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Open-Economy Macroeconomics: The Balance of Payments and Exchange Rates

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The growth of international trade has made the economies of the world increasingly interdependent. U.S. imports now account for about 15 percent of U.S. gross domestic product (GDP) and billions of dollars flow through the international capital market each day. In the previous chapter we explored the gains that come to countries from trade, as they exploit comparative advantage and gain access to new goods. The ubiquity of this trade also means that economic problems in one part of the world can often be felt by their trading partners elsewhere. In this chapter we explore the ways in which the openness of the economy affects macroeconomic policy making.

From a macroeconomic point of view, the main difference between an international transaction and a domestic transaction concerns currency exchange. When people in countries with different currencies buy from and sell to each other, an exchange of currencies must also take place.

Brazilian coffee exporters cannot spend U.S. dollars in Brazil; they need Brazilian reals. A U.S. wheat exporter cannot use Brazilian reals to buy a tractor from a U.S. company or to pay the rent on warehouse facilities. Somehow international exchange must be managed in a way that allows both partners in the transaction to wind up with their own currency.

exchange rate The ratio at which two currencies are traded. The price of one currency in terms of another.

The amount of trade between two countries depends on the **exchange rate**—the price of one country's currency in terms of the other country's currency. If the Japanese yen were expensive (making the dollar cheap), both Japanese and Americans would buy from U.S. producers. If the yen were cheap (making the U.S. dollar expensive), both Japanese and Americans would buy from Japanese producers. As we saw in the last chapter, within a certain range of exchange rates, trade flows in both directions. Each country specializes in producing the goods in which it enjoys a comparative advantage, and trade is mutually beneficial.

We begin our discussion of open-economy macroeconomics by looking at the *balance of payments*—the record of a nation's transactions with the rest of the world. We then go on to consider how our model of the macroeconomy changes when we allow for the international exchange of goods, services, and capital. Finally, we explore the determination of the rate of exchange of one currency for another and how the exchange rate system affects the economy, including fiscal and monetary policy.

19.1 LEARNING OBJECTIVE

Explain how the balance of payments is calculated.

The Balance of Payments

foreign exchange All currencies other than the domestic currency of a given country.

All foreign currencies—euros, Swiss francs, Japanese yen, Brazilian reals, and so forth—can be grouped together as "foreign exchange." **Foreign exchange** is simply all currencies other than the domestic currency of a given country (in the case of the United States, the U.S. dollar). U.S. demand for foreign exchange arises because its citizens want to buy things whose prices are quoted in other currencies, such as Australian jewelry, vacations in Mexico, and bonds or stocks issued by Sony Corporation of Japan. Whenever U.S. citizens make these purchases, foreign currencies must first be purchased. Typically this happens indirectly without most customers thinking about it at all.

Where does the *supply* of foreign exchange come from? The answer is simple: The United States (actually U.S. citizens or firms) earns foreign exchange when it sells products, services, or assets to another country. Some of these foreign exchange transactions are transparent to the consumer. When Mexican tourists visit Disney World, they go to an ATM, which takes pesos from their banks in Mexico and converts them to dollars dispensed in Florida. Other transactions are less transparent. Saudi Arabian purchases of stock in General Motors and Colombian purchases of real estate in Miami also increase the U.S. supply of foreign exchange although the currency exchange is often done by a middleman.

balance of payments The record of a country's transactions in goods, services, and assets with the rest of the world; also the record of a country's sources (supply) and uses (demand) of foreign exchange.

The record of a country's transactions in goods, services, and assets with the rest of the world is its **balance of payments**. The balance of payments is also the record of a country's sources (supply) and uses (demand) of foreign exchange.[1]

The Current Account MyLab Economics Concept Check

The balance of payments is divided into two major accounts, the *current account* and the *financial account*. These are shown in Table 19.1, which provides data on the U.S. balance of payments for 2017. We begin with the current account.

The first two items in the current account are exports and imports of goods. Among the biggest exports of the United States are commercial aircraft, chemicals, and agricultural products. U.S. exports *earn* foreign exchange for the United States and are a credit item on the current account. U.S. imports *use up* foreign exchange and are a debit item. In 2017 the United States exported $1,550.7 billion in goods and imported $2,361.9 billion, thus using up more foreign exchange than it earned regarding trade in goods.

Next in the current account is trade in services. Like most other countries, the United States buys services from and sells services to other countries. For example, a U.S. firm shipping wheat

[1]Bear in mind the distinction between the balance of payments and a balance sheet. A *balance sheet* for a firm or a country measures that entity's stock of assets and liabilities at a moment in time. The *balance of payments*, by contrast, measures *flows*, usually over a period of a month, a quarter, or a year. Despite its name, the balance of payments is *not* a balance sheet.

to England might purchase insurance from a British insurance company. A Dutch flower grower may fly flowers to the United States aboard a U.S. airliner. In the first case, the United States is importing services and therefore using up foreign exchange; in the second case, it is selling services to foreigners and earning foreign exchange. In 2017 the United States exported $780.9 billion in services and imported $538.1 billion, thus earning more foreign exchange than it used up regarding trade in services.

The difference between a country's exports of goods and services and its imports of goods and services is its **balance of trade**. When exports of goods and services are less than imports of goods and services, a country has a **trade deficit**. Table 19.1 shows that the U.S. trade deficit in 2017 was fairly large at $568.4 billion.

balance of trade A country's exports of goods and services minus its imports of goods and services.

trade deficit The situation when a country imports more than it exports.

Next in Table 19.1 comes investment income. U.S. citizens hold foreign assets (stocks, bonds, and real assets such as buildings and factories). Dividends, interest, rent, and profits paid to U.S. asset holders are a source of foreign exchange. Conversely, when foreigners earn dividends, interest, and profits on assets held in the United States, foreign exchange is used up. In 2017 the United States earned $926.9 in investment income and paid out $709.9 billion.

Last in the current account are transfer payments. Transfer payments from the United States to foreigners are another use of foreign exchange. Some of these transfer payments are from private U.S. citizens, and some are from the U.S. government. You may send a check to a relief agency in Africa. Many immigrants in the United States send remittances to their countries of origin to help support extended families. Conversely, foreigners make transfer payments to the United States, which earns income for the United States. In 2017 the United States received $149.7 billion in transfer payments from abroad and sent $264.5 billion abroad.

Line (10) in Table 19.1 shows the balance on current account. This is the balance of trade plus investment and transfer income and minus investment and transfer payments. Put another way, the **balance on current account** is the sum of income from exports of goods and services and income from investments and transfers minus payments for imports of goods and services and payments for investments and transfers. The balance on current account shows how much a nation has spent on foreign goods, services, investment income payments, and transfers relative to how much it has earned from other countries. When the balance is negative, which it was for the United States in 2017, a nation has spent more on foreign goods and services (plus investment income and transfers paid) than it has earned through the sales of its goods and services to the rest of the world (plus investment income and transfers received).

balance on current account The sum of income from exports of goods and services and income from investments and transfers minus payments for imports of goods and services and payments for investments and transfers.

TABLE 19.1 U.S. Balance of Payments, 2017

Current Account		Billions of dollars
(1)	Goods exports	$1,550.7
(2)	Goods imports	2361.9
(3)	Exports of services	780.9
(4)	Imports of services	538.1
(5)	Balance of trade: (1) − (2) + (3) − (4)	−568.4
(6)	Investment income	926.9
(7)	Investment payments	709.0
(8)	Transfer income	149.7
(9)	Transfer payments	264.5
(10)	Balance on current account: (5) + (6) − (7) + (8) − (9)	−466.2
Financial account		
(11)	Net capital transfer receipts	24.8
(12)	Change in net U.S. liabilities	375.5
(13)	Net receipts from financial derivatives	−26.4
(14)	Statistical discrepancy	92.2
(15)	Balance of payments: (10) + (11) + (12) + (13) + (14)	0.0

Item (13) is the change in foreign assets in the United States minus the change in U.S. assets abroad. In 2017 this number was positive, which means that there was an increase in net U.S. liabilities.

Source: Bureau of Economic Analysis, March 21, 2018.

The Financial Account MyLab Economics Concept Check

For each transaction recorded in the current account, there is an offsetting transaction recorded in the financial account. Consider, for example, the $466.2 billion current account deficit that the United States ran in 2017. This deficit must be paid for, and how it is paid shows up in the financial account. The first two lines under the financial account in Table 19.1 are receipts recorded in the financial account: net capital transfer receipts and net receipts from financial derivatives. These are small. The first is positive, which says that the net flow to the United States was positive. The second is negative, which was a net flow out of the United States. The third line, line (13), shows that net U.S. liabilities (to the rest of the world) increased by $375.5 billion. So the United States borrowed from the rest of the world (on net) $375.5 billion to partly finance the $466.2 billion deficit. If there were no measurement errors, the entire deficit would be financed by lines (11), (12), and (13): net capital receipts and net borrowing. There are, however, measurement errors, where the total error is called the *statistical discrepancy*. In 2017 the statistical discrepancy was $92.2 billion. This is, of course, a large error. But the main point to take away from this analysis is that aside from measurement errors, a current account deficit must be financed by changes in a country's net capital receipts and its net liabilities to the rest of the world. The balance of payments—line (15) in Table 19.1—is always zero.

An example may help in seeing the link between the current and financial accounts. Say a U.S. citizen buys a beer in a store on Caye Caulker, Belize, for $1.75 using U.S. currency, which is accepted in Belize along with the local currency. This is an import of the United States, so the U.S. current-account deficit has increased by $1.75. What happens on the financial account? The Belize store owner now has the $1.75, which is an asset for her (i.e., for Belize) and a liability for the United States. Net U.S. liabilities to the rest of the world have thus increased by $1.75—line (13) in Table 19.1.

There are many international financial transactions that do not lead to a change in net U.S. liabilities in the financial account. If the Chinese central bank buys a U.S. government bond with yuan, its U.S. assets have increased (the bond), but so has its foreign liabilities (the yuan). In the United States there is an increase in foreign liabilities (the bond), but also an increase in foreign assets (the yuan). The *net* position of each country has not changed. The only way the net position of a country can change is through a positive or negative value of its current account. If in the Belize example the U.S. citizen had simply exchanged $1.75 U.S. for $3.50 Belize (the exchange rate between the Belize dollar and the U.S. dollar is two to one), with no beer purchased, this would not have led to a change in net U.S. liabilities. This is just a swap of assets with no change in the current account.

The balance of payments pertains to flows. In Table 19.1 these are flows for the year 2017. Regarding stocks, we know that stocks and flows are related. For example, the net wealth of a country vis-à-vis the rest of the world at the end of a given year is equal to its net wealth at the end of the previous year plus its current-account balance during the year. In 2017 the net wealth of the United States vis-à-vis the rest of the world decreased by $466.2 billion—its current account deficit for 2017. It is important to realize that the *only* way a country's net wealth position can change is if its current account balance is nonzero. Simply switching one form of asset for another does not change a country's net wealth position. A country's net wealth position is simply the sum of all its past current account balances.

Prior to the mid-1970s, the United States had generally run current account surpluses, and thus its net wealth position was positive. It was a creditor nation. This began to turn around in the mid-1970s, and by the mid-1980s, the United States was running large current account deficits. Sometime during this period, the United States changed from having a positive net wealth position vis-à-vis the rest of the world to having a negative position. In other words, the United States changed from a creditor nation to a debtor nation. The current account deficits have persisted, and the United States is now the largest debtor nation in the world. At the end of 2017 foreign assets in the United States totaled $35.5 trillion and U.S. assets abroad totaled $27.6 trillion.[2] The U.S. net wealth position was thus −$7.9 trillion. This large negative position reflects the fact that the United States has spent much more since the 1970s on foreign goods and services (plus investment income and transfers paid) than it earned through the sales of its goods and services to the rest of the world (plus investment income and transfers received).

[2]Bureau of Economic Analysis, March 31, 2015.

ECONOMICS IN PRACTICE

Debtor and Creditor Nations

Since their independence, developing nations have been net recipients of foreign debt from developed nations to finance their development plans. Many of the poorest countries of the world are overwhelmed with debt burdens that they find difficult to manage. This has urged the International Monetary Fund (IMF) and the World Bank to start the Heavily Indebted Poor Countries (HIPC) Initiative in 1996. To help with economic and human development, the HIPC Initiative has extended $99 billion in the form of debt relief and low-interest loans to 37 very poor nations.

However, since the beginning of the twenty-first century, several industrial nations have become debtor nations instead of their previous role as suppliers of capital to developing nations. In response to a slowdown in the growth prospects of industrial nations, middle-income and emerging market economies have been acting as their net creditors, especially during the global financial crisis of 2008–2009. The United Nations reports that external debt levels of high-income countries are on average 2 to 3 times higher than in low and middle-income developing nations. As such, the net financial flows to developing countries turned negative between 2015 and 2017.

Since 2006, with this change in global capital flows, the IMF started building a database of the balance of payments figures of countries round the world. Among these are the Net International Investment Position (NIIP), which is defined as the difference between foreign assets that domestic residents own and liabilities. When external assets exceed liabilities, the NIIP is positive and when liabilities exceed assets it is negative. The United States is the largest debtor nation in the world, with a negative NIIP of €7,710.5 billion. For the same period, Japan recorded a positive NIIP of €2,829.1 billion.

The European Union (EU-28) reported a negative NIIP of nearly €500 billion in 2017, which equals almost 5 percent of GDP. Germany and the Netherlands are the major net creditor

economies in Europe, while Spain, Ireland, and France held higher positions in financial liabilities abroad than financial assets, making them net borrowers or debtors.[1]

Thus, the risks of debt sustainability have grown for a few developed countries as well as for some developing and emerging economies. The NIIP position is an important parameter to gauge a country's financial condition and creditworthiness. But instead of looking at absolute values, the NIIP's size has to be examined in relation to the economy's size (the ratio of NIIP to GDP).

CRITICAL THINKING

1. Visit the IMF database at www.data.imf.org. Examine the NIIP position of your country in relation to its GDP. Is your country a net debtor or creditor?

[1]European Central Bank (2018), "Euro Area Quarterly Balance of Payments and International Investment Position," January 11.

Equilibrium Output (Income) in an Open Economy

19.2 LEARNING OBJECTIVE

Discuss how equilibrium output is determined in an open economy, and describe the trade feedback effect and the price feedback effect.

Everything we have said so far has been descriptive. Now we turn to analysis. How are all these trade and capital flows determined? What impacts do they have on the economies of the countries involved? To simplify our discussion, we will assume that exchange rates are fixed. We will relax this assumption later.

The International Sector and Planned Aggregate Expenditure MyLab Economics Concept Check

The first change we will have to make to take into account the openness of the economy is in the calculation of the multiplier, one of the backbones of economic policy analysis. Our earlier calculations of the multiplier defined aggregate expenditure (*AE*) as consisting of the consumption of households (*C*), the planned investment of firms (*I*), and the spending of the government (*G*).

With an open economy, we must now include in aggregate expenditures the goods and services a country exports to the rest of the world, *EX*, and we will also have to make an adjustment

for what it imports, *IM*. Clearly *EX* should be included as part of total output and income. A U.S. razor sold to a buyer in Mexico is as much a part of U.S. production as a similar razor sold in Pittsburgh. Exports simply represent demand for domestic products not by domestic households and firms and the government, but by the rest of the world.

What about imports? Imports are *not a part of domestic output* (*Y*) because they are produced outside the home country. When we calculate households' total consumption spending, firms' total investment spending, and total government spending, imports are included. Therefore, to calculate domestic output correctly, we must subtract the parts of consumption, investment, and government spending that constitute imports. The definition of planned aggregate expenditure becomes:

Planned aggregate expenditure in an open economy:

$$AE \equiv C + I + G + EX - IM$$

net exports of goods and services (*EX* − *IM*) The difference between a country's total exports and total imports.

The last two terms ($EX - IM$) together are the country's **net exports of goods and services**.

Determining the Level of Imports What determines the level of imports and exports in a country? Clearly the level of imports is a function of income (*Y*). When U.S. income increases, U.S. citizens buy more of everything, including Japanese cars and Korean smartphones. When income rises, imports tend to go up. Algebraically,

$$IM = mY$$

where *Y* is income and *m* is some positive number. (*m* is assumed to be less than one; otherwise, a $1 increase in income generates an increase in imports of more than $1, which is unrealistic.) Recall from Chapter 8 that the marginal propensity to consume (*MPC*) measures the change in consumption that results from a $1 change in income. Similarly, the **marginal propensity to import**, abbreviated as *MPM* or *m*, is the change in imports caused by a $1 change in income. If $m = 0.2$, or 20 percent, and income is $1,000, then imports, *IM*, are equal to $0.2 \times \$1{,}000 = \$200$. If income rises by $100 to $1,100, the change in imports will equal $m \times$ (the change in income) $= 0.2 \times \$100 = \$20$.

marginal propensity to import (*MPM*) The change in imports caused by a $1 change in income.

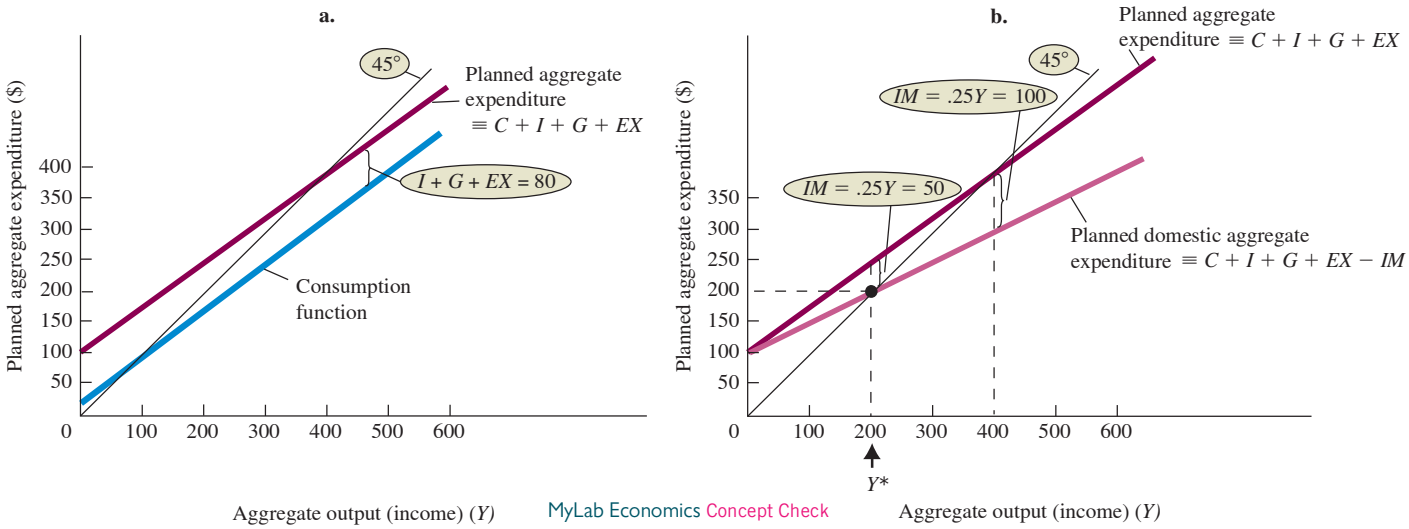
For now we will assume that exports (*EX*) are given (that is, they are not affected, even indirectly, by the state of the domestic economy.) This assumption is relaxed later in this chapter.

Solving for Equilibrium Given the assumption about how imports are determined, we can solve for equilibrium income. This procedure is illustrated in Figure 19.1. Starting from the consumption function (blue line) in Figure 19.1(a), we gradually build up the components of planned aggregate expenditure (red line). Assuming for simplicity that planned investment, government purchases, and exports are all constant and do not depend on income, we move easily from the blue line to the red line by adding the fixed amounts of *I*, *G*, and *EX* to consumption at every level of income. In this example, we take $I + G + EX$ to equal 80.

$C + I + G + EX$, however, includes spending on imports, which are not part of domestic production. To get spending on domestically produced goods, we must subtract the amount that is imported at each level of income. In Figure 19.1(b), we assume $m = 0.25$, so that 25 percent of total income is spent on goods and services produced in foreign countries. For example, at $Y = 200$, $IM = 0.25\,Y$, or 50. Similarly, at $Y = 400$, $IM = 0.25\,Y$, or 100. Figure 19.1(b) shows the planned *domestic* aggregate expenditure curve that nets out imports from expenditures.

Equilibrium is reached when planned domestic aggregate expenditure equals domestic aggregate output (income). This is true at only one level of aggregate output, $Y^* = 200$, in Figure 19.1(b). If *Y* were below *Y**, planned expenditure would exceed output, inventories would be lower than planned, and output would rise. At levels above *Y**, output would exceed planned expenditure, inventories would be larger than planned, and output would fall.

The Open-Economy Multiplier All of this has implications for the size of the multiplier. Recall the multiplier, introduced in Chapter 8, and consider a sustained rise in government purchases (*G*). Initially, the increase in *G* will cause planned aggregate expenditure to be greater than aggregate output. Domestic firms will find their inventories to be lower than planned and thus will increase



MyLab Economics Concept Check

▲ **FIGURE 19.1 Determining Equilibrium Output in an Open Economy**

In **a.**, planned investment spending (I), government spending (G), and total exports (EX) are added to consumption (C) to arrive at planned aggregate expenditure. However, $C + I + G + EX$ includes spending on imports. In **b.**, the amount imported at every level of income is subtracted from planned aggregate expenditure. Equilibrium output occurs at $Y^* = 200$, the point at which planned domestic aggregate expenditure crosses the 45-degree line.

their output, but added output means more income. More workers are hired, and profits are higher. Some of the added income is saved, and some is spent. The added consumption spending leads to a second round of inventories being lower than planned and raising output. Equilibrium output rises by a multiple of the initial increase in government purchases. This is the multiplier effect.

In Chapters 8 and 9, we showed that the simple multiplier equals $1/(1 - MPC)$, or $(1/MPS)$. That is, a sustained increase in government purchases equal to ΔG will lead to an increase in aggregate output (income) of $\Delta G\ [1/(1 - MPC)]$. If the MPC were 0.75 and government purchases rose by \$10 billion, equilibrium income would rise by $4 \times$ \$10 billion, or \$40 billion. The multiplier is $[1/(1 - 0.75)] = [1/025] = 4.0$.

In an open economy, some of the increase in income brought about by the increase in G is spent on imports instead of domestically produced goods and services. The part of income spent on imports does not increase domestic income (Y) because imports are produced by foreigners. To compute the multiplier, we need to know how much of the increased income is used to increase domestic consumption. (We are assuming all imports are consumption goods. In practice, some imports are investment goods and some are goods purchased by the government.) In other words, we need to know the marginal propensity to consume *domestically produced* goods. Domestic consumption is $C - IM$. So the marginal propensity to consume domestic goods is the marginal propensity to consume all goods (the MPC) minus the marginal propensity to import (the MPM). The marginal propensity to consume domestic goods is $(MPC - MPM)$. Consequently,

$$\text{open-economy multipler} = \frac{1}{1 - (MPC - MPM)}$$

If the MPC is 0.75 and the MPM is 0.25, then the multiplier is 1/0.5, or 2.0. This multiplier is smaller than the multiplier in which imports are not taken into account, which is 1/0.25, or 4.0. The effect of a sustained increase in government spending (or investment) on income—that is, the multiplier—is smaller in an open economy than in a closed economy. The reason: When government spending (or investment) increases and income and consumption rise, some of the extra consumption spending that results is on foreign products and not on domestically produced goods and services. In an open economy the impact of government spending on the domestic economy is less than it otherwise would be. At the same time, one country's government spending increases affects other countries. Fiscal policy in one country can affect the macroeconomy is its trading partners.

We see from this that taking imports into account reduces the multiplier. This effect is especially large in the case of small, open economies like the Caribbean nations in which much of what is consumed is imported. As we will see, in these countries, the government has very little independent control over fiscal policy.

Imports, Exports, and the Trade Feedback Effect MyLab Economics Concept Check

For simplicity, we have so far assumed that the level of imports depends only on income and that the level of exports is fixed. In reality, the amount of spending on imports also depends on factors other than income and exports are not fixed. We will now consider the more realistic picture.

The Determinants of Imports The same factors that affect households' consumption behavior and firms' investment behavior are likely to affect the demand for imports because some imported goods are consumption goods and some are investment goods. For example, anything that increases consumption spending is likely to increase the demand for imports. We saw in Chapters 8 and 9 that factors such as the after-tax real wage, after-tax nonlabor income, and interest rates affect consumption spending; thus, they should also affect spending on imports. Similarly, anything that increases investment spending is likely to increase the demand for imports. A decrease in interest rates, for example, should encourage spending on both domestically produced goods and foreign-produced goods.

There is one additional consideration in determining spending on imports: the *relative prices* of domestically produced and foreign-produced goods. If the prices of foreign goods fall relative to the prices of domestic goods, people will consume more foreign goods relative to domestic goods. When Japanese cars are inexpensive relative to U.S. cars, consumption of Japanese cars should be high and vice versa.

The Determinants of Exports We now relax our assumption that exports are fixed. The foreign demand for U.S. exports is identical to the foreign countries' imports from the United States. Germany imports goods, some of which are U.S.-produced. Total expenditure on imports in Germany is a function of the factors we just discussed except that the variables are German variables instead of U.S. variables. This is true for all other countries as well. The demand for U.S. exports thus depends on economic activity in the rest of the world—rest-of-the-world real wages, wealth, nonlabor income, interest rates, and so forth—as well as on the prices of U.S. goods relative to the prices of rest-of-the-world goods. When foreign output increases, U.S. exports tend to increase. In this way economic growth in the rest of the world stimulates the economy in the United States. U.S. exports also tend to increase when U.S. prices fall relative to foreign goods prices. With an open economy, countries are interdependent. U.S. exports also tend to increase when U.S. prices fall relative to foreign prices.

The Trade Feedback Effect We can now combine what we know about the demand for imports and the demand for exports to discuss the **trade feedback effect**. Suppose the United States finds its exports increasing, perhaps because the world suddenly decides it prefers U.S. computers to other computers. Rising exports will lead to an increase in U.S. output (income), which leads to an increase in U.S. imports. Here is where the trade feedback begins. U.S. imports are somebody else's exports. The extra import demand from the United States raises the exports of the rest of the world. When other countries' exports to the United States go up, their output and incomes also rise, in turn leading to an increase in the demand for imports from the rest of the world. Some of the extra imports demanded by the rest of the world come from the United States, so U.S. exports increase. The increase in U.S. exports stimulates U.S. economic activity even more, triggering a further increase in the U.S. demand for imports and so on. An increase in U.S. imports increases other countries' exports, which stimulates those countries' economies and increases their imports, which increases U.S. exports, and so on. This is the trade feedback effect. In other words, an increase in U.S. economic activity leads to a worldwide increase in economic activity, which then "feeds back" to the United States.

trade feedback effect
The tendency for an increase in the economic activity of one country to lead to a worldwide increase in economic activity, which then feeds back to that country.

Import and Export Prices and the Price Feedback Effect MyLab Economics Concept Check

We have talked about the price of imports, but we have not yet discussed the factors that influence import prices. The consideration of import prices is complicated because more than one currency is involved. When we talk about "the price of imports," do we mean the

price in dollars, in yen, or in euros? The same question holds for the price of exports because the exports of one country are the imports of another. When Mexico exports auto parts to the United States, Mexican manufacturers are interested in the price of auto parts in terms of pesos because pesos are what they use for transactions in Mexico. U.S. consumers are interested in the price of auto parts in dollars because dollars are what they use for transactions in the United States. The link between the two prices is the dollar/peso exchange rate.

Suppose Mexico is experiencing inflation and the price of radiators in pesos rises from 1,000 pesos to 1,200 pesos per radiator. If the dollar/peso exchange rate remains unchanged at, say, $0.10 per peso, Mexico's export price for radiators in terms of dollars will also rise from $100 to $120 per radiator. Because Mexico's exports to the United States are, by definition, U.S. imports from Mexico, an increase in the dollar prices of Mexican exports to the United States means an increase in the prices of U.S. imports from Mexico. Therefore, when Mexico's export prices rise with no change in the dollar/peso exchange rate, U.S. import prices rise. Export prices of other countries affect U.S. import prices.

A country's export prices tend to move fairly closely with the general price level in that country. If Mexico is experiencing a general increase in prices, this change likely will be reflected in price increases of all domestically produced goods, both exportable and nonexportable. The general rate of inflation abroad is likely to affect U.S. import prices. If the inflation rate abroad is high, U.S. import prices are likely to rise.

The Price Feedback Effect We have just seen that when a country experiences an increase in domestic prices, the prices of its exports will increase. It is also true that when the prices of a country's *imports* increase, the prices of domestic goods may increase in response. There are at least two ways this effect can occur.

First, an increase in the prices of imported inputs will increase the costs of firms which use these imports as inputs, causing a country's aggregate supply curve to shift to the left. Recall from Chapter 12 that a leftward shift in the aggregate supply curve resulting from a cost increase causes aggregate output to fall and prices to rise (stagflation).

Second, if import prices rise relative to domestic prices, households will tend to substitute domestically produced goods and services for imports. This is equivalent to a rightward shift of the aggregate demand curve. If the domestic economy is operating on the upward-sloping part of the aggregate supply curve, the overall domestic price level will rise in response to an increase in aggregate demand. Perfectly competitive firms will see market-determined prices rise, and imperfectly competitive firms will experience an increase in the demand for their products. Studies have shown, for example, that the price of automobiles produced in the United States moves closely with the price of imported cars.

Still, this is not the end of the story. Suppose a country—say, Mexico—experiences an increase in its domestic price level. This will increase the price of its exports to Canada (and to all other countries). The increase in the price of Canadian imports from Mexico will lead to an increase in domestic prices in Canada. Canada also exports to Mexico. The increase in Canadian prices causes an increase in the price of Canadian exports to Mexico, which then further increases the Mexican price level.

This is called the **price feedback effect**, in the sense that inflation is "exportable." An increase in the price level in one country can drive up prices in other countries, which in turn further increases the price level in the first country. Through export and import prices, a domestic price increase can "feed back" on itself.

price feedback effect
The process by which a domestic price increase in one country can "feed back" on itself through export and import prices. An increase in the price level in one country can drive up prices in other countries. This in turn further increases the price level in the first country.

It is important to realize that the discussion so far has been based on the assumption of fixed exchange rates. Life is more complicated under flexible exchange rates, to which we now turn.

The Open Economy with Flexible Exchange Rates

19.3 LEARNING OBJECTIVE

Discuss factors that affect exchange rates in an open economy with a floating system.

Exchange rates are a factor in determining the flow of international trade and the structure of those exchange rates thus matters. In practice, the structure of exchange rates has changed considerably over time, influenced in part by international agreements and events.

In the early part of the twentieth century, nearly all currencies were backed by gold. Their values were fixed in terms of a specific number of ounces of gold, which determined their values in international trading—exchange rates. In 1944, with the international monetary system in chaos as the end of World War II drew near, a large group of experts unofficially representing 44 countries met in Bretton Woods, New Hampshire, and drew up a number of agreements. One of those agreements established a system of essentially fixed exchange rates under which each country agreed to intervene by buying and selling currencies in the foreign exchange market when necessary to maintain the agreed-to value of its currency.

In 1971, most countries, including the United States, began to allow exchange rates to be flexible, determined essentially by supply and demand. Flexible exchange rates are known as **floating or market determined exchange rates**. Although there are considerable intricacies in the way flexible exchange rates operate, the logic is straightforward. If British goods are popular with U.S. consumers, there will be a large demand for British pounds by the U.S. customers for those goods. If the British don't like U.S. goods, few will demand U.S. dollars to buy those goods. Without government intervention in the marketplace, the price of British pounds in dollars would rise in this situation as those who want to exchange dollars for pounds (those who "demand" pounds) exceed those who want to exchange pounds for dollars (those who "supply" pounds). The exchange rate market thus reflects the markets for real goods in the various economies. Although governments still intervene to ensure that exchange rate movements are "orderly," exchange rates today are largely determined by the unregulated forces of supply and demand.

floating, *or* market-determined, exchange rates
Exchange rates that are determined by the unregulated forces of supply and demand.

Understanding how an economy interacts with the rest of the world when exchange rates are not fixed is not as simple as when we assume fixed exchange rates. Exchange rates determine the price of imported goods relative to domestic goods and can have significant effects on the level of imports and exports. Consider a 20 percent drop in the value of the dollar against the British pound. Dollars buy fewer pounds, and pounds buy more dollars. Both British residents, who now get more dollars for pounds, and U.S. residents, who get fewer pounds for dollars, find that U.S. goods and services are more attractive. Exchange rate movements have important impacts on imports, exports, and the movement of capital between countries.

The Market for Foreign Exchange MyLab Economics Concept Check

What determines exchange rates under a floating rate system? To explore this question, we assume that there are just two countries, the United States and Great Britain. It is easier to understand a world with only two countries, and most of the points we will make can be generalized to a world with many trading partners.

The Supply of and Demand for Pounds

Governments, private citizens, banks, and corporations exchange pounds for dollars and dollars for pounds every day. In our two-country case, those who *demand* pounds are holders of dollars seeking to exchange them for pounds to buy British goods, travel to Britain, or invest in British stocks and bonds. Those who *supply* pounds are holders of pounds seeking to exchange them for dollars to buy U.S. goods, visit or invest in the United States. The supply of dollars on the foreign exchange market is the number of dollars that holders seek to exchange for pounds in a given time period. The demand for and supply of dollars on foreign exchange markets determine e*xchange* rates.

In addition to buyers and sellers who exchange money to engage in transactions, some people and institutions hold currency balances for speculative reasons. If you think that the U.S. dollar is going to decline in value relative to the pound, you may want to hold some of your wealth in the form of pounds. Table 19.2 summarizes some of the major categories of private foreign exchange demanders and suppliers in the two-country case of the United States and Great Britain.

We can use a variant of supply and demand analysis to help us understand the exchange rate in currency markets. Figure 19.2 shows the demand curve for pounds in the foreign exchange market. On the vertical axis is the price of pounds, expressed in dollars per pound, and on the horizontal axis is the quantity of pounds. Thus, as we move down the vertical axis, the pound depreciates relative to the dollar—it takes fewer dollars to buy a pound. Suppose we start at a point at which it costs $2 to buy one pound and the price of a British good is one pound. To buy that good at the existing exchange rate would cost an American $2. Let us suppose at that exchange rate 100 units of the good are demanded, giving rise to a demand for 100 pounds in the currency market. Now let the pound depreciate, so that it costs only $1 to buy a pound. It seems likely that the British good

TABLE 19.2 Some Buyers and Sellers in International Exchange Markets: United States and Great Britain

The Demand for Pounds (Supply of Dollars)
1. Firms, households, or governments that import British goods into the United States or want to buy British-made goods and services
2. U.S. citizens traveling in Great Britain
3. Holders of dollars who want to buy British stocks, bonds, or other financial instruments
4. U.S. companies that want to invest in Great Britain
5. Speculators who anticipate a decline in the value of the dollar relative to the pound
The Supply of Pounds (Demand for Dollars)
1. Firms, households, or governments that import U.S. goods into Great Britain or want to buy U.S.-made goods and services
2. British citizens traveling in the United States
3. Holders of pounds who want to buy stocks, bonds, or other financial instruments in the United States
4. British companies that want to invest in the United States
5. Speculators who anticipate a rise in the value of the dollar relative to the pound

will look more attractive to Americans. With a fixed price in pounds for the good in question, Americans can buy that one pound good for only $1 rather than the original $2. Whereas people originally wanted 100 units of the good, with a dollar price much reduced they will likely want more than 100 units. To facilitate that transaction will thus require more than 100 pounds. The demand-for-pounds curve in the foreign exchange market thus has a negative slope.

What about the supply of pounds? Pounds are supplied by the British who want to buy U.S. goods. Figure 19.3 shows a supply curve for pounds in the foreign exchange market. As we move up the vertical axis, the dollar becomes cheaper; each pound translates into more dollars, making the price of U.S.-produced goods and services lower to the British. The British buy more U.S.-made goods when the price of pounds is high (the value of the dollar is low). If the demand for U.S. imports is elastic then that increase in British demand for U.S. goods and services increases the quantity of pounds supplied. The curve representing the supply of pounds in the foreign exchange market has a positive slope.

The key to understanding the supply and demand curves represented here is to recognize that the price on the vertical axis is the price of one currency relative to a second. As we go down the vertical axis in this case, the pound becomes less expensive relative to the dollar, or equivalently, the dollar becomes more expensive relative to the pound. Moving down the vertical axis to the origin, the low relative price of the pound induces demand for pounds by Americans

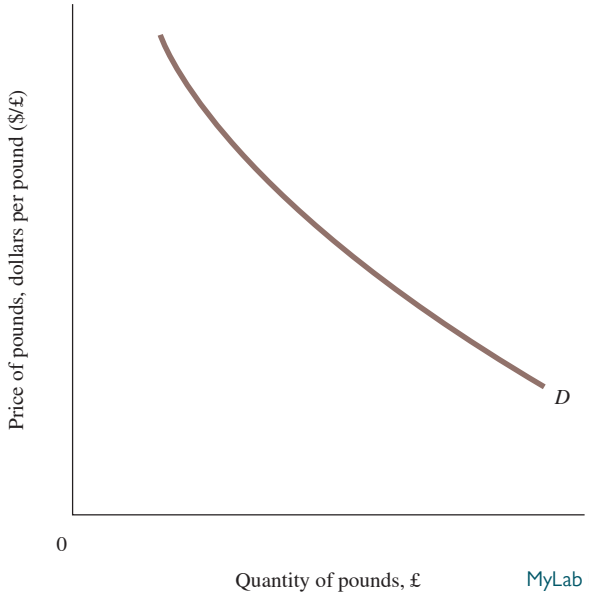


FIGURE 19.2
The Demand for Pounds in the Foreign Exchange Market
When the price of pounds falls, British-made goods and services appear less expensive to U.S. buyers. If British prices are constant, U.S. buyers will buy more British goods and services and the quantity of pounds demanded will rise.

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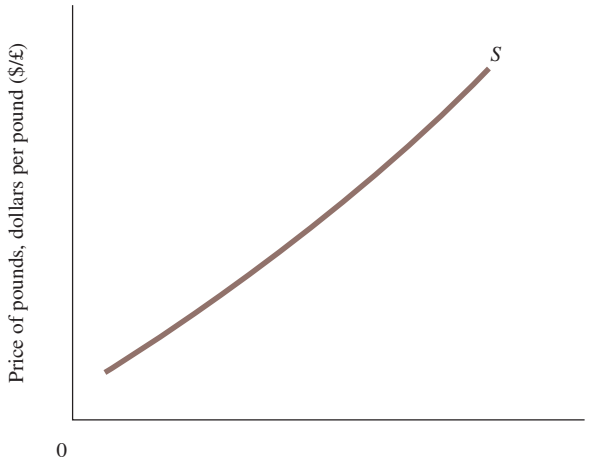
▸ FIGURE 19.3
The Supply of Pounds in the Foreign Exchange Market
When the price of pounds rises, the British can obtain more dollars for each pound. This means that U.S.-made goods and services appear less expensive to British buyers. Thus, the quantity of pounds supplied is likely to rise with the exchange rate.



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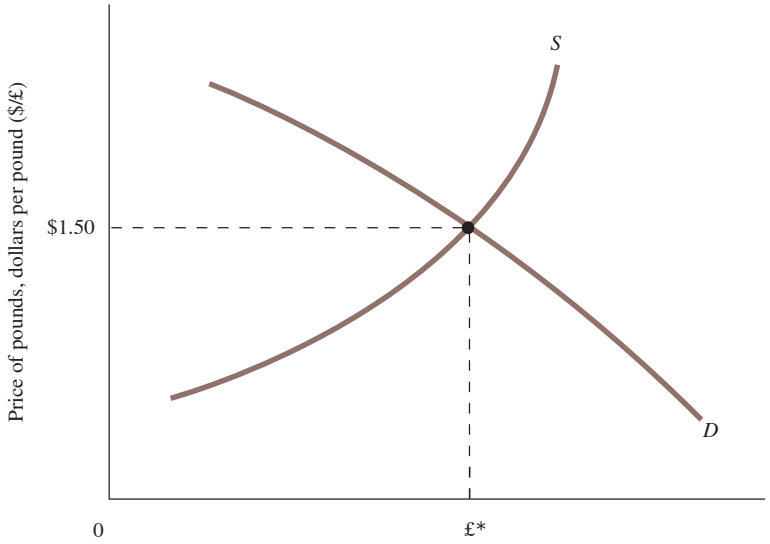
to buy British goods. At the same time, however, British buyers are less interested in the now expensive American goods, and fewer pounds are supplied.

appreciation of a currency The rise in the price of one currency relative to another.

depreciation of a currency The fall in the price of one currency relative to another.

The Equilibrium Exchange Rate When exchange rates are allowed to float, they are determined the same way other prices are determined: The equilibrium exchange rate occurs at the point at which the quantity demanded of a foreign currency equals the quantity of that currency supplied. This is illustrated in Figure 19.4. An excess demand for pounds (quantity demanded in excess of quantity supplied) will cause the price of pounds to rise—the pound will **appreciate** relative to the dollar. An excess supply of pounds will cause the price of pounds to fall—the pound will **depreciate** relative to the dollar.[3]

▸ FIGURE 19.4
The Equilibrium Exchange Rate
When exchange rates are allowed to float, they are determined by the forces of supply and demand. An excess demand for pounds will cause the pound to appreciate against the dollar. An excess supply of pounds will lead to a depreciating pound.



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[3]Although Figure 19.3 shows the supply-of-pounds curve in the foreign exchange market with a positive slope, under certain circumstances the curve may bend back. Suppose the price of a pound rises from $1.50 to $2.00. Consider a British importer who buys 10 Chevrolets each month at $15,000 each, including transportation costs. When a pound exchanges for $1.50, he will supply 100,000 pounds per month to the foreign exchange market—100,000 pounds brings $150,000, enough to buy 10 cars. Now suppose the cheaper dollar causes him to buy 12 cars. Twelve cars will cost a total of $180,000; but at $2 = 1 pound, he will spend only 90,000 pounds per month. The supply of pounds on the market falls when the price of pounds rises. The reason for this seeming paradox is simple. The number of pounds a British importer needs to buy U.S. goods depends on both the quantity of goods he buys and the price of those goods in pounds. If demand for imports is inelastic so that the percentage decrease in price resulting from the depreciated currency is greater than the percentage increase in the quantity of imports demanded, importers will spend fewer pounds and the quantity of pounds supplied in the foreign exchange market will fall. The supply of pounds will slope upward as long as the demand for U.S. imports is elastic.

Factors That Affect Exchange Rates MyLab Economics Concept Check

We now know enough to discuss the factors likely to influence exchange rates. Anything that changes the behavior of the people in Table 19.2 can cause demand and supply curves to shift and the exchange rate to adjust accordingly.

Purchasing Power Parity: The Law of One Price If the costs of transporting goods between two countries are small, we would expect the price of the same good in both countries to be roughly the same. The price of basketballs should be roughly the same in Canada and the United States, for example.

It is not hard to see why. If the price of basketballs is cheaper in Canada, it will benefit someone to buy balls in Canada at a low price and sell them in the United States at a higher price. This decreases the supply of basketballs in Canada and pushes up the price and increases the supply of balls in the United States, and pushes down the price. This process should continue as long as the price differential, and therefore the profit opportunity, persists. For a good with trivial transportation costs, we would expect this **law of one price** to hold. The price of a good should be the same regardless of where we buy it. Price differences across the two countries create arbitrage opportunities.

law of one price If the costs of transportation are small, the price of the same good in different countries should be roughly the same.

If the law of one price held for all goods and if each country consumed the same market basket of goods, the exchange rate between the two currencies would be determined simply by the relative price levels in the two countries. If the price of a basketball were $10 in the United States and $12 in Canada, the U.S.–Canada exchange rate would have to be $1 U.S. per $1.20 Canadian. If the exchange rate were instead one-to-one, it would be profitable for people to buy the balls in the United States and sell them in Canada. This would increase the demand for U.S. dollars in Canada, thereby driving up their price in terms of Canadian dollars to $1 U.S. per $1.2 Canadian, at which point no one could make a profit shipping basketballs across international lines and the process would cease.[4]

The theory that exchange rates will adjust so that the price of similar goods in different countries is the same is known as the **purchasing-power-parity theory**. According to this theory, if it takes 10 times as many Mexican pesos to buy a pound of salt in Mexico as it takes U.S. dollars to buy a pound of salt in the United States, the equilibrium exchange rate should be 10 pesos per dollar.

purchasing-power-parity theory A theory of international exchange holding that exchange rates are set so that the price of similar goods in different countries is the same.

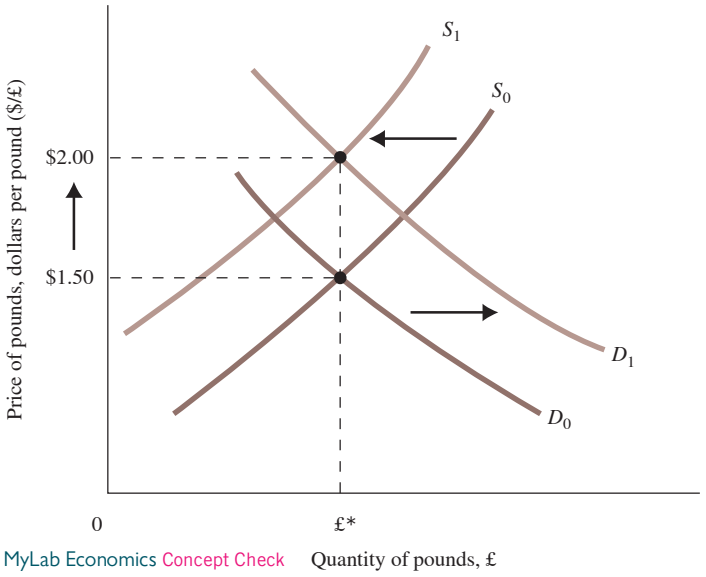
In practice, transportation costs for many goods are quite large and the law of one price does not hold for these goods. (Haircuts are often cited as a good example. The transportation costs for a U.S. resident to get a British haircut are indeed large unless that person is an airline pilot.) Also, many products that are potential substitutes for each other are not precisely identical. For instance, a Rolls Royce and a Honda are both cars, but there is no reason to expect the exchange rate between the British pound and the yen to be set so that the prices of the two are equalized. In addition, countries consume different market baskets of goods, so we would not expect the aggregate price levels to follow the law of one price. Nevertheless, a high rate of inflation in one country relative to another puts pressure on the exchange rate between the two countries, and there is a general tendency for the currencies of relatively high-inflation countries to depreciate.

Figure 19.5 shows the adjustment likely to occur following an increase in the U.S. price level relative to the price level in Great Britain. This change in relative prices will affect citizens of both countries. Higher prices in the United States make imports relatively less expensive. U.S. citizens are likely to increase their spending on imports from Britain, shifting the demand for pounds to the right, from D_0 to D_1. At the same time, the British see U.S. goods getting more expensive and reduce their demand for exports from the United States. Consequently, the supply of pounds shifts to the left, from S_0 to S_1. The result is an increase in the price of pounds. Before the change in relative prices, one pound sold for $1.50; after the change, one pound costs $2.00. The pound appreciates, and the dollar depreciates.

Relative Interest Rates Another factor that influences a country's exchange rate is the level of its interest rate relative to other countries' interest rates. If the interest rate is 2 percent in

[4]Of course, if the rate were $1 U.S. to $2 Canadian, it would benefit people to buy basketballs in Canada (at $12 Canadian, which is $6 U.S.) and sell them in the United States. This would weaken demand for the U.S. dollar, and its price would fall from $2 Canadian until it reached $1.20 Canadian.

FIGURE 19.5
Exchange Rates Respond to Changes in Relative Prices
The higher price level in the United States makes imports relatively less expensive. U.S. citizens are likely to increase their spending on imports from Britain, shifting the demand for pounds to the right, from D_0 to D_1. At the same time, the British see U.S. goods getting more expensive and reduce their demand for exports from the United States. The supply of pounds shifts to the left, from S_0 to S_1. The result is an increase in the price of pounds. The pound appreciates, and the dollar is worth less.



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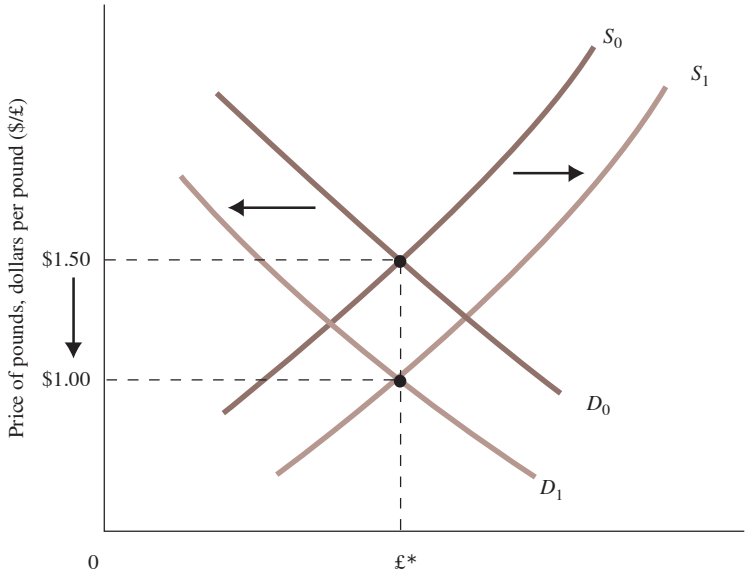
the United States and 3 percent in Great Britain, people with money to lend have an incentive to buy British securities instead of U.S. securities. Although it is sometimes difficult for individuals in one country to buy securities in another country, it is easy for international banks and investment companies to do so. If the interest rate is lower in the United States than in Britain, there will be a movement of funds out of U.S. securities into British securities as banks and firms move their funds to the higher-yielding securities.

How does a U.S. bank buy British securities? It takes its dollars, buys British pounds, and uses the pounds to buy the British securities. The bank's purchase of pounds drives up the price of pounds in the foreign exchange market. The increased demand for pounds increases the price of the pound (and decreases the price of the dollar). A high interest rate in Britain relative to the interest rate in the United States tends to depreciate the dollar.

Figure 19.6 shows the effect of rising interest rates in the United States on the dollar-to-pound exchange rate. Higher interest rates in the United States attract British investors. To buy U.S. securities, the British need dollars. The supply of pounds (the demand for dollars) shifts to the right, from S_0 to S_1. The same relative interest rates affect the portfolio choices of U.S. banks, firms, and households. With higher interest rates at home, there is less incentive for U.S. residents to

FIGURE 19.6
Exchange Rates Respond to Changes in Relative Interest Rates
If U.S. interest rates rise relative to British interest rates, British citizens holding pounds may be attracted into the U.S. securities market. To buy bonds in the United States, British buyers must exchange pounds for dollars. The supply of pounds shifts to the right, from S_0 to S_1. At the same time, U.S. citizens are less likely to be interested in British securities because interest rates are higher at home. The demand for pounds shifts to the left, from D_0 to D_1. The result is the pound depreciates vis-a-vis the dollar and the dollar (naturally) appreciates vis-a-vis the pound.



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buy British securities. The demand for pounds drops at the same time the supply increases and the demand curve shifts to the left, from D_0 to D_1. The net result is a depreciating pound and an appreciating dollar. The price of pounds falls from $1.50 to $1.00.

The Effects of Exchange Rates on the Economy MyLab Economics Concept Check

We are now ready to discuss some of the implications of floating exchange rates. Recall, when exchange rates are fixed, households spend some of their incomes on imports and the multiplier is smaller than it would be otherwise. Imports are a "leakage" from the circular flow, much like taxes and saving. Exports, in contrast, are an "injection" into the circular flow; they represent spending on U.S.-produced goods and services from abroad and can stimulate output.

Exchange Rate Effects on Imports, Exports, and Real GDP As we already know, when a country's currency depreciates (falls in value), its import prices rise and its export prices (in foreign currencies) fall. When the U.S. dollar is cheap, U.S. products are more competitive with products produced in the rest of the world and foreign-made goods look expensive to U.S. citizens.

A depreciation of a country's currency can thus serve as a stimulus to the economy. Suppose the U.S. dollar depreciates relative to the other major currencies, as it did sharply between 1985 and 1988 and again, more moderately from 2002 to 2008 and 2012 to 2013. If foreign buyers increase their spending on U.S. goods, and domestic buyers substitute U.S.-made goods for imports, aggregate expenditure on domestic output will rise, inventories will fall, and real GDP (Y) will increase. A depreciation of a country's currency is likely to increase its GDP.[5]

Exchange Rates and the Balance of Trade: The J Curve A depreciating currency tends to increase exports and decrease imports, so you might think that it also will reduce a country's trade deficit. In fact, the effect of depreciation on the balance of trade is ambiguous.

Many economists believe that when a currency starts to depreciate, the balance of trade is likely to worsen for the first few quarters (perhaps three to six). After that, the balance of trade may improve. This effect is graphed in Figure 19.7. The curve in this figure resembles the letter *J*, and the movement in the balance of trade that it describes is sometimes called the **J-curve effect**. The point of the *J* shape is that the balance of trade gets worse before it gets better following a currency depreciation.

J-curve effect Following a currency depreciation, a country's balance of trade may get worse before it gets better. The graph showing this effect is shaped like the letter *J*, hence the name J-curve effect.

How does the J curve come about? Recall from Table 19.1 that the balance of trade is equal to export revenue minus import costs, including exports and imports of services:

$$\begin{aligned}\text{balance of trade} = {} & \text{dollar price of exports} \times \text{quantity of exports} \\ & - \text{dollar price of imports} \times \text{quantity of imports}\end{aligned}$$

A currency depreciation affects the items on the right side of this equation as follows: First, the quantity of exports increases and the quantity of imports decreases; both have a *positive* effect on the balance of trade (lowering the trade deficit or raising the trade surplus). Second, the dollar price of exports is not likely to change very much, at least not initially. The dollar price of exports changes when the U.S. price level changes, but the initial effect of a depreciation on the domestic price level is not likely to be large. Third, the dollar price of imports increases. Imports into the United States are more expensive because $1 U.S. buys fewer yen, euros, and so on, than before. An increase in the dollar price of imports has a *negative* effect on the balance of trade.

The following is an example to clarify this last point: The dollar price of a Japanese car that costs 1,200,000 yen rises from $10,000 to $12,000 when the exchange rate moves from

[5]For this reason, some countries are tempted at times to intervene in foreign exchange markets, depreciate their currencies, and stimulate their economies. If all countries attempted to lower the value of their currencies simultaneously, there would be no gain in income for any of them. Although the exchange rate system at the time was different, such a situation actually occurred during the early years of the Great Depression. Many countries practiced so-called *beggar-thy-neighbor* policies of competitive devaluations in a desperate attempt to maintain export sales and employment.

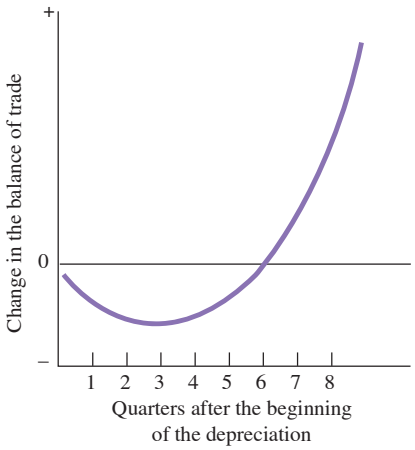

FIGURE 19.7
The Effect of a Depreciation on the Balance of Trade (the J Curve)
Initially, a depreciation of a country's currency may worsen its balance of trade. The negative effect on the price of imports may initially dominate the positive effects of an increase in exports and a decrease in imports.

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120 yen per dollar to 100 yen per dollar. After the currency depreciation, the United States ends up spending more (in dollars) for the Japanese car than it did before. Of course, the United States will end up buying fewer Japanese cars than it did before. Does the number of cars drop enough so that the quantity effect is bigger than the price effect or vice versa? Does the value of imports increase or decrease?

The net effect of a depreciation on the balance of trade could go either way. The depreciation stimulates exports and cuts back imports, but it also increases the dollar price of imports. It seems that the negative effect dominates initially. The impact of a depreciation on the price of imports is generally felt quickly, while it takes time for export and import quantities to respond to price changes. In the short run, the value of imports increases more than the value of exports, so the balance of trade worsens. The initial effect is likely to be negative, but after exports and imports have had time to respond, the net effect turns positive. The more elastic the demand for exports and imports is, the larger the eventual improvement in the balance of trade will be.

Exchange Rates and Prices The depreciation of a country's currency tends to increase its price level. There are two reasons for this effect. First, when a country's currency is less expensive, its products are more competitive on world markets, so exports rise. In addition, domestic buyers tend to substitute domestic products for the now-more-expensive imports. This means that planned aggregate expenditure on domestically produced goods and services rises and that the aggregate demand curve shifts to the right. The result is a higher price level, a higher output, or both. (You may want to draw an *AS*/*AD* diagram to verify this outcome.) If the economy is close to capacity, the result is likely to be higher prices. Second, a depreciation makes imported inputs more expensive. If costs increase, the aggregate supply curve shifts to the left. If aggregate demand remains unchanged, the result is an increase in the price level.

Monetary Policy with Flexible Exchange Rates Let us now put everything in this chapter together and consider what happens when monetary policy is used first to stimulate the economy and then to contract the economy in an open economy with flexible exchange rates.

Suppose the economy is below full employment and the Federal Reserve (Fed) lowers the interest rate. The lower interest rate stimulates planned investment spending and consumption spending. Output thus increases, but there are additional effects: (1) The lower interest rate has an impact in the foreign exchange market. A lower interest rate means a lower demand for U.S. securities by foreigners, so the demand for dollars drops. (2) U.S. investment managers will be more likely to buy foreign securities (which are now paying relatively higher interest rates), so the supply of dollars rises. Both events push down the value of the dollar. A cheaper dollar is a good thing if the goal of the Fed is to stimulate the domestic economy because a cheaper dollar means more U.S. exports and fewer imports. If consumers substitute U.S.-made goods for imports, both the added exports and the decrease in imports mean more spending on domestic products, so the multiplier actually increases. Flexible exchange rates thus help the Fed in its goal to stimulate the economy.

Now suppose inflation is a problem and the Fed raises the interest rate. Here again, floating exchange rates help. The higher interest rate lowers planned investment and consumption

spending, reducing output and lowering the price level. The higher interest rate also attracts foreign buyers into U.S. financial markets, driving up the value of the dollar, which reduces the price of imports. The reduction in the price of imports causes a shift of the aggregate supply curve to the right, which helps fight inflation, which is what the Fed wants to do. Flexible exchange rates thus help the Fed in its goal to fight inflation.

Fiscal Policy with Flexible Exchange Rates Although we have just seen that flexible exchange rates help the Fed achieve its goals, the opposite is the case for the fiscal authorities in normal times when there is no zero lower interest rate bound and the Fed is following the Fed rule. Say that the administration and Congress want to stimulate the economy, and they increase government spending to do this. This increases output in the usual way (shift of the *AD* curve to the right). This usual way means that the interest rate is also higher (from the Fed rule because output and the price level are higher). The higher interest rate attracts foreign investment and leads to an appreciation of the dollar. An appreciation, other things being equal, increases imports and decreases exports, which has a negative effect on output. The increase in output is thus less than it would have been had there been no appreciation. The appreciation also leads to a decrease in import prices, which shifts the *AS* curve to the right, thus decreasing the price level, other things being equal. Although the price level is lower than otherwise, output, which was the main target of the administration's policy in our example, is lower, all else equal. Flexible exchange rates thus makes the task of the fiscal authorities in their goal to stimulate the economy more difficult.

Flexible exchange rates also hurt the fiscal authorities if they want to contract the economy to fight inflation. Suppose we decrease government spending to try to reduce inflation. This shifts the *AD* curve to the left, which decreases output and the price level. The interest rate is also lower (from the Fed rule because output and the price level are lower), which leads to a depreciation of the dollar. The depreciation, other things being equal, decreases imports and increases exports, which has a positive effect on output. However, the depreciation also leads to an increase in import prices, which shifts the *AS* curve to the left, thus increasing the price level, other things being equal. Although output is higher than otherwise, inflation, which was our target, is higher than it would have been in a closed economy other things being equal. So flexible exchange rates also hurt the fiscal authorities in their goal to fight inflation.

Note that the appreciation or depreciation of the currency occurs because of the Fed rule. If the Fed does not change the interest rate in response to the fiscal policy change, either because there is a zero lower bound or because it just doesn't want to, there is no appreciation or depreciation and thus no offset to what the fiscal authorities are trying to do from the existence of flexible exchange rates.

Monetary Policy with Fixed Exchange Rates Although most major countries in the world today have a flexible exchange rate (counting for this purpose the eurozone countries as one country), it is interesting to ask what role monetary policy can play when a country has a fixed exchange rate. The answer is, no role.

Suppose a country fixes or "pegs" its exchange rate to the value of the dollar? In fact a number of countries do this, including countries like Hong Kong and Singapore, who are heavily reliant on their financial sectors. When a country decides to peg its exchange rate to another currency, say the U.S. dollar, it gives up its power to change its interest rate. Why? Consider a monetary authority of a pegged country that wants to lower its interest rate to stimulate the economy. The problem is that with its interest rate lower than rates abroad, people in the country will be induced to move their capital abroad to earn the higher interest rates. In other words, there will be an outflow of capital. Normally, this outflow would cause the country's currency to depreciate, but with a pegged rate, this won't happen. To keep the exchange rate from depreciating, the country's monetary authority will be forced to buy the domestic currency outflow by selling its foreign reserves. Eventually the monetary authority will run out of foreign reserves and thus be unable to support the pegged exchange rate. It is thus not feasible for the country to change its interest rate and keep its exchange rate unchanged. A commitment to peg is thus a commitment to give up one's independent monetary policy.

When the various European countries moved in 1999 to a common currency, the euro, each country gave up its monetary policy. Monetary policy is decided for all of the eurozone

countries by the European Central Bank (ECB). The Bank of Italy, for example, no longer has any influence over Italian interest rates. Interest rates are influenced by the ECB. This is the price Italy paid for giving up the lira. The one case in which a country can change its interest rate and keep its exchange rate fixed is if it imposes capital controls. Imposing capital controls means that the country limits or prevents people from buying or selling its currency in the foreign exchange markets. A citizen of the country may be prevented, for example, from using the country's currency to buy dollars. The problem with capital controls is that they are hard to enforce, especially for large countries and for long periods of time.

An Interdependent World Economy

The increasing interdependence of countries in the world economy has made the problems facing policymakers more difficult. We used to be able to think of the United States as a relatively self-sufficient region. Forty years ago economic events outside U.S. borders had relatively little effect on its economy. This situation is no longer true. The events of the past four decades have taught us that the performance of the U.S. economy is heavily dependent on events outside U.S. borders.

This chapter and the previous chapter have provided only the bare bones of open-economy macroeconomics. If you continue your study of economics, more will be added to the basic story we have presented. The next chapter concludes with a discussion of the problems of developing countries.

SUMMARY

1. The main difference between an international transaction and a domestic transaction concerns currency exchange: When people in different countries buy from and sell to each other, an exchange of currencies must also take place.
2. The *exchange rate* is the price of one country's currency in terms of another country's currency.

19.1 THE BALANCE OF PAYMENTS *p. 386*

3. *Foreign exchange* is all currencies other than the domestic currency of a given country. The record of a nation's transactions in goods, services, and assets with the rest of the world is its *balance of payments*. The balance of payments is also the record of a country's sources (supply) and uses (demand) of foreign exchange.

19.2 EQUILIBRIUM OUTPUT (INCOME) IN AN OPEN ECONOMY *p. 389*

4. In an open economy, some income is spent on foreign produced goods instead of domestically produced goods. To measure planned domestic aggregate expenditure in an open economy, we add total exports but subtract total imports: $C + I + G + EX - IM$. The open economy is in equilibrium when domestic aggregate output (income) (Y) equals planned domestic aggregate expenditure.
5. In an open economy, the multiplier equals

$$1/[1 - (MPC - MPM)],$$

where MPC is the marginal propensity to consume and MPM is the marginal propensity to import. The *marginal propensity to import* is the change in imports caused by a $1 change in income.

6. In addition to income, other factors that affect the level of imports are the after-tax real wage rate, after-tax nonlabor income, interest rates, and relative prices of domestically produced and foreign-produced goods. The demand for exports is determined by economic activity in the rest of the world and by relative prices.
7. An increase in U.S. economic activity leads to a worldwide increase in economic activity, which then "feeds back" to the United States. An increase in U.S. imports increases other countries' exports, which stimulates economies and increases their imports, which increases U.S. exports, which stimulates the U.S. economy and increases its imports, and so on. This is the *trade feedback effect*.
8. Export prices of other countries affect U.S. import prices. The general rate of inflation abroad is likely to affect U.S. import prices. If the inflation rate abroad is high, U.S. import prices are likely to rise.
9. One country's exports are another country's imports, thus an increase in export prices increases other countries' import prices. An increase in other countries' import prices leads to an increase in their domestic prices—and their export prices. In short, export prices affect import prices and vice versa. This *price feedback effect* shows that inflation is "exportable"; an increase in the price level in one country can drive up prices in other countries, making inflation in the first country worse.

19.3 THE OPEN ECONOMY WITH FLEXIBLE EXCHANGE RATES *p. 393*

10. The equilibrium exchange rate occurs when the quantity demanded of a foreign currency in the foreign exchange market equals the quantity of that currency supplied in the foreign exchange market.
11. *Depreciation of a currency* occurs when a nation's currency falls in value relative to another country's currency. *Appreciation of a currency* occurs when a nation's currency rises in value relative to another country's currency.
12. According to the *law of one price*, if the costs of transportation are small, the price of the same good in different countries should be roughly the same. The theory that exchange rates are set so that the price of similar goods in different countries is the same is known as the *purchasing-power-parity* theory. In practice, transportation costs are significant for many goods, and the law of one price does not hold for these goods.
13. A high rate of inflation in one country relative to another country puts pressure on the exchange rate between the two countries. There is a general tendency for the currencies of relatively high-inflation countries to depreciate.
14. A depreciation of the dollar tends to increase U.S. GDP by making U.S. exports cheaper (hence, more competitive abroad) and by making U.S. imports more expensive (encouraging consumers to switch to domestically produced goods and services).
15. The effect of a depreciation of a nation's currency on its balance of trade is unclear. In the short run, a currency depreciation may increase the balance-of-trade deficit because it raises the price of imports. Although this price increase causes a decrease in the quantity of imports demanded, the impact of a depreciation on the price of imports is generally felt quickly, but it takes time for export and import quantities to respond to price changes. The initial effect is likely to be negative, but after exports and imports have had time to respond, the net effect turns positive. The tendency for the balance-of-trade deficit to widen and then to decrease as the result of a currency depreciation is known as the *J-curve effect*.
16. The depreciation of a country's currency tends to raise its price level for two reasons. First, a currency depreciation increases planned aggregate expenditure, an effect that shifts the aggregate demand curve to the right. If the economy is close to capacity, the result is likely to be higher prices. Second, a depreciation makes imported inputs more expensive. If costs increase, the aggregate supply curve shifts to the left. If aggregate demand remains unchanged, the result is an increase in the price level.
17. When exchange rates are flexible, a U.S. expansionary monetary policy decreases the interest rate and stimulates planned investment and consumption spending. The lower interest rate leads to a lower demand for U.S. securities by foreigners and a higher demand for foreign securities by U.S. investment-fund managers. As a result, the dollar depreciates. A U.S. contractionary monetary policy appreciates the dollar.
18. Flexible exchange rates do not always work to the advantage of policy makers. An expansionary fiscal policy can appreciate the dollar and work to reduce the multiplier.

REVIEW TERMS AND CONCEPTS

appreciation of a currency, *p. 396*
balance of payments, *p. 386*
balance of trade, *p. 387*
balance on current account, *p. 387*
depreciation of a currency, *p. 396*
exchange rate, *p. 386*
floating, *or* market-determined, exchange rates, *p. 394*
foreign exchange, *p. 386*
J-curve effect, *p. 399*
law of one price, *p. 397*
marginal propensity to import (*MPM*), *p. 390*
net exports of goods and services ($EX - IM$), *p. 390*
price feedback effect, *p. 393*
purchasing-power-parity theory, *p. 397*
trade deficit, *p. 387*
trade feedback effect, *p. 392*

Equations:

Planned aggregate expenditure in an open economy:
$AE \equiv C + I + G + EX - IM$, *p. 390*
Open-economy multiplier $= \frac{1}{1 - (MPC - MPM)}$, *p. 391*

PROBLEMS

All problems are available on MyLab Economics.

19.1 THE BALANCE OF PAYMENTS

LEARNING OBJECTIVE: Explain how the balance of payments is calculated.

1.1 Obtain a recent issue of *The Economist*. Turn to the section titled "Economic and financial indicators." Look at the table titled "Trade, exchange rates, budget balances, and interest rates." Which country had the largest trade deficit over the last year and during the last month? Which country had the largest trade surplus over the last year and during the last month? How does the current account deficit/surplus compare to the overall trade balance? How can you explain the difference?

1.2 What effect will each of the following events have on the current account balance if the exchange rate is fixed? If the exchange rate is floating?

a. The Indian government raises taxes and income falls.
b. The Chinese inflation rate increases, and prices in China rise faster than those in countries with which China trades.

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c. India adopts a contractionary monetary policy. Interest rates rise (and are now higher than those in other countries) and income falls.

d. The textile companies' "Buy Japanese" campaign is successful, and Japanese consumers switch from purchasing imported products to buying products made in Japan.

1.3 **[Related to the *Economics in Practice* on p. 389]** The United States is the second largest oil importer in the world, importing 7.2 million barrels of crude oil per day as in April 2015. Go to www.inflationdata.com and look up crude oil prices for the past five years; then go to www.bea.gov to look up the U.S. net international investment position (NIIP) for the past five years. Does there appear to be a relationship between the price of crude oil and U.S. NIIP? Briefly explain the result of your findings.

19.2 EQUILIBRIUM OUTPUT (INCOME) IN AN OPEN ECONOMY

LEARNING OBJECTIVE: Discuss how equilibrium output is determined in an open economy, and describe the trade feedback effect and the price feedback effect.

2.1 The exchange rate between the U.S. dollar and the euro is floating freely—both governments do not intervene in the market for each currency. Suppose the president of the United States decides to place tariffs on certain imports from Europe. He has also argued in many places that the dollar is too strong vis-á-vis other currencies and it should be weakened so that the United States regains some of its competitive advantage.

a. How will consumption change in the United States?

b. What will happen if the income rises in the United States?

c. How will a decline in the export of European goods impact the dollar-euro exchange rate?

d. Consider the effects of a tariff on European imports. How will the European Union respond to U.S. tariffs?

2.2 You are given the following model that describes the economy of Hypothetica.

(1) Consumption function: $C = 80 + 0.75Y_d$
(2) Planned investment: $I = 49$
(3) Government spending: $G = 60$
(4) Exports: $EX = 20$
(5) Imports: $IM = 0.05Y_d$
(6) Disposable income: $Y_d = Y - T$
(7) Taxes: $T = 20$
(8) Planned aggregate expenditure:

$$AE = C = I + G + EX - IM$$

(9) Definition of equilibrium income: $Y = AE$

a. What is equilibrium income in Hypothetica? What is the government deficit? What is the current account balance?

b. If government spending is increased to $G = 75$, what happens to equilibrium income? Explain using the government spending multiplier. What happens to imports?

c. Now suppose the amount of imports is limited to $IM = 25$ by a quota on imports. If government spending is again increased from 60 to 75, what happens to equilibrium income? Explain why the same increase in G has a bigger effect on income in the second case. What is it about the presence of imports that changes the value of the multiplier?

d. If exports are fixed at $EX = 20$, what must income be to ensure a current account balance of zero? (*Hint:* Imports depend on income, so what must income be for imports to be equal to exports?) By how much must we cut government spending to balance the current account? (*Hint:* Use your answer to the first part of this question to determine how much of a decrease in income is needed. Then use the multiplier to calculate the decrease in G needed to reduce income by that amount.)

19.3 THE OPEN ECONOMY WITH FLEXIBLE EXCHANGE RATES

LEARNING OBJECTIVE: Discuss factors that affect exchange rates in an open economy with a floating system.

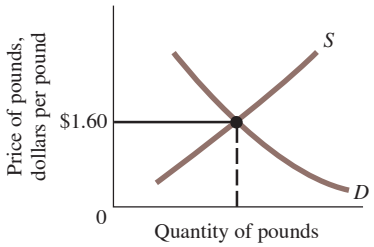
3.1 On January 3, 2014, the euro was trading at $1.36658, while on August 20, 2018, the euro was worth $1.15. What reasons can you give for the dollar strengthening vis-á-vis the euro?

3.2 Suppose the following graph shows what prevailed on the foreign exchange market in 2018 with floating exchange rates.

a. Name three phenomena that might shift the demand curve to the right.

b. Which, if any, of these three phenomena might cause a simultaneous shift of the supply curve to the left?

c. What effects might each of the three phenomena have on the balance of trade if the exchange rate floats?



3.3 Suppose the exchange rate between the Danish krone and the U.S. dollar is 7 *DKK* = $1 and the exchange rate between the Chilean peso and the U.S. dollar is 650 *CLP* = $1.

a. Express both of these exchange rates in terms of dollars per unit of the foreign currency.

b. What should the exchange rate be between the Danish krone and the Chilean peso? Express the exchange rate in terms of one krone and in terms of one peso.

c. Suppose the exchange rate between the krone and the dollar changes to 5 DKK = $1 and the exchange rate between the peso and the dollar changes to 700 CLP = $1. For each of the three currencies, explain whether the currency has appreciated or depreciated against the other two currencies.

3.4 Suppose the exchange rate between the British pound and the U.S. dollar is £1 = $1.50.

a. Draw a graph showing the demand and supply of pounds for dollars.

b. If the Bank of England implements a contractionary monetary policy, explain what will happen to the exchange rate between the pound and the dollar and show this on a graph. Has the dollar appreciated or depreciated relative to the pound? Explain.

c. If the U.S. government implements an expansionary fiscal policy, explain what will happen to the exchange rate between the pound and the dollar and show this on a graph. Has the dollar appreciated or depreciated relative to the pound? Explain.

3.5 Canada is the second-largest trading partner for the United States (just recently surpassed by China). In 2017, U.S. exports to Canada were more than $340 billion and imports from Canada totaled more than $332 billion. On January 1, 2017, the exchange rate between the Canadian dollar and the U.S. dollar was 1.34 Canadian dollars = 1 U.S. dollar. On January 1, 2018, the exchange rate was 1.26 Canadian dollars = 1 U.S. dollar. Explain how this change in exchange rates could impact U.S. consumers and firms?

3.6 The exchange rate between the U.S. dollar and the British pound is a floating rate, with no government intervention. If a large trade deficit with Great Britain prompts the United States to impose quotas on certain British imports, resulting in a reduction in the quantity of these imports, what will happen to the dollar–pound exchange rate? Why? (*Hint:* There is an excess supply of pounds, or an excess demand for dollars.) What effects will the change in the value of each currency have on employment and output in the United States? What about the balance of trade? (Ignore complications such as the J curve.)

3.7 Do an Internet search and look up historical exchange rates. Find the recent exchange rates between the Indian rupee and the Chinese yuan and between the U.S. dollar and the Emirati dirham. Compare them with exchange rates a year ago. Go to the website of Ministry of Commerce and Industry, India, to find the latest value of Indian exports, imports, and trade balance and compare with estimates of the previous year. Did these values increase or decrease during that year? Explain how changes in the exchange rates may have had an impact on the changes in Indian exports, imports, and the trade balance. Discuss if you witness any deviation from the theories studied.

3.8 The data in the following table represents price level changes and interest rate changes over a one-year period for three countries: Astoria, Borgia, and Calistoga. Based on the data, explain what is likely to happen to the exchange rate for Astorian asters relative to the other two countries' currencies over that one-year period. Use supply and demand graphs to support your answer, with prices listed as asters per borg and asters per cali, and quantities representing borgs and calis.

Country/ Currency	Price Index January 1, 2018	Price Index January 1, 2019	Interest Rate January 1, 2018	Interest Rate January 1, 2019
Astoria/aster	100	110	4 percent	6 percent
Borgia/borg	120	132	4 percent	8 percent
Calistoga/cali	150	168	4 percent	6 percent

CRITICAL THINKING QUESTIONS

QUESTION 1 Tania is a Costa Rican graduate student at the University of Florida. She earns a small salary as a graduate student, and she sends a portion of that income to her family in Costa Rica as a remittance. Would this transfer appear as a positive or negative entry in the U.S. Current Account? And in the Costa Rican Current Account?

QUESTION 2 During 2015 and 2016, the Mexican Peso depreciated substantially in value, and many Mexican commentators lamented a tragic occurrence and blamed then-President Enrique Peña Nieto. Why might this depreciation of the Mexican Peso have been a good thing?

CHAPTER 19 APPENDIX: World Monetary Systems since 1900

Since the beginning of the twentieth century, the world has operated under a number of different monetary systems. This Appendix provides a brief history of each and a description of how they worked.

LEARNING OBJECTIVE

Explain what the Bretton Woods system is.

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The Gold Standard MyLab Economics Concept Check

The gold standard was the major system of exchange rate determination before 1914. All currencies were priced in terms of gold—an ounce of gold was worth so much in each currency. When all currencies exchanged at fixed ratios to gold, exchange rates could be determined easily. For instance, one ounce of gold was worth $20 U.S.; that same ounce of gold exchanged for £4 (British pounds). Because $20 and £4 were each worth one ounce of gold, the exchange rate between dollars and pounds was $20/£4, or $5 to £1.

For the gold standard to be effective, it had to be backed up by the country's willingness to buy and sell gold at the determined price. As long as countries maintain their currencies at a fixed value in terms of gold *and* as long as each country is willing to buy and sell gold, exchange rates are fixed. If at the given exchange rate the number of U.S. citizens who want to buy things produced in Great Britain is equal to the number of British citizens who want to buy things produced in the United States, the currencies of the two countries will simply be exchanged. What if U.S. citizens suddenly decide they want to drink imported Scotch instead of domestic bourbon? If the British do not have an increased desire for U.S. goods, they will still accept U.S. dollars because those dollars can be redeemed in gold. This gold can then be immediately turned into pounds.

As long as a country's overall balance of payments remained in balance, no gold would enter or leave the country and the economy would be in equilibrium. If U.S. citizens bought more from the British than the British bought from the United States, however, the U.S. balance of payments would be in deficit and the U.S. stock of gold would begin to fall. Conversely, Britain would start to accumulate gold because it would be exporting more than it spent on imports.

Under the gold standard, gold was a big determinant of the money supply.[6] An inflow of gold into a country caused that country's money supply to expand, and an outflow of gold caused that country's money supply to contract. If gold were flowing from the United States to Great Britain, the British money supply would expand and the U.S. money supply would contract.

Now recall from previous chapters the impacts of a change in the money supply. An expanded money supply in Britain will lower British interest rates and stimulate aggregate demand. As a result, aggregate output (income) and the price level in Britain will increase. Higher British prices will discourage U.S. citizens from buying British goods. At the same time, British citizens will have more income and will face relatively lower import prices, causing them to import more from the States.

On the other side of the Atlantic, U.S. citizens will face a contracting domestic money supply. This will cause higher interest rates, declining aggregate demand, lower prices, and falling output (income). The effect will be lower demand in the United States for British goods. Thus, changes in relative prices and incomes that resulted from the inflow and outflow of gold would automatically bring trade back into balance.

Problems with the Gold Standard MyLab Economics Concept Check

Two major problems were associated with the gold standard. First, the gold standard implied that a country had little control over its money supply. The reason, as we have just seen, is that the money stock increased when the overall balance of payments was in surplus (gold inflow) and decreased when the overall balance was in deficit (gold outflow). A country that was experiencing a balance-of-payments deficit could correct the problem only by the painful process of allowing its money supply to contract. This contraction brought on a slump in economic activity, a slump that would eventually restore balance-of-payments equilibrium, but only after reductions in income and employment. Countries could (and often did) act to protect their gold reserves, and this precautionary step prevented the adjustment mechanism from correcting the deficit.

Making the money supply depend on the amount of gold available had another disadvantage. When major new gold fields were discovered (as in California in 1849 and South Africa in

[6] In the days when currencies were tied to gold, changes in the amount of gold influenced the supply of money in two ways. A change in the quantity of gold coins in circulation had a direct effect on the supply of money; indirectly, gold served as a backing for paper currency. A decrease in the central bank's gold holdings meant a decline in the amount of paper money that could be supported.

1886), the world's supply of gold (and therefore of money) increased. The price level rose and income increased. When no new gold was discovered, the supply of money remained unchanged and prices and income tended to fall.

When President Reagan took office in 1981, he established a commission to consider returning the nation to the gold standard. The final commission report recommended against such a move. An important part of the reasoning behind this recommendation was that the gold standard puts enormous economic power in the hands of gold-producing nations.

Fixed Exchange Rates and the Bretton Woods System MyLab Economics Concept Check

As World War II drew to a close, a group of economists from the United States and Europe met to formulate a new set of rules for exchange rate determination that they hoped would avoid the difficulties of the gold standard. The rules they designed became known as the *Bretton Woods system*, after the town in New Hampshire where the delegates met. The Bretton Woods system was based on two (not necessarily compatible) premises. First, countries were to maintain fixed exchange rates with one another. Instead of pegging their currencies directly to gold, however, currencies were fixed in terms of the U.S. dollar, which was fixed in value at $35 per ounce of gold. The British pound, for instance, was fixed at roughly $2.40, so that an ounce of gold was worth approximately £14.6. As we shall see, the pure system of fixed exchange rates would work in a manner very similar to the pre-1914 gold standard.

The second aspect of the Bretton Woods system added a new wrinkle to the operation of the international economy. Countries experiencing a "fundamental disequilibrium" in their balance of payments were allowed to change their exchange rates. (The term *fundamental disequilibrium* was necessarily vague, but it came to be interpreted as a large and persistent current account deficit.) Exchange rates were not really fixed under the Bretton Woods system; they were, as someone remarked, only "fixed until further notice."

The point of allowing countries with serious current account problems to alter the value of their currency was to avoid the harsh recessions that the operation of the gold standard would have produced under these circumstances. However, the experience of the European economies in the years between World War I and World War II suggested that it might not be a good idea to give countries complete freedom to change their exchange rates whenever they wanted.

During the Great Depression, many countries undertook so-called competitive devaluations to protect domestic output and employment. That is, countries would try to encourage exports—a source of output growth and employment—by attempting to set as low an exchange rate as possible, thereby making their exports competitive with foreign-produced goods. Unfortunately, such policies had a built-in flaw. A devaluation of the pound against the French franc might help encourage British exports to France, but if those additional British exports cut into French output and employment, France would likely respond by devaluing the franc against the pound, a move that, of course, would undo the effects of the pound's initial devaluation.

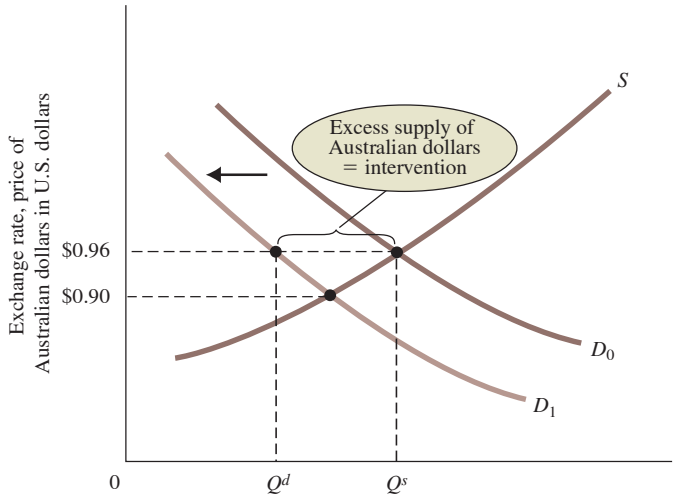
To solve this exchange rate rivalry, the Bretton Woods agreement created the International Monetary Fund (IMF). Its job was to assist countries experiencing temporary current account problems.[7] It was also supposed to certify that a "fundamental disequilibrium" existed before a country was allowed to change its exchange rate. The IMF was like an international economic traffic cop whose job was to ensure that all countries were playing the game according to the agreed-to rules and to provide emergency assistance where needed.

"Pure" Fixed Exchange Rates MyLab Economics Concept Check

Under a pure fixed exchange rate system, governments set a particular *fixed* rate at which their currencies will exchange for one another and then commit themselves to maintaining that rate. A true fixed exchange rate system is like the gold standard in that exchange rates are supposed

[7]The idea was that the IMF would make short-term loans to a country with a current account deficit. The loans would enable the country to correct the current account problem gradually, without bringing on a deep recession, running out of foreign exchange reserves, or devaluing the currency.

FIGURE 19A.1
Government Intervention in the Foreign Exchange Market
If the price of Australian dollars were set in a completely unfettered market, one Australian dollar would cost 0.96 U.S. dollars when demand is D_0 and 0.90 when demand is D_1. If the government has committed to keeping the value at 0.96, it must buy up the excess supply of Australian dollars ($Q^s - Q^d$).



MyLab Economics Concept Check

to stay the same forever. Because currencies are no longer backed by gold, they have no fixed, or standard, value relative to one another. There is, therefore, no automatic mechanism to keep exchange rates aligned with each other, as with the gold standard.

The result is that under a pure fixed exchange rate system, governments must at times intervene in the foreign exchange market to keep currencies aligned at their established values. Economists define government intervention in the foreign exchange market as the buying or selling of foreign exchange for the purpose of manipulating the exchange rate. What kind of intervention is likely to occur under a fixed exchange rate system, and how does it work?

We can see how intervention works by looking at Figure 19.A.1. Initially, the market for Australian dollars is in equilibrium. At the fixed exchange rate of 0.96, the supply of dollars is exactly equal to the demand for dollars. No government intervention is necessary to maintain the exchange rate at this level. Now suppose Australian wines are found to be contaminated with antifreeze and U.S. citizens switch to California wines. This substitution away from the Australian product shifts the U.S. demand curve for Australian dollars to the left: The United States demands fewer Australian dollars at every exchange rate (cost of an Australian dollar) because it is purchasing less from Australia than it did before.

If the price of Australian dollars were set in a completely unfettered market, the shift in the demand curve would lead to a fall in the price of Australian dollars, just the way the price of wheat would fall if there was an excess supply of wheat. Remember, the Australian and U.S. governments have committed themselves to maintaining the rate at 0.96. To do so, either the U.S. government or the Australian government (or both) must buy up the excess supply of Australian dollars to keep its price from falling. In essence, the fixed exchange rate policy commits governments to making up any difference between the supply of a currency and the demand so as to keep the price of the currency (exchange rate) at the desired level. The government promises to act as the supplier (or demander) of last resort, who will ensure that the amount of foreign exchange demanded by the private sector will equal the supply at the fixed price.

Problems with the Bretton Woods System MyLab Economics Concept Check

As it developed after the end of World War II, the system of more-or-less fixed exchange rates had some flaws that led to its abandonment in 1971.

First, there was a basic asymmetry built into the rules of international finance. Countries experiencing large and persistent current account deficits—what the Bretton Woods agreements termed "fundamental disequilibria"—were obliged to devalue their currencies and/or take measures to cut their deficits by contracting their economies. Both of these alternatives were

unpleasant because devaluation meant rising prices and contraction meant rising unemployment. However, a country with a current account deficit had no choice because it was losing stock of foreign exchange reserves. When its stock of foreign currencies became exhausted, it had to change its exchange rate because further intervention (selling off some of its foreign exchange reserves) became impossible.

Countries experiencing current account surpluses were in a different position because they were gaining foreign exchange reserves. Although these countries were supposed to stimulate their economies and/or revalue their currencies to restore balance to their current account, they were not obliged to do so. They could easily maintain their fixed exchange rate by buying up any excess supply of foreign exchange with their own currency, of which they had plentiful supply.

In practice, this meant that some countries—especially Germany and Japan—tended to run large and chronic current account surpluses and were under no compulsion to take steps to correct the problem. The U.S. economy, stimulated by expenditures on the Vietnam War, experienced a large and prolonged current account deficit (capital outflow) in the 1960s, which was the counterpart of these surpluses. The United States was, however, in a unique position under the Bretton Woods system. The value of gold was fixed in terms of the U.S. dollar at $35 per ounce of gold. Other countries fixed their exchange rates in terms of U.S. dollars (and therefore only indirectly in terms of gold). Consequently, the United States could never accomplish anything by devaluing its currency in terms of gold. If the dollar was devalued from $35 to $40 per ounce of gold, the yen, pegged at 200 yen per dollar, would move in parallel with the dollar (from 7,000 yen per ounce of gold to 8,000 yen per ounce), with the dollar–yen exchange rate unaffected. To correct its current account deficits vis-à-vis Japan and Germany, it would be necessary for those two countries to adjust their currencies' exchange rates with the dollar. These countries were reluctant to do so for a variety of reasons. As a result, the U.S. current account was chronically in deficit throughout the late 1960s.

A second flaw in the Bretton Woods system was that it permitted devaluations only when a country had a "chronic" current account deficit and was in danger of running out of foreign exchange reserves. This meant that devaluations could often be predicted quite far in advance, and they usually had to be rather large if they were to correct any serious current account problem. The situation made it tempting for speculators to "attack" the currencies of countries with current account deficits.

Problems such as these eventually led the United States to abandon the Bretton Woods rules in 1971. The U.S. government refused to continue pegging the value of the dollar in terms of gold. Thus, the prices of all currencies were free to find their own levels.

The alternative to fixed exchange rates is a system that allows exchange rates to move freely or flexibly in response to market forces. Two types of flexible exchange rate systems are usually distinguished. In a *freely floating system*, governments do not intervene at all in the foreign exchange market.[8] They do not buy or sell currencies with the aim of manipulating the rates. In a *managed floating system*, governments intervene if markets are becoming "disorderly"—fluctuating more than a government believes is desirable. Governments may also intervene if they think a currency is increasing or decreasing too much in value even though the day-to-day fluctuations may be small.

Since the demise of the Bretton Woods system in 1971, the world's exchange rate system can be described as "managed floating." One of the important features of this system has been times of large fluctuations in exchange rates. For example, the yen–dollar rate went from 347 in 1971 to 210 in 1978, to 125 in 1988, and to 80 in 1995. Those are very large changes, changes that have important effects on the international economy, some of which we have covered in this text.

[8]However, governments may from time to time buy or sell foreign exchange for their own needs (instead of influencing the exchange rate). For example, the U.S. government might need British pounds to buy land for a U.S. embassy building in London. For our purposes, we ignore this behavior because it is not "intervention" in the strict sense of the word.

APPENDIX SUMMARY

1. The gold standard was the major system of exchange rate determination before 1914. All currencies were priced in terms of gold. Difficulties with the gold standard led to the Bretton Woods agreement following World War II. Under this system, countries maintained fixed exchange rates with one another and fixed the value of their currencies in terms of the U.S. dollar. Countries experiencing a "fundamental disequilibrium" in their current accounts were permitted to change their exchange rates.
2. The Bretton Woods system was abandoned in 1971. Since then, the world's exchange rate system has been one of managed floating rates. Under this system, governments intervene if foreign exchange markets are fluctuating more than the government thinks desirable.

APPENDIX PROBLEMS

All problems are available on MyLab Economics.

CHAPTER 19 APPENDIX: WORLD MONETARY SYSTEMS SINCE 1900

LEARNING OBJECTIVE: Explain what the Bretton Woods system is.

1A.1 The currency of Atlantis is the wimp. In 2018, Atlantis developed a balance-of-payments deficit with the United States as a result of an unanticipated decrease in exports; U.S. citizens cut back on the purchase of Atlantean goods. Assume Atlantis is operating under a system of fixed exchange rates.

a. How does the drop in exports affect the market for wimps? Identify the deficit graphically.

b. How must the government of Atlantis act (in the short run) to maintain the value of the wimp?

c. If Atlantis had originally been operating at full employment (potential GDP), what impact would those events have had on its economy? Explain your answer.

d. The chief economist of Atlantis suggests an expansionary monetary policy to restore full employment; the Secretary of Commerce suggests a tax cut (expansionary fiscal policy). Given the fixed exchange rate system, describe the effects of these two policy options on Atlantis's current account.

e. How would your answers to a, b, and c change if the two countries operated under a floating rate system?