



CHAPTER 31

Open-Economy Macroeconomics: Basic Concepts

When you decide to buy a car, you may compare the latest models offered by Ford and Toyota. When you take your next vacation, you may consider spending it on a beach in Florida or in Mexico. When you start saving for your retirement, you may choose between a mutual fund that buys stock in U.S. companies and one that buys stock in foreign companies. In all these cases, you are participating not just in the U.S. economy but in economies around the world.

Openness to international trade yields clear benefits: Trade allows people to produce what they produce best and to consume the great variety of goods and services produced around the world. Indeed, one of the *Ten Principles of Economics* highlighted in Chapter 1 is that trade can make everyone better off. International trade can raise living standards in all countries by allowing each country to specialize in producing those goods and services in which it has a comparative advantage.



So far, our development of macroeconomics has largely ignored the economy's interaction with other economies around the world. For most questions in macroeconomics, international issues are peripheral. For instance, when we discuss the natural rate of unemployment and the causes of inflation, the effects of international trade can safely be ignored. Indeed, to keep their models simple, macroeconomists often assume a **closed economy**—an economy that does not interact with other economies.

closed economy

an economy that does not interact with other economies in the world

open economy

an economy that interacts freely with other economies around the world

Yet when macroeconomists study an **open economy**—an economy that interacts freely with other economies around the world—they encounter a whole set of new issues. This chapter and the next provide an introduction to open-economy macroeconomics. We begin in this chapter by discussing the key macroeconomic variables that describe an open economy's interactions in world markets. You may have noticed mention of these variables—exports, imports, the trade balance, and exchange rates—when reading news reports or watching the nightly news. Our first job is to understand what these data mean. In the next chapter, we develop a model to explain how these variables are determined and how they are affected by various government policies.

31-1 The International Flows of Goods and Capital

An open economy interacts with other economies in two ways: It buys and sells goods and services in world product markets, and it buys and sells capital assets such as stocks and bonds in world financial markets. Here we discuss these two activities and the close relationship between them.

exports

goods and services that are produced domestically and sold abroad

imports

goods and services that are produced abroad and sold domestically

net exports

the value of a nation's exports minus the value of its imports; also called the trade balance

trade balance

the value of a nation's exports minus the value of its imports; also called net exports

trade surplus

an excess of exports over imports

31-1a The Flow of Goods: Exports, Imports, and Net Exports

Exports are domestically produced goods and services that are sold abroad, and **imports** are foreign-produced goods and services that are sold domestically. When Boeing, the U.S. aircraft manufacturer, builds a plane and sells it to Air France, the sale is an export for the United States and an import for France. When Volvo, the Swedish car manufacturer, makes a car and sells it to a U.S. resident, the sale is an import for the United States and an export for Sweden.

The **net exports** of any country are the difference between the value of its exports and the value of its imports:

$$\text{Net exports} = \text{Value of country's exports} - \text{Value of country's imports.}$$

The Boeing sale raises U.S. net exports, and the Volvo sale reduces U.S. net exports. Because net exports tell us whether a country is, in total, a seller or a buyer in world markets for goods and services, net exports are also called the **trade balance**. If net exports are positive, exports are greater than imports, indicating that the country sells more goods and services abroad than it buys from other countries. In this case, the country is said to run a **trade surplus**. If net exports are negative, exports are less than imports, indicating that the country sells fewer goods and services abroad than it buys from other

countries. In this case, the country is said to run a **trade deficit**. If net exports are zero, its exports and imports are exactly equal, and the country is said to have **balanced trade**.

In the next chapter, we develop a theory that explains an economy’s trade balance, but even at this early stage, it is easy to think of many factors that might influence a country’s exports, imports, and net exports. Those factors include the following:

- The tastes of consumers for domestic and foreign goods.
- The prices of goods at home and abroad.
- The exchange rates at which people can use domestic currency to buy foreign currencies.
- The incomes of consumers at home and abroad.
- The cost of transporting goods from country to country.
- Government policies toward international trade.

As these variables change, so does the amount of international trade.

trade deficit

an excess of imports over exports

balanced trade

a situation in which exports equal imports

© MORT GERBERG / THE NEW YORKER COLLECTION / WWW.CARTOONBANK.COM



“But we’re not just talking about buying a car—we’re talking about confronting this country’s trade deficit with Japan.”

case study

The Increasing Openness of the U.S. Economy

One dramatic change in the U.S. economy over the past six decades has been the increasing importance of international trade and finance. This change is illustrated in Figure 1, which shows the total value of goods and services exported to other countries and imported from other countries expressed as a percentage of gross domestic product (GDP). In the 1950s, imports and exports of goods and services were typically between 4 and 5 percent of GDP. In recent years, they have been about three times that level. The trading partners of the United States include a diverse group of countries. As of 2012, the largest

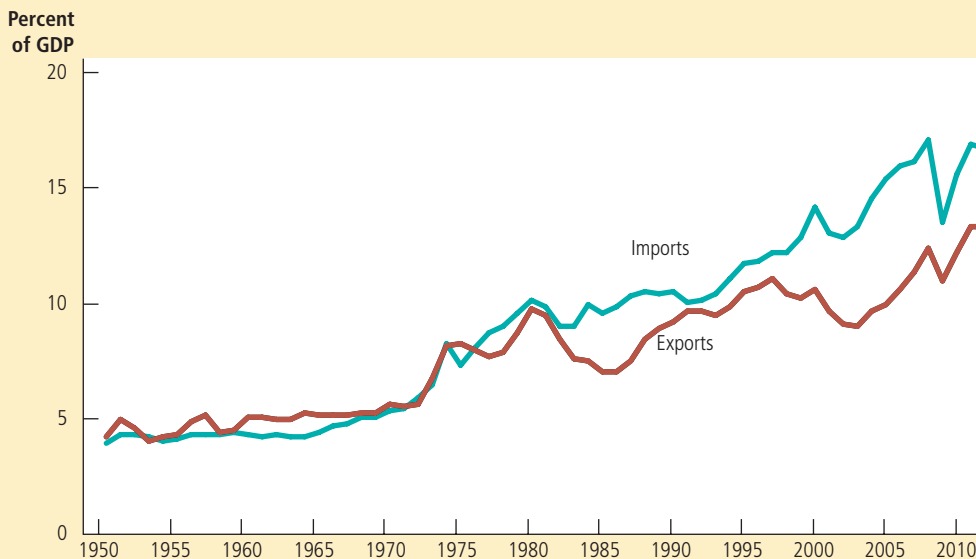


FIGURE 1

The Internationalization of the U.S. Economy

This figure shows exports and imports of the U.S. economy as a percentage of U.S. GDP since 1950. The substantial increases over time show the increasing importance of international trade and finance.

Source: U.S. Department of Commerce.

trading partner, as measured by imports and exports combined, was Canada, followed by China, Mexico, Japan, Germany, and the United Kingdom.

The increase in international trade over the past several decades is partly due to improvements in transportation. In 1950, the average merchant ship carried less than 10,000 tons of cargo; today, many ships carry more than 100,000 tons. The long-distance jet was introduced in 1958, and the wide-body jet in 1967, making air transport far cheaper than it had been. Because of these developments, goods that once had to be produced locally can now be traded around the world. Cut flowers grown in Israel are flown to the United States to be sold. Fresh fruits and vegetables that can grow only in summer in the United States can now be consumed in winter as well because they can be shipped from countries in the Southern Hemisphere.

The increase in international trade has also been influenced by advances in telecommunications, which have allowed businesses to reach overseas customers more easily. For example, the first transatlantic telephone cable was not laid

IN THE NEWS

The Changing Nature of U.S. Exports

International trade can show up in surprising places.

Jeremy Lin and America's "New Exports"

By Austan Goolsbee

Insanity swept the nation last week. The undrafted Harvard graduate Jeremy Lin seemed to transform himself from benchwarmer to MVP candidate in a matter of days. New York Knicks #17 jerseys became the biggest seller in the NBA and interest in Mr. Lin surged world-wide.

That same week we learned that China's president-to-be, Xi Jinping, is an NBA fan. After meeting President Obama at the White House, Mr. Xi traveled to Iowa and then attended a Lakers game in Los Angeles. Mr. Obama, for his part, visited a Boeing 787 plant to tout exports as an engine of growth.

Though seemingly unrelated, these three events together highlighted one of the more promising ways out of our economic doldrums: growing exports—with exports broadly

defined to include things like entertainment royalties, tourism, travel and services.

While U.S. economic conditions have improved in recent months, anxiety lingers and the slumps in housing and consumer spending remain. Exports, however, have grown impressively and have plenty of room to keep expanding.

During our last economic expansion, we focused on the home market while the other advanced economies' exports grew three times faster than ours did. Big emerging markets grew even more.

Today, growing exports are a natural opportunity for us and one of the last areas of bipartisan agreement in Washington. And exports are not confined to traditional manufactured goods.

When a foreign visitor comes to America on vacation and, like Mr. Xi, buys an NBA ticket in Los Angeles or a lunch in Muscatine, Iowa, those count in official statistics as exports. If a fan in Indonesia watches an NBA game or buys a Jeremy Lin jersey, the royalties



count as an export. Many services increase our exports: tuition paid by foreign students, fares paid on U.S. airlines by foreign fliers, ad sales on Google from foreign companies.

These things add up. Last year, according to the Bureau of Economic Analysis (BEA), the U.S. exported \$2.1 trillion of goods and services (the most ever) and more than \$600 billion of that came from services.

Think of them as the New Exports. We already export far more of them than any other country. We export more educations than computers and more tourism than aerospace products or machinery. Unlike our massive trade deficit in goods, we run major trade surpluses in the New Exports—\$179 billion of surplus in 2011 and probably more in 2012, according to the BEA. This supports millions of jobs across America.

until 1956. As recently as 1966, the technology allowed only 138 simultaneous conversations between North America and Europe. Today, because e-mail is such a common form of business communication, it is almost as easy to communicate with a customer across the world as it is to communicate with one across town.

Technological progress has also fostered international trade by changing the kinds of goods that economies produce. When bulky raw materials (such as steel) and perishable goods (such as foodstuffs) were a large part of the world's output, transporting goods was often costly and sometimes impossible. By contrast, goods produced with modern technology are often light and easy to transport. Consumer electronics, for instance, have low weight for every dollar of value, which makes them easy to produce in one country and sell in another. An even more extreme example is the film industry. Once a studio in Hollywood makes a movie, it can send copies of the film around the world at almost zero cost. And indeed, movies are a major export of the United States.

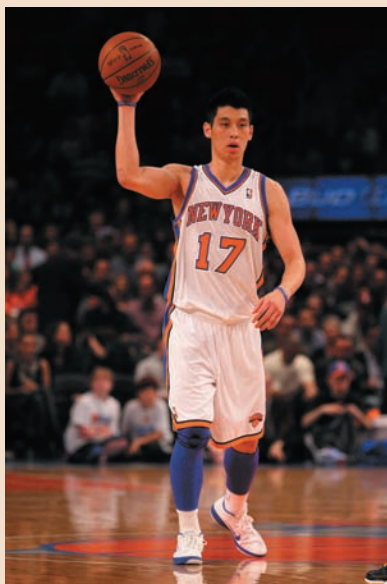
Promoting the New Exports requires more than just the conventional prying open of foreign markets and reducing tariff and regulatory barriers to our goods. It involves fighting restrictions on Internet commerce and enforcing intellectual-property rules. It also involves some less confrontational (and often easier) strategies such as improving foreigners' opinions of America so they want to come visit or send their children to school here, and then expanding student and tourist visas to enable them to do so.

Modest investments can facilitate major private-sector economic gains. Take tourists coming from countries like Brazil. In a recent survey, 94% of Brazilians said it was either difficult or nearly impossible to get here. To obtain a visa, they must undergo a multi-stage ordeal that includes traveling to a personal interview in a city with a U.S. consulate—of which there are only four in all of Brazil. Start to finish, the process can take up to five months.

Last month President Obama called for speeding up the visa process to promote tourism here. The U.S. Travel Association estimates that adding a consular official costs, with overhead, around \$280,000 per year. Since the average Brazilian traveler to the U.S. spends around

\$5,000, the association estimates that a single official can generate as much as \$50 million of travel exports for U.S. business (not to mention more than \$1 million in visa fees to the U.S. government).

Supporting New Exports doesn't require diplomatic battles with China or shepherding new trade agreements through Congress.



Jeremy Lin: Export Promoter.

These are exports that other countries want us to have and that we have missed by our own short-sightedness. Last week we extended the payroll tax cut to help the economy. We have given tax incentives to encourage companies to invest. Why not also use short-run government incentives to encourage New Exports, such as limited-time discounts on airline taxes, visa-application costs and airport-landing fees?

As a Chicago Bulls fan, I find the resurgent Knicks irritating. Still, I will root for more Linsanity because with every game watched in Asia, jersey sold in Europe or visit to an NBA game by a foreign tourist, this young man is doing more than just helping his team. He's demonstrating a way for our economy to grow. Playing for a .500 team, Mr. Lin probably won't be up there cutting down the nets in celebration at the end of the year. He was an economics major, though, so if it's any consolation to him, he's already helped cut down the trade deficit.

Mr. Goolsbee is a professor of economics at the University of Chicago. He was formerly an economic adviser to President Obama. ▲

Source: Reprinted with permission of *The Wall Street Journal*, Copyright © 2012 Dow Jones & Company, Inc. All Rights Reserved Worldwide.

The government's trade policies have also been a factor in increasing international trade. As we discussed earlier in this book, economists have long believed that free trade between countries is mutually beneficial. Over time, most policymakers around the world have come to accept these conclusions. International agreements, such as the North American Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and Trade (GATT), have gradually lowered tariffs, import quotas, and other trade barriers. The pattern of increasing trade illustrated in Figure 1 is a phenomenon that most economists and policymakers endorse and encourage. ▲

31-1b The Flow of Financial Resources: Net Capital Outflow

So far, we have been discussing how residents of an open economy participate in world markets for goods and services. In addition, residents of an open economy participate in world financial markets. A U.S. resident with \$25,000 could use that money to buy a car from Toyota, or she could instead use that money to buy stock in the Toyota Corporation. The first transaction would represent a flow of goods, whereas the second would represent a flow of capital.

The term **net capital outflow** refers to the difference between the purchase of foreign assets by domestic residents and the purchase of domestic assets by foreigners:

$$\begin{aligned} \text{Net capital outflow} = & \text{Purchase of foreign assets by domestic residents} \\ & - \text{Purchase of domestic assets by foreigners.} \end{aligned}$$

When a U.S. resident buys stock in Telmex, the Mexican telecommunications company, the purchase increases the first term on the right side of this equation and, therefore, increases U.S. net capital outflow. When a Japanese resident buys a bond issued by the U.S. government, the purchase increases the second term on the right side of this equation and, therefore, decreases U.S. net capital outflow.

The flow of capital between the U.S. economy and the rest of the world takes two forms. If McDonald's opens up a fast-food outlet in Russia, that is an example of *foreign direct investment*. Alternatively, if an American buys stock in a Russian corporation, that is an example of *foreign portfolio investment*. In the first case, the American owner (McDonald's Corporation) actively manages the investment, whereas in the second case, the American owner (the stockholder) has a more passive role. In both cases, U.S. residents are buying assets located in another country, so both purchases increase U.S. net capital outflow.

The net capital outflow (sometimes called *net foreign investment*) can be either positive or negative. When it is positive, domestic residents are buying more foreign assets than foreigners are buying domestic assets. Capital is said to be flowing out of the country. When the net capital outflow is negative, domestic residents are buying less foreign assets than foreigners are buying domestic assets. Capital is said to be flowing into the country. That is, when net capital outflow is negative, a country is experiencing a capital inflow.

We develop a theory to explain net capital outflow in the next chapter. Here let's consider briefly some of the more important variables that influence net capital outflow:

- The real interest rates paid on foreign assets.
- The real interest rates paid on domestic assets.
- The perceived economic and political risks of holding assets abroad.
- The government policies that affect foreign ownership of domestic assets.

net capital outflow
the purchase of foreign assets by domestic residents minus the purchase of domestic assets by foreigners

For example, consider U.S. investors deciding whether to buy Mexican government bonds or U.S. government bonds. (Recall that a bond is, in effect, an IOU of the issuer.) To make this decision, U.S. investors compare the real interest rates offered on the two bonds. The higher a bond's real interest rate, the more attractive it is. While making this comparison, however, U.S. investors must also take into account the risk that one of these governments might default on its debt (that is, not pay interest or principal when it is due), as well as any restrictions that the Mexican government has imposed, or might impose in the future, on foreign investors in Mexico.

31-1c The Equality of Net Exports and Net Capital Outflow

We have seen that an open economy interacts with the rest of the world in two ways—in world markets for goods and services and in world financial markets. Net exports and net capital outflow each measure a type of imbalance in these markets. Net exports measure an imbalance between a country's exports and its imports. Net capital outflow measures an imbalance between the amount of foreign assets bought by domestic residents and the amount of domestic assets bought by foreigners.

An important but subtle fact of accounting states that, for an economy as a whole, net capital outflow (*NCO*) must always equal net exports (*NX*):

$$NCO = NX.$$

This equation holds because every transaction that affects one side of this equation affects the other side by exactly the same amount. This equation is an *identity*—an equation that must hold because of how the variables in the equation are defined and measured.

To see why this accounting identity is true, let's consider an example. Imagine that you are a computer programmer residing in the United States. One day, you write some software and sell it to a Japanese consumer for 10,000 yen. The sale of software is an export of the United States, so it increases U.S. net exports. What else happens to ensure that this identity holds? The answer depends on what you do with the 10,000 yen you are paid.

First, let's suppose that you simply stuff the yen in your mattress. (We might say you have a yen for yen.) In this case, you are using some of your income to invest in the Japanese economy. That is, a domestic resident (you) has acquired a foreign asset (the Japanese currency). The increase in U.S. net exports is matched by an increase in the U.S. net capital outflow.

More realistically, however, if you want to invest in the Japanese economy, you won't do so by holding on to Japanese currency. More likely, you would use the 10,000 yen to buy stock in a Japanese corporation, or you might buy a Japanese government bond. Yet the result of your decision is much the same: A domestic resident ends up acquiring a foreign asset. The increase in U.S. net capital outflow (the purchase of the Japanese stock or bond) exactly equals the increase in U.S. net exports (the sale of software).

Let's now change the example. Suppose that instead of using the 10,000 yen to buy a Japanese asset, you use them to buy a good made in Japan, such as a Nintendo Wii. As a result of the Wii purchase, U.S. imports increase. Together, the software export and the Wii import represent balanced trade. Because exports and imports increase by the same amount, net exports are unchanged. In this case, no American ends up acquiring a foreign asset and no foreigner ends up acquiring a U.S. asset, so there is also no impact on U.S. net capital outflow.

A final possibility is that you go to a local bank to exchange your 10,000 yen for U.S. dollars. But this doesn't change the situation because the bank now has to do something with the 10,000 yen. It can buy Japanese assets (a U.S. net capital outflow); it can buy a Japanese good (a U.S. import); or it can sell the yen to another American who wants to make such a transaction. In the end, U.S. net exports must equal U.S. net capital outflow.

This example all started when a U.S. programmer sold some software abroad, but the story is much the same when Americans buy goods and services from other countries. For example, if Walmart buys \$50 million of clothing from China and sells it to American consumers, something must happen to that \$50 million. One possibility is that China could use the \$50 million to invest in the U.S. economy. This capital inflow from China might take the form of Chinese purchases of U.S. government bonds. In this case, the purchase of the clothing reduces U.S. net exports, and the sale of bonds reduces U.S. net capital outflow. Alternatively, China could use the \$50 million to buy a plane from Boeing, the U.S. aircraft manufacturer. In this case, the U.S. import of clothing balances the U.S. export of aircraft, so net exports and net capital outflow are both unchanged. In all cases, the transactions have the same effect on net exports and net capital outflow.

We can summarize these conclusions for the economy as a whole.

- When a nation is running a trade surplus ($NX > 0$), it is selling more goods and services to foreigners than it is buying from them. What is it doing with the foreign currency it receives from the net sale of goods and services abroad? It must be using it to buy foreign assets. Capital is flowing out of the country ($NCO > 0$).
- When a nation is running a trade deficit ($NX < 0$), it is buying more goods and services from foreigners than it is selling to them. How is it financing the net purchase of these goods and services in world markets? It must be selling assets abroad. Capital is flowing into the country ($NCO < 0$).

The international flow of goods and services and the international flow of capital are two sides of the same coin.

31-1d Saving, Investment, and Their Relationship to the International Flows

A nation's saving and investment are crucial to its long-run economic growth. As we have seen earlier in this book, saving and investment are equal in a closed economy. But matters are not as simple in an open economy. Let's now consider how saving and investment are related to the international flows of goods and capital as measured by net exports and net capital outflow.

As you may recall, the term *net exports* appeared earlier in the book when we discussed the components of GDP. The economy's GDP (Y) is divided among four components: consumption (C), investment (I), government purchases (G), and net exports (NX). We write this as

$$Y = C + I + G + NX.$$

Total expenditure on the economy's output of goods and services is the sum of expenditure on consumption, investment, government purchases, and net exports. Because each dollar of expenditure is placed into one of these four components, this equation is an accounting identity: It must be true because of the way the variables are defined and measured.

Recall that national saving is the income of the nation that is left after paying for current consumption and government purchases. National saving (S) equals $Y - C - G$. If we rearrange the equation to reflect this fact, we obtain

$$\begin{aligned} Y - C - G &= I + NX \\ S &= I + NX. \end{aligned}$$

Because net exports (NX) also equal net capital outflow (NCO), we can write this equation as

$$\begin{aligned} S &= I + NCO \\ \text{Saving} &= \text{Domestic investment} + \text{Net capital outflow} \end{aligned}$$

This equation shows that a nation's saving must equal its domestic investment plus its net capital outflow. In other words, when a U.S. citizen saves a dollar of her income for the future, that dollar can be used to finance the accumulation of domestic capital or it can be used to finance the purchase of foreign capital.

This equation should look somewhat familiar. Earlier in the book, when we analyzed the role of the financial system, we considered this identity for the special case of a closed economy. In a closed economy, net capital outflow is zero ($NCO = 0$), so saving equals investment ($S = I$). By contrast, an open economy has two uses for its saving: domestic investment and net capital outflow.

As before, we can view the financial system as standing between the two sides of this identity. For example, suppose the Garcia family decides to save some of its income for retirement. This decision contributes to national saving, the left side of our equation. If the Garcias deposit their saving in a mutual fund, the mutual fund may use some of the deposit to buy stock issued by General Motors, which uses the proceeds to build a factory in Ohio. In addition, the mutual fund may use some of the Garcias' deposit to buy stock issued by Toyota, which uses the proceeds to build a factory in Osaka. These transactions show up on the right side of the equation. From the standpoint of U.S. accounting, the General Motors expenditure on a new factory is domestic investment, and the purchase of Toyota stock by a U.S. resident is net capital outflow. Thus, all saving in the U.S. economy shows up as investment in the U.S. economy or as U.S. net capital outflow.

The bottom line is that saving, investment, and international capital flows are inextricably linked. When a nation's saving exceeds its domestic investment, its net capital outflow is positive, indicating that the nation is using some of its saving to buy assets abroad. When a nation's domestic investment exceeds its saving, its net capital outflow is negative, indicating that foreigners are financing some of this investment by purchasing domestic assets.

31-1e Summing Up

Table 1 summarizes many of the ideas presented so far in this chapter. It describes the three possibilities for an open economy: a country with a trade deficit, a country with balanced trade, and a country with a trade surplus.

Consider first a country with a trade surplus. By definition, a trade surplus means that the value of exports exceeds the value of imports. Because net exports are exports minus imports, net exports NX are greater than zero. As a result, income $Y = C + I + G + NX$ must be greater than domestic spending $C + I + G$. But if income Y is more than spending $C + I + G$, then saving $S = Y - C - G$ must

TABLE 1

International Flows of Goods and Capital: Summary

This table shows the three possible outcomes for an open economy.

Trade Deficit	Balanced Trade	Trade Surplus
Exports < Imports	Exports = Imports	Exports > Imports
Net Exports < 0	Net Exports = 0	Net Exports > 0
$Y < C + I + G$	$Y = C + I + G$	$Y > C + I + G$
Saving < Investment	Saving = Investment	Saving > Investment
Net Capital Outflow < 0	Net Capital Outflow = 0	Net Capital Outflow > 0

be more than investment I . Because the country is saving more than it is investing, it must be sending some of its saving abroad. That is, the net capital outflow must be greater than zero.

Similar logic applies to a country with a trade deficit (such as the U.S. economy in recent years). By definition, a trade deficit means that the value of exports is less than the value of imports. Because net exports are exports minus imports, net exports NX are negative. Thus, income $Y = C + I + G + NX$ must be less than domestic spending $C + I + G$. But if income Y is less than spending $C + I + G$, then saving $S = Y - C - G$ must be less than investment I . Because the country is investing more than it is saving, it must be financing some domestic investment by selling assets abroad. That is, the net capital outflow must be negative.

A country with balanced trade falls between these cases. Exports equal imports, so net exports are zero. Income equals domestic spending, and saving equals investment. The net capital outflow equals zero.

case study**Is the U.S. Trade Deficit a National Problem?**

You may have heard the press call the United States “the world’s largest debtor.” The nation earned that description by borrowing heavily in world financial markets during the past three decades to finance large trade deficits. Why did the United States do this, and should this event give Americans reason to worry?

To answer these questions, let’s see what the macroeconomic accounting identities tell us about the U.S. economy. Panel (a) of Figure 2 shows national saving and domestic investment as a percentage of GDP since 1960. Panel (b) shows net capital outflow (that is, the trade balance) as a percentage of GDP. Notice that, as the identities require, net capital outflow always equals national saving minus domestic investment. The figure shows that both national saving and domestic investment, as a percentage of GDP, fluctuate substantially over time. Before 1980, they tended to fluctuate together, so the net capital outflow was typically small—between -1 and 1 percent of GDP. Since 1980, national saving has often fallen well below domestic investment, leading to sizable trade deficits and substantial inflows of capital. That is, the net capital outflow is often a large negative number.

To understand the fluctuations in Figure 2, we need to go beyond these data and discuss the policies and events that influence national saving and domestic investment. History shows that there is no single cause of trade deficits. Rather, they can arise under a variety of circumstances. Here are three prominent historical episodes.

Unbalanced fiscal policy: From 1980 to 1987, the flow of capital into the United States went from 0.5 to 3.1 percent of GDP. This 2.6 percentage point change is largely attributable to a fall in national saving of 3.2 percentage points.

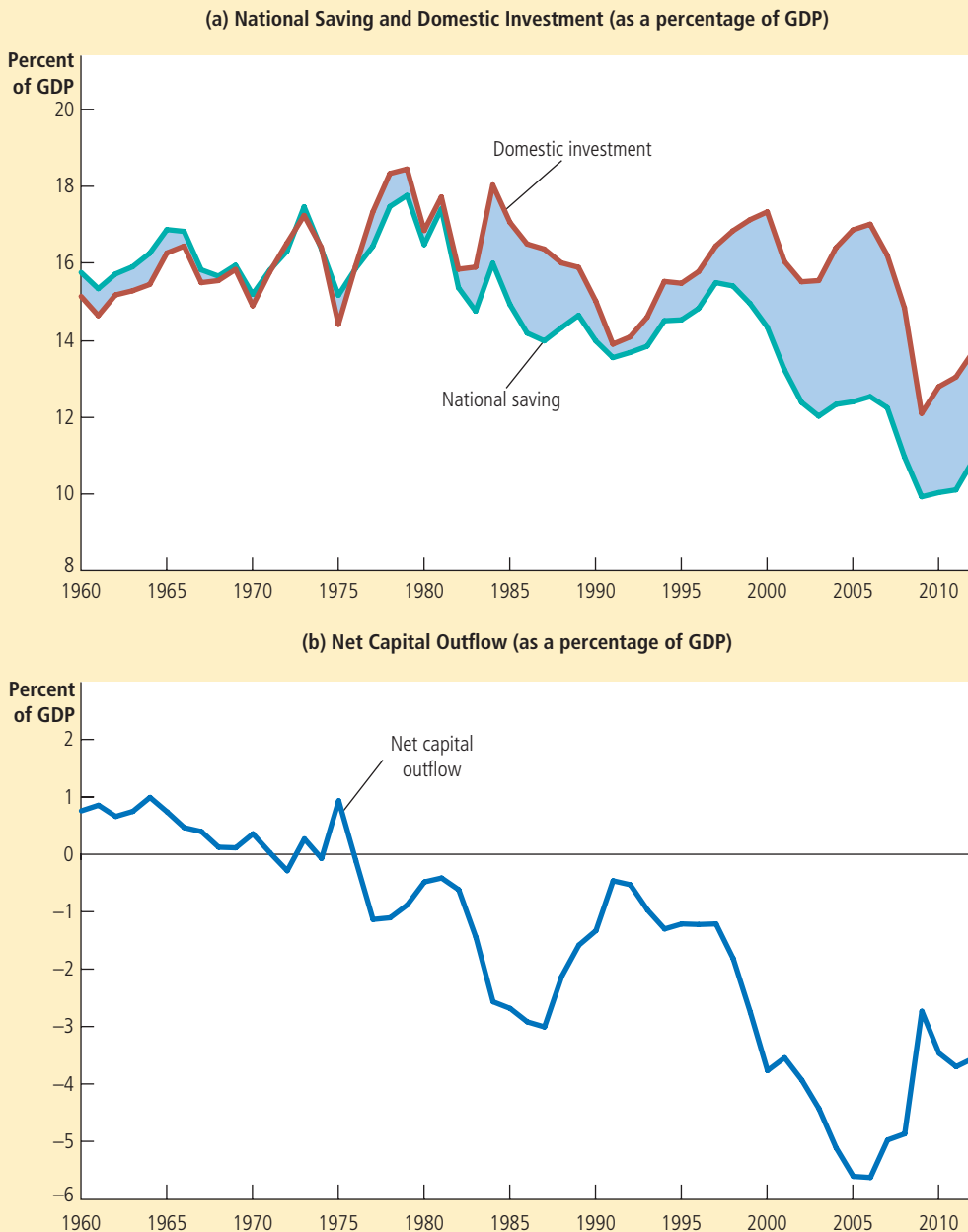


FIGURE 2

National Saving, Domestic Investment, and Net Capital Outflow

Panel (a) shows national saving and domestic investment as a percentage of GDP. Panel (b) shows net capital outflow as a percentage of GDP. You can see from the figure that national saving has been lower since 1980 than it was before 1980. This fall in national saving has been reflected primarily in reduced net capital outflow rather than in reduced domestic investment.

Source: U.S. Department of Commerce.

This decline in national saving, in turn, is often explained by the decline in public saving—that is, the increase in the government budget deficit. These budget deficits arose because President Ronald Reagan cut taxes and increased defense spending, while he found his proposed cuts in nondefense spending harder to enact.

An investment boom: A different story explains the trade deficits that arose during the following decade. From 1991 to 2000, the capital flow into the United States went from 0.5 to 3.8 percent of GDP. None of this 3.3 percentage point change is attributable to a decline in saving; in fact, saving increased over this time, as the government’s budget switched from deficit to surplus. But investment went from

13.4 to 17.8 percent of GDP, as the economy enjoyed a boom in information technology and many firms were eager to make these high-tech investments.

An economic downturn: During the period from 2000 to 2012, the capital flow into the United States remained large. The consistency of this variable, however, stands in stark contrast to the remarkable changes in saving and investment, both of which fell by about 4.5 percentage points. Investment fell because tough economic times starting in 2008 made additional capital less profitable, while national saving fell because the government began running extraordinarily large budget deficits in response to the downturn. At the end of this period, national saving was financing only about two-thirds of domestic investment, while flows of capital from abroad financed the rest.

Are these trade deficits and international capital flows a problem for the U.S. economy? There is no easy answer to this question. One has to evaluate the circumstances and the possible alternatives.

Consider first a trade deficit induced by a fall in saving, as occurred during the 1980s. Lower saving means that the nation is putting away less of its income to provide for its future. Once national saving has fallen, however, there is no reason to deplore the resulting trade deficits. If national saving fell without inducing a trade deficit, investment in the United States would have to fall. This fall in investment, in turn, would adversely affect the growth in the capital stock, labor productivity, and real wages. In other words, given that U.S. saving has declined, it is better to have foreigners invest in the U.S. economy than no one at all.

Now consider a trade deficit induced by an investment boom, like the trade deficits of the 1990s. In this case, the economy is borrowing from abroad to finance the purchase of new capital goods. If this additional capital provides a good return in the form of higher production of goods and services, then the economy should be able to handle the debt that is being accumulated. On the other hand, if the investment projects fail to yield the expected returns, the debts will look less desirable, at least with the benefit of hindsight.

Just as an individual can go into debt in either a prudent or a profligate manner, so can a nation. A trade deficit is not a problem in itself, but it can sometimes be a symptom of a problem. ▲

Quick Quiz Define net exports and net capital outflow. Explain how they are related.

31-2 The Prices for International Transactions: Real and Nominal Exchange Rates

So far, we have discussed measures of the flow of goods and services and the flow of capital across a nation's border. In addition to these quantity variables, macroeconomists also study variables that measure the prices at which these international transactions take place. Just as the price in any market serves the important role of coordinating buyers and sellers in that market, international prices help coordinate the decisions of consumers and producers as they interact in world markets. Here we discuss the two most important international prices: the nominal and real exchange rates.

nominal exchange rate
the rate at which a person can trade the currency of one country for the currency of another

31-2a Nominal Exchange Rates

The **nominal exchange rate** is the rate at which a person can trade the currency of one country for the currency of another. For example, when you go to a bank, you might see a posted exchange rate of 80 yen per dollar. If you give

the bank 1 U.S. dollar, you will receive 80 Japanese yen in return; and if you give the bank 80 Japanese yen, you will receive 1 U.S. dollar. (In actuality, the bank will post slightly different prices for buying and selling yen. The difference gives the bank some profit for offering this service. For our purposes here, we can ignore these differences.)

An exchange rate can always be expressed in two ways. If the exchange rate is 80 yen per dollar, it is also $1/80 (= 0.0125)$ dollar per yen. Throughout this book, we always express the nominal exchange rate as units of foreign currency per U.S. dollar, such as 80 yen per dollar.

If the exchange rate changes so that a dollar buys more foreign currency, that change is called an **appreciation** of the dollar. If the exchange rate changes so that a dollar buys less foreign currency, that change is called a **depreciation** of the dollar. For example, when the exchange rate rises from 80 to 90 yen per dollar, the dollar is said to appreciate. At the same time, because a Japanese yen now

appreciation

an increase in the value of a currency as measured by the amount of foreign currency it can buy

depreciation

a decrease in the value of a currency as measured by the amount of foreign currency it can buy

FYI

The Euro

You may have once heard of, or perhaps even seen, currencies such as the French franc, the German mark, or the Italian lira. These types of money no longer exist. During the 1990s, many European nations decided to give up their national currencies and use a common currency called the *euro*. The euro started circulating on January 1, 2002, when twelve nations began using it as their official money. As of 2013, there were seventeen nations using the euro. Several European nations, such as the United Kingdom, Sweden, and Denmark, have declined joining and have kept their own currencies.

Monetary policy for the euro area is set by the European Central Bank (ECB), with representatives from all of the participating countries. The ECB issues the euro and controls the supply of this money, much as the Federal Reserve controls the supply of dollars in the U.S. economy.

Why did these countries adopt a common currency? One benefit of a common currency is that it makes trade easier. Imagine that each of the fifty U.S. states had a different currency. Every time you crossed a state border, you would need to change your money and perform the kind of exchange-rate calculations discussed in the text. This would be inconvenient, and it might deter you from buying goods and services outside your own state. The countries of Europe decided that as their economies became more integrated, it would be better to avoid this inconvenience.

To some extent, the adoption of a common currency in Europe was a political decision based on concerns beyond the scope of standard economics.



PETER STONE / ALAMY

Some advocates of the euro

wanted to reduce nationalistic feelings and to make Europeans appreciate more fully their shared history and destiny. A single money for most of the continent, they argued, would help achieve this goal.

There are, however, costs of choosing a common currency. If the nations of Europe have only one money, they can have only one monetary policy. If they disagree about what monetary policy is best, they will have to reach some kind of agreement, rather than each going its own way. Because adopt-

ing a single money has both benefits and costs, there is debate among economists about whether Europe's adoption of the euro was a good decision.

From 2010 to 2012, the euro question heated up as several European nations dealt with a variety of economic difficulties. Greece, in particular, had run up a large government debt and found itself facing possible default. As a result, it had to raise taxes and cut back government spending substantially. Some observers suggested that dealing with these problems would have been easier if the government had an additional tool—a national monetary policy. The possibility of Greece's leaving the euro area and reintroducing its own currency was even discussed. As this book was going to press, however, that outcome looked unlikely. ▲



buys less of the U.S. currency, the yen is said to depreciate. When the exchange rate falls from 80 to 70 yen per dollar, the dollar is said to depreciate, and the yen is said to appreciate.

At times, you may have heard the media report that the dollar is either “strong” or “weak.” These descriptions usually refer to recent changes in the nominal exchange rate. When a currency appreciates, it is said to *strengthen* because it can then buy more foreign currency. Similarly, when a currency depreciates, it is said to *weaken*.

For any country, there are many nominal exchange rates. The U.S. dollar can be used to buy Japanese yen, British pounds, Mexican pesos, and so on. When economists study changes in the exchange rate, they often use indexes that average these many exchange rates. Just as the consumer price index turns the many prices in the economy into a single measure of the price level, an exchange rate index turns these many exchange rates into a single measure of the international value of a currency. So when economists talk about the dollar appreciating or depreciating, they often are referring to an exchange rate index that takes into account many individual exchange rates.

31-2b Real Exchange Rates

real exchange rate

the rate at which a person can trade the goods and services of one country for the goods and services of another

The **real exchange rate** is the rate at which a person can trade the goods and services of one country for the goods and services of another. For example, if you go shopping and find that a pound of Swiss cheese is twice as expensive as a pound of American cheese, the real exchange rate is $\frac{1}{2}$ pound of Swiss cheese per pound of American cheese. Notice that, like the nominal exchange rate, we express the real exchange rate as units of the foreign item per unit of the domestic item. But in this instance, the item is a good rather than a currency.

Real and nominal exchange rates are closely related. To see how, consider an example. Suppose that a bushel of American rice sells for \$100 and a bushel of Japanese rice sells for 16,000 yen. What is the real exchange rate between American and Japanese rice? To answer this question, we must first use the nominal exchange rate to convert the prices into a common currency. If the nominal exchange rate is 80 yen per dollar, then a price for American rice of \$100 per bushel is equivalent to 8,000 yen per bushel. American rice is half as expensive as Japanese rice. The real exchange rate is $\frac{1}{2}$ bushel of Japanese rice per bushel of American rice.

We can summarize this calculation for the real exchange rate with the following formula:

$$\text{Real exchange rate} = \frac{\text{Nominal exchange rate} \times \text{Domestic price}}{\text{Foreign price}}$$

Using the numbers in our example, the formula applies as follows:

$$\begin{aligned} \text{Real exchange rate} &= \frac{(80 \text{ yen/dollar}) \times (\$100/\text{bushel of American rice})}{16,000 \text{ yen/bushel of Japanese rice}} \\ &= \frac{8,000 \text{ yen/bushel of American rice}}{16,000 \text{ yen/bushel of Japanese rice}} \\ &= \frac{1}{2} \text{ bushel of Japanese rice/bushel of American rice.} \end{aligned}$$

Thus, the real exchange rate depends on the nominal exchange rate and on the prices of goods in the two countries measured in the local currencies.

Why does the real exchange rate matter? As you might guess, the real exchange rate is a key determinant of how much a country exports and imports. When Uncle Ben's, Inc., is deciding whether to buy U.S. rice or Japanese rice to put into its boxes, it will ask which rice is cheaper. The real exchange rate gives the answer. As another example, imagine that you are deciding whether to take a seaside vacation in Miami, Florida, or in Cancún, Mexico. You might ask your travel agent the price of a hotel room in Miami (measured in dollars), the price of a hotel room in Cancún (measured in pesos), and the exchange rate between pesos and dollars. If you decide where to vacation by comparing costs, you are basing your decision on the real exchange rate.

When studying an economy as a whole, macroeconomists focus on overall prices rather than the prices of individual items. That is, to measure the real exchange rate, they use price indexes, such as the consumer price index, which measure the price of a basket of goods and services. By using a price index for a U.S. basket (P), a price index for a foreign basket (P^*), and the nominal exchange rate between the U.S. dollar and foreign currencies (e), we can compute the overall real exchange rate between the United States and other countries as follows:

$$\text{Real exchange rate} = (e \times P) / P^*$$

This real exchange rate measures the price of a basket of goods and services available domestically relative to a basket of goods and services available abroad.

As we examine more fully in the next chapter, a country's real exchange rate is a key determinant of its net exports of goods and services. A depreciation (fall) in the U.S. real exchange rate means that U.S. goods have become cheaper relative to foreign goods. This change encourages consumers both at home and abroad to buy more U.S. goods and fewer goods from other countries. As a result, U.S. exports rise and U.S. imports fall; both of these changes raise U.S. net exports. Conversely, an appreciation (rise) in the U.S. real exchange rate means that U.S. goods have become more expensive compared to foreign goods, so U.S. net exports fall.

Quick Quiz Define nominal exchange rate and real exchange rate, and explain how they are related. • If the nominal exchange rate goes from 100 to 120 yen per dollar, has the dollar appreciated or depreciated?

31-3 A First Theory of Exchange-Rate Determination: Purchasing-Power Parity

Exchange rates vary substantially over time. In 1970, a U.S. dollar could be used to buy 3.65 German marks or 627 Italian lira. In 1998, as both Germany and Italy were getting ready to adopt the euro as their common currency, a U.S. dollar bought 1.76 German marks or 1,737 Italian lira. In other words, over this period, the value of the dollar fell by more than half compared to the mark, while it more than doubled compared to the lira.

What explains these large and opposite changes? Economists have developed many models to explain how exchange rates are determined, each emphasizing just some of the many forces at work. Here we develop the simplest theory of