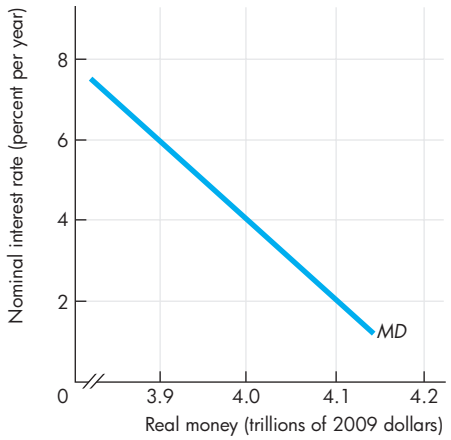
The Money Market

21. Explain the change in the nominal interest rate in the short run if
    a. Real GDP increases.
    b. The money supply increases.
    c. The price level rises.
22. The figure shows the demand for money curve.



    If the Fed decreases the quantity of real money from $4 trillion to $3.9 trillion, explain how the price of a bond will change.
23. Use the data in Problem 7 to work this problem.
    The interest rate is 4 percent a year. Suppose that real GDP decreases from $20 billion to $10 billion and the quantity of money remains unchanged. Do people buy bonds or sell bonds? Explain how the interest rate changes.

The Quantity Theory of Money

24. The table provides some data for the United States in the first decade following the Civil War.

	1869	1879
Quantity of money	$1.3 billion	$1.7 billion
Real GDP (1929 dollars)	$7.4 billion	*Z*
Price level (1929 = 100)	*X*	54
Velocity of circulation	4.50	4.61

Source of data: Milton Friedman and Anna J. Schwartz, *A Monetary History of the United States 1867–1960*

    a. Calculate the value of *X* in 1869.
    b. Calculate the value of *Z* in 1879.
    c. Are the data consistent with the quantity theory of money? Explain your answer.

Economics in the News

25. After you have studied *Economics in the News* on pp. 648–649, answer the following questions.
    a. What changes in the interest rate and the quantity of M2 occurred between 2007 and 2014?
    b. Why is the outcome feared by bankers optimistic?
    c. By how much would the quantity of M2 demanded decrease if the interest rate rose to 2 percent, or 3 percent, or 4 percent? (Express your answer as a percentage of GDP.)
    d. What could the banks do to prevent deposits from decreasing by as much as predicted by the demand for M2 curve in Fig. 3 on p. 649?
    e. What would you expect to happen to the monetary base if interest rates rise? Why?
26. **The Truth is Out: Money is Just an IOU, and the Banks Are Rolling In It**
    The central bank can print as much money as it wants to, but it doesn't as it was created to regulate money supply. If governments could print money, and not independent central banks, they would surely put out too much of it, and the resulting inflation would throw the economy into chaos.

    Source: *The Guardian*, March 18, 2014

    a. Explain how the money market will be affected if too much money is printed by the central bank.
    b. Explain using the quantity theory of money how printing money increases inflation in the long run.

Mathematical Note

27. In the United Kingdom, the currency drain ratio is 38 percent of deposits and the reserve ratio is 2 percent of deposits. In Australia, the quantity of money is $150 billion, the currency drain ratio is 33 percent of deposits, and the reserve ratio is 8 percent of deposits.
    a. Calculate the U.K. money multiplier.
    b. Calculate the monetary base in Australia.

26 THE EXCHANGE RATE AND THE BALANCE OF PAYMENTS

After studying this chapter, you will be able to:

- Explain how the exchange rate is determined
- Explain interest rate parity and purchasing power parity
- Describe the alternative exchange rate policies and explain their effects
- Describe the balance of payments accounts and explain what causes an international deficit

The dollar ($), the euro (€), and the yen (¥) are three of the world's monies and most international payments are made using one of them. But the world has more than 100 different monies. What determines the value of the dollar in terms of other kinds of money?

For almost thirty years, foreign entrepreneurs have roamed the United States with giant, virtual shopping carts buying U.S. businesses. Why?

In this chapter, you're going to discover the answers to these questions. In *Economics in the News* at the end of the chapter, we'll look at the rising dollar in the summer of 2014.

The Foreign Exchange Market

When Wal-Mart imports Blu-ray players from Japan, it pays for them using Japanese yen. And when Japan Airlines buys an airplane from Boeing, it pays using U.S. dollars. When you take a European holiday, you pay for the holiday with euros. Whenever people buy things from another country, they use the currency of that country to make the transaction. It doesn't make any difference what the item is that is being traded internationally. It might be a Blu-ray player, an airplane, an international holiday, insurance or banking services, real estate, the stocks and bonds of a government or corporation, or even an entire business.

Foreign money is just like U.S. money. It consists of notes and coins issued by a central bank and mint and deposits in banks and other depository institutions. When we described U.S. money in Chapter 25, we distinguished between currency (notes and coins) and deposits. But when we talk about foreign money, we refer to it as foreign currency. **Foreign currency** is the money of other countries regardless of whether that money is in the form of notes, coins, or bank deposits.

We buy these foreign currencies and foreigners buy U.S. dollars in the foreign exchange market.

Trading Currencies

The currency of one country is exchanged for the currency of another in the **foreign exchange market**. The foreign exchange market is not a place like a downtown flea market or a fruit and vegetable market. The foreign exchange market is made up of thousands of people—importers and exporters, banks, international investors and speculators, international travelers, and specialist traders called *foreign exchange brokers*.

The foreign exchange market opens on Monday morning in Sydney, Australia, and Hong Kong, which is still Sunday evening in New York. As the day advances, markets open in Singapore, Tokyo, Bahrain, Frankfurt, London, New York, Chicago, and San Francisco. As the West Coast markets close, Sydney is only an hour away from opening for the next day of business. The sun barely sets in the foreign exchange market. Dealers around the world are in continual Internet contact, and on a typical day in 2014, $5.3 trillion (of all currencies) were traded in the foreign exchange market—that's $6 million every second.

Exchange Rates

An **exchange rate** is the price at which one currency exchanges for another currency in the foreign exchange market. For example, on August 25, 2014, $1 would buy 104 Japanese yen or 76 euro cents. So the exchange rate was 104 yen per dollar or, equivalently, 76 euro cents per dollar.

The exchange rate fluctuates. Sometimes it rises and sometimes it falls. A rise in the exchange rate is called an *appreciation* of the dollar, and a fall in the exchange rate is called a *depreciation* of the dollar. For example, when the exchange rate rises from 104 yen to 110 yen per dollar, the dollar appreciates against the yen; when the exchange rate falls from 110 yen to 104 yen per dollar, the dollar depreciates against the yen.

Economics in Action on p. 659 shows the fluctuations of the U.S. dollar against three currencies from 2000 to 2014.

Questions About the U.S. Dollar Exchange Rate

The performance of the U.S. dollar in the foreign exchange market raises a number of questions that we address in this chapter.

First, how is the exchange rate determined? Why does the U.S. dollar sometimes appreciate and at other times depreciate?

Second, how do the Fed and other central banks operate in the foreign exchange market? In particular, how was the exchange rate between the U.S. dollar and the Chinese yuan fixed and why did it remain constant for many years?

Third, how do exchange rate fluctuations influence our international trade and international payments? In particular, could we eliminate, or at least decrease, our international deficit by changing the exchange rate? Would an appreciation of the yuan change the balance of trade and payments between the United States and China?

We begin by learning how trading in the foreign exchange market determines the exchange rate.

An Exchange Rate Is a Price

An exchange rate is a price—the price of one currency in terms of another. And like all prices, an exchange rate is determined in a market—the *foreign exchange market*.

The U.S. dollar trades in the foreign exchange market and is supplied and demanded by tens of

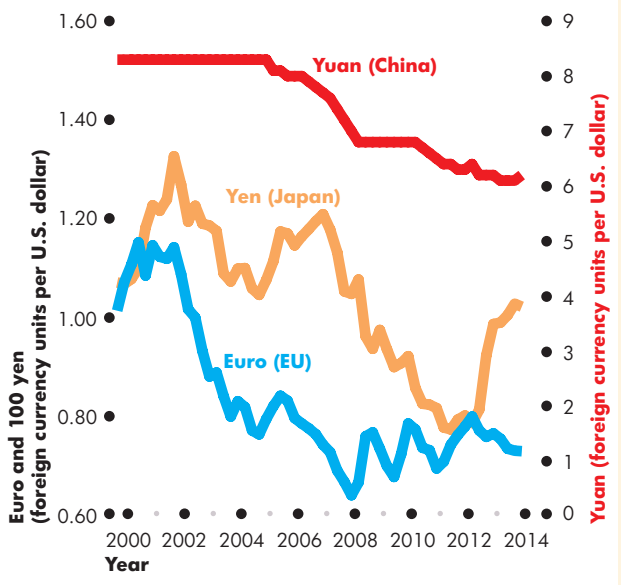
ECONOMICS IN ACTION

The U.S. Dollar: More Down than Up

The figure shows the U.S. dollar exchange rate against the three currencies that feature prominently in U.S. imports—the Chinese yuan, the European euro, and the Japanese yen—between 2000 and 2014.

Against the yuan, the dollar was constant before 2005 and since then it has depreciated. Against the yen and the euro, the dollar appreciated before 2002. Since then, the dollar depreciated against the yen through 2012 and then appreciated. Against the euro, the dollar depreciated from 2002 through 2008 and then appreciated.

Notice the high-frequency fluctuations (rapid brief up and down movements) of the dollar against the euro and the yen compared to the smooth changes against the yuan. Think about why that might be, and we'll check your answer later in this chapter.



The U.S. Dollar Against Three Currencies

Source of data: Pacific Exchange Rate Service.

thousands of traders every hour of every business day. Because it has many traders and no restrictions on who may trade, the foreign exchange market is a *competitive market*.

In a competitive market, demand and supply determine the price. So to understand the forces that determine the exchange rate, we need to study the factors that influence demand and supply in the foreign exchange market. But there is a feature of the foreign exchange market that makes it special.

The Demand for One Money Is the Supply of Another Money

When people who are holding the money of some other country want to exchange it for U.S. dollars, they demand U.S. dollars and supply that other country's money. And when people who are holding U.S. dollars want to exchange them for the money of some other country, they supply U.S. dollars and demand that other country's money.

So the factors that influence the demand for U.S. dollars also influence the supply of European euros, or Japanese yen, or Chinese yuan. And the factors that influence the demand for that other country's money also influence the supply of U.S. dollars.

We'll first look at the influences on the demand for U.S. dollars in the foreign exchange market.

Demand in the Foreign Exchange Market

People buy U.S. dollars in the foreign exchange market so that they can buy U.S.-produced goods and services—U.S. exports. They also buy U.S. dollars so that they can buy U.S. assets such as bonds, stocks, businesses, and real estate or so that they can keep part of their money holding in a U.S. dollar bank account.

The quantity of U.S. dollars demanded in the foreign exchange market is the amount that traders plan to buy during a given time period at a given exchange rate. This quantity depends on many factors, but the main ones are

1. The exchange rate
2. World demand for U.S. exports
3. Interest rates in the United States and other countries
4. The expected future exchange rate

We look first at the relationship between the quantity of U.S. dollars demanded in the foreign exchange market and the exchange rate when the other three influences remain the same.

The Law of Demand for Foreign Exchange The law of demand applies to U.S. dollars just as it does to anything else that people value. Other things remaining the same, the higher the exchange rate, the smaller is the quantity of U.S. dollars demanded in the foreign exchange market. For example, if the market price of the U.S. dollar rises from 100 yen to 120

yen but nothing else changes, the quantity of U.S. dollars that people plan to buy in the foreign exchange market decreases. The exchange rate influences the quantity of U.S. dollars demanded for two reasons:

- Exports effect
- Expected profit effect

Exports Effect The larger the value of U.S. exports, the larger is the quantity of U.S. dollars demanded by the buyers of U.S. exports in the foreign exchange market. But the value of U.S. exports depends on the prices of U.S.-produced goods and services *expressed in the currency of the foreign buyer*. And these prices depend on the exchange rate. The lower the exchange rate, other things remaining the same, the lower are the prices of U.S.-produced goods and services to foreigners and the greater is the volume of U.S. exports. So if the exchange rate falls (and other influences remain the same), the quantity of U.S. dollars demanded in the foreign exchange market increases.

To see the exports effect at work, think about orders for Boeing's new 787 Dreamliner. If the price of this airplane is $100 million and the exchange rate is 90 euro cents per U.S. dollar, its price to KLM, a European airline, is €90 million. KLM decides that this price is too high, so it doesn't buy a Dreamliner. If the exchange rate falls to 80 euro cents per U.S. dollar and other things remain the same, the price of a Dreamliner falls to €80 million, so KLM decides to buy one and enters the foreign exchange market to buy 100 million U.S. dollars.

Expected Profit Effect The larger the expected profit from holding U.S. dollars, the greater is the quantity of U.S. dollars demanded in the foreign exchange market. But expected profit depends on the exchange rate. For a given expected future exchange rate, the lower the exchange rate today, the larger is the expected profit from buying U.S. dollars today and holding them, so the greater is the quantity of U.S. dollars demanded in the foreign exchange market today. Let's look at an example.

Suppose that Mitsubishi Bank, a Japanese bank, expects the exchange rate to be 120 yen per U.S. dollar at the end of the year. If today's exchange rate is also 120 yen per U.S. dollar, Mitsubishi Bank expects no profit from buying U.S. dollars and holding them until the end of the year. But if today's exchange rate is 100 yen per U.S. dollar and Mitsubishi Bank buys U.S. dollars, it expects to sell those dollars at the end of the year for 120 yen per dollar and make a profit of 20 yen on each U.S. dollar bought.

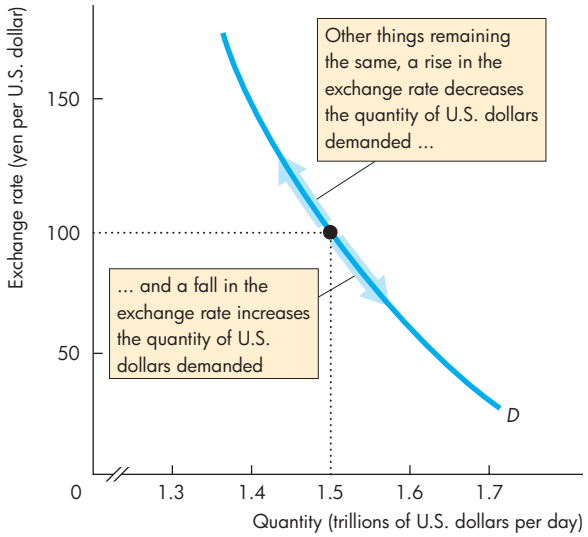
The lower the exchange rate today, other things remaining the same, the greater is the expected profit from holding U.S. dollars, so the greater is the quantity of U.S. dollars demanded in the foreign exchange market today.

Demand Curve for U.S. Dollars

Figure 26.1 shows the demand curve for U.S. dollars in the foreign exchange market. A change in the exchange rate, other things remaining the same, brings a change in the quantity of U.S. dollars demanded and a movement along the demand curve. The arrows show such movements.

We will look at the factors that *change* demand in the next section of this chapter. Before doing that, let's see what determines the supply of U.S. dollars.

FIGURE 26.1 The Demand for U.S. Dollars



The quantity of U.S. dollars demanded depends on the exchange rate. Other things remaining the same, if the exchange rate rises, the quantity of U.S. dollars demanded decreases and there is a movement up along the demand curve for U.S. dollars. If the exchange rate falls, the quantity of U.S. dollars demanded increases and there is a movement down along the demand curve for U.S. dollars.

MyEconLab Animation

Supply in the Foreign Exchange Market

People and businesses sell U.S. dollars and buy other currencies so that they can buy foreign-produced goods and services—U.S. imports. They also sell U.S. dollars and buy foreign currencies so that they can buy foreign assets such as bonds, stocks, businesses, and real estate or so that they can hold part of their money in bank deposits denominated in a foreign currency.

The quantity of U.S. dollars supplied in the foreign exchange market is the amount that traders plan to sell during a given time period at a given exchange rate. This quantity depends on many factors, but the main ones are

1. The exchange rate
2. U.S. demand for imports
3. Interest rates in the United States and other countries
4. The expected future exchange rate

Let's look at the law of supply in the foreign exchange market—the relationship between the quantity of U.S. dollars supplied in the foreign exchange market and the exchange rate when the other three influences remain the same.

The Law of Supply of Foreign Exchange Other things remaining the same, the higher the exchange rate, the greater is the quantity of U.S. dollars supplied in the foreign exchange market. For example, if the exchange rate rises from 100 yen to 120 yen per U.S. dollar and other things remain the same, the quantity of U.S. dollars that people plan to sell in the foreign exchange market increases.

The exchange rate influences the quantity of dollars supplied for two reasons:

- Imports effect
- Expected profit effect

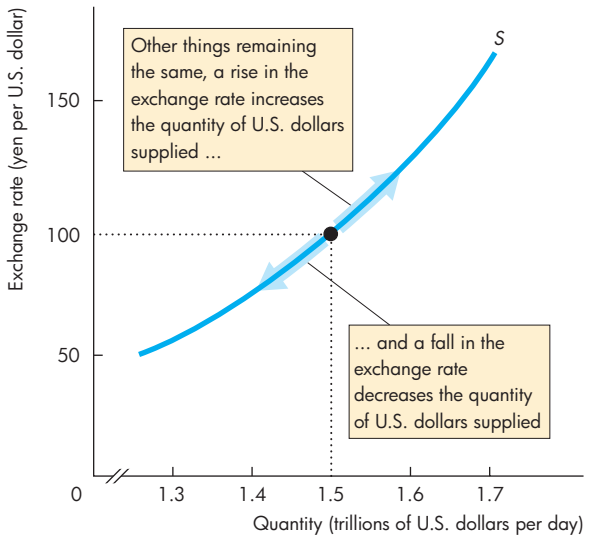
Imports Effect The larger the value of U.S. imports, the larger is the quantity of U.S. dollars supplied in the foreign exchange market. But the value of U.S. imports depends on the prices of foreign-produced goods and services *expressed in U.S. dollars*. These prices depend on the exchange rate. The higher the exchange rate, other things remaining the same, the lower are the prices of foreign-produced goods and services to Americans and the greater is the volume of U.S. imports. So if the exchange rate rises (and other influences remain the same), the quantity of U.S. dollars supplied in the foreign exchange market increases.

Expected Profit Effect This effect works just like that on the demand for the U.S. dollar but in the opposite direction. The higher the exchange rate today, other things remaining the same, the larger is the expected profit from selling U.S. dollars today and holding foreign currencies, so the greater is the quantity of U.S. dollars supplied in the foreign exchange market.

Supply Curve for U.S. Dollars

Figure 26.2 shows the supply curve of U.S. dollars in the foreign exchange market. A change in the exchange rate, other things remaining the same, brings a change in the quantity of U.S. dollars supplied and a movement along the supply curve. The arrows show such movements.

FIGURE 26.2 The Supply of U.S. Dollars



The quantity of U.S. dollars supplied depends on the exchange rate. Other things remaining the same, if the exchange rate rises, the quantity of U.S. dollars supplied increases and there is a movement up along the supply curve of U.S. dollars. If the exchange rate falls, the quantity of U.S. dollars supplied decreases and there is a movement down along the supply curve of U.S. dollars.

MyEconLab Animation

Market Equilibrium

Equilibrium in the foreign exchange market depends on how the Federal Reserve and other central banks operate. Here, we will study equilibrium when central banks keep out of the foreign exchange market and examine the effects of alternative central bank actions later (on pp. 669–671).

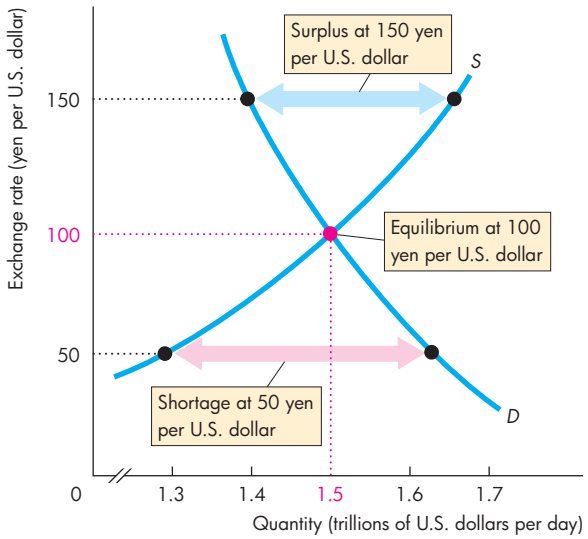
Figure 26.3 shows the demand curve for U.S. dollars, *D*, from Fig. 26.1, the supply curve of U.S. dollars, *S*, from Fig. 26.2, and the equilibrium exchange rate. The exchange rate acts as a regulator of the quantities demanded and supplied. If the exchange rate is too high, there is a surplus of dollars. For example, in Fig. 26.3, if the exchange rate is 150 yen per U.S. dollar, there is a surplus of U.S. dollars. If the exchange rate is too low, there is a shortage of dollars. For example, if the exchange rate is 50 yen per U.S. dollar, there is a shortage of U.S. dollars.

At the equilibrium exchange rate, there is neither a shortage nor a surplus—the quantity supplied equals the quantity demanded. In Fig. 26.3, the equilibrium exchange rate is 100 yen per U.S. dollar. At this exchange rate, the quantity demanded and the quantity supplied are each $1.5 trillion a day.

The foreign exchange market is constantly pulled to its equilibrium by foreign exchange traders who are constantly looking for the best price they can get. If they are selling, they want the highest price available. If they are buying, they want the lowest price available. Information flows from trader to trader through a worldwide computer network, and the price adjusts minute by minute to keep the exchange rate at its equilibrium.

But as you've seen (in *Economics in Action* on p. 659), the U.S. dollar fluctuates a lot against other currencies. Changes in the demand for U.S. dollars or the supply of U.S. dollars bring these exchange rate fluctuations. We'll now look at the factors that make demand and supply change, starting with the demand side of the market.

FIGURE 26.3 Equilibrium Exchange Rate



The demand curve for U.S. dollars is *D*, and the supply curve of U.S. dollars is *S*. If the exchange rate is 150 yen per U.S. dollar, there is a surplus of U.S. dollars and the exchange rate falls. If the exchange rate is 50 yen per U.S. dollar, there is a shortage of U.S. dollars and the exchange rate rises. If the exchange rate is 100 yen per U.S. dollar, there is neither a shortage nor a surplus of U.S. dollars and the exchange rate remains constant. The foreign exchange market is in equilibrium.

MyEconLab Animation and Draw Graph

Changes in the Demand for U.S. Dollars

The demand for U.S. dollars in the foreign exchange market changes when there is a change in

- World demand for U.S. exports
- U.S. interest rate relative to the foreign interest rate
- The expected future exchange rate

World Demand for U.S. Exports An increase in world demand for U.S. exports increases the demand for U.S. dollars. To see this effect, think about Boeing's airplane sales. An increase in demand for air travel in Australia sends that country's airlines on a global shopping spree. They decide that the 787 is the ideal product, so they order 50 airplanes from Boeing. The demand for U.S. dollars now increases.

U.S. Interest Rate Relative to the Foreign Interest Rate People and businesses buy financial assets to make a return. The higher the interest rate that people can make on U.S. assets compared with foreign assets, the more U.S. assets they buy.

What matters is not the *level* of the U.S. interest rate, but the U.S. interest rate relatative to the foreign interest rate—the U.S. interest rate minus the foreign

interest rate, which is called the **U.S. interest rate differential**. If the U.S. interest rate rises and the foreign interest rate remains constant, the U.S. interest rate differential increases. The larger the U.S. interest rate differential, the greater is the demand for U.S. assets and the greater is the demand for U.S. dollars in the foreign exchange market.

The Expected Future Exchange Rate For a given current exchange rate, other things remaining the same, a rise in the expected future exchange rate increases the profit that people expect to make by holding U.S. dollars and the demand for U.S. dollars increases today.

Figure 26.4 summarizes the influences on the demand for U.S. dollars. An increase in the demand for U.S. exports, a rise in the U.S. interest rate differential, or a rise in the expected future exchange rate increases the demand for U.S. dollars today and shifts the demand curve rightward from D_0 to D_1. A decrease in the demand for U.S. exports, a fall in the U.S. interest rate differential, or a fall in the expected future exchange rate decreases the demand for U.S. dollars today and shifts the demand curve leftward from D_0 to D_2.

Changes in the Supply of U.S. Dollars

The supply of U.S. dollars in the foreign exchange market changes when there is a change in

- U.S. demand for imports
- U.S. interest rate relative to the foreign interest rate
- The expected future exchange rate

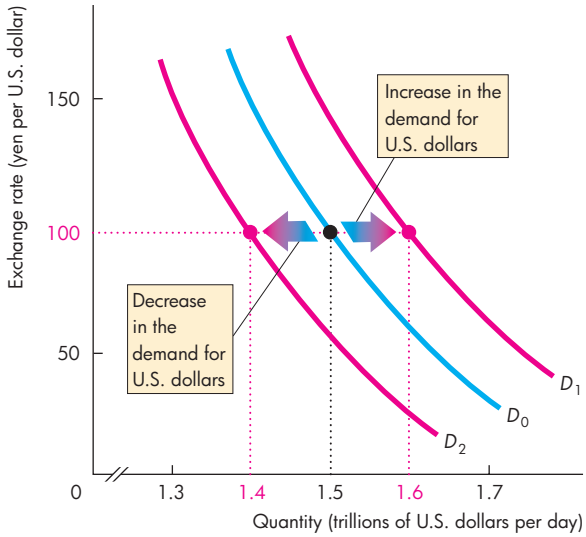
U.S. Demand for Imports An increase in the U.S. demand for imports increases the supply of U.S. dollars in the foreign exchange market. To see why, think about Wal-Mart's purchase of Blu-ray players. An increase in the demand for Blu-ray players sends Wal-Mart out on a global shopping spree. Wal-Mart decides that Panasonic Blu-ray players produced in Japan are the best buy, so Wal-Mart increases its purchases of these players. The supply of U.S. dollars now increases as Wal-Mart goes to the foreign exchange market for Japanese yen to pay Panasonic.

U.S. Interest Rate Relative to the Foreign Interest Rate The effect of the U.S. interest rate differential on the supply of U.S. dollars is the opposite of its effect on the demand for U.S. dollars. The larger the U.S. interest rate differential, the *smaller* is the supply of U.S. dollars in the foreign exchange market.

With a higher U.S. interest rate differential, people decide to keep more of their funds in U.S. dollar assets and less in foreign currency assets. They buy a smaller quantity of foreign currency and sell a smaller quantity of dollars in the foreign exchange market.

So, a rise in the U.S. interest rate, other things remaining the same, decreases the supply of U.S. dollars in the foreign exchange market.

FIGURE 26.4 Changes in the Demand for U.S. Dollars



A change in any influence on the quantity of U.S. dollars that people plan to buy, other than the exchange rate, brings a change in the demand for U.S. dollars.

The demand for U.S. dollars

Increases if:

- World demand for U.S. exports increases
- The U.S. interest rate differential rises
- The expected future exchange rate rises

Decreases if:

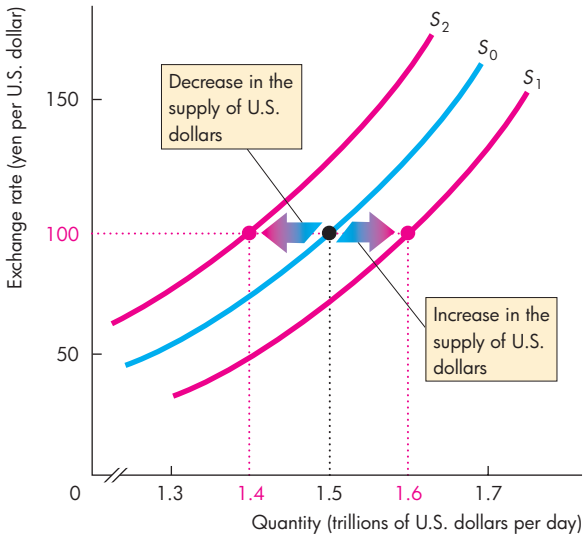
- World demand for U.S. exports decreases
- The U.S. interest rate differential falls
- The expected future exchange rate falls

MyEconLab Animation

The Expected Future Exchange Rate For a given current exchange rate, other things remaining the same, a fall in the expected future exchange rate decreases the profit that can be made by holding U.S. dollars and decreases the quantity of U.S. dollars that people and businesses want to hold. To reduce their holdings of U.S. dollar assets, people and businesses must sell U.S. dollars. When they do so, the supply of U.S. dollars in the foreign exchange market increases.

Figure 26.5 summarizes the influences on the supply of U.S. dollars. If the supply of U.S. dollars increases, the supply curve shifts rightward from S_0 to S_1. And if the supply of U.S. dollars decreases, the supply curve shifts leftward from S_0 to S_2.

FIGURE 26.5 Changes in the Supply of U.S. Dollars



A change in any influence on the quantity of U.S. dollars that people plan to sell, other than the exchange rate, brings a change in the supply of dollars.

The supply of U.S. dollars

Increases if:

- U.S. import demand increases
- The U.S. interest rate differential falls
- The expected future exchange rate falls

Decreases if:

- U.S. import demand decreases
- The U.S. interest rate differential rises
- The expected future exchange rate rises

MyEconLab Animation

Changes in the Exchange Rate

The exchange rate changes when either the demand for dollars or the supply of dollars changes.

If the demand for U.S. dollars increases and the supply does not change, the exchange rate rises. If the demand for U.S. dollars decreases and the supply does not change, the exchange rate falls.

Similarly, if the supply of U.S. dollars decreases and the demand does not change, the exchange rate rises. If the supply of U.S. dollars increases and the demand does not change, the exchange rate falls.

These predictions are exactly the same as those for any other market. Two episodes in the life of the U.S. dollar (next page) illustrate these predictions.

Two of the influences on demand and supply—the U.S. interest rate differential and the expected future exchange rate—change both sides of the foreign exchange market simultaneously. A rise in the U.S. interest rate differential or a rise in the expected future exchange rate increases demand, decreases supply, and raises the exchange rate. Similarly, a fall in the U.S. interest rate differential or a fall in the expected future exchange rate decreases demand, increases supply, and lowers the exchange rate.

We take a closer look at the interest rate differential and expectations in the next section.

REVIEW QUIZ

1. What are the influences on the demand for U.S. dollars in the foreign exchange market?
2. What are the influences on the supply of U.S. dollars in the foreign exchange market?
3. How is the equilibrium exchange rate determined?
4. What happens if there is a shortage or a surplus of U.S. dollars in the foreign exchange market?
5. What makes the demand for U.S. dollars change?
6. What makes the supply of U.S. dollars change?
7. What makes the U.S. dollar exchange rate fluctuate?

Work these questions in Study Plan 26.1 and get instant feedback. Do a Key Terms Quiz.

MyEconLab

ECONOMICS IN ACTION

The Dollar on a Roller Coaster

The foreign exchange market is a striking example of a competitive market. The expectations of thousands of traders around the world influence this market minute-by-minute throughout the 24-hour global trading day.

Demand and supply rarely stand still and their fluctuations bring a fluctuating exchange rate. Two episodes in the life of the dollar illustrate these fluctuations: 2007–2012, when the dollar depreciated and 2012–2014, when the dollar appreciated.

A Depreciating U.S. Dollar: 2007–2012 Between July 2007 and August 2012, the U.S. dollar depreciated against the yen. It fell from 120 yen to 77 yen per U.S. dollar. Part (a) of the figure provides a possible explanation for this depreciation.

In 2007, the demand and supply curves were those labeled D_{07} and S_{07}. The exchange rate was 120 yen per U.S. dollar.

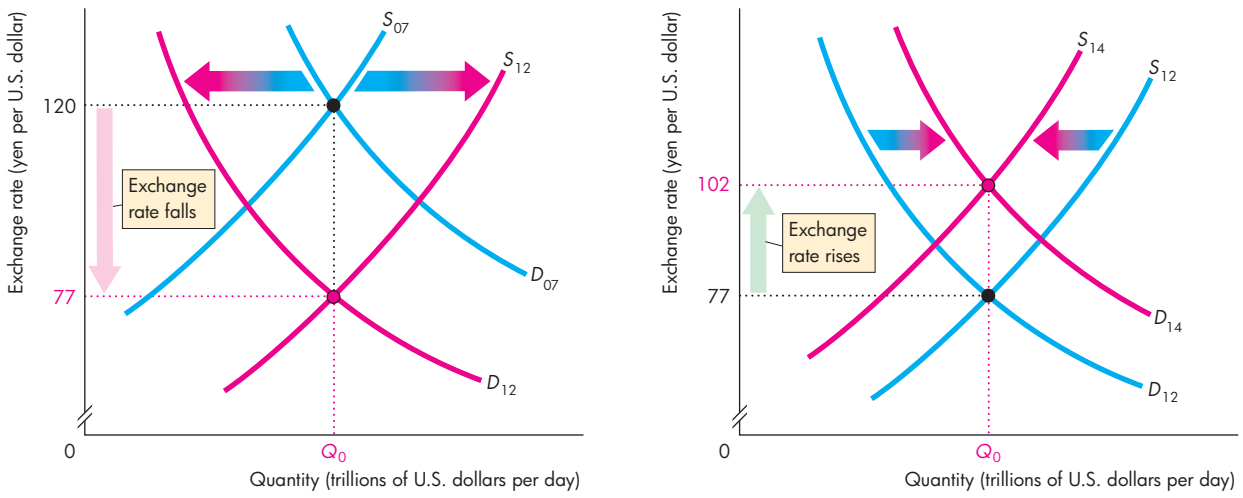
During the last quarter of 2007 and the first three quarters of 2008, the U.S. economy entered a severe credit crisis. The Federal Reserve cut the interest rate in the United States, but the Bank of Japan kept the interest rate unchanged in Japan. With a narrowing of the U.S. interest rate differential, funds flowed out of the United States. Also, currency traders expected the U.S. dollar to depreciate against the yen. The demand for U.S. dollars decreased and the supply of U.S. dollars increased.

In part (a) of the figure, the demand curve shifted leftward from D_{07} to D_{12}, the supply curve shifted rightward from S_{07} to S_{12}, and the exchange rate fell to 77 yen per U.S. dollar.

An Appreciating U.S. Dollar: 2012–2014 Between January 2012 and June 2014, the U.S. dollar appreciated against the yen. It rose from 77 yen to 102 yen per U.S. dollar. Part (b) of the figure provides an explanation for this appreciation. The demand and supply curves labeled D_{12} and S_{12} are the same as in part (a).

During 2013 and 2014, the Federal Reserve kept the U.S. interest rate low, but traders began to expect a future interest rate rise. Interest rates in Japan were even lower than in the United States, and the Bank of Japan, the central bank, embarked on a policy of expanding the Japanese money supply. With an expected future increase in U.S. interest rates and a lessened prospect of a rise in Japanese interest rates, the U.S. interest rate differential was expected to increase, so the dollar was expected to appreciate. The demand for U.S. dollars increased, and the supply of U.S. dollars decreased.

In the figure, the demand curve shifted rightward from D_{12} to D_{14}, the supply curve shifted leftward from S_{12} to S_{14}, and the exchange rate rose to 102 yen per U.S. dollar



(a) 2007–2012 **(b) 2012–2014**

The Falling and Rising U.S. Dollar

Arbitrage, Speculation, and Market Fundamentals

You've just seen how an exchange rate is determined. In our example, we used the U.S. dollar–Japanese yen exchange rate, but exchange rates between the U.S. dollar and all other currencies are determined in a similar way. So are the exchange rates *among* the other currencies such as that of the European euro and U.K. pound. Exchange rates are kept in alignment with each other by a process called *arbitrage*.

Arbitrage

Arbitrage is the practice of seeking to profit by buying in one market and selling for a higher price in another related market. Arbitrage in the foreign exchange market and international loans markets and goods markets achieves three outcomes:

- The law of one price
- No round-trip profit
- Interest rate parity
- Purchasing power parity

The Law of One Price The *law of one price* states that if an item is traded in more than one place, the price will be the same in all locations. An example of this law is that the exchange rate between the U.S. dollar and the U.K. pound is the same in New York as it is in London.

You can see why arbitrage brings about this outcome by imagining that the exchange rate in London is 0.60 U.K. pounds per dollar and the price in New York is 0.61 U.K. pounds per dollar. In this imaginary sitiuation, a trader who buys dollars in London and sells them in New York makes a profit of 0.01 U.K. pounds on every dollar traded. A trade of 1 million dollars brings a profit of 10,000 U.K. pounds.

Within a few seconds, the demand for U.K. pounds increases in London and the supply of U.K. pounds increases in New York. These changes in demand and supply raise the exchange rate in London and lower it in New York and make it equal in both markets—removing the profit opportunity.

No Round-Trip Profit A round trip is using currency *A* to buy currency *B*, and then using *B* to buy *A*. A round trip might involve more stages, using *B* to buy *C* and then using *C* to buy *A*.

Arbitrage removes profit from all transactions of this type. Any fleeting profit is taken, and the changes in supply and demand induced by the momentarily available profit snap the exchange rates back to levels that remove the profit.

Interest Rate Parity Borrowers and lenders must choose the currency in which to denominate their assets and debts. **Interest rate parity**, which means equal rates of return across currencies, means that for risk-free transactions, there is no gain from choosing one currency over another.

To see why interest rate parity always prevails, suppose a Brazilian real bank deposit in Rio de Janeiro earns 10 percent a year and a U.S. dollar bank deposit in New York earns 1 percent a year. Why wouldn't people move their funds from New York to Rio?

The answer begins with the fact that to earn 10 percent in Rio, funds must be converted from U.S. dollars to reals at the beginning of the year and from reals back to dollars at the end of the year. This transaction can be done without risk by selling reals for U.S. dollars today for delivery one year from today at an exchange rate agreed today. Such a transaction is called a *future* or *forward* transaction and it takes place at the *one-year forward exchange rate*.

Suppose that today's exchange rate is 2.30 reals per dollar, and you convert $100 to 230 reals. In one year, you will have 253 reals—your deposit of 230 reals plus interest of 23 reals. If the one-year forward exchange rate is 2.50 reals per U.S. dollar, you can contract today to sell 253 reals for $101 for delivery in one year. But that is exactly the amount you can earn by putting your $100 in the New York bank and earning 1 percent a year.

If for a few seconds, interest rate parity did not hold and it was possible to profit from buying and holding Brazilian reals, traders would flock to the profit opportunity, supply dollars and demand reals, and drive the exchange rate to its interest rate parity level.

Purchasing Power Parity Suppose a camera costs 10,000 yen in Tokyo and $100 in New York. If the exchange rate is 100 yen per dollar, the two monies have the same value. You can buy the camera in either Tokyo or New York for the same price. You can express that price as either 10,000 yen or $100, but the price is the same in the two currencies.

The situation we've just described is called **purchasing power parity** (or PPP), which means *equal value of money*. PPP is an example of the law of one price, and if it does not prevail, arbitrage forces go to work. To see these forces, suppose that the price of the camera in New York is $120, but in Tokyo

it remains at 10,000 yen and the exchange rate remains at 100 yen per dollar. In this case, the camera in Tokyo still costs 10,000 yen or $100, but in New York, it costs $120 or 12,000 yen. Money buys more in Japan than in the United States. Money is *not* of equal value in the two countries.

Arbitrage now kicks in. With the camera cheaper in Toyko than in New York, the demand for cameras increases in Tokyo and the supply of cameras increases in New York. The New York price falls and the Tokyo price rises to eliminate the price difference and restore purchasing power parity.

If most goods and services cost more in one country than another, the currency of the first country is said to be *overvalued*: a depreciation of the currency would restore PPP. Similarly, the currency of the country with the lower prices is said to be *undervalued*: an appreciation of that currency would restore PPP. When goods and services cost the same in two countries, their currencies are said to be at their PPP levels.

Determining whether a currency is overvalued or undervalued based on PPP is not easy, and testing PPP by looking at individual prices requires care to ensure that the goods compared are identical. What is identical isn't always immediately obvious (see *Economics in Action* below).

Speculation

Speculation is trading on the *expectation* of making a profit. Speculation contrasts with arbitrage, which is trading on the certainty of making a profit. Most foreign exchange transactions are based on speculation, which explains why the expected future exchange rate plays such a central role in the foreign exchange market.

The expected future exchange rate influences both supply and demand, so it influences the current equilibrium exchange rate. But what determines the expected future exchange rate?

The Expected Future Exchange Rate An expectation is a forecast. Exchange rate forecasts, like weather forecasts, are made over horizons that run from a few hours to many months and perhaps years. Also, like weather forecasters, exchange rate forecasters use scientific models and data to make their predictions.

But exchange rate forecasting differs from weather forecasting in three ways. First, exchange rate forecasts are hedged with a lot of uncertainty; second, there are many divergent forecasts; and third, the forecasts influence the outcome.

The dependence of today's exchange rate on forecasts of tomorrow's exchange rate can give rise to exchange rate volatility in the short run.

ECONOMICS IN ACTION

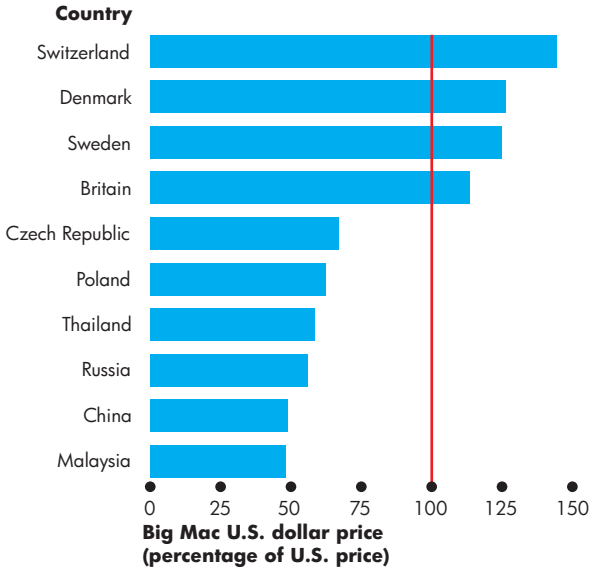
A Big Mac Index

Because a Big Mac is the same in Chicago as in Beijing, *The Economist* magazine wondered if its price in these cities might tell us how far China's yuan is from its PPP level. In July 2014, the price of a Big Mac was $4.80 in America and 16.93 yuan or $2.73 in China. Does this dollar price difference mean that the yuan is undervalued?

The Big Mac price comparison doesn't answer this question. A Big Mac *looks* the same in all places but most of its value is in its *service*, not its *appearance*.

The figure shows the price of a Big Mac as a percentage of the U.S. price averaged over 2000, 2007, and 2014. It shows that the price is persistently above the U.S. price in a few rich countries and persistently below the U.S. price in lower-income countries.

The persistent differences arise from different relative prices of services, not from over- or under-valued currencies.



The U.S. Dollar Price of a Big Mac in 10 Countries

Source of data: *The Economist*, April 2000, June 2007, and July 2014.

Exchange Rate Volatility An exchange rate might rise one day and fall the next, as news about the influences on the exchange rate change the expected future exchange rate. For example, news that the Fed is going to start to raise U.S. interest rates next month brings an immediate increase in the demand for U.S. dollars, decrease in the supply of U.S. dollars, and appreciation of the U.S. dollar. As the news is digested and its expected consequences revised, expectations are revised, sometimes upward and sometimes downward, bringing further changes in the exchange rate.

The influences of expectations and the constant arrival of news about the influences on supply and demand, make day-to-day and week-to-week changes in the exchange rate impossible to predict. But trends around which the exchange rate fluctuates are predictable and depend on market fundamentals.

Market Fundamentals

The demand for U.S. dollars depends on world demand for U.S. exports, the supply of U.S. dollars depends on U.S. demand for imports, and both demand and supply depend on the U.S. interest rate differential. These are the market fundamentals that influence the exchange rate. But how they influence the exchange rate is different in the short run and the long run. The short-run influences are those described in the previous section of this chapter. To understand the long-run, we need to define and understand the role played by the real exchange rate.

The Real Exchange Rate The **real exchange rate** is the relative price of U.S.-produced goods and services to foreign-produced goods and services. It is a measure of the quantity of the real GDP of other countries that a unit of U.S. real GDP buys. For example, the real Japanese yen exchange rate, *RER*, is

$$RER = (E \times P) \div P^*,$$

where E is the exchange rate (yen per U.S. dollar), P is the U.S. price level, and P^* is the Japanese price level.

To understand the real exchange rate, suppose that the exchange rate E is 100 yen per dollar. The United States produces only computer chips priced at \$150 each, so P equals \$150 and $E \times P$ equals 15,000 yen. Japan produces only iPods priced at 5,000 yen each, so P^* equals 5,000 yen. Then the real Japanese yen exchange rate is

$$RER = (100 \times 150) \div 5{,}000 = 3 \text{ iPods per chip.}$$

If Japan and the United States produced identical goods, the real exchange rate would equal 1 unit of U.S. real GDP per unit of Japanese real GDP.

In reality, U.S. real GDP is a different bundle of goods and services from Japanese real GDP. So the real exchange rate is not 1 and it changes over time. The forces of demand and supply in the markets for the millions of goods and services that make up real GDP determine the relative price of Japanese and U.S. real GDP and the real exchange rate.

Price Levels and Money We can turn the real exchange rate equation around and determine the exchange rate as

$$E = RER \times P^* \div P.$$

This equation says that the exchange rate equals the real exchange rate multiplied by the foreign price level, divided by the domestic price level.

In the long run, the quantity of money determines the price level. But the quantity theory of money applies to all countries, so the quantity of money in Japan determines the price level in Japan, and the quantity of money in the United States determines the price level in the United States.

For a given real exchange rate, a change in the quantity of money brings a change in the price level *and* a change in the exchange rate.

The market fundamentals that determine the exchange rate in the long run are the real exchange rate and the quantities of money in each economy.

REVIEW QUIZ

1. What is arbitrage and what are its effects in the foreign exchange market?
2. What is interest rate parity and what happens when this condition doesn't hold?
3. What makes an exchange rate hard to predict?
4. What is purchasing power parity and what happens when this condition doesn't hold?
5. What determines the real exchange rate and the nominal exchange rate in the short run?
6. What determines the real exchange rate and the nominal exchange rate in the long run?

Work these questions in Study Plan 26.2 and get instant feedback. Do a Key Terrms Quiz. MyEconLab

Exchange Rate Policy

Because the exchange rate is the price of a country's money in terms of another country's money, governments and central banks must have a policy toward the exchange rate. Three possible exchange rate policies are

- Flexible exchange rate
- Fixed exchange rate
- Crawling peg

Flexible Exchange Rate

A **flexible exchange rate** is an exchange rate that is determined by demand and supply in the foreign exchange market with no direct intervention by the central bank.

Most countries, including the United States, operate a flexible exchange rate, and the foreign exchange market that we have studied so far in this chapter is an example of a flexible exchange rate regime.

But even a flexible exchange rate is influenced by central bank actions. If the Fed raises the U.S. interest rate and other countries keep their interest rates unchanged, the demand for U.S. dollars increases, the supply of U.S. dollars decreases, and the exchange rate rises. (Similarly, if the Fed lowers the U.S. interest rate, the demand for U.S. dollars decreases, the supply increases, and the exchange rate falls.)

In a flexible exchange rate regime, when the central bank changes the interest rate, its purpose is not usually to influence the exchange rate, but to achieve some other monetary policy objective. (We return to this topic at length in Chapter 31.)

Fixed Exchange Rate

A **fixed exchange rate** is an exchange rate that is determined by a decision of the government or the central bank and is achieved by central bank intervention in the foreign exchange market to block the unregulated forces of demand and supply.

The world economy operated a fixed exchange rate regime from the end of World War II to the early 1970s. China had a fixed exchange rate until recently. Hong Kong has had a fixed exchange rate for many years and continues with that policy today.

Active intervention in the foreign exchange market is required to achieve a fixed exchange rate.

If the Fed wanted to fix the U.S. dollar exchange rate against the Japanese yen, the Fed would have to sell U.S. dollars to prevent the exchange rate from rising above the target value and buy U.S. dollars to prevent the exchange rate from falling below the target value.

There is no limit to the quantity of U.S. dollars that the Fed can *sell*. The Fed creates U.S. dollars and can create any quantity it chooses. But there is a limit to the quantity of U.S. dollars the Fed can *buy*. That limit is set by U.S. official foreign currency reserves because to buy U.S. dollars the Fed must sell foreign currency. Intervention to buy U.S. dollars stops when U.S. official foreign currency reserves run out.

Let's look at the foreign exchange interventions that the Fed can make.

Suppose the Fed wants the exchange rate to be steady at 100 yen per U.S. dollar. If the exchange rate rises above 100 yen, the Fed sells dollars. If the exchange rate falls below 100 yen, the Fed buys dollars. By these actions, the Fed keeps the exchange rate close to its target rate of 100 yen per U.S. dollar.

Figure 26.6 shows the Fed's intervention in the foreign exchange market. The supply of dollars is S and initially the demand for dollars is D_0. The equilibrium exchange rate is 100 yen per dollar. This exchange rate is also the Fed's target exchange rate, shown by the horizontal red line.

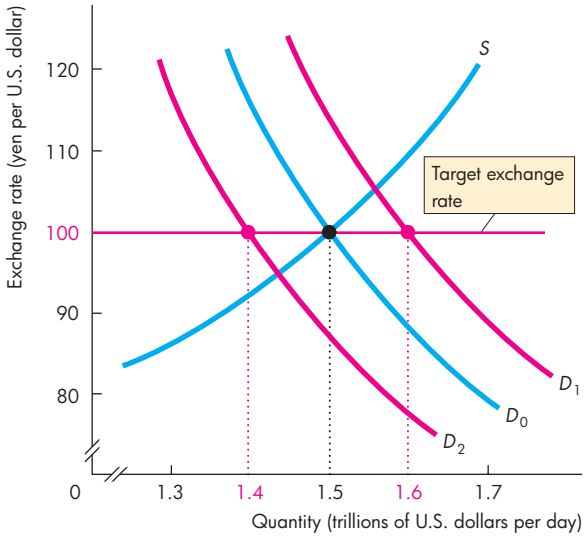
When the demand for U.S. dollars increases and the demand curve shifts rightward to D_1, the Fed sells $100 billion. This action prevents the exchange rate from rising. When the demand for U.S. dollars decreases and the demand curve shifts leftward to D_2, the Fed buys $100 billion. This action prevents the exchange rate from falling.

If the demand for U.S. dollars fluctuates between D_1 and D_2 and on average is D_0, the Fed can repeatedly intervene in the way we've just seen. Sometimes the Fed buys and sometimes it sells but, on average, it neither buys nor sells.

But suppose the demand for U.S. dollars *increases permanently* from D_0 to D_1. To maintain the exchange rate at 100 yen per U.S. dollar, the Fed must sell dollars and buy foreign currency, so U.S. official foreign currency reserves would be increasing. At some point, the Fed would abandon the exchange rate of 100 yen per U.S. dollar and stop piling up foreign currency reserves.

Now suppose the demand for U.S. dollars *decreases permanently* from D_0 to D_2. In this situation, the Fed

FIGURE 26.6 Foreign Exchange Market Intervention



Initially, the demand for U.S. dollars is D_0, the supply of U.S. dollars is S, and the exchange rate is 100 yen per U.S. dollar. The Fed can intervene in the foreign exchange market to keep the exchange rate close to its target rate (100 yen in this example). If the demand for U.S. dollars increases and the demand curve shifts from D_0 to D_1, the Fed sells dollars. If the demand for U.S. dollars decreases and the demand curve shifts from D_0 to D_2, the Fed buys dollars. Persistent intervention on one side of the market cannot be sustained.

MyEconLab Animation

cannot maintain the exchange rate at 100 yen per U.S. dollar indefinitely. To hold the exchange rate at 100 yen, the Fed must *buy* U.S. dollars. When the Fed buys U.S. dollars in the foreign exchange market, it uses U.S. official foreign currency reserves. So the Fed's action decreases its foreign currency reserves. Eventually, the Fed would run out of foreign currency and would then have to abandon the target exchange rate of 100 yen per U.S. dollar.

Crawling Peg

A **crawling peg** is an exchange rate that follows a path determined by a decision of the government or the central bank and is achieved in a similar way to a fixed exchange rate by central bank intervention in the foreign exchange market. A crawling peg works like a fixed exchange rate except that the target value changes. The target might change at fixed intervals (daily, weekly, monthly) or at random intervals.

The Fed has never operated a crawling peg, but some prominent countries do use this system. When China abandoned its fixed exchange rate, it replaced it with a crawling peg. Developing countries might use a crawling peg as a method of trying to control inflation—of keeping the inflation rate close to target.

The ideal crawling peg sets a target for the exchange rate equal to the equilibrium exchange rate

ECONOMICS IN ACTION

The People's Bank of China in the Foreign Exchange Market

You saw in the figure on p. 659 that the exchange rate between the U.S. dollar and the Chinese yuan was constant for several years. The reason for this constant exchange rate is that China's central bank, the People's Bank of China, intervened to operate a *fixed exchange rate policy*. From 1997 until 2005, the yuan was pegged at 8.28 yuan per U.S. dollar. Since 2005, the yuan has appreciated slightly, but it has not been permitted to fluctuate freely. Since 2005, the yuan has been on a crawling peg.

Why Does China Manage Its Exchange Rate? The popular story is that China manages its exchange rate to keep its export prices low and to make it easier to compete in world markets. You've seen that this story is correct *only in the short run*. With prices in China unchanged, a lower yuan–U.S. dollar exchange rate brings lower U.S. dollar prices for China's exports. But the yuan–U.S. dollar exchange rate was fixed for almost 10 years and has been managed for five more years. This long period of a fixed exchange rate has long-run, not short-run, effects. In the long run, the exchange rate has no effect on competitiveness. The reason is that prices adjust to reflect the exchange rate and the real exchange rate is unaffected by the nominal exchange rate.

So why does China fix its exchange rate? The most convincing answer is that China sees a fixed exchange rate as a way of controlling its inflation rate. By making the yuan crawl against the U.S. dollar, China's inflation rate is anchored to the U.S. inflation rate and will depart from U.S. inflation by an amount determined by the speed of the crawl.

The bottom line is that in the long run, exchange rate policy is monetary policy, not foreign trade policy. To change its exports and imports, a country must change its comparative advantage (Chapter 2).

How Does China Manage Its Exchange Rate? The People's Bank manages the exchange rate between the yuan and the U.S. dollar by intervening in the foreign exchange market and buying U.S. dollars. But to do so, it must pile up U.S. dollars.

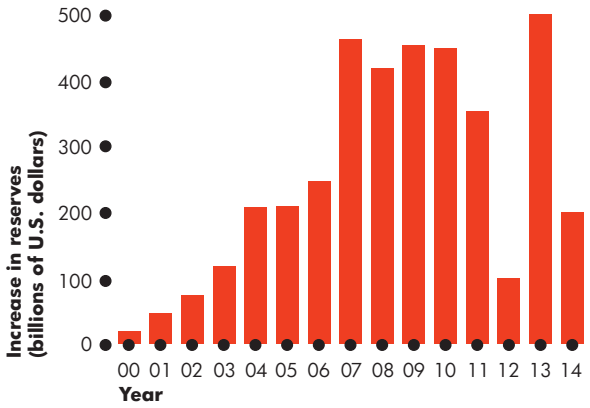
Part (a) of the figure shows the scale of China's increase in official foreign currency reserves, some of which are euros and yen but most of which are U.S. dollars. You can see that China's reserves increased by more than $400 billion a year in 2007 through 2010.

The demand and supply curves in part (b) of the figure illustrate what is happening in the market for U.S. dollars priced in terms of the yuan and explains why China's reserves have increased. The demand curve *D* and supply curve *S* intersect at 5 yuan per U.S. dollar. If the People's Bank of China takes no actions in the market, this exchange rate is the equilibrium rate (an assumed value).

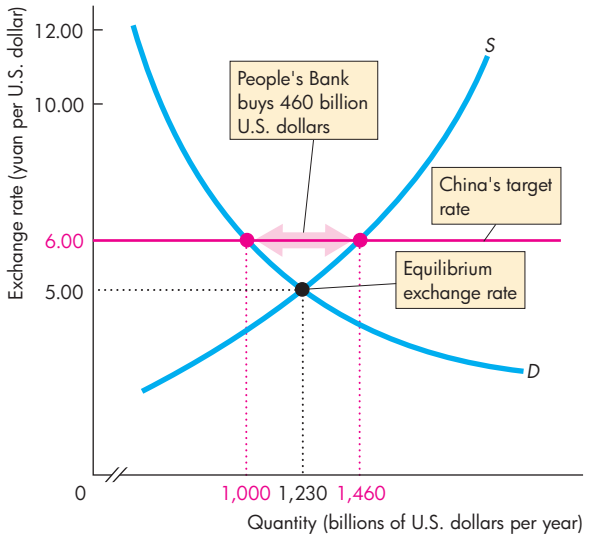
The consequence of the fixed (and crawling peg) yuan exchange rate is that China has piled up U.S. dollar reserves on a huge scale. By mid-2006, China's official foreign currency reserves approached $1 trillion and by 2014, they had reached $4 trillion!

If the People's Bank stopped buying U.S. dollars, the U.S. dollar would depreciate and the yuan would appreciate—the yuan–U.S. dollar exchange rate would fall—and China would stop piling up U.S. dollar reserves.

In the example in the figure, the dollar would depreciate to 5 yuan per dollar.



(a) Increase in U.S. dollar reserves



(b) Pegging the yuan

China's Foreign Exchange Market Intervention

Source of data: The People's Bank of China.

on average. The peg seeks only to prevent large swings in the expected future exchange rate that change demand and supply and make the exchange rate fluctuate too wildly.

A crawling peg departs from the ideal if, as often happens with a fixed exchange rate, the target rate departs from the equilibrium exchange rate for too long. When this happens, the country either runs out of reserves or piles up reserves.

In the final part of this chapter, we explain how the balance of international payments is determined.

REVIEW QUIZ

1. What is a flexible exchange rate and how does it work?
2. What is a fixed exchange rate and how is its value fixed?
3. What is a crawling peg and how does it work?
4. How has China operated in the foreign exchange market, why, and with what effect?

Work these questions in Study Plan 26.3 and get instant feedback. Do a Key Terms Quiz.

MyEconLab

Financing International Trade

You now know how the exchange rate is determined, but what is the effect of the exchange rate? How does currency depreciation or currency appreciation influence our international trade and payments? We're going to lay the foundation for addressing these questions by looking at the scale of international trading, borrowing, and lending and at the way in which we keep our records of international transactions. These records are called the *balance of payments accounts*.

Balance of Payments Accounts

A country's **balance of payments accounts** records its international trading, borrowing, and lending in three accounts:

1. Current account
2. Capital and financial account
3. Official settlements account

The **current account** records receipts from exports of goods and services sold abroad, payments for imports of goods and services from abroad, net interest income paid abroad, and net transfers abroad (such as foreign aid payments). The *current account balance* equals the sum of exports minus imports, net interest income, and net transfers.

The **capital and financial account** records foreign investment in the United States minus U.S. investment abroad. (This account also has a statistical discrepancy that arises from errors and omissions in measuring international capital transactions.)

The **official settlements account** records the change in **U.S. official reserves**, which are the government's holdings of foreign currency. If U.S. official reserves *increase*, the official settlements account balance is *negative*. The reason is that holding foreign money is like investing abroad. U.S. investment abroad is a minus item in the capital and financial account and in the official settlements account.

The sum of the balances on the three accounts *always* equals zero. That is, to pay for our current account deficit, we must either borrow more from abroad than we lend abroad or use our official reserves to cover the shortfall.

Table 26.1 shows the U.S. balance of payments accounts in 2013. Items in the current account and the capital and financial account that provide foreign currency to the United States have a plus sign; items that cost the United States foreign currency have a minus sign. The table shows that in 2013, U.S. imports exceeded U.S. exports and the current account had a deficit of $400 billion. How do we pay for imports that exceed the value of our exports? That is, how do we pay for our current account deficit?

We pay by borrowing from the rest of the world. The capital account tells us by how much. We borrowed $1,017 billion (foreign investment in the United States) but made loans of $650 billion (U.S. investment abroad). Our *net* foreign borrowing was $1,017 billion minus $650 billion, which equals $367 billion. There is almost always a statistical discrepancy between capital and financial account and current account transactions, and in 2013, the discrepancy was $30 billion. Combining the discrepancy with the measured net foreign borrowing gives a capital and financial account balance of $397 billion.

TABLE 26.1 U.S. Balance of Payments Accounts in 2013

Current account	**Billions of dollars**
Exports of goods and services	+2,280
Imports of goods and services	–2,757
Net interest income	+209
Net transfers	–132
Current account balance	–400
Capital and financial account	
Foreign investment in the United States	+1,017
U.S. investment abroad	–650
Statistical discrepancy	+30
Capital and financial account balance	+397
Official settlements account	
Official settlements account balance	3

Source of data: Bureau of Economic Analysis.

The capital and financial account balance plus the current account balance equals the change in U.S. official reserves. In 2013, the capital and financial account balance of $397 billion plus the current account balance of –$400 billion equaled –$3 billion. Official reserves *decreased* in 2013 by $3 billion. Holding less foreign reserves is like borrowing from the rest of the world, so this amount appears in the official settlements account in Table 26.1 as +$3 billion. The sum of the balances on the three balance of payments accounts equals zero.

To see more clearly what the nation's balance of payments accounts mean, think about your own balance of payments accounts. They are similar to the nation's accounts.

An Individual's Balance of Payments Accounts An individual's current account records the income from supplying the services of factors of production and the expenditure on goods and services. Consider Jackie, for example. She worked in 2014 and earned an income of $25,000. Jackie has $10,000 worth of investments that earned her an interest income of $1,000. Jackie's current account shows an income of $26,000. Jackie spent $18,000 buying consumption goods and services. She also bought a new house, which cost her $60,000. So Jackie's total expenditure was $78,000. Jackie's expenditure minus her income is $52,000 ($78,000 minus $26,000). This amount is Jackie's current account deficit.

ECONOMICS IN ACTION

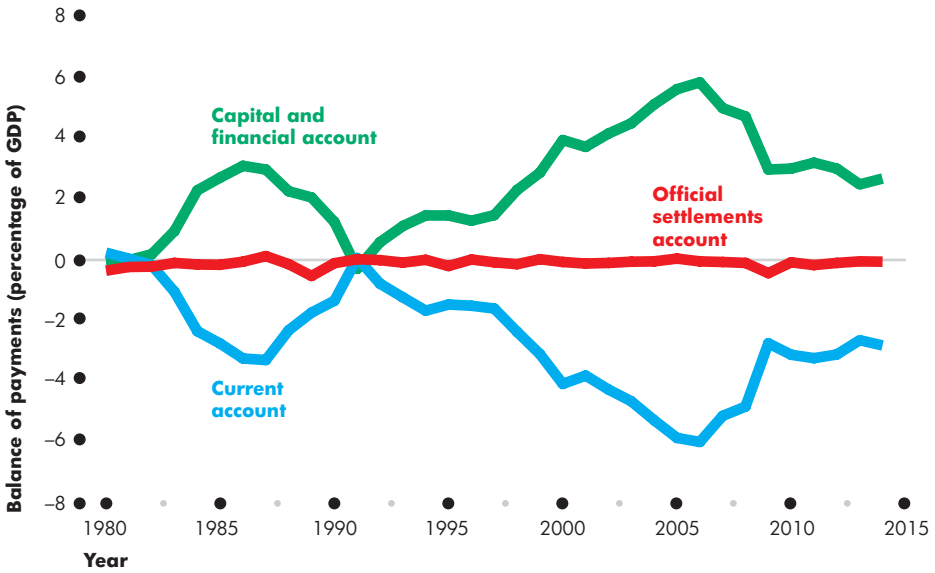
Three Decades of Deficits

The numbers that you reviewed in Table 26.1 give a snapshot of the balance of payments accounts in 2013. The figure below puts that snapshot into perspective by showing the balance of payments between 1980 and the first half of 2014.

Because the economy grows and the price level rises, changes in the dollar value of the balance of payments do not convey much information. To remove the influences of economic growth and inflation, the figure shows the balance of payments expressed as a percentage of nominal GDP.

As you can see, a large current account deficit emerged during the 1980s but declined from 1987 to 1991. The current account deficit then increased through 2006, decreased again through 2009, and then remained steady.

The capital and financial account balance is almost a mirror image of the current account balance. The official settlements balance is very small in comparison with the balances on the other two accounts.



The U.S. Balance of Payments

Source of data: Bureau of Economic Analysis.

To pay for expenditure of $52,000 in excess of her income, Jackie must either use the money that she has in the bank or take out a loan. Suppose that Jackie took out a loan of $50,000 to help buy her house and that this loan was the only borrowing that she did. Borrowing is an *inflow* in the capital account, so Jackie's capital account *surplus* was $50,000. With a current account deficit of $52,000 and a capital account surplus of $50,000, Jackie was still $2,000 short. She got that $2,000 from her own bank account. Her cash holdings decreased by $2,000.

Jackie's income from her work is like a country's income from its exports. Her income from her investments is like a country's interest income from foreigners. Her purchases of goods and services, including her purchase of a house, are like a country's imports. Jackie's loan—borrowing from someone else—is like a country's borrowing from the rest of the world. The change in Jackie's bank account is like the change in the country's official reserves.

Borrowers and Lenders

A country that is borrowing more from the rest of the world than it is lending to the rest of the world is called a **net borrower**. Similarly, a **net lender** is a country that is lending more to the rest of the world than it is borrowing from the rest of the world.

The United States is a net borrower, but it has not always been in this situation. Throughout the 1960s and most of the 1970s, the United States was a net lender to the rest of the world—the United States had a current account surplus and a capital account deficit. But from the early 1980s, with the exception of only a single year, 1991, the United States has been a net borrower from the rest of the world. And during the years since 1992, the scale of U.S. borrowing has mushroomed.

Most countries are net borrowers like the United States. But a few countries, including China, Japan, and oil-rich Saudi Arabia, are net lenders. In 2014, when the United States borrowed more than $397 billion from the rest of the world, China alone lent more than $200 billion.

International borrowing and lending takes place in the global market for loanable funds. You studied the loanable funds market in Chapter 24, but there, we didn't take explicit account of the effects of the balance of payments and international borrowing and lending on the market. That's what we will now do.

The Global Loanable Funds Market

Figure 26.7(a) illustrates the demand for loanable funds, DLF_W, and the supply of loanable funds, SLF_W, in the global loanable funds market. The world equilibrium real interest rate makes the quantity of funds supplied in the world as a whole equal to the quantity demanded. In this example, the equilibrium real interest rate is 5 percent a year and the quantity of funds is $10 trillion.

An International Borrower Figure 26.7(b) shows the loanable funds market in a country that borrows from the rest of the world. The country's demand for loanable funds, *DLF*, is part of the world demand in Fig. 26.7(a). The country's supply of loanable funds, SLF_D, is part of the world supply.

If this country were isolated from the global market, the real interest rate would be 6 percent a year (where the *DLF* and SLF_D curves intersect). But if the country is integrated into the global economy, with an interest rate of 6 percent a year, funds would *flood into* it. With a real interest rate of 5 percent a year in the global market, suppliers of loanable funds would seek the higher return in this country. In effect, the country faces the supply of loanable funds curve, *SLF*, which is horizontal at the world equilibrium real interest rate.

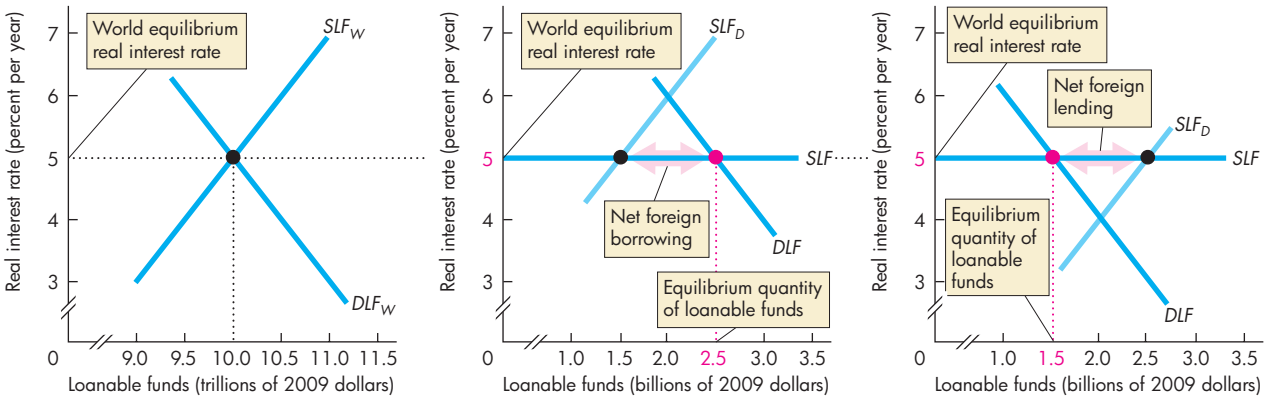
The country's demand for loanable funds and the world interest rate determine the equilibrium quantity of loanable funds—$2.5 billion in Fig. 26.7(b).

An International Lender Figure 26.7(c) shows the situation in a country that lends to the rest of the world. As before, the country's demand for loanable funds, *DLF*, is part of the world demand and the country's supply of loanable funds, SLF_D, is part of the world supply in Fig. 26.7(a).

If this country were isolated from the global market, the real interest rate would be 4 percent a year (where the *DLF* and SLF_D curves intersect). But if this country is integrated into the global economy, with an interest rate of 4 percent a year, funds would quickly *flow out* of it. With a real interest rate of 5 percent a year in the rest of the world, domestic suppliers of loanable funds would seek the higher return in other countries. Again, the country faces the supply of loanable funds curve, *SLF*, which is horizontal at the world equilibrium real interest rate.

The country's demand for loanable funds and the world interest rate determine the equilibrium quantity of loanable funds—$1.5 billion in Fig. 26.7(c).

FIGURE 26.7 Borrowing and Lending in the Global Loanable Funds Market



(a) The global market **(b) An international borrower** **(c) An international lender**

In the global loanable funds market in part (a), the demand for loanable funds curve, DLF_W, and the supply of funds curve, SLF_W, determine the world real interest rate. Each country can get funds at the world real interest rate and faces the (horizontal) supply curve *SLF* in parts (b) and (c).

At the world real interest rate, borrowers in part (b) want more funds than the quantity supplied by domestic lenders, $1.5 million on the domestic supply curve SLF_D. The shortage is made up by net foreign borrowing.

Domestic suppliers of funds in part (c) want to lend more than domestic borrowers demand. The excess quantity supplied goes to foreign borrowers.

MyEconLab Animation

Debtors and Creditors

A net borrower might be decreasing its net assets held in the rest of the world, or it might be going deeper into debt. A nation's total stock of foreign investment determines whether it is a debtor or a creditor. A **debtor nation** is a country that during its entire history has borrowed more from the rest of the world than it has lent to it. It has a stock of outstanding debt to the rest of the world that exceeds the stock of its own claims on the rest of the world. A **creditor nation** is a country that during its entire history has invested more in the rest of the world than other countries have invested in it.

The United States was a debtor nation through the nineteenth century as we borrowed from Europe to finance our westward expansion, railroads, and industrialization. We paid off our debt and became a creditor nation for most of the twentieth century. But following a string of current account deficits, we became a debtor nation again in 1986.

Since 1986, the total stock of U.S. borrowing from the rest of the world has exceeded U.S. lending to the rest of the world. The largest debtor nations are the capital-hungry developing countries (such as the United States was during the nineteenth century). The international debt of these countries grew from less than a third to more than a half of their gross domestic product during the 1980s and created what was called the "Third World debt crisis."

Should we be concerned that the United States is a net borrower and a debtor? The answer depends on whether the borrowing is financing investment that in turn is generating economic growth and higher income, or financing consumption expenditure. If the borrowed money is used to finance consumption, it will eventually have to be reduced, and the longer it goes on, the greater is the reduction in consumption that will eventually be necessary.

Is U.S. Borrowing for Consumption?

In 2014, the United States borrowed $397 billion from abroad. In that year, private investment in buildings, plant, and equipment was $2,829 billion and government investment in defense equipment and social projects was $588 billion. All this investment added to the nation's capital and increased productivity. Government also spends on education and healthcare services, which increase *human capital*. U.S. international borrowing is financing private and public investment, not consumption.

Current Account Balance

What determines a country's current account balance and net foreign borrowing? You've seen that net exports (*NX*) is the main item in the current account. We can define the current account balance (*CAB*) as

$$CAB = NX + \text{Net interest income} + \text{Net transfers}.$$

We can study the current account balance by looking at what determines net exports because the other two items are small and do not fluctuate much.

Net Exports

Net exports are determined by the government budget and private saving and investment. To see how net exports are determined, we need to recall some of the things that we learned in Chapter 24 about the flows of funds that finance investment. Table 26.2 refreshes your memory and summarizes some calculations.

Part (a) lists the national income variables that are needed, with their symbols. Part (b) defines three balances: net exports, the government sector balance, and the private sector balance.

Net exports is exports of goods and services minus imports of goods and services.

The **government sector balance** is equal to net taxes minus government expenditure on goods and services. If that number is positive, a government sector surplus is lent to other sectors; if that number is negative, a government deficit must be financed by borrowing from other sectors. The government sector deficit is the sum of the deficits of the federal, state, and local governments.

The **private sector balance** is saving minus investment. If saving exceeds investment, a private sector surplus is lent to other sectors. If investment exceeds saving, a private sector deficit is financed by borrowing from other sectors.

Part (b) also shows the values of these balances for the United States in 2014. As you can see, net exports were –$564 billion, a deficit of $564 billion. The government sector's revenue from *net* taxes was $2,362 billion and its expenditure was $3,162 billion, so the government sector balance was −$800 billion—a deficit of $800 billion. The private sector saved $3,065 billion and invested $2,829 billion, so its balance was $236 billion—a surplus of $236 billion.

Part (c) shows the relationship among the three balances. From the *National Income and Product Accounts*, we know that real GDP, *Y*, is the sum of consumption expenditure (*C*), investment, government expenditure, and net exports. Real GDP also equals the sum of consumption expenditure, saving, and net taxes. Rearranging these equations tells us that net exports is the sum of the government sector balance and the private sector balance. In the United States in 2014, the government sector balance was

TABLE 26.2 Net Exports, the Government Budget, Saving, and Investment

	Symbols and equations	United States in 2014 (billions of dollars)
(a) Variables		
Exports*	X	2,335
Imports*	M	2,899
Government expenditure	G	3,162
Net taxes	T	2,362
Investment	I	2,829
Saving	S	3,065
(b) Balances		
Net exports	$X - M$	2,335 – 2,899 = –564
Government sector	$T - G$	2,362 – 3,162 = –800
Private sector	$S - I$	3,065 – 2,829 = +236
(c) Relationship among balances		
National accounts	$Y = C + I + G + X - M$	
	$= C + S + T$	
Rearranging:	$X - M = S - I + T - G$	
Net exports	$X - M$	–564
equals:		
Government sector	$T - G$	–800
plus		
Private sector	$S - I$	+236

Source of data: Bureau of Economic Analysis. The data are for 2014, second quarter, seasonally adjusted at annual rate.

*The *National Income and Product Accounts* measures of exports and imports are slightly different from the balance of payments accounts measures in Table 26.1 on p. 634.

ECONOMICS IN ACTION

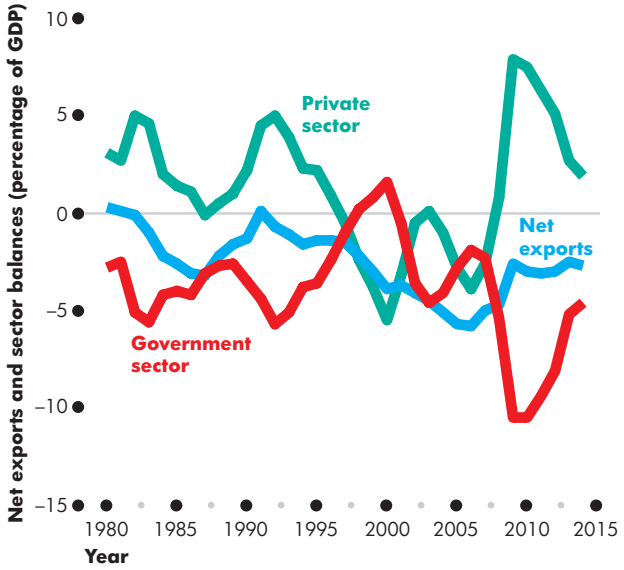
The Three Sector Balances

You've seen that net exports equal the sum of the government sector balance and the private sector balance. How do these three sector balances fluctuate over time?

The figure answers this question. It shows the government sector balance (the red line), net exports (the blue line), and the private sector balance (the green line).

The private sector balance and the government sector balance move in opposite directions. When the government sector deficit increased during the late 1980s and early 1990s, the private sector surplus increased. And when the government sector deficit decreased and became a surplus during the late 1990s and early 2000s, the private sector's surplus decreased and became a deficit. And when the government deficit increased yet again from 2007 to 2009, the private sector deficit shrank and became a surplus.

Sometimes, when the government sector deficit increases, as it did during the first half of the 1980s, net exports become more negative. But after the early 1990s, net exports did not follow the government sector balance closely. Rather, net exports respond to the *sum* of the government sector and private sector balances. When both the private sector and the government sector have a deficit, net exports are negative and the combined private and government deficit is financed by borrowing from the rest of the world. But the dominant trend in net exports is negative.



The Three Sector Balances

Source of data: Bureau of Economic Analysis.

−$800 billion and the private sector balance was $236 billion. The government sector balance plus the private sector balance equaled net exports of −$564 billion.

Where Is the Exchange Rate?

We haven't mentioned the exchange rate while discussing the balance of payments. Doesn't it play a role? The answer is that in the short run it does but in the long run it doesn't.

In the short run, a fall in the dollar lowers the real exchange rate, which makes U.S. imports more costly and U.S. exports more competitive. A higher price of imported consumption goods and services might induce a decrease in consumption expenditure and an increase in saving. A higher price of imported capital goods might induce a decrease in investment. Other things remaining the same, an increase in saving or a decrease in investment decreases the private sector deficit and decreases the current account deficit.

But in the long run, a change in the nominal exchange rate leaves the real exchange rate unchanged and plays no role in influencing the current account balance.

REVIEW QUIZ

1. What are the transactions that the balance of payments accounts record?
2. Is the United States a net borrower or a net lender? Is it a debtor or a creditor nation?
3. How are net exports and the government sector balance linked?

Work these questions in Study Plan 26.4 and get instant feedback. Do a Key Terms Quiz. MyEconLab

Economics in the News on pp. 678–679 looks at the foreign exchange market as the U.S. dollar rose against the euro in the summer of 2014.

The Rising Dollar

Fed Minutes Lift U.S. Bond Yields and Dollar

The Financial Times
August 20, 2014

… [The] dollar extended its recent advance as the markets took a hawkish view of the minutes of the Federal Reserve's July policy meeting. …

Analysts said the minutes indicated that the Fed's Open Market Committee had moved closer toward raising interest rates. …

Paul Dales at Capital Economics said the minutes made it very clear that any change in officials' expectations of when the first rate hike would take place depended on incoming economic data. …

"Overall, a lot still depends on whether or not wage growth accelerates as the labor market continues to improve. Nonetheless, the minutes provide some support to our view that rates will first rise in March and will then increase by more than widely expected."…

But the bond and currency markets moved to price in an earlier tightening. The dollar index—a measure of the U.S. currency's value against a basket of its peers—was up 0.5 percent at its highest level in 11 months. The euro was down 0.4 percent at $1.3262—its first break below $1.33 since November—while the dollar was up 0.9 percent versus the yen at a four-month high of ¥103.75. …

This rekindled the prospect of an early U.K. rate rise and drove sterling as high as $1.6678 against the dollar—although it later eased back to $1.6593, down 0.1 percent on the day, as the dollar rose broadly. …

Recent data showing a drop in the annual rate of U.K inflation last month—and stagnant wage growth—had persuaded some in the markets to push back their expectations of the timing of a rate rise. …

ESSENCE OF THE STORY

- The minutes of the Federal Reserve's July FOMC meeting indicated a movement toward raising interest rates.
- When the first increase occurs will depend on wage and employment growth.
- Paul Dales of Capital Economics predicts that interest rates will first rise in March 2015 and then increase by more than most expect.
- Anticipating an earlier interest rate rise, the dollar strengthened against other currencies.

MyEconLab More Economics in the News

ECONOMIC ANALYSIS

- The news article says the dollar rose against "a basket" of other currencies when the Fed published the minutes of the July meeting of the FOMC on August 20, 2014.
- The main currencies in the "basket" are the Japanese yen, the European euro, and the U.K. pound.
- Figure 1 shows how the dollar exchange rate changed against these three currencies from July 2 to August 27, 2014.
- You can see that the dollar increased against all three currencies. It increased most against the European euro and the U.K. pound and least against the Japanese yen.
- The Fed's July meeting minutes indicated that the Fed was moving closer to being ready to raise interest rates, and the news article attributes the stronger dollar to this news.
- But as you can see in Fig. 1, although the foreign exchange value of the dollar did rise immediately after the July minutes were released, it had been rising for almost two months.
- Also, after August 21, the dollar rose only against the euro. Against the yen and the pound, the dollar remained approximately constant.
- These facts about the timing of changes in the exchange rate and the different behavior of the dollar against the euro from the other two currencies suggests that other forces are at work.
- The summer of 2014 was a time of global tension arising from the poliltical situation in Ukraine. Currency traders sold the Russian ruble and the Ukrainian hryvinia and bought the U.S. dollar rather than the euro or pound.
- The Russia-Ukraine situation and the added effect of the expectation of a U.S. interest rate rise changed the demand for and supply of U.S. dollars in the foreign exchange market.
- The political tensions and predicted future rise in the U.S. interest rate increased the expected future exchange rate.
- With a higher expected future exchange rate, the demand for dollars increases and the supply of dollars decreases, and these changes in demand and supply bring an immediate appreciation of the dollar.
- Figure 2 shows these changes in supply and demand and their effects on the U.S. dollar–euro exchange rate.
- On July 2, demand was D_0 and supply was S_0. The equilibrium exchange rate was 0.732 euros per dollar. (The equilibrium quantity of dollars traded is an assumption.)

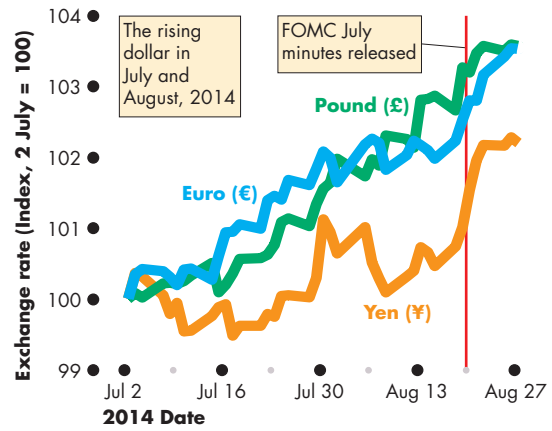


Figure 1 The U.S. Dollar Exchange Rate in July and August 2014

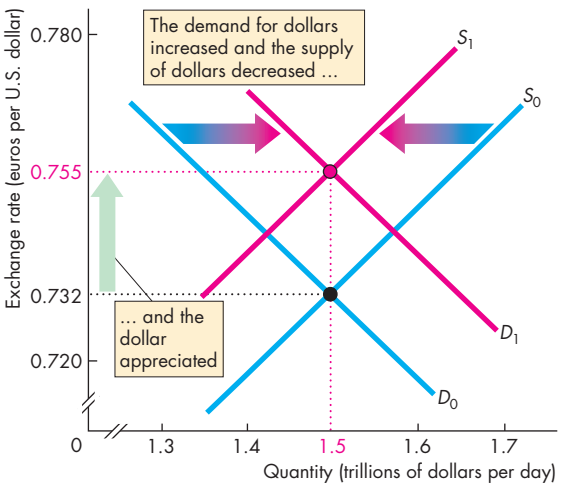


Figure 2 The U.S. Dollar Foreign Exchange Market

- On August 22, demand had increased to D_1 and supply had decreased to S_1. The equilibrium exchange rate had risen to 0.755 euros per dollar—an appreciation of the dollar (and a depreciation of the euro).
- Although we can explain past changes in the exchange rate, we can't predict the future exchange rate because we can't predict the course of the factors that influence it.

SUMMARY

Key Points

The Foreign Exchange Market (pp. 658–665)

- Foreign currency is obtained in exchange for domestic currency in the foreign exchange market.
- Demand and supply in the foreign exchange market determine the exchange rate.
- The higher the exchange rate, the smaller is the quantity of U.S. dollars demanded and the greater is the quantity of U.S. dollars supplied.
- The equilibrium exchange rate makes the quantity of U.S. dollars demanded equal the quantity of U.S. dollars supplied.
- Changes in the demand for U.S. exports change the demand for U.S. dollars and changes in the U.S. demand for imports change the supply of U.S. dollars .
- Changes in the U.S. interest rate differential or the expected future exchange rate change *both* the demand for and supply of U.S. dollars, but in opposite directions.

Working Problems 1 to 5 will give you a better understanding of the foreign exchange market.

Arbitrage, Speculation, and Market Fundamentals

(pp. 666–668)

- Arbitrage in the foreign exchange market achieves interest rate parity and purchasing power parity.
- Speculation in the foreign exchange market can bring excess volatility to the exchange rate.
- In the long run, the exchange rate is determined by the real exchange rate and the relative quantities of money.

Working Problems 6 to 8 will give you a better understanding of arbitrage, speculation, and market fundamentals.

Exchange Rate Policy (pp. 669–671)

- An exchange rate can be flexible, fixed, or a crawling peg.
- To achieve a fixed or a crawling exchange rate, a central bank must either buy or sell foreign currency in the foreign exchange market.

Working Problem 9 will give you a better understanding of exchange rate policy.

Financing International Trade (pp. 672–677)

- A country's international transactions are recorded in its current account, capital account, and official settlements account.
- The current account balance is similar to net exports and is determined by the government sector balance plus the private sector balance.
- International borrowing and lending take place in the global loanable funds market.

Working Problem 10 will give you a better understanding of financing international trade.

Key Terms

MyEconLab Key Terms Quiz

Arbitrage, 666
Balance of payments accounts, 672
Capital and financial account, 672
Crawling peg, 670
Creditor nation, 675
Current account, 672
Debtor nation, 675
Exchange rate, 658
Fixed exchange rate, 669
Flexible exchange rate, 669
Foreign currency, 658
Foreign exchange market, 658
Government sector balance, 676
Interest rate parity, 666
Net borrower, 674
Net exports, 676
Net lender, 674
Official settlements account, 672
Private sector balance, 676
Purchasing power parity, 666
Real exchange rate, 668
U.S. interest rate differential, 663
U.S. official reserves, 672

WORKED PROBLEM

MyEconLab You can work this problem in Chapter 26 Study Plan.

On June 1, 2015, the exchange rate was 101 yen per U.S. dollar. During that day, the Fed made a surprise announcement that it would raise the interest rate next month by 1 percentage point. At the same moment, the Bank of Japan announced that it would lower the interest rate next month.

On June 2, 2015, the exchange rate was 99 yen per U.S. dollar.

Questions

1. Explain the effect of the Fed's announcement on the demand for and supply of U.S. dollars.
2. Explain the effect of the Bank of Japan's announcement on the demand for and supply of U.S. dollars.
3. Explain the effect of the two announcements on the U.S. dollar–yen exchange rate: Would the U.S. dollar appreciate or depreciate?
4. Could the change in the exchange rate on June 2 have resulted from the two announcements or must some other influence have changed too? If so, what might that influence have been?

Solutions

1. The Fed's announcement of a 1 percentage point rise in the U.S. interest rate next month means that, other interest rates remaining the same, the U.S. interest rate differential will increase next month.

   An increase in the U.S. interest rate differential next month will increase the demand for U.S. dollars and decrease the supply of U.S. dollars next month. The exchange rate next month will increase.

   With the increase in the exchange rate expected next month, the demand for U.S. dollars will increase and the supply of U.S. dollars will decrease on June 2.

Key Point: An expected *future* rise in the interest rate differential increases the demand for U.S. dollars and decreases the supply of U.S. dollars immediately through its effect on the expected future exchange rate.

2. The Bank of Japan's announcement that it will lower the interest rate in Japan next month has the same effect on the U.S. interest rate differential as a rise in the U.S. interest rate.

   So the effect of a Japanese interest rate cut reinforces that of a U.S. interest rate increase.

   The even-larger increase in the interest rate differential next month will bring a larger increase in the demand for U.S. dollars and decrease in the supply of U.S. dollars next month, and a larger increase in the exchange rate next month.

   The larger increase in the exchange rate expected next month will bring a larger increase in the demand for U.S. dollars and decrease the supply of U.S. dollars on June 2.

Key Point: A fall in the foreign interest rate has the same effects on the demand for and supply of U.S. dollars as a rise in the U.S. interest rate.

3. The two interest rate announcements have the same effects: They increase the demand for U.S. dollars and decrease the supply of U.S. dollars.

   An increase in the demand for U.S. dollars raises the exchange rate and a decrease in the supply of U.S. dollars raises the exchange rate, so the announcements would make the dollar appreciate.

Key Point: An increase in demand and a decrease in supply have the same effect on price: They raise the price. The exchange rate is a price.

4. When the U.S. dollar fell from 101 yen on June 1 to 99 yen on June 2, the U.S. dollar depreciated.

   Other things remaining the same, the two central bank announcements would have appreciated the U.S. dollar.

   Because the exchange rate fell—the dollar depreciated—either the demand for U.S. dollars must have decreased or the supply of U.S. dollars must have increased.

   The influences on demand and supply that might have changed are U.S. exports or U.S. imports.

   A decrease in U.S. exports would have decreased the demand for U.S. dollars.

   An increase in U.S. imports would have increased the supply of U.S. dollars.

Key Point: When the exchange rate falls, either the demand for U.S. dollars has decreased or the supply of U.S. dollars has increased or both have occurred.

STUDY PLAN PROBLEMS AND APPLICATIONS

MyEconLab You can work Problems 1 to 10 in Chapter 26 Study Plan and get instant feedback. Problems marked update with real-time data.

The Foreign Exchange Market (Study Plan 26.1)

Use the following data to work Problems 1 to 3.

The U.S. dollar exchange rate increased from $0.96 Canadian in June 2011 to $1.03 Canadian in June 2012, and it decreased from 81 Japanese yen in June 2011 to 78 yen in June 2012.

1. Did the U.S. dollar appreciate or depreciate against the Canadian dollar? Did the U.S. dollar appreciate or depreciate against the yen?
2. What was the value of the Canadian dollar in terms of U.S. dollars in June 2011 and June 2012? Did the Canadian dollar appreciate or depreciate against the U.S. dollar over the year June 2011 to June 2012?
3. What was the value of 100 yen in terms of U.S. dollars in June 2011 and June 2012? Did the yen appreciate or depreciate against the U.S. dollar over the year June 2011 to June 2012?
4. On March 30, 2012, the U.S. dollar was trading at 82 yen per U.S. dollar on the foreign exchange market. On August 30, 2012, the U.S. dollar was trading at 79 yen per U.S. dollar.
   a. What events in the foreign exchange market could have brought this fall in the value of the U.S. dollar?
   b. Did the events you've described change the demand for U.S. dollars, the supply of U.S. dollars, or both demand and supply in the foreign exchange market?
5. Colombia is the world's biggest producer of roses. The global demand for roses increases and at the same time Columbia's central bank increases the interest rate. In the foreign exchange market for Colombian pesos, what happens to
   a. The demand for pesos?
   b. The supply of pesos?
   c. The quantity of pesos demanded?
   d. The quantity of pesos supplied?
   e. The peso–U.S. dollar exchange rate?

Arbitrage, Speculation, and Market Fundamentals (Study Plan 26.2)

6. If a euro deposit in a bank in France earns interest of 4 percent a year and a yen deposit in Japan earns 0.5 percent a year, other things remaining the same and adjusted for risk, what is the exchange rate expectation of the Japanese yen?
7. The U.K. pound is trading at 1.50 U.S. dollars per U.K. pound and purchasing power parity holds. The U.S. interest rate is 1 percent a year and the U.K. interest rate is 3 percent a year.
   a. Calculate the U.S. interest rate differential.
   b. What is the U.K. pound expected to be worth in terms of U.S. dollars one year from now?
   c. Which country more likely has the lower inflation rate? How can you tell?
8. The U.S. price level is 115, the Japanese price level is 92, and the real exchange rate is 98.75 Japanese real GDP per unit of U.S. real GDP. What is the nominal exchange rate?

Exchange Rate Policy (Study Plan 26.3)

9. With the strengthening of the yen against the U.S. dollar in 2012, Japan's central bank did not take any action. A Japanese politician called on the central bank to take actions to weaken the yen, saying it will help exporters in the short run and have no long-run effects.
   a. What is Japan's current exchange rate policy?
   b. What does the politician want the exchange rate policy to be in the short run? Why would such a policy have no effect on the exchange rate in the long run?

Financing International Trade (Study Plan 26.4)

10. The table gives some information about the U.S. international transactions.

Item	Billions of U.S. dollars
Imports of goods and services	2,215
Foreign investment in the United States	1,408
Exports of goods and services	1,754
U.S. investment abroad	1,200
Net interest income	167
Net transfers	–142
Statistical discrepancy	231

   a. Calculate the balance on the three balance of payments accounts.
   b. Was the United States a net borrower or a net lender? Explain your answer.

ADDITIONAL PROBLEMS AND APPLICATIONS

MyEconLab You can work these problems in MyEconLab if assigned by your instructor. Problems marked update with real-time data.

The Foreign Exchange Market

11. Suppose that yesterday, the U.S. dollar was trading on the foreign exchange market at 0.75 euros per U.S. dollar and today the U.S. dollar is trading at 0.80 euros per U.S. dollar. Which of the two currencies (the U.S. dollar or the euro) has appreciated and which has depreciated today?
12. Suppose that the exchange rate rose from 80 yen per U.S. dollar to 90 yen per U.S. dollar. What is the effect of this change on the quantity of U.S. dollars that people plan to sell in the foreign exchange market?
13. Suppose that the exchange rate for the Mexican peso fell from 15 pesos per U.S. dollar to 10 pesos per U.S. dollar. What is the effect of this change on the quantity of U.S. dollars that people plan to buy in the foreign exchange market?
14. Today's exchange rate between the Lebanese pound and the U.S. dollar is 1,500 LBP per dollar and the central bank of Lebanon is buying U.S. dollars in the foreign exchange market. If the central bank of Lebanon did not purchase U.S. dollars would there be excess demand or excess supply of U.S. dollars in the foreign exchange market? Would the exchange rate remain at 1,500 LBP per U.S. dollar? If not, which currency would appreciate?
15. On October 25, 2000, the exchange rate was 0.8307 U.S. dollar per euro. It increased to 1.588 U.S. dollars per euro on July 16, 2008, and then decreased to 1.0557 U.S. dollar per euro on March 16, 2015. If the euro is expected to bounce back to its 2008 exchange rate, explain how this would affect the demand for and the supply of euros in the foreign exchange market?
16. The exchange rate changed from 1.0557 U.S. dollar per euro on July 16, 2008 to 1.588 U.S. dollars per euro on March 16, 2015. Which factors caused these changes in the exchange rate? Which factors would change *both* demand and supply?
17. Australia produces natural resources (coal, iron ore, natural gas, and others), the demand for which has increased rapidly as China and other emerging economies expand.
    a. Explain how growth in the demand for Australia's natural resources would affect the demand for Australian dollars in the foreign exchange market.
    b. Explain how the supply of Australian dollars would change.
    c. Explain how the value of the Australian dollar would change.
    d. Illustrate your answer with a graphical analysis.

Arbitrage, Speculation, and Market Fundamentals

Use the following news clip to work Problems 18 and 19.

Indian Entrepreneur Seeks Opportunities

Rahul Reddy, an Indian real estate entrepreneur, believes that "The United States is good for speculative higher-risk investments." He profited from earlier investment in Australia and a strong Australian dollar provided him with the funds to enter the U.S. real estate market at prices that he believed "we will probably not see for a long time." He said, "The United States is an economic powerhouse that I think will recover, and if the exchange rate goes back to what it was a few years ago, we will benefit."

Based on an article in *Forbes*, July 10, 2008

18. Explain why Mr. Reddy is investing in the U.S. real estate market.
19. Explain what would happen if the speculation made by Mr. Reddy became widespread. Would expectations become self-fulfilling?

Use the following information to work Problems 20 and 21.

Brazil's Overvalued Real

The Brazilian real has appreciated 33 percent against the U.S. dollar and has pushed up the price of a Big Mac in Sao Paulo to $4.60, higher than the New York price of $3.99. Despite Brazil's interest rate being at 8.75 percent a year compared to the U.S. interest rate at near zero, foreign funds flowing into Brazil surged in October.

Source: Bloomberg News, October 27, 2009

20. Does purchasing power parity hold? If not, does PPP predict that the Brazilian real will appreciate or depreciate against the U.S. dollar? Explain.
21. Does interest rate parity hold? If not, why not?