



UNDERSTANDING FOREIGN EXCHANGE

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15 PAYMENTS AMONG NATIONS

Throughout Parts I and II we focused on international trade in products. This focus is justified by the need to understand the basis for international trade and the effects of various government policies toward trade. In that discussion countries seemed to exchange exports of goods and services for imports of goods and services. Little attention was given to the monetary and financial aspects of international transactions.

In Parts III and IV we add money and international finance to our discussion. We will recognize (1) that many international transactions are trades in financial assets like bonds, loans, deposits, stocks and other ownership rights and (2) that nearly all international transactions involve the exchange of money (or some other financial asset) for something else—for a good, service, or a different financial asset.

This chapter examines the framework used to summarize a country's international transactions. The bridge that links all the separate parts of international economics is the **balance of payments**, the set of accounts recording all flows of value between a nation's residents and the residents of the rest of the world during a period of time. Until one is familiar with the balance of payments, it is hard to see what the U.S. government's borrowing abroad has to do with the decision to buy a Sharp hand calculator in a department store, how repaying that foreign debt relates to our sales of aircraft, or how trade events like the purchase of the calculator or the sale of the aircraft could affect the nation's money supply and interest rates. Understanding the balance of payments is also key to understanding how people trade one country's money for that of another country. Even the international flow of humans shows up in the balance of payments, when the migrants make purchases or send money back home. Fortunately, for all the diverse traffic over that bridge, its design is straightforward. We now cross it to widen our view from trade alone to all the exchanges of values between nations, with their many links to macroeconomic concerns like growth, inflation, and unemployment.

Two Sides to Any International Exchange

An exchange between a country and the rest of the world involves two flows of value to be recorded in the balance-of-payments accounts. From that country's point of view each exchange, each transaction, involves two opposite flows of equal value:

- * A **credit (+)** is a flow for which the country is paid. Exports are an example.
- * A **debit (-)** is a flow for which the country must pay. Imports are an example.

Any exchange automatically enters the balance-of-payments accounts twice: as a credit (+) and as a debit (-) of the same value. This is just an international application of the fundamental accounting principle of double-entry bookkeeping.

To build a set of accounts showing useful summary information, accountants distinguish between different categories of flows and put the two flows for each transaction into two of the different categories. The main kinds of flows in the balance-of-payments accounts are

Merchandise trade flows (flows of goods).

Service flows.

Unilateral transfers (gifts).

Private capital (asset) flows.

Official asset flows.

To show how international transactions affect these five useful categories, let us imagine a set of just five illustrative transactions between the United States and the rest of the world in a short time period.

First, suppose that the U.S. government sells \$29 billion worth of wheat to Russia from its surplus stockpiles, being paid with \$29 billion in gold by the Russian government. There is an outflow of \$29 billion worth of wheat, an export of merchandise, for which the United States must be paid. The offsetting inflow is the payment itself, in this case \$29 billion in gold to the U. S. government. The wheat-for-gold transaction creates these two bookkeeping entries (in billions of dollars):

	Credit (+) (\$ billion)	Debit (-) (\$ billion)
Merchandise exports (wheat)	\$29	
Increase in official assets (gold)		\$29

Note that the payment of gold is a debit item, an inflow of value. It qualifies as a debit because it is something for which the United States must give up something else, namely wheat.¹ Gold is viewed as an official asset, but wheat is not,

¹In every case, the credit and debit entries have the opposite signs in the accounts of the other country. In Russia's balance of payments, this transaction entails a credit of \$29 billion for gold exports and a debit of \$29 billion for wheat imports.

even though the wheat might have been held by government officials. The term *official assets* here refers more strictly to official moneylike assets, an attribute possessed by gold but not by wheat. The moneylike assets such as gold that are generally recognized as official assets are called **official international reserves**.

Consider a second international transaction also involving merchandise trade. Northern Illinois Gas, a U.S. utility company, buys \$34 billion in natural gas from a Canadian firm. Suppose that it pays for the natural gas by writing a check on its deposits in a New York bank. Two accounting entries are made regarding the U.S. accounts:

	Credit (+) (\$ billion)	Debit (-) (\$ billion)
Merchandise imports (natural gas)		\$34
Private capital inflow (bank's deposit liability to a foreign resident)	\$34	

The debit entry probably seems easier and more natural than the credit entry in this case. It is clear that importing natural gas is an inflow of something valuable for which the United States must pay. But why should the payment be recorded as a "private capital inflow"? Because the writing of the check placed a bank liability (obligation to pay) into the hands of foreign residents. Before the purchase, the bank owed that bank deposit to Northern Illinois Gas, a resident of the United States. That was a purely domestic matter, not involving the balance of international payments. Once the gas is paid for, however, the New York bank owes an obligation—the right to redeem the checking deposit for cash—to a resident of Canada. This means that the New York bank is borrowing (incurring a new obligation to repay in the future) from Canada, which the bank used to cancel its obligation to somebody in the United States (Northern Illinois Gas). When you borrow, you gain the right to be paid now. In this key respect, borrowing is like an export of goods. It entitles you to be paid now. It is a credit item.

The rule regarding capital flows is this:

Capital inflows are credits (+). They take the form of either an increase in a nation's liabilities to foreign residents or a decrease in assets previously obtained from other countries. Each of these is a flow for which the nation must be given payment right now, so each is a credit entry.

Capital outflows are debits (-). They take the form of either an increase in a nation's assets obtained from other countries or a decrease in its liabilities to other countries. Each of these is a flow for which the nation must give up payment right now, so each is a debit entry.²

²Capital inflow (or capital import) and capital outflow (or capital export) refer to the directions in which the funds (payments) are flowing (in or out of the country). Capital inflows can also be considered "asset exports" and capital outflows can also be considered "asset imports" if we focus instead on the direction of flows of the financial assets themselves.

A capital outflow arises in the example to which we now turn.

Next, imagine that Brazilian soccer fans spend \$16 billion as tourists in the United States during a soccer tournament, paying for their hotels, meals, and transportation through New York bank deposits. The two flows are entered in the U.S. accounts as

	<i>Credit (+)</i> (\$ billion)	<i>Debit (-)</i> (\$ billion)
Service exports (travel)	\$16	
Private capital outflow (reduction in bank's obligations to foreign residents)		\$16

Again, one entry fits intuition more easily than the other. It is easy to see that the sales of tourist services to Brazilians are a U.S. export, for which the United States must be paid. And if that is clearly a credit item, it makes sense that the other entry must be a debit item. But why would it be labeled a "private capital outflow"? The answer is because reducing your liability to foreigners is like buying a claim on them, the usual sense of the phrase *capital outflow*. It is a use for which you must pay right now, just like any form of lending. Both repaying your liabilities and lending (buying somebody else's IOUs) are debits.

Our fourth transaction offers a further look at the financial side of the accounts. Suppose that the U.S. Treasury pays \$25 billion in interest on its past borrowing from Japanese investors, paying with checks on a New York bank. The two accounting entries are

	<i>Credit (+)</i> (\$ billion)	<i>Debit (-)</i> (\$ billion)
Service import (interest paid for use of money)		\$25
Private capital inflow (increase in bank's obligations to foreign residents)	\$25	

The payment of interest represents a payment for a service, the service of using somebody else's money (or capital) for a period of time. Therefore, the U.S. government is importing such lending services from Japan. It must pay for these services, so they are a debit. The means of payment is a credit. Why is this credit counted as a "private capital inflow"? The private New York bank on whom the U.S. government wrote the checks now has a new liability to residents of Japan. It is borrowing anew from foreigners. The bank uses the borrowing from foreigners to cancel an equal checking-account obligation to the U.S. government, which has less claim on the private bank now that it has written checks.

So far, we can see that every transaction has two equal sides. If we add up all the credits as pluses and all the debits as minuses, the net result is zero. That is,

the total credits must always equal the total debits. That is correct. To see just how correct it is, though, let us turn to a case that might look like a violation of this accounting balance.

Our fifth hypothetical transaction involves giving something away. Suppose that the U.S. government simply gives \$8 billion in foreign aid to the government of Egypt in the form of wheat from U.S. government stockpiles. This case differs from the sale of wheat to Russia (above) because Egypt is not paying, with gold or checks or anything else. The correct way to record the credit and debit flows is as follows:

	<i>Credit (+)</i> (\$ billion)	<i>Debit (-)</i> (\$ billion)
Merchandise export (wheat)	\$8	
Unilateral transfer to Egypt		\$8

The \$8 billion credit is straightforward since this is just another merchandise export, for which the United States must be paid. The accountants get around the fact that the United States was *not* paid by Egypt by inventing a debit item for the unilateral transfer (gift) to Egypt. They invent the fiction that the United States received \$8 billion in good will—or gratitude—from Egypt for its gift of wheat. That good will is something received, a debit, for which the United States pays in wheat. In this way, even a one-way flow is transformed by accounting fiction into a two-way flow, preserving the all-in zero balance of double-entry bookkeeping.

Putting the Accounts Together

To arrange the credit and debit flows from separate transactions into a useful summary set of accounts, group them according to the five types of flows. Figure 15.1 does this for our simplified set of five transactions. In this set of transactions, the United States was a slight net exporter of merchandise (exporting \$37 billion of wheat and importing \$34 billion of natural gas). It was a net importer of services since its import of lending services from Japan (its interest payment of \$25 billion to Japan) exceeded its sales of travel services to the Brazilian soccer fans. For all goods and services together, the United States was a net importer by \$6 billion, which is a deficit in the **goods and services balance** of \$6 billion. In addition, the nation gave away \$8 billion in unilateral transfers to Egypt, so there were \$14 billion that had to be paid for (or financed) somehow.

The net flow of currently used goods, services, and gifts is the **current account balance**. If this is positive (a surplus), the nation earns that much in extra assets or reduced liabilities in its dealings with other countries. If it is negative (a deficit), the country must pay by giving up assets or increasing its liabilities. In

FIGURE 15.1 A Simple Balance-of-Payments Account for the United States, Resulting from Only Five Transactions (\$ billions)

<i>Flows and Balances</i>	<i>Credits (+)</i>	<i>Debits (-)</i>	<i>Credits Minus Debits = Net Surplus (+) or Deficit (-)</i>
Merchandise trade flows	\$(29 + 8 =) 37	\$34	\$ 3
Service flows	16	25	-9
Unilateral transfers (gifts)		8	-8
Private capital flows	(25 + 34 =) 59	16	43
Official asset flows		29	-29
Grand balance of credits minus debits:			0
Five Key Balances			
Merchandise trade (goods) balance			3
Goods and services balance			-6
Current account balance (goods, services, gifts)			-14
Net private capital flows			43
Overall balance (current account + private capital flows)			29

the simple case of Figure 15.1, the United States has a current account deficit of \$14 billion. It paid for this by incurring greater debts to foreigners. In this case, its extra debts took the form of extra private-bank deposit liabilities to foreigners, worth \$43 billion, minus a buildup of \$29 billion in official gold reserves acquired from Russia, or net new liabilities of \$14 billion covering the \$14 billion deficit for goods, services, and gifts.

The simple view of Figure 15.1 shows us a skeletal balance of payments with the main categories in clear view: goods flows, service flows, gifts, private capital flows, and official asset flows. Now that we understand the main categories, let us take a closer look at the varieties of entries that actually go into those categories. Figure 15.2 gives some extra detail, using the actual balance-of-payments accounts of the United States for 1993.

At the top of the accounts, there is little detail to add. Merchandise exports and imports are easy to understand. The only wrinkle is that some of them go unrecorded, due to smuggling, negligence, or national secrecy (such as hiding some military sales and gifts from the U.S. balance of payments). The net balance of merchandise trade (Line 21) is often called the *trade balance*.³

Services take a miscellany of forms. In the simple examples above, we only considered travel services and interest payments. In addition to travel or tourism services, nations trade transportation, insurance, education, financial, technical,

³Prior to January 1994 the merchandise trade balance received considerable attention in the United States because it was the only information about the U.S. balance of payments reported monthly. The United States now reports the goods and services balance monthly. This provides monthly information that is meaningful for most economic analyses. Nonetheless, there is considerable noise or variation in these data, so be careful when interpreting month-to-month changes.

Figure 15.2 U.S. Balance-of-Payments Account, 1993 (\$ billions)

	Credit (+)	Debit (-)
1. Exports of goods and services	\$756	
2. Merchandise exports	457	
3. Service exports (travel, investment income, etc.)	299	
4. Imports of goods and services		-827
5. Merchandise imports		-589
6. Services imports (travel, investment income, etc.)		-238
7. Unilateral transfers, net		-32
8. U.S. government transfers to foreigners		-18
9. Private remittances and other transfers		-14
10. Changes in U.S. holdings of foreign assets (excluding official international reserves), net		-147
11. U.S. direct investments abroad		-58
12. Other U.S. investments abroad		-89
13. Changes in foreign holdings of U.S. assets (excluding official international reserves), net	159	
14. Foreign direct investments in the U.S.	21	
15. Other foreign investments in the U.S.	138	
16. Official international reserve transactions, net	70	
17. Foreign official holdings of U.S. assets	71	
18. U.S. holdings of official reserve assets		-1
19. Statistical discrepancy	21	
20. Net balance of credits minus debits	0	
Five Key Balances		
21. Merchandise trade balance (lines 2 and 5)		-132
22. Goods and services balance (lines 1 and 4)		-71
23. Current account balance (lines 1, 4, and 7)		-103
24. Net private capital flows and statistical discrepancy*	33	
25. Overall balance (lines 23 and 24, or the negative of line 16)		-70

In the source, lines 10 and 18 are included in the category "U.S. assets abroad, net," and lines 13 and 17 are included in the category "Foreign assets in the United States, net."

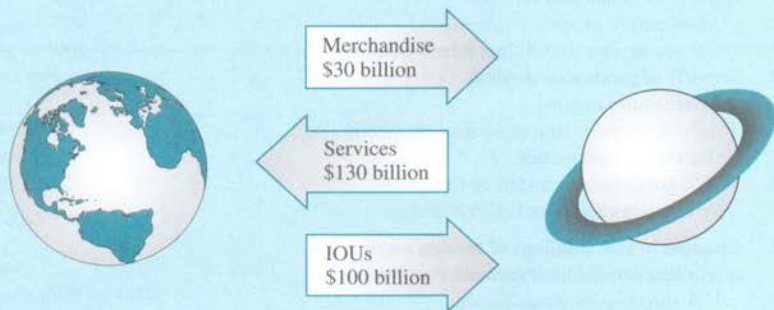
*Lines 10, 13, and 19.

SOURCE: U.S. Bureau of Economic Analysis, *Survey of Current Business*, March 1995, p. 80.

telecommunications, and other business and professional services. Nations also pay each other royalties for use of technologies or brand names. In addition, there are other kinds of payments for capital services besides interest, such as dividends, and there are payments for the services of foreign labor, such as the honorarium paid to a U.S. professor for giving a talk at a Canadian university.⁴

⁴In some presentations of a country's balance of payments, including the standard presentation used by the International Monetary Fund in its publications, overall services transactions are split into two parts: flows of "normal" (or "nonincome") services (such as tourism) and flows of income payments for the services of foreign capital and foreign labor.

Planet Earth's Balance of Payments



Planet Earth has been trading heavily with the rest of the galaxy for years. Since the early 1980s and perhaps earlier, we have been exporting billions of dollars of goods into space. We have been importing even bigger amounts of services and goodwill, especially lending services, from space. To cover our current account deficit, we have been sending out ever greater IOUs (promises to repay somebody out there in space). In 1991, for example, we exported \$30 billion in goods, imported \$130 billion in services and goodwill, and sent out \$100 billion in promises to repay. How long can this continue?

You may feel that something is wrong with the basic facts here. Yet, these flows are consistent with all the world's official balance-of-payments statistics. If you add up the trade balances and current account balances of every country in 1991, you find that \$30 billion of merchandise imports and \$100 billion of current account surplus are unaccounted for, implying that a net export of \$130 billion in services and goodwill are also unaccounted for. How could that happen? We cannot rule out the possibility that the missing flows went to the rest of the galaxy, as suggested. A more likely explanation, however, is that there are systematic patterns of misreporting international flows right here on Earth. The \$30 billion of

lost imports are probably imports that went unreported because of smuggling or other incentives to underreport. (Drug traffic is probably not the reason why, since drug trade is unreported on both the export and the import sides.) The \$130 billion in lost service exports is probably income on foreign investments, hidden to avoid taxes and regulation. A related problem arises in the world's capital account, in which the world appears to be a massive recipient of capital inflows from the rest of the galaxy. This most probably represents unreported "capital flight," the secret sending of wealth to foreign countries, away from the supervision of one's home government. Separate estimates suggest that unreported capital flight is particularly severe from developing nations, especially Latin America.

How serious are errors of this magnitude? The world's missing net current account surplus has been about 2 percent of the value of world exports of goods and services since the early 1980s. By itself, that is an acceptable rate of error. However, it is just a *net* error, the result of offsetting errors in both directions.

SOURCES: IMF, International Financial Statistics Yearbook 1993; and IMF, World Economic Outlook 1989 and 1994.

Unilateral (or unrequited) transfers also take a variety of forms. There are official government grants in aid to foreigners, as in the simple example of a U.S. grant of wheat to Egypt. Private individuals also make unilateral transfers. Historically, the largest kind of private transfer is international migrants' remittances of money and goods back to their families in the home country. Another kind of private aid is charitable giving, such as international famine relief.

The net flows of financial assets and similar claims (excluding official asset flows) is the private **capital account balance**. The values reported in this account are for the principal amounts only of assets traded—any flows of earnings on foreign assets are reported in the services account. Some varieties of private capital flows call for special comment here and in Part V. **Direct investments** are defined as any flow of lending to, or purchases of ownership in, a foreign enterprise that is largely owned by residents of the investing country. Chapter 27 offers a more detailed definition. Foreign investments that are not direct are often called *portfolio investments*, indicating that the investor's home country does not own a large share of the enterprise being invested in, but is just investing or lending as part of a diversified portfolio. The official U.S. parlance now avoids the term *portfolio*, referring instead to securities, claims, and liabilities not falling under the direct investment heading. The securities are bonds and stocks; the other financial claims and liabilities include bank deposits and various kinds of loans.⁵

The distinction between private capital flows and official capital flows is not quite the same as the distinction between private and government. The term *official* in Lines 16 through 18 refers to official reserve assets held by *monetary-type* officials, not all government. Other (“nonofficial”) government assets are included in the private category. The purpose of that distinction is to focus on the monetary task of regulating currency values, to which we return in discussing the overall surplus or deficit.

Early in this century gold was the major official reserve asset. While gold is still held as a reserve asset, it is now little used in official reserve transactions. The majority of countries' official reserve assets are now foreign exchange assets, financial assets denominated in a foreign currency that is readily acceptable in international transactions. For the United States, these foreign exchange assets feature German mark and Japanese yen assets. For other countries these foreign exchange assets are often U.S. dollar assets. Two other small categories of official reserve assets are certain claims that a country has on the International Monetary Fund (IMF), especially its reserve position in the Fund, and the country's holdings of Special Drawings Rights (SDRs), a reserve asset created by the Fund.

At the bottom of the accounts comes the suspicious item, statistical discrepancy. If the flows on the two sides of every transaction are correctly recorded, there should not be any statistical discrepancy at all. Line 19 in Figure 15.2 should be zero. In fact, it is a credit of \$21 billion, meaning that the debit items for the United States are more fully measured than its credit items. The accountants add the statistical discrepancy to make the accounts balance and to warn us that something was missed. In fact, the statistical discrepancy may understate what was missed. It is the net result of errors and omissions on both the credit and debit sides. In truth, more than \$21 billion of credits were missed, but some were offset by failure to count all the debits.

⁵Note that each asset or liability category is defined as an increase in that asset or liability. Decreases in one or the other will have the opposite sign. Thus, for example, Mexican repayment of principal on a U.S. bank loan would reduce the bank (asset) claims of the United States against foreigners, bringing a credit entry (a capital inflow) on Line 12 of Figure 15.2. Another example: U.S. repayment of principal on a Treasury bond held by investors in Japan would bring a debit entry (a capital outflow) on Line 15.

How do the measurement errors arise? Which items appear to be most seriously undermeasured? It is hard to know just by looking at one nation's accounts. We get good clues, however, by adding up all the balance-of-payments accounts in the world. These should balance, but do not. For the world as a whole, there is a tendency to underreport merchandise imports, service exports (especially investment incomes), and capital exports. (See the box "Planet Earth's Balance of Payments.") The main difficulty is probably that many people succeed in hiding their imports, their foreign investment incomes, and their capital flight from their own government officials.

The Macro Meaning of the Current Account Balance

The current account balance has several meanings. To discuss these, let's consider a country that has a current account surplus. The first meaning of a surplus on goods, services, and gifts has already been introduced. When all these flows for current uses have been netted out, what is left is the increase in all of the foreign financial assets minus all of the country's foreign financial liabilities. The reason is straightforward. The only (nonhuman) things being exchanged between nations are goods, services, gifts, and financial assets. If all credits must equal all debits, then the surplus on goods, services, and gifts—that is, the current account surplus—must equal **net foreign investment**, the net accumulation of foreign assets minus foreign liabilities.

The fact that the current account (CA) surplus equals net foreign investment (I_f) links it to saving, investment, and national income. A nation that has net foreign investment ($I_f > 0$) is a nation that is investing part of its national saving (S) abroad instead of in domestic capital formation (I_d). So the value of *national saving equals domestic investment plus foreign investment*: $S = I_d + I_f$.

The net foreign investment, or $I_f = S - I_d$, also equals something else. It is the amount by which all national income or product (Y) exceeds what the nation is spending for all purposes including domestic capital formation. These total expenditures (E) are expenditures for private consumption of home plus foreign goods and services (C), plus government purchases of goods and services (G), plus investment purchases of capital goods (I_d again). You can see the link between this total national expenditure and national product by remembering a national product identity from introductory courses:

$$\begin{aligned} \text{National product} &= \text{All purchases of our national product} \\ Y &= C + I_d + G + X - M \end{aligned}$$

This implies that national product (Y) differs from national expenditure ($E = C + I_d + G$) by the amount of the current account balance, or the difference between exports and imports of goods and services,⁶ $X - M$:

$$Y - E = X - M$$

⁶In equating $X - M$, exports minus imports of goods and services, with the current account balance, we are ignoring unilateral transfers. This is one of several simplifications generally used in macroeconomic analysis. (Another is equating national product with national income.)

So the current account surplus in the balance of payments turns out to equal three other things:

Current account surplus	$CA = X - M$
= Net foreign investment	$= I_f$
= National saving not invested at home	$= S - I_d$
= Difference between national product and national expenditure	$= Y - E$

The same identities apply to a country with a deficit in its current account—all expressions are negative in value. The current account deficit ($M > X$) is financed by foreign borrowing (negative net foreign investment I_f). The deficit also represents an excess of domestic capital investment over national saving ($I_d > S$) and an excess of national expenditure over national product ($E > Y$).

These identities help us see what must be changed if the current account balance is to be changed. For instance, consider a country that seeks to reduce its current account deficit (that is, increase the value of its current account balance, making it less negative). An improvement in the country's current account balance must be accompanied by an increase in the value of national product (Y) relative to the value of national expenditure (E). If national production cannot expand much, then national spending must fall in order to decrease imports or to permit more local production to be exported.

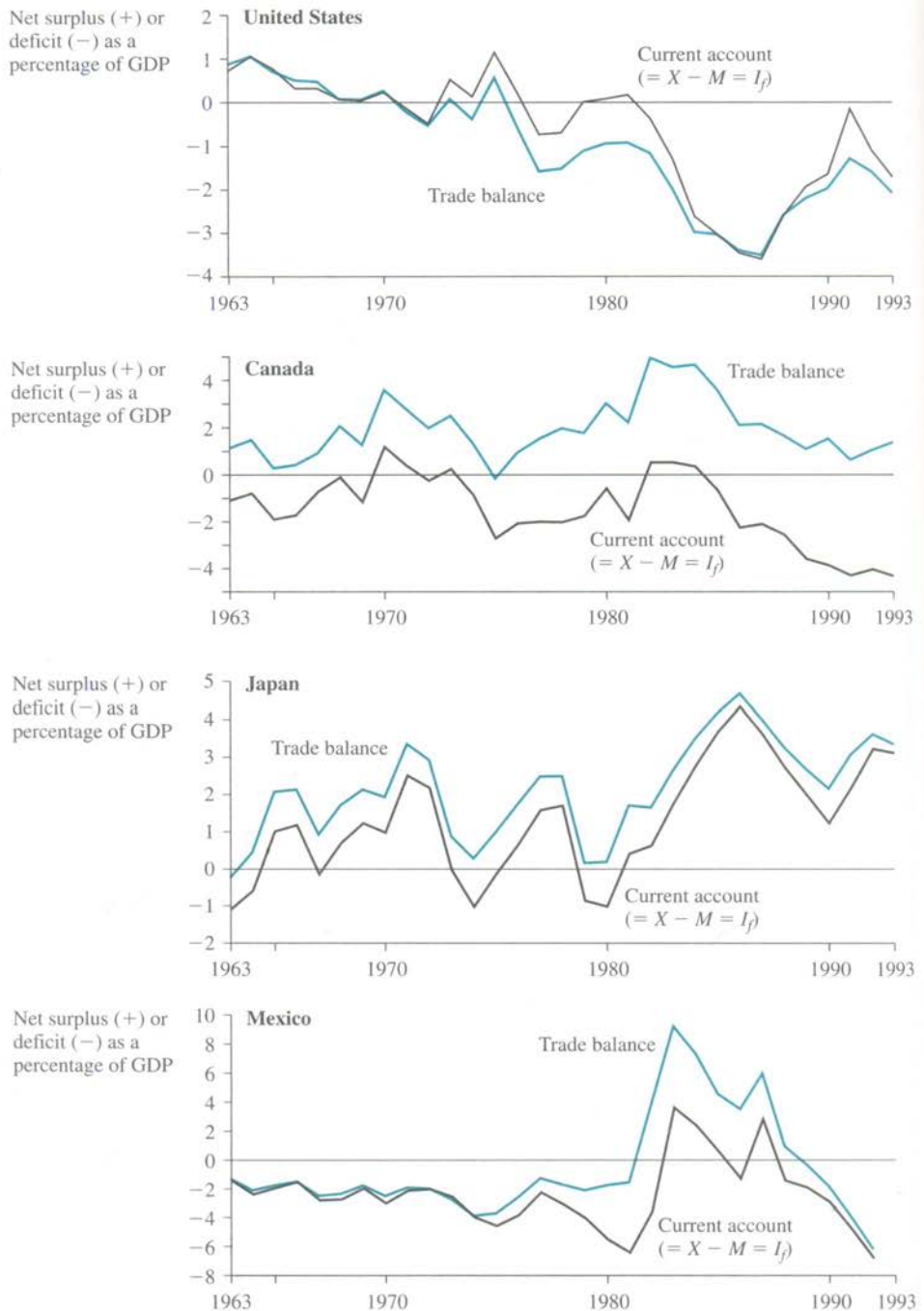
The identities also help us to understand what forces might be causing changes in the current account balance. To see some uses for the current account, let's look at how it has behaved since the early 1960s, as a share of gross domestic product, for the four countries in Figure 15.3.

The first panel in Figure 15.3 shows that the United States has evolved from a net exporter and lender after World War II to a borrower. Up through the 1960s, the United States had a positive current account balance, matched or exceeded by its positive trade balance. The United States was a net exporter and lender largely because Europe and Japan, still recovering from World War II, badly needed American goods and loans (and foreign aid under the Marshall Plan). During the 1970s and up through 1982, a new pattern began to emerge. The United States became a net importer of merchandise, but still kept its current account approximately in balance, thanks largely to interest and profit earnings on previous foreign investments. After 1982, the United States shifted into dramatic trade and current account deficits, becoming the world's largest borrower. The underlying reason: Led by new federal government deficits, the United States cut its rate of national saving (S/Y) much faster than its domestic investment (I_d/Y) and therefore borrowed heavily from Japan and other countries (negative $I_f/Y =$ negative CA/Y). In the late 1980s and early 1990s, the trade and current account deficits then decreased somewhat as a percentage of GDP. (The current account deficit for 1991 was unusually low because of transfer payments from the allied countries to the United States related to Operation Desert Storm against Iraq.)

Canadian experience fits a classic pattern of a borrowing country with good growth potential. Most of the time Canada has borrowed capital from other countries (especially from the United States), as shown by Canada's current account deficits for most years. Canada has paid for its borrowings out of the proceeds

FIGURE 15.3

Current Account Balances and Merchandise Trade Balances for the United States, Canada, Japan, and Mexico, 1963–93



SOURCE: International Monetary Fund, *International Financial Statistics Yearbook*, 1993; and International Monetary Fund, *International Financial Statistics*, January 1995.

from growth itself, using much of its merchandise trade surplus to pay foreign investors the earnings on their earlier investments. The payment of interest and profits on past borrowings is much of the gap between the trade surplus and the current account balance in Figure 15.3.

Since the early 1960s, Japan has had a merchandise trade surplus, which became large and controversial in the 1980s as Japanese goods penetrated markets throughout the world. Japan also has consistently had a deficit in services and gifts. Until the early 1980s, these two often offset each other, resulting in a current account balance that shifted between relatively small surpluses and deficits. Since the early 1980s, Japan's net foreign investment ($I_f = X - M > 0$) became a large positive share of GDP. In the mid-1980s, Japanese foreign investment, including heavy lending to the United States, became the dominant force in international finance (although its role then diminished into the early 1990s). Behind this shift to net foreign lending in the early and mid-1980s, lay a widening gap between Japan's outstanding national savings and its domestic capital formation. (Again, $I_f = S - I_d$.)

Until the debt crisis of 1982, Mexico was a consistent borrower. Its current account was in deficit (negative I_f), and net payments of interest and dividends to foreign creditors showed up as a widening gap between the merchandise trade balance and the current account balance. Figure 15.3 shows part of the tremendous shock Mexico felt when its debt crisis hit in 1982. Its merchandise trade balance jumped to a surplus of more than 9 percent of GDP in 1983, not because exports grew (they did not) but because it had to cut out two-thirds of its imports in the belt tightening necessary to meet most of its swollen interest and repay principal to foreign creditors. Between 1983 and 1987, Mexico was actually a net "investor," in that it reduced its net foreign liabilities by running current account surpluses. Since 1988, Mexico has returned to being a net foreign borrower ($CA < 0$).

The Macro Meaning of the Overall Balance

The overall balance should indicate whether a country's balance of payments has achieved an overall pattern that is sustainable over time. Unfortunately, there is no one indicator that represents overall balance perfectly. The indicator often used is based on the division of net foreign investment (or borrowing), I_f , into two components: the balance on net private (or nonofficial) capital flows (KA) and transactions in official reserve assets (OR). The **official settlements balance** (B) measures the sum of the current account balance plus the private capital account balance,⁷

$$B = CA + KA.$$

⁷The official settlements balance also includes the statistical discrepancy because we assume that the discrepancy results from mismeasurement of private transactions.

FIGURE 15.4 U.S. International Investment Position at the End of Selected Years, 1897–1992 (\$ billions)

	1897	1914	1930	1946	1960	1982	1993
U.S. investments abroad	\$1.3	\$5.0	\$21.5	\$39.4	\$85.6	\$958.8	\$2,647.4
Private	0.7	3.5	17.2	13.5	49.3	740.7	2,401.6
Direct investments*	0.6	2.6	8.0	7.2	31.9	226.6	993.2
Other	0.1	0.9	9.2	6.3	17.4	514.1	1,408.4
U.S. government (nonofficial)	0.0	—	—	5.2	16.9	74.7	80.9
U.S. official reserve assets†	0.6	1.5	4.3	20.7	19.4	143.4	164.9
Foreign investments in the United States	3.4	7.2	8.4	15.9	40.9	693.8	3,155.1
Direct investments*	—	1.3	1.4	2.5	6.9	130.4	745.6
Other	3.4	5.9	7.0	13.4	34.0	563.4	2,409.5
U.S. net international investment position	-2.1	-2.2	13.1	23.5	44.7	265.0	-507.7

*Direct investment refers to any international investment in a foreign enterprise owned in large part by the investor's home country. For 1982 and subsequent years, these investments are reported at estimated market values. For previous years, they are reported at historic cost.

†U.S. official reserve assets consist of gold and foreign exchange assets plus the reserve position at the IMF and Special Drawing Rights. For 1982 and subsequent years, reserve gold is reported at market values.

SOURCES: U.S. Bureau of the Census, *Historical Statistics of the United States: Colonial Times to 1970* (Washington, DC: U.S. Government Printing Office, 1976); and U.S. Bureau of Economic Analysis, *Survey of Current Business*, June 1994.

Because all items in the balance of payments must sum to zero, any imbalance in the official settlements balance must be financed (or paid for) through official reserves transactions:

$$B + OR = 0.$$

If the overall balance B is in surplus, it equals an accumulation of the country's official reserve assets or a decrease in foreign official reserve holdings of the country's assets (that is, a debit in the remaining official reserve items in the account). If the overall balance is in deficit, it equals a decrease in the country's holdings of official reserve assets or an accumulation of foreign official reserve holdings of the country's assets (that is, a credit in the remaining items in the accounts). In some situations such changes in official reserve holdings can be specifically desired by the monetary authorities (for instance, gradually to increase the country's holdings of official reserve assets). In other situations these changes are not specifically desired and indicate an overall imbalance.

The official settlements balance measures the net flows of all private transactions in goods, services, and (nonofficial) financial assets. However, it is the counterbalancing items—the changes in official reserve holdings—that show the macroeconomic meaning of the official settlements balance. Most of the transactions by countries' monetary authorities that result in changes in official reserve holdings are official intervention by these authorities in the foreign exchange markets. The monetary authorities enter the foreign exchange markets to buy and sell currencies, usually domestic currency for some foreign currency. For instance, the monetary authority of a country can buy domestic currency and sell foreign currency. The selling reduces the authority's holdings of foreign

exchange assets that count as official international reserves. Or the authority can sell domestic currency and buy foreign currency. The buying adds to its official international reserves.

We can see some of these relationships by returning to the U.S. balance of payments for 1993 in Figure 15.2. Foreign monetary authorities increased their official reserve holdings of U.S. dollar assets by \$71 billion, mostly by intervening in foreign exchange markets to buy dollars. Their willingness to acquire dollars and dollar assets provided essentially all of the financing for the United States to run its official settlements balance deficit of \$70 billion. This can also be viewed as providing most of the financing for the U.S. current account deficit of \$103 billion.

As we will see in the chapters that follow in Parts III and IV, changes in official international reserves resulting from foreign exchange intervention can have impacts on many other economic variables. This activity can affect exchange rates, money supplies, interest rates, private international financial capital flows, domestic capital formation, national product, and exports and imports of goods and services.

The International Investment Position

Complementing the balance of payments accounts is a balance sheet called the **international investment position**, a statement of the stocks of a nation's international assets and foreign liabilities at a point in time, usually the end of a year. The change in the international investment position is closely related to the current account balance. Any imbalance in the current account contributes to the change in the nation's net foreign assets during a time period.⁸ The link between the two kinds of accounts relates to a subtle but common semantic distinction. We say that a nation is a *lender* or a *borrower* depending on whether its current account is in surplus or deficit during a time period. We say that a nation is a *creditor* or *debtor* depending on whether its net stock of foreign assets is positive or negative. The first refers to flows over time, and the second to stocks (or holdings) at a point in time.

Within the 20th century, the United States has come full circle in its international investment position. As shown in Figure 15.4, the nation was a net debtor before World War I. World War I suddenly transformed the United States into the world's leading creditor, a role the country played reluctantly for the next 20 years. Over most of the postwar period, the United States was increasingly a creditor in nominal dollar terms, though not as a share of GDP, reaching a peak nominal creditor position by the end of 1983. However, the large current account deficits that the United States experienced during the 1980s required financing through increased international borrowing. The creditor position built up over 60

⁸Changes in the market values of assets previously acquired can also change the international investment position.

years was erased and reversed in the next 6 years.⁹ By early 1989, the United States again became a net debtor, and the indebtedness kept rising into the 1990s. Figure 15.4 dramatizes the change with the stark contrast in the net positions at the end of 1982 and the end of 1992. The United States used to lend on long term and borrow on short term, acting as a world banker making a large net interest income off the fact that it lent at higher interest (and dividend and profit) rates than it borrowed. That has all changed. Even direct foreign investment, long an American specialty, is now nearly balanced in the U.S. accounts.

⁹The data cited here use market or current values for all items. If, instead, some items, especially direct investments, are valued at historic cost and reserve gold is valued at its artificially low "official" price, then the United States appeared to become a net debtor at the beginning of 1985. In the 1980s the United States shifted to reporting data that use market or current values.

Summary

Basic definitions abound in this chapter. Terms introduced here appear constantly in the news media, and they will reappear throughout this book. Definitely review any of them that are not familiar at first sight.

A country's **balance of payments** is a systematic account of all the exchanges of value between residents of that country and the rest of the world during a given time period. Two flows occur in any exchange, or transaction, according to double-entry bookkeeping:

A **credit (+)** is a flow for which the country is paid.

A **debit (-)** is a flow for which the country must pay.

Flows from international transactions are grouped into five flow categories. Each category contains flows of more detailed types whose definitions also should be learned. The five flow categories, with some important sub-categories, are

1. **Merchandise trade** flows (i.e., goods flows).
2. **Service flows**, including such services as travel, transportation, and insurance, as well as fees, royalties, and payments for the

services of foreign capital (earnings of interest, dividends, and profits).

3. **Unilateral transfers**, including government foreign aid grants and private gifts and remittances.
4. **Private capital flows**, including direct foreign investments, portfolio investments in securities, changes in bank deposits, changes in other financial claims, and statistical discrepancy.
5. **Official asset flows**, including changes in official gold and foreign exchange assets, changes in other official reserve assets related to the IMF, and changes in liabilities that foreign countries consider to be their official reserve assets.

To highlight what is happening to wealth and reserves and currency markets, flow categories are summed into five special net balances, each defined so that a surplus is positive and a deficit is negative:

1. The **merchandise trade balance** equals the net credits minus debits, or net exports, on merchandise flows. This is one meaning of the term *trade balance*.

- The **goods and services balance** equals the net exports of both goods and services. It is a more meaningful definition of a trade balance.
- The **current account balance** equals the net credits minus debits on the flows of goods, services, and unilateral transfers. It also equals the change in the nation's foreign assets minus foreign liabilities, also known as **net foreign investment**.
- The net private **capital account balance** equals net credits minus debits involving changes in private national residents' foreign financial assets and liabilities. This balance is in surplus if the nation is a net private *borrower*, or *capital importer*, but not if it is a net investor piling up more foreign assets than liabilities.
- The **overall balance** (or **official settlements balance**) equals the sum of the current account balance plus the private capital account balance. If it is in surplus, it is counterbalanced by an accumulation of official net assets (a debit item at the bottom of the accounts). If it is in deficit, it is counterbalanced by an accumulation of official net liabilities (a credit item at the bottom of the accounts).

The current account balance has special macroeconomic meaning. As net foreign investments (I_f) it equals the part of national saving (S) that is not used in domestic capital formation (I_d). That is, it fits into the basic identity that saving equals investment: $S = I_d + I_f$. A nation that is running a current account deficit, like the United States since 1982, is a nation that is saving less than its domestic capital formation,

so that the current account deficit represents its net foreign borrowing. The current account deficit also equals the excess of current national expenditures (E , expenditure on consumption, domestic capital formation, and government goods and services) over current national production of goods and services (Y). Viewed another way, a net current account deficit represents intertemporal trade, with the nation importing more goods and services (and gratitude for any gifts) for current use and promising to repay with net exports of goods and services (and gratitude for any gifts) in the future. Japan, by contrast, has run massive current account surpluses, accumulating claims to future goods and services (and gratitude).

The overall balance is intended to indicate whether the overall pattern of the country's balance of payments has achieved a sustainable equilibrium. The official settlements balance does not quite match this concept, but it is still useful in macroeconomic analysis. It indicates the extent of official intervention in the foreign exchange markets—the buying and selling of currencies by the monetary authorities. As we will see in subsequent chapters, such intervention can have effects on exchange rates, money supplies, and many other macroeconomic variables.

A nation's **international investment position** shows its stocks of international assets and liabilities at a moment of time. These stocks are changed each year by the flows of private and official assets measured in the balance of payments. As a result of large current account deficits since the early 1980s, the United States switched from being the world's largest net creditor to being its largest net debtor.

Suggested Reading

The balance-of-payments accounts of most nations are summarized in the IMF's *International Financial Statistics* and also in its *Balance of Payments Yearbook*. More detailed

accounts for the United States appear regularly in the *Survey of Current Business*, while those for Canada are in the *Canada Yearbook*.

Questions and Problems

- ◆ 1. What is the current account balance of a nation with a government budget deficit of \$128 billion, private saving of \$806 billion, and domestic capital formation of \$777 billion? ◆
2. "A country is better off running a current account surplus rather than a current account deficit." Do you agree or disagree? Explain.
- ◆ 3. National saving can be used domestically or internationally. Explain the basis for this statement, including the benefits to the nation of each use of its saving.
4. "Consider a country whose assets are not held by other countries as official international reserves. If this country has a surplus in its official settlements balance, then the monetary authority of the country is decreasing its holdings of official reserves assets." Do you agree or disagree? Explain.
- ◆ 5. Which of the following transactions would contribute to a U.S. current account surplus on the balance of payments?
 - a. Boeing barter a \$100 million plane to Mexico in exchange for \$100 million worth of hotel services on the Mexican coast.
 - b. The United States borrows \$100 million long-term from Saudi Arabia to buy \$100 million of Saudi oil this year.
 - c. The United States sells a \$100 million jet to Turkey for \$100 million in bank deposits.
 - d. The U.S. government makes a gift of \$100 million to the government of Greece, in the form of New York bank deposits, to pay for injuries caused by Turkish jet attacks.
 - e. The German central bank buys \$100 million in U.S.-dollar bank deposits from a New York bank, paying by providing DM (deutsche mark) bank deposits to the New York bank.
6. Which of the above transactions contributed to a U.S. deficit in the overall (official settlements) balance?
7. Using the line numbers in Figure 15.2, decide which lines should contain the credit and debit items for each of the following transactions from the point of view of the United States:
 - a. Pepsico signs an agreement with Russia bartering Pepsico's managerial services and trademarks in making Pepsi Cola in Russia for an equivalent dollar value of Stolichnaya vodka and Soviet merchant ships.
 - b. Manufacturers Hanover of New York lends the government of Brazil \$184 million in a new loan so that Brazil simultaneously pays Manufacturers Hanover \$184 million in interest on an old loan.
 - c. The City of Kyoto, Japan, pays Americans \$3 billion in Kyoto city bonds (IOUs) to buy the Dallas Cowboys football franchise (i.e., Kyoto acquires all future paper title to profits from the Cowboys and their name).
 - d. U.S. tourists pay \$280, with a check written on a Vermont bank, to stay in Toronto's SkyDome Hotel overlooking the Blue Jays baseball stadium.
8. You are given the following information about a country's international transactions during a year:

Merchandise exports	\$330
Merchandise imports	198
Service exports	196
Service imports	204
Unilateral transfers, net	-5
Increase in the country's holding of foreign assets, net (excluding official reserve assets)	202
Increase in foreign holdings of the country's assets, net (excluding official reserve assets)	102
Statistical discrepancy, net	4

- a. Calculate the values of the country's merchandise trade balance, goods and services balance, current account balance, and official settlements balance.
 - b. What is the value of the change in official reserve assets (net)? Is the country increasing or decreasing its net holdings of official reserve assets?
- ◆ 9. What are the effects of each of the following on the U.S. international investment position?
- a. Foreign central banks increase their official holdings of U.S. government securities.
 - b. U.S. residents increase their holdings of stocks issued by Japanese companies.
 - c. A British pension fund sells some of its holdings of the stocks of U.S. companies in order to buy U.S. corporate bonds.
10. On December 31, a country has the following stocks of international assets and liabilities to foreigners.
- The country's residents own \$30 billion of bonds issued by foreign governments.
 - The country's central bank holds \$20 billion of gold and \$15 billion of foreign-currency assets as official reserve assets.
 - Foreign firms have invested in production facilities in the country, with the value of their investments currently \$40 billion.
 - Residents of foreign countries own \$25 billion of bonds issued by the country's companies.
- a. What is the value of the country's international investment position? Is the country an international creditor or debtor?
 - b. If the country during the next year runs a surplus in its current account, what will the impact be on the value of the country's international investment position?

16 THE FOREIGN EXCHANGE MARKET

In foreign commerce, as in international dialogue, somebody has to translate. People in different countries use different currencies as well as different languages. The translator between different currencies is the exchange rate, the price of one country's money in units of another country's money. You can go only so far using just one currency. If an American wants to buy something from a foreign resident, the foreign resident will typically want to have the payment translated into her home currency. They are less willing to keep dollars than the American, just as they are less willing to speak only English.

What determines the exchange rate, or the pressures on it, is the subject of the rest of Part III. This chapter introduces the real-world institutions of currency trading. It also begins to build a theory of exchange rates, starting with the role of forces that show up in the balance-of-payments entries of Chapter 15.

Much of the study of exchange rates is like a trip to another planet. It is a strange land, far removed from the economics of an ordinary household. It is populated by strange creatures—hedgers, arbitrageurs, the Gnomes of Zurich, the Snake in the Tunnel, the crawling peg, and the dirty float.

Yet the student of exchange rates is helped by the presence of two familiar forces: profit maximization and competition. The familiar assumption that individuals act as though they are out to maximize the real value of their net incomes (profits) appears to be at least as valid in international financial behavior as in other realms of economics. To be sure, people act as though they are maximizing a subtle concept of profit, one that takes account of a wide variety of economic and political risks. Yet, the parties engaged in international finance do seem to react to changing conditions in the way that a profit-maximizer would.

It also happens that competition prevails in most international financial markets despite a folklore full of tales about how groups of wealthy speculators manage to corner those markets. There is competition in the markets for foreign exchange and in the international lending markets. Thus, for these markets, we can use the familiar demand and supply analysis of competitive markets. Here

again, it is important to make one disclaimer: It is definitely not the case that all markets in the international arena are competitive. Monopoly and oligopoly are evident in much of the direct investment activity we shall discuss in Part V as well as in the cartels already discussed in Chapter 13. Ordinary demand and supply curves would not do justice to the facts in these areas. Yet, in the financial markets that play a large role in the material of Parts III and IV, competitive conditions do hold, even more so than in most markets usually thought of as competitive.

The Basics of Currency Trading

Foreign exchange is the act of trading different nations' moneys.¹ The moneys take the same forms as money within a country. The greater part of the money assets traded in foreign exchange markets are demand deposits in banks. A very small part consists of coins and currency of the ordinary pocket variety.

An **exchange rate** is the price of one nation's money in terms of another nation's money.² There are actually two basic types of exchange rate, depending on the timing of actual exchange of the moneys. The **spot exchange rate** is the price for "immediate" exchange. (For standard large trades in the market, immediate exchange for most currencies actually means exchange or delivery in two working days after the exchange is agreed, while it means one working day after the exchange is agreed for exchanges between U.S. dollars, Canadian dollars, and Mexican pesos.) The **forward exchange rate** is the price for an exchange that will take place sometime in the future. Forward exchange rates are prices that are agreed today for exchanges of moneys that will occur at a specified time in the future, such as 30, 90, or 180 days from now. This chapter focuses on foreign exchange in general and spot exchange rates specifically. Chapter 17 examines forward foreign exchange and its uses.

In today's increasingly international world, many newspapers keep daily track of exchange rates with quotations like those shown in Figure 16.1. Notice that each price is stated in two ways: first as a U.S. dollar price of the other currency and next as the price of the U.S. dollar in units of the other currency. The pairs of prices are just reciprocals of each other. Saying that the British pound sterling costs 1.6093 U.S. dollars is the same as saying the U.S. dollar is worth £0.6214 ($1.6093 = 1/0.6214$), and so forth. Each exchange rate can thus be read in either of two directions. This is done simply because both sides of the price are money, unlike regular prices of goods and services where only one of the things

¹The term *foreign exchange* also refers to holdings of foreign currencies.

²Exchange rates are one kind of price that a national money has. Another is its ability to buy goods and services immediately. The second kind of price, the usual "value of the dollar," is just the reciprocal of the money cost of buying a bundle of goods and services. A third kind of price of money is the cost of just renting it, and having access to it, for a given period of time. This is (roughly) the rate of interest that borrowers pay for the use of money, and it is analogous to other rental prices such as the price of renting an apartment or a rental car.

FIGURE 16.1

Exchange Rate
Quotations

EXCHANGE RATES

Thursday, April 20, 1995

The New York foreign exchange selling rates below apply to trading among banks in amounts of \$1 million and more, as quoted at 3 p.m. Eastern time by Bankers Trust Co., Dow Jones Telerate Inc. and other sources. Retail transactions provide fewer units of foreign currency per dollar.

Country	U.S. \$ equiv.		Currency per U.S. \$		Country	U.S. \$ equiv.		Currency per U.S. \$	
	Thur.	Wed.	Thur.	Wed.		Thur.	Wed.	Thur.	Wed.
Argentina (Peso)	1.00	1.00	1.00	1.00	New Zealand (Dollar) ..	.6713	.6701	1.4898	1.4924
Australia (Dollar) .....	.7356	.7333	1.3595	1.3638	Norway (Krone) .....	.1604	.1619	6.2355	6.1755
Austria (Schilling) .....	.10344	.10460	9.67	9.56	Pakistan (Rupee) .....	.0324	.0324	30.83	30.85
Bahrain (Dinar)	2.6526	2.6525	.3770	.3770	Peru (New Sol) .....	.4440	.4437	2.25	2.25
Belgium (Franc) .....	.03509	.03545	28.50	28.21	Philippines (Peso) .....	.03845	.03845	26.01	26.01
Brazil (Real)	1.0881393	1.0940919	.92	.91	Poland (Zloty) .....	.42105263	.42105263	2.37	2.37
Britain (Pound)	1.6093	1.6095	.6214	.6213	Portugal (Escudo) .....	.006826	.006884	146.50	145.26
30-Day Forward	1.6118	1.6104	.6204	.6210	Saudi Arabia (Riyal) ..	.26662	.26663	3.7506	3.7504
90-Day Forward	1.6104	1.6091	.6210	.6215	Singapore (Dollar) .....	.7145	.7169	1.3995	1.3948
180-Day Forward	1.6069	1.6056	.6223	.6228	Slovak Rep. (Koruna) ..	.0340136	.0340136	29.4000	29.4000
Canada (Dollar) .....	.7309	.7289	1.3682	1.3719	South Africa (Rand) ..	.2776	.2785	3.6022	3.5907
30-Day Forward .....	.7290	.7270	1.3717	1.3754	South Korea (Won) .....	.0013078	.0013040	764.65	766.85
90-Day Forward .....	.7271	.7251	1.3752	1.3792	Spain (Peseta) .....	.008048	.008060	124.25	124.08
180-Day Forward .....	.7246	.7225	1.3801	1.3841	Sweden (Krona) .....	.1345	.1356	7.4371	7.3759
Czech. Rep. (Koruna) ..	.0387883	.0391834	25.7810	25.5210	Switzerland (Franc) ..	.8760	.8826	1.1415	1.1330
Commercial rate .....	.002549	.002563	392.25	390.15	30-Day Forward .....	.8760	.8849	1.1416	1.1300
Chile (Peso) .....	.118720	.118717	8.4232	8.4234	90-Day Forward .....	.8799	.8889	1.1365	1.1249
China (Renminbi) .....	.001142	.001141	875.98	876.05	180-Day Forward .....	.8859	.8952	1.1288	1.1171
Colombia (Peso) .....	.1835	.1845	5.4505	5.4200	Taiwan (Dollar) .....	.039431	.039527	25.36	25.30
Denmark (Krone) .....	.000409	.000410	2443.50	2441.00	Thailand (Baht) .....	.04074	.04087	24.55	24.46
Ecuador (Sucre) .....	.23434	.23434	4.2673	4.2673	Turkey (Lira) .....	.0000234	.0000235	42689.02	42478.50
Floating rate .....	.20408	.20563	4.9000	4.8630	United Arab (Dirham) ..	.2722	.2723	3.6731	3.6729
Finland (Markka) .....	.20371	.20527	4.9090	4.8715	Uruguay (New Peso) ..	.165289	.165837	6.05	6.03
France (Franc) .....	.20310	.20461	4.9237	4.8872	Financial .....	.00589	.00589	169.78	169.78
30-Day Forward .....	.20269	.20413	4.9337	4.8967	Venezuela (Bolívar) ..	---	---	---	---
90-Day Forward .....	.7227	.7297	1.3837	1.3705	SDR	1.58241	1.59295	.63195	.62777
180-Day Forward .....	.7230	.7310	1.3831	1.3679	ECU	1.32050	1.33130	---	---
Germany (Mark) .....	.7250	.7330	1.3793	1.3642	Special Drawing Rights (SDR) are based on exchange rates for the U.S., German, British, French and Japanese currencies. Source: International Monetary Fund.	---	---	---	---
30-Day Forward .....	.7278	.7361	1.3741	1.3585	European Currency Unit (ECU) is based on a basket of community currencies.	---	---	---	---
90-Day Forward .....	.004424	.004475	226.03	223.45	---	---	---	---	
180-Day Forward	1.2934	1.2935	7.7315	7.7310	---	---	---	---	
Greece (Drachma) .....	.0083098	.0083850	120.3400	119.2600	---	---	---	---	
Hong Kong (Dollar) .....	.03181	.03185	31.43	31.39	---	---	---	---	
Hungary (Forint) .....	.0004486	.0004488	2229.00	2228.00	---	---	---	---	
India (Rupee)	1.6355	1.6575	.6114	.6033	---	---	---	---	
Indonesia (Rupiah) .....	.3368	.3379	2.9690	2.9597	---	---	---	---	
Ireland (Punt) .....	.0005765	.0005789	1734.50	1727.50	---	---	---	---	
Israel (Shekel) .....	.012032	.012300	83.11	81.30	---	---	---	---	
Italy (Lira) .....	.012058	.012364	82.93	80.88	---	---	---	---	
Japan (Yen) .....	.012155	.012464	82.27	80.23	---	---	---	---	
30-Day Forward .....	.012305	.012621	81.26	79.24	---	---	---	---	
90-Day Forward	1.4577	1.4684	.6860	.6810	---	---	---	---	
180-Day Forward	3.4412	3.4542	.2906	.2895	---	---	---	---	
Jordan (Dinar) .....	.000613	.000613	1632.00	1632.50	---	---	---	---	
Kuwait (Dinar) .....	.4039	.4051	2.4760	2.4688	---	---	---	---	
Lebanon (Pound)	2.8729	2.8729	.3481	.3481	---	---	---	---	
Malaysia (Ringgit) .....	.1670844	.1638002	5.9850	6.1050	---	---	---	---	
Malta (Lira)6460	.6517	1.5481	1.5345	---	---	---	---	
Mexico (Peso)	---	---	---	---	---	---	---	---	
Floating rate	---	---	---	---	---	---	---	---	
Netherlands (Guilder) ..	---	---	---	---	---	---	---	---	

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being traded is money (as in \$1.15 per gallon of gasoline). To avoid unnecessary confusion *the rest of the book will refer to the exchange rate as the price of the foreign currency.* When the home currency is the dollar, the exchange rates will be dollar prices of other currencies, like \$1.6093 per pound, \$0.7227 per German mark, and other figures in the left columns of Figure 16.1.³

³Traders in the market also have conventions for stating exchange rates. In the market, most rates referring to the U.S. dollar are quoted as units of other currency per U.S. dollar, but some (including the British pound, Irish punt, and Canadian dollar) are quoted as U.S. dollars per unit of this currency. In addition, traders who are willing to buy or sell foreign exchange quote two exchange rates: one for buying and the

The foreign exchange market is not a single gathering place where traders shout buy and sell order at each other. Rather, banks and the traders who work at banks are at the center of the foreign exchange market. These banks and their traders—using computers, telephones, and other telecommunications—conduct foreign exchange trades with their customers and also with each other. The trading done with customers is called the *retail part of the market*. Some of this is trading with individuals in small amounts. We see this part of the market, for instance, when we travel to a foreign country, but it is a very small part of overall foreign exchange trading. Most of the retail part of the market involves nonfinancial companies, financial institutions, and other organizations that undertake large trades as the customers of the banks that actively deal in the market. The trading done between the banks active in the market is called the *interbank part of the market*.

The banks active in foreign exchange trading are located in countries around the world so this is a 24-hour market. On working days from Monday through Friday, foreign exchange trading is always occurring somewhere in the world. Although banks throughout the world participate, most foreign exchange trading involves banks in three locations: London, New York, and Tokyo.

The total volumes traded in the foreign exchange market are enormous and have been growing rapidly. Foreign exchange trading in 1994 has been estimated at about \$1 trillion *per day* versus a daily turnover of only about \$200 billion for U.S. government securities and only about \$9 billion on the New York Stock Exchange. Yet the number of people employed as traders in banks in this industry is only a few thousand for the world as a whole. (See the box “Foreign Exchange Traders: A Breed Apart.”)

Most foreign exchange trading (perhaps 80 to 90 percent) involves the exchange of U.S. dollars for another currency. Indeed, although some trades are made directly between currencies other than the U.S. dollar, many such trades are actually done in two steps. One foreign currency is exchanged for dollars, and these dollars are exchanged for the other foreign currency. Because the dollar is often used in this way to accomplish trading between two other currencies, the dollar is sometimes call a *vehicle currency*.

Using the Foreign Exchange Market

In the customer or retail part of the spot foreign exchange market, individuals, businesses, and other organizations can acquire foreign moneys to make payments, or they can sell foreign moneys that they have received in payments. The spot foreign exchange market thus provides clearing services—serving to permit payments to flow between individuals, businesses, and other organizations that prefer to use different moneys. These payments are for all of the types of items

other for selling. The resulting *bid-ask spread* is a source of profits to these traders. Furthermore, the difference between buying and selling rates (or the bid-ask spread) varies by size (or type) of trade. It is larger for smaller trades, and largest for small transactions in actual currency and coins. The difference between buying and selling rates typically is relatively small for large trades in major currencies. We will ignore differences in buy and sell rates in most subsequent discussion, talking instead about the exchange rate as a single number.

included in the balance-of-payments account, including payments for exports and imports of goods and services and payments for purchases or sales of foreign financial assets.

An example can show how this works. The example also demonstrates the role of demand deposits as the major form of money traded in the foreign exchange market. Consider a British firm that has purchased a small airplane (a corporate jet) from the U.S. producer of the plane and now is making the payment for it. If the British firm pays by writing a check in pounds sterling, the U.S. firm receiving the sterling check must be content to hold on to sterling bank deposits or sell the sterling for dollars. Alternatively, if the U.S. firm will accept payment only in dollars, then it is the British buyer who must sell sterling to get the dollars to pay the U.S. exporter.

Let's assume that the latter is the case. The British firm contacts its bank and requests a quotation on the exchange rate for selling pounds and acquiring dollars. If the rate is acceptable, the British firm instructs its bank to take the pounds from its demand deposit (checking) account, convert these pounds into dollars, and transfer the dollars to the U.S. producer. The British bank holds dollar demand deposits in the United States, at its correspondent bank in New York. The British bank instructs its correspondent bank in New York to take dollars from its demand deposit account and transfer the dollars to the U.S. producer, by transferring them to the U.S. producer's bank for deposit into the producer's demand deposit account.⁴

As with most payments that are purely domestic, demand deposits are used in this foreign exchange trade and in completing the international payment for the airplane. The British firm used the pounds in its demand deposit account to purchase the dollars needed. The U.S. producer used its demand deposit account to receive the dollar payment. The British bank used its dollar demand deposits in its correspondent bank in New York for two purposes: (1) as the dollars that it sold to its customer in the foreign transaction and (2) as the (same) dollars that were then transferred to the U.S. producer as payment.

Two systems that utilize modern computer and telecommunication technologies are likely to be used in this and similar foreign exchange and international payments activities. The first is SWIFT (the Society for Worldwide Interbank Financial Telecommunications), which is used to transmit instructions from one member bank to another (in our example, from the British bank to its correspondent bank in New York). Such messages are sent through SWIFT instantly, error-free, securely, and at low cost. SWIFT has over 1,000 member banks in many countries. The second is CHIPS (the Clearing House International Payments System). CHIPS clears dollars transfers between its member banks, which include all large and internationally active banks. In our example CHIPS would be used if the New York correspondent bank and the bank of the U.S. producer

⁴The British bank could also use dollars available at its own U.S. branch to carry out this payment in the United States, if it has a branch there.

were members. CHIPS handles tens of thousands of payments totaling several hundred billion dollars each day, safely and at low cost. Each bank's payments and receipts through CHIPS are totaled at the end of each day, and only the differences are settled up by actual flows of dollar funds among the banks. CHIPS reinforces the role of the U.S. dollar as a vehicle currency by ensuring that dollar transfers between its member banks can be done very efficiently.

Interbank Foreign Exchange Trading

Most foreign exchange trading, perhaps 90 percent or more, is trading between banks in the interbank part of the foreign exchange market. The interbank part of the market serves several functions. Participation in the interbank part of the market provides a bank with a continuous stream of information on conditions in the foreign exchange market through talking with traders at other banks and through observing the prices (exchange rates) being quoted. Interbank trading allows a bank to readjust its own position quickly and at low cost when it separately conducts a large trade with a customer. For instance, if Citibank buys a large amount of yen from Toyota (and sell dollars to Toyota), Citibank may be unwilling to continue holding the yen. Citibank then can sell the yen to another bank (and buy dollars) quickly and at low cost. Interbank trading also permits a bank to take on a position in a foreign currency quickly if the bank and its traders want to speculate on exchange rate movements in the near future. Such speculative positions are usually held only for a short time, typically being closed out by the end of the day.

Some interbank trading is conducted directly between the traders at different banks. In this case the traders know to whom they are quoting exchange rates for possible trades. Other trades between banks are conducted through foreign exchange brokers. The use of brokers provides anonymity to the traders until an exchange rate is agreed on for a trade. The use of brokers can also economize on the costs of searching for the best available exchange rates as the broker's business is to know the rates at which various banks are willing to trade. Brokers earn commissions for their services.

Skilled traders work at desks in their separate banks dealing with each other (and with brokers) by computer and by phone. Computer terminals show current exchange rate ranges on all major currencies for delivery at various dates. Major banks post the exchange rates at which each is probably willing to trade currencies with other banks. If a bank is shopping for the best rate directly, it consults the ranges quoted on the computer screens. Finding a likely prospect, the buyer bank deals with the other bank directly by phone to get a firmer price bid. Within about a minute, as a rule, any haggling is settled and a transaction is made by verbal agreement. If necessary, documents consummating the trade are mailed later. To repeat, what the banks are trading are demand deposits denominated in different currencies.

Foreign exchange trading in this interbank part of the market is not for the little guy. Notice that the quoted interbank rates in Figure 16.1 are for amounts of

\$1 million or more. In fact, traders often save time on the phone by referring to each million dollars as a “dollar.” With millions being exchanged each minute, extremely fine margins of profit or loss can loom large. For example, a trader who spends a minute shopping and secures 10 million pounds at \$1.6092 per pound, instead of accepting a ready offer at \$1.6093 has brought his bank an extra \$1,000 within that minute. That’s equivalent to a wage rate of \$60,000 an hour. Correspondingly, anyone who reacts a bit too slowly or too excitedly to a given news release transmitted over the wire services (e.g., announcement of rapid growth in the Canadian money supply, rumors of a coup in Libya, or a wildcat steel strike in Italy) can lose money at an even faster rate. On the average, these professionals make more than they lose, enough to justify their rates of pay. But foreign exchange trading is a lively and tense job. That department of a large bank is usually run as a tight ship with no room for “passengers” who do not make a good rate of return from quick dealings at fine margins.

Demand and Supply for Foreign Exchange

To understand what makes a country’s currency rise and fall in its exchange rate value, you should proceed through the same steps used to analyze any competitive market. First, portray the interaction of demand and supply as determinants of the equilibrium price and quantity, and then explore what forces lie behind the demand and supply curves.

Within the foreign exchange market, people want to trade moneys for various reasons. Some are engaged in trading goods and services and are making or receiving payments for these products. Some are engaged in international flows of financial assets. They are investing or borrowing internationally, and need to convert one nation’s money to another money in the process of buying and selling financial assets, incurring and paying back debts, and so forth.

A nation’s export of goods and services typically cause foreign moneys to be sold in order to buy that nation’s money. For instance, the importer in a foreign country desires to pay using his currency, while the U.S. exporter desires to be paid in dollars. Somewhere in the payments process, foreign money is exchanged for dollars. We saw a specific example of this in the previous section on using the foreign exchange market. Thus, *U.S. exports of goods and services will create a supply of foreign currency* and a demand for U.S. dollars to the extent that foreign buyers have their own currencies to offer and U.S. exporters prefer to end up holding U.S. dollars and not some other currency. Only if U.S. exporters are happy to hold onto pounds (or the United Kingdom importers somehow have large holdings of dollars to spend) can U.S. exports to Britain keep from generating a supply of pounds and a demand for dollars.

Importing goods and services correspondingly tends to cause the home currency to be sold in order to buy foreign currency. For instance, if a U.S. importer desires to pay in dollars, and the British exporter desires to be paid in pounds because he wants to end up holding his home currency, then somewhere in the

payments process dollars must be exchanged for pounds. Thus, U.S. *imports of goods and services will create a demand for foreign currency* and a supply of U.S. dollars to the extent that U.S. importers have dollars to offer and foreign exporters prefer to end up holding their own currencies. Only if foreign exporters are happy to hold onto dollars (or the U.S. importers somehow have large holdings of foreign currencies to spend) can U.S. imports keep from generating a supply of dollars and a demand for foreign currency.⁵

Similar reasoning applies to transactions in financial assets. Consider a U.S. insurance company that wants to replace some of its current holdings of U.S.-dollar-denominated bonds with British-pound-denominated bonds, perhaps because it expects a higher rate of return on the sterling investment. The company will need to sell dollars and buy pounds in the foreign exchange market, and then use these pounds to make payment in the process of buying the pound-denominated bonds. U.S. *capital outflows will create a demand for foreign currency* and a supply of U.S. dollars to the extent that the investors begin with dollars and desire to invest in foreign financial assets that must be paid for in foreign currencies.

In another case, a British resident currently holding sterling demand deposits wishes to buy shares in Microsoft. The person will need to sell pounds and buy dollars in the foreign exchange market, and then use these dollars to make payment in the process of buying the stock. U.S. *capital inflows will create a supply of foreign currency* and a demand for dollars to the extent that investors begin with foreign currency and desire to invest in U.S. financial assets that must be paid for in dollars.

All of these transactions create supply and demand for foreign exchange. The supply and demand determine the exchange rate, within certain constraints imposed by the nature of the foreign exchange system or regime under which the country operates.

The simplest system is the **floating exchange rate system** without intervention by governments or central bankers. The major countries have been on something close to this system since 1973. The spot price of foreign currency is market-driven, determined by the interaction of private demand and supply for that currency. The market clears itself through the price mechanism.

The two parts of Figure 16.2 on page 331 show how such a system could yield equilibrium exchange rates for the pound sterling and the German mark at the *E* points. We can indicate the logic behind the slopes of the curves in Figure 16.2 by focusing on the demand curve for foreign currency.

What makes the demand curve slope downward? That is, why should a lower (higher) price of a currency generally mean that more (less) of it is demanded? To see the likelihood of the downward slope, imagine that the exchange rate in Figure 16.2A has just shifted from \$1.98 to \$1.60. As the pound

⁵Unilateral transfers can also result in demand or supply of foreign currency. For instance, some people in the United States and Canada demand foreign currency in order to be able to send remittances and cash gifts to relatives in Italy, Mexico, or some other country from which they emigrated.

Foreign Exchange Traders: A Breed Apart

Our world is a difficult place in which to find expert advice. Those whose opinions I value will not volunteer it; those who volunteer it I find of no value.

Bertrand Russell

Everybody speculates in one way or another, but only a few thousand professionals make foreign exchange speculation their living. As of 1989, the core of the profession consisted of traders in major banks in the following centers:

	<i>Number of Banks with Foreign Exchange Depts.</i>	<i>Number of Traders</i>
North America		
New York	127	1,070
Toronto	16	112
Chicago	10	53
Los Angeles	8	58
San Francisco	8	55
Western Europe		
London	285	2,418
Paris	92	573
Luxembourg	77	444
Frankfurt	55	411
Zurich	45	314
Milan	38	221
Brussels	37	285
Asia and the Middle East		
Hong Kong	80	552
Singapore	72	471
Tokyo	41	341
Bahrain	32	139

SOURCE: Mayer, Duesenberry, and Aliber (1990, p. 482).

London continues to lead, in trade volume as well as in personnel, even though the British pound's involvement in foreign exchange trading (14 percent in 1992) is below the presence of the dollar (82 percent), deutsche mark (40 percent), and the yen (23

percent). In April 1992, London traded \$300 billion a day in foreign exchange (after the figures are adjusted to eliminate double-counting), versus daily volumes of \$192 billion for the United States and \$126 billion for Japan.

There are good reasons why there are so few foreign exchange traders. One is the capital-intensity of this particular business. It takes a lot of money but only a few decision makers. The other is the nature of the work itself.

Trading millions of dollars of foreign exchange per minute is a harrowing job; it's almost in the same category with being an air traffic controller or a bomb defuser. A trader should be somebody who loves pressure and can take losses. Many who try it soon develop a taste for other kinds of work. Once an economics student visiting a foreign exchange trading room in a major bank asked a trader, "How long do people last at this job?" The enthusiastic answer: "Yes, it is an excellent job for young people."

Yet, for all the job turnover, many thrive on this particular kind of risk. Who are these people? What credentials did they bring to this business, and what can they teach us? Here are two who have cast their lot with foreign exchange trading with differing results.

Richard Dennis, Prince of the Pit

Richard Dennis of Chicago would seem to have found the secret to foreign exchange trading. His rise illustrates the elusiveness of the formula for success in this career. Some traders enter their jobs with MBAs from the top schools, whereas others walk in from unskilled jobs and offer no visible training. Richard Dennis was in the latter group. After high school he dabbled in philosophy courses but left college to work for a trading firm as a runner. At age 21 he borrowed \$1,600 from his parents to buy a "seat" in the "pit"—a trading position on the commodity



and foreign exchange floor of the Chicago Board of Trade. By age 34, he had amassed hundreds of millions of dollars and had joined the *Forbes* list of the 400 wealthiest individuals in America.

Rugged individualism is clearly part of his formula. His three basic rules of market analysis are to figure out the market yourself, try not to be influenced by news, and try not to be influenced by others' opinions. He further stresses the importance of being able to take losses. Have the strength to go home, after a day of losing millions, happy about having done the right thing even if it happened to lose. "The biggest strength I've had in trading . . . is [that] at some level I could stand to fail." On his reckoning, a successful strategy loses most of the time, but wins enough on a few key days to come out way ahead. That sounds like a formula for success—or failure. It is only slightly more informative than "buy low, sell high" or "the trend is your friend."

What kind of person would Dennis prefer to hire as a new trader?

Well, people who have high math aptitude, super achievers in their [College test] scores, people with some interest in computers or market methods or who worked in systematizing things. . . . [T]he majority of people we wound up hiring had some interest in games. They were chess players or backgammon players.

Dennis hired and trained 20 young traders, dubbed "turtles," who averaged a 103 percent annual rate of return. What did he teach them? The main principle is that the market doesn't use its

information fully and efficiently:

Futures [including forward exchange rates] are one of the few areas that are so under-invested in that they still remain what economists call an inefficient market. . . . You can, I think, profit from predictable price changes in a way that you can't with stocks. . . . The money managers who essentially trade and make money based to a large extent on computer modeling of trading are in effect finding out where those inefficiencies are.

While most of the "turtles" prospered, Dennis himself suffered some reverses, including a loss of over \$20 million in 1988. With his personal fortune dwindling down to only a couple hundred million dollars, he stopped trading that year, at age 39, and turned to other pursuits. Aside from being a part owner of the Chicago White Sox baseball team, he dabbled in different liberal causes, first as a classic Democrat worshipping Franklin Roosevelt and then as a free-market Libertarian. By 1991, he was back in the trading pits, however, again risking millions each day.

Mr. X: No Mariachi Music, Please

Some traders lose, of course. Consider the case of a Mr. X (real name withheld), who trusted the Mexican government and bet against the marketplace back in 1976.

Mr. X, a 59-year-old New York financial consultant, had been doing well speculating in the Mexican peso. Over two years, he had netted \$750,000 on peso speculation in addition to his ordinary business

income. Then, in August 1976, the market became jittery about signs of excessive inflationary spending by the Mexican government on the eve of the upcoming election.

Most reasoned there was a danger that the peso would become too abundant and sink in value. They began to sell pesos, depressing the peso's value in the (unpegged) forward market. The Mexican government scoffed at such rumors, running full-page ads proclaiming Mexico's good health and its pledge to continue its policy of keeping the peso pegged to the dollar, as it had been for over 20 years.

Mr. X believed them. He promised to buy \$7.2 million in pesos at the forward rate of about 8 cents a peso (or about 90 million pesos) for delivery in September 1976. Of this, only \$0.7 million was to be his own money. The rest was pledged by five brokerage houses including Merrill Lynch and E. F. Hutton, who respected his previous financial track record. As long as the spot peso turned out to be worth more than 8 cents in September, he and his brokers would make money.

On August 31, the Mexican government announced it was forced to let the peso float after all. Within a week, the peso had dropped to 5 cents, making his September pesos worth \$4.5 million—once he had bought them for the stipulated \$7.2 million. As soon as the brokers saw this loss of \$2.7 million looming, they seized as many of his assets as they could. But they could only seize \$0.9 million, leaving a further loss of \$1.8 million to fight over. Mr. X

was summoned to an angry meeting with the brokerage houses.

What the meeting showed was, as one brokerage official sourly noted, "if you are going to lose in the market, you want to lose big." Mr. X's losses were so great that he could not possibly repay soon. If the brokers took him to court, he would be bankrupt. He calmly proposed that they should lend him more money for a while so that he could try his hand at some new ventures. That is, they should pay themselves back with their own money. When tempers cooled, the compromise was that he would get a five-year moratorium on his debts. Translation: He was allowed to default on part of his obligations. In this respect, his 1976 behavior was to be matched by the Mexican government itself six years later. In the great debt crisis of 1982, as discussed in Chapter 26, Mexico declared it was unable to repay all its debts to industrial-country banks and eventually forced them to take partial losses on their loans to Mexico.

What lesson did Mr. X learn? "As soon as I get liquidity again, I'm going back into the market and make it all back. This is the day of the trader."

SOURCES: The Wall Street Journal, January 6, 1977, and August 30, 1988; *InterMarket*, 1984; *Chicago Tribune*, August 30, 1988; *Chicago Life* XXVI, 1989; *Reason*, March 1989; *Washington Post*, September 1, 1991, p. H1; and *Futures*, May 1993, pp. 60–62.

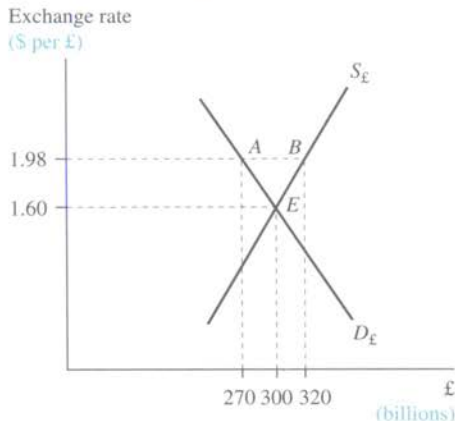
declines below \$1.98, Americans will discover more uses for it. One use would be to buy wool sweaters in Britain. Before the pound sinks, a sweater selling for £50 in London would cost American tourists \$99 ($= 50 \times 1.98$). If the pound suddenly sinks to \$1.60, the same £50 wool sweater would cost American tourists only \$80. They would start buying more. To pay for the extra sweaters, they would want more pounds sterling, to be paid to British merchants. As long as the level of business remains higher, there is more demand for pounds to conduct that business.

The case of British wool sweaters is just one illustration of the forces that might make the demand curve for a currency slope downward. There are usually many such responses of trade to a change in the exchange rate. A sinking pound means more bicycles bought from British companies and less bought from Schwinn. There is more reason to buy British and therefore more reason for a

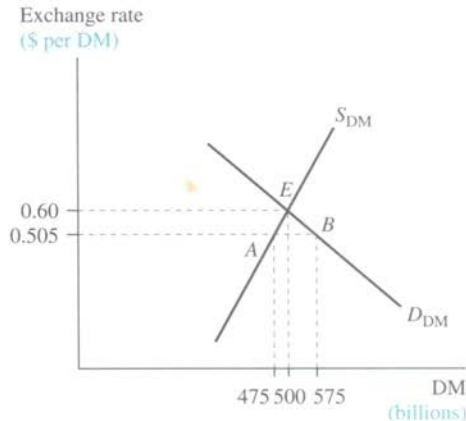
FIGURE 16.2

The Spot Exchange Market with and without Official Intervention

A. The market for pounds



B. The market for German marks (DM)



The demand and supply curves represent all demand and supply for that currency except for any official intervention by the official government authorities (like the central banks). With no official intervention, the market reaches an equilibrium at point E in panels A and B. If the government wishes to fix the exchange rate at a different level, then it must intervene to buy or sell the currency to meet any difference between private (or nonofficial) demand and supply, the gaps AB in panels A and B.

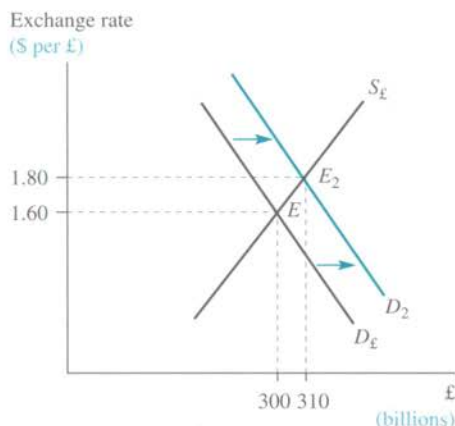
demand for pounds as a currency to facilitate such transactions. As long as a lower exchange rate raises the quantity demanded, the demand curve will slope downward.⁶

To explain what makes the floating exchange rate rise or fall over time, we need to know the forces that shift the supply and demand curves. Again, let's focus on the demand curve. The demand curve is shifted by a variety of changes in the economy. Many of the demand-side forces relate to the balance-of-payments categories of Chapter 15. Shifts in trade demand away from the United States and toward the United Kingdom (caused by forces other than changes in the exchange rate) would result in extra attempts to sell dollars and buy foreign currency. This can be graphed as an upward (rightward) shift of the demand for foreign exchange. Similarly, a rise in U.S. residents' willingness to lend money to U.K. borrowers or to invest in pound-denominated financial assets usually requires that extra dollars be converted into pounds, thus shifting the demand curve for pounds to the right. In a floating-rate system, if for any reason the demand curve for foreign currency shifts to the right (representing increased demand for foreign money), and the supply curve remains unchanged, then the exchange rate value of the foreign currency rises. Such a shift is shown in Figure 16.3. The rightward shift in demand for pounds to D_2 increases the price of pounds from \$1.60 to \$1.80 per pound, as the market equilibrium shifts from E to E_2 .

⁶Similar logic can be applied to examine the slope of the supply curve for foreign exchange, but the actual slope of the supply curve is not so clear-cut. We presume for now that the supply curve has the usual upward slope.

FIGURE 16.3

A Shift in Demand for Pounds in the Spot Exchange Market



The demand curve for foreign exchange can be shifted to the right (or raised) by either of the following changes related to the balance of payments:

A shift of trade demand away from U.S. goods and services toward those of other countries.

A rise in U.S. willingness to lend money to or invest in other countries.

If the demand curve shifts to the right, then the market equilibrium exchange rate value of the pound rises. (Chapters 18 and 19 discuss in more depth the forces that shift the curves and change the exchange rate.)

The previous figure, Figure 16.2, can also be used to introduce the other main foreign exchange regime, the **fixed exchange rate system**. Here, officials strive to keep the exchange rate virtually fixed (or pegged) even if the rate they choose differs from the current equilibrium rate. Their usual procedure under such a system is to declare a narrow “band” of exchange rates within which the rate is allowed to vary. If the exchange rate hits the top or bottom of the band, the officials must intervene. In Figure 16.2A, consider an officially declared “par value” of \$2.00 at which the pound is substantially overvalued relative to its market-clearing rate of \$1.60 per pound. British officials have announced that they will support the pound at 1 percent below par (about \$1.98), and the dollar at 1 percent above par (about \$2.02). In Figure 16.2A, they are forced to make good on this pledge by officially intervening in the foreign exchange market, buying £50 billion (and selling \$99 billion, equal to £50 billion times \$1.98 per pound). This intervention fills the gap *AB* between nonofficial supply and demand at the \$1.98 exchange rate.⁷ Only in this way can they bring the total demand for pounds, private plus official, up to the 320 billion of sterling money supplied. If their purchases of pounds with dollars fall short, total demand cannot meet the supply and the price must fall below the official support point of \$1.98. British officials wanting to defend the fixed exchange rate may not have sufficient reserves of dollars to keep the price fixed indefinitely, a point to which we shall return several times.

⁷Such official intervention could also be pictured as shifting the demand or supply curves. However, it seems more descriptive, when examining the defense of a fixed rate, to consider official exchange market intervention as filling the gap between quantity demanded and quantity supplied in the absence of the intervention.

Another case of official intervention in defense of a fixed exchange rate is shown in Figure 16.2B. German government officials have declared that the par value of the German mark (DM) shall be 50 cents in U.S. currency, and that the support points are 50.5 cents and 49.5 cents. As the demand and supply curves are drawn, the mark is substantially undervalued relative to the market-clearing rate of \$0.60 per mark. To defend the fixed rate, government officials must intervene in the foreign exchange market and sell 100 billion DM to meet the strong demand at 50.5 cents. If the German government officials cannot tolerate buying enough dollars to plug the gap *AB* and keep the exchange rate down at 50.5 cents, they may give up and let the price rise.

Changes in exchange rates are given various names depending on the kind of exchange rate regime prevailing. Under the floating-rate system a fall in the market price (the exchange rate value) of a currency is called a **depreciation** of that currency; a rise is an **appreciation**. We refer to a discrete official reduction in the otherwise fixed par value of a currency as a **devaluation**; **revaluation** is the antonym describing a discrete raising of the official par. Devaluations and revaluations are the main ways of changing exchange rates in a nearly fixed-rate system, a system where the rate is usually, but not always, fixed.

Arbitrage within the Spot Exchange Market

We have pictured foreign exchange as a single market for trading between two currencies. Yet, we have also noted that trading occurs in different locations around the world. For instance, for a period of time each day, trading is occurring in both New York and London as well as in other money centers in Europe. Will the rates in the different locations be essentially the same at a point in time, or can they diverge as local supply and demand conditions differ? Furthermore, exchange rates exist for many different currencies, both rates representing the dollar price of various foreign currencies and the cross-rates between foreign currencies. Are these exchange rates and cross-rates related in some way, or can they have independent levels?

Arbitrage, the process of buying and selling to make a (nearly) riskless pure profit, ensures that rates in different locations are essentially the same, and that rates and cross-rates are related and consistent among themselves. What would happen if pounds were being exchanged at \$1.70 per pound in London, and \$1.60 per pound at the same time in New York? If foreign exchange trading and money transfers can be done freely, then there is an opportunity to make a riskless profit by arbitraging between the two locations. Buy pounds where they are cheap (in New York) and simultaneously sell them where they are expensive (in London). For each pound bought and sold at the initial exchange rates, the arbitrage profit is 10 cents. Such arbitrage would occur on a large scale, increasing the demand for pounds in New York and increasing the supply of pounds in London. The dollar-pound exchange rate then would increase in New York

and/or decrease in London, and the two rates would be driven to be essentially the same (that is, within the small range reflecting transactions costs that prevent any further profitable arbitrage).

What would happen if the exchange rate for the pound in terms of dollars is \$1.60, the exchange rate for the German mark in terms of dollars is \$0.50, and the cross-rate between the mark and the pound is 3 marks per pound? Although it is more subtle, there is also an opportunity to make a riskless profit by arbitraging through the three rates—a process called **triangular arbitrage**. To see this, start with some number of dollars, say \$150. Your \$150 buy 300 marks ($100/0.50$). Use these marks to buy pounds at the cross-rate, and you have 100 pounds ($300/3$). Convert these pounds back into dollars and you end up with \$160 (100×1.60). Your triangular arbitrage has made \$10 profit for each \$150 that you start with. This profit occurs almost instantly and with essentially no risk if you establish all three spot trades at the same time.

As a large amount of this triangular arbitrage occurs, pressures are placed on the exchange rates to bring them into line with each other. The extra demand for marks tends to increase the dollar–mark exchange rate. The extra demand for pounds (paid for by marks) tends to increase the mark–pound cross-rate. The extra supply of pounds (to acquire dollars) tends to reduce the dollar–pound exchange rate. One or more of the exchange rates will change (due to demand and supply pressures) so that the cross-rate of marks per pound essentially equals the ratio of the dollar–pound exchange rate to the dollar–mark exchange rate. For instance, if only the cross-rate changes, then its value must shift to 3.2 marks per pound ($1.60/0.50$). At this cross-rate there is no further opportunity for profits from triangular arbitrage.

Just the threat of arbitrage of these types usually keeps the exchange rate between two currencies essentially the same in different locations, and keeps cross-rates in correct alignment with other exchange rates. Opportunities for actual arbitrage of these types is rare.

Summary

A **foreign exchange** transaction is a trade of one national money for another. The **exchange rate** is the price at which the moneys are traded. Spot foreign exchange is for immediate delivery, while forward foreign exchange is for future delivery at a price that is agreed to now. Banks and their traders are at the center of the foreign exchange market. They use telephones, other telecommunications, and computers to conduct foreign exchange trades with customers (the retail part of the market) and with each other (the interbank part of the market).

Spot foreign exchange serves a clearing function, permitting payments to be made between entities who want to hold or use different currencies. The exchange rate is determined by supply and demand, within any constraints imposed by the governmental choice of an exchange rate system or regime. Under a freely flexible or floating–exchange-rate system, market supply and demand set the equilibrium price (exchange rate) that clears the market. A floating exchange rate changes over time as supply and demand shift over time. Under a

fixed-rate or pegged-rate system, officials buy and sell a currency so as to keep its exchange rate within an officially stipulated band. When the currency's value lies at the bottom of its official band, officials must buy it by selling

other currencies. When the currency's value presses against the top of its official price range, officials must sell it in exchange for other currencies.

Suggested Reading

Three good alternative textbook views of the foreign exchange market are Giddy (1994, Chapter 2), Eiteman, Stonehill, and

Moffet (1995, Chapter 4), and Grabbe (1991, Chapter 3).

Questions and Problems

- ◆ 1. What are the major types of transactions or activities that result in demand for foreign currency in the spot foreign exchange market?
2. What are the major types of transactions or activities that result in supply of foreign currency in the spot foreign exchange market?
- ◆ 3. What has happened to the exchange rate value of the dollar in each case?
 - a. The spot rate goes from \$0.50/DM to \$0.51/DM.
 - b. The spot rate goes from 2DM/\$ to 1.96DM/\$.
 - c. The spot rate goes from \$0.010/yen to \$0.009/yen.
 - d. The spot rate goes from 100 yen/\$ to 111 yen/\$.
4. A U.S. firm must make a payment of 1 million yen to a Japanese firm that has sold the U.S. firm sets of Japanese baseball-player trading cards. The U.S. firm begins with a dollar checking account. Explain in detail how this payment would be made, including the use of the spot foreign exchange market and banks in both countries.
- ◆ 5. A British bank has acquired a large number of dollars in its dealings with its clients. How could this bank use the interbank foreign exchange market if it was unwilling to continue holding these dollars?
6. A trader at a U.S. bank believes that the German mark will strengthen substantially in exchange rate value during the next hour. How would the trader use the interbank market to attempt to profit from her belief?
- ◆ 7. For each of the following, is it part of demand for yen or supply of yen in the foreign exchange market?
 - a. A Japanese firm sells its U.S. government securities to obtain funds to buy real estate in Japan.
 - b. A U.S. import company must pay for glassware purchased from a small Japanese producer.
 - c. A U.S. farm cooperative receives payment from a Japanese importer of U.S. oranges.
 - d. A U.S. pension fund uses some incoming contributions to buy equity shares of several Japanese companies through the Tokyo stock market.

8. You have access to the following three spot exchange rates:

\$0.01/yen.

\$0.20/franc.

25 yen/franc.

You start with dollars and want to end up with dollars.

- How would you engage in arbitrage to profit from these three rates? What is the profit for each dollar used initially?
 - As a result of this arbitrage, what is the pressure on the cross-rate between yen and francs? What must the value of the cross-rate be to eliminate the opportunity for triangular arbitrage?
- ◆ 9. The spot exchange rate between the dollar and the German mark is a floating or flexible rate. What are the effects of each of the following on this exchange rate?
- There is a large increase in German demand for U.S. exports as U.S. culture becomes more popular in Germany.
 - There is a large increase in German demand for investments in U.S.-dollar-denominated financial assets because of

a German belief that the U.S. economy and political situation have improved markedly.

- Political uncertainties in Europe lead U.S. investors to shift their financial investments out of Germany, back to the United States.
 - U.S. demand for products imported from Germany falls significantly as bad press reports lead Americans to question the quality of German products.
10. Assume instead that the spot exchange rate between the dollar and German mark is a fixed or pegged rate within a narrow band around a central rate. For each change shown in problem 9 above, assume that just before the change private (or nonofficial) supply and demand intersected at an equilibrium exchange rate within this narrow band. For each change shown in problem 9, what intervention is necessary by the monetary authorities to defend the fixed rate if the change shifts the intersection of private supply and demand outside of the band?