section 8

The Open Economy: International Trade and Finance

"You should see, when they come in the door, the shopping bags they hand off to the coat check. I mean, they're just spending. It's Monopoly money to them." So declared a New York restaurant manager, describing the European tourists who, in the summer of 2008, accounted for a large share of her business. Meanwhile, American tourists in Europe were suffering sticker shock. One American, whose family of four was visiting Paris, explained his changing vacation plans: "We might not stay as long. We might eat cheese sandwiches."

It was quite a change from 2000, when an article in the *New York Times* bore the headline: "Dollar makes the good life a tourist bargain in Europe." What happened? The answer is that there was a large shift in the relative values of the euro, the currency used by much of Europe, and the U.S. dollar. At its low point in 2000, a euro was worth only about 85 cents. By mid-2008 it was worth more than $1.50, and in early 2010 it's value had fallen again, to less than $1.28.

Bloomberg via Getty Images

What causes the relative value of the dollar and the euro to change? What are the effects of such changes? These are among the questions addressed by *open-economy macroeconomics,* the branch of macroeconomics that deals with the relationships between national economies. In this section we'll learn about some of the key issues in open-economy macroeconomics: the determinants of a country's *balance of payments,* the factors affecting *exchange rates,* the different forms of *exchange rate policy* adopted by various countries, and the relationship between exchange rates and macroeconomic policy. In the final module we will apply what we have learned about macroeconomic modeling to conduct policy analysis.

What you will learn in this **Module:**

- The meaning of the balance of payments accounts
- The determinants of international capital flows

Module 41
Capital Flows and the Balance of Payments

Capital Flows and the Balance of Payments

A country's **balance of payments accounts** are a summary of the country's transactions with other countries.

In 2008, people living in the United States sold about $3.5 trillion worth of stuff to people living in other countries and bought about $3.5 trillion worth of stuff in return. What kind of stuff? All kinds. Residents of the United States (including employees of firms operating in the United States) sold airplanes, bonds, wheat, and many other items to residents of other countries. Residents of the United States bought cars, stocks, oil, and many other items from residents of other countries.

How can we keep track of these transactions? Earlier we learned that economists keep track of the domestic economy using the national income and product accounts. Economists keep track of international transactions using a different but related set of numbers, the *balance of payments accounts.*

Balance of Payments Accounts

A country's **balance of payments accounts** are a summary of the country's transactions with other countries.

To understand the basic idea behind the balance of payments accounts, let's consider a small-scale example: not a country, but a family farm. Let's say that we know the following about how last year went financially for the Costas, who own a small artichoke farm in California:

- They made $100,000 by selling artichokes.
- They spent $70,000 on running the farm, including purchases of new farm machinery, and another $40,000 buying food, paying utility bills for their home, replacing their worn-out car, and so on.
- They received $500 in interest on their bank account but paid $10,000 in interest on their mortgage.
- They took out a new $25,000 loan to help pay for farm improvements but didn't use all the money immediately. So they put the extra in the bank.

Robin MacDougall/Robin MacDougall

table **41.1**

The Costas' Financial Year

	Sources of cash	Uses of cash	Net
Purchases or sales of goods and services	Artichoke sales: $100,000	Farm operation and living expenses: $110,000	–$10,000
Interest payments	Interest received on bank account: $500	Interest paid on mortgage: $10,000	–$9,500
Loans and deposits	Funds received from new loan: $25,000	Funds deposited in bank: $5,500	+$19,500
Total	**$125,500**	**$125,500**	**$0**

How could we summarize the Costas' year? One way would be with a table like Table 41.1, which shows sources of cash coming in and money going out, characterized under a few broad headings. The first row of Table 41.1 shows sales and purchases of goods and services: sales of artichokes; purchases of groceries, heating oil, that new car, and so on. The second row shows interest payments: the interest the Costas received from their bank account and the interest they paid on their mortgage. The third row shows cash coming in from new borrowing versus money deposited in the bank.

In each row we show the net inflow of cash from that type of transaction. So the net in the first row is –$10,000 because the Costas spent $10,000 more than they earned. The net in the second row is –$9,500, the difference between the interest the Costas received on their bank account and the interest they paid on the mortgage. The net in the third row is $19,500: the Costas brought in $25,000 with their new loan but put only $5,500 of that sum in the bank.

The last row shows the sum of cash coming in from all sources and the sum of all cash used. These sums are equal, by definition: every dollar has a source, and every dollar received gets used somewhere. (What if the Costas hid money under the mattress? Then that would be counted as another "use" of cash.)

A country's balance of payments accounts summarize its transactions with the world using a table similar to the one we just used to summarize the Costas' financial year.

Table 41.2 on the next page shows a simplified version of the U.S. balance of payments accounts for 2008. Where the Costa family's accounts show sources and uses of cash, the balance of payments accounts show payments from foreigners—in effect, sources of cash for the United States as a whole—and payments to foreigners.

Row 1 of Table 41.2 shows payments that arise from sales and purchases of goods and services. For example, the value of U.S. wheat exports and the fees foreigners pay to U.S. consulting companies appear in the second column of row 1; the value of U.S. oil imports and the fees American companies pay to Indian call centers—the people who often answer your 1-800 calls—appear in the third column of row 1.

Row 2 shows *factor income*—payments for the use of factors of production owned by residents of other countries. Mostly this means investment income: interest paid on loans from overseas, the profits of foreign-owned corporations, and so on. For example, the profits earned by Disneyland Paris, which is owned by the U.S.-based Walt Disney Company, appear in the second column of row 2; the profits earned by the U.S. operations of Japanese auto companies appear in the third column. Factor income also includes labor income. For example, the wages of an American engineer who works temporarily on a construction site in Dubai are counted in the second column of row 2.

Row 3 shows *international transfers*—funds sent by residents of one country to residents of another. The main element here is the remittances that immigrants, such as the millions of Mexican-born workers employed in the United States,

table **41.2**

The U.S. Balance of Payments in 2008 (billions of dollars)

		Payments from foreigners	Payments to foreigners	Net
1	Sales and purchases of goods and services	$1,827	$2,523	–$696
2	Factor income	765	646	119
3	Transfers	—	—	–128
	Current account (1 + 2 + 3)			**–705**
4	Official asset sales and purchases	487	530	–43
5	Private sales and purchases of assets	47	–534	581
	Financial account (4 + 5)			**538**
	Total	—	—	**–167**

Source: Bureau of Economic Analysis.

send to their families in their country of origin. Notice that Table 41.2 shows only the net value of transfers. That's because the U.S. government provides only an estimate of the net, not a breakdown between payments to foreigners and payments from foreigners.

The next two rows of Table 41.2 show payments resulting from sales and purchases of assets, broken down by who is doing the buying and selling. Row 4 shows transactions that involve governments or government agencies, mainly central banks. As we'll learn later, in 2008, most of the U.S. sales in this category involved the accumulation of *foreign exchange reserves* by the central banks of China and oil-exporting countries. Row 5 shows private sales and purchases of assets. For example, the 2008 purchase of Budweiser, an American brewing company, by the Belgian corporation InBev showed up in the second column of row 5; purchases of European stocks by U.S. investors show up as positive values in the third column. However, because U.S. residents sold more foreign assets than they purchased in 2008, the value for this category is negative.

In laying out Table 41.2, we have separated rows 1, 2, and 3 into one group and rows 4 and 5 into another. This reflects a fundamental difference in how these two groups of transactions affect the future.

When a U.S. resident sells a good, such as wheat, to a foreigner, that's the end of the transaction. But a financial asset, such as a bond, is different. Remember, a bond is a promise to pay interest and principal in the future. So when a U.S. resident sells a bond to a foreigner, that sale creates a liability: the U.S. resident will have to pay interest and repay principal in the future. The balance of payments accounts distinguish between transactions that don't create liabilities and those that do.

A country's **balance of payments on the current account,** or the **current account,** is its balance of payments on goods and services plus net international transfer payments and factor income.

A country's **balance of payments on goods and services** is the difference between its exports and its imports during a given period.

The **merchandise trade balance,** or **trade balance,** is the difference between a country's exports and imports of goods.

Transactions that don't create liabilities are considered part of the **balance of payments on the current account,** often referred to simply as the **current account:** the balance of payments on goods and services plus factor income and net international transfer payments. The balance of row 1 of Table 41.2, –$696 billion, corresponds to the most important part of the current account: **the balance of payments on goods and services,** the difference between the value of exports and the value of imports during a given period.

By the way, if you read news reports on the economy, you may well see references to another measure, the **merchandise trade balance,** sometimes referred to as the **trade balance** for short. This is the difference between a country's exports and imports of

goods alone—not including services. Economists sometimes focus on the merchandise trade balance, even though it's an incomplete measure, because data on international trade in services aren't as accurate as data on trade in physical goods, and they are also slower to arrive.

The current account, as we've just learned, consists of international transactions that don't create liabilities. Transactions that involve the sale or purchase of assets, and therefore do create future liabilities, are considered part of the **balance of payments on the financial account,** or the **financial account** for short. (Until a few years ago, economists often referred to the financial account as the *capital account.* We'll use the modern term, but you may run across the older term.)

A country's **balance of payments on the financial account,** or simply the **financial account,** is the difference between its sales of assets to foreigners and its purchases of assets from foreigners during a given period.

So how does it all add up? The shaded rows of Table 41.2 show the bottom lines: the overall U.S. current account and financial account for 2008. As you can see, in 2008, the United States ran a current account deficit: the amount it paid to foreigners for goods, services, factors, and transfers was greater than the amount it received. Simultaneously, it ran a financial account surplus: the value of the assets it sold to foreigners was greater than the value of the assets it bought from foreigners.

In the official data, the U.S. current account deficit and financial account surplus almost, but not quite, offset each other: the financial account surplus was $167 billion smaller than the current account deficit. But that's just a statistical error, reflecting the imperfection of official data. (And a $167 billion error when you're measuring inflows and outflows of $3.5 trillion isn't bad!) In fact, it's a basic rule of balance of payments accounting that the current account and the financial account must sum to zero:

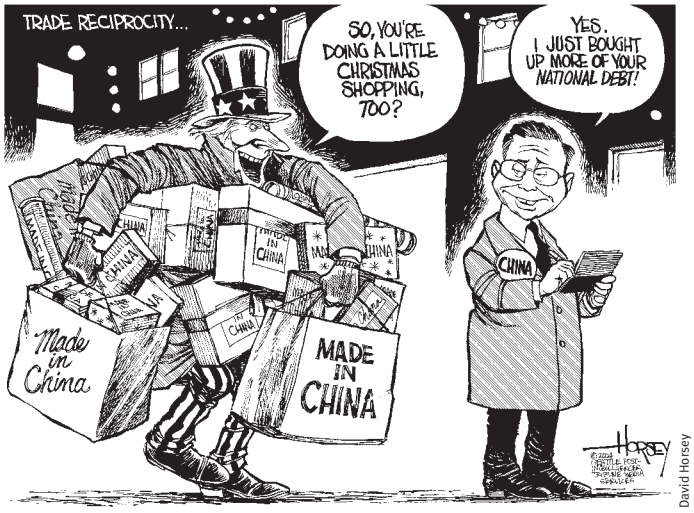
(41-1) Current account (CA) + Financial account (FA) = 0

or

$$CA = -FA$$

Why must Equation 41-1 be true? We already saw the fundamental explanation in Table 41.1, which showed the accounts of the Costa family: in total, the sources of cash must equal the uses of cash. The same applies to balance of payments accounts. Figure 41.1 on the next page, a variant on the circular-flow diagram we have found useful in discussing domestic macroeconomics, may help you visualize how this adding up works.

Instead of showing the flow of money *within* a national economy, Figure 41.1 shows the flow of money *between* national economies. Money flows into the United States from the rest of the world as payment for U.S. exports of goods and services, as payment for the use of U.S.-owned factors of production, and as transfer payments. These flows (indicated by the lower green arrow) are the positive components of the U.S. current account. Money also flows into the United States from foreigners who purchase U.S. assets (as shown by the lower red arrow)—the positive component of the U.S. financial account.



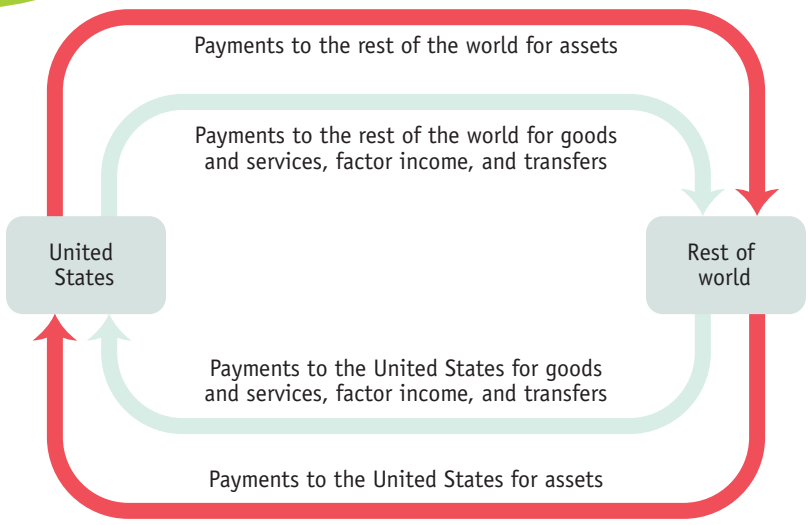
David Horsey

At the same time, money flows from the United States to the rest of the world as payment for U.S. imports of goods and services, as payment for the use of foreign-owned factors of production, and as transfer payments. These flows, indicated by the upper green arrow, are the negative components of the U.S. current account. Money also flows from the United States to purchase foreign assets, as shown by the upper red arrow—the negative component of the U.S. financial account. As in all circular-flow diagrams, the flow into a box and the flow out of a box are equal. This means

figure 41.1

The Balance of Payments

The green arrows represent payments that are counted in the current account. The red arrows represent payments that are counted in the financial account. Because the total flow into the United States must equal the total flow out of the United States, the sum of the current account plus the financial account is zero.



that the sum of the red and green arrows going into the United States is equal to the sum of the red and green arrows going out of the United States. That is,

(41-2) Positive entries on the current account (lower green arrow) + Positive entries on the financial account (lower red arrow) = Negative entries on the current account (upper green arrow) + Negative entries on the financial account (upper red arrow)

Equation 41-2 can be rearranged as follows:

(41-3) Positive entries on the current account – Negative entries on the current account + Positive entries on the financial account – Negative entries on the financial account = 0

fyi

GDP, GNP, and the Current Account

When we discussed national income accounting, we derived the basic equation relating GDP to the components of spending:

$$Y = C + I + G + X - IM$$

where X and IM are exports and imports, respectively, of goods and services. But as we've learned, the balance of payments on goods and services is only one component of the current account balance. Why doesn't the national income equation use the current account as a whole?

The answer is that gross domestic product, which is the value of goods and services produced in a country, doesn't include two sources of income that are included in calculating the current account balance: international factor income and international transfers. The profits of Ford Motors U.K. aren't included in America's GDP, and the funds Latin American immigrants send home to their families aren't subtracted from GDP.

Shouldn't we have a broader measure that does include these sources of income? Actually, gross national product—GNP—does include international factor income. Estimates of U.S. GNP differ slightly from estimates of GDP because GNP adds in items such as the earnings of U.S. companies abroad and subtracts items such as the interest payments on bonds owned by residents of China and Japan. There isn't, however, any regularly calculated measure that includes transfer payments.

Why do economists use GDP rather than a broader measure? Two reasons. First, the original purpose of the national accounts was to track production rather than income. Second, data on international factor income and transfer payments are generally considered somewhat unreliable. So if you're trying to keep track of movements in the economy, it makes sense to focus on GDP, which doesn't rely on these unreliable data.

Michael Newman/Photo Edit

The funds Latin American immigrants send home through Western Union wires, as advertised on this billboard, aren't subtracted from GDP.

Equation 41-3 is equivalent to Equation 41-1: the current account plus the financial account—both equal to positive entries minus negative entries—is equal to zero.

But what determines the current account and the financial account?

Modeling the Financial Account

A country's financial account measures its net sales of assets, such as currencies, securities, and factories, to foreigners. Those assets are exchanged for a type of capital called *financial capital,* which is funds from savings that are available for investment spending. We can thus think of the financial account as a measure of *capital inflows* in the form of foreign savings that become available to finance domestic investment spending.

What determines these capital inflows?

Part of our explanation will have to wait for a little while because some international capital flows are created by governments and central banks, which sometimes act very differently from private investors. But we can gain insight into the motivations for capital flows that are the result of private decisions by using the *loanable funds model* we developed previously. In using this model, we make two important simplifications:

- We simplify the reality of international capital flows by assuming that all flows are in the form of loans. In reality, capital flows take many forms, including purchases of shares of stock in foreign companies and foreign real estate as well as *foreign direct investment,* in which companies build factories or acquire other productive assets abroad.
- We also ignore the effects of expected changes in *exchange rates,* the relative values of different national currencies. We'll analyze the determination of exchange rates later.

Figure 41.2 recaps the loanable funds model for a closed economy. Equilibrium corresponds to point *E,* at an interest rate of 4%, at which the supply of loanable funds (*S*) intersects the demand (*D*). If international capital flows are possible, this diagram changes and *E* may no longer be the equilibrium. We can analyze the causes and effects of international capital flows using Figure 41.3 on the next page, which places the loanable funds market diagrams for two countries side by side.

Figure 41.3 illustrates a world consisting of only two countries, the United States and Britain. Panel (a) shows the loanable funds market in the United States, where

figure 41.2

The Loanable Funds Model Revisited

According to the loanable funds model of the interest rate, the equilibrium interest rate is determined by the intersection of the supply of loanable funds curve, *S,* and the demand for loanable funds curve, *D.* At point *E,* the equilibrium interest rate is 4%.

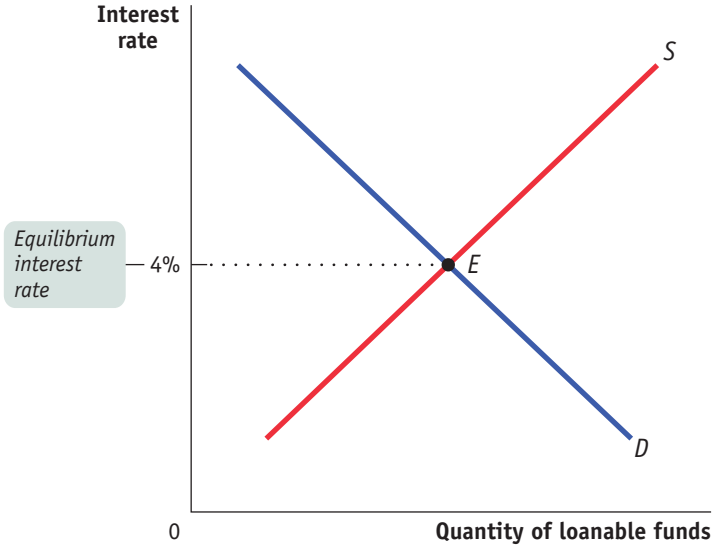
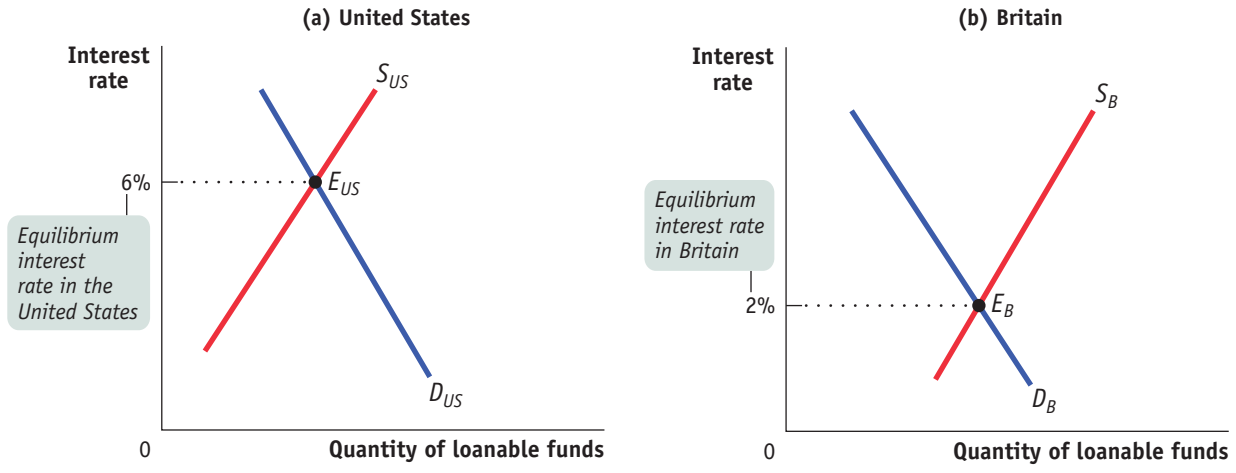


figure 41.3 Loanable Funds Markets in Two Countries



Here we show two countries, the United States and Britain, each with its own loanable funds market. The equilibrium interest rate is 6% in the U.S. market but only 2% in the British market. This creates an incentive for capital to flow from Britain to the United States.

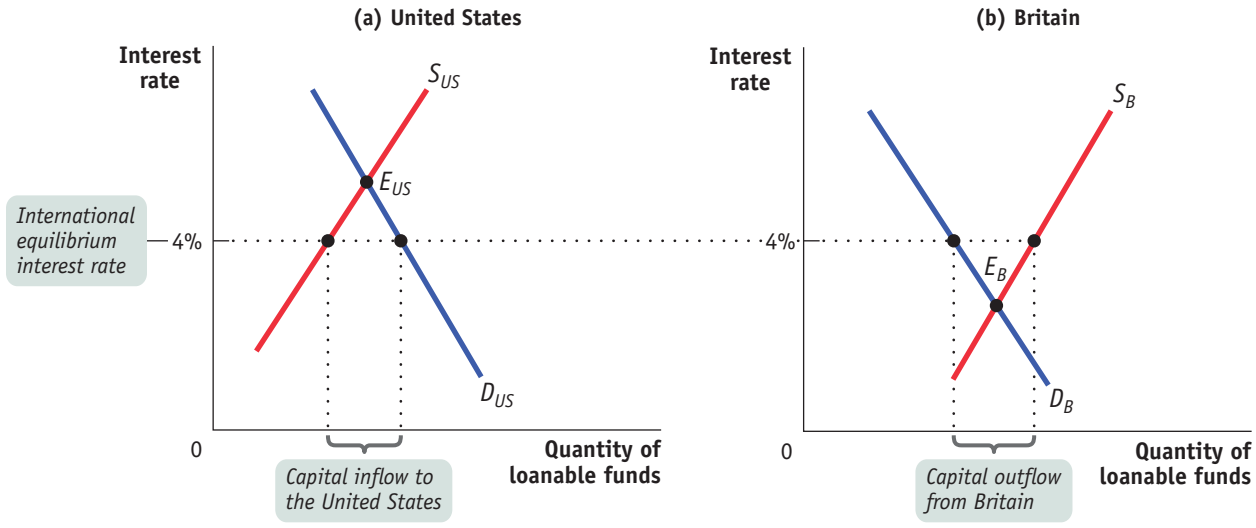
the equilibrium in the absence of international capital flows is at point E_{US} with an interest rate of 6%. Panel (b) shows the loanable funds market in Britain, where the equilibrium in the absence of international capital flows is at point E_B with an interest rate of 2%.

Will the actual interest rate in the United States remain at 6% and that in Britain at 2%? Not if it is easy for British residents to make loans to Americans. In that case, British lenders, attracted by high American interest rates, will send some of their loanable funds to the United States. This capital inflow will increase the quantity of loanable funds supplied to American borrowers, pushing the U.S. interest rate down. At the same time, it will reduce the quantity of loanable funds supplied to British borrowers, pushing the British interest rate up. So international capital flows will narrow the gap between U.S. and British interest rates.

Let's further suppose that British lenders regard a loan to an American as being just as good as a loan to one of their own compatriots, and American borrowers regard a debt to a British lender as no more costly than a debt to an American lender. In that case, the flow of funds from Britain to the United States will continue until the gap between their interest rates is eliminated. In other words, international capital flows will equalize the interest rates in the two countries. Figure 41.4 shows an international equilibrium in the loanable funds markets where the equilibrium interest rate is 4% in both the United States and Britain. At this interest rate, the quantity of loanable funds demanded by American borrowers exceeds the quantity of loanable funds supplied by American lenders. This gap is filled by "imported" funds—a capital inflow from Britain. At the same time, the quantity of loanable funds supplied by British lenders is greater than the quantity of loanable funds demanded by British borrowers. This excess is "exported" in the form of a capital outflow to the United States. And the two markets are in equilibrium at a common interest rate of 4%. At that interest rate, the total quantity of loans demanded by borrowers across the two markets is equal to the total quantity of loans supplied by lenders across the two markets.

In short, international flows of capital are like international flows of goods and services. Capital moves from places where it would be cheap in the absence of international capital flows to places where it would be expensive in the absence of such flows.

figure 41.4 International Capital Flows



British lenders lend to borrowers in the United States, leading to equalization of interest rates at 4% in both countries. At that rate, American borrowing exceeds American lending; the difference is made up by capital inflows to the United States. Meanwhile, British lending exceeds British borrowing; the excess is a capital outflow from Britain.

Underlying Determinants of International Capital Flows

The open-economy version of the loanable funds model helps us understand international capital flows in terms of the supply and demand for funds. But what underlies differences across countries in the supply and demand for funds? And why, in the absence of international capital flows, would interest rates differ internationally, creating an incentive for international capital flows?

International differences in the demand for funds reflect underlying differences in investment opportunities. In particular, a country with a rapidly growing economy, other things equal, tends to offer more investment opportunities than a country with a slowly growing economy. So a rapidly growing economy typically—though not always—has a higher demand for capital and offers higher returns to investors than a slowly growing economy in the absence of capital flows. As a result, capital tends to flow from slowly growing to rapidly growing economies.

The classic example is the flow of capital from Britain to the United States, among other countries, between 1870 and 1914. During that era, the U.S. economy was growing rapidly as the population increased and spread westward and as the nation industrialized. This created a demand for investment spending on railroads, factories, and so on. Meanwhile, Britain had a much more slowly growing population, was already industrialized, and already had a railroad network covering the country. This left Britain with savings to spare, much of which were lent to the United States and other New World economies.

International differences in the supply of funds reflect differences in savings across countries. These may be the result of differences in private savings rates, which vary widely among countries. For example, in 2006, private savings were 26.5% of Japan's GDP but only 14.8% of U.S. GDP. They may also reflect differences in savings by governments. In particular, government budget deficits, which reduce overall national savings, can lead to capital inflows.

fyi

A Global Savings Glut?

In the early years of the twenty-first century, the United States entered into a massive current account deficit, which meant that it became the recipient of huge capital inflows from the rest of the world, especially China, other Asian countries, and the Middle East. Why did that happen?

In an influential speech early in 2005, Ben Bernanke—who was at that time a governor of the Federal Reserve and who would soon become the Fed's chair—offered a hypothesis: the United States wasn't responsible. The "principal causes of the U.S. current account deficit," he declared, lie "outside the country's borders." Specifically, he argued that special factors had created a "global savings glut" that had pushed down interest rates worldwide and thereby led to an excess of investment spending over savings in the United States.

What caused this global savings glut? According to Bernanke, the main cause was the series of financial crises that began in Thailand in 1997, ricocheted across much of Asia, and then hit Russia in 1998, Brazil in 1999, and Argentina in 2002. The ensuing fear and economic devastation led to a fall in investment spending and a rise in savings in many relatively poor countries. As a result, a number of these countries, which had previously been the recipients of capital inflows from developed countries like the United States, began experiencing large capital outflows. For the most part, the capital flowed to the United States, perhaps because "the depth and sophistication of the country's financial markets" made it an attractive destination.

When Bernanke gave his speech, it was viewed as reassuring: basically, he argued that the United States was responding in a sensible way to the availability of cheap money in world financial markets. Later, however, it would become clear that the cheap money from abroad helped fuel a housing bubble, which caused widespread financial and economic damage when it burst.

Two-way Capital Flows

The loanable funds model helps us understand the direction of *net* capital flows—the excess of inflows into a country over outflows, or vice versa. As we saw in Table 41.2, however, *gross* flows take place in both directions: for example, the United States both sells assets to foreigners and buys assets from foreigners. Why does capital move in both directions?

The answer to this question is that in the real world, as opposed to the simple model we've just constructed, there are other motives for international capital flows besides seeking a higher rate of interest. Individual investors often seek to diversify against risk by buying stocks in a number of countries. Stocks in Europe may do well when stocks in the United States do badly, or vice versa, so investors in Europe try to reduce their risk by buying some U.S. stocks, even as investors in the United States try to reduce their risk by buying some European stocks. The result is capital flows in both directions. Meanwhile, corporations often engage in international investment as part of their business strategy—for example, auto companies may find that they can compete better in a national market if they assemble some of their cars locally. Such business investments can also lead to two-way capital flows, as, say, European carmakers build plants in the United States even as U.S. computer companies open facilities in Europe.

Andrew Holbrooke/Time Life Pictures/Getty Images

Nike, like many other companies, has opened plants in China to take advantage of low labor costs and to gain better access to the large Chinese market. Here, two Chinese employees assemble running shoes in a Nike factory in China.

Finally, some countries, including the United States, are international banking centers: people from all over the world put money in U.S. financial institutions, which then invest many of those funds overseas.

The result of these two-way flows is that modern economies are typically both debtors (countries that owe money to the rest of the world) and creditors (countries to which the rest of the world owes money). Due to years of both capital inflows and outflows, at the end of 2008, the United States had accumulated foreign assets worth $19.9 trillion and foreigners had accumulated assets in the United States worth $23.3 trillion.

fyi

The Golden Age of Capital Flows

Technology, it's often said, shrinks the world. Jet planes have put most of the world's cities within a few hours of one another; modern telecommunications transmit information instantly around the globe. So you might think that international capital flows must now be larger than ever.

But if capital flows are measured as a share of world savings and investment, that belief turns out not to be true. The golden age of capital flows actually preceded World War I—it lasted from 1870 to 1914.

These capital flows went mainly from European countries, especially Britain, to what were then known as "zones of recent settlement," countries that were attracting large numbers of European immigrants. Among the big recipients of capital inflows were Australia, Argentina, Canada, and the United States.

The large capital flows reflected differences in investment opportunities. Britain, a mature industrial economy with limited natural resources and a slowly growing population, offered relatively limited opportunities for new investment. The zones of recent settlement, with rapidly growing populations and abundant natural resources, offered investors a higher return and attracted capital inflows. Estimates suggest that over this period Britain sent about 40% of its savings abroad, largely to finance railroads and other large projects. No country has matched that record in modern times.

Why can't we match the capital flows of our great-great-grandfathers? Economists aren't completely sure, but they have pointed to two causes: migration restrictions and political risks.

During the golden age of capital flows, capital movements were complementary to population movements: the big recipients of capital from Europe were also places to which large numbers of Europeans were moving. These large-scale population movements were possible before World War I because there were few legal restrictions on immigration. In today's world, by contrast, migration is limited by extensive legal barriers, as anyone considering a move to the United States or Europe can tell you.

The other factor that has changed is political risk. Modern governments often limit foreign investment because they fear it will diminish their national autonomy. And due to political or security concerns, governments sometimes seize foreign property, a risk that deters investors from sending more than a relatively modest share of their wealth abroad. In the nineteenth century such actions were rare, partly because some major destinations of investment were still European colonies and partly because in those days governments had a habit of sending troops and gunboats to enforce the claims of their investors.

Module 41 AP Review

Solutions appear at the back of the book.

Check Your Understanding

1. Which of the balance of payments accounts do the following events affect?
   a. Boeing, a U.S.-based company, sells a newly built airplane to China.
   b. Chinese investors buy stock in Boeing from Americans.
   c. A Chinese company buys a used airplane from American Airlines and ships it to China.
   d. A Chinese investor who owns property in the United States buys a corporate jet, which he will keep in the United States so he can travel around America.

Tackle the Test: Multiple-Choice Questions

1. The current account includes which of the following?
   I. payments for goods and services
   II. transfer payments
   III. factor income
   a. I only
   b. II only
   c. III only
   d. I and II only
   e. I, II, and III

2. The balance of payments on the current account plus the balance of payments on the financial account is equal to
   a. zero.
   b. one.
   c. the trade balance.
   d. net capital flows.
   e. the size of the trade deficit.

3. The financial account was previously known as the
   a. gross national product.
   b. capital account.
   c. trade deficit.
   d. investment account.
   e. trade balance.

4. The trade balance includes which of the following?
   I. imports and exports of goods
   II. imports and exports of services
   III. net capital flows
   a. I only
   b. II only
   c. III only
   d. I and II only
   e. I, II, and III

5. Which of the following will increase the demand for loanable funds in a country?
   a. economic growth
   b. decreased investment opportunities
   c. a recession
   d. decreased private savings rates
   e. government budget surpluses

Tackle the Test: Free-Response Questions

1. a. How would a decrease in real income in the United States affect the U.S. current account balance? Explain.
   b. Suppose China decides that it needs a huge program of infrastructure spending, which it will finance by borrowing. How will this program affect the U.S. balance of payments? Explain.

2. Use two correctly labeled side-by-side graphs of the loanable funds market in the United States and China to show how a higher interest rate in the United States will lead to capital flows between the two countries. On your graphs, be sure to label the starting and ending interest rates and the size of the capital inflows and outflows.

Answer (4 points)

1 point: The current account balance will increase (or move toward a surplus).

1 point: The decrease in income will cause imports to decrease.

1 point: The increase in infrastructure spending in China will reduce the surplus in the U.S. financial account and reduce the deficit in the U.S. current account.

1 point: Because China is financing the program by borrowing, it is likely that other countries will increase their lending to China, decreasing their lending to the United States. These capital outflows from the United States will reduce the U.S. surplus in the financial account and reduce the deficit in the current account.

What you will learn in this Module:

- The role of the foreign exchange market and the exchange rate
- The importance of real exchange rates and their role in the current account

Module 42 The Foreign Exchange Market

The Role of the Exchange Rate

We've just seen how differences in the supply of loanable funds from savings and the demand for loanable funds for investment spending lead to international capital flows. We've also learned that a country's balance of payments on the current account plus its balance of payments on the financial account add up to zero: a country that receives net capital inflows must run a matching current account deficit, and a country that generates net capital outflows must run a matching current account surplus.

The behavior of the financial account—reflecting inflows or outflows of capital—is best described as equilibrium in the international loanable funds market. At the same time, the balance of payments on goods and services, the main component of the current account, is determined by decisions in the international markets for goods and services. So given that the financial account reflects the movement of capital and the current account reflects the movement of goods and services, what ensures that the balance of payments really does balance? That is, what ensures that the two accounts actually offset each other?

The answer lies in the role of the *exchange rate,* which is determined in the *foreign exchange market.*

Understanding Exchange Rates

In general, goods, services, and assets produced in a country must be paid for in that country's currency. American products must be paid for in dollars; European products must be paid for in euros; Japanese products must be paid for in yen. Occasionally, sellers will accept payment in foreign currency, but they will then exchange that currency for domestic money.

International transactions, then, require a market—the **foreign exchange market**—in which currencies can be exchanged for each other. This market determines **exchange rates,** the prices at which currencies trade. (The foreign exchange market is, in fact, not located in any one geographic spot. Rather, it is a global electronic market that traders around the world use to buy and sell currencies.)

Currencies are traded in the **foreign exchange market.**

The prices at which currencies trade are known as **exchange rates.**

table **42.1**

Exchange Rates, April 30, 2010, 9:40 A.M.

	U.S. dollars	Yen	Euros
One U.S. dollar exchanged for	1	94.20	0.7479
One yen exchanged for	0.010616	1	0.00796
One euro exchanged for	1.3371	125.6	1

Table 42.1 shows exchange rates among the world's three most important currencies as of 9:40 A.M., EST, on April 30, 2010. Each entry shows the price of the "row" currency in terms of the "column" currency. For example, at that time US$1 exchanged for €0.7479, so it took €0.7479 to buy US$1. Similarly, it took US$1.3371 to buy €1. These two numbers reflect the same rate of exchange between the euro and the U.S. dollar: 1/1.3371 = €0.7479.

There are two ways to write any given exchange rate. In this case, there were €0.7479 to US$1 and US$1.3371 to €1. Which is the correct way to write it? The answer is that there is no fixed rule. In most countries, people tend to express the exchange rate as the price of a dollar in domestic currency. However, this rule isn't universal, and the U.S. dollar–euro rate is commonly quoted both ways. The important thing is to be sure you know which one you are using!

When discussing movements in exchange rates, economists use specialized terms to avoid confusion. When a currency becomes more valuable in terms of other currencies, economists say that the currency **appreciates.** When a currency becomes less valuable in terms of other currencies, it **depreciates.** Suppose, for example, that the value of €1 went from $1 to $1.25, which means that the value of US$1 went from €1 to €0.80 (because 1/1.25 = 0.80). In this case, we would say that the euro appreciated and the U.S. dollar depreciated.

Movements in exchange rates, other things equal, affect the relative prices of goods, services, and assets in different countries. Suppose, for example, that the price of an American hotel room is US$100 and the price of a French hotel room is €100. If the exchange rate is €1 = US$1, these hotel rooms have the same price. If the exchange rate is €1.25 = US$1, the French hotel room is 20% cheaper than the American hotel room. If the exchange rate is €0.80 = US$1, the French hotel room is 25% more expensive than the American hotel room.

But what determines exchange rates? Supply and demand in the foreign exchange market.

The Equilibrium Exchange Rate

Imagine, for the sake of simplicity, that there are only two currencies in the world: U.S. dollars and euros. Europeans who want to purchase American goods, services, and assets come to the foreign exchange market to exchange euros for U.S. dollars. That is, Europeans demand U.S. dollars from the foreign exchange market and, correspondingly, supply euros to that market. Americans who want to buy European goods, services, and assets come to the foreign exchange market to exchange U.S. dollars for euros. That is, Americans supply U.S. dollars to the foreign exchange market and, correspondingly, demand euros from that market. (International transfers and payments of factor income also enter into the foreign exchange market, but to make things simple, we'll ignore these.)

Figure 42.1 shows how the foreign exchange market works. The quantity of dollars demanded and supplied at any given euro–U.S. dollar exchange rate is shown on the horizontal axis, and the euro–U.S. dollar exchange rate is shown on the vertical axis. The exchange rate plays the same role as the price of a good or service in an ordinary supply and demand diagram.

The figure shows two curves, the demand curve for U.S. dollars and the supply curve for U.S. dollars. The key to understanding the slopes of these curves is that the level of the exchange rate affects exports and imports. When a country's currency appreciates (becomes more valuable), exports fall and imports rise. When a country's currency depreciates (becomes less valuable), exports rise and imports fall. To understand why the demand curve for U.S. dollars slopes downward, recall that the exchange rate, other things equal, determines the prices of American goods, services, and assets relative to those of European goods, services, and assets. If the U.S. dollar rises against the euro

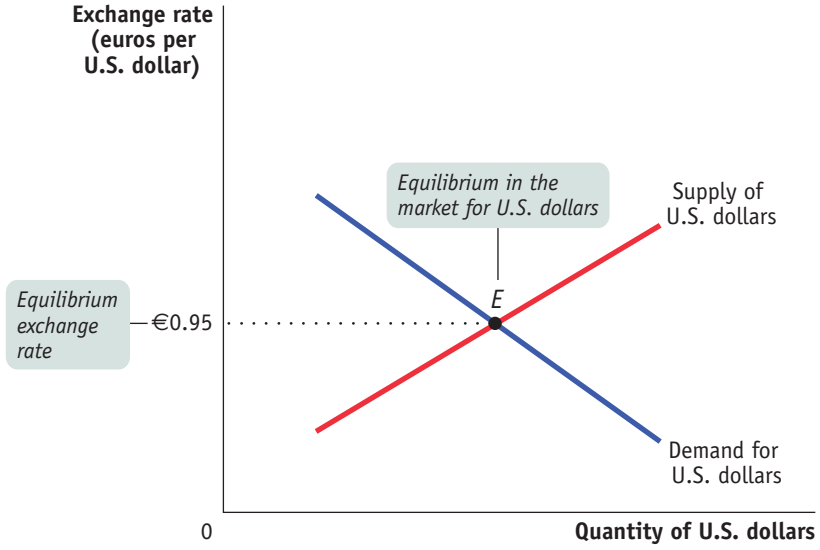
When a currency becomes more valuable in terms of other currencies, it **appreciates.**

When a currency becomes less valuable in terms of other currencies, it **depreciates.**

figure 42.1

The Foreign Exchange Market

The foreign exchange market matches up the demand for a currency from foreigners who want to buy domestic goods, services, and assets with the supply of a currency from domestic residents who want to buy foreign goods, services, and assets. Here the equilibrium in the market for dollars is at point *E*, corresponding to an equilibrium exchange rate of €0.95 per US$1.



(the dollar appreciates), American products will become more expensive to Europeans relative to European products. So Europeans will buy less from the United States and will acquire fewer dollars in the foreign exchange market: the quantity of U.S. dollars demanded falls as the number of euros needed to buy a U.S. dollar rises. If the U.S. dollar falls against the euro (the dollar depreciates), American products will become relatively cheaper for Europeans. Europeans will respond by buying more from the United States and acquiring more dollars in the foreign exchange market: the quantity of U.S. dollars demanded rises as the number of euros needed to buy a U.S. dollar falls.

A similar argument explains why the supply curve of U.S. dollars in Figure 42.1 slopes upward: the more euros required to buy a U.S. dollar, the more dollars Americans will supply. Again, the reason is the effect of the exchange rate on relative prices. If the U.S. dollar rises against the euro, European products look cheaper to Americans—who will demand more of them. This will require Americans to convert more dollars into euros.

The **equilibrium exchange rate** is the exchange rate at which the quantity of U.S. dollars demanded in the foreign exchange market is equal to the quantity of U.S. dollars supplied. In Figure 42.1, the equilibrium is at point *E,* and the equilibrium exchange rate is 0.95. That is, at an exchange rate of €0.95 per US$1, the quantity of U.S. dollars supplied to the foreign exchange market is equal to the quantity of U.S. dollars demanded.

To understand the significance of the equilibrium exchange rate, it's helpful to consider a numerical example of what equilibrium in the foreign exchange market looks like. Such an example is shown in Table 42.2 on the next page. (This is a hypothetical table that isn't intended to match real numbers.) The first row shows European purchases of U.S. dollars, either to buy U.S. goods and services or to buy U.S. assets such as real estate or shares of stock in U.S. companies. The second row shows U.S. sales of U.S. dollars, either to buy European goods and services or to buy European assets. At the equilibrium exchange rate, the total quantity of U.S. dollars Europeans want to buy is equal to the total quantity of U.S. dollars Americans want to sell.

Remember that the balance of payments accounts divide international transactions into two types. Purchases and sales of goods and services are counted in the current account. (Again, we're leaving out transfers and factor income to keep things

The **equilibrium exchange rate** is the exchange rate at which the quantity of a currency demanded in the foreign exchange market is equal to the quantity supplied.

table **42.2**

Equilibrium in the Foreign Exchange Market: A Hypothetical Example

European purchases of U.S. dollars (trillions of U.S. dollars)	To buy U.S. goods and services: 1.0	To buy U.S. assets: 1.0	Total purchases of U.S. dollars: 2.0
U.S. sales of U.S. dollars (trillions of U.S. dollars)	To buy European goods and services: 1.5	To buy European assets: 0.5	Total sales of U.S. dollars: 2.0
	U.S. balance of payments on the current account: −0.5	U.S. balance of payments on the financial account: +0.5	

simple.) Purchases and sales of assets are counted in the financial account. At the equilibrium exchange rate, then, we have the situation shown in Table 42.2: the sum of the balance of payments on the current account plus the balance of payments on the financial account is zero.

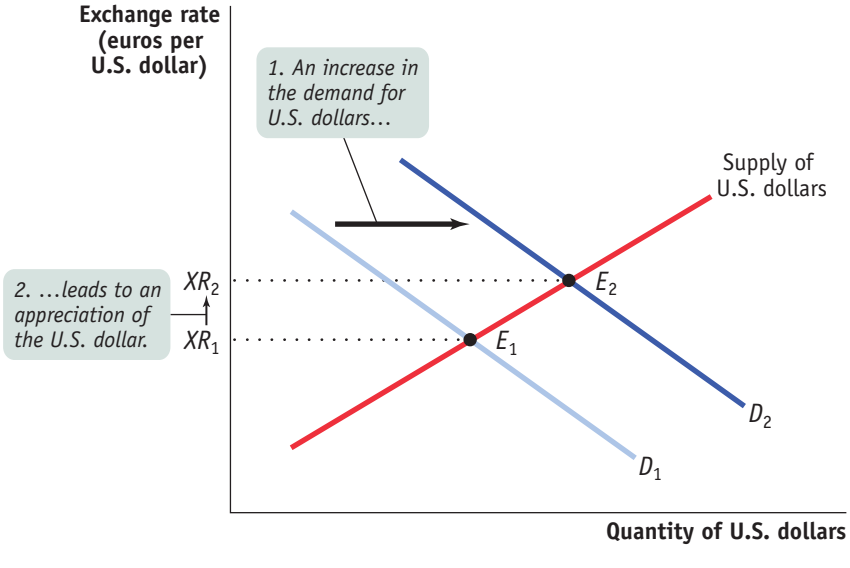
Now let's briefly consider how a shift in the demand for U.S. dollars affects equilibrium in the foreign exchange market. Suppose that for some reason capital flows from Europe to the United States increase—say, due to a change in the preferences of European investors. The effects are shown in Figure 42.2. The demand for U.S. dollars in the foreign exchange market increases as European investors convert euros into dollars to fund their new investments in the United States. This is shown by the shift of the demand curve from D_1 to D_2. As a result, the U.S. dollar appreciates: the number of euros per U.S. dollar at the equilibrium exchange rate rises from XR_1 to XR_2.

What are the consequences of this increased capital inflow for the balance of payments? The total quantity of U.S. dollars supplied to the foreign exchange market still must equal the total quantity of U.S. dollars demanded. So the increased capital inflow to the United States—an increase in the balance of payments on the financial

figure **42.2**

An Increase in the Demand for U.S. Dollars

An increase in the demand for U.S. dollars might result from a change in the preferences of European investors. The demand curve for U.S. dollars shifts from D_1 to D_2. So the equilibrium number of euros per U.S. dollar rises—the dollar *appreciates.* As a result, the balance of payments on the current account falls as the balance of payments on the financial account rises.



account—must be matched by a decline in the balance of payments on the current account. What causes the balance of payments on the current account to decline? The appreciation of the U.S. dollar. A rise in the number of euros per U.S. dollar leads Americans to buy more European goods and services and Europeans to buy fewer American goods and services.

Table 42.3 shows how this might work. Europeans are buying more U.S. assets, increasing the balance of payments on the financial account from 0.5 to 1.0. This is offset by a reduction in European purchases of U.S. goods and services and a rise in U.S. purchases of European goods and services, both the result of the dollar's appreciation. *So any change in the U.S. balance of payments on the financial account generates an equal and opposite reaction in the balance of payments on the current account.* Movements in the exchange rate ensure that changes in the financial account and in the current account offset each other.

table **42.3**

Effects of Increased Capital Inflows

European purchases of U.S. dollars (trillions of U.S. dollars)	To buy U.S. goods and services: 0.75 (down 0.25)	To buy U.S. assets: 1.5 (up 0.5)	**Total purchases of U.S. dollars: 2.25**
U.S. sales of U.S. dollars (trillions of U.S. dollars)	To buy European goods and services: 1.75 (up 0.25)	To buy European assets: 0.5 (no change)	**Total sales of U.S. dollars: 2.25**
	U.S. balance of payments on the current account: −1.0 (down 0.5)	**U.S. balance of payments on the financial account: +1.0 (up 0.5)**	

Let's briefly run this process in reverse. Suppose there is a reduction in capital flows from Europe to the United States—again due to a change in the preferences of European investors. The demand for U.S. dollars in the foreign exchange market falls, and the dollar depreciates: the number of euros per U.S. dollar at the equilibrium exchange rate falls. This leads Americans to buy fewer European products and Europeans to buy more American products. Ultimately, this generates an increase in the U.S. balance of payments on the current account. So a fall in capital flows into the United States leads to a weaker dollar, which in turn generates an increase in U.S. net exports.

Real exchange rates are exchange rates adjusted for international differences in aggregate price levels.

Inflation and Real Exchange Rates

In 1990, one U.S. dollar exchanged, on average, for 2.8 Mexican pesos. By 2010, the peso had fallen against the dollar by more than 75%, with an average exchange rate in early 2010 of 12.8 pesos per dollar. Did Mexican products also become much cheaper relative to U.S. products over that 20-year period? Did the price of Mexican products expressed in terms of U.S. dollars also fall by more than 75%? The answer is no because Mexico had much higher inflation than the United States over that period. In fact, the relative price of U.S. and Mexican products changed little between 1990 and 2010, although the exchange rate changed a lot.

Keith Dannemiller/Alamy

The exchange rates listed at currency exchange booths are nominal exchange rates. The current account responds only to changes in real exchange rates, which have been adjusted for differing levels of inflation.

To take account of the effects of differences in inflation rates, economists calculate **real exchange rates,** exchange rates adjusted for international differences in aggregate price levels. Suppose that the exchange rate we are looking at is the number of Mexican pesos per U.S. dollar. Let P_{US} and P_{Mex} be indexes of the aggregate price levels in the United States and Mexico, respectively.

Then the real exchange rate between the Mexican peso and the U.S. dollar is defined as:

$$\textbf{(42-1)} \quad \text{Real exchange rate} = \text{Mexican pesos per U.S. dollar} \times \frac{P_{US}}{P_{Mex}}$$

To distinguish it from the real exchange rate, the exchange rate unadjusted for aggregate price levels is sometimes called the *nominal* exchange rate.

To understand the significance of the difference between the real and nominal exchange rates, let's consider the following example. Suppose that the Mexican peso depreciates against the U.S. dollar, with the exchange rate going from 10 pesos per U.S. dollar to 15 pesos per U.S. dollar, a 50% change. But suppose that at the same time the price of everything in Mexico, measured in pesos, increases by 50%, so that the Mexican price index rises from 100 to 150. We'll assume that there is no change in U.S. prices, so that the U.S. price index remains at 100. The initial real exchange rate is:

$$\text{Pesos per dollar} \times \frac{P_{US}}{P_{Mex}} = 10 \times \frac{100}{100} = 10$$

After the peso depreciates and the Mexican price level increases, the real exchange rate is:

$$\text{Pesos per dollar} \times \frac{P_{US}}{P_{Mex}} = 15 \times \frac{100}{150} = 10$$

In this example, the peso has depreciated substantially in terms of the U.S. dollar, but the *real* exchange rate between the peso and the U.S. dollar hasn't changed at all. And because the real peso–U.S. dollar exchange rate hasn't changed, the nominal depreciation of the peso against the U.S. dollar will have no effect either on the quantity of goods and services exported by Mexico to the United States or on the quantity of goods and services imported by Mexico from the United States. To see why, consider again the example of a hotel room. Suppose that this room initially costs 1,000 pesos per night, which is $100 at an exchange rate of 10 pesos per dollar. After both Mexican prices and the number of pesos per dollar rise by 50%, the hotel room costs 1,500 pesos per night—but 1,500 pesos divided by 15 pesos per dollar is $100, so the Mexican hotel room still costs $100. As a result, a U.S. tourist considering a trip to Mexico will have no reason to change plans.

PhotoSpin, Inc/Alamy

The same is true for all goods and services that enter into trade: *the current account responds only to changes in the real exchange rate, not the nominal exchange rate.* A country's products become cheaper to foreigners only when that country's currency depreciates in real terms, and those products become more expensive to foreigners only when the currency appreciates in real terms. As a consequence, economists who analyze movements in exports and imports of goods and services focus on the real exchange rate, not the nominal exchange rate.

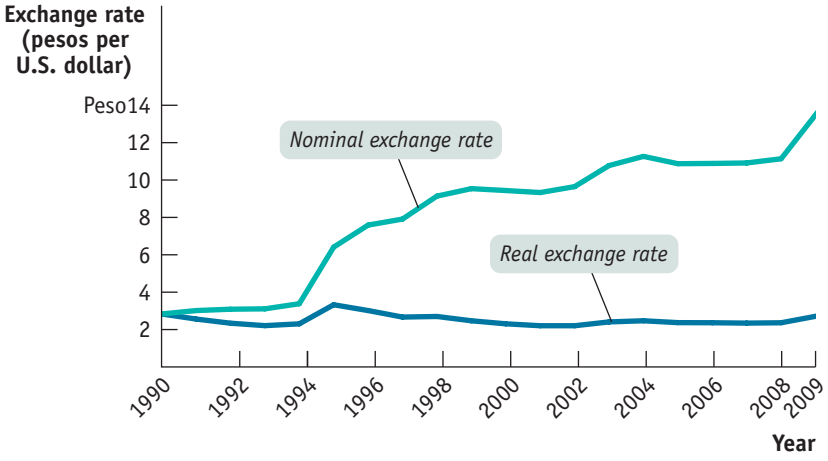
Figure 42.3 illustrates just how important it can be to distinguish between nominal and real exchange rates. The line labeled "Nominal exchange rate" shows the number of pesos it took to buy a U.S. dollar from 1990 to 2009. As you can see, the peso depreciated massively over that period. But the line labeled "Real exchange rate" shows the real exchange rate: it was calculated using Equation 42.1, with price indexes for both Mexico and the United States set so that the value in 1990 was 100. In real terms, the

figure 42.3

Real versus Nominal Exchange Rates, 1990–2009

Between 1990 and 2009, the price of a dollar in Mexican pesos increased dramatically. But because Mexico had higher inflation than the United States, the real exchange rate, which measures the relative price of Mexican goods and services, ended up roughly where it started.

Source: OECD.



peso depreciated between 1994 and 1995, and again in 2008, but not by nearly as much as the nominal depreciation. By 2009, the real peso–U.S. dollar exchange rate was just about back where it started.

Purchasing Power Parity

A useful tool for analyzing exchange rates, closely connected to the concept of the real exchange rate, is known as *purchasing power parity*. The **purchasing power parity** between two countries' currencies is the nominal exchange rate at which a given basket of goods and services would cost the same amount in each country. Suppose, for example, that a basket of goods and services that costs $100 in the United States costs 1,000 pesos in Mexico. Then the purchasing power parity is 10 pesos per U.S. dollar: at that exchange rate, 1,000 pesos = $100, so the market basket costs the same amount in both countries.

The **purchasing power parity** between two countries' currencies is the nominal exchange rate at which a given basket of goods and services would cost the same amount in each country.

Calculations of purchasing power parities are usually made by estimating the cost of buying broad market baskets containing many goods and services—everything from automobiles and groceries to housing and telephone calls. But once a year the magazine *The Economist* publishes a list of purchasing power parities based on the cost of buying a market basket that contains only one item—a McDonald's Big Mac.

Nominal exchange rates almost always differ from purchasing power parities. Some of these differences are systematic: in general, aggregate price levels are lower in poor countries than in rich countries because services tend to be cheaper in poor countries. But even among countries at roughly the same level of economic development, nominal exchange rates vary quite a lot from purchasing power parity. Figure 42.4 shows the nominal exchange rate between the Canadian dollar and the U.S. dollar, measured as the number of Canadian dollars per U.S. dollar, from 1990 to 2008, together with an estimate of the purchasing power parity exchange rate between the United States and Canada over the same period. The purchasing power parity didn't change much over the whole period because the United States and Canada had about the same rate of inflation. But at the beginning of the period the nominal exchange rate was below purchasing power parity, so a given market basket was more expensive in Canada than in the United States. By 2002, the nominal exchange rate was far above the purchasing power parity, so a market basket was much cheaper in Canada than in the United States.

fyi

Burgernomics

For a number of years the British magazine *The Economist* has produced an annual comparison of the cost in different countries of one particular consumption item that is found around the world—a McDonald's Big Mac. The magazine finds the price of a Big Mac in local currency, then computes two numbers: the price of a Big Mac in U.S. dollars using the prevailing exchange rate, and the exchange rate at which the price of a Big Mac would equal the U.S. price. If purchasing power parity held for Big Macs, the dollar price of a Big Mac would be the same everywhere. If purchasing power parity is a good theory for the long run, the exchange rate at which a Big Mac's price matches the


Photodisc

U.S. price should offer some guidance about where the exchange rate will eventually end up.

In the July 2009 version of the Big Mac index, there were some wide variations in the dollar price of a Big Mac. In the U.S., the price was $3.57. In China, converting at the official exchange rate, a Big Mac cost only $1.83. In Switzerland, though, the price was $5.98.

The Big Mac index suggested that the euro would eventually fall against the dollar: a Big Mac on average cost €3.31, so that the purchasing power parity was $1.08 per €1 versus an actual market exchange rate of $1.39.

Serious economic studies of purchasing power parity require data on the prices of many goods and services. It turns out, however, that estimates of purchasing power parity based on the Big Mac index usually aren't that different from more elaborate measures. Fast food seems to make for pretty good fast research.

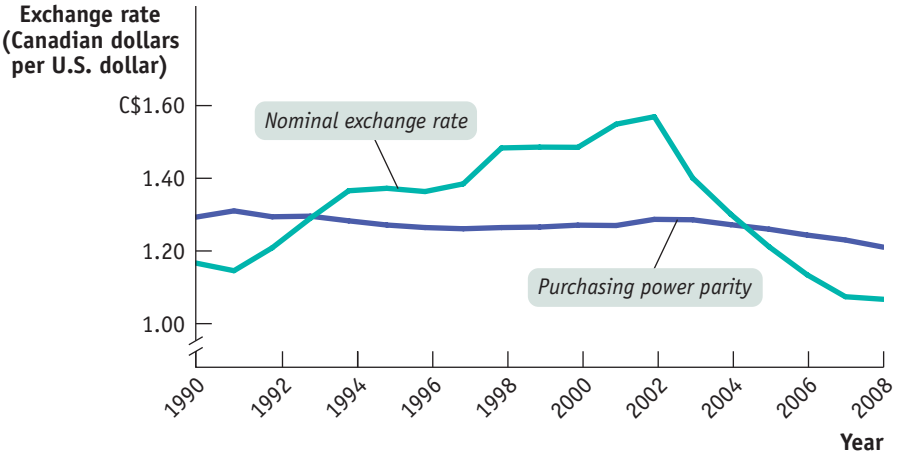
Over the long run, however, purchasing power parities are pretty good at predicting actual changes in nominal exchange rates. In particular, nominal exchange rates between countries at similar levels of economic development tend to fluctuate around levels that lead to similar costs for a given market basket. In fact, by July 2005, the nominal exchange rate between the United States and Canada was C$1.22 per US$1—just about the purchasing power parity. And by 2008, the cost of living was once again higher in Canada than in the United States.

figure 42.4

Purchasing Power Parity versus the Nominal Exchange Rate, 1990–2008

The purchasing power parity between the United States and Canada—the exchange rate at which a basket of goods and services would have cost the same amount in both countries—changed very little over the period shown, staying near C$1.20 per US$1. But the nominal exchange rate fluctuated widely.

Source: OECD.



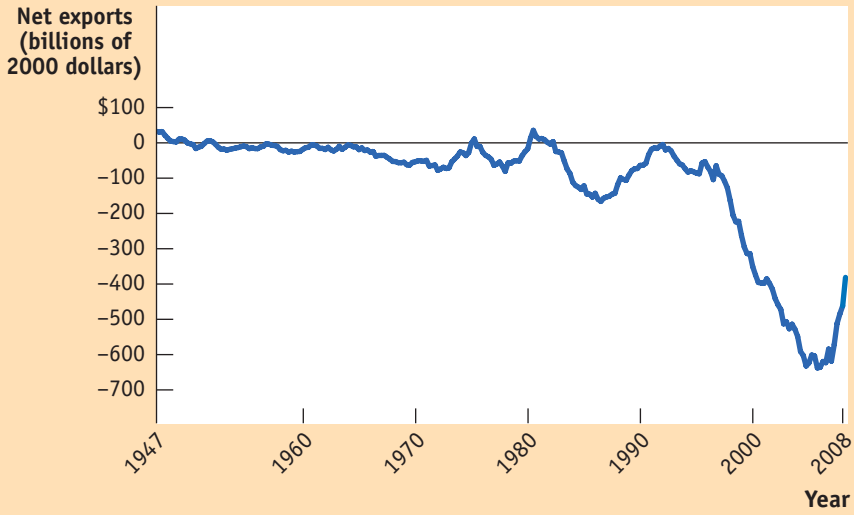
fyi

Low-Cost America

Does the exchange rate matter for business decisions? And how. Consider what European auto manufacturers were doing in 2008. One report from the University of Iowa summarized the situation as follows:

While luxury German carmakers BMW and Mercedes have maintained plants in the American South since the 1990s, BMW aims to expand U.S. manufacturing in South Carolina by 50% during the next five years. Volvo of Sweden is in negotiations to build a plant in New Mexico. Analysts at Italian carmaker Fiat determined that it needs to build a North American factory to profit from the upcoming re-launch of its Alfa Romeo model. Tennessee recently closed a deal with Volkswagen to build a $1 billion factory by offering $577 million in incentives.

Why were European automakers flocking to America? To some extent because they were being offered special incentives, as the case of Volkswagen in Tennessee illustrates. But the big factor was the exchange rate. In the early 2000s, one euro was, on average, worth less than a dollar; by the summer of 2008 the exchange rate was around €1 = $1.50. This change in the exchange rate made it substantially cheaper for European car manufacturers to produce in the United States than at home—especially if the cars were intended for the U.S. market.



Automobile manufacturing wasn't the only U.S. industry benefiting from the weak dollar; across the board, U.S. exports surged after 2006 while import growth fell off. The figure shows one measure of U.S. trade performance, real net exports of goods and services: exports minus imports, both measured in 2000 dollars. As you can see, this balance, after a long slide, turned sharply upward in 2006.

The positive effects of the weak dollar on net exports were good news for the U.S. economy. The collapse of the housing bubble after 2006 was a big drag on aggregate demand; rising net exports were a welcome offsetting boost.

Module 42 AP Review

Solutions appear at the back of the book.

Check Your Understanding

1. Suppose Mexico discovers huge reserves of oil and starts exporting oil to the United States. Describe how this would affect the following:
   a. the nominal peso–U.S. dollar exchange rate
   b. Mexican exports of other goods and services
   c. Mexican imports of goods and services

2. Suppose a basket of goods and services that costs $100 in the United States costs 800 pesos in Mexico and the current nominal exchange rate is 10 pesos per U.S. dollar. Over the next five years, the cost of that market basket rises to $120 in the United States and to 1,200 pesos in Mexico, although the nominal exchange rate remains at 10 pesos per U.S. dollar. Calculate the following:
   a. the real exchange rate now and five years from now, if today's price index in both countries is 100
   b. purchasing power parity today and five years from now

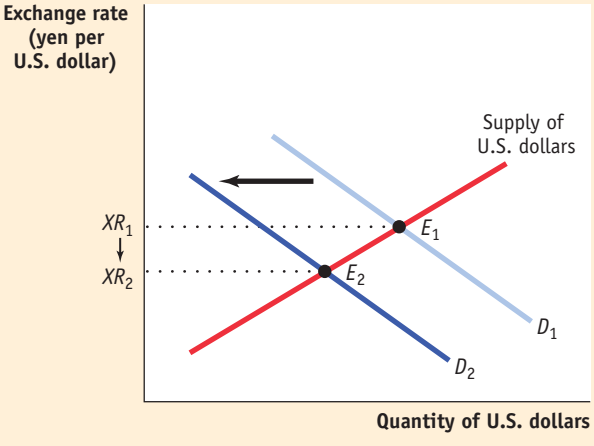
Tackle the Test: Multiple-Choice Questions

1. When the U.S. dollar buys more Japanese yen, the U.S. dollar has
   I. become more valuable in terms of the yen.
   II. appreciated.
   III. depreciated
   a. I only
   b. II only
   c. III only
   d. I and II only
   e. I and III only
2. The nominal exchange rate at which a given basket of goods and services would cost the same in each country describes
   a. the international consumer price index (ICPI).
   b. appreciation.
   c. depreciation.
   d. purchasing power parity.
   e. the balance of payments on the current account.
3. What happens to the real exchange rate between the euro and the U.S. dollar (expressed as euros per dollar) if the aggregate price levels in Europe and the United States both fall? It
   a. is unaffected.
   b. increases.
   c. decreases.
   d. may increase, decrease, or stay the same.
   e. cannot be calculated.
4. Which of the following would cause the real exchange rate between pesos and U.S. dollars (in terms of pesos per dollar) to decrease?
   a. an increase in net capital flows from Mexico to the United States
   b. an increase in the real interest rate in Mexico relative to the United States
   c. a doubling of prices in both Mexico and the United States
   d. a decrease in oil exports from Mexico to the United States
   e. an increase in the balance of payments on the current account in the United States
5. Which of the following will decrease the supply of U.S. dollars in the foreign exchange market?
   a. U.S. residents increase their travel abroad.
   b. U.S. consumers demand fewer imports.
   c. Foreigners increase their demand for U.S. goods.
   d. Foreigners increase their travel to the United States.
   e. Foreign investors see increased investment opportunities in the United States.

Tackle the Test: Free-Response Questions

1. Draw a correctly labeled graph of the foreign exchange market showing the effect on the equilibrium exchange rate between the U.S. and Japan (the number of yen per U.S. dollar) if capital flows from Japan to the United States decrease due to a change in the preferences of Japanese investors. Has the U.S. dollar appreciated or depreciated?

Answer (7 points)



1 point: The axes are labeled "Exchange rate (yen per U.S. dollar)" and "Quantity of U.S. dollars".

1 point: The supply of U.S. dollars is labeled and slopes upward.

1 point: The demand for U.S. dollars is labeled and slopes downward.

1 point: The initial equilibrium exchange rate is found at the intersection of the initial supply and demand curves and is shown on the vertical axis.

1 point: The new demand for U.S. dollars is to the left of the initial demand.

1 point: The new equilibrium exchange rate is found where the initial supply curve and new demand curve intersect and is shown on the vertical axis.

1 point: The U.S. dollar has depreciated.

2. Use a correctly labeled graph of the foreign exchange market between the U.S. and Europe to illustrate what would happen to the value of the U.S. dollar if there were an increase in the U.S. demand for imports from Europe.

What you will learn in this Module:

- The difference between fixed exchange rates and floating exchange rates
- Considerations that lead countries to choose different exchange rate regimes.

Module 43
Exchange Rate Policy

Exchange Rate Policy

The nominal exchange rate, like other prices, is determined by supply and demand. Unlike the price of wheat or oil, however, the exchange rate is the price of a country's money (in terms of another country's money). Money isn't a good or service produced by the private sector; it's an asset whose quantity is determined by government policy. As a result, governments have much more power to influence nominal exchange rates than they have to influence ordinary prices.

The nominal exchange rate is a very important price for many countries: the exchange rate determines the price of imports; it determines the price of exports; in economies where exports and imports are large relative to GDP, movements in the exchange rate can have major effects on aggregate output and the aggregate price level. What do governments do with their power to influence this important price?

The answer is, it depends. At different times and in different places, governments have adopted a variety of *exchange rate regimes.* Let's talk about these regimes, how they are enforced, and how governments choose a regime. (From now on, we'll adopt the convention that we mean the nominal exchange rate when we refer to the exchange rate.)

Exchange Rate Regimes

An **exchange rate regime** is a rule governing policy toward the exchange rate. There are two main kinds of exchange rate regimes. A country has a **fixed exchange rate** when the government keeps the exchange rate against some other currency at or near a particular target. For example, Hong Kong has an official policy of setting an exchange rate of HK$7.80 per US$1. A country has a **floating exchange rate** when the government lets the exchange rate go wherever the market takes it. This is the policy followed by Britain, Canada, and the United States.

Fixed exchange rates and floating exchange rates aren't the only possibilities. At various times, countries have adopted compromise policies that lie somewhere between fixed and floating exchange rates. These include exchange rates that are fixed at any given time but are adjusted frequently, exchange rates that aren't fixed but are "managed" by the government to avoid wide swings, and exchange rates that float within a "target zone" but are prevented from leaving that zone. In this book, however, we'll focus on the two main exchange rate regimes.

An **exchange rate regime** is a rule governing policy toward the exchange rate.

A country has a **fixed exchange rate** when the government keeps the exchange rate against some other currency at or near a particular target.

A country has a **floating exchange rate** when the government lets the exchange rate go wherever the market takes it.

Government purchases or sales of currency in the foreign exchange market constitute **exchange market intervention.**

Foreign exchange reserves are stocks of foreign currency that governments maintain to buy their own currency on the foreign exchange market.

The immediate question about a fixed exchange rate is how it is possible for governments to fix the exchange rate when the exchange rate is determined by supply and demand.

How Can an Exchange Rate Be Held Fixed?

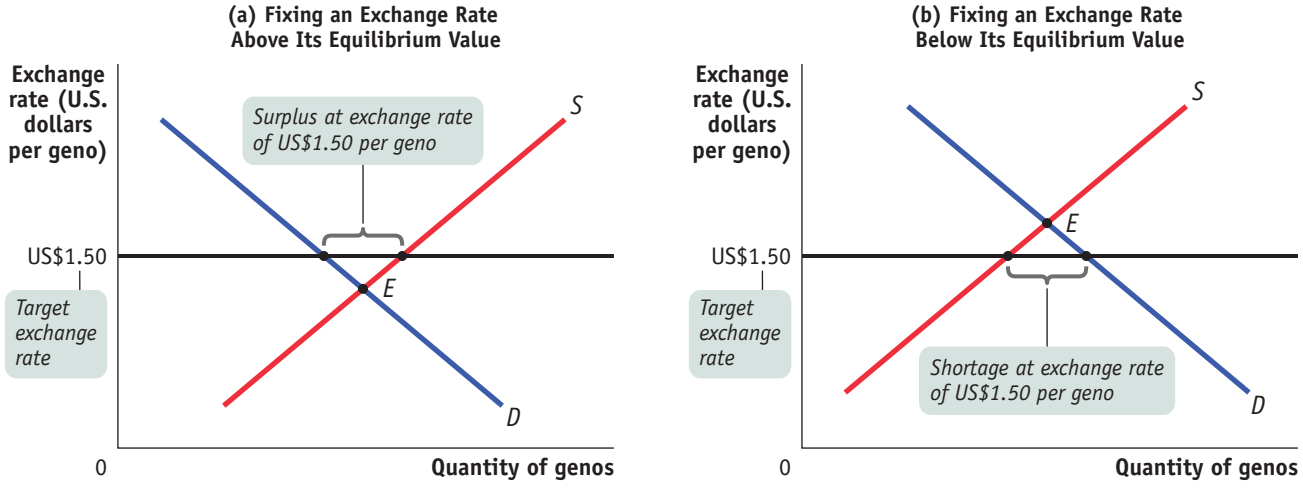
To understand how it is possible for a country to fix its exchange rate, let's consider a hypothetical country, Genovia, which for some reason has decided to fix the value of its currency, the geno, at US$1.50.

The obvious problem is that $1.50 may not be the equilibrium exchange rate in the foreign exchange market: the equilibrium rate may be either higher or lower than the target exchange rate. Figure 43.1 shows the foreign exchange market for genos, with the quantities of genos supplied and demanded on the horizontal axis and the exchange rate of the geno, measured in U.S. dollars per geno, on the vertical axis. Panel (a) shows the case in which the equilibrium value of the geno is *below* the target exchange rate. Panel (b) shows the case in which the equilibrium value of the geno is *above* the target exchange rate.

Consider first the case in which the equilibrium value of the geno is below the target exchange rate. As panel (a) shows, at the target exchange rate there is a surplus of genos in the foreign exchange market, which would normally push the value of the geno down. How can the Genovian government support the value of the geno to keep the rate where it wants? There are three possible answers, all of which have been used by governments at some point.

One way the Genovian government can support the geno is to "soak up" the surplus of genos by buying its own currency in the foreign exchange market. Government purchases or sales of currency in the foreign exchange market are called **exchange market intervention.** To buy genos in the foreign exchange market, of course, the Genovian government must have U.S. dollars to exchange for genos. In fact, most countries maintain **foreign exchange reserves,** stocks of foreign currency (usually U.S. dollars or euros) that they can use to buy their own currency to support its price.

figure 43.1 Exchange Market Intervention



In both panels, the imaginary country of Genovia is trying to keep the value of its currency, the geno, fixed at US$1.50. In panel (a), there is a surplus of genos on the foreign exchange market. To keep the geno from falling, the Genovian government can buy genos and sell U.S. dollars. In panel (b), there is a shortage of genos. To keep the geno from rising, the Genovian government can sell genos and buy U.S. dollars.

We mentioned earlier that an important part of international capital flows is the result of purchases and sales of foreign assets by governments and central banks. Now we can see why governments sell foreign assets: they are supporting their currency through exchange market intervention. As we'll see in a moment, governments that keep the value of their currency *down* through exchange market intervention must *buy* foreign assets. First, however, let's talk about the other ways governments fix exchange rates.

A second way for the Genovian government to support the geno is to try to shift the supply and demand curves for the geno in the foreign exchange market. Governments usually do this by changing monetary policy. For example, to support the geno, the Genovian central bank can raise the Genovian interest rate. This will increase capital flows into Genovia, increasing the demand for genos, at the same time that it reduces capital flows out of Genovia, reducing the supply of genos. So, other things equal, an increase in a country's interest rate will increase the value of its currency.

Third, the Genovian government can support the geno by reducing the supply of genos to the foreign exchange market. It can do this by requiring domestic residents who want to buy foreign currency to get a license and giving these licenses only to people engaging in approved transactions (such as the purchase of imported goods the Genovian government thinks are essential). Licensing systems that limit the right of individuals to buy foreign currency are called **foreign exchange controls.** Other things equal, foreign exchange controls increase the value of a country's currency.

Foreign exchange controls are licensing systems that limit the right of individuals to buy foreign currency.

So far we've been discussing a situation in which the government is trying to prevent a depreciation of the geno. Suppose, instead, that the situation is as shown in panel (b) of Figure 43.1, where the equilibrium value of the geno is *above* the target exchange rate and there is a shortage of genos. To maintain the target exchange rate, the Genovian government can apply the same three basic options in the reverse direction. It can intervene in the foreign exchange market, in this case *selling* genos and acquiring U.S. dollars, which it can add to its foreign exchange reserves. It can *reduce* interest rates to increase the supply of genos and reduce the demand. Or it can impose foreign exchange controls that limit the ability of foreigners to buy genos. All of these actions, other things equal, will reduce the value of the geno.

As we said, all three techniques have been used to manage fixed exchange rates. But we haven't said whether fixing the exchange rate is a good idea. In fact, the choice of exchange rate regime poses a dilemma for policy makers because fixed and floating exchange rates each have both advantages and disadvantages.

The Exchange Rate Regime Dilemma

Few questions in macroeconomics produce as many arguments as that of whether a country should adopt a fixed or a floating exchange rate. The reason there are so many arguments is that both sides have a case.

To understand the case for a fixed exchange rate, consider for a moment how easy it is to conduct business across state lines in the United States. There are a number of things that make interstate commerce trouble-free, but one of them is the absence of any uncertainty about the value of money: a dollar is a dollar, in both New York City and Los Angeles.

By contrast, a dollar isn't a dollar in transactions between New York City and Toronto. The exchange rate between the Canadian dollar and the U.S. dollar fluctuates, sometimes widely. If a U.S. firm promises to pay a Canadian firm a given number of U.S. dollars a year from now, the value of that promise in Canadian currency can vary by 10% or more. This uncertainty has the effect of deterring trade between the two countries. So one benefit of a fixed exchange rate is certainty about the future value of a currency.

Robert Nickelsberg/Getty Images

Once you cross the border into Canada, a dollar is no longer worth a dollar.

There is also, in some cases, an additional benefit to adopting a fixed exchange rate: by committing itself to a fixed rate, a country is also committing itself not to engage in inflationary policies because such policies would destabilize the exchange rate. For example, in 1991, Argentina, which has a long history of irresponsible policies leading to severe inflation, adopted a fixed exchange rate of US$1 per Argentine peso in an attempt to commit itself to non-inflationary policies in the future. (Argentina's fixed exchange rate regime collapsed disastrously in late 2001. But that's another story.)

The point is that there is some economic value in having a stable exchange rate. Indeed, the presumed benefits of stable exchange rates motivated the international system of fixed exchange rates created after World War II. It was also a major reason for the creation of the euro.

However, there are also costs to fixing the exchange rate. To stabilize an exchange rate through intervention, a country must keep large quantities of foreign currency on hand, and that currency is usually a low-return investment. Furthermore, even large reserves can be quickly exhausted when there are large capital flows out of a country. If a country chooses to stabilize an exchange rate by adjusting monetary policy rather than through intervention, it must divert monetary policy from other goals, notably stabilizing the economy and managing the inflation rate. Finally, foreign exchange controls, like import quotas and tariffs, distort incentives for importing and exporting goods and services. They can also create substantial costs in terms of red tape and corruption.

So there's a dilemma. Should a country let its currency float, which leaves monetary policy available for macroeconomic stabilization but creates uncertainty for everyone affected by trade? Or should it fix the exchange rate, which eliminates the uncertainty but means giving up monetary policy, adopting exchange controls, or both? Different countries reach different conclusions at different times. Most European countries, except for Britain, have long believed that exchange rates among major European economies, which do most of their international trade with each other, should be fixed. But Canada seems happy with a floating exchange rate with the United States, even though the United States accounts for most of Canada's trade.

In the next module we'll consider macroeconomic policy under each type of exchange rate regime.

fyi

China Pegs the Yuan

In the early years of the twenty-first century, China provided a striking example of the lengths to which countries sometimes go to maintain a fixed exchange rate. Here's the background: China's spectacular success as an exporter led to a rising surplus on the current account. At the same time, non-Chinese private investors became increasingly eager to shift funds into China, to take advantage of its growing domestic economy. These capital flows were somewhat limited by foreign exchange controls—but kept coming in anyway. As a result of the current account surplus and private capital inflows, China found itself in the position described by panel (b) of Figure 43.1: at the target exchange rate, the demand for yuan exceeded the supply. Yet the Chinese government was determined to keep the exchange rate fixed (although it began allowing gradual appreciation in 2005).

To keep the rate fixed, China had to engage in large-scale exchange market intervention, selling yuan, buying up other countries' currencies (mainly U.S. dollars) on the foreign exchange market, and adding them to its reserves. During 2008, China added $418 billion to its foreign exchange reserves, bringing the year-end total to $1.9 trillion.

To get a sense of how big these totals are, you have to know that in 2008 China's nominal GDP, converted into U.S. dollars at the prevailing exchange rate, was $4.25 trillion. So in 2008, China bought U.S. dollars and other currencies equal to about 10% of its GDP. That's as if the U.S. government had bought $1.4 trillion worth of yen and euros in just a single year—and was continuing to buy yen and euros even though it was already sitting on a $7 trillion pile of foreign currencies.

Chris Cameron/Alamy

China has a history of intervention in the foreign exchange market that kept its currency, and therefore its exports, relatively cheap for foreign consumers to buy.

Module 43 AP Review

Solutions appear at the back of the book.

Check Your Understanding

1. Draw a diagram, similar to Figure 43.1, representing the foreign exchange situation of China when it kept the exchange rate fixed at a target rate of $0.121 per yuan and the market equilibrium rate was higher than the target rate. Then show with a diagram how each of the following policy changes might eliminate the disequilibrium in the market.
   a. allowing the exchange rate to float more freely
   b. placing restrictions on foreigners who want to invest in China
   c. removing restrictions on Chinese who want to invest abroad
   d. imposing taxes on Chinese exports, such as clothing

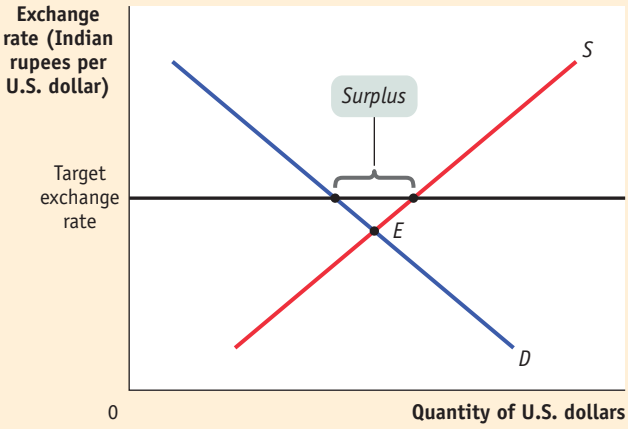
Tackle the Test: Multiple-Choice Questions

1. Which of the following methods can be used to fix a country's exchange rate at a predetermined level?
   I. using foreign exchange reserves to buy its own currency
   II. using monetary policy to change interest rates
   III. implementing foreign exchange controls
   a. I only
   b. II only
   c. III only
   d. I and II only
   e. I, II, and III
2. Changes in exchange rates affect which of the following?
   a. the price of imports
   b. the price of exports
   c. aggregate demand
   d. aggregate output
   e. all of the above
3. The United States has which of the following exchange rate regimes?
   a. fixed
   b. floating
   c. fixed, but adjusted frequently
   d. fixed, but managed
   e. floating within a target zone
4. Which of the following interventions would be required to keep a country's exchange rate fixed if the equilibrium exchange rate in the foreign exchange market were below the fixed exchange rate (measured as units of foreign currency per unit of domestic currency)? The government/central bank
   a. buys the domestic currency.
   b. sells the domestic currency.
   c. buys the foreign currency.
   d. lowers domestic interest rates.
   e. removes foreign exchange controls.
5. Which of the following is a benefit of a fixed exchange rate regime?
   a. certainty about the value of domestic currency
   b. commitment to inflationary policies
   c. no need for foreign exchange reserves
   d. allows unrestricted use of monetary policy
   e. all of the above

Tackle the Test: Free-Response Questions

1. Suppose the United States and India were the only two countries in the world.
   a. Draw a correctly labeled graph of the foreign exchange market for U.S. dollars showing the equilibrium in the market.
   b. On your graph, indicate a fixed exchange rate set above the equilibrium exchange rate. Does the fixed exchange rate lead to a surplus or shortage of U.S. dollars? Explain and show the amount of the surplus/shortage on your graph.
   c. To bring the foreign exchange market back to an equilibrium at the fixed exchange rate, would the U.S. government need to buy or sell dollars? On your graph, illustrate how the government's buying or selling of dollars would bring the equilibrium exchange rate back to the desired fixed rate.

Answer (9 points)



1 point: The vertical axis is labeled "Exchange rate (Indian rupees per U.S. dollar)" and the horizontal axis is labeled "Quantity of U.S. dollars."

1 point: Demand is downward sloping and labeled, supply is upward sloping and labeled.

1 point: The equilibrium exchange rate and the equilibrium quantity of dollars are labeled on the axes at the point where the supply and demand curves intersect.

1 point: The fixed exchange rate level is depicted above the equilibrium exchange rate.

1 point: Surplus

1 point: The quantity supplied exceeds the quantity demanded at the higher fixed exchange rate.

1 point: The surplus is labeled as the horizontal distance between the supply and demand curves at the fixed exchange rate.

1 point: Buy

1 point: The new demand curve is shown to the right of the old demand curve, crossing the supply curve at the fixed exchange rate.

2. List three tools used to fix exchange rates and explain the major costs resulting from their use.

What you will learn in this Module:

- The meaning and purpose of devaluation and revaluation of a currency under a fixed exchange rate regime
- Why open-economy considerations affect macroeconomic policy under floating exchange rates

Module 44
Exchange Rates and Macroeconomic Policy

Exchange Rates and Macroeconomic Policy

When the euro was created in 1999, there were celebrations across the nations of Europe—with a few notable exceptions. You see, some countries chose not to adopt the new currency. The most important of these was Britain, but other European countries, such as Switzerland and Sweden, also decided that the euro was not for them.

Why did Britain say no? Part of the answer was national pride: for example, if Britain gave up the pound, it would also have to give up currency that bears the portrait of the queen. But there were also serious economic concerns about giving up the pound in favor of the euro. British economists who favored adoption of the euro argued that if Britain used the same currency as its neighbors, the country's international trade would expand and its economy would become more productive. But other economists pointed out that adopting the euro would take away Britain's ability to have an independent monetary policy and might lead to macroeconomic problems.

As this discussion suggests, the fact that modern economies are open to international trade and capital flows adds a new level of complication to our analysis of macroeconomic policy. Let's look at three policy issues raised by open-economy macroeconomics.

Devaluation and Revaluation of Fixed Exchange Rates

Historically, fixed exchange rates haven't been permanent commitments. Sometimes countries with a fixed exchange rate switch to a floating rate. In other cases, they retain a fixed exchange rate regime but change the target exchange rate. Such adjustments in the target were common during the Bretton Woods era. For example, in 1967 Britain changed the exchange rate of the pound against the U.S. dollar from US$2.80 per £1 to US$2.40 per £1. A modern example is Argentina, which maintained a fixed exchange rate against the dollar from 1991 to 2001, but switched to a floating exchange rate at the end of 2001.

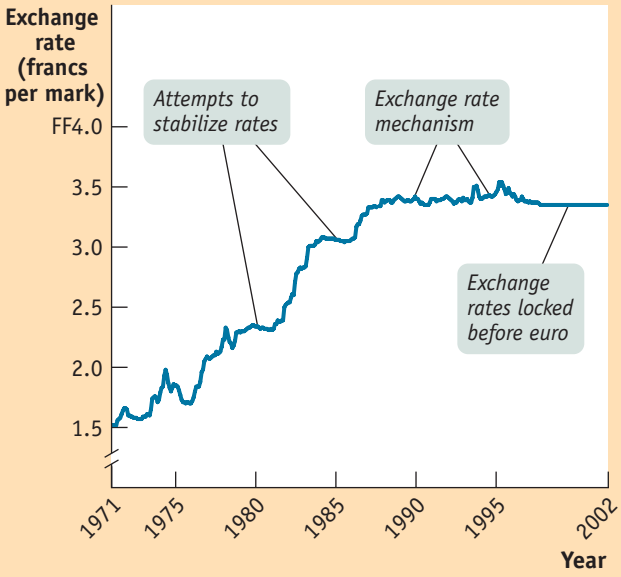
fyi

From Bretton Woods to the Euro

In 1944, while World War II was still raging, representatives of the Allied nations met in Bretton Woods, New Hampshire, to establish a postwar international monetary system of fixed exchange rates among major currencies. The system was highly successful at first, but it broke down in 1971. After a confusing interval during which policy makers tried unsuccessfully to establish a new fixed exchange rate system, by 1973 most economically advanced countries had moved to floating exchange rates.

In Europe, however, many policy makers were unhappy with floating exchange rates, which they believed created too much uncertainty for business. From the late 1970s onward they tried several times to create a system of more or less fixed exchange rates in Europe, culminating in an arrangement known as the Exchange Rate Mechanism. (The Exchange Rate Mechanism was, strictly speaking, a "target zone" system—exchange rates were free to move within a narrow band, but not outside it.) And in 1991 they agreed to move to the ultimate in fixed exchange rates: a common European currency, the euro. To the surprise of many analysts, they pulled it off: today most of Europe has abandoned national currencies for euros.

The accompanying figure illustrates the history of European exchange rate arrangements. It shows the exchange rate between the French franc and the German mark, measured as francs per mark, since 1971. The exchange rate fluctuated widely at first. The "plateaus" you can see in the data—eras when the exchange rate fluctuated only modestly—are periods when attempts to restore fixed exchange rates were in process. The Exchange Rate Mechanism, after a couple of false starts, became effective in 1987, stabilizing the exchange rate at about 3.4 francs per mark. (The wobbles in the early 1990s reflect two currency crises—episodes in which widespread expectations of imminent devaluations led to large but temporary capital flows.)



In 1999 the exchange rate was "locked"—no further fluctuations were allowed as the countries prepared to switch from francs and marks to euros. At the end of 2001, the franc and the mark ceased to exist.

The transition to the euro has not been without costs. With most of Europe sharing the same currency, it must also share the same monetary policy. Yet economic conditions in the different countries aren't always the same.

Indeed, as this book went to press, there were serious stresses within the eurozone because the world financial crisis was hitting some countries, such as Greece, Portugal, Spain and Ireland, much more severely than it was hitting others, notably Germany.

A **devaluation** is a reduction in the value of a currency that is set under a fixed exchange rate regime.

A **revaluation** is an increase in the value of a currency that is set under a fixed exchange rate regime.

A reduction in the value of a currency that is set under a fixed exchange rate regime is called **devaluation.** As we've already learned, a *depreciation* is a downward move in a currency. A devaluation is a depreciation that is due to a revision in a fixed exchange rate target. An increase in the value of a currency that is set under a fixed exchange rate regime is called a **revaluation.**

A devaluation, like any depreciation, makes domestic goods cheaper in terms of foreign currency, which leads to higher exports. At the same time, it makes foreign goods more expensive in terms of domestic currency, which reduces imports. The effect is to increase the balance of payments on the current account. Similarly, a revaluation makes domestic goods more expensive in terms of foreign currency, which reduces exports, and makes foreign goods cheaper in domestic currency, which increases imports. So a revaluation reduces the balance of payments on the current account.

Devaluations and revaluations serve two purposes under a fixed exchange rate regime. First, they can be used to eliminate shortages or surpluses in the foreign exchange market. For example, in 2010, some economists were urging China to revalue

the yuan so that it would not have to buy up so many U.S. dollars on the foreign exchange market.

Second, devaluation and revaluation can be used as tools of macroeconomic policy. A devaluation, by increasing exports and reducing imports, increases aggregate demand. So a devaluation can be used to reduce or eliminate a recessionary gap. A revaluation has the opposite effect, reducing aggregate demand. So a revaluation can be used to reduce or eliminate an inflationary gap.

Monetary Policy Under a Floating Exchange Rate Regime

Under a floating exchange rate regime, a country's central bank retains its ability to pursue independent monetary policy: it can increase aggregate demand by cutting the interest rate or decrease aggregate demand by raising the interest rate. But the exchange rate adds another dimension to the effects of monetary policy. To see why, let's return to the hypothetical country of Genovia as discussed in Module 43 and ask what happens if the central bank cuts the interest rate.

Just as in a closed economy, a lower interest rate leads to higher investment spending and higher consumer spending. But the decline in the interest rate also affects the foreign exchange market. Foreigners have less incentive to move funds into Genovia because they will receive a lower rate of return on their loans. As a result, they have less need to exchange U.S. dollars for genos, so the demand for genos falls. At the same time, Genovians have *more* incentive to move funds abroad because the rate of return on loans at home has fallen, making investments outside the country more attractive. Thus, they need to exchange more genos for U.S. dollars and the supply of genos rises.

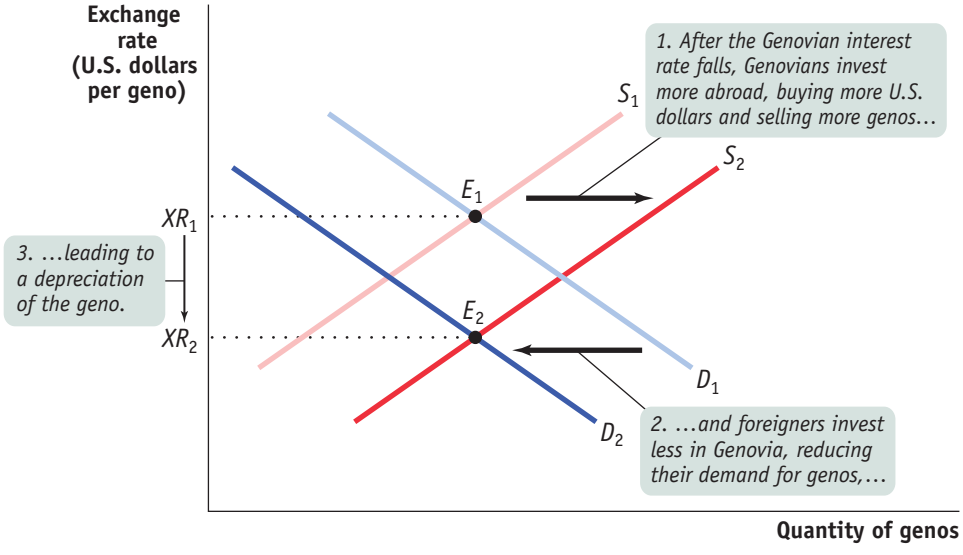
Figure 44.1 shows the effect of an interest rate reduction on the foreign exchange market. The demand curve for genos shifts leftward, from D_1 to D_2, and the supply curve shifts rightward, from S_1 to S_2. The equilibrium exchange rate, as measured in U.S. dollars per geno, falls from XR_1 to XR_2. That is, a reduction in the Genovian interest rate causes the geno to *depreciate*.

The depreciation of the geno, in turn, affects aggregate demand. We've already seen that a devaluation—a depreciation that is the result of a change in a fixed exchange

figure 44.1

Monetary Policy and the Exchange Rate

Here we show what happens in the foreign exchange market if Genovia cuts its interest rate. Residents of Genovia have a reduced incentive to keep their funds at home, so they invest more abroad. As a result, the supply of genos shifts rightward, from S_1 to S_2. Meanwhile, foreigners have less incentive to put funds into Genovia, so the demand for genos shifts leftward, from D_1 to D_2. The geno depreciates: the equilibrium exchange rate falls from XR_1 to XR_2.



rate—increases exports and reduces imports, thereby increasing aggregate demand. A depreciation that results from an interest rate cut has the same effect: it increases exports and reduces imports, increasing aggregate demand.

In other words, monetary policy under floating rates has effects beyond those we've described in looking at closed economies. In a closed economy, a reduction in the interest rate leads to a rise in aggregate demand because it leads to more investment spending and consumer spending. In an open economy with a floating exchange rate, the interest rate reduction leads to increased investment spending and consumer spending, but it also increases aggregate demand in another way: it leads to a currency depreciation, which increases exports and reduces imports, further increasing aggregate demand.

International Business Cycles

Up to this point, we have discussed macroeconomics, even in an open economy, as if all demand changes or *shocks* originated from the domestic economy. In reality, however, economies sometimes face shocks coming from abroad. For example, recessions in the United States have historically led to recessions in Mexico.

The key point is that changes in aggregate demand affect the demand for goods and services produced abroad as well as at home: other things equal, a recession leads to a fall in imports and an expansion leads to a rise in imports. And one country's imports are another country's exports. This link between aggregate demand in different national economies is one reason business cycles in different countries sometimes—but not always—seem to be synchronized. The prime example is the Great Depression, which affected countries around the world.

The extent of this link depends, however, on the exchange rate regime. To see why, think about what happens if a recession abroad reduces the demand for Genovia's exports. A reduction in foreign demand for Genovian goods and services is also a reduction in demand for genos on the foreign exchange market. If Genovia has a fixed exchange rate, it responds to this decline with exchange market intervention. But if Genovia has a floating exchange rate, the geno depreciates. Because Genovian goods and services become cheaper to foreigners when the demand for exports falls, the quantity of goods and services exported doesn't fall by as much as it would under a fixed rate. At the same time, the fall in the geno makes imports more expensive to Genovians, leading to a fall in imports. Both effects limit the decline in Genovia's aggregate demand compared to what it would have been under a fixed exchange rate regime.

HADJ/SIPA

For better or worse, trading partners tend to import each other's business cycles in addition to each other's goods.

One of the virtues of floating exchange rates, according to their advocates, is that they help insulate countries from recessions originating abroad. This theory looked pretty good in the early 2000s: Britain, with a floating exchange rate, managed to stay out of a recession that affected the rest of Europe, and Canada, which also has a floating rate, suffered a less severe recession than the United States.

In 2008, however, a financial crisis that began in the United States seemed to be producing a recession in virtually every country. In this case, it appears that the international linkages between financial markets were much stronger than any insulation from overseas disturbances provided by floating exchange rates.

fyi

The Joy of a Devalued Pound

The Exchange Rate Mechanism is the system of European fixed exchange rates that paved the way for the creation of the euro in 1999. Britain joined that system in 1990 but dropped out in 1992. The story of Britain's exit from the Exchange Rate Mechanism is a classic example of open-economy macroeconomic policy.

Britain originally fixed its exchange rate for both the reasons we described earlier: British leaders believed that a fixed exchange rate would help promote international trade, and they also hoped that it would help fight inflation. But by 1992 Britain was suffering from high unemployment: the unemployment rate in September 1992 was over 10%. And as long as the country had a fixed exchange rate, there wasn't much the government could do. In particular, the government wasn't able to cut interest rates because it was using high interest rates to help support the value of the pound.

In the summer of 1992, investors began speculating against the pound—selling pounds in the expectation that the currency would drop in value. As its foreign reserves dwindled, this speculation forced the British government's hand. On September 16, 1992, Britain abandoned its fixed exchange rate. The pound promptly dropped 20% against the German mark, the most important European currency at the time.

At first, the devaluation of the pound greatly damaged the prestige of the British government. But the Chancellor of the Exchequer—the equivalent of the U.S. Treasury Secretary—claimed to be happy about it. "My wife has never before heard me singing in the bath," he told reporters. There were several reasons for his joy. One was that the British government would no longer have to engage in large-scale exchange market intervention to support the pound's value. Another was that devaluation increases aggregate demand, so the pound's fall would help reduce British unemployment. Finally, because Britain no longer had a fixed exchange rate, it was free to pursue an expansionary monetary policy to fight its slump.

Photodisc

Indeed, events made it clear that the chancellor's joy was well founded. British unemployment fell over the next two years, even as the unemployment rate rose in France and Germany. One person who did not share in the improving employment picture, however, was the chancellor himself. Soon after his remark about singing in the bath, he was fired.

Module 44 AP Review

Solutions appear at the back of the book.

Check Your Understanding

1. Look at the graph in the FYI section on page 438. Where do you see devaluations and revaluations of the franc against the mark?
2. In the late 1980s, Canadian economists argued that the high interest rate policies of the Bank of Canada weren't just causing high unemployment—they were also making it hard for Canadian manufacturers to compete with U.S. manufacturers. Explain this complaint, using our analysis of how monetary policy works under floating exchange rates.

Tackle the Test: Multiple-Choice Questions

1. Devaluation of a currency occurs when which of the following happens?
   - I. The supply of a currency with a floating exchange rate increases.
   - II. The demand for a currency with a floating exchange rate decreases.
   - III. The government decreases the fixed exchange rate.

   a. I only
   b. II only
   c. III only
   d. I and II only
   e. I, II, and III

2. Devaluation of a currency will lead to which of the following?
   a. appreciation of the currency
   b. an increase in exports
   c. an increase in imports
   d. a decrease in exports
   e. floating exchange rates

3. Devaluation of a currency is used to achieve which of the following?
   a. an elimination of a surplus in the foreign exchange market
   b. an elimination of a shortage in the foreign exchange market
   c. a reduction in aggregate demand
   d. a lower inflation rate
   e. a floating exchange rate

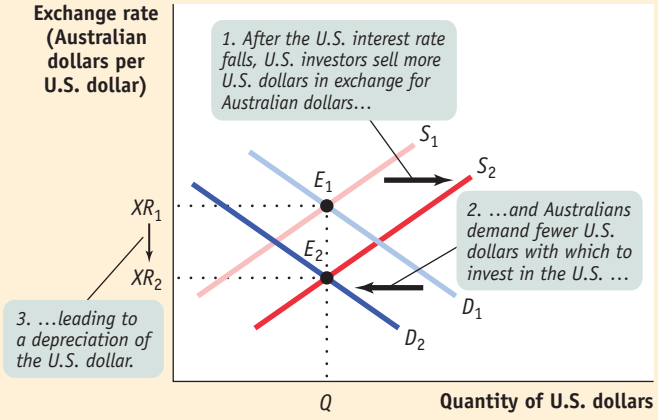
4. Monetary policy that reduces the interest rate will do which of the following?
   a. appreciate the domestic currency
   b. decrease exports
   c. increase imports
   d. depreciate the domestic currency
   e. prevent inflation

5. Which of the following will happen in a country if a trading partner's economy experiences a recession?
   a. It will experience an expansion.
   b. Exports will decrease.
   c. The demand for the country's currency will increase.
   d. The country's currency will appreciate.
   e. All of the above will occur.

Tackle the Test: Free-Response Questions

1. Suppose the United States and Australia were the only two countries in the world, and that both countries pursued a floating exchange rate regime. Note that the currency in Australia is the Australian dollar.
   a. Draw a correctly labeled graph showing equilibrium in the foreign exchange market for U.S. dollars.
   b. If the Federal Reserve pursues expansionary monetary policy, what will happen to the U.S. interest rate and international capital flows? Explain.
   c. On your graph of the foreign exchange market, illustrate the effect of the Fed's policy on the supply of U.S. dollars, the demand for U.S. dollars, and the equilibrium exchange rate.
   d. How does the Fed's monetary policy affect U.S. aggregate demand? Explain.

Answer (10 points)



1 point: The vertical axis is labeled "Exchange rate (Australian dollars per U.S. dollar)" and the horizontal axis is labeled "Quantity of U.S. dollars."

1 point: Demand is downward sloping and labeled; supply is upward sloping and labeled.

1 point: The equilibrium exchange rate and equilibrium quantity of dollars are labeled on the axes at the point where the supply and demand curves intersect.

1 point: The U.S. interest rate falls.

1 point: There is an increase in the capital flow into Australia and an increase in the capital flow out of the United States.

1 point: The lower interest rate in the United States reduces the incentive to invest in the United States and increases the incentive to invest in Australia.

1 point: The supply of U.S. dollars increases.

1 point: The demand for U.S. dollars decreases.

1 point: The exchange rate falls (the U.S. dollar depreciates).

1 point: The lower exchange rate leads to more exports from the United States to Australia (they are cheaper now) and fewer imports into the United States from Australia (they are more expensive now). When exports increase and imports decrease, U.S. aggregate demand increases.

2. Explain how a floating exchange rate system can help insulate a country from recessions abroad.

What you will learn in this Module:

- How to use macroeconomic models to conduct policy analysis
- How to approach free-response macroeconomics questions

Module 45
Putting It All Together

Having completed our study of the basic macroeconomic models, we can use them to analyze scenarios and evaluate policy recommendations. In this module we develop a step-by-step approach to macroeconomic analysis. You can adapt this approach to problems involving any macroeconomic model, including models of aggregate demand and supply, production possibilities, money markets, and the Phillips curve. By the end of this module you will be able to combine mastery of the principles of macroeconomics with problem solving skills to analyze a new scenario on your own.

A Structure for Macroeconomic Analysis

In our study of macroeconomics we have seen questions about the macroeconomy take many different forms. No matter what the specific question, most macroeconomic problems have the following components:

1) A *starting point*. To analyze any situation, you have to know where to start.

2) A *pivotal event*. This might be a change in the economy or a policy response to the initial situation.

3) *Initial effects of the event*. An event will generally have some initial, short-run effects.

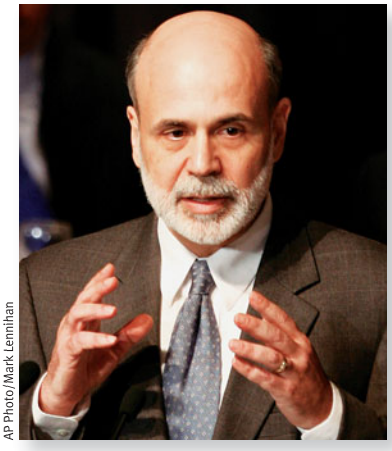
4) *Secondary and long-run effects of the event*. After the short-run effects run their course, there are typically secondary effects and the economy will move toward its long-run equilibrium.

For example, you might be asked to consider the following scenario and answer the associated questions.

Assume the U.S. economy is currently operating at an aggregate output level above potential output. Draw a correctly labeled graph showing aggregate demand, short-run aggregate supply, long-run aggregate supply, equilibrium output, and the aggregate price level. Now assume that the Federal Reserve conducts contractionary monetary policy. Identify the open-market operation the Fed would conduct, and draw a correctly labeled graph of the money market to show the effect of the monetary policy on the nominal interest rate.

Show and explain how the Fed's actions will affect equilibrium in the aggregate demand and supply graph you drew previously. Indicate the new aggregate price level on your graph.

Assume Canada is the largest trading partner of the United States. Draw a correctly labeled graph of the foreign exchange market for the U.S. dollar showing how the change in the aggregate price level



AP Photo/Mark Lennihan

How will the Fed's monetary policy change nominal interest rates?

you indicate on your graph above will affect the foreign exchange market. What will happen to the value of the U.S. dollar relative to the Canadian dollar?

How will the Federal Reserve's contractionary monetary policy affect the real interest rate in the United States? Explain.

Taken as a whole, this scenario and the associated questions can seem overwhelming. Let's start by breaking down our analysis into four components.

1. **The starting point**
   Assume the U.S. economy is currently operating at an aggregate output level above potential output.
2. **The pivotal event**
   Now assume that the Federal Reserve conducts contractionary monetary policy.
3. **Initial effects of the event**
   Show and explain how the Fed's actions will affect equilibrium.
4. **Secondary and long-run effects of the event**
   Assume Canada is the largest trading partner of the United States. What will happen to the value of the U.S. dollar relative to the Canadian dollar?

   How will the Federal Reserve's contractionary monetary policy affect the real interest rate in the United States? Explain.

Now we are ready to look at each of the steps and untangle this scenario.

The Starting Point

Assume the U.S. economy is currently operating at an aggregate output level above potential output. Draw a correctly labeled graph showing aggregate demand, short-run aggregate supply, long-run aggregate supply, equilibrium output, and the aggregate price level.

To analyze a situation, you have to know where to start. You will most often use the aggregate demand-aggregate supply model to evaluate macroeconomic scenarios. In this model, there are three possible starting points: long-run macroeconomic equilibrium, a recessionary gap, and an inflationary gap. This means that there are three possible "starting-point" graphs, as shown in Figure 45.1. The economy can be in long-run macroeconomic equilibrium with production at potential output as in panel (a), it can be in short-run macroeconomic equilibrium at an aggregate output level below potential output (creating a recessionary gap) as in panel (b), or it can be in short-run macroeconomic equilibrium at an aggregate output level above potential output (creating an inflationary gap) as in panel (c) and in our scenario.

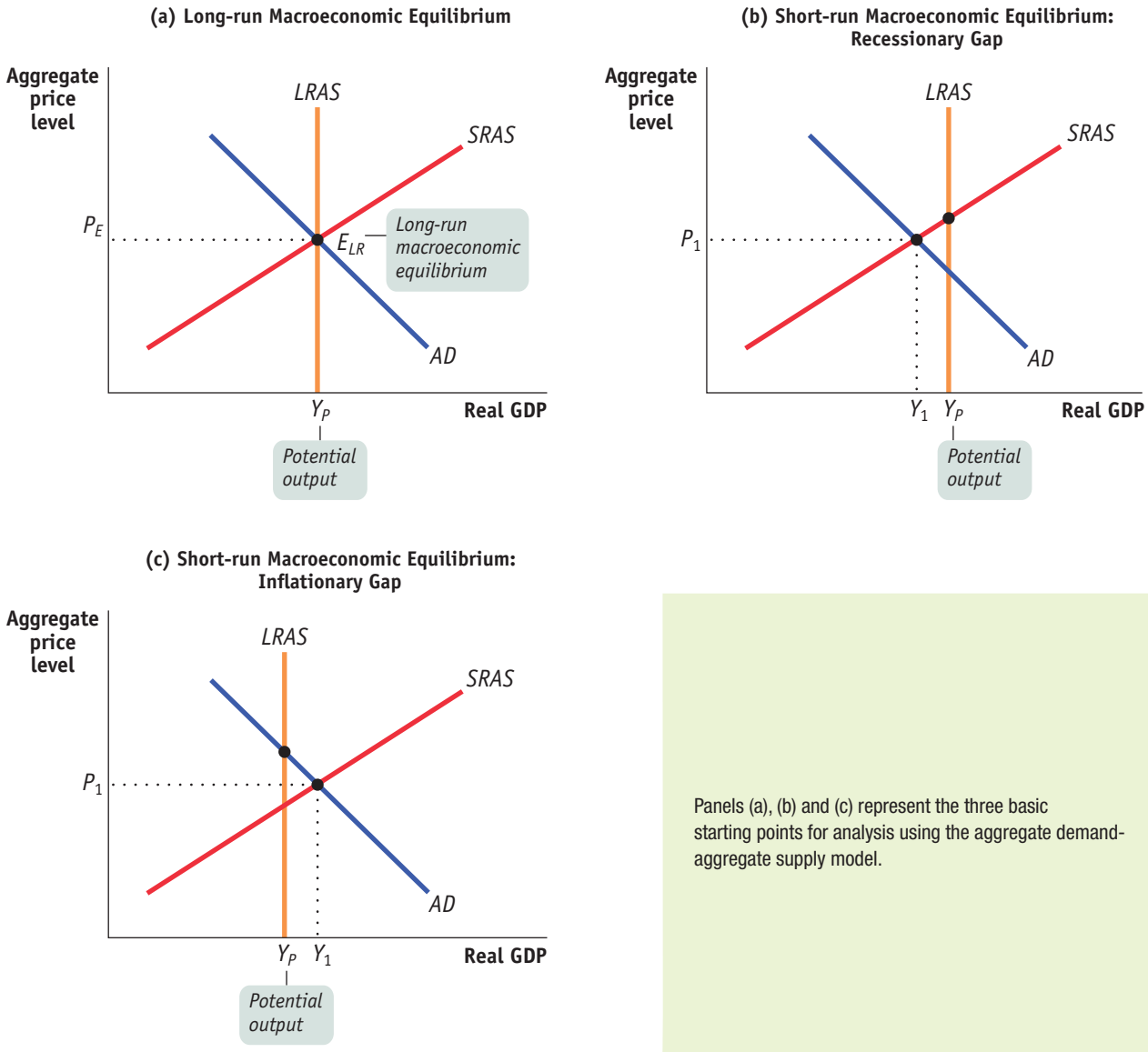
The Pivotal Event

Now assume that the Federal Reserve conducts contractionary monetary policy.

It is the events in a scenario that make it interesting. Perhaps a country goes into or recovers from a recession, inflation catches consumers off guard or becomes expected, consumers or businesses become more or less confident, holdings of money or wealth change, trading partners prosper or falter, or oil prices plummet or spike. The event can also be expansionary or contractionary monetary or fiscal policy. With the infinite number of possible changes in policy, politics, the economy, and markets around the world, don't expect to analyze a familiar scenario on the exam.

While it's impossible to foresee all of the scenarios you might encounter, we can group the determinants of change into a reasonably small set of major factors that influence macroeconomic models. Table 45.1 matches major factors with the curves they affect. With these influences in mind, it is relatively easy to proceed through a problem by identifying how the given events affect these factors. Most hypothetical scenarios involve changes in just one or two major factors. Although the real world is more complex, it is largely the same factors that change—there are just more of them changing at once.

figure 45.1 Analysis Starting Points



Panels (a), (b) and (c) represent the three basic starting points for analysis using the aggregate demand-aggregate supply model.

As shown in Table 45.1 on the next page, many curves are shifted by changes in only two or three major factors. Even for the aggregate demand curve, which has the largest number of associated factors, you can simplify the task further by asking yourself, "Does the event influence consumer spending, investment spending, government spending, or net exports?" If so, aggregate demand shifts. A shift of the long-run aggregate supply curve is caused only by events that affect labor productivity or the number of workers.

In the supply and demand model there are five major factors that shift the demand curve and five major factors that shift the supply curve. Most examples using this model will represent a change in one of these ten factors. The loanable funds market, money market, and foreign exchange market

AP Photo/Gus Ruelas

You've seen the speech, now, how would you analyze the proposed policy?

table **45.1**

Major Factors that Shift Curves in Each Model

Aggregate Demand and Aggregate Supply		
Aggregate Demand Curve	**Short-run Aggregate Supply Curve**	**Long-run Aggregate Supply Curve**
Expectations	Commodity prices	Productivity
Wealth	Nominal wages	Physical capital
Size of existing capital stock	Productivity	Human capital
Fiscal and monetary policy	Business taxes	Technology
Net Exports		Quantity of resources
Interest rates		
Investment spending		

Supply and Demand	
Demand Curve	**Supply Curve**
Income	Input prices
Prices of substitutes and complements	Prices of substitutes and complements in production
Tastes	Technology
Consumer expectations	Producer expectations
Number of consumers	Number of producers

Loanable Funds Market	
Demand Curve	**Supply Curve**
Investment opportunities	Private saving behavior
Government borrowing	Capital inflows

Money Market	
Demand Curve	**Supply Curve**
Aggregate price level	Set by the Federal Reserve
Real GDP	
Technology (related to money market)	
Institutions (related to money market)	

Foreign Exchange Market	
Demand	**Supply**
Foreigners' purchases of domestic	Domestic residents' purchases of foreign
Goods	Goods
Services	Services
Assets	Assets

Note: It is the *real* exchange rate (adjusted for international differences in aggregate price levels) that affects imports and exports.

have their own clearly identified factors that affect supply or demand. With this information you can link specific events to relevant factors in the models to see what changes will occur. Remember that having correctly labeled axes on your graphs is crucial to a correct analysis.

Often, as in our scenario, the event is a policy response to an undesirable starting point such as a recessionary or inflationary gap. Expansionary policy is used to combat

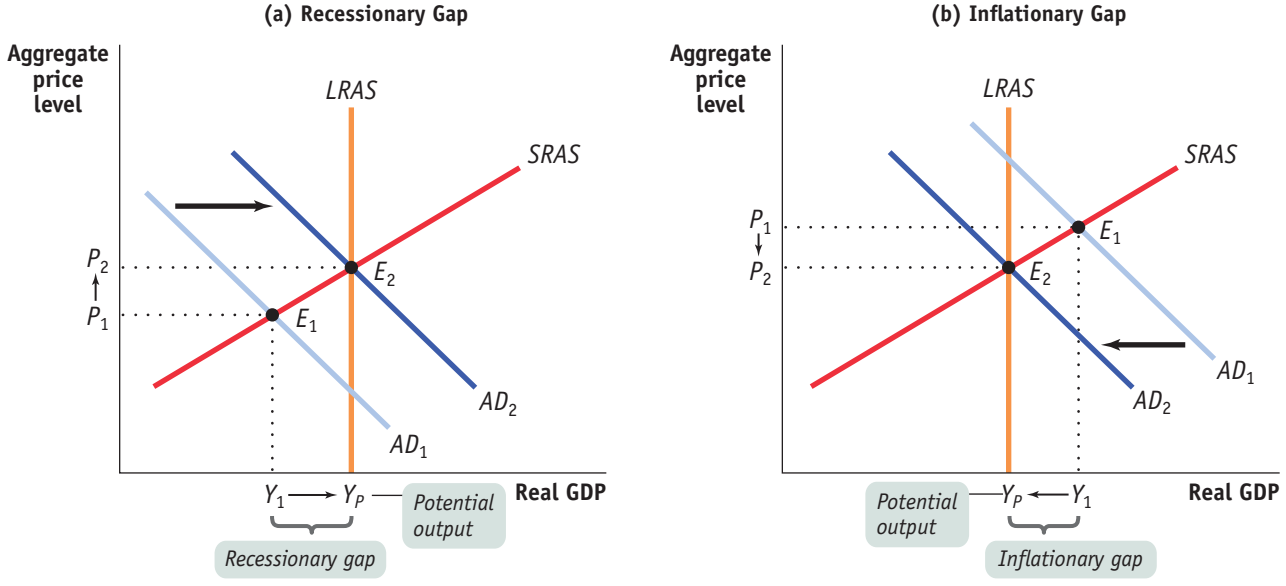
a recession, and contractionary policy is used to combat inflationary pressures. To begin analyzing a policy response, you need to fully understand how the Federal Reserve can implement each type of monetary policy (e.g., increase or decrease the money supply) and how that policy eventually affects the economy. You also need to understand how the government can implement expansionary or contractionary fiscal policy by raising or lowering taxes or government spending.

The Initial Effect of the Event

Show and explain how the Fed's actions will affect equilibrium.

We have seen that events will create short-run effects in our models. In the short-run, fiscal and monetary policy both affect the economy by shifting the aggregate demand curve. As shown in panel (a) of Figure 45.2, expansionary policy shifts aggregate demand to the right, and as shown in panel (b), contractionary policy shifts aggregate demand to the left. To illustrate the effect of a policy response, shift the aggregate demand curve on your starting point graph and indicate the effects of the shift on the aggregate price level and aggregate output.

figure 45.2 Monetary and Fiscal Policy Close Output Gaps



By shifting the aggregate demand curve, monetary and fiscal policy can close output gaps in the economy as shown in panel (a) for a recessionary gap and panel (b) for an inflationary gap.

Secondary and Long-Run Effects of the Event

Assume Canada is the largest trading partner of the United States. What will happen to the value of the U.S. dollar relative to the Canadian dollar?

How will the Federal Reserve's contractionary monetary policy affect the real interest rate in the United States? Explain.

Secondary Effects In addition to the initial, short-run effects of any event, there will be secondary effects and the economy will move to its long-run equilibrium after the short-run effects run their course.

We have seen that negative or positive demand shocks (including those created by inappropriate monetary or fiscal policy) move the economy away from long-run macroeconomic equilibrium. As explained in Module 18, in the absence of policy responses, such events will eventually be offset through changes in short-run aggregate supply resulting from changes in nominal wage rates. This will move the economy back to long-run macroeconomic equilibrium.

If the short-run effects of an action result in changes in the aggregate price level or real interest rate, there will also be secondary effects throughout the open economy. International capital flows and international trade will be affected as a result of the initial effects experienced in the economy. A price level decrease, as in our scenario, will encourage exports and discourage imports, causing an appreciation in the domestic currency on the foreign exchange market. A change in the interest rate affects aggregate demand through changes in investment spending and consumer spending. Interest rate changes also affect aggregate demand through changes in imports or exports caused by currency appreciation and depreciation. These secondary effects act to reinforce the effects of monetary policy.

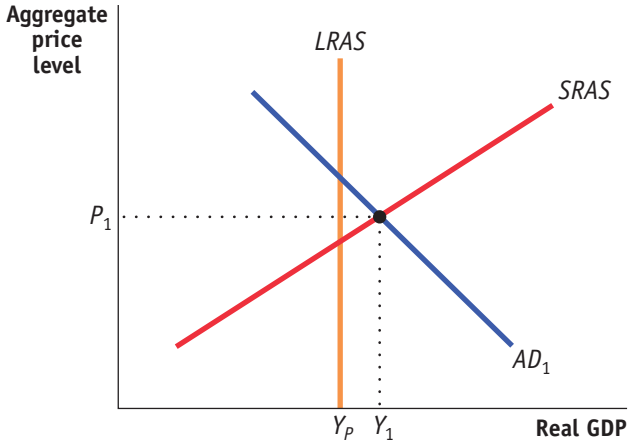
Long-run Effects While deviations from potential output are ironed out in the long run, other effects remain. For example, in the long run the use of fiscal policy affects the federal budget. Changes in taxes or government spending that lead to budget deficits (and increased federal debt) can "crowd out" private investment spending in the long run. The government's increased demand for loanable funds drives up the interest rate, decreases investment spending, and partially offsets the initial increase in aggregate demand. Of course, the deficit could be addressed by printing money, but that would lead to problems with inflation in the long run.

We know that in the long run, monetary policy affects only the aggregate price level, not real GDP. Because money is neutral, changes in the money supply have no effect on the real economy. The aggregate price level and nominal values will be affected by the same proportion, leaving real values (including the real interest rate as mentioned in our scenario) unchanged.

Analyzing Our Scenario

Now let's address the specific demands of our problem.

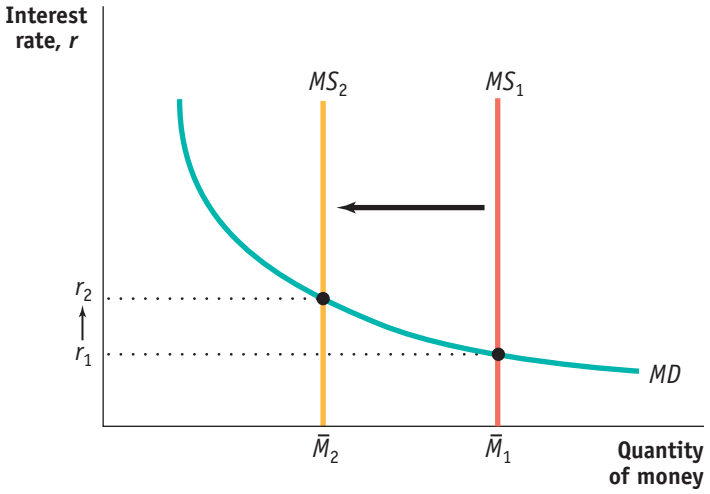
✔ *Draw a correctly labeled graph showing aggregate demand, short-run aggregate supply, long-run aggregate supply, equilibrium output, and the aggregate price level.*



✔ *Identify the open-market operation the Fed would conduct.*

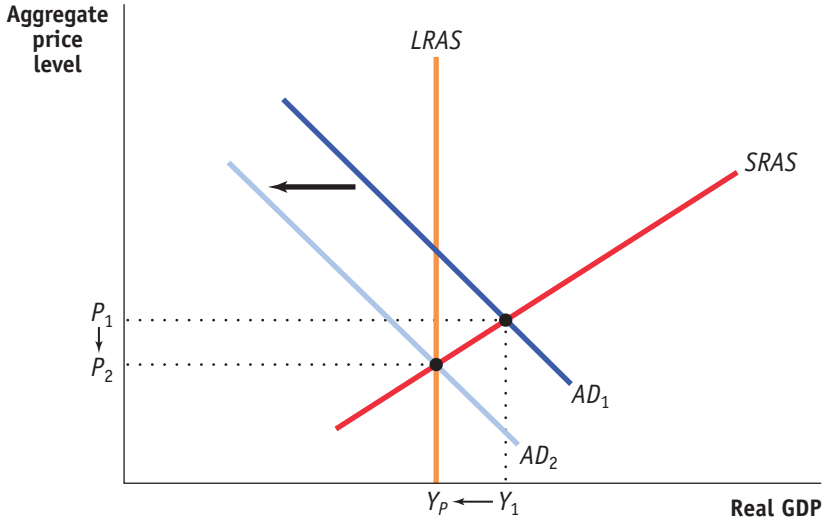
The Fed would sell U.S. Treasury securities (bonds, bills, or notes).

✔ *Draw a correctly labeled graph of the money market to show the effect of the monetary policy on the nominal interest rate.*



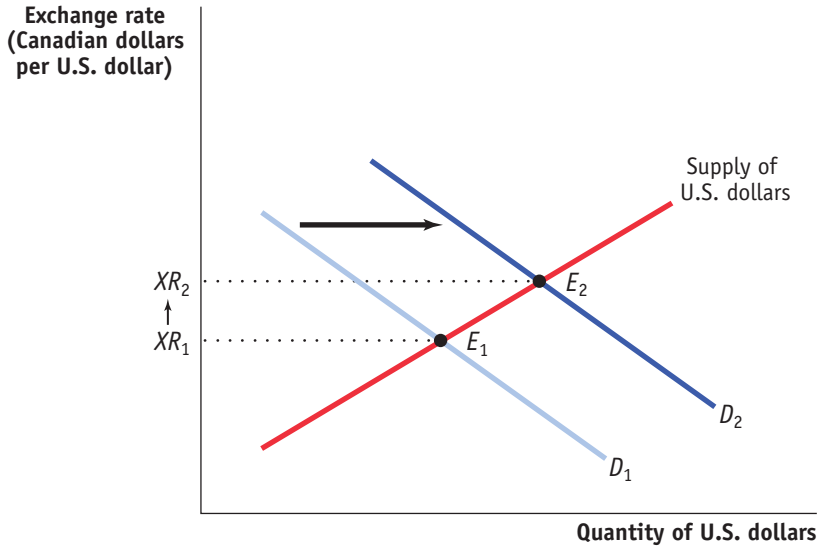
✔ *Show and explain how the Fed's actions will affect equilibrium in the aggregate demand and supply graph you drew previously. Indicate the new aggregate price level on your graph.*

A higher interest rate will lead to decreased investment and consumer spending, decreasing aggregate demand. The equilibrium price level and real GDP will fall.



✔ *Draw a correctly labeled graph of the foreign exchange market for the U.S. dollar showing how the change in the aggregate price level you indicate on your graph above will affect the foreign exchange market.*

The decrease in the U.S. price level will make U.S. exports relatively inexpensive for Canadians to purchase and lead to an increase in demand for U.S. dollars with which to purchase those exports.



✔ *What will happen to the U.S. dollar relative to the Canadian dollar?*

The U.S. dollar will appreciate.

✔ *How will the Federal Reserve's contractionary monetary policy affect the real interest rate in the United States? Explain.*

There will be no effect on the real interest rate in the long run because, due to the neutrality of money, changes in the money supply do not affect real values in the long run.

Module 45 AP Review

Solutions appear at the back of the book.

Check Your Understanding

1. The economy is operating in long-run macroeconomic equilibrium.
   a. Illustrate this situation using a correctly labeled aggregate demand-aggregate supply graph.
   b. Use your graph to show the short-run effect on real GDP and the aggregate price level if there is a decrease in government spending.
   c. What will happen to the aggregate price level and real GDP in the long run? Explain.
   d. Suppose the government is experiencing a persistent budget deficit. How will the decrease in government spending affect that deficit? Use a correctly labeled graph of the loanable funds market to show the effect of a decrease in government spending on the interest rate.

Tackle the Test: Multiple-Choice Questions

Questions 1–5 refer to the following scenario:

The United States and Mexico are trading partners. Suppose a flu outbreak significantly decreases U.S. tourism in Mexico and causes the Mexican economy to enter a recession. Assume that the money that would have been spent by U.S. tourists in Mexico is, instead, not spent at all.

1. Which of the following occurs as a result of the recession in Mexico?
   I. Output in Mexico decreases.
   II. Aggregate demand in the United States decreases.
   III. Output in the United States decreases.
   a. I only
   b. II only
   c. III only
   d. I and II only
   e. I, II, and III

2. What is the effect of Mexico's falling income on the demand for money and the nominal interest rate in Mexico?

	Demand for money	*Nominal interest rate*
a.	increases	decreases
b.	decreases	decreases
c.	increases	increases
d.	decreases	increases
e.	increases	unchanged

3. If the aggregate price level in Mexico decreases, what will happen to the real interest rate?
   a. It will increase.
   b. It will decrease.
   c. It will be unchanged.
   d. It will stabilize.
   e. It cannot be determined.

4. Suppose the aggregate price level in Mexico decreases relative to that in the United States. What is the effect of this price level change on the demand and on the exchange rate, for Mexican pesos?

	Demand for pesos	*Exchange rate*
a.	increases	appreciates
b.	increases	depreciates
c.	decreases	appreciates
d.	decreases	depreciates
e.	decreases	is unchanged

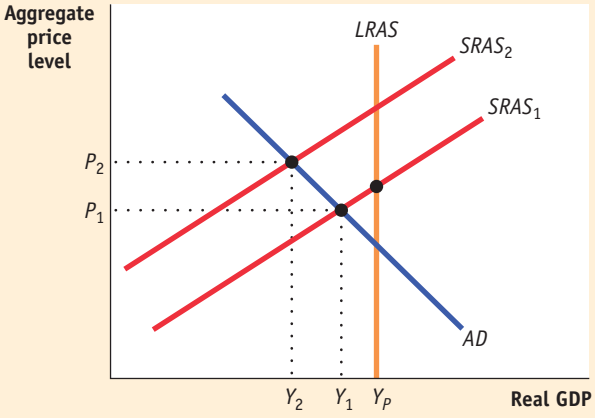
5. If the Mexican government pursues expansionary fiscal policy in response to the recession, what will happen to aggregate demand and aggregate supply in the short-run?

	Aggregate demand	*Short-run aggregate supply*
a.	increase	increase
b.	increase	decrease
c.	decrease	increase
d.	decrease	decrease
e.	increase	no change

Tackle the Test: Free-Response Questions

1. Suppose the U.S. economy is experiencing a recession.
   a. Draw a correctly labeled aggregate demand-aggregate supply graph showing the aggregate demand, short-run aggregate supply, long-run aggregate supply, equilibrium output, and aggregate price level.
   b. Assume that energy prices increase in the United States. Show the effects of this increase on the equilibrium in your graph from part a.
   c. According to your graph, how does the increase in energy prices affect unemployment and inflation in the economy?
   d. Assume the United States and Canada are the only two countries in an open economy and that energy prices have remained unchanged in Canada. Draw a correctly labeled graph of the foreign exchange market for U.S. dollars, and use it to show the effect of increased U.S. energy prices on the demand for U.S. dollars. Explain.

Answer (12 points)



1 point: The vertical axis is labeled "Aggregate price level" and the horizontal axis is labeled "Aggregate output" or "Real GDP."

1 point: The *AD* curve slopes downward, the *SRAS* curve slopes upward, and the *LRAS* curve is vertical.

1 point: The equilibrium is found where the *SRAS* curve crosses the *AD* curve, and the equilibrium aggregate price level and aggregate output are shown on the axes at this point.

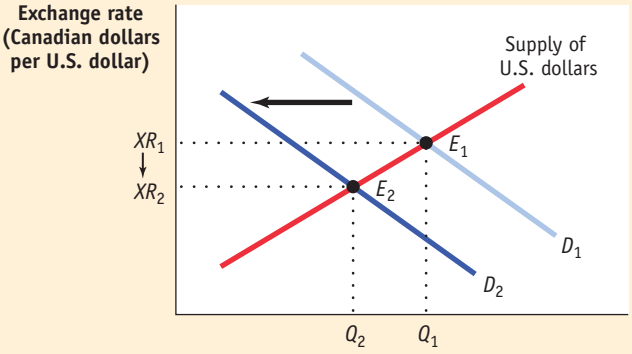
1 point: The equilibrium is to the left of the *LRAS* curve.

1 point: The *SRAS* curve shifts to the left.

1 point: The equilibrium aggregate price level and output are shown on the axes at the new equilibrium (increased aggregate price level, decreased aggregate output).

1 point: It increases unemployment.

1 point: It increases the aggregate price level (inflation).



1 point: The vertical axis is labeled "Exchange rate (Canadian dollars per U.S. dollar)," horizontal axis is labeled "Quantity of U.S. dollars." Demand for U.S. dollars slopes downward and is labeled, supply of U.S. dollars slopes upward and is labeled.

1 point: The equilibrium exchange rate and quantity of U.S. dollars are shown on the axes at the intersection of the demand and supply curves.

1 point: The demand for U.S. dollars will decrease.

1 point: The inflation in the United States will lead to a decrease in the demand for U.S. exports (which must be purchased with U.S. dollars).

2. Assume the United States is operating below potential output.
   a. Draw a correctly labeled aggregate demand and supply graph showing equilibrium in the economy.
   b. Suppose the government decreases taxes. On your graph, show how the decrease in taxes will affect *AD, SRAS, LRAS,* equilibrium aggregate price level, and output.
   c. Assume the decrease in taxes led to an increased budget deficit and that the deficit spending was funded through government borrowing from the public. Use a correctly labeled graph of the market for loanable funds to show the effect of increased borrowing on the interest rate.
   d. Given the effect on the interest rate from part c, draw a correctly labeled graph of the foreign exchange market showing the effect of the change in the interest rate on the supply of U.S. dollars. Explain how the interest rate affects the supply of U.S. dollars.
   e. According to your graph from part d, what has happened to the value of the U.S. dollar? How will this affect U.S. exports and aggregate demand?

Section 8 Review

Summary

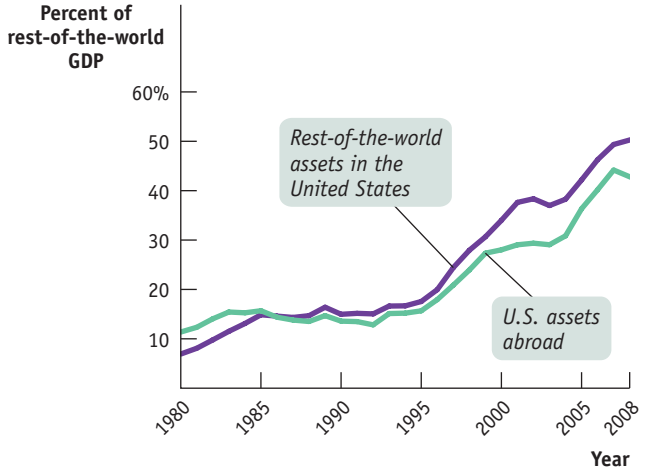
1. A country's **balance of payments accounts** summarize its transactions with the rest of the world. The **balance of payments on the current account,** or the **current account,** includes the **balance of payments on goods and services** together with balances on factor income and transfers. The **merchandise trade balance,** or **trade balance,** is a frequently cited component of the balance of payments on goods and services. The **balance of payments on the financial account,** or **the financial account,** measures capital flows. By definition, the balance of payments on the current account plus the balance of payments on the financial account is zero.
2. Capital flows respond to international differences in interest rates and other rates of return; they can be usefully analyzed using an international version of the loanable funds model, which shows how a country where the interest rate would be low in the absence of capital flows sends funds to a country where the interest rate would be high in the absence of capital flows. The underlying determinants of capital flows are international differences in savings and opportunities for investment spending.
3. Currencies are traded in the **foreign exchange market;** the prices at which they are traded are **exchange rates.** When a currency rises against another currency, it **appreciates;** when it falls, it **depreciates.** The **equilibrium exchange rate** matches the quantity of that currency supplied to the foreign exchange market to the quantity demanded.
4. To correct for international differences in inflation rates, economists calculate **real exchange rates,** which multiply the exchange rate between two countries' respective currencies by the ratio of the countries' price levels. The current account responds only to changes in the real exchange rate, not the nominal exchange rate. **Purchasing power parity** is the exchange rate that makes the cost of a basket of goods and services equal in two countries. While purchasing power parity and the nominal exchange rate almost always differ, purchasing power parity is a good predictor of actual changes in the nominal exchange rate.
5. Countries adopt different **exchange rate regimes,** rules governing exchange rate policy. The main types are **fixed exchange rates,** where the government takes action to keep the exchange rate at a target level, and **floating exchange rates,** where the exchange rate is free to fluctuate. Countries can fix exchange rates using **exchange market intervention,** which requires them to hold **foreign exchange reserves** that they use to buy any surplus of their currency. Alternatively, they can change domestic policies, especially monetary policy, to shift the demand and supply curves in the foreign exchange market. Finally, they can use **foreign exchange controls.**
6. Exchange rate policy poses a dilemma: there are economic payoffs to stable exchange rates, but the policies used to fix the exchange rate have costs. Exchange market intervention requires large reserves, and exchange controls distort incentives. If monetary policy is used to help fix the exchange rate, it isn't available to use for domestic policy.
7. Fixed exchange rates aren't always permanent commitments: countries with a fixed exchange rate sometimes engage in **devaluations** or **revaluations.** In addition to helping eliminate a surplus of domestic currency on the foreign exchange market, a devaluation increases aggregate demand. Similarly, a revaluation reduces shortages of domestic currency and reduces aggregate demand.
8. Under floating exchange rates, expansionary monetary policy works in part through the exchange rate: cutting domestic interest rates leads to a depreciation, and through that to higher exports and lower imports, which increases aggregate demand. Contractionary monetary policy has the reverse effect.
9. The fact that one country's imports are another country's exports creates a link between the business cycles in different countries. Floating exchange rates, however, may reduce the strength of that link.

Key Terms

Balance of payments accounts, p. 410
Balance of payments on the current account (the current account), p. 412
Balance of payments on goods and services, p. 412
Merchandise trade balance (trade balance), p. 412
Balance of payments on the financial account (the financial account), p. 413
Foreign exchange market, p. 421
Exchange rates, p. 421
Appreciates, p. 422
Depreciates, p. 422
Equilibrium exchange rate, p. 423
Real exchange rate, p. 425
Purchasing power parity, p. 427
Exchange rate regime, p. 431
Fixed exchange rate, p. 431
Floating exchange rate, p. 431
Exchange market intervention, p. 432
Foreign exchange reserves, p. 432
Foreign exchange controls, p. 433
Devaluation, p. 438
Revaluation, p. 438

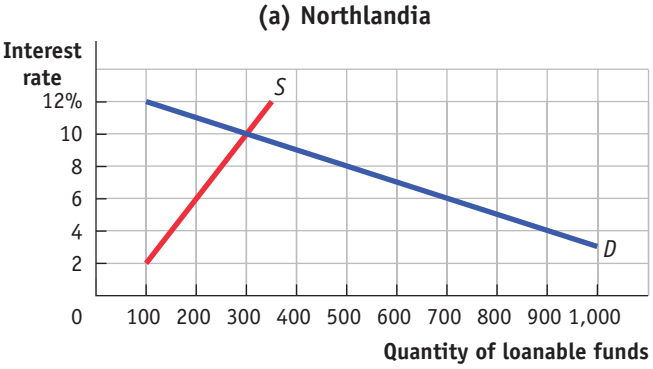
Problems

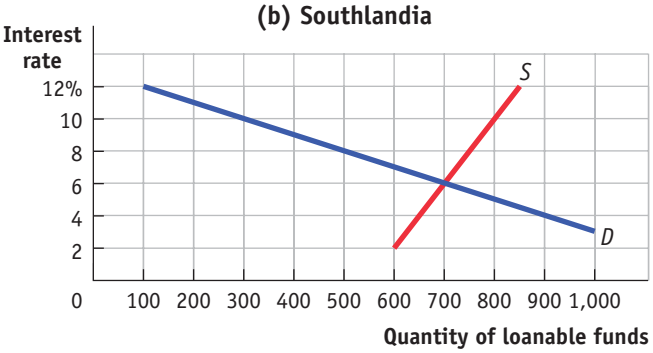
1. How would the following transactions be categorized in the U.S. balance of payments accounts? Would they be entered in the current account (as a payment to or from a foreigner) or the financial account (as a sale to or purchase of assets from a foreigner)? How will the balance of payments on the current and financial accounts change?
   a. A French importer buys a case of California wine for $500.
   b. An American who works for a French company deposits her paycheck, drawn on a Paris bank, into her San Francisco bank.
   c. An American buys a bond from a Japanese company for $10,000.
   d. An American charity sends $100,000 to Africa to help local residents buy food after a harvest shortfall.
2. The accompanying diagram shows the assets of the rest of the world that are in the United States and U.S. assets abroad, both as a percentage of rest-of-the-world GDP. As you can see from the diagram, both have increased nearly fivefold since 1980.



   a. As U.S. assets abroad have increased as a percentage of rest-of-the-world GDP, does this mean that the United States, over the period, has experienced net capital outflows?
   b. Does this diagram indicate that world economies were more tightly linked in 2007 than they were in 1980?
3. In the economy of Scottopia in 2008, exports equaled $400 billion of goods and $300 billion of services, imports equaled $500 billion of goods and $350 billion of services, and the rest of the world purchased $250 billion of Scottopia's assets. What was the merchandise trade balance for Scottopia? What was the balance of payments on the current account in Scottopia? What was the balance of payments on the financial account? What was the value of Scottopia's purchases of assets from the rest of the world?
4. In the economy of Popania in 2008, total Popanian purchases of assets in the rest of the world equaled $300 billion, purchases of Popanian assets by the rest of the world equaled $400 billion, and Popania exported goods and services equaled $350 billion. What was Popania's balance of payments on the financial account in 2008? What was its balance of payments on the current account? What was the value of its imports?
5. Suppose that Northlandia and Southlandia are the only two trading countries in the world, that each nation runs a balance of payments on both current and financial accounts equal to zero, and that each nation sees the other's assets as identical to its own. Using the accompanying diagrams, explain how the demand and supply of loanable funds, the interest rate, and the balance of payments on the current and

financial accounts will change in each country if international capital flows are possible.





6. Based on the exchange rates for the first trading days of 2009 and 2010 shown in the accompanying table, did the U.S. dollar appreciate or depreciate during 2009? Did the movement in the value of the U.S. dollar make American goods and services more or less attractive to foreigners?

January 2, 2009	January 4, 2010
US$1.45 to buy 1 British pound sterling	US$1.61 to buy 1 British pound sterling
32.82 Taiwan dollars to buy US$1	31.74 Taiwan dollars to buy US$1
US$0.82 to buy 1 Canadian dollar	US$0.96 to buy 1 Canadian dollar
90.98 Japanese yen to buy US$1	92.35 Japanese yen to buy US$1
US$1.39 to buy 1 euro	US$1.44 to buy 1 euro
1.07 Swiss francs to buy US$1	1.03 Swiss francs to buy US$1

7. Go to http://fx.sauder.ubc.ca. Using the table labeled "The Most Recent Cross-Rates of Major Currencies," determine whether the British pound (GBP), the Canadian dollar (CAD), the Japanese yen (JPY), the euro (EUR), and the Swiss franc (CHF) have appreciated or depreciated against the U.S. dollar (USD) since January 4, 2010. The exchange rates on January 4, 2010, are listed in the table in Problem 6 above.

8. Suppose the United States and Japan are the only two trading countries in the world. What will happen to the value of the U.S. dollar if the following occur, other things equal?

a. Japan relaxes some of its import restrictions.

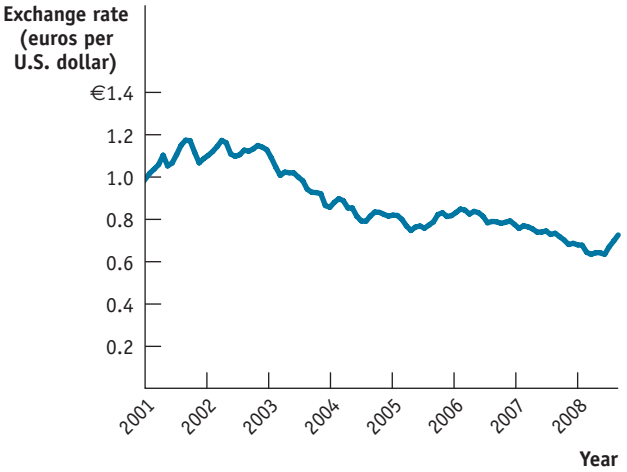
b. The United States imposes some import tariffs on Japanese goods.

c. Interest rates in the United States rise dramatically.

d. A report indicates that Japanese cars are much safer than previously thought, especially compared with American cars.

9. From January 1, 2001, to June 30, 2003, the U.S. federal funds rate decreased from 6.5% to 1%. During the same period, the analogous interest rate in Europe decreased from 5.75% to 3%.

a. Considering the change in interest rates over the period and using the loanable funds model, would you have expected funds to flow from the United States to Europe or from Europe to the United States over this period?



b. The accompanying diagram shows the exchange rate between the euro and the U.S. dollar from January 1, 2001, through September 30, 2008. Is the eventual decrease in the exchange rate over the period from January 2001 to June 2003 consistent with the movement in funds predicted in part a?

10. In each of the following scenarios, suppose that the two nations are the only trading nations in the world. Given inflation and the change in the nominal exchange rate, which nation's goods become more attractive?

a. Inflation is 10% in the United States and 5% in Japan; the U.S. dollar–Japanese yen exchange rate remains the same.

b. Inflation is 3% in the United States and 8% in Mexico; the price of the U.S. dollar falls from 12.50 to 10.25 Mexican pesos.

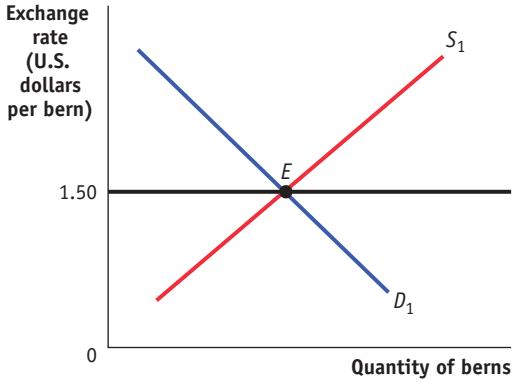
c. Inflation is 5% in the United States and 3% in the eurozone; the price of the euro falls from $1.30 to $1.20.

d. Inflation is 8% in the United States and 4% in Canada; the price of the Canadian dollar rises from US$0.60 to US$0.75.

11. Starting from a position of equilibrium in the foreign exchange market under a fixed exchange rate regime, how must a government react to an increase in the demand for the nation's goods and services by the rest of the world to keep the exchange rate at its fixed value?

12. Suppose that Albernia's central bank has fixed the value of its currency, the bern, to the U.S. dollar (at a rate of US$1.50 to 1 bern) and is committed to that exchange rate. Initially, the foreign exchange market for the bern is also in equilib-

rium, as shown in the accompanying diagram. However, both Albernians and Americans begin to believe that there are big risks in holding Albernian assets; as a result, they become unwilling to hold Albernian assets unless they receive a higher rate of return on them than they do on U.S. assets. How would this affect the diagram? If the Albernian central bank tries to keep the exchange rate fixed using monetary policy, how will this affect the Albernian economy?



13. Your study partner asks you, "If central banks lose the ability to use discretionary monetary policy under fixed exchange rates, why would nations agree to a fixed exchange rate system?" How do you respond?