chapter

18

Open-Economy Macroeconomics: Adjustment Policies

LEARNING GOALS:

After reading this chapter, you should be able to:

- Understand how a nation can achieve internal and external balance with fiscal and monetary policies under a fixed and a flexible exchange rate system
- Understand the difficulties and experiences in achieving internal and external balance
- Understand the disadvantage of using direct controls to achieve internal and external balance

18.1 Introduction

In this chapter, we examine the adjustment policies that are used to achieve full employment with price stability and equilibrium in the balance of payments. The need for adjustment policies arises because the automatic adjustment mechanisms discussed in the previous two chapters have serious unwanted side effects (see Section 17.6c). The economist most responsible for shifting the emphasis from automatic adjustment mechanisms to adjustment policies was *James Meade*.

The most important economic goals or objectives of nations are (1) internal balance, (2) external balance, (3) a *reasonable* rate of growth, (4) an *equitable* distribution of income, and (5) *adequate* protection of the environment. Internal balance refers to full employment or a rate of unemployment of no more than, say, 4 to 5 percent per year (the so-called *frictional unemployment* arising in the process of changing jobs) and a rate of inflation of no more than 2 or 3 percent per year. External balance refers to equilibrium in the balance of payments (or a desired temporary disequilibrium such as a surplus that a nation may want in order to replenish its depleted international reserves). In general, nations place priority on internal over external balance, but they are sometimes forced to switch their priority when faced with large and persistent external imbalances.

To achieve these objectives, nations have the following policy instruments at their disposal: (1) expenditure-changing, or demand, policies, (2) expenditure-switching policies, and (3) direct controls. Expenditure-changing policies include both fiscal and monetary policies. *Fiscal policy* refers to changes in government

expenditures, taxes, or both. Fiscal policy is *expansionary* if government expenditures are increased and/or taxes reduced. These actions lead to an expansion of domestic production and income through a multiplier process (just as in the case of an increase in domestic investment or exports) and induce a rise in imports (depending on the marginal propensity to import of the nation). *Contractionary* fiscal policy refers to a reduction in government expenditures and/or an increase in taxes, both of which reduce domestic production and income and induce a fall in imports.

The introduction of the government sector means that the equilibrium condition of Equation (17-6) (repeated here for ease of reference as Equation (18-1)) must be extended to become Equation (18-2), where G refers to government expenditures and T to taxes:

$$I + X = S + M \tag{18-1}$$

$$I + X + G = S + M + T \tag{18-2}$$

Government expenditures *(G)*, just like investments *(I)* and exports *(X)*, are injections into the system, while taxes *(T)*, just like savings *(S)* and imports *(M)*, are a leakage from the system. Equation (18-2) can also be rearranged as

$$(G - T) = (S - I) + (M - X) \tag{18-3}$$

which postulates that a government budget deficit $(G > T)$ must be financed by an excess of S over I and/or an excess of M over X (see Case Study 18-1). Expansionary fiscal policy refers to an increase in $(G - T)$, and this can be accomplished with an increase in G, a reduction in T, or both. Contractionary fiscal policy refers to the opposite.

Monetary policy involves a change in the nation's money supply that affects domestic interest rates. Monetary policy is *easy* if the money supply is increased and interest rates fall. This induces an increase in the level of investment and income in the nation (through the multiplier process) and induces imports to rise. At the same time, the reduction in the interest rate induces a short-term capital outflow or reduced inflow. On the other hand, *tight* monetary policy refers to a reduction in the nation's money supply and a rise in the interest rate. This discourages investment, income, and imports, and also leads to a short-term capital inflow or reduced outflow.

CASE STUDY 18-1 Government, Private-Sector, and Current Account Balances in the G-7 Countries

Table 18.1 shows the average government balance $(G - T)$, the private-sector balance $(S - I)$, and the trade or current account balance $(X - M)$ as a percentage of GDP for the G-7 countries over the 1996–2000 period and their values in 2001. From the table we see that Equation (18-3) (slightly reformulated) holds. For example, for the United States in 2001, $T - G = 0.6$ (a budget surplus). Therefore, $G - T = -0.6$ is equal to $S - I = -4.7$ plus $M - X$ or *minus* $X - M = -(-4.1) = +4.1$. Thus, we have $-0.6 = -4.7 + 4.1$. The table shows that Japan had the largest budget deficit and the largest private-sector and current account surpluses over the 1996–2001 period among the G-7 countries, while the United States had the largest private balance and current account deficit.

(continued)

CASE STUDY 18-1 Continued

TABLE 18.1. Government, Private-Sector, and Current Account Balances as a Percentage of GDP in the G-7 Countries, 1996–2001

Country	Government Balances		Private-Sector Balances		Current Account Balances	
	1996–2000 Average	2001	1996–2000 Average	2001	1996–2000 Average	2001
United States	−0.1	0.6	−2.7	−4.7	−2.7	−4.1
Japan	−5.6	−6.4	7.9	8.5	2.3	2.1
Germany	−1.7	−2.5	1.2	1.8	−0.6	−0.7
United Kingdom	−0.6	1.1	−0.6	−2.9	−1.2	−1.8
France	−2.6	−1.5	4.7	3.0	2.2	1.6
Italy	−2.9	−1.4	4.6	1.5	1.6	0.1
Canada	0.5	2.8	−0.4	0.9	0.1	3.7

Source: Organization for Economic Cooperation and Development, *Economic Outlook* (Paris: OECD, December 2001), p. 134.

Expenditure-switching policies refer to changes in the exchange rate (i.e., a devaluation or revaluation). A devaluation switches expenditures from foreign to domestic commodities and can be used to correct a deficit in the nation's balance of payments. But it also increases domestic production, and this induces a rise in imports, which neutralizes a part of the original improvement in the trade balance. A revaluation switches expenditures from domestic to foreign products and can be used to correct a surplus in the nation's balance of payments. This also reduces domestic production and, consequently, induces a decline in imports, which neutralizes part of the effect of the revaluation.

Direct controls consist of tariffs, quotas, and other restrictions on the flow of international trade and capital. These are also expenditure-switching policies, but they can be aimed at specific balance-of-payments items (as opposed to a devaluation or revaluation, which is a general policy and applies to all items at the same time). Direct controls in the form of price and wage controls can also be used to stem domestic inflation when other policies fail.

Faced with multiple objectives and with several policy instruments at its disposal, the nation must decide which policy to utilize to achieve each of its objectives. According to *Tinbergen* (Nobel prize winner in economics in 1969), the nation usually needs as many effective policy instruments as the number of independent objectives it has. If the nation has two objectives, it usually needs two policy instruments to achieve the two objectives *completely*; if it has three objectives, it requires three instruments, and so on. Sometimes a policy instrument directed at a particular objective also helps the nation move closer to another objective. At other times, it pushes the nation even farther away from the second objective. For example, expansionary fiscal policy to eliminate domestic unemployment will also reduce a balance-of-payments surplus, but it will increase a deficit.

Since each policy affects both the internal and external balance of the nation, it is crucial that each policy be paired with and used for the objective toward which it is most effective, according to the principle of effective market classification developed by *Mundell*. We will see in Section 18.6A that if the nation does not follow this principle, it will move even farther from both balances.

In Section 18.2, we analyze the use of expenditure-changing and expenditure-switching policies to achieve both internal and external balance. Section 18.3 introduces new tools of analysis to define equilibrium in the goods market, in the money market, and in the balance of payments. These new analytical tools are then used to examine ways to reach internal and external balance with fixed exchanges in Section 18.4 and with flexible exchange rates in Section 18.5. Section 18.6 presents and evaluates the so-called assignment problem, or how fiscal and monetary policies must be used to achieve both internal and external balance. In Section 18.6B, we relax the assumption that domestic prices remain constant until full employment is reached. Section 18.7 then examines direct controls. In the appendix, we derive the condition for equilibrium in the goods market, in the money market, and in the balance of payments and present a mathematical summary of these new tools of analysis.

18.2 Internal and External Balance with Expenditure-Changing and Expenditure-Switching Policies

In this section, we examine how a nation can simultaneously attain internal and external balance with expenditure-changing and expenditure-switching policies. For simplicity we assume a zero international capital flow (so that the balance of payments is equal to the nation's trade balance). We also assume that prices remain constant until aggregate demand begins to exceed the full-employment level of output. The assumption of no international capital flow is relaxed in the next section, and the assumption of no inflation until full employment is reached is relaxed in Section 18.6B.

In Figure 18.1, the vertical axis measures the exchange rate (R). An increase in R refers to a devaluation and a decrease in R to a revaluation. The horizontal axis measures real domestic expenditures, or absorption (D). Besides domestic consumption and investments, D also includes government expenditures (which can be manipulated in the pursuit of fiscal policy).

The EE curve shows the various combinations of exchange rates and real domestic expenditures, or absorption, that result in external balance. The EE curve is positively inclined because a higher R (due to a devaluation) improves the nation's trade balance (if the Marshall–Lerner condition is satisfied) and must be matched by an increase in real domestic absorption (D) to induce imports to rise sufficiently to keep the trade balance in equilibrium and maintain external balance. For example, starting from point F on EE, an increase in R from R_2 to R_3 must be accompanied by an increase in D from D_2 to D_3 for the nation to maintain external balance (point J' on EE). A smaller increase in D will lead to a balance-of-trade surplus, while a larger increase in D will lead to a balance-of-trade deficit.

On the other hand, the YY curve shows the various combinations of exchange rates *(R)* and domestic absorption *(D)* that result in internal balance (i.e., full employment with price stability). The YY curve is negatively inclined because a lower R (due to a revaluation) worsens the trade balance and must be matched with larger domestic absorption *(D)* for the nation to remain in internal balance. For example, starting from point F on YY, a reduction in R from R_2 to R_1 must be accompanied by an increase in D from D_2 to D_3 to maintain internal balance (point J on YY). A smaller increase in D will lead to unemployment, while a larger increase in D will lead to excess aggregate demand and (demand-pull) inflation.

In Figure 18.1, we see that only at point F (i.e., at R_2 and D_2), defined as where the EE and YY curves intersect, will the nation be simultaneously in external and internal balance. With points above the EE curve referring to external surpluses and points below referring to deficits, and with points below the YY curve referring to unemployment and points above referring to inflation, we can define the following four zones of external and internal imbalance (see the figure):

Zone I External surplus and internal unemployment

Zone II External surplus and internal inflation

Zone III External deficit and internal inflation

Zone IV External deficit and internal unemployment

From the figure we can now determine the combination of expenditure-changing and expenditure-switching policies required to reach point F. For example, starting from point C (deficit and unemployment), both the exchange rate *(R)* and domestic absorption *(D)* must be increased to reach point F. By increasing R only, the nation can reach either external balance (point C' on the EE curve) or, with a larger increase in R, internal balance (point C'' on the YY curve), but it cannot reach both simultaneously. Similarly, by increasing domestic absorption only, the nation can reach internal balance (point J on the YY curve),

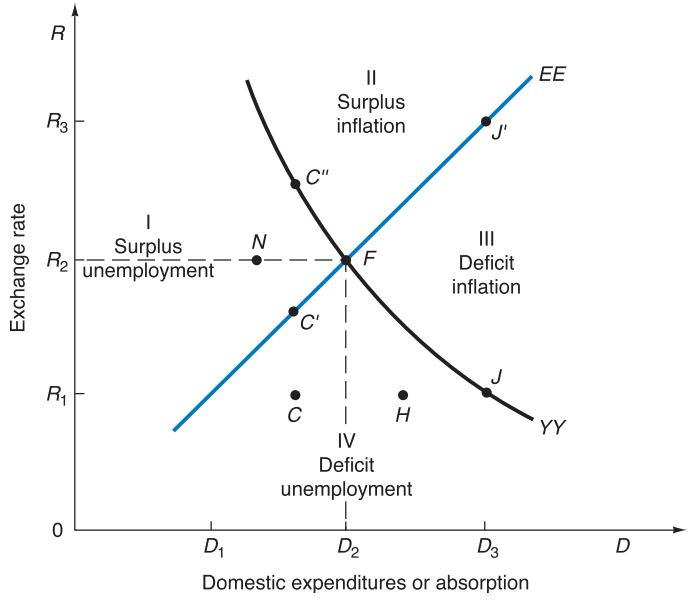

FIGURE 18.1. Swan Diagram.
The vertical axis measures the exchange rate and the horizontal axis real domestic expenditures, or absorption. Points on the *EE* curve refer to external balance, with points to the left indicating external surplus and points to the right indicating external deficit. Points on the *YY* curve refer to internal balance, with points to the left indicating internal unemployment and points to the right indicating internal inflation. The crossing of the *EE* and *YY* curves defines the four zones of external and internal imbalance and helps us determine the appropriate policy mix to reach external and internal balance simultaneously at point *F*.

but this leaves an external deficit because the nation will be below the *EE* curve. Note that although both point *C* and point *H* are in zone IV, point *C* requires an increase in domestic absorption while point *H* requires a decrease in domestic absorption to reach point *F* (see the figure).

Even if the nation were already in internal balance, say, at point *J* on *YY*, a devaluation alone could get the nation to point J' on *EE*, but then the nation would face inflation. Thus, two policies are usually required to achieve two goals simultaneously. Only if the nation happens to be directly across from or directly above or below point *F* will the nation be able to reach point *F* with a single policy instrument. For example, from point *N* the nation will be able to reach point *F* simply by increasing domestic absorption from D_1 to D_2. The reason is that this increase in domestic absorption induces imports to rise by the precise amount required to eliminate the original surplus without any change in the exchange rate. But this is unusual. The precise combination of expenditure-changing and expenditure-switching policies for each of the four zones of Figure 18.1 is left as an end-of-chapter problem. Figure 18.1 is called a Swan diagram in honor of *Trevor Swan*, the Australian economist who introduced it.

Under the fixed exchange rate system that prevailed from the end of World War II until 1971, industrial nations were generally unwilling to devalue or revalue their currency even when they were in *fundamental* disequilibrium. Surplus nations enjoyed the prestige of the surplus and the accumulation of reserves. Deficit nations regarded devaluation as a sign of weakness and feared it might lead to *destabilizing* international capital movements (see Chapter 21). As a result, nations were left with only expenditure-changing policies to achieve internal and external balance. This presented a serious theoretical problem until *Mundell* showed how to use fiscal policy to achieve internal balance and monetary policy to achieve external balance. Thus, even without an expenditure-switching policy, nations could theoretically achieve both internal and external balance simultaneously.

18.3 Equilibrium in the Goods Market, in the Money Market, and in the Balance of Payments

We now introduce the Mundell–Fleming model to show how a nation can use fiscal and monetary policies to achieve both internal and external balance without any change in the exchange rate. To do so, we need some new tools of analysis. These are introduced at an intuitive level in this section and rigorously in the appendix. The intuitive presentation here is adequate for our purposes, and there is no need to go to the appendix to understand what follows in the remainder of the chapter. The new tools introduced in this section will then be utilized in the next section to proceed with our analysis.

The new tools of analysis take the form of three curves: the *IS* curve, showing all points at which the goods market is in equilibrium; the *LM* curve, showing equilibrium in the money market; and the *BP* curve, showing equilibrium in the balance of payments. Short-term capital is now assumed to be responsive to international interest rate differentials. Indeed, it is this response that allows us to separate fiscal from monetary policies and direct fiscal policy to achieve internal balance and monetary policy to achieve external balance.

The *IS, LM*, and *BP* curves are shown in Figure 18.2. The *IS* curve shows the various combinations of interest rates *(i)* and national income *(Y)* that result in equilibrium in the

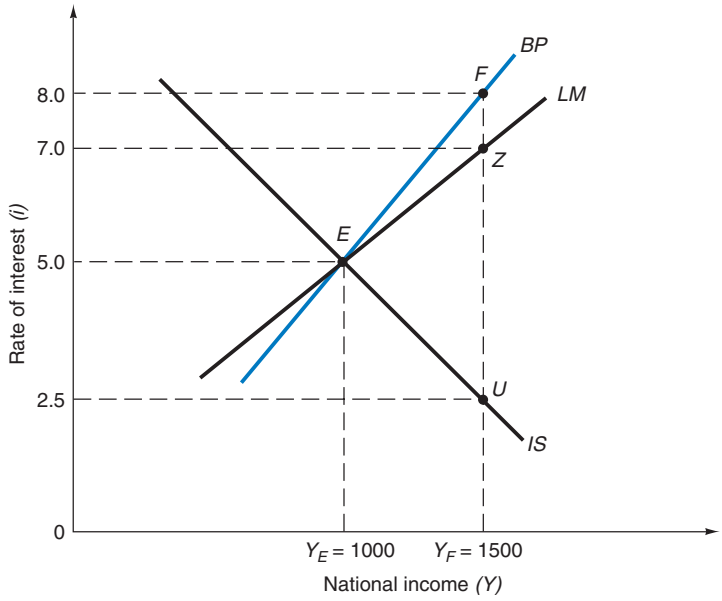

FIGURE 18.2. Equilibrium in the Goods and Money Markets and in the Balance of Payments. The *IS, LM,* and *BP* curves show the various combinations of interest rates and national income at which the goods market, the money market, and the nation's balance of payments, respectively, are in equilibrium. The *IS* curve is negatively inclined because lower rates of interest (and higher investments) are associated with higher incomes (and higher savings and imports) for the quantities of goods and services demanded and supplied to remain equal. The *LM* curve is positively inclined because higher incomes (and a larger transaction demand for money) must be associated with higher interest rates (and a lower demand for speculative money balances) for the total quantity of money demanded to remain equal to the given supply of money. The *BP* curve is also positively inclined because higher incomes (and imports) require higher rates of interest (and capital inflows) for the nation to remain in balance-of-payments equilibrium. All markets are in equilibrium at point *E*, where the *IS, LM,* and *BP* curves cross at $i = 5.0\%$, and $Y_E = 1000$. However, $Y_E < Y_F$.

goods market. The goods market is in equilibrium whenever the quantity of goods and services demanded equals the quantity supplied, or when injections into the system equal leakages, as shown by Equation (18-2). The level of investment *(I)* is now taken to be inversely related to the rate of interest *(i)*. That is, the lower the rate of interest (to borrow funds for investment purposes), the higher is the level of investment (and national income, through the multiplier process). As in Chapter 17, saving *(S)* and imports *(M)* are a positive function of, or increase in, the level of income of the nation *(Y)*, while the nation's exports *(X)*, government expenditures *(G)*, and taxes *(T)* are taken to be exogenous, or independent, of Y. With this in mind, let's see why the *IS* curve is negatively sloped.

The interest rate of $i = 5.0\%$ and national income of $Y_E = 1000$ define one equilibrium point in the goods market (point E on the *IS* curve). The *IS* curve is negatively inclined because at lower interest rates, the level of investment is higher so that the level of national income will also have to be higher to induce a higher level of saving and imports to once again be equal to the higher level of investment. At that point, the nation's goods market is once again in equilibrium. Exports, government expenditures, and taxes are not affected by the increase in the level of national income because they are exogenous. Thus, equilibrium

in the nation's goods market is reestablished when $\Delta I = \Delta S + \Delta M$. For example, at $i = 2.5\%$, the level of investment will be higher than at $i = 5.0\%$, and the level of national income will have to be $Y_F = 1500$ (the full-employment level of income) to maintain equilibrium in the goods market (point U on the IS curve). At $Y < 1500$ (with $i = 2.5\%$), there is unemployment, and at $Y > 1500$ there is inflation.

The *LM* curve shows the various combinations of interest rates *(i)* and national income *(Y)* at which the demand for money is equal to the given and fixed supply of money, so that the money market is in equilibrium. Money is demanded for transactions and speculative purposes. The transaction demand for money consists of the active working balances held for the purpose of making business payments as they become due. The transaction demand for money is positively related to the level of national income. That is, as the level of national income rises, the quantity demanded of active money balances increases (usually in the same proportion) because the volume of transactions is greater. The speculative demand for money arises from the desire to hold money balances instead of interest-bearing securities. The reason for the preference for money balances is to avoid the risk of falling security prices. Furthermore, money balances will allow the holder to take advantage of possible future (financial) investment opportunities. However, the higher the rate of interest, the smaller is the quantity of money demanded for speculative or liquidity purposes because the cost (interest foregone) of holding inactive money balances is greater.

At $i = 5.0\%$ and $Y_E = 1000$, the quantity of money demanded for transaction purposes plus the quantity demanded for speculative purposes equals the given supply of money so that the money market is in equilibrium (point E on the LM curve). The LM curve is positively inclined because the higher the rate of interest (i), the smaller the quantity of money demanded for speculative purposes. The remaining larger supply of money available for transaction purposes will be held only at higher levels of national income. For example, at $r = 7.0\%$, the level of national income will have to be $Y_F = 1500$ (point Z on the LM curve) for the money market to remain in equilibrium. At $Y < 1500$ (and $r = 7.0\%$), the demand for money falls short of the supply of money, while at $Y > 1500$, there is an excess demand for money. To be noted is that the LM curve is derived on the assumption that the monetary authorities keep the nation's money supply fixed.

The *BP* curve shows the various combinations of interest rates *(i)* and national income *(Y)* at which the nation's balance of payments is in equilibrium *at a given exchange rate*. The balance of payments is in equilibrium when a trade deficit is matched by an equal net capital inflow, a trade surplus is matched by an equal net capital outflow, or a zero trade balance is associated with a zero *net* international capital flow. One point of external balance is given by point E on the BP curve at $i = 5.0\%$ and $Y_E = 1000$. The BP curve is positively inclined because higher rates of interest lead to greater capital inflows (or smaller outflows) and must be balanced with higher levels of national income and imports for the balance of payments to remain in equilibrium.

For example, at $i = 8.0\%$, the level of national income will have to be $Y_F = 1500$ for the nation's balance of payments to remain in equilibrium (point F on the BP curve). To the left of the FE curve, the nation has a balance-of-payments surplus and to the right a balance-of-payments deficit. The more responsive international short-term capital flows are to changes in interest rates, the flatter is the BP curve. The BP curve is drawn on the assumption of a constant exchange rate. A devaluation or depreciation of the nation's currency shifts the BP curve down since the nation's trade balance improves, and so a lower interest rate and smaller capital inflows (or greater capital outflows) are required to keep the balance of payments in equilibrium. On the other hand, a revaluation or appreciation

of the nation's currency shifts the BP curve upward. Since we are here assuming that the exchange rate is fixed, the BP curve does not shift.

In Figure 18.2, the only point at which the nation is simultaneously in equilibrium in the goods market, in the money market, and in the balance of payments is at point E, where the IS, LM, and BP curves cross. Note that this equilibrium point is associated with an income level of $Y_E = 1000$, which is below the full-employment level of national income of $Y_F = 1500$. Also to be noted is that the BP curve need not cross at the $IS-LM$ intersection. In that case, the goods and money markets, but not the balance of payments, would be in equilibrium. However, a point such as E, where the nation is simultaneously in equilibrium in all three markets, is a convenient starting point to examine how the nation, by the appropriate combination of fiscal and monetary policies, can reach the full-employment level of national income (and remain in external balance) while keeping the exchange rate fixed.

18.4 Fiscal and Monetary Policies for Internal and External Balance with Fixed Exchange Rates

In this section, we first examine the effect of fiscal policy on the IS curve and the effect of monetary policy on the LM curve, and then we show how fiscal and monetary policies can be used to reach internal and external balance, starting from a position of external balance and unemployment (point E in Figure 18.2), or alternatively, starting from a condition of unemployment and deficit in the balance of payments, and finally assuming that capital flows are perfectly elastic.

18.4A Fiscal and Monetary Policies from External Balance and Unemployment

An expansionary fiscal policy in the form of an increase in government expenditures and/or a reduction in taxes (which increases private consumption) shifts the IS curve to the right so that at each rate of interest the goods market is in equilibrium at a higher level of national income. On the other hand, a contractionary fiscal policy shifts the IS curve to the left. An easy monetary policy in the form of an increase in the nation's money supply shifts the LM curve to the right, indicating that at each rate of interest the level of national income must be higher to absorb the increase in the money supply. On the other hand, a tight monetary policy reduces the nation's money supply and shifts the LM curve to the left. Monetary and fiscal policies will not directly affect the BP curve, and since we are here assuming that the exchange rate is fixed, the BP curve remains unchanged (i.e., it does not shift).

Figure 18.3 shows that the nation of Figure 18.2 can reach the full-employment level of national income or internal balance and remain in external balance by combining the *expansionary fiscal policy* that shifts the IS curve to the right to IS' and the *tight monetary policy* that shifts the LM curve to the left to LM' in such a way that broken curves IS' and LM' intersect the unchanged BP curve at the full-employment level of income of $Y_F = 1500$ and $i = 8.0\%$ (point F). That is, the worsened trade balance resulting from the increase in national income (an induced rise in imports) is matched by an equal increase in capital inflows (or reduction in capital outflows) as the interest rate rises to $i = 8.0\%$ so as to keep the nation's balance of payments in equilibrium.

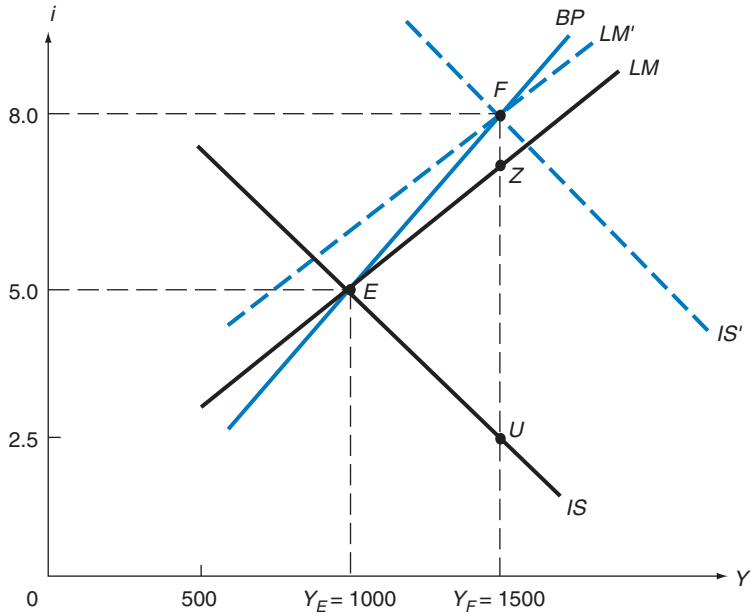

FIGURE 18.3. Fiscal and Monetary Policies from Domestic Unemployment and External Balance. Starting from point *E* with domestic unemployment and external balance, the nation can reach the full-employment level of national income of $Y_F = 1500$ with external balance by pursuing the expansionary fiscal policy that shifts the *IS* curve to the right to *IS′* and the tight monetary policy that shifts the *LM* curve to the left to *LM′*, while holding the exchange rate fixed. All three markets are then in equilibrium at point *F*, where curves *IS′* and *LM′* cross on the unchanged *BP* curve at $i = 8.0\%$ and $Y_F = 1500$.

The nation could reach the full-employment level of national income by the *easy* monetary policy that shifts the *LM* curve to the right so as to cross the unchanged *IS* curve at point *U*. However, at point *U*, the interest rate would be $i = 2.5\%$ (which is lower than $i = 5.0\%$ at point *E*), and so the worsening trade balance as income rises would be accompanied by a smaller capital inflow (or larger capital outflow) as the interest rate falls, leaving a large balance-of-payments deficit. As an alternative, the nation could reach the full-employment level of national income by the expansionary fiscal policy that shifts the *IS* curve to the right so as to cross the *LM* curve at point *Z*. At point *Z*, the interest rate is higher than at point *E* so that the worsened trade balance would be accompanied by an increased capital inflow (or reduced capital outflow). However, this increased capital inflow or reduced outflow is not sufficient to avoid a deficit in the nation's balance of payments (since point *Z* is to the right of the *BP* curve).

To reach the full-employment level of national income of $Y_F = 1500$ and also have equilibrium in its balance of payments, the nation should pursue the stronger expansionary policy that shifts the *IS* curve not to point *Z* on the *LM* curve but to point *F* on the *BP* curve (as in the figure). The tight monetary policy shown in the figure to shift the *LM* curve to *LM′*, while neutralizing part of the expansionary fiscal policy indicated by *IS′*, also causes the nation's interest rate to rise to $i = 8.0\%$ as required for external balance. Thus, two *conflicting* policies (an expansionary fiscal policy and a tight monetary policy) are required for this nation to reach internal and external balance simultaneously.

18.4B Fiscal and Monetary Policies from External Deficit and Unemployment

Figure 18.4 shows an initial situation where the *IS* and *LM* curves intersect at point *E* (as in Figures 18.2 and 18.3) but the *BP* curve does not. That is, the domestic economy is in equilibrium (with unemployment) at $i = 5.0\%$ and $Y_E = 1000$, but the nation faces a deficit in its balance of payments because point *E* is to the right of point *B* on the *BP* curve. That is, external balance requires the level of national income to be $Y = 700$ at $i = 5.0\%$ (point *B* on the *BP* curve). Since $Y_E = 1000$ instead, the nation has a deficit in its balance of payments equal to the excess level of national income of 300 $(1000 - 700)$ times the marginal propensity to import (*MPM*). If $MPM = 0.15$ (as in Chapter 17), the deficit in the nation's balance of payments is $(300)\ (0.15) = 45$ (assuming no foreign repercussions: with foreign repercussions, the balance-of-payments deficit would be smaller). At $Y_E = 1000$, the interest rate would have to be $i = 6.5\%$ (point B' on the *BP* curve) for capital inflows to be larger by 45 (or capital outflows smaller by 45) for the nation's balance of payments to be in equilibrium.

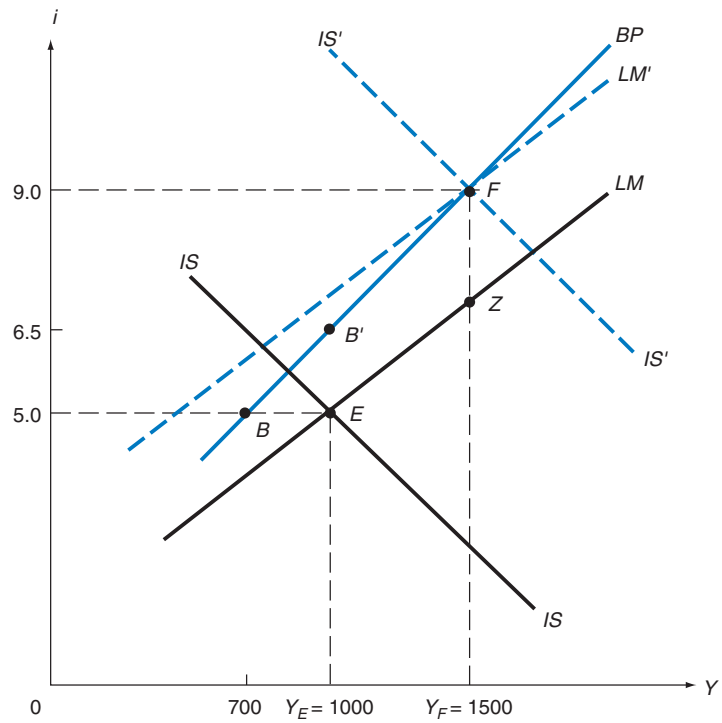

FIGURE 18.4. Fiscal and Monetary Policies from Domestic Unemployment and External Deficit. Starting from point *E* with domestic unemployment and external deficit, the nation can reach the full-employment level of national income of $Y_F = 1500$ with external balance by pursuing the expansionary fiscal policy that shifts the *IS* curve to the right to *IS'* and the tight monetary policy that shifts the *LM* curve to the left to *LM'*, while keeping the exchange rate fixed. All three markets are then in equilibrium at point *F*, where curves *IS'* and *LM'* cross on the unchanged *BP* curve at $i = 9.0\%$ and $Y_F = 1500$. Because of the original external deficit, the nation now requires a higher interest rate than in Figure 18.3 to reach external and internal balance.

Starting from point E, where the domestic economy is in equilibrium with unemployment and a balance-of-payments deficit (of 45 if $MPM = 0.15$), the nation can reach the full-employment level of output of $Y_F = 1500$ with external balance by using the expansionary fiscal policy that shifts the IS curve to the right to IS' and the tight monetary policy that shifts the LM curve to the left to LM', so that the broken IS' and LM' curves cross the unchanged BP curve at $i = 9.0\%$ and $Y_F = 1500$ (point F in the figure). Note that in this case the interest rate must rise from $i = 5.0\%$ to $i = 9.0\%$ rather than to $i = 8.0\%$ (as in Figure 18.3) for the nation to also achieve external balance.

18.4c Fiscal and Monetary Policies with Elastic Capital Flows

In the previous section, we have seen that a country with domestic unemployment and an external deficit can achieve both internal and external balance simultaneously with the appropriate *expansionary* fiscal policy and *tight* monetary policy. An inspection of Figure 18.4, however, reveals that a tight monetary policy was required only because the BP curve was steeper than the LM curve and was located to the left of the LM curve at the full-employment level of national income (Y_F). This implies that international capital flows are not very responsive to changes in international interest differentials.

With the elimination of all or most controls on international capital flows among industrial countries today, however, the BP curve is likely to be much flatter than the one shown in Figure 18.4 for these countries and to be located to the right of the LM curve at the full-employment level of income, as shown in Figure 18.5. In that case, a nation that starts at point E with domestic unemployment and a balance-of-payments deficit (point B is above point E) could reach internal and external balance by adopting the *expansionary* fiscal policy that shifts the IS curve to IS' and the *easy* monetary policy that shifts the LM curve to LM', in such a way that the IS' and LM' curves intersect on the unchanged BP curve at point F, with $i = 6.0\%$ and $Y_F = 1500$. Since international capital flows are now much more elastic than in the previous case, the interest rate needs only to rise from $i = 5.0\%$ to $i = 6.0\%$, instead of from $i = 5.0\%$ to $i = 9.0\%$ as in Figure 18.4. Thus, facing domestic unemployment and an external deficit, the nation will require an expansionary fiscal policy but a tight *or* easy monetary policy to achieve both internal and external balance, depending on whether the BP curve is to the left or to the right of the LM curve at the full-employment level of national income (i.e., depending on how responsive capital flows are to interest rate differentials).

A figure similar to Figure 18.4 or 18.5 could be drawn to show any other combination of internal and external disequilibria to begin with, together with the appropriate mix of fiscal and monetary policies required to reach the full-employment level of national income with external balance and a fixed exchange rate. This type of analysis is essential not only to examine the workings of the fixed exchange rate system that prevailed from the end of World War II until 1971, but also to examine the experience of the countries of the European Union as they sought to maintain stable exchange rates on their way to a common currency (the euro introduced in January 1999) and for the many developing nations that still peg or keep their exchange rates fixed in terms of the currency of a large developed nation, a basket of currencies, or special drawing rights (SDRs). The analysis is also relevant for the United States, Japan, Canada, and the European Union (after the adoption of the euro) to the extent that they *manage* their exchange rates by inducing international capital flows. Case Study 18-2 examines the relationship between U.S. current account and budget deficits since 1980.

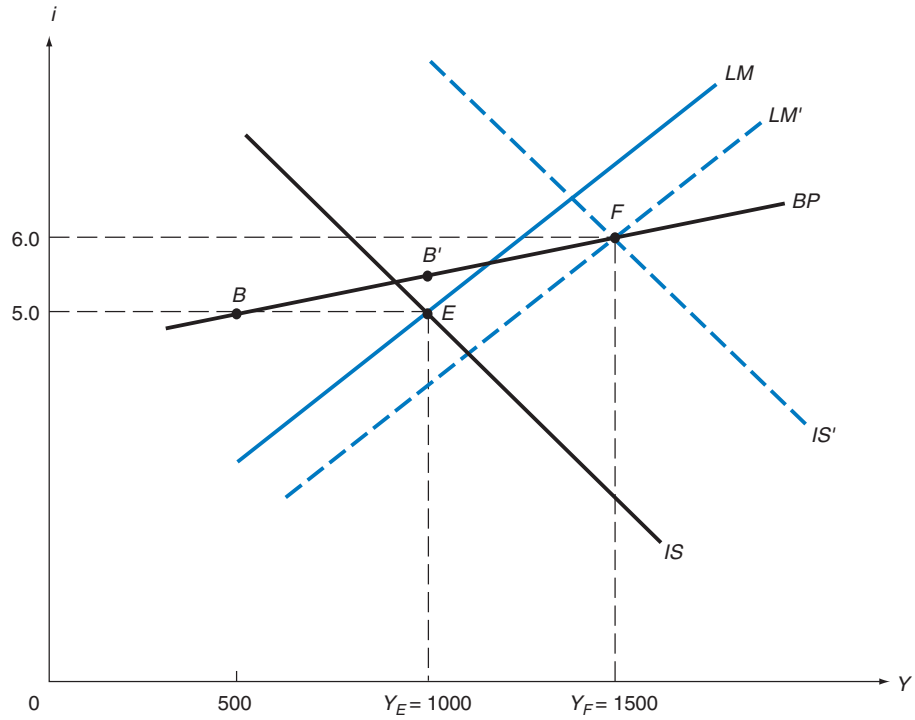

FIGURE 18.5. Fiscal and Monetary Policies with Elastic Capital Flows.
Starting from point *E* with domestic unemployment and external deficit, the nation can reach the full-employment level of national income of $Y_F = 1500$ with external balance by pursuing the expansionary fiscal policy that shifts the *IS* curve to the right to *IS′* and the *easy* monetary policy that shifts the *LM* curve to the right to *LM′*, while keeping the exchange rate fixed. All three markets are then in equilibrium at point *F*, where curves *IS′* and *LM′* cross on the unchanged *BP* curve at $i = 6.0\%$ and $Y_F = 1500$.

CASE STUDY 18-2 Relationship between U.S. Current Account and Budget Deficits

Figure 18.6 shows that from 1980 to 1989, 2001 to 2003, and 2010 and 2011, the U.S. current account deficit and the U.S. budget deficit (the excess of all government expenditures over all taxes collected) as percentages of the U.S. gross domestic product (GDP) moved more or less together (and for that reason, they are often referred to as the *twin deficits*). This does not mean, however, that the budget deficit fully explains or causes the current account deficit because each depends on many other factors, such as rates of savings, inflation, and growth, as well as expectations about taxes, interest rates, and exchange rates in the United States and abroad. From Equation (18-3), we can see that *only if (S-I) stays the same, do (X-M) and (G-T) move together*. In fact, from 1989 to 2001 and 2003 to 2010, the U.S. current account deficit and the U.S. budget deficit moved in opposite directions, with the first rising when the second was falling, and vice versa. The United States had the largest budget deficit (11.6 percent of GDP) in 2009 and the largest current account deficit (6.0 percent of GDP) in 2006.

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CASE STUDY 18-2 Continued

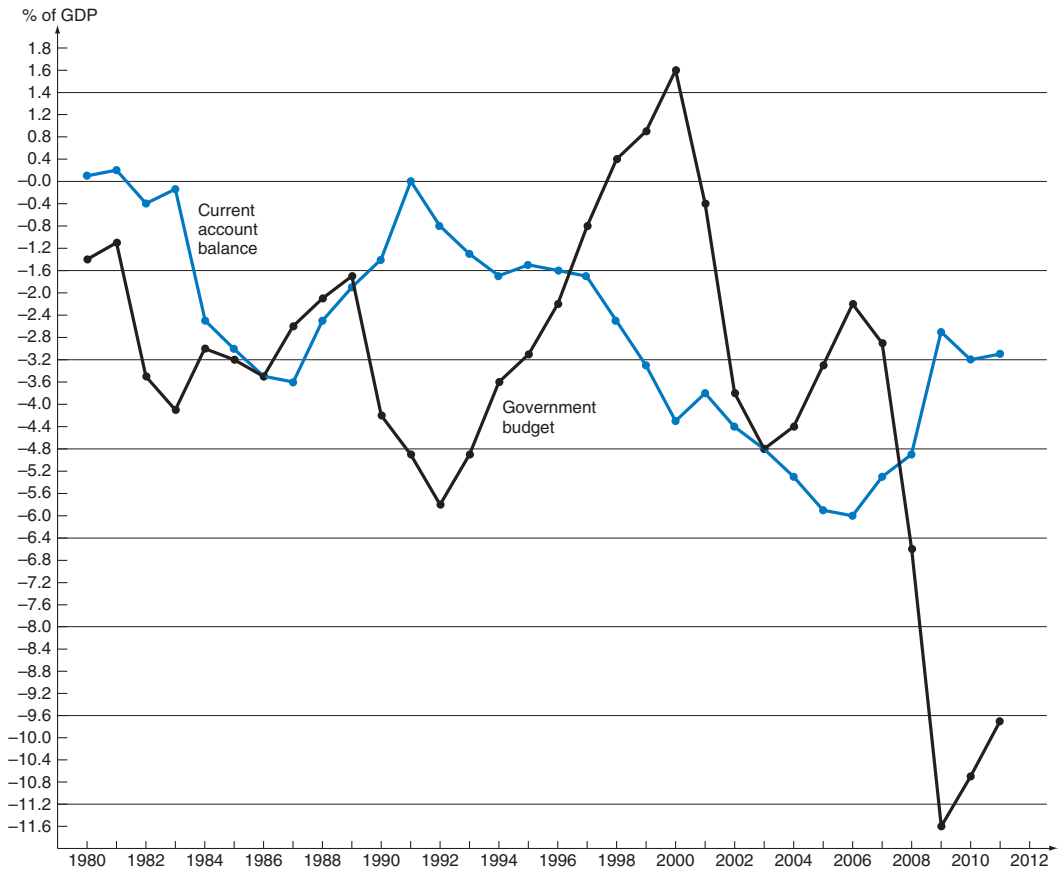


FIGURE 18.6. U.S. Current Account and Budget Deficits as a Percentage of GDP, 1980–2012.
From 1980 to 1989, 2001 to 2003, and 2010 to 2011, the U.S. current account deficit and the U.S. budget deficit, as a percentage of GDP, moved together as "twins," but they moved in opposite direction in other years.
Sources: Organization for Economic Cooperation Development, *Economic Outlook* (Paris: OECD, December 2012); D. Salvatore, "Twin Deficits in the G-7 Countries and Global Structural Imbalances," *Journal of Policy Modeling*, September 2006, pp. 701–712; and D. Salvatore, "Global Imbalances," *Princeton Encyclopedia of the World Economy* (Princeton, N.J.: Princeton University Press, 2008), pp. 536–541.

18.4D Fiscal and Monetary Policies with Perfect Capital Mobility

In Figure 18.7, we return to the initial equilibrium condition where all three markets are simultaneously in equilibrium at point E (as in Figures 18.2 and 18.3), but with perfect capital mobility (so that the BP curve is now horizontal at $i = 5\%$ prevailing on the world market). This means that a small nation can borrow or lend any desired amount at 5.0 percent. The condition was particularly relevant for small Western European nations as a result of the high capital market integration that took place during the 1980s and 1990s through the Eurocurrency market. In this extreme case, a small nation can reach the

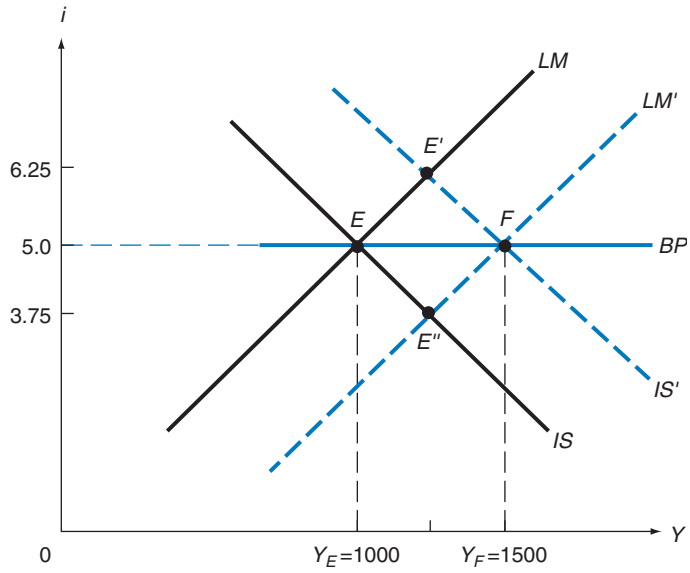


FIGURE 18.7. Fiscal and Monetary Policies with Perfect Capital Mobility and Fixed Exchange Rates. Starting from point *E* with domestic unemployment and external balance, and perfect capital mobility and a fixed exchange rate, the nation can reach the full-employment level of national income of $Y_F = 1500$ with the expansionary fiscal policy that shifts the *IS* curve to the right to *IS'* and with the *LM* curve shifting to the right to *LM'* because of capital inflows that the nation is unable to neutralize.

full-employment level of national income with equilibrium in its balance of payments by the appropriate fiscal policy and without any monetary policy. Indeed, in this world of perfect capital mobility and fixed exchange rates, monetary policy would be entirely ineffective. This can be shown as follows.

Starting from point E in Figure 18.7, the small nation should pursue the expansionary fiscal policy that shifts the IS curve to the right to IS' so that it crosses the horizontal BP curve at point F, at $Y_F = 1500$. The intersection of the broken IS' curve with the unchanged LM curve at point E' indicates a tendency for the nation's interest rate to rise to $i = 6.25\%$. However, because of perfect capital mobility at $i = 5.0\%$ for this small nation, there is a capital *inflow* from abroad that increases the nation's money supply (as the foreign currency is exchanged for domestic currency) and shifts the LM curve to LM'. As a result, broken curves IS' and LM' intersect at point F on the horizontal BP curve, with $i = 5.0\%$ and $Y_F = 1500$, and the nation is simultaneously in internal and external balance. In this case, it will be impossible for the small nation to prevent its money supply from increasing until the LM curve has shifted all the way to LM'. Only then will capital inflows come to an end and the nation's money supply stabilize (at the level given by LM').

If this small nation attempted to reach point F by the easy monetary policy that shifts the LM curve to the right to LM', the interest rate would tend to fall to $i = 3.75\%$ (point E'' in the figure). This would lead to capital *outflows*, which would reduce the nation's money supply to the original level and shift the LM' curve back to the original LM position. If the nation attempted to sterilize, or neutralize, the effect of these capital outflows on its money supply, it would soon exhaust all of its foreign exchange reserves, and the capital outflows

would continue until the nation's money supply had been reduced to the original position given by the *LM* curve. Thus, with fixed exchange rates, monetary policy is completely ineffective if international capital flows are highly elastic, as they are likely to be, for many small industrial nations in today's world of highly integrated capital markets. Case Study 18-3 examines the effect of fiscal policy in the United States and its repercussions on the European Union and on Japan.

CASE STUDY 18-3 Effect of U.S. Fiscal Policy in the United States and Abroad

Table 18.2 shows the effect of a U.S. restrictive fiscal policy (through a combination of increase in taxes and a reduction in government expenditures) equal to 6 percent of GDP on the U.S. growth rate, inflation rate, trade balance, current account balance, and short-term interest rates, and its repercussions on the European Monetary Union (EMU) and Japan under a fixed exchange rate system. Effects are measured in relation to what would have been the case in the United States without the restrictive fiscal policy over the 2004–2009 period (baseline

TABLE 18.2. Effect of a Restrictive U.S. Fiscal Policy with Fixed Exchange Rates, 2004–2009

	Yearly Averages: 2004–2009		
	Baseline Scenario	Restrictive Fiscal Policy[a]	End Point (2009) Scenario with Respect to Baseline
United States			
Growth of real GDP[b]	3.3	2.6	−4.5
Rate of inflation[b]	1.3	1.6	1.5
Trade balance[c]	−4.7	−3.7	2.1
Current account balance[c]	−5.1	−3.8	2.6
Short-term interest rate[d]	3.9	0.0	−5.4
European Monetary Union			
Growth of real GDP[b]	2.3	2.2	−0.4
Rate of inflation[b]	1.6	1.7	1.0
Trade balance[c]	2.5	1.9	−1.4
Current account balance[c]	1.0	0.3	−1.5
Short-term interest rate[d]	3.6	2.5	−1.5
Japan			
Growth of real GDP[b]	1.6	1.3	−2.0
Rate of inflation[b]	−0.2	−0.7	−2.7
Trade balance[c]	2.6	2.2	−1.3
Current account balance[c]	5.0	4.5	−1.3
Short-term interest rate[d]	0.0	0.0	0.0

[a]Restrictive fiscal policy equal to 6 percent of U.S. GDP.
[b]Numbers in the first two columns refer to yearly average rates of change; numbers in the third columns show the *level* in 2009 relative to the baseline.
[c]Percent of GDP.
[d]Percent.
Source: Organization for Economic Cooperation and Development, *Economic Outlook* (Paris: OECD, June 2004).

(continued)

■ CASE STUDY 18-3 Continued

scenario). The table shows average yearly effects over the 2004–2009 period and the outcome at the end of the period (i.e., in 2009) as compared to the baseline scenario without the U.S. restrictive fiscal policy.

From the table, we see that a restrictive fiscal policy equal to 6 percent of GDP in the United States reduces the average growth rate of real GDP from 3.3 percent per year under the baseline scenario to 2.6 percent per year over the 2004–2009 period in the United States. The average inflation rate would be 1.6 percent per year instead of the 1.3 percent rate assumed in the baseline scenario, the average trade balance would be –3.7 percent of GPD instead of –4.7 percent, the average current account balance would be –3.8 percent of GDP instead of –5.1 percent, and the average short-term interest rate would be 0.0 instead of 3.9 percent. The direction of these effects are as anticipated, except for the increase in the rate of inflation (the zero interest rate also seems unrealistic).

The last column of the table shows the outcome in 2009, as compared to the baseline scenario. That is, U.S. growth would be 4.5 percent lower with respect to the baseline scenario, the price level would be 1.5 percent higher, the trade balance would be better by 2.1 percentage points (say, from –5.0 to –2.9 percent of GDP), the current account balance would improve by 2.6 percentage points in relation to GDP, and short-term interest rates would be 5.4 percent points lower (say, 7.0 instead of 1.6 percent). The U.S. restrictive fiscal policy would have repercusions on the European Monetary Union and Japan, as indicated in the bottom part of the table.

18.5 The *IS–LM–BP* Model with Flexible Exchange Rates

In this section, we utilize the *IS–LM–BP* model to examine how internal and external balance can be reached simultaneously with monetary policy under a freely flexible exchange rate system (or with exchange rate changes). In Section 18.5A we examine the case where we have imperfect capital mobility, and in Section 18.5B, the case where there is perfect capital mobility.

18.5A The *IS–LM–BP* Model with Flexible Exchange Rates and Imperfect Capital Mobility

We start from point E in Figure 18.8, where all three markets are in equilibrium with external balance and unemployment (exactly as in Figure 18.2). The government would then use the easy monetary policy that shifts the LM curve to the right to LM' so as to intersect the IS curve at point U, at $Y_F = 1500$ and $i = 2.5\%$. Since point U is to the right of the BP curve, the nation has an external deficit (because Y is higher and i is lower than at point E).

Under a flexible exchange rate system, the nation's currency depreciates and the BP curve shifts to the right. At the same time, the depreciation improves the nation's trade balance (if the Marshall–Lerner condition is satisfied), and so the IS curve shifts to the right. The depreciation will also increase domestic prices and the transaction demand for

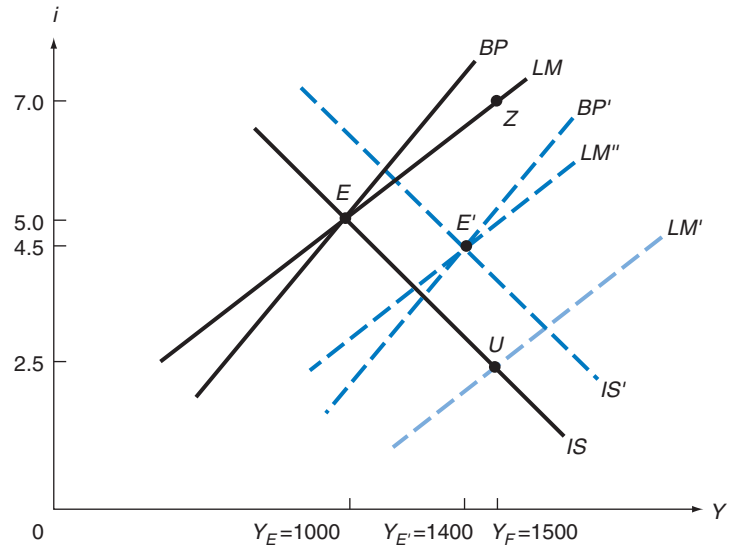


FIGURE 18.8. The *IS–LM–BP* Model with Flexible Exchange Rates.
Starting from point *E*, where all three markets are in equilibrium with an external balance and domestic unemployment, the nation could use easy monetary policy to shift the *LM* curve to the right to *LM′* so as to cross the *IS* curve at point *U* and reach the full-employment level of income of $Y_F = 1500$. However, since point *U* is to the right of the *BP* curve, the nation has an external deficit. With flexible exchange rates, the nation's currency depreciates and this causes the *BP* and *IS* curves to shift to the right and the *LM′* curve to the left until curves *BP′*, *IS′*, and *LM″* cross at a point such as *E′*, with $Y_{E'} = 1400$. The process can be repeated with additional doses of easy monetary policy until all three markets are in equilibrium at $Y_F = 1500$.

money and shift the LM' curve to the left (as the *real* money supply declines as a result of rising domestic prices). Equilibrium will be reestablished in all three markets where curves IS' and LM'' intersect on the BP' curve at a point such as E', with $Y_{E'} = 1400$ and $i = 4.5\%$. The process can be repeated with additional doses of easy monetary policy until all three markets are in equilibrium at the full-employment level of national income of $Y_F = 1500$. Note that with flexible exchange rates, equilibrium in all three markets will always be on the BP curve, but now the BP curve also will shift.

The analysis is analogous if, in order to reach the full-employment level of national income from point E, the nation uses the expansionary fiscal policy that shifts the IS curve to the right so as to cross the LM curve at point Z. Since point Z is to the right of the BP curve, the nation will have a deficit in its balance of payments. With flexible exchange rates, the nation's currency depreciates and the BP curve shifts to the right. This induces a rightward shift in the IS curve and a leftward shift in the LM curve, until the IS and LM curves intersect on the BP curve and all three markets are simultaneously in equilibrium. Note that the nation may need to apply additional doses of expansionary fiscal policy to reach the full-employment level of national income of $Y_F = 1500$. (You are asked to draw this figure in Problem 10.)

If the BP curve had been to the right of point Z to begin with, the nation's currency would appreciate and this would cause opposite shifts in the BP, IS, and LM curves until

all three markets are simultaneously in equilibrium at the full-employment level of national income (see Problem 11, with answer at the end of the book). Note, however, that in either case (i.e., whether the *BP* curve is steeper or flatter than the *LM* curve) when a nation starts with an easy monetary policy rather than with an expansionary fiscal policy, it ends up with a lower interest rate, which is a stimulus to long-run growth. What is important is that by using expenditure-changing (i.e., monetary and/or fiscal) policies to achieve internal balance, the nation will have to allow the exchange rate to vary or engage in expenditure-switching policies to achieve external balance simultaneously. We are then back to the analysis in Section 18.2 and the Swan diagram of Figure 18.1.

18.5B The *IS–LM–BP* Model with Flexible Exchange Rates and Perfect Capital Mobility

Starting at point E in Figure 18.9 (the same as in Figure 18.7), with domestic unemployment and external balance, perfect capital mobility and flexible exchange rates, suppose that the nation uses the expansionary fiscal policy that shifts the IS curve to IS', which intersects the BP curve at point F at $Y_F = 1500$. The intersection of the broken IS' curve with the unchanged LM curve at point E' indicates a tendency for the nation's interest rate to

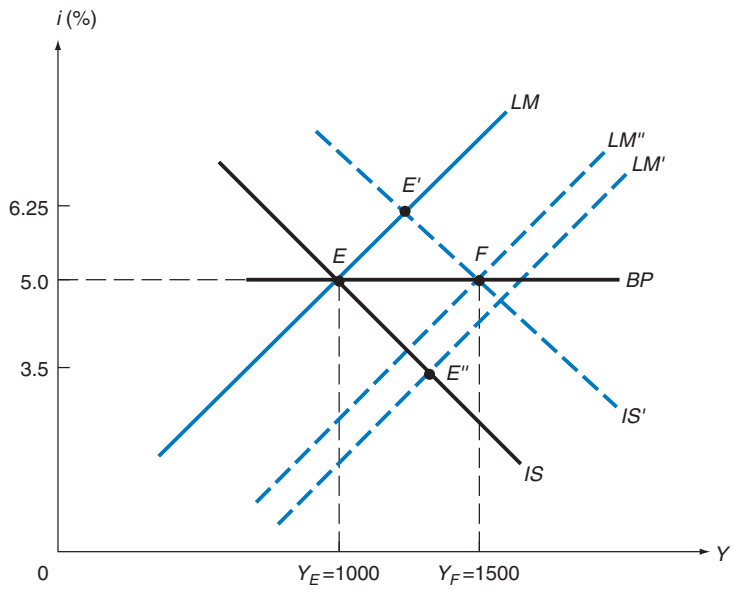


FIGURE 18.9. Adjustment Policies with Perfect Capital Flows and Flexible Exchange Rates.
Starting from point E with domestic unemployment and external balance, and perfectly elastic capital flows and flexible exchange rates, the nation can reach the full-employment level of national income of $Y_F = 1500$ with the easy monetary policy that shifts the *LM* curve to the right to *LM′*. This causes the *IS* curve to shift to the right to *IS′* (because the tendency of the currency to depreciate improves the nation's trade balance) and the *LM′* curve back part of the way to *LM″* (because of the reduction in the real money supply resulting from the increase in domestic prices). The final equilibrium is at point *F* where the *IS′* and *LM″* curves cross on the *BP* curve at $Y_F = 1500$.

rise to $i = 6.25\%$. This leads to massive capital inflows and appreciation of the nation's currency, which discourages exports and encourages imports, and shifts the IS' curve to the left and back to its original IS position. Thus, with flexible exchange rates and perfect capital mobility, fiscal policy is completely ineffective at influencing the level of national income.

On the other hand, starting from point E, an easy monetary policy that shifts the LM curve to LM' tends to lower the interest rate in the nation (see point E'' where the LM' curve intersects the IS curve). This would lead to a capital outflow and a tendency of the nation's currency to depreciate, which shifts the IS curve to the right to IS' (as exports are stimulated and imports discouraged) and the LM' curve a little back to the left to LM'' (as the real money supply falls because of rising prices in the nation) in such a way that the IS' and LM'' curves cross on the BP curve at point F at $Y_F = 1500$. Now the nation achieves internal and external balance with monetary policy only. Note that we made the LM' curve cross the BP curve a little to the right of $Y_F = 1500$ in order to accommodate the subsequent leftward shift of the LM' curve to LM'' and show final equilibrium point F at $Y_F = 1500$. Thus, with perfect capital mobility, monetary policy is effective and fiscal policy ineffective with flexible exchange rates, while fiscal policy is effective and monetary policy ineffective with fixed exchange rates.

The IS–LM–BP model has been the "workhorse" of economic policy formulation for open economies during the past four decades. One serious criticism levied against the model is that it mixes stock and flows. In particular, the LM curve is based on the *stock* of money, while the BP curve is based on the *flow* of capital. Mixing stock and flows is never a good idea. In this context, the model assumes that a rise in domestic interest rates will lead to a continuous capital inflow from abroad to finance the nation's balance-of-payments deficit. The capital inflow, however, is likely to be of a once-and-for-all type and to come to an end after investors have readjusted their portfolios following the increase in the domestic interest rate. Case Study 18-4 examines the effect of monetary policy in the United States and other OECD nations under flexible exchange rates.

CASE STUDY 18-4 Effect of Monetary Policy in the United States and Other OECD Countries

Table 18.3 shows the effect of a 4 percent increase in the money supply (expansionary monetary policy) in the United States or in other OECD countries on the gross national product (GNP), consumer price index (CPI), interest rate, currency value, and current account of the United States and other OECD countries. The OECD—the Organization for Economic Cooperation and Development—included all 24 of the world's industrial countries at the time of the exercise. The simulation results were obtained by using the Multi-Country Model of the Federal Reserve Board. Although the effects of an increase in the money supply are felt over several years, the results reported in Table 18.3 show the effect in the second year after the money supply increased.

Part A of the table shows that a 4 percent increase in the U.S. money supply results (through the multiplier process) in a 1.5 percent increase in U.S. GNP the year after the United States increased its money supply. A longer period of time would show a larger total effect. It also leads to a 0.4 percent increase in the U.S. prices, a 2.2 percentage points decline (say, from 6.2 percent to 4.0 percent) in the U.S. short-term interest rate, a 6.0 percent decrease in the international value of the

(continued)

CASE STUDY 18-4 Continued

dollar (depreciation), and a $3.1 billion deterioration in the U.S. current account balance (because the tendency of U.S. imports to rise due to higher GNP overwhelms the tendency of the dollar depreciation to improve the U.S. current account).

The top right part of the table shows that the increase in the U.S. money supply leads to a reduction in the growth of GNP in the rest of the OECD countries of 0.7 percent, a 0.6 percent fall in prices, a 0.5 percentage point reduction in the short-run interest rate, and a deterioration in the current account balance of $3.5 billion. The effect on the foreign exchange rates of the rest of OECD was not estimated. The reduction in the GNP of the rest of the world may seem strange in view of the increase in U.S. imports. But the increase in U.S. imports may be coming from the rest of the world (developing and OPEC countries) rather than from other OECD countries. Furthermore, the repercussions of an expansionary monetary policy in the United States do not operate only through trade and are too intricate to evaluate by logical reasoning alone. That's why we need a model.

Part B of the table shows that a 4 percent increase in the money supply in the rest of OECD would lead to a 1.5 percent increase in the average GNP, a 0.6 percent increase in prices, a 2.1 percentage point reduction in the short-term interest rate, a 5.4 percent currency depreciation, and a $3.5 billion improvement in the current account balance of the rest of OECD. These changes have repercussions in the United States, where prices fall by 0.2 percent, short-term interest rates decrease by 0.2 percentage points, and the U.S. current account improves by $0.1 billion. The net effect on U.S. GNP is nil, and the effect on the exchange rate of the dollar was not estimated.

TABLE 18.3. Estimated Effect in the Second Year of an Increase in the Money Supply by 4 Percent

A. An Increase in the Money Supply in the United States

	Effect in the United States	Effect in the Rest of OECD
GNP	1.5%	−0.7%
CPI	0.4%	−0.6%
Interest rate	−2.2%[a]	−0.5%[a]
Currency value	−6.0%	—
Current account	−$3.1 billion	−$3.5 billion

B. An Increase in the Money Supply in the Rest of the OECD

	Effect in the Rest of OECD	Effect in the United States
GNP	1.5%	0.0%
CPI	0.6%	−0.2%
Interest rate	−2.1%[a]	−0.2%[a]
Currency value	−5.4%	—
Current account	$3.5 billion	$0.1 billion

[a]Percentage point change.

Source: R. Bryant, D. Henderson, G. Holtham, P. Hooper, and S. Symansky, eds., *Empirical Macroeconomics for Interdependent Economies* (Washington, D.C.: Brookings Institution, 1988), p. 23.

18.6 Policy Mix and Price Changes

In this section, we first examine the reasons for directing fiscal policy to achieve internal balance and monetary policy to achieve external balance. Then we evaluate the effectiveness of this policy mix and the problem created by allowing for cost-push inflation. Finally, we summarize the policy-mix experience of the United States and the other leading industrial nations during the postwar period.

18.6A Policy Mix and Internal and External Balance

In Figure 18.10, movements along the horizontal axis away from the origin refer to *expansionary* fiscal policy (i.e., higher government expenditures and/or lower taxes), while movements along the vertical axis away from the origin refer to *tight* monetary policy (i.e., reductions in the nation's money supply and increases in its interest rate).

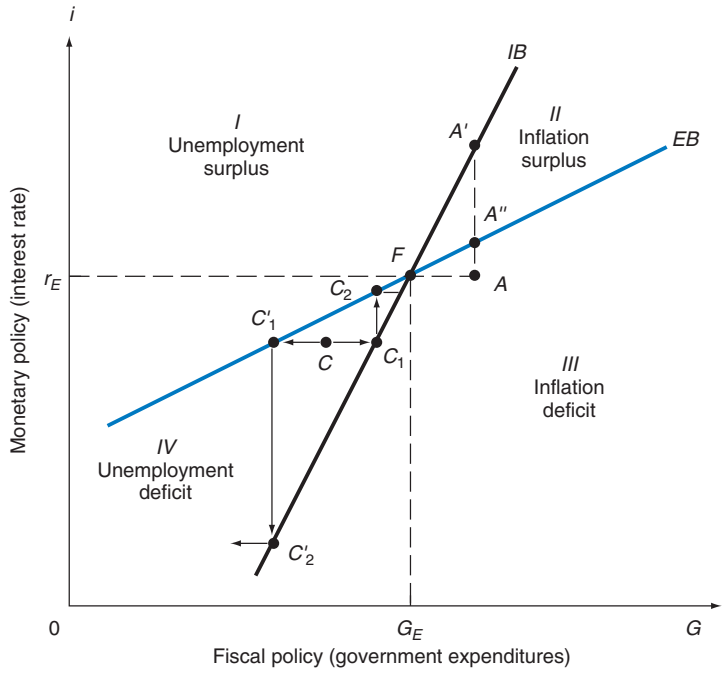


FIGURE 18.10. Effective Market Classification and the Policy Mix.
Moving to the right on the horizontal axis refers to expansionary fiscal policy, while moving upward along the vertical axis refers to tight monetary policy and higher interest rates. The various combinations of fiscal and monetary policies that result in internal balance are given by the *IB* line, and those that result in external balance are given by the *EB* line. The *EB* line is flatter than the *IB* line because monetary policy also induces short-term international capital flows. Starting from point *C* in zone IV, the nation should use expansionary fiscal policy to reach point C_1 on the *IB* line and then tight monetary policy to reach point C_2 on the *EB* line, on its way to point *F*, where the nation is simultaneously in internal and external balance. If the nation did the opposite, it would move to point C'_1 on the *EB* line and then to point C'_2 on the *IB* line, thus moving farther and farther away from point *F*.

The *IB* line in the figure shows the various combinations of fiscal and monetary policies that result in internal balance (i.e., full employment with price stability) in the nation. The *IB* line is positively inclined because an *expansionary* fiscal policy must be balanced by a *tight* monetary policy of a sufficient intensity to maintain internal balance. For example, starting at point *F* in Figure 18.10, an increase in government expenditures that moves the nation to point *A* leads to excess aggregate demand, or demand-pull inflation. This can be corrected or avoided by the tight monetary policy and higher interest rate that moves the nation to point A' on the *IB* line. A tight monetary policy that leaves the nation's interest rate below that indicated by point A' does not eliminate the excess aggregate demand entirely and leaves some inflationary pressure in the nation. On the other hand, a tighter monetary policy and higher interest rate that moves the nation above point A' not only eliminates the inflation created by the increase in government expenditures but leads to unemployment. Thus, to the right of and below the *IB* line there is inflation, and to the left of and above there is unemployment.

On the other hand, the *EB* line shows the various combinations of fiscal and monetary policies that result in external balance (i.e., equilibrium in the nation's balance of payments). Starting from a point of external balance on the *EB* line, an expansionary fiscal policy stimulates national income and causes the nation's trade balance to worsen. This must be balanced with a tight monetary policy that increases the nation's interest rate sufficiently to increase capital inflows (or reduce capital outflows) for the nation to remain in external balance. For example, starting from point *F* on the *EB* line, an expansionary fiscal policy that moves the nation to point *A* leads to an external deficit, which can be corrected or avoided by the tight monetary policy and higher interest rate that moves the nation to point A'' on the *EB* line. As a result, the *EB* line is also positively inclined. A monetary policy that moves the nation to a point below point A'' leaves an external deficit, while a tighter monetary policy that moves the nation above point A'' leads to an external surplus. Thus, to the right of and below the *EB* line there is an external deficit, and to the left of and above there is an external surplus.

Only at point *F*, where the *IB* and *EB* lines cross, will the nation be at the same time in internal and external balance. The crossing of the *IB* and *EB* curves in Figure 18.10 defines the four zones of internal and external imbalance. Note that the *EB* line is flatter than the *IB* line. This is always the case whenever short-term international capital flows are responsive to international interest differentials. This can be explained as follows. Expansionary fiscal policy raises national income and increases the transaction demand for money in the nation. If monetary authorities increase the money supply sufficiently to satisfy this increased demand, the interest rate will remain unchanged. Under these circumstances, fiscal policy affects the level of national income but not the nation's interest rate. On the other hand, monetary policy operates by changing the money supply and the nation's interest rate. The change in the nation's interest rate affects not only the level of investment and national income (through the multiplier process) but also international capital flows. As a result, monetary policy is more effective than fiscal policy in achieving external balance, and so the *EB* line is flatter than the *IB* line.

Following the *principle of effective market classification*, monetary policy should be assigned to achieve external balance and fiscal policy to achieve internal balance. If the nation did the opposite, it would move farther and farther away from internal and external

balance. For example, if from point C in Figure 18.10, indicating unemployment and a deficit (zone IV), the nation used a contractionary fiscal policy to eliminate the external deficit and moved to point C'_1 on the EB line, and then used an easy monetary policy to eliminate unemployment and moved to point C'_2 on the IB line, the nation would move farther and farther away from point F. On the other hand, if the nation appropriately used an expansionary fiscal policy to reach point C_1 on the IB line, and then used a tight monetary policy to reach point C_2 on the EB line, the nation would move closer and closer to point F. In fact, the nation could move from point C to point F in a single step by the appropriate mix of expansionary fiscal and contractionary monetary policies (as in the IS–LM–BP models in Figures 18.3 and 18.4). The nation could similarly reach point F from any other point of internal and external imbalance by the appropriate combination of fiscal and monetary policies. This is left as end-of-chapter problems.

The more responsive international short-term capital flows are to interest rate differentials across nations, the flatter is the EB line in relation to the IB line. On the other hand, if short-term capital flows did not respond at all to interest differentials, the EB line would have the same slope as (and coincide with) the IB line so that no useful purpose could be served by separating fiscal and monetary policies as was done above. In that case, the nation could not achieve internal and external balance at the same time without also changing its exchange rate. This would bring us back to the case examined in Section 18.2.

18.6B Evaluation of the Policy Mix with Price Changes

The combination of fiscal policy to achieve internal balance and monetary policy to achieve external balance with a fixed exchange rate faces several criticisms. One of these is that short-term international capital flows may not respond as expected to international interest rate differentials, and their response may be inadequate or even erratic and of a once-and-for-all nature rather than continuous (as assumed by Mundell). According to some economists, the use of monetary policy merely allows the nation to *finance* its deficit in the *short run*, unless the deficit nation continues to tighten its monetary policy over time. Long-run adjustment may very well require exchange rate changes, as pointed out in Section 18.2.

Another criticism is that the government and monetary authorities do not know precisely what the effects of fiscal and monetary policies will be and that there are various lags—in recognition, policy selection, and implementation—before these policies begin to show results. Thus, the process of achieving internal and external balance described in Section 18.6A using Figure 18.10 is grossly oversimplified. Furthermore, in a nation such as the United States, it is difficult to coordinate fiscal and monetary policies because fiscal policy is conducted by one branch of the government while monetary policy is determined by the semiautonomous Federal Reserve Board. However, the nation may still be able to move closer and closer to internal and external balance on a step-by-step basis (as indicated by the arrows from point C in Figure 18.10) if fiscal authorities pursue only the objective of internal balance and disregard the external imbalance, and if monetary authorities can be persuaded to pursue only the goal of external balance without regard to the effect that monetary policies have on the internal imbalance.

Another difficulty arises when we relax the assumption that prices remain constant until the full-employment level of national income is reached. Until the 1990s, prices usually started to rise well before full employment was attained and rose faster as the economy neared full employment. (The controversial inverse relationship, or trade-off, between the rate of unemployment and the rate of inflation is summarized by the Phillips curve.) With price increases or inflation occurring even at less than full employment, the nation has at least three objectives: full employment, price stability, and equilibrium in the balance of payments, thus requiring three policies to achieve all three objectives completely. The nation might then have to use fiscal policy to achieve full employment, monetary policy to achieve price stability, and exchange rate changes to achieve external balance. In unusual circumstances, the government may also impose direct controls to achieve one or more of its objectives when other policies fail. These are examined in the next section. During the 1990s, globalization changed all that as firms resisted price increases because of increased international competition and workers refrained from demanding wage increases even when the economy was at full employment for fear of losing their jobs.

Modern nations also have as a fourth objective an "adequate" rate of growth, which usually requires a low long-term interest rate to achieve. The nation may then attempt to "twist" the interest rate structure (i.e., change the relationship that would otherwise prevail between short-term and long-term interest rates), keeping long-term interest rates low (as required by the growth objective) and allowing higher short-term interest rates (as may be required for price stability or external balance). Monetary authorities may try to accomplish this by open market sales of treasury bills (to depress their price and raise short-term interest rates) and purchases of long-term bonds (to increase their price and lower long-term interest rates). There is some indication that the United States tried to do this during the early 1960s but without much success.

18.6c Policy Mix in the Real World

If we look at the policy mix that the United States and the other leading industrial nations actually followed during the fixed exchange rate period of the 1950s and 1960s, we find that most of these nations generally used fiscal and monetary policies to achieve internal balance and switched their aims only when the external imbalance was so serious that it could no longer be ignored. Even then, these nations seemed reluctant to use monetary policy to correct the external imbalance and instead preferred using direct controls over capital flows (discussed in the next section). During this period, the United Kingdom and France were forced to devalue their currencies, while Germany had to revalue the mark. Canada, unable to maintain a fixed exchange rate, allowed its dollar to fluctuate.

During the period of flexible but managed exchange rates since 1971, the leading nations seemed content, for the most part, to leave to the exchange rate the function of adjusting to external imbalances and generally directed fiscal and monetary policies to achieve internal balance. Indeed, during the oil crisis of the 1970s, nations even attempted to manage the exchange rate to support their efforts to contain domestic inflationary pressures. However, since financial markets were subject to rapidly changing expectations and adjusted much more quickly than real markets (e.g., exports and imports), there was a great deal of

volatility and overshooting of exchange rates about equilibrium rates. As inflationary pressures subsided during the first half of the 1980s, the leading nations generally continued to direct fiscal and monetary policies to achieve internal balance but (except for the United States) sometimes switched monetary policy toward the external imbalance as they attempted to manage their exchange rates.

By 1985, it became evident that the dollar was grossly overvalued and showed no tendency to drop in value as a result of purely market forces. The huge *budget* deficit of the United States kept real interest rates higher in the United States than abroad, and this attracted very large capital inflows to the United States, which resulted in a large overvaluation of the dollar, huge trade deficits, and calls for protectionism (see Section 13.5). The United States then organized a coordinated international effort with the other four leading industrial nations (Germany, Japan, France, and England) to intervene in foreign exchange markets to correct the overvaluation of the dollar. From 1986 to 1991, the United States advocated a simultaneous equal and coordinated reduction in interest rates in the leading nations so as to stimulate growth and reduce unemployment without directly affecting trade and capital flows.

From its peak in February 1985, the dollar depreciated more or less continuously until 1988, but the U.S. current account deficit did not begin to improve until the end of 1987 (refer to Figure 16.6). In 1990 and 1991, reunified Germany pushed its interest rates up to avoid inflationary pressures at home, encourage domestic savings, and attract foreign capital to help finance the rebuilding of East Germany, while the United States and other industrialized countries of Europe lowered their interest rates to fight weak economies and recession. Thus, the leading industrial countries continued to give priority to their internal balance and to direct monetary policy to achieve internal rather than external balance.

From 1992 to 1997, interest rates were reduced in Europe in order to stimulate anemic growth after the deep recession of the early 1990s, but increased in the United States in order to contain inflationary pressures in the face of relatively rapid growth. From 1997 to 2000, growth and interest rates were much higher in the United States than in Europe and Japan, and the United States received huge inflows of foreign financial capital and direct investments, which led to growing dollar appreciation and trade deficits. In 2001, the high-tech bubble burst and the United States fell into a recession. From 2001 to 2003, the Fed sharply reduced the interest rate to 1 percent (the lowest in 40 years) and President Bush pushed a huge budget stimulus package.

With resumption of rapid growth in the United States in 2004, the Federal Reserve Bank (or the Fed) and the European Central Bank started raising interest rates in 2006 and 2007 in order to contain growing inflationary pressures. But then the the Fed and the European Central Bank (ECB) reversed course and cut interest rates sharply in 2008 and 2009 (the Fed almost to zero) and introduced huge stimulus packages to combat the deep recession that resulted from the global financial crisis. Economic recovery, however, remained slow in 2010 and 2011 (this is discussed in detail in Section 21.6). From 2006, the huge U.S. current account deficit began to decline as a result of the depreciation of the dollar from 2002 (see Figure 16.6). Case Study 18-5 provides an overview of U.S. monetary and fiscal policies since 2000, while Case Study 18-6 shows that the recession would have been much deeper without the strong fiscal and monetary action undertaken by the U.S. government and the Fed.

CASE STUDY 18-5 U.S. Monetary and Fiscal Policies during the Past Decade

Table 18.4 presents U.S. macroeconomic data that summarize the course of U.S. monetary policy (measured by the growth rate of the money supply) and fiscal policy (measured by the budget balance) and their effects on other macro variables from 2000 to 2011. The first row shows that the United States experienced rapid growth in 2000, faced a mild recession in 2001 (but nevertheless managed a small positive growth for the year as a whole), saw slow growth in 2002, and experienced relatively high growth from 2003 to 2006. Growth slowed as a result of the subprime housing mortgage crisis in 2007 and was negative (but close to zero) in 2008 as the United States entered the deep recession of 2009, followed by very slow recovery in 2010 and 2011.

The second row of Table 18.4 shows a negative growth of the money supply in 2000 when the Federal Reserve Bank (the government institution entrusted with the conduct of monetary policy in the United States) wrongly thought that the problem facing the U.S. economy was a resurgence of inflation. With recession hitting the U.S. economy instead, the Fed reversed course and increased the money supply very rapidly in 2001, and again in 2003 and 2004 to stimulate growth. With rapid growth resuming in 2004 and the danger of inflation arising from the sharp increase in the price of petroleum and other primary commodities in 2006 and 2007, however, the Fed sharply reduced the growth of the money supply (which was actually negative in 2005 and 2006). In 2008, it again quickly changed course and rapidly expanded the money supply to combat the financial crisis that started in 2007, the 2008–2009 recession, and slow growth in 2010 and 2011.

The budget surplus in 2000 (shown in the third row) gave way to budget deficits, which reached 5.0 percent of GDP in 2003, primarily as the result of the drastic tax cut legislated in 2001–2003 and the cost of the Iraqi war. The budget deficit increased to 6.6 percent of GDP in 2008 and to the all-time high for the postwar period of 11.6 percent of GDP in 2009 as a result of the huge stimulus package to counter the deep recession. Row 4 shows that, as expected, the short-term interest rate moved inversely to the rate of growth of the money supply, except in 2002, 2007, and 2009. The relationship between the current account and the exchange rate was examined in Case Study 16.4, while that between the budget deficit and the current account was discussed in Case Study 18-2.

TABLE 18.4. U.S. Macroeconomic Data, 2000–2011

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1. Growth of real GDP (percent per year)	4.1	1.1	1.7	2.5	3.5	3.1	2.7	1.9	−0.3	−3.5	3.0	1.7
2. Growth of money supply (percent per year)	−3.1	8.7	3.2	7.1	5.4	−0.1	−0.6	0.5	16.7	5.7	8.2	18.6
3. Budget balance (as a percentage of GDP)	1.5	−0.6	−4.0	−5.0	−4.4	−3.3	−2.2	−2.9	−6.6	−11.6	−10.7	−9.7
4. Interest rate (percent per year)	6.5	3.7	1.8	1.2	1.6	3.5	5.2	5.3	3.2	0.9	0.5	0.4
5. Inflation rate (percent per year)	3.4	2.8	1.6	2.3	2.7	3.4	3.2	2.9	3.8	−0.3	1.6	3.1
6. Effective exchange rate (foreign currencies per dollar, 2000 = 100)	100.0	105.3	105.8	99.6	95.1	92.6	91.0	87.0	84.0	88.7	85.4	81.4
7. Current account balance (as percentage of GDP)	−4.2	−3.9	−4.3	−4.7	−5.3	−5.9	−6.0	−5.1	−4.7	−2.7	−3.2	−3.1

Sources: Organization for Economic Cooperation and Development, *Economic Outlook* (Paris: OECD, May 2012) and International Monetary Fund, *International Financial Statistics* (Washington, D.C.: 2012).

CASE STUDY 18-6 Deeper U.S. Recession without Strong Fiscal and Monetary Measures

The United States and most other advanced and emerging market economies adopted very strong fiscal and monetary measures to overcome the 2008–2009 financial and economic crisis. Without those measures, the great recession would have been deeper and lasted longer.

Figure 18.11 shows the level of U.S. real GDP under four different scenarios: (1) the baseline scenario (the top line), which includes the effect of the strong stimulus package and powerful financial measures (huge expansion of liquidity) undertaken by the United States to combat the great recession of 2009; (2) the scenario using only financial measures (the second from the top line); (3) the scenario using only the stimulus package (the third from the top line); and (4) the scenario using neither the stimulus package or financial measures to counter the deep recession (the bottom line). Scenarios 2 and 3 show that U.S. real GDP would have fallen more and longer; scenario 4 indicates that the U.S. recession would not only have been much deeper but would have continued into 2010.

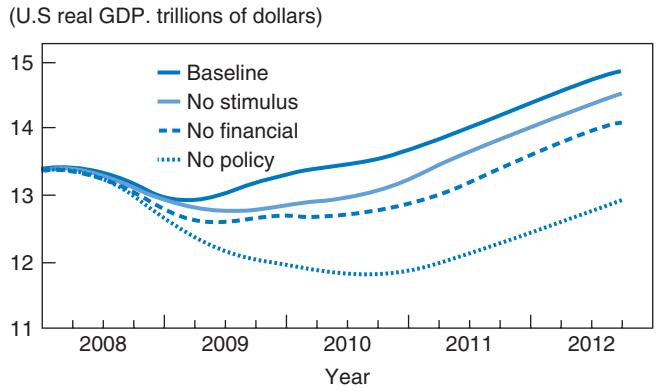


FIGURE 18.11. Fiscal and Financial Measures in the U.S. Recession.
The top line shows the change in U.S. real GDP from 2008 to 2012 with the stimulus package and financial measures to combat the 2008–2009 recession. The second and third lines from the top are, respectively, the scenarios with only financial measures and only the stimulus package. The bottom line is the scenario without any measure.
Source: U.S. Bureau of Economic Analysis, 2010.

18.7 Direct Controls

Direct controls to affect the nation's balance of payments can be subdivided into trade controls (such as tariffs, quotas, and other quantitative restrictions on the flow of international trade), financial or exchange controls (such as restrictions on international capital flows and multiple exchange rates), and others. In general, trade controls are both less important and less acceptable than exchange controls. Direct control can also take the form of price and wage controls in an attempt to restrain domestic inflation when more general policies have failed.

18.7A Trade Controls

One of the most important trade or commercial controls is the import tariff. This increases the price of imported goods to domestic consumers and stimulates the domestic production of import substitutes. On the other hand, export subsidies make domestic goods cheaper to foreigners and encourage the nation's exports. In general, an import tariff and an export subsidy of a given percentage applied across the board on all commodities are equivalent to a devaluation of the nation's currency by the same percentage. However, import duties and export subsidies are usually applied to specific items rather than across the board. As pointed out in Chapter 9, we can always find an import tariff equivalent to an import quota. Both are expenditure-switching policies, just as a devaluation is, and both stimulate domestic production. In general, nations today are not allowed to impose new import tariffs and quotas except temporarily, when in serious balance-of-payments difficulties.

Another trade control, frequently applied today by developing nations but also used by some developed nations in the past, is the requirement that the importer make an advance deposit at a commercial bank of a sum equal to the value or a fraction of the value of the goods he wishes to import, for a period of time of varying duration and at no interest. This has the effect of increasing the price of imports by the interest foregone on the sum deposited with the commercial bank, and it also discourages imports. The nation can impose an advance deposit of a different amount and length of time on each type of commodity. Advance deposits are thus flexible devices, but they can be difficult and costly to administer. A deficit nation may also impose restrictions on foreign travel and tourist expenditures abroad. A detailed discussion of trade controls and their welfare effects was presented in Chapter 9.

18.7B Exchange Controls

Turning to financial, or exchange controls, we find that developed nations sometimes impose restrictions on capital exports when in balance-of-payments deficit and on capital imports when in surplus. For example, in 1963 the United States imposed the Interest Equalization Tax on portfolio capital exports and voluntary (later mandatory) restraints on direct investments abroad to reduce its balance-of-payments deficit. However, while this improved the U.S. capital account, it certainly reduced U.S. exports and the subsequent return flow of interest and profit on U.S. foreign investments with an uncertain net effect on the overall balance of payments.

On the other hand, West Germany and Switzerland sought to discourage capital imports by allowing lower or no interest on foreign deposits in the face of large balance-of-payments surpluses and in order to insulate their economies from worldwide inflationary pressures. In the late 1960s and early 1970s, France and Belgium established a two-tier foreign exchange market and allowed the exchange rate on capital transactions to fall (i.e., the "financial franc" to appreciate) as a result of large capital inflows, while keeping the exchange rate higher on current account transactions (i.e., on the "commercial franc") in order not to discourage their exports and encourage their imports. Italy adopted a two-tier foreign exchange market for many years after the collapse of the Bretton Woods System in 1971, even though it was administratively difficult and costly to keep the two markets apart.

In addition, developed nations facing balance-of-payments surpluses and huge capital inflows often engage in forward sales of their currency to increase the forward discount and discourage capital inflows. On the other hand, deficit nations often engage in forward purchases of their currency to increase the forward premium on their currency and discourage capital outflows. The funds for such forward purchases are often borrowed from surplus nations. For example, under the General Arrangements to Borrow negotiated within the framework of the International Monetary Fund in 1962 (and renewed several times subsequently), the Group of Ten most important industrial nations (the United States, the United Kingdom, West Germany, Japan, France, Italy, Canada, the Netherlands, Belgium, and Sweden) agreed to lend up to $30 billion to any member of the group facing large short-term capital outflows (see Section 21.4B). With the rapid globalization and integration of capital markets that took place during the 1980s and 1990s, however, developed nations abolished most restrictions on international capital flows.

Most developing nations, on the other hand, have some type of exchange controls. The most common is multiple exchange rates, with higher exchange rates on luxury and nonessential imports and lower rates on essential imports. The higher exchange rate on luxuries and nonessentials makes these foreign products more expensive to domestic buyers and discourages their importation, while the lower exchange rate on essential imports (such as capital equipment deemed necessary for development) makes these products cheaper to domestic users and encourages their importation. An extreme form of exchange control requires exporters and other earners of foreign exchange to turn in all their exchange earnings to monetary authorities, who then proceed to allocate the available supply of foreign exchange to importers through import licenses and at various rates, depending on how important the monetary authorities consider the particular import commodity to be. This, however, encourages black markets, transfer pricing (i.e., under- or over-invoicing—see Section 12.5A), and corruption. Case Study 18-7 summarizes the prevalence of exchange controls among the members of the International Monetary Fund in 2011.

18.7C Other Direct Controls and International Cooperation

Government authorities have sometimes imposed direct controls to achieve a purely domestic objective, such as inflation control, when more general policies have failed. For example, in 1971 the United States imposed price and wage controls, or an income policy, to control inflation. However, these price and wage controls were not very successful and were later repealed. From an efficiency point of view, monetary and fiscal policies and exchange rate changes are to be preferred to direct controls on the domestic economy and on international trade and finance. The reason is that direct controls often *interfere with* the operation of the market mechanism, while the more general expenditure-changing and expenditure-switching policies *work through* the market. Nevertheless, when these general policies take too long to operate, when their effect is uncertain, or when the problem affects only one sector of the economy, nations may turn to direct controls as temporary measures to achieve specific objectives. An example is the "voluntary" export quotas on Japanese automobiles negotiated by the United States in 1981.

In general, for direct controls and other policies to be effective, a great deal of international cooperation is required. For example, the imposition of an import quota by a nation may result in retaliation by the other nations affected (thus nullifying the effect of the quota) unless these nations are consulted and understand and agree to the need for such a temporary measure. The same is true for the exchange rate that a nation seeks to maintain.

CASE STUDY 18-7 Direct Controls on International Transactions Around the World

Table 18.5 summarizes data on the different types of direct controls that various countries imposed on international transactions in 2011. From the table, we see that the most common forms of direct controls on international transactions around the world are capital controls on commercial banks and other credit institutions; guarantees, securities, and financial backup facilities; and capital controls on direct investments, capital market securities, real estate transactions, and institutional investors.

TABLE 18.5. Direct Controls on International Transactions by IMF Members in 2011

Type of Restriction	Number of Countries
A. Exchange rate structure	
1. Dual exchange rates	15
2. Multiple exchange rates	7
B. Arrangements of payments and receipts	
1. Bilateral payments arrangements	68
2. Payment arrears	35
C. Controls on proceeds from exports and/or invisible transactions	
1. Repatriation requirements	87
2. Surrender requirements	57
D. Capital (financial) transactions	
1. Capital (financial) market securities	144
2. Money market instruments	124
3. Collective investment securities	122
4. Derivatives and other instruments	97
5. Commercial credits	85
6. Financial credits	115
7. Guarantees, sureties, and financial backup facilities	79
8. Direct investments	147
9. Liquidation of direct investments	47
10. Real estate transactions	143
11. Personal capital (financial) transactions	95
12. Commercial banks and other credit institutions	168
13. Institutional investors	140

Source: International Monetary Fund, *Exchange Arrangements and Exchange Restrictions* (Washington, D.C.: IMF, 2011).

(One notable exception occurred in the early 1990s when the United States allowed the dollar to greatly depreciate with respect to the Japanese yen, against Japanese wishes, in an effort to reduce the large and persistent U.S. trade deficit with Japan.) Similarly, an increase in the interest rate by a nation to attract more foreign capital may be completely neutralized if other nations increase their interest rates by the same amount so as to leave international interest rate differentials unchanged. A more detailed discussion of the process by which most direct controls were dismantled by developed nations after World War II under the leadership of the IMF and GATT is presented in Chapter 21.

SUMMARY

1. Adjustment policies are needed because the automatic adjustment mechanisms discussed in the previous two chapters have unwanted side effects. The most important economic goals or objectives of nations are internal and external balance. Internal balance refers to full employment with price stability. External balance refers to equilibrium in the balance of payments. To reach these goals, nations have at their disposal expenditure-changing policies (i.e., fiscal and monetary policies) and expenditure-switching policies (devaluation or revaluation). According to the principle of effective market classification, each policy should be paired or used for the objective toward which it is most effective.

2. In the Swan diagram, the positively inclined *EE* curve shows the various combinations of exchange rates and domestic absorption that result in external balance. To the left of *EE* we have external surpluses, and to the right external deficits. The negatively inclined *YY* curve shows the various combinations of exchange rates and domestic absorption that result in internal balance. To the left of *YY* there is unemployment, and to the right inflation. The intersection of the *EE* and *YY* curves defines the four possible combinations of external and internal imbalance and helps us determine the policy mix required to reach internal and external balance simultaneously (given by the point of intersection of the two curves).

3. The goods market is in equilibrium whenever the quantities of goods and services demanded and supplied are equal. The money market is in equilibrium whenever the quantity of money demanded for transactions and speculative purposes is equal to the given supply of money. The balance of payments is in equilibrium whenever a trade deficit is matched by an equal net capital inflow or a trade surplus is matched by an equal net capital outflow. The *IS, LM*, and *BP* curves show the various combinations of interest rates and national income at which the goods market, the money market, and the balance of payments, respectively, are in equilibrium. The *IS* curve is negatively inclined, while the *LM* and *BP* curves are usually positively inclined. The more responsive capital flows are to interest rate changes, the flatter is the *BP* curve. If the three curves intersect at the same point, the three markets are simultaneously in equilibrium at that point.

4. Expansionary fiscal policy shifts the *IS* curve to the right, and tight monetary policy shifts the *LM* curve to the left, but they leave the *BP* curve unchanged as long as the exchange rate is kept fixed. Starting from a condition of domestic unemployment and external balance, the nation can achieve internal and external balance simultaneously by the appropriate expansionary fiscal policy and tight monetary policy without changing the exchange rate. The same general policy mix is required for the nation to achieve internal and external balance starting from a condition of internal unemployment and external deficit, except with high capital mobility, where expansionary fiscal and easy monetary policies are required. With perfect capital mobility and a horizontal *BP* curve, monetary policy is completely ineffective, and the nation can reach internal and external balance with the appropriate fiscal policy alone with fixed exchange rates.

5. With flexible exchange rates, the nation could reach internal and external balance by using only monetary or fiscal policy. Using monetary policy will have a greater effect on interest rates in the nation and thus on its rate of growth. With perfectly elastic international capital flows and flexible exchange rates, monetary policy is effective while fiscal policy is completely ineffective.

6. The *IB* and *EB* curves show the various combinations of fiscal and monetary policies required for the nation to achieve internal and external balance, respectively. They are both positively inclined, but the *EB* curve is flatter, or more effective for achieving external balance, because monetary policy also induces short-term international capital flows. The nation should use fiscal policy to achieve internal balance and monetary policy to achieve external balance. (If the nation does the opposite, it will move farther and farther away from internal and external balance.) This policy mix, however, is relevant only in the short run. In the

long run, external balance may require a change in the exchange rate. The existence of inflation at less than full employment adds price stability as a third objective. Growth may be a fourth objective. Then, four policy instruments are usually required. Since the mid-1980s, the United States has advocated a coordinated effort among the leading industrial nations to achieve these objectives.

7. Direct controls can be subdivided into trade controls, exchange controls, and others. Trade controls refer to tariffs, quotas, advance deposits on imports, and other selective restrictions on the flow of international trade. Exchange controls include restrictions on international capital movements, forward market intervention, and multiple exchange rates. Other direct controls sometimes applied to reduce inflation when more general policies have failed are price and wage controls. In general, direct controls lead to inefficiencies because they frequently interfere with the operation of the market mechanism. For direct controls and other policies to be effective, international cooperation is often essential.

A LOOK AHEAD

Chapter 19 extends the analysis of adjustment policies in open economies to also deal with price changes. This is done within an aggregate demand and aggregate supply framework. We will examine the effect of international transactions on aggregate demand and aggregate supply and show how a nation can achieve full employment, price stability, and equilibrium in the balance of payments under fixed and flexible exchange rates, and in the short run and the long run.

KEY TERMS

BP curve, p. 580
Direct controls, p. 575
Exchange controls, p. 600
Expenditure-changing policies, p. 573
Expenditure-switching policies, p. 575
External balance, p. 573
Internal balance, p. 573
IS curve, p. 578
LM curve, p. 580
Multiple exchange rates, p. 602
Mundell–Fleming model, p. 578
Phillips curve, p. 597
Principle of effective market classification, p. 575
Speculative demand for money, p. 580
Trade controls, p. 600
Transaction demand for money, p. 580

QUESTIONS FOR REVIEW

1. Why do nations need policies to adjust balance-of-payments disequilibria? Which are the most important objectives of nations?
2. What policies can nations utilize to achieve their objectives? How do these policies operate to achieve the intended objectives?
3. What is meant by the principle of effective market classification? Why is it crucial that nations follow this principle?
4. What does the *EE* curve in the Swan diagram show? What does the *YY* curve show? What are the four zones of external and internal imbalance defined by these two curves? What does the point of intersection of the *EE* and *YY* curves show?
5. How does the Swan diagram help us determine the policy mix to reach external and internal equilibrium simultaneously? Under what conditions does a single policy instrument help a nation reach both external and internal balance simultaneously?
6. What does the *IS* curve show? Why is it negatively inclined? What does the *LM* curve show? What is meant by the transaction and speculative demands for money? Why is the *LM* curve usually positively inclined? What does the *BP* curve

show? Why is it usually positively inclined? What determines the slope of the *BP* curve? Under what condition are the goods market, the money market, and the nation's balance of payments simultaneously in equilibrium? Is this necessarily the full-employment level of income?

7. What effects do expansionary and contractionary fiscal policies have on the *IS* curve? What effects do easy and tight monetary policies have on the *LM* curve? Do fiscal and monetary policies directly affect the *BP* curve? What would cause the *BP* curve to shift down? to shift up?

8. How can fiscal and monetary policies be used to achieve full employment and external balance under fixed exchange rates and limited international capital mobility? with high international capital mobility?

9. Why is monetary policy completely ineffective with perfect international capital mobility under fixed exchange rates?

10. How can a nation use fiscal and monetary policies to correct unemployment and a balance-of-payments deficit with flexible exchange rates and imperfect capital mobility? with perfect international capital mobility?

11. What does the *IB* curve show? Why is it positively inclined? What does the *EB* curve show? Why is it positively inclined? Why is the *EB* curve usually flatter than the *IB* curve? Why should the nation use fiscal policy to achieve internal balance and monetary policy to achieve external balance? What happens if the nation does the opposite?

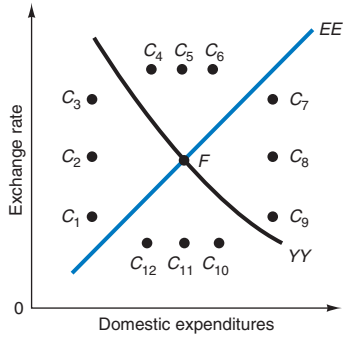
12. What are the criticisms faced by the policy mix of using fiscal policy to achieve internal balance and monetary policy to achieve external balance? What happens when the additional objectives of price stability and growth are recognized as separate goals?

13. What is meant by direct controls? trade controls? exchange controls? Explain how the most important forms of trade and exchange controls operate to affect the nation's balance of payments.

14. What are the advantages and the disadvantages of direct controls? Why do direct controls to affect the nation's balance of payments require international cooperation to be effective?

PROBLEMS

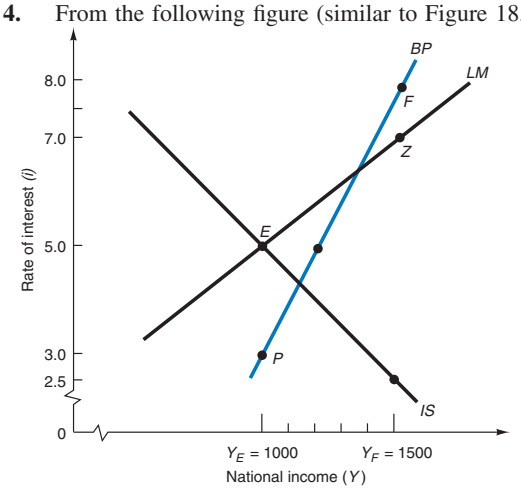
***1.** Indicate the expenditure-changing and expenditure-switching policies required to achieve external and internal balance simultaneously for points C_1, C_4, C_7, and C_{10} in the following figure (similar to Figure 18.1).



2. Indicate the expenditure-changing and expenditure-switching policies required to achieve external and internal balance simultaneously for points C_2, C_5, C_8, and C_{11}, in the figure for Problem 1.

3. Indicate the expenditure-changing and expenditure-switching policies required to achieve external and internal balance simultaneously for points C_3, C_6, C_9, and C_{12}, in the figure for Problem 1.

4. From the following figure (similar to Figure 18.2):



(a) Indicate whether the nation faces a deficit or surplus in its balance of payments at $Y_E = 1000$.

(b) Determine the size of the deficit or surplus that the nation faces at $Y_E = 1000$ if its marginal propensity to import is $MPM = 0.15$ and there are no foreign repercussions.

5. Show how the nation in Problem 4 can reach full employment with external balance by using the appropriate mix of fiscal and monetary policies.

6. Draw on graph paper a figure similar to Figure 18.4, but without the broken curves IS' and LM' and assuming that the full-employment level of national income is $Y_F = 1200$. Indicate on your figure the appropriate mix of fiscal and monetary policies required for the nation to achieve simultaneously internal and external balance under a fixed exchange rate system.

7. Repeat Problem 6 for the assumption that the full-employment level of national income is $Y_E = 1000$.

8. Draw on graph paper a figure similar to Figure 18.2, but interchanging the labels of the *LM* and *BP* curves so that the *BP* curve is now flatter than the *LM* curve.

(a) Show on your graph the appropriate mix of fiscal and monetary policies required by the nation to reach full employment with external balance.

(b) How does the required policy mix in this case differ from that required for the case shown in Figure 18.2 discussed in Section 18.4?

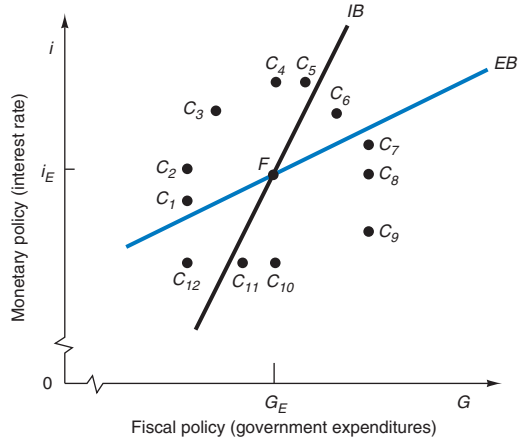
9. Explain what would happen in Problem 8 if international capital flows were perfectly elastic.

10. Starting from point *E* in Figure 18.8, draw a figure showing how the nation could reach internal and external balance with flexible exchange rates by using an expansionary fiscal rather than an easy monetary policy.

***11.** Starting from point *E* in Figure 18.8, draw a figure showing how the nation could reach internal and external balance with flexible exchange rates by using an expansionary fiscal rather than an easy monetary policy if capital mobility is large and the *BP* curve is to the right of point *Z* in Figure 18.8.

***12.** Indicate the type of fiscal and monetary policies required to reach point *F* in the following figure (similar to Figure 18.10) for points C_3, C_6, C_9, and C_{12}.

13. Indicate the type of fiscal and monetary policies required to reach point *F* in the figure for Problem 12 for points C_1, C_5, C_7, and C_{11}.



14. Indicate the type of fiscal and monetary policies required to reach point *F* in the figure for Problem 12 for points C_4, C_8, and C_{10}.

*= Answer provided at www.wiley.com/college/salvatore.

APPENDIX

In Sections A18.1 to A18.3 of this appendix, we show how the *IS*, *LM*, and *BP* curves of Figure 18.2 are derived, and the effects on these curves of fiscal policy, monetary policy, and a depreciation or devaluation of the nation's currency. Section A18.4 summarizes the analysis mathematically.

A18.1 Derivation of the *IS* Curve

Figure 18.12 consists of four panels labeled I to IV as we move clockwise, which are used to derive the *IS* curve in panel I. The *IS* curve shows the various combinations of interest rates *(i)* and levels of national income *(Y)* at which the goods market is in equilibrium in the sense that the leakage from the income stream, in the form of domestic saving *(S)* plus imports *(M)*, is equal to the injections into the income stream in the form of investment *(I)* plus exports *(X)*, and assuming for the moment the absence of a government sector.

In panel II, the saving plus import function $[S(Y) + M(Y)]$ from the top panel of Figure 17.3 is plotted showing the positive relationship between total leakages and the level of national income. The 45° line in panel III shows the equilibrium condition that leakages $(S + M)$ equal injections $(I + X)$. Panel IV shows total injections in the form of the investment function (where investment is inversely related to the rate of interest) plus the exogenous export function $[I(i) + X]$. The investment function is usually referred to as the marginal efficiency of investment schedule. For example, at $Y_E = 1000$, $S + M = 450 = I + X$ at $i = 5.0\%$, so that we derive point E in panel I. Similarly, at $Y_F = 1500$, $S + M = 650 = I + X$ at $i = 2.5\%$, so that we derive point U in panel I. Assuming that the *IS* curve is a straight line, we can derive the *IS* curve by joining point E and point U in panel I. This is the *IS* curve in Figure 18.2.

The inclusion of government expenditures *(G)* will lead to a total injections function of $I(i)) + X + G$, which is to the left of the total injections function shown in panel IV by the amount of G, and an *IS* function, which is to the right of the one shown in panel I by the amount of G times the open-economy multiplier (k'). On the other hand, the inclusion of taxes *(T)* will lead to a total leakage function of $S(Y) + M(Y) + T$, which is higher than the total leakage function shown in panel II by the amount of T, and *IS* function, which is to the left of the one shown in panel I by the amount of T times the open-economy tax multiplier. The equilibrium condition that total injections equal total leakages is then

$$I + X + G = S + M + T \tag{18A-1}$$

The inclusion of government expenditures (G) and taxes (T) will allow us to use the diagram to analyze the effect of fiscal policy on the *IS* curve. In what follows, however, we assume for simplicity that there are no taxes and that G is for fiscal policy purposes only.

The diagram can also be used to examine the effect of a depreciation or devaluation on the *IS* curve. Specifically, a depreciation or devaluation of the nation's currency will reduce its imports at each level of income, so that the total leakages function in panel II shifts up by the reduction of imports at each level of income. At the same time, the nation's exports will increase, shifting the total injections function in panel IV to the left by the increase in exports. The *IS* function in panel I will then shift to the right by the improvement in the nation's trade balance $(X - M)$ times the nation's open-economy multiplier.

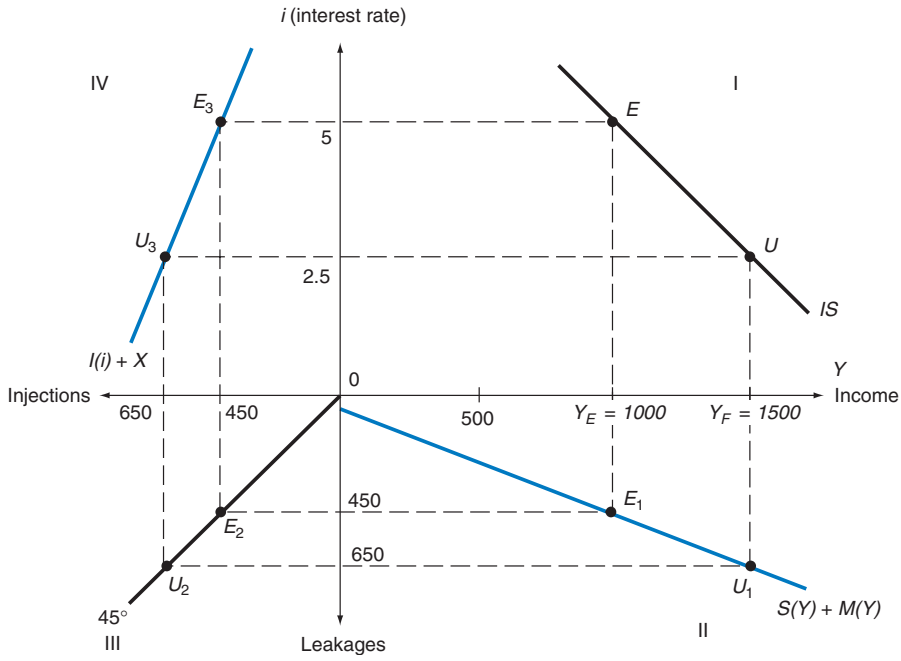


FIGURE 18.12. Derivation of the *IS* Curve.
Panel II shows the positive relationship between the leakages of saving plus imports and national income. The 45° line in panel III shows the equilibrium condition that leakages ($S + M$) equal injections ($I + X$). Panel IV shows the total injections function of investment (which is inversely related to the interest rate) and exogenous exports. The *IS* curve in panel I shows the various combinations of i and Y at which the goods market is in equilibrium (given by leakages equal injections). Expansionary fiscal policy shifts the total injections function to the left by the increase in government expenditures (G) and shifts the *IS* curve to the right by the increase in G times the open-economy multiplier (k'). A depreciation or devaluation shifts the total leakages function up by the reduction in M at each Y, shifts the total injections function to the left by the increase in X, and shifts the *IS* function to the right by the increase in $(X - M)$ times k'.

Problem Trace (i.e., pencil in) in each of the four panels of Figure 18.12 the effect of an expansionary fiscal policy that increases government expenditures *(G)* from 0 to 50. Assume that the government changes the money supply as it pursues this expansionary fiscal policy in such a way as to keep the interest rate unchanged. Assume also that the open-economy multiplier for the nation is $k' = 2.5$ (as in Section 17.3D under the assumption that the nation is small enough that there are no foreign repercussions).

A18.2 Derivation of the *LM* Curve

The four panels of Figure 18.13 are used to derive the *LM* curve in panel I. The *LM* curve shows the various combinations of interest rates *(i)* and levels of national income *(Y)* at which the money market is in equilibrium in the sense that the quantity of money demanded for transaction and speculative purposes is equal to the given and fixed supply of money.

Panel II shows the positive relationship between the transaction demand for money *(MT)* and national income (with *MT* a constant fraction of *Y*). Panel III shows how much of

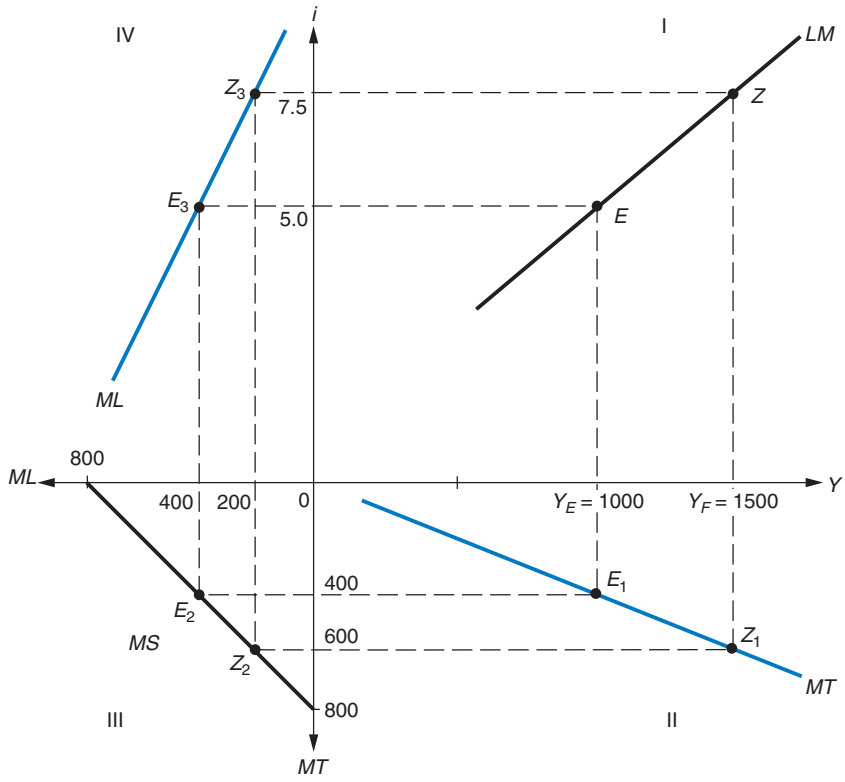


FIGURE 18.13. Derivation of the *LM* Curve.
Panel II shows the positive relationship between the transaction demand for money (*MT*) and national income (*Y*). Panel III shows how much of the assumed total supply of money of $MS = 800$ is held for transaction purposes and how much is left for speculative purposes. Panel IV shows the speculative, or liquidity, demand for money (*ML*) as a decreasing function of the rate of interest. The *LM* curve in panel I shows the various combinations of *i* and *Y* at which the money market is in equilibrium (given by the equality of the total demand for money to the fixed supply of money). Easy monetary policy shifts the *MS* curve down in panel III and the *LM* curve to the right in panel I in order to reestablish equilibrium in the money market. A depreciation or devaluation shifts the *MT* curve down in panel II and the *LM* curve to the left in panel I.

the assumed total supply of money of $MS = 800$ is held for transaction purposes and how much is left for speculative purposes. Panel IV shows the speculative, or liquidity, demand for money *(ML)* as a decreasing function of the rate of interest. That is, the higher the rate of interest or the opportunity cost of holding money balances, the smaller is the quantity demanded for speculative, or liquidity, purposes.

For example, at $Y_E = 1000$, $MT = 400$, leaving another 400 (out of $MS = 800$) to be held for liquidity purposes at $i = 5.0\%$. This defines point E in panel I. Similarly, at $Y_F = 1500$, $MT = 600$, leaving 200 of the fixed money supply of $MS = 800$ to be held for liquidity purposes at $i = 7.5\%$. This defines point Z in panel I. Joining points E and Z in panel I, we derive the LM curve (on the assumption that the LM curve is a straight line). This is the LM curve in Figure 18.2.

An increase in the supply of money as a result of easy monetary policy will shift the *MS* curve down in panel III and shift the *LM* curve to the right in panel I until equilibrium in the money market is reestablished. On the other hand, a depreciation or devaluation of the nation's currency will increase domestic prices and the transaction demand for money (i.e., *MT* shifts down in panel II) and shift the *LM* curve to the left in panel I until equilibrium in the money market is reestablished.

Problem Starting from point *E* on the *LM* curve in panel I, trace (i.e., pencil in) in each of the four panels of Figure 18.14 the effect of (a) an easy monetary policy that increases the nation's money supply by 100, on the assumption that the entire increase in the money supply will be held for transaction purposes, and (b) a depreciation that shifts the *MT* function down by 200 in panel II, on the assumption that monetary authorities keep *MS* at 800. (c) What happens if instead monetary authorities increase *MS* by 200 to $MS = 1000$ in part (b)?

A18.3 Derivation of the *BP* Curve

The four panels of Figure 18.14 are used to derive the *BP* curve in panel I. The *BP* curve shows the various combinations of interest rates and national income at which the nation's balance of payments is in equilibrium.

In panel II, the trade balance $(X - M)$ from the bottom panel of Figure 17.3 is plotted as a *decreasing* function of national income. The 45° line in panel III shows the external equilibrium condition that a balance-of-trade deficit be matched by an equal net short-term *capital inflow*, or a balance-of-trade surplus be equal to a net short-term *capital outflow*. Panel IV shows net short-term capital inflows (SC) as an increasing function of the interest rate in the nation (and interest differential in favor of the nation on the assumption of constant interest rates abroad). For example, at $Y_E = 1000$, $X - M = 0 = SC$ at $i = 5.0\%$. This defines point *E* in panel I. Similarly, at $Y_F = 1500$, $X - M = -75$ and $SC = +75$ (so that $X - M + SC = 0$) at $i = 8.0\%$. This defines point *F* in panel I. By joining points *E* and *F*, we derive the *BP* curve in panel I and in Figure 18.2. Note that at $Y < Y_E$, $X - M > 0$ and $SC < 0$ (i.e., there is a net capital outflow from the nation), so that $X - M + SC = 0$ and we get another point on the *FE* curve below point *E*.

The *BP* curve is drawn on the assumption that the exchange rate is fixed. A depreciation or devaluation from a condition of less than full employment in the nation shifts the $X - M$ function up and improves the nation's trade balance at each level of income so that a smaller net short-term capital inflow (or an even greater outflow) is needed at a lower *i* to keep the balance of payments in equilibrium (i.e., the *BP* curve shifts down in panel I).

Problem Starting from point *E* on the *BP* curve in panel I, trace (i.e., pencil in) in each of the four panels of Figure 18.14 the effect of a depreciation or devaluation that shifts the $X - M$ function up by 50 in panel II.

A18.4 Mathematical Summary

The preceding discussion can be summarized mathematically in terms of the following three equations, respectively, the equilibrium condition in the goods market, in the money

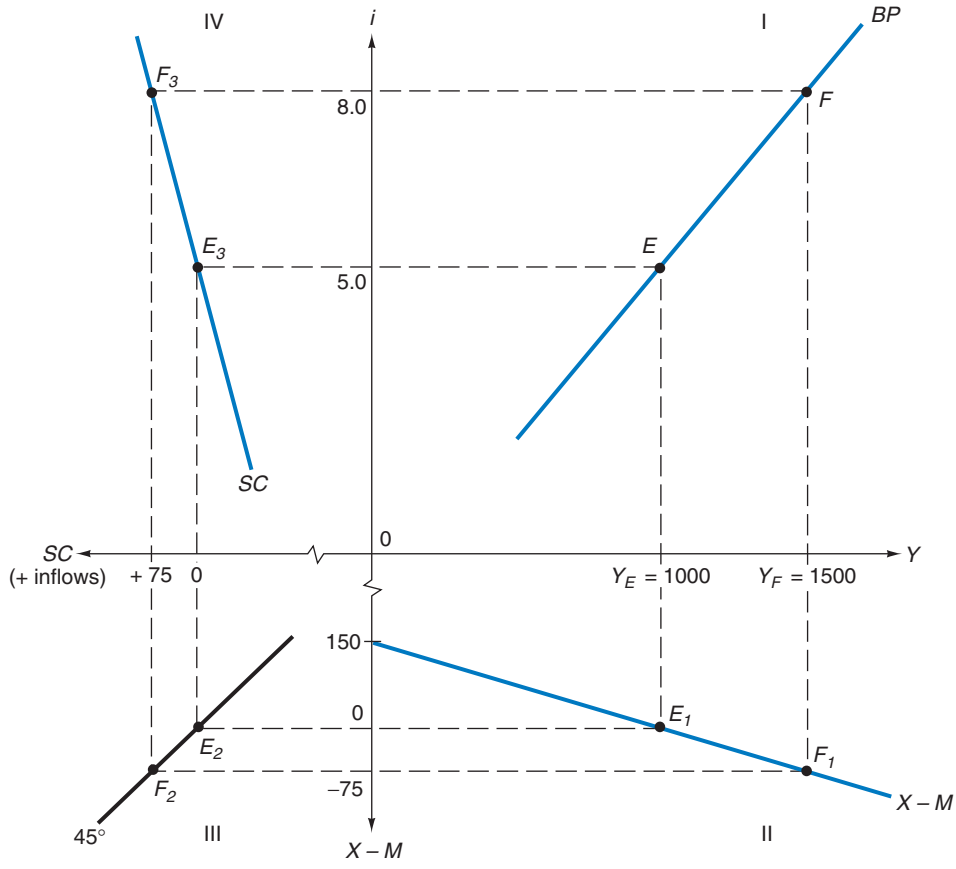


FIGURE 18.14. **Derivation of the *BP* Curve.**
Panel II shows the negative relationship between the trade balance ($X - M$) and national income (from the bottom panel of Figure 17.3). The 45° line in panel III shows the external equilibrium condition that a balance-of-trade deficit be matched by an equal net short-term capital inflow (*SC*). Panel IV shows *SC* as an increasing function of *i*. The *BP* curve shows the various combinations of *i* and *Y* for external balance. A depreciation or devaluation shifts the $X - M$ function up at each *Y* so that a smaller *SC* at a lower *i* is needed to maintain external balance (i.e., the *FE* curve shifts down).

market, and in the balance of payments, in terms of the three unknowns of the system, which are the level of national income *(Y)*, the rate of interest *(i)*, and the exchange rate *(R)*.

As pointed out in Section A18.1, equilibrium in the goods market for an open economy with a government sector occurs where the sum of the injections of investment *(i)* plus government expenditures (G^*, used as a fiscal policy variable) plus exports *(X)* equals the sum of the leakages of saving *(S)* plus imports *(M)*, and assuming zero taxes *(T)*.

$$\bar{I}(\bar{i}) + G^* + X(\overset{+}{R}) = S(\overset{+}{Y}) + M(\overset{+}{Y}, \overset{-}{R}) \tag{18A-2}$$

where the variables in parentheses denote functional dependence and the positive or negative signs above the variables refer to a direct or inverse functional relationship. For example,

$I(\bar{i})$ means that investment is inversely related to or is a decreasing function of the rate of interest.

For the money market to be in equilibrium, the transaction demand for money *(MT)* plus the speculative, or liquidity, demand for money *(ML)* must be equal to the money supply, which is determined by the monetary authorities and is used as a monetary policy variable (MS^*):

$$MT(\overset{+}{Y}, \overset{+}{R}) + ML(\bar{i}) = MS^* \tag{18A-3}$$

Finally, for the balance of payments to be in equilibrium, the balance on net short-term international capital flows *(SC)* must be equal in absolute amount and opposite in sign to the trade balance *(TB)*:

$$SC(\overset{+}{i}) = TB(\overset{-}{Y}, \overset{+}{R}) \tag{18A-4}$$

Given the value of policy variables G^* and MS^*, we can determine the equilibrium value of Y, i, and R. Graphically, this corresponds to a point such as point E in Figure 18.8, where the *IS, LM*, and *BP* curves intersect and the three markets are simultaneously in equilibrium.

Since G^* appears only in Equation (18A-2), fiscal policy affects only the goods market and shifts only the *IS* curve. Since MS^* appears only in Equation (18A-3), monetary policy affects only the money market and shifts the *LM* curve only. Since R appears in all three equations, a change in the exchange rate affects all three markets and shifts all three curves (as indicated in Section 18.5).

Problem Use the above three equations to trace the effects of (a) a contractionary fiscal policy, (b) a tight monetary policy, and (c) an appreciation or revaluation of the nation's currency.

SELECTED BIBLIOGRAPHY

For a problem-solving approach to the topics covered in this chapter, see:

- D. Salvatore, *Theory and Problems of International Economics*, 4th ed. (New York: McGraw-Hill, 1996), ch. 10.

The classics on the theory of economic policy in general and balance-of-payments adjustment policies in particular are:

- J. E. Meade, *The Theory of International Economic Policy*, Vol. I, *The Balance of Payments* (London: Oxford University Press, 1951), parts 3 and 4.
- Jan Tinbergen, *On the Theory of Economic Policy* (Amsterdam: North-Holland, 1952).
- T. Swan, "Longer-Run Problems of the Balance of Payments," in H. W. Arndt and W. M. Corden, eds., *The Australian Economy: A Volume of Readings* (Melbourne: Cheshire Press, 1955), pp. 384–395. Reprinted in R. E. Caves and H. G. Johnson, *Readings in International Economics* (Homewood, Ill.: Irwin, 1968), pp. 455–464.

The classics on internal and external balance in a world with money are:

- R. A. Mundell, "The Appropriate Use of Monetary and Fiscal Policy Under Fixed Exchange Rates," *International Monetary Fund Staff Papers*, March 1962, pp. 70–77. Reprinted in R. A. Mundell, *International Economics* (New York: Macmillan, 1968), pp. 233–239.
- R. A. Mundell, "Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates," *Canadian Journal of Economics and Political Science*, November 1963, pp. 475–485.
- M. J. Fleming, "Domestic Financial Policies Under Fixed and Under Floating Exchange Rates," *International Monetary Fund Staff Papers*, November 1962, pp. 369–379. Reprinted

in R. N. Cooper, *International Finance* (Baltimore: Penguin, 1969), pp. 291–303.

For an evaluation and extension of the *IS–LM–BP* model, see:

- R. Mundell, *International Economics* (New York: Macmillan, 1968).
- R. Stern, *The Balance of Payments: Theory and Economic Policy* (Chicago: Aldine, 1973).
- M. Mussa, "Macroeconomic Interdependence and the Exchange Rate Regime," in R. Dornbusch and J. A. Frenkel, eds., *International Economic Policy* (Baltimore: Johns Hopkins University Press, 1979), pp. 160–204.
- R. C. Bryant, *Money and Monetary Policy in Interdependent Nations* (Washington, D.C.: Brookings Institution, 1980).
- P. B. Kenen, "Macroeconomic Theory and Policy: How the Closed Economy Was Opened," in R. W. Jones and P.B. Kenen, eds., *Handbook of International Economics*, Vol. II (Amsterdam: North-Holland, 1985), pp. 625–677.
- R. C. Marston, "Stabilization Policies in Open Economies," in R. W. Jones and P. B. Kenen, eds., *Handbook of International Economics*, Vol. II (Amsterdam: North-Holland, 1985), pp. 859–916.
- J. A. Frenkel and A. Razin, "The Mundell–Fleming Model a Quarter Century Later," *IMF Staff Papers*, December 1987, pp. 567–620.
- R. Dornbusch, *Open Economy Macroeconomics* (New York: Academic Press, 1989).
- N. G. Mankiw, "Symposium on Keynesian Economics Today," *Journal of Economic Perspectives*, Winter 1993, pp. 3–4.
- M. Obstefeld, "International Macroeconomics: Beyond the Mundell-Fleming Model," *NBER Working Paper No. 8369*, July 2001.
- P. R. Lane, "The New Open Economy Macroeconomics," *Journal of International Economics*, August 2001, pp. 235–266.

The experience with fiscal, monetary, and exchange rate policies to achieve internal and external balance is examined in:

- M. Michaely, *The Responsiveness of Demand Policies to Balance of Payments: The Postwar Patterns* (New York: NBER, 1971).
- S. W. Black, "The Relationship Between Exchange Rate Policy and Monetary Policy in Ten Industrial Countries," in J. F. O. Bilson and R. C. Marston, eds., *Exchange Rate Theory and Practice* (Chicago: University of Chicago Press, 1984), pp. 499–515.
- L. O. Laney, "The Strong Dollar, the Current Account, and Federal Deficits: Cause and Effect," *Economic Review*, Federal Reserve Bank of Dallas, January 1984, pp. 1–14.
- B. M. Friedman, "Lessons on Monetary Policy from the 1980s," *Journal of Economic Perspectives*, Summer 1988, pp. 51–72.
- R. C. Bryant, G. Holtman, and P. Hoover, *External Deficits and the Dollar* (Washington, D.C.: Brookings Institution, 1988).
- D. Salvatore, ed., *Handbook of National Economic Policies* (Westport, Conn., and New York: Greenwood Press and North-Holland, 1992).
- A. J. Lenz, *Narrowing the U.S. Current Account Deficit* (Washington, D.C.: Institute for International Economics, 1992).
- W. Max Corden, "Absorption, the Budget, and Debt: The Wonderland of Possibilities," in H. Herberg and N. V. Long, eds., *Trade, Welfare, and Economic Policies: Essays in Honor of Murray Kemp* (Ann Arbor: University of Michigan Press, 1993), pp. 379–391.
- R. Bryant, P. Hooper, and C. Mann, eds., *Evaluating Policy Regimes: New Research in Empirical Macroeconomics* (Washington, D.C.: Brookings Institution, 1993).
- M. Obstfeld and K. Rogoff, "The Intertemporal Approach to the Current Account," in G. Grossman and K. Rogoff, eds., *The Handbook of International Economics, Vol. III* (Amsterdam: North-Holland, 1995), pp. 1731–1799.
- M. Baxter, "International Trade and the Business Cycle," in G. Grossman and K. Rogoff, eds., *The Handbook of International Economics, Vol. III* (Amsterdam: North-Holland, 1995), pp. 1803–1864.
- M. Fratianni, D. Salvatore, and J. von Hagen, eds., *Handbook of Macroeconomic Policy in Open Economies* (Westport, Conn.: Greenwood Press, 1997).
- R. I. McKinnon and K. Ohno, *Dollar and Yen: Resolving Economic Conflict Between the United States and Japan* (Cambridge, Mass.: MIT Press, 1997).
- A. M. Meulendyke, *U.S. Monetary Policy and Financial Markets* (New York: Federal Reserve Bank of New York, 1998).
- A. Cuckierman, "Are Contemporary Central Banks Transparent about Economic Models and Objectives and What Difference Does It Make?" *Federal Reserve Bank of St. Louis Review*, July–August 2002, pp. 15–36.
- D. Salvatore, ed., "U.S. Trade Deficits, the Dollar, and International Monetary Stability," "Twin Deficits, Growth and Stability in the U.S. Economy," and "Growth, Productivity and Wages in the U.S. Economy," Special Issues of the *Journal of Policy Modeling*, respectively, of September 2006,

2007, and 2008, with the participation of William Baumol, Guillermo Calvo, Richard Cooper, Sebastian Edwards, Barry Eichengreen, Martin Feldstein, Jeffrey Frankel, Glenn Hubbard, Dale Jorgenson, Lawrence Klein, Greg Mankiw, Ronald McKinnon, Robert Mundell, Kenneth Rogoff, John Taylor, and others.

- D. Salvatore, "Global Imbalances," *Princeton Encyclopedia of the World Economy* (Princeton, N.J.: Princeton University Press, 2008), pp. 536–541.
- S. Kim and N. Roubini, "Twin or Twin Divergence Fiscal Policy, Current Account, and Real Exchange Rate in the U.S.," *Journal of International Economics*, March 2008, pp. 362–383.
- K. Flood, "The Global Effects of U.S. Fiscal Policy," *Bank of Canada Discussion Paper 2008–08*, May 2008.
- P. O. Gourinchas and M. A. Kose, eds., "Fiscal Policy, Stabilization, and Sustainability," *Special Issue of the IMF Economic Review*, July 2011.
- T. Cwick and V. Wieland, "Keynesian Spending," *Economic Policy*, July 2011, pp. 493–549.
- Council of Economic Advisors, *Economic Report of the President* (Washington. D.C.: U.S. Government Printing Office, 2012).
- International Monetary Fund, *World Economic Outlook* (Washington, D.C., October 2012).
- Organization for Economic Cooperation and Development, *Economic Outlook* (Paris: OECD, December 2012).

For an evaluation of information on direct controls, see:

- J. N. Bhagwati, *Anatomy and Consequences of Exchange Controls Regimes* (Cambridge, Mass.: Ballinger, 1978).
- J. N. Bhagwati, *Protectionism* (Cambridge, Mass.: MIT Press, 1988).
- S. Edwards, *Real Exchange Rates, Devaluation, and Adjustment* (Cambridge, Mass.: MIT Press, 1989).
- J. N. Bhagwati, *The World Trading System at Risk* (Princeton, N.J.: Princeton University Press, 1991).
- B. B. Aghevli, M. S. Khan, and P. J. Montiel, *Exchange Rate Policy in Developing Countries: Some Analytical Issues* (Washington, D.C.: IMF, 1991).
- M. P. Dooley, "A Survey of Literature on Controls over International Capital Transactions," *IMF Staff Papers*, December 1996, pp. 639–687.
- S. J. Wei and Z. Zhang, "Collateral Damage: Exchange Rate Controls and International Trade," *NBER Working Paper No. 13020*, December 2007.
- International Monetary Fund, *Exchange Rate Arrangements and Exchange Rate Restrictions* (Washington, D.C.: IMF, 2011).

INTERNet

Data on the current account, budget balance, and growth of the GDP of the United States that can be used to examine the relationship among them are found on the Bureau of Economic Analysis, the Penn World Table, and the Federal Reserve Bank of St. Louis web sites, respectively, at:

http://www.bea.doc.gov

http://research.stlouisfed.org/fred2

Information and data on the conduct and effectiveness of fiscal and monetary policy in industrial nations can be found on the web sites of the Bank for International Settlements (BIS), the Organization for Economic Cooperation and Development (OECD), and the National Bureau of Economic Research (NBER), respectively, at:

http://www.bis.org

http://www.oecd.org

http://www.nber.org