinges on something special about the export market. This is not the case, however. It only looks as

FIGURE 22.13 *Devaluation Affects the Trade Balance*

A. How Devaluation Could Worsen the Trade Balance

Exchange Rate	$P_x^{£}$	•	X	−	$P_m^{£}$	•	M	=	$CA^{£}$
Before dollar devaluation: \$1.60/£	1.00	•	80	−	1.00	•	120	=	−40
After dollar devaluation: \$2.00/£	0.75	•	80	−	1.00	•	120	=	−60

The key to this case: Demand curves are inelastic so the volumes of exports and imports do not change. Devaluing our currency just lowers the value of foreign exchange we earn on exports, worsening the trade deficit.

B. The Small-Country Case

Exchange Rate	$P_x^{£}$	•	X	−	$P_m^{£}$	•	M	=	$CA^{£}$
Before dollar devaluation: \$1.60/£	1.00	•	80	−	1.00	•	120	=	−40
After dollar devaluation: \$2.00/£	1.00	•	105	−	1.00	•	100	=	+ 5

The small-country case illustrates the ability of high demand elasticities to guarantee that devaluation improves the trade balance. The essence of the small-country case is that foreign curves are infinitely elastic so the world (£) prices are not affected by our country's actions. On the export side, the infinite elasticity of foreign demand means that our own supply elasticity dictates what happens to the volume of exports *(X)*. We probably export more, raising our earnings of foreign exchange. On the import side, the infinite elasticity of foreign supply means that our demand elasticity dictates what happens to volume *(M)*. We probably import less, cutting our demand for foreign exchange.

Appendix G generalizes from such special cases, showing how larger demand elasticities raise the ability of devaluation to improve the trade balance.

though the change is confined to the export side because we are looking at the equation expressed in sterling. If we had looked at the *CA* equation in dollar prices, the deterioration would still appear:

$$\begin{array}{rcccccc} \mathrm{CA}^{\$} & = & P_x^{\$} & \bullet & X & - & P_m^{\$} \bullet M \\ \textit{down} & = & (\textit{no change} & \bullet & \textit{no change}) & - & (\textit{up} \bullet \textit{no change}) \end{array}$$

Why the Response Is Probably Stable

In all likelihood, however, a drop in the value of the home currency improves the current account balance, especially in the long run. The reason, basically, is that export and import demand elasticities end up being sufficiently high, and, as Appendix G proves, this is enough to ensure the stable response.

One quick way to see why the case of perfectly inelastic demands does not prevail is to note its strange implications. It implies, first, that we make it harder for ourselves to buy foreign goods with each unit of exports (i.e., $P_x^{£}/P_m^{£}$ drops), yet this impoverishing effect fails to get us to cut our spending on imports. The result looks even stranger upside down. It implies that a country could succeed in cutting its trade deficit and at the same time buy imports more cheaply (in terms

of the export good) by cleverly *revaluing* its currency (for example, raising the value of the dollar from \$1.60/£ to \$1.00/£). If that were a common occurrence, governments would have discovered it long ago, and they would have solved their trade deficits by happily raising the values of their currencies.

Over the long run, price elasticities tend to be higher, and each nation tends to face elastic curves from the outside world, both the foreign demand curve for its exports and the foreign supply curve for its imports. In the extreme *small-country case,* the home country faces infinitely elastic foreign curves. Foreign-currency (£) prices are fixed, and the current account balance is affected by a drop in our currency as follows:

$$\begin{aligned} CA^{£} &= (P_x^{£} \bullet X) - (P_m^{£} \bullet M) \\ Up &= (no\ change \bullet up) - (no\ change \bullet down) \end{aligned}$$

We know that if the real volume of exports (X) changes, it will rise, because the same pound price of exports means more dollars per unit for sellers. They will respond to the new incentive with extra production and export sales. Similarly, we know that any change in the real volume of imports (M) will be a drop because the same pound price for imports leaves the dollar-country consumers with a higher dollar price. In the small-country case, both sides of the current account move in the right direction: Export revenues rise and import payments decline. Figure 22.13B provides a numerical illustration that underlines the contrast with the pessimistic case of Figure 22.13A. The crucial role of elasticities, illustrated in the two halves of Figure 22.13, also emerges from the technical formulas of Appendix G.

The fact that the elasticities of response to a given change (here, the devaluation or depreciation of the dollar) rise over time brings a second key result: *Devaluation is more likely to improve the trade balance, the longer the span of elapsed time.* The current account balance may dip for several months after a devaluation or depreciation of the home currency. The changes in prices are likely to occur faster than any changes in trade quantities, and the changes in trade quantities at first are small because it takes time for buyers to respond to the price changes by altering their behavior. Contracts previously concluded must expire or be renegotiated, and alternative sources of products must be identified and evaluated. Eventually the quantity responses become larger, as buyers do switch to lower-priced products. As quantity effects become larger, the current account balance improves.

Figure 22.14 gives a schematic diagram of what economists think is a typical response of the current account balance to a drop in the home currency. The typical pattern is called a **J curve** because of its shape over the first couple of years of response to devaluation. The value of the current account at first deteriorates, but then begins to improve. After a moderate time period, perhaps about 18 months, the value of the current account returns to where it started, and thereafter it moves above its initial value. This analysis indicates that it may take some time for a large decrease in the exchange rate value of the country's currency to have a positive impact on the current account. The shift in the FE curve

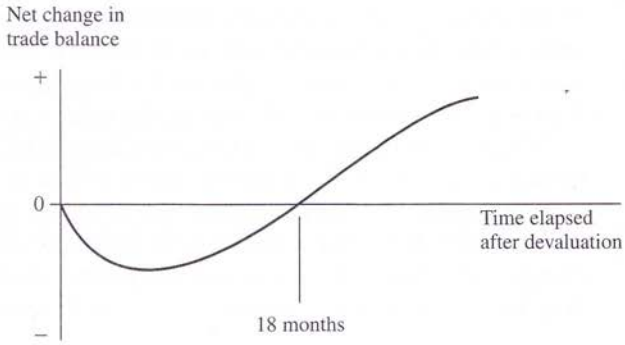


FIGURE 22.14
The J Curve: How the Trade Balance Probably Responds to a Drop in the Value of the Home Currency

is more complicated than in the previous section. In the short run the FE curve could (perversely) shift to the left unless a capital inflow (perhaps based on the anticipation of the eventual beneficial effects of the devaluation) stabilizes the curve. Eventually the FE curve should shift to the right, but perhaps not until a year or more after the devaluation.

Summary

If a country has a fixed exchange rate, it must defend the fixed rate chosen. The first part of this chapter examined four major implications of having a fixed exchange rate and defending it using official intervention.

The first implication is that intervention to defend the fixed rate alters monetary conditions in the country. Faced with an external imbalance in the country's overall international payments, the central bank defends the fixed rate by buying or selling domestic currency in the foreign exchange market. The intervention changes the central bank's liabilities that serve as the base for the domestic money supply. The change in the domestic money supply then results in macroeconomic adjustments that tend to reduce the external imbalance. The domestic interest rate changes, altering international capital flows, at least in the short run. The change in real national product and income alters demand for imports. In addition, a change in the domestic price level can alter both exports and imports by changing the country's international price competitiveness.

The central bank can attempt to resist this monetary process through **sterilization**, which prevents the domestic money supply from changing. But there are limits to how long the central bank can use sterilized intervention to defend the fixed exchange rate. If the external imbalance continues, then the country's holdings of official reserves continue to change because the central bank is also selling or buying foreign currency as the other half of the intervention. Eventually the change in official reserve holdings forces the central bank to make some adjustment. For instance, if the central bank is selling foreign currency in its intervention, then eventually the central bank runs low on its holdings of official reserves.

The second implication is that a fixed exchange rate and its defense constrains a country's ability to pursue an independent monetary policy. If the country begins with an

external deficit, the defense of the fixed rate eventually forces the country to contract its money supply. If the country begins with an external surplus, the defense of the fixed rate eventually forces the country to expand its money supply. If the country begins with an external balance, then any change in monetary policy and the money supply would create an external imbalance, and the intervention to defend the fixed rate would tend to reverse the monetary change.

The third implication is that the effects of fiscal policy are also altered by a fixed exchange rate. A change in fiscal policy causes the country's current and capital accounts to change in opposite directions in the short run, so the effect on the overall payments balance depends on how large the two changes are. If international financial capital flows are not that responsive to interest rate changes, then the resulting external imbalance following a fiscal policy change leads to intervention that changes monetary conditions in the other direction, reducing the effect of the fiscal policy change on national product. If international capital flows are sufficiently responsive, the resulting external imbalance leads to intervention that changes monetary conditions in the same direction, enhancing the effect of fiscal policy on real product. In the extreme case of **perfect capital mobility,** the fiscal change can have the full spending multiplier effect because the domestic interest rate remains unchanged and equal to the foreign interest rate. (However, with perfect capital mobility the country has *no* independent monetary policy.)

The fourth implication is that defending a fixed exchange rate without sterilization alters how different exogenous shocks affect the country's macroeconomy in the short run. The effects of **domestic monetary shocks** are greatly reduced without sterilization. The effects of **domestic spending shocks** on national product depend on how responsive international financial capital flows are to changes in the interest rate. If international capital is more responsive, a domestic spending shock has more effect.

International capital-flow shocks can have major effects on the domestic economy because they require intervention to defend the fixed rate as the shock hits. For instance, a shift to capital outflow leads to intervention that results in a lower domestic money supply. Domestic interest rates tend to increase, and national product and income tend to decline.

International trade shocks affect the economy directly by changing aggregate demand. In addition, the resulting intervention to defend the fixed exchange rate causes a monetary change that generally reinforces the change in demand, resulting in a larger change in national product and income.

The second part of the chapter examined broad policy issues for countries that have fixed exchange rates. A country wants to achieve both internal and external balance. Yet, stabilizing an open macroeconomy with a fixed exchange rate is not easy. If a country has only one policy for influencing aggregate demand (for instance, monetary policy that changes the money supply), it would have to be very lucky for the level of aggregate demand that is best for the domestic economy to turn out to be the one that keeps external payments in balance. One way out of the dilemma was proposed by Robert Mundell and J. Marcus Fleming. They noted that expansionary monetary and fiscal policies have opposite effects on domestic interest rates. The difference can be used to influence international capital flows in the short run.

This means that monetary policy has a comparative advantage in affecting the external balance, whereas fiscal policy has a comparative advantage in affecting the domestic economy. We can thus devise a monetary–fiscal mix to deal with any pairing of imbalances in the external accounts and the domestic economy, as shown in Figure 22.11.

When policymakers cannot confidently estimate the positions of the curves, they can still follow a simpler **assignment rule** with fair chances of at least approaching the desired combination of internal and external balance. When policies are adjusted smoothly and take quick effect, internal and external balance can be reached by assigning the internal task to fiscal policy and the external task to monetary policy.

Faced with a large or continuing external imbalance, a country's government may decide to react by surrendering—by changing the exchange rate: devaluing, revaluing, or shifting to a floating exchange rate that immediately depreciates or appreciates. A change in the exchange rate can reduce the external imbalance by altering the country's international price competitiveness. Changes in exports and imports alter the current account balance. The exchange rate change also has an impact on internal balance. The export and import changes alter aggregate demand, and the change in the domestic prices of imported goods can alter the country's general price level or inflation rate.

However, it is not certain that the exchange rate change actually does reduce the external imbalance. The effect on the value of the current account balance depends on changes in both the volumes (quantities) and prices of exports and imports. Consider a devaluation. Measured in foreign currency, the price of exportable products tends to decrease, the quantity of exports tends to increase, and the price and quantity of imports tend to decrease. The value of exports could increase or decrease. If the value of exports decreases, the current account balance only improves if the decline in the value of imports is larger. A general condition that ensures that the current account balance improves is that the price elasticities of demand for exports and imports be sufficiently high so that the changes in the volumes of exports and imports are large enough. In practice, the price effects, especially the decrease in the foreign-currency price of exports, often occurs quickly, while the volume effects occur more slowly but eventually become sufficiently large. The current account balance thus deteriorates at first, but after a period of months it tends to improve, tracing out a pattern called the **J curve.**

Suggested Reading

A technical treatment of the economics of fixed exchange rates is presented in Rivera-Batiz and Rivera-Batiz (1994, Chapter 14). Some of Robert Mundell's pioneering articles on internal and external balance and the implications of international capital mobility are reprinted in Mundell (1968, Chapters 16 and 18). The same path-breaking analysis was simultaneously developed by Fleming (1962).

Fieleke (1994) discusses the purposes and activities of the International Monetary Fund. Kamin (1988) reviews effects of nearly 100 instances of currency devaluations since the early 1950s.

Questions and Problems

✦1. "A country with a deficit in its overall international payments runs the risk of increasing inflation if it defends its fixed exchange rate by (unsterilized) official intervention in the foreign exchange market." Do you agree or disagree? Why?

2. A country with a fixed exchange rate has achieved external balance. Government spending then increases in an effort to reduce unemployment. What is the effect of this policy change on the country's official settlements balance? If the central bank uses unsterilized intervention to defend the fixed rate, will intervention tend to reduce the expansionary effect of the fiscal policy?

✦3. What does perfect capital mobility mean for the effectiveness of monetary and fiscal policies under fixed exchange rates?

4. What is the assignment rule? What are its possible advantages and drawbacks?

✦5. "According to the logic of the J-curve analysis, a country that revalues its currency should have an improvement in the value of its current account in the months immediately after the revaluation." Do you agree or disagree? Why?

6. The Pugelovian central bank intervenes in the foreign exchange market by selling U.S. $10 billion to prevent the Pugelovian currency (the pnut) from depreciating.
   a. What impact does this have on the Pugelovian holdings of official international reserves?
   b. What effect will this have on the Pugelovian money supply if the central bank does not sterilize? Explain.
   c. What effect will this have on the Pugelovian money supply if the central bank does sterilize (using an open market operation in Pugelovian government bonds)? Explain.

✦7. A country initially has achieved both external balance and internal balance. International financial capital is reasonably mobile so the country's FE curve is upward sloping (and flatter than the LM curve). The country has a fixed exchange rate and defends it using official intervention. The country does not sterilize. As a result of the election of a new government, foreign investors become bullish on the country. International financial capital inflows increase dramatically and remain higher for a number of years.
   a. What shift occurs in the FE curve because of the increased capital inflows?
   b. What intervention is necessary to defend the fixed exchange rate?
   c. As a result of the intervention, how does the country adjust back to external balance? Illustrate this using an IS–LM–FE graph. What is the effect of all of this on the country's internal balance?

8. A country initially has achieved both external balance and internal balance. The country prohibits international financial capital inflows and outflows, so its capital account (excluding official reserves transactions) is always zero because of these capital controls. The country has a fixed exchange rate and defends it using official intervention. The country does not sterilize. An exogenous shock now occurs—foreign demand for the country's exports increases.
   a. What is the slope of the country's FE curve?
   b. What shifts occur in the IS, LM, or FE curves because of the increase in foreign demand for the country's exports?
   c. What intervention is necessary to defend the fixed exchange rate?
   d. As a result of the intervention, how does the country adjust back to external balance? Illustrate this using an IS–LM–FE graph. What is the effect of all of this on the country's internal balance?

✦9. What is the mixture of monetary and fiscal policies that can cure each of the following imbalances?
   a. Rising inflation and overall payments deficit (e.g., point *H* in Figure 22.11).
   b. Rising inflation and overall payments surplus (e.g., point *F* in Figure 22.11).
   c. Insufficient aggregate demand and overall payments surplus (e.g., point *C* in Figure 22.11).

10. The Pugelovian government has just devalued the Pugelovian currency by 10 percent. For each of the following, will this devaluation improve the Pugelovian current account deficit? Explain each.
    a. People are very fixed in their habits. Both Pugelovian importers and foreign buyers of Pugelovian exports buy the same physical volumes no matter what.
    b. Pugelovian firms keep the Pugelovian pnut prices of Pugelovian exports constant, and foreign firms keep the foreign-currency prices of exports to Pugelovia constant.