International Finance: Theory and Policy

Preface

Traditionally, intermediate-level international economics texts seem to fall into one of two categories. Some are written for students who may one day continue on in an economics PhD program. These texts develop advanced general equilibrium models and use sophisticated mathematics. However, these texts are also very difficult for the average, non-PhD-bound student to understand. Other intermediate texts are written for noneconomics majors who may take only a few economics courses in their program. These texts present descriptive information about the world and only the bare basics about how economic models are used to describe that world.

This text strives to reach a median between these two approaches. First, I believe that students need to learn the theory and models to understand how economists understand the world. I also think these ideas are accessible to most students if they are explained thoroughly. This text presents numerous models in some detail, not by employing advanced mathematics, but rather by walking students through a detailed description of how a model's assumptions influence its conclusions. Second, and perhaps more important, students must learn how the models connect with the real world. I believe that theory is done primarily to guide policy. We do positive economics to help answer the normative questions; for example, what should a country do about its trade policy or its exchange rate policy? The results from models give us insights that help us answer these questions. Thus this text strives to explain why each model is interesting by connecting its results to some aspect of a current policy issue. A prime example is found in Chapter 13 "Fixed versus Floating Exchange Rates" of this book, which addresses the age-old question of whether countries use fixed or floating exchange rates. The chapter applies the theories developed throughout the text to assist our understanding of this long-standing debate.

Chapter 1: Introductory Finance Issues: Current Patterns, Past History, and International Institutions

Economics is a social science whose purpose is to understand the workings of the real-world economy. An economy is something that no one person can observe in its entirety. We are all a part of the economy, we all buy and sell things daily, but we cannot observe all parts and aspects of an economy at any one time.

For this reason, economists build mathematical models, or theories, meant to describe different aspects of the real world. For some students, economics seems to be all about these models and theories, these abstract equations and diagrams. However, in actuality, economics is about the real world, the world we all live in.

For this reason, it is important in any economics course to describe the conditions in the real world before diving into the theory intended to explain them. In this case, in a textbook about international finance, it is very useful for a student to know some of the values of important macroeconomic variables, the trends in these variables over time, and the policy issues and controversies surrounding them.

This first chapter provides an overview of the real world with respect to international finance. It explains not only how things look now but also where we have been and why things changed along the way. It describes current economic conditions and past trends with respect to the most critical international macroeconomic indicators. In particular, it compares the most recent worldwide economic recession with past business cycle activity to put our current situation into perspective. The chapter also discusses important institutions and explains why they have been created.

With this overview about international finance in the real world in mind, a student can better understand why the theories and models in the later chapters are being developed. This chapter lays the groundwork for everything else that follows.

1.1 The International Economy and International Economics

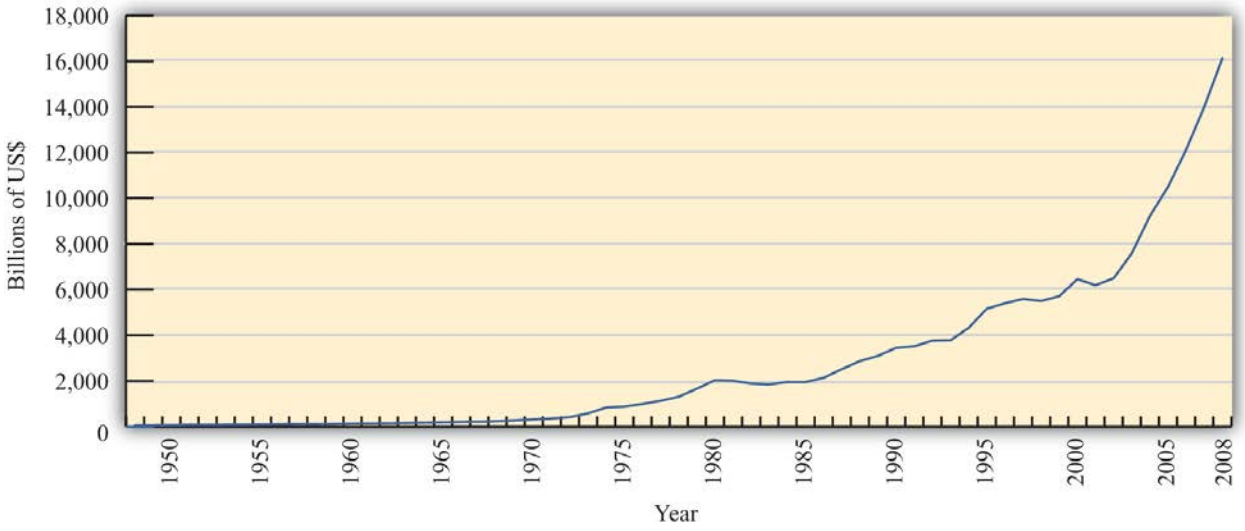
LEARNING OBJECTIVES

1. Learn past trends in international trade and foreign investment.
2. Learn the distinction between international trade and international finance.

International economics is growing in importance as a field of study because of the rapid integration of international economic markets. Increasingly, businesses, consumers, and governments realize that their lives are affected not only by what goes on in their own town, state, or country but also by what is happening around the world. Consumers can walk into their local shops today and buy goods and services from all over the world. Local businesses must compete with these foreign products. However, many of these same businesses also have new opportunities to expand their markets by selling to a multitude of consumers in other countries. The advance of telecommunications is also rapidly reducing the cost of providing services internationally, while the Internet will assuredly change the nature of many products and services as it expands markets even further.

One simple way to see the rising importance of international economics is to look at the growth of exports in the world during the past fifty or more years. Figure 1.1 "World Exports, 1948–2008 (in Billions of U.S. Dollars)" shows the overall annual exports measured in billions of U.S. dollars from 1948 to 2008.

FIGURE 1.1 WORLD EXPORTS, 1948–2008 (IN BILLIONS OF U.S. DOLLARS)



Source: World Trade Organization, International trade and tariff data,http://www.wto.org/english/res_e/statis_e/statis_e.htm.

Recognizing that one country's exports are another country's imports, one can see the exponential growth in outflows and inflows during the past fifty years.

However, rapid growth in the value of exports does not necessarily indicate that trade is becoming more important. A better method is to look at the share of traded goods in relation to the size of the world economy. Figure 1.2 "World Exports, 1970–2008 (Percentage of World GDP)" shows world exports as a percentage of the world gross domestic product (GDP) for the years 1970 to 2008. It shows a steady increase in trade as a share of the size of the world economy. World exports grew from just over 10 percent of the GDP in 1970 to over 30 percent by 2008. Thus trade is not only rising rapidly in absolute terms; it is becoming relatively more important too.

Figure 1.2 World Exports, 1970–2008 (Percentage of World GDP)

Source: IMF World Economic Outlook Database, http://www.imf.org/external/pubs/ft/weo/2009/02/weodata/index.aspx.

One other indicator of world interconnectedness can be seen in changes in the amount of foreign direct investment (FDI). FDI is foreign ownership of productive activities and thus is another way in which foreign economic influence can affect a country.Figure 1.3 "World Inward FDI Stocks, 1980–2007 (Percentage of World GDP)" shows the stock, or the sum total value, of FDI around the world taken as a percentage of the world GDP between 1980 and 2007. It gives an indication of the importance of foreign ownership and influence around the world. As can be seen, the share of FDI has grown dramatically from around 5 percent of the world GDP in 1980 to over 25 percent of the GDP just twenty-five years later.

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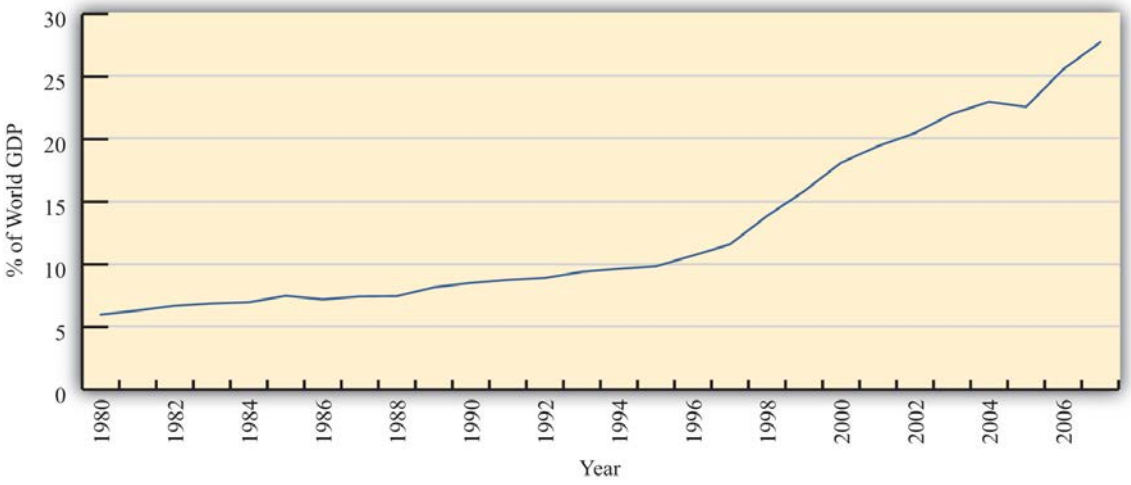
The growth of international trade and investment has been stimulated partly by the steady decline of trade barriers since the Great Depression of the 1930s. In the post–World War II era,

Figure 1.3 World Inward FDI Stocks, 1980–2007 (Percentage of World GDP)



Source: IMF World Economic Outlook Database,http://www.imf.org/external/pubs/ft/weo/2009/02/weodata/index.aspx; UNCTAD, FDI Statistics: Division on Investment and Enterprise,http://www.unctad.org/Templates/Page.asp?intItemID=4979&lang=1

the General Agreement on Tariffs and Trade, or GATT, prompted regular negotiations among a growing body of members to reciprocally reduce tariffs (import taxes) on imported goods. During each of these regular negotiations (eight of these rounds were completed between 1948 and 1994), countries promised to reduce their tariffs on imports in exchange for concessions—that means tariff reductions—by other GATT members. When the Uruguay Round, the most recently completed round, was finalized in 1994, the member countries succeeded in extending the agreement to include liberalization promises in a much larger sphere of influence. Now countries not only would lower tariffs on goods trade but also would begin to liberalize the agriculture and services markets. They would eliminate the many quota systems—like the multifiber agreement in clothing—that had sprouted up in previous decades. And they would agree to adhere to certain minimum standards to protect intellectual property rights such as patents, trademarks, and copyrights. TheWorld Trade Organization (WTO) was created to manage this system of new agreements, to provide a forum for regular discussion of trade matters, and to implement a well-defined process for settling trade disputes that might arise among countries.

As of 2009, 153 countries were members of the WTO "trade liberalization club," and many more countries were still negotiating entry. As the club grows to include more members—and if the latest round of trade liberalization talks, called the Doha Round, concludes with an agreement—world markets will become increasingly open to trade and investment. [1]

Another international push for trade liberalization has come in the form of regional free trade agreements. Over two hundred regional trade agreements around the world have been notified, or announced, to the WTO. Many countries have negotiated these agreements with neighboring countries or major trading partners to promote even faster trade liberalization. In part, these have arisen because of the slow, plodding pace of liberalization under the GATT/WTO. In part, the regional trade agreements have occurred because countries have wished to promote interdependence and connectedness with important economic or strategic trade partners. In any case, the phenomenon serves to open international markets even further than achieved in the WTO.

These changes in economic patterns and the trend toward ever-increasing openness are an important aspect of the more exhaustive phenomenon known as globalization. Globalization more formally refers to the economic, social, cultural, or environmental changes that tend to interconnect peoples around the world. Since the economic aspects of globalization are certainly the most pervasive of these changes, it is increasingly important to understand the implications of a global marketplace on consumers, businesses, and governments. That is where the study of international economics begins.

What Is International Economics?

International economics is a field of study that assesses the implications of international trade, international investment, and international borrowing and lending. There are two broad subfields within the discipline: international trade and international finance.

International trade is a field in economics that applies microeconomic models to help understand the international economy. Its content includes basic supply-and-demand analysis of international markets; firm and consumer behavior; perfectly competitive, oligopolistic, and monopolistic market structures; and the effects of market distortions. The typical course describes economic relationships among consumers, firms, factory owners, and the government.

The objective of an international trade course is to understand the effects of international trade on individuals and businesses and the effects of changes in trade policies and other economic conditions. The

course develops arguments that support a free trade policy as well as arguments that support various types of protectionist policies. By the end of the course, students should better understand the centuries-old controversy between free trade and protectionism.

International finance applies macroeconomic models to help understand the international economy. Its focus is on the interrelationships among aggregate economic variables such as GDP, unemployment rates, inflation rates, trade balances, exchange rates, interest rates, and so on. This field expands basic macroeconomics to include international exchanges. Its focus is on the significance of trade imbalances, the determinants of exchange rates, and the aggregate effects of government monetary and fiscal policies. The pros and cons of fixed versus floating exchange rate systems are among the important issues addressed.

This international trade textbook begins in this chapter by discussing current and past issues and controversies relating to microeconomic trends and policies. We will highlight past trends both in implementing policies that restrict trade and in forging agreements to reduce trade barriers. It is these real-world issues that make the theory of international trade worth studying.

KEY TAKEAWAYS

- International trade and investment flows have grown dramatically and consistently during the past half century.
- International trade is a field in economics that applies microeconomic models to help understand the international economy.
- International finance focuses on the interrelationships among aggregate economic variables such as GDP, unemployment, inflation, trade balances, exchange rates, and so on.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"
   a. The approximate share of world exports as a percentage of world GDP in 2008.
   b. The approximate share of world foreign direct investment as a percentage of world GDP in 1980.
   c. The number of countries that were members of the WTO in 2009.

d. This branch of international economics applies microeconomic models to understand the international economy.
e. This branch of international economics applies macroeconomic models to understand the international economy.

[1] Note that the Doha Round of discussions was begun in 2001 and remains uncompleted as of 2009.

1.2 GDP Unemployment, Inflation, and Government Budget Balances

LEARNING OBJECTIVE

1. Learn current values for several important macroeconomic indicators from a selected set of countries, including GDP, GDP per capita, unemployment rates, inflation rates, national budget balances, and national debts.

When someone reads the business and economics news it is common to see numerous values and figures used to describe the economic situation somewhere. For example, if you read a story about the Philippines you might read that the gross domestic product (GDP) is $167 billion or that the GDP per person is $3,500 per person, or that its unemployment rate is 7.1 percent and its inflation rate is now 2.8 percent. You might read that it has a government budget deficit of 3.7 percent of the GDP and a trade deficit of 5.2 percent of the GDP. But what does this all mean? How is someone supposed to interpret and understand whether the numbers indicate something good, bad, or neutral about the country?

One way to make judgments is to compare these numbers with other countries. To this end, the next few sections will present some recent data for a selected set of countries. Although memorizing these numbers is not so important, especially since they will all soon change, it is helpful to have an idea about what the values are for a few countries; or if not that, to know the approximate normal average for a particular variable. Thus it is useful to know that GDP per person ranges from about $500 per year at the low end to about $50,000 to $75,000 per person at the high end. It is also useful to know that unemployment rates are normally less than 10 percent. So when you read that Zimbabwe recently had unemployment of 75 percent, a reader will know how unusually large that is. Once you also recognize that inflation rates are normally less than 10 percent, a rate of 10,000 percent will strike you as extraordinary.

Thus the values for some of these numbers will be helpful to make comparisons across countries today and to make comparisons over time for a particular country. Therefore, it can be very helpful to know the numbers for at least a few countries, or what may be deemed a set of reference countries. The countries in Table 1.1 "GDP and GDP per Capita (PPP in Billions of Dollars), 2009" were selected to provide a cross section of countries at different levels of economic development. Thus the United States, the European Union, and Japan represent the largest economies in the world today. Meanwhile, countries like Brazil, Russia, India, and China are watched so closely today that they have acquired their own acronym: the

BRIC countries. Finally, countries like Indonesia, Kenya, Ghana, and Burundi are among the poorest nations of the world. Note that in later tables other countries were substituted for the African countries because data are less difficult to obtain.

Gross Domestic Product around the World

Macroeconomics is the study of the interrelationships of aggregate economic variables. The most important of these, without question, is a country's gross domestic product (GDP). GDP measures the total value of all goods and services produced by a country during a year. As such, it is a measure of the extent of economic activity in a country or the economic size of a country.

And because the consumption of goods and services is one way to measure an individual's economic well-being, it is easy to calculate the GDP per capita (i.e., per person) to indicate the average well-being of individuals in a country.

Details about how to measure and interpret GDP follow in subsequent chapters, but before doing so, it makes some sense to know a little about how economy size and GDP per person vary across countries around the world. Which are the biggest countries, and which are the smallest? Which countries provide more goods and services, on average, and which produce less? And how wide are the differences between countries? Table 1.1 "GDP and GDP per Capita (PPP in Billions of Dollars), 2009" provides recent information for a selected group of countries. Note that reported numbers are based on purchasing power parity (PPP), which is a better way to make cross-country comparisons and is explained later. A convenient source of the most recent comprehensive data from three sources (the International Monetary Fund [IMF], the World Bank, and the U.S. CIA) of GDP (http://en.wikipedia.org/wiki/List_of_countries_by_GDP_%28PPP%29) and GDP per person (http://en.wikipedia.org/wiki/List_of_countries_by_GDP_%28PPP%29_per_capita) is available at Wikipedia.

Table 1.1 GDP and GDP per Capita (PPP in Billions of Dollars), 2009

Country/Region (Rank)	GDP (Percentage in the World)	GDP per Capita (Rank)
World	68,997 (100)	10,433
European Union (1)	15,247 (22.1)	—

Country/Region (Rank)	GDP (Percentage in the World)	GDP per Capita (Rank)
United States (2)	14,265 (20.7)	47,440 (6)
China (3)	7,916 (11.5)	5,970 (100)
Japan (4)	4,354 (6.3)	34,116 (24)
India (5)	3,288 (4.8)	2,780 (130)
Russia (7)	2,260 (3.3)	15,948 (52)
Brazil (10)	1,981 (2.9)	10,466 (77)
South Korea (14)	1,342 (1.9)	27,692 (33)
Indonesia (17)	908 (1.3)	3,980 (121)
Kenya (82)	60 (nil)	1,712 (148)
Ghana (96)	34 (nil)	1,518 (152)
Burundi (158)	3 (nil)	390 (178)

Table 1.1 "GDP and GDP per Capita (PPP in Billions of Dollars), 2009" displays several things that are worth knowing. First, note that the United States and European Union each make up about one-fifth of the world economy; together the two are 42 percent. Throw Japan into the mix with the European Union and the United States and together they make up less than one-sixth of the world's population. However, these three developed nations produce almost one-half of the total world production. This is a testament to the high productivity in the developed regions of the world. It is also a testament to the low productivity in much of the rest of the world, where it takes another five billion people to produce the remaining half of the GDP.

The second thing worth recognizing is the wide dispersion of GDPs per capita across countries. The United States ranks sixth in the world at $47,440 and is surpassed by several small countries like Singapore and Luxembourg and/or those with substantial oil and gas resources such as Brunei, Norway, and Qatar (not shown in Table 1.1 "GDP and GDP per Capita (PPP in Billions of Dollars), 2009"). Average

GDP per capita in the world is just over $10,000, and it is just as remarkable how far above the average some countries like the United States, Japan, and South Korea are as it is how far below the average other countries like China, India, Indonesia, and Kenya are. Perhaps most distressing is the situation of some countries like Burundi that has a GDP of only $370 per person. (Other countries in a similar situation include Zimbabwe, Congo, Liberia, Sierra Leone, Niger, and Afghanistan.)

Unemployment and Inflation around the World

Two other key macroeconomic variables that are used as an indicator of the health of a national economy are the unemployment rate and the inflation rate. The unemployment rate measures the percentage of the working population in a country who would like to be working but are currently unemployed. The lower the rate, the healthier the economy and vice versa. The inflation rate measures the annual rate of increase of the consumer price index (CPI). The CPI is a ratio that measures how much a set of goods costs this period relative to the cost of the same set of goods in some initial year. Thus if the CPI registers 107, it would cost $107 (euros or whatever is the national currency) to buy the goods today, while it would have cost just $100 to purchase the same goods in the initial period. This represents a 7 percent increase in average prices over the period, and if that period were a year, it would correspond to the annual inflation rate. In general, a relatively moderate inflation rate (about 0–4 percent) is deemed acceptable; however, if inflation is too high it usually contributes to a less effective functioning of an economy. Also, if inflation is negative, it is called deflation, and that can also contribute to an economic slowdown.

Table 1.2 Unemployment and Inflation Rates

Country/Region	Unemployment Rate (%)	Inflation Rate (%)
European Union	9.8 (Oct. 2009)	+0.5 (Nov. 2009)
United States	10.0 (Nov. 2009)	+1.8 (Nov. 2009)
China	9.2 (2008)	+0.6 (Nov. 2009)
Japan	5.1 (Oct. 2009)	−2.5 (Oct. 2009)
India	9.1 (2008)	+11.5 (Oct. 2009)
Russia	7.7 (Oct. 2009)	+9.1 (Nov. 2009)

Country/Region	Unemployment Rate (%)	Inflation Rate (%)
Brazil	7.5 (Oct. 2009)	+4.2 (Nov. 2009)
South Korea	3.5 (Nov. 2009)	+2.4 (Nov. 2009)
Indonesia	8.1 (Feb. 2009)	+2.4 (Oct. 2009)
Spain	19.3 (Oct. 2009)	+0.3 (Nov. 2009)
South Africa	24.5 (Sep. 2009)	+5.8 (Nov. 2009)
Estonia	15.2 (Jul. 2009)	−2.1 (Nov. 2009)

Source: *Economist*, Weekly Indicators, December 17, 2009.

The unemployment rates and inflation rates in most countries are unusual in the reported period because of the economic crisis that hit the world in 2008. The immediate effect of the crisis was a drop in demand for many goods and services, a contraction in GDP, and the loss of jobs for workers in many industries. In addition, prices were either stable or fell in many instances. When most economies of the world were booming several years earlier, a normal unemployment rate would have been 3 to 5 percent, while a normal inflation rate would stand at about 3 to 6 percent.

As Table 1.2 "Unemployment and Inflation Rates" shows, though, unemployment rates in most countries in 2009 are much higher than that, while inflation rates tend to be lower with several exceptions. In the United States, the unemployment rate has more than doubled, but in the European Union, unemployment was at a higher rate than the United States before the crisis hit, and so it has not risen quite as much. Several standouts in unemployment are Spain and South Africa. These are exceedingly high rates coming very close to the United States unemployment rate of 25 percent reached during the Great Depression in 1933.

India's inflation rate is the highest of the group listed but is not much different from inflation in India the year before of 10.4 percent. Russia's inflation this year has actually fallen from its rate last year of 13.2 percent. Japan and Estonia, two countries in the list, are reporting deflation this year. Japan had inflation of 1.7 percent in the previous year, whereas Estonia's rate had been 8 percent.

Government Budget Balances around the World

Another factor that is often considered in assessing the health of an economy is the state of the country's government budget. Governments collect tax revenue from individuals and businesses and use that money to finance the purchase of government provided goods and services. Some of the spending is on public goods such as national defense, health care, and police and fire protection. The government also transfers money from those better able to pay to others who are disadvantaged, such as welfare recipients or the elderly under social insurance programs.

Generally, if government were to collect more in tax revenue than it spent on programs and transfers, then it would be running a government budget surplus and there would be little cause for concern. However, many governments oftentimes tend to spend and transfer more than they collect in tax revenue. In this case, they run a government budget deficit that needs to be paid for or financed in some manner. There are two ways to cover a budget deficit. First, the government can issue Treasury bills and bonds and thus borrow money from the private market; second, the government can sometimes print additional money. If borrowing occurs, the funds become unavailable to finance private investment or consumption, and thus the situation represents a substitution of public spending for private spending. Borrowed funds must also be paid back with accrued interest, which implies that larger future taxes will have to be collected assuming that budget balance or a surplus is eventually achieved.

When governments borrow, they will issue Treasury bonds with varying maturities. Thus some will be paid back in one of two years, but others perhaps not for thirty years. In the meantime, the total outstanding balance of IOUs (i.e., I owe you) that the government must pay back in the future is called the national debt. This debt is owed to whoever has purchased the Treasury bonds; for many countries, a substantial amount is purchased by domestic citizens, meaning that the country borrows from itself and thus must pay back its own citizens in the future. The national debt is often confused with a nation's international indebtedness to the rest of the world, which is known as its international investment position (defined in the next section).

Excessive borrowing by a government can cause economic difficulties. Sometimes private lenders worry that the government may become insolvent (i.e., unable to repay its debts) in the future. In this case, creditors may demand a higher interest rate to compensate for the higher perceived risk. To prevent that risk, governments sometimes revert to the printing of money to reduce borrowing needs. However, excessive money expansion is invariably inflationary and can cause long-term damage to the economy.

In Table 1.3 "Budget Balance and National Debt (Percentage of GDP), 2009", we present budget balances for a selected set of countries. Each is shown as a percentage of GDP, which gives a more accurate portrayal of the relative size. Although there is no absolute number above which a budget deficit or a national debt is unsustainable, budget deficits greater than 5 percent per year, those that are persistent over a long period, or a national debt greater than 50 percent of GDP tends to raise concerns among investors.

Table 1.3 Budget Balance and National Debt (Percentage of GDP), 2009

Country/Region	Budget Balance (%)	National Debt (%)
European Union	−6.5	—
United States	−11.9	37.5
China	−3.4	15.6
Japan	−7.7	172.1
India	−8.0	56.4
Russia	−8.0	6.5
Brazil	−3.2	38.8
South Korea	−4.5	24.4
Indonesia	−2.6	29.3
Spain	−10.8	40.7
South Africa	−5.0	31.6
Estonia	−4.0	4.8

Source: *Economist*, Weekly Indicators, December 17, 2009, and the CIA World Factbook.

Note that all the budget balances for this selected set of countries are in deficit. For many countries, the deficits are very large, exceeding 10 percent in the U.S. and Spain. Although deficits for most countries are common, usually they are below 5 percent of the GDP. The reason for the higher deficits now is because

most countries have increased their government spending to counteract the economic recession, while at the same time suffering a reduction in tax revenues also because of the recession. Thus budget deficits have ballooned around the world, though to differing degrees.

As budget deficits rise and as GDP falls due to the recession, national debts as a percent of GDP are also on the rise in most countries. In the United States, the national debt is still at a modest 37.5 percent, but recent projections suggest that in a few years it may quickly rise to 60 percent or 70 percent of the GDP. Note also that these figures subtract any debt issued by the government and purchased by another branch of the government. For example, in the United States for the past decade or more, the Social Security system has collected more in payroll taxes than it pays out in benefits. The surplus, known as the Social Security "trust fund," is good because in the next few decades as the baby boom generation retires, the numbers of Social Security recipients is expected to balloon. But for now the surplus is used to purchase government Treasury bonds. In other words, the Social Security administration lends money to the rest of the government. Those loans currently sum to about 30 percent of GDP or somewhat over $4 trillion. If we include these loans as a part of the national debt, the United States debt is now, according to the online national debt clock, more than $12 trillion or about 85 percent of GDP. (This is larger than 37.5 + 30 percent because the debt clock is an estimate of more recent figures and reflects the extremely large government budget deficit run in the previous year.)

Most other countries' debts are on a par with that of the U.S. with two notable exceptions. First, China and Russia's debts are fairly modest at only 15.6 percent and 6.5 percent of GDP, respectively. Second, Japan's national debt is an astounding 172 percent of GDP. It has arisen because the Japanese government has tried to extricate its economy from an economic funk by spending and borrowing over the past two decades.

KEY TAKEAWAYS

- GDP and GDP per capita are two of the most widely tracked indicators of both the size of national economies and an economy's capacity to provide for its citizens.
- In general, we consider an economy more successful if its GDP per capita is high, unemployment rate is low (3–5 percent), inflation rate is low and nonnegative (0–6 percent), government budget deficit is low (less than 5 percent of GDP) or in surplus, and its national debt is low (less than 25 percent).

- The United States, as the largest national economy in the world, is a good reference point for comparing macroeconomic data.
  - The U.S. GDP in 2008 stood at just over $14 trillion while per capita GDP stood at $47,000. U.S. GDP made up just over 20 percent of world GDP in 2008.
  - The U.S. unemployment rate was unusually high at 10 percent in November 2009 while its inflation rate was very low at 1.8 percent.
  - The U.S. government budget deficit was at an unusually high level of 11.9 percent of GDP in 2009 while its international indebtedness made it a debtor nation in the amount of 37 percent of its GDP.
- Several noteworthy statistics are presented in this section:
  - Average world GDP per person stands at around $10,000 per person.
  - The GDP in the U.S. and most developed countries rises as high as $50,000 per person.
  - The GDP in the poorest countries like Kenya, Ghana, and Burundi is less than $2,000 per person per year.
  - U.S. unemployment has risen to a very high level of 10 percent; however, in Spain it sits over 19 percent, while in South Africa it is over 24 percent.
  - Inflation is relatively low in most countries but stands at over 9 percent in Russia and over 11 percent in India. In several countries like Japan and Estonia, deflation is occurring.
  - Due to the world recession, budget deficits have grown larger in most countries, reaching almost 12 percent of GDP in the United States.
  - The national debts of countries are also growing larger, and Japan's has grown to over 170 percent of GDP.

EXERCISES

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"
   a. The approximate value of world GDP in 2008.
   b. The approximate value of EU GDP in 2008.
   c. The approximate value of U.S. GDP in 2008.

d. The approximate value of world GDP per capita in 2008.

e. The approximate value of EU GDP per capita in 2008.

f. The approximate value of U.S. GDP per capita in 2008.

g. The approximate value of South Africa's unemployment rate in 2009.

h. The approximate value of India's inflation rate in 2009.

i. The approximate value of the U.S. budget balance as a percentage of its GDP in 2009.

j. The approximate value of Japan's national debt as a percentage of its GDP in 2009.

Use the information in Table 1.1 "GDP and GDP per Capita (PPP in Billions of Dollars), 2009" and Table 1.3 "Budget Balance and National Debt (Percentage of GDP), 2009" to calculate the dollar values of the government budget balance and the national debt for Japan, China, Russia, South Korea, and Indonesia.

1.3 Exchange Rate Regimes, Trade Balances, and Investment Positions

LEARNING OBJECTIVE

1. Learn current values for several important international macroeconomic indicators from a selected set of countries, including the trade balance, the international investment position, and exchange rate systems.

Countries interact with each other in two important ways: trade and investment. Trade encompasses the export and import of goods and services. Investment involves the borrowing and lending of money and the foreign ownership of property and stock within a country. The most important international macroeconomic variables, then, are the trade balance, which measures the difference between the total value of exports and the total value of imports, and the exchange rate, which measures the number of units of one currency that exchanges for one unit of another currency.

Exchange Rate Regimes

Because countries use different national currencies, international trade and investment requires an exchange of currency. To buy something in another country, one must first exchange one's national currency for another. Governments must decide not only how to issue its currency but how international transactions will be conducted. For example, under a traditional gold standard, a country sets a price for gold (say $20 per ounce) and then issues currency such that the amount in circulation is equivalent to the value of gold held in reserve. In this way, money is "backed" by gold because individuals are allowed to convert currency to gold on demand.

Today's currencies are not backed by gold; instead most countries have a central bank that issues an amount of currency that will be adequate to maintain a vibrant growing economy with low inflation and low unemployment. A central bank's ability to achieve these goals is often limited, especially in turbulent economic times, and this makes monetary policy contentious in most countries.

One of the decisions a country must make with respect to its currency is whether to fix its exchange value and try to maintain it for an extended period, or whether to allow its value to float or fluctuate according to market conditions. Throughout history,fixed exchange rates have been the norm, especially because of the long period that countries maintained a gold standard (with currency *fixed* to gold) and because of the fixed exchange rate system (called the Bretton Woods system) after World War II. However, since 1973,

when the Bretton Woods system collapsed, countries have pursued a variety of different exchange rate mechanisms.

The International Monetary Fund (IMF), created to monitor and assist countries with international payments problems, maintains a list of country currency regimes. The list displays a wide variety of systems currently being used. The continuing existence of so much variety demonstrates that the key question, "Which is the most suitable currency system?" remains largely unanswered. Different countries have chosen differently. Later, this course will explain what is necessary to maintain a fixed exchange rate or floating exchange rate system and what are some of the pros and cons of each regime. For now, though, it is useful to recognize the varieties of regimes around the world.

Table 1.4 Exchange Rate Regimes

Country/Region	Regime
Euro Area	Single currency within: floating externally
United States	Float
China	Crawling peg
Japan	Float
India	Managed float
Russia	Fixed to composite
Brazil	Float
South Korea	Float
Indonesia	Managed float
Spain	Euro zone; fixed in the European Union; float externally
South Africa	Float
Estonia	Currency board

Source: International Monetary Fund, De Facto Classification of Exchange Rate Regimes and Monetary Policy Framework, 2008.

Table 1.4 "Exchange Rate Regimes" shows the selected set of countries followed by a currency regime. Notice that many currencies—including the U.S. dollar, the Japanese yen, the Brazilian real, the South Korean won, and the South African rand—are independently floating, meaning that their exchange values are determined in the private market on the basis of supply and demand. Because supply and demand for currencies fluctuate over time, so do the exchange values, which is why the system is called *floating*.

Note that India and Indonesia are classified as "managed floating." This means that the countries' central banks will sometimes allow the currency to float freely, but at other times will nudge the exchange rate in one direction or another.

China is listed and maintaining a crawling peg, which means that the currency is essentially fixed except that the Chinese central bank is allowing its currency to appreciate slowly with respect to the U.S. dollar. In other words, the fixed rate itself is gradually but unpredictably adjusted.

Estonia is listed as having a currency board. This is a method of maintaining a fixed exchange rate by essentially eliminating the central bank in favor of a currency board that is mandated by law to follow procedures that will automatically keep its currency fixed in value.

Russia is listed as fixing to a composite currency. This means that instead of fixing to one other currency, such as the U.S. dollar or the euro, Russia fixes to a basket of currencies, also called a composite currency. The most common currency basket to fix to is the Special Drawing Rights (SDR), a composite currency issued by the IMF used for central bank transactions.

Finally, sixteen countries in the European Union are currently members of the euro area. Within this area, the countries have retired their own national currencies in favor of using a single currency, the euro. When all countries circulate the same currency, it is the ultimate in fixity, meaning they have fixed exchange rates among themselves because there is no need to exchange. However, with respect to other external currencies, like the U.S. dollar or the Japanese yen, the euro is allowed to float freely.

Trade Balances and International Investment Positions

One of the most widely monitored international statistics is a country's trade balance. If the value of total exports from a country exceeds total imports, we say a country has a trade surplus. However, if total

imports exceed total exports, then the country has a**trade deficit**. Of course, if exports equal imports, then the country has balanced trade.

The terminology is unfortunate because it conveys a negative connotation to trade deficits, a positive connotation to trade surpluses, and perhaps an ideal connotation to trade balance. Later in the text, we will explain if or when these connotations are accurate and when they are inaccurate. Suffice it to say, for now, that sometimes trade deficits can be positive, trade surpluses can be negative, and trade balance could be immaterial.

Regardless, it is popular to decry large deficits as being a sign of danger for an economy, to hail large surpluses as a sign of strength and dominance, and to long for the fairness and justice that would arise if only the country could achieve balanced trade. What could be helpful at an early stage, before delving into the arguments and explanations, is to know how large the countries' trade deficits and surpluses are. A list of trade balances as a percentage of GDP for a selected set of countries is provided in Table 1.5 "Trade Balances and International Investment Positions GDP, 2009".

It is important to recognize that when a country runs a trade deficit, residents of the country purchase a larger amount of foreign products than foreign residents purchase from them. Those extra purchases are financed by the sale of domestic assets to foreigners. The asset sales may consist of property or businesses (a.k.a. investment), or it may involve the sale of IOUs (borrowing). In the former case, foreign investments entitle foreign owners to a stream of profits in the future. In the latter case, foreign loans entitle foreigners to a future repayment of principal and interest. In this way, trade and international investment are linked.

Because of these future profit takings and loan repayments, we say that a country with a deficit is becoming a debtor country. On the other hand, anytime a country runs a trade surplus, it is the domestic country that receives future profit and is owed repayments. In this case, we say a country running trade surpluses is becoming a creditor country. Nonetheless, trade deficits or surpluses only represent the debts or credits extended over a one-year period. If trade deficits continue year after year, then the total external debt to foreigners continues to grow larger. Likewise, if trade surpluses are run continually, then credits build up. However, if a deficit is run one year followed by an equivalent surplus the second year, rather than extending new credit to foreigners, the surplus instead will represent a repayment of the previous

year's debt. Similarly, if a surplus is followed by an equivalent deficit, rather than incurring debt to foreigners, the deficit instead will represent foreign repayment of the previous year's credits.

All of this background is necessary to describe a country's international investment position (IIP), which measures the total value of foreign assets held by domestic residents minus the total value of domestic assets held by foreigners. It corresponds roughly to the sum of a country's trade deficits and surpluses over its entire history. Thus if the value of a country's trade deficits over time exceeds the value of its trade surpluses, then its IIP will reflect a larger value of foreign ownership of domestic assets than domestic ownership of foreign assets and we would say the country is a net debtor. In contrast, if a country has greater trade surpluses than deficits over time, it will be a net creditor.

Note how this accounting is similar to that for the national debt. A country's national debt reflects the sum of the nation's government budget deficits and surpluses over time. If deficits exceed surpluses, as they often do, a country builds up a national debt. Once a debt is present, though, government surpluses act to retire some of that indebtedness.

The key differences between the two are that the national debt is public indebtedness to both domestic and foreign creditors whereas the international debt (i.e., the IIP) is both public and private indebtedness but only to foreign creditors. Thus repayment of the national debt sometimes represents a transfer between domestic citizens and so in the aggregate has no impact on the nation's wealth. However, repayment of international debt always represents a transfer of wealth from domestic to foreign citizens.

Table 1.5 Trade Balances and International Investment Positions GDP, 2009

Country/Region	Trade Balance (%)	Debtor (−)/Creditor (+) Position (%)
Euro Area	−0.9	−17.5
United States	−3.1	−24.4
China	+6.1	+35.1
Japan	+2.7	+50.4
India	−0.3	−6.8
Russia	+2.2	+15.1

Country/Region	Trade Balance (%)	Debtor (−)/Creditor (+) Position (%)
Brazil	−0.8	−26.6
South Korea	+3.8	−57.9
Indonesia	+1.2	−31.4
Spain	−5.7	−83.6
South Africa	−5.4	−4.1
Estonia	+5.8	−83.1

Sources: *Economist*, the IMF, and the China State Administration of Foreign Exchange. See *Economist*, Weekly Indicators, December 30, 2009; IMF Dissemination Standards Bulletin Board at http://dsbb.imf.org/Applications/web/dsbbhome; IMF GDP data from Wikipedia at http://en.wikipedia.org/wiki/List_of_countries_by_GDP_%28nominal%29; and China State Administration of Foreign Exchange at http://www.safe.gov.cn/model_safe_en/tjsj_en/tjsj_detail_en.jsp?ID=30303000000000000,18&id=4.

Table 1.5 "Trade Balances and International Investment Positions GDP, 2009" shows the most recent trade balances and international investment positions, both as a percentage of GDP, for a selected set of countries. One thing to note is that some of the selected countries are running trade deficits while others are running trade surpluses. Overall, the value of all exports in the world must equal the value of all imports, meaning that some countries' trade deficits must be matched with other countries' trade surpluses. Also, although there is no magic number dividing good from bad, most observers contend that a trade deficit over 5 percent of GDP is cause for concern and an international debt position over 50 percent is probably something to worry about. Any large international debt is likely to cause substantial declines in living standards for a country when it is paid back—or at least if it is paid back.

The fact that debts are sometimes defaulted on, meaning the borrower decides to walk away rather than repay, poses problems for large creditor nations. The more money one has lent to another, the more one relies on the good faith and effort of the borrower. There is an oft-quoted idiom used to describe this

problem that goes, “If you owe me $100, *you* have a problem, but if you owe me a million dollars, then *I* have a problem.” Consequently, international creditor countries may be in jeopardy if their credits exceed 30, 40, or 50 percent of GDP.

Note from the data that the United States is running a trade deficit of 3.1 percent of GDP, which is down markedly from about 6 percent a few years prior. The United States has also been running a trade deficit for more than the past thirty years and as a result has amassed a debt to the rest of the world larger than any other country, totaling about $3.4 trillion or almost 25 percent of U.S. GDP. As such, the U.S. is referred to as the largest debtor nation in the world.

In stark contrast, during the past twenty-five or more years Japan has been running persistent trade surpluses. As a result, it has amassed over $2.4 trillion of credits to the rest of the world or just over 50 percent of its GDP. It is by far the largest creditor country in the world. Close behind Japan is China, running trade surpluses for more than the past ten years and amassing over $1.5 trillion of credits to other countries. That makes up 35 percent of its GDP and makes China a close second to Japan as a major creditor country. One other important creditor country is Russia, with over $250 billion in credits outstanding or about 15 percent of its GDP.

Note that all three creditor nations are also running trade surpluses, meaning they are expending their creditor position by becoming even bigger lenders.

Like the United States, many other countries have been running persistent deficits over time and have amassed large international debts. The most sizeable are for Spain and Estonia, both over 80 percent of their GDPs. Note that Spain continues to run a trade deficit that will add to it international debt whereas Estonia is now running a trade surplus that means it is in the process of repaying its debt. South Korea and Indonesia are following a similar path as Estonia. In contrast, the Euro area, South Africa, and to a lesser degree Brazil and India are following the same path as the United States—running trade deficits that will add to their international debt.

KEY TAKEAWAYS

- Exchange rates and trade balances are two of the most widely tracked international macroeconomic indicators used to discern the health of an economy.
- Different countries pursue different exchange rate regimes, choosing variations of floating and fixed systems.

- The United States, as the largest national economy in the world, is a good reference point for comparing international macroeconomic data.
  - The United States maintains an independently floating exchange rate, meaning that its value is determined on the private market.
  - The United States trade deficit is currently at 3.1 percent of GDP. This is down from 6 percent recently but is one of a string of deficits spanning over thirty years.
  - The U.S. international investment position stands at almost 25 percent of GDP, which by virtue of the U.S. economy size, makes the United States the largest debtor nation in the world.
- Several other noteworthy statistics are presented in this section:
  - China maintains a crawling peg fixed exchange rate.
  - Russia fixes its currency to a composite currency while Estonia uses a currency board to maintain a fixed exchange rate.
  - Japan is the largest creditor country in the world, followed closely by China and more distantly by Russia.
  - Spain and Estonia are examples of countries that have serious international debt concerns, with external debts greater than 80 percent of their GDPs.

EXERCISES

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. The de facto exchange rate regime implemented in China in 2008.

b. The de facto exchange rate regime implemented in the United States in 2008.

c. The de facto exchange rate regime implemented in Indonesia in 2008.

d. The de facto exchange rate regime implemented in Estonia in 2008.

e. The name for the exchange rate regime in which a fixed exchange rate is adjusted gradually and unpredictably.

f. The name for the exchange rate regime in which the exchange rate value is determined by supply and demand for currencies in the private marketplace.

g. The term for the measure of the total value of foreign assets held by domestic residents minus the total value of domestic assets held by foreigners.

h. This country was the largest creditor country in the world as of 2008.

Use the information in Table 1.1 "GDP and GDP per Capita (PPP in Billions of Dollars), 2009" and Table 1.5 "Trade Balances and International Investment Positions GDP, 2009" to calculate the dollar values of the trade balance and the international investment position for Japan, China, Russia, South Korea, and Indonesia.

1.4 Business Cycles: Economic Ups and Downs

LEARNING OBJECTIVES

1. Understand the distinctions between an economic recession and a depression.
2. Compare and contrast the current recession in the United States with previous economic downturns.
3. Recognize why the economic downturn in the 1930s is called the Great Depression.

In 2009 the world was in the midst of the largest economic downturn since the early 1980s. Economic production was falling and unemployment rising. International trade fell substantially everywhere in the world, while investment both domestically and internationally dried up.

The source of these problems was the bursting of a real estate bubble. Bubbles are fairly common in both real estate and stock markets. A bubble is described as a steady and persistent increase in prices in a market, in this case, in the real estate markets in the United States and abroad. When bubbles are developing, many market observers argue that the prices are reflective of true values despite a sharp and unexpected increase. These justifications fool many people into buying the products in the hope that the prices will continue to rise and generate a profit.

When the bubble bursts, the demand driving the price increases ceases and a large number of participants begin to sell off their product to realize their profit. When these occur, prices quickly plummet. The dramatic drop in real estate prices in the United States in 2007 and 2008 left many financial institutions near bankruptcy. These financial market instabilities finally spilled over into the real sector (i.e., the sector where goods and services are produced), contributing to a world recession. As the current economic crisis unfolds, there have been many suggestions about similarities between this recession and the Great Depression in the 1930s. Indeed, it is common for people to say that this is the biggest economic downturn since the Great Depression. But is it?

To understand whether it is or not, it is useful to look at the kind of data used to measure recessions or depressions and to compare what has happened recently with what happened in the past. First, here are some definitions.

An economic recession refers to a decline in a country's measured real gross domestic product (GDP) over a period usually coupled with an increasing aggregate unemployment rate. In other words, it refers to a

decline in economic productive activity. How much of a decline is necessary before observers will begin to call it a recession is almost always arguable, although there are a few guidelines one can follow.

In the United States, it is typical to define a recession as two successive quarters of negative real GDP growth. This definition dates to the 1970s and is little more than a rule of thumb, but it is one that has become widely applied. A more official way to define a recession is to accept the pronouncements of the National Bureau of Economic Research (NBER). This group of professional economists looks at more factors than just GDP growth rates and will also make judgments about when a recession has begun and when one has ended. According to the NBER, the current recession began in December 2007 in the United States. However, it did not proclaim that until December 2008. Although the U.S. economy contracted in the fourth quarter of 2007, it grew in the first two quarters of 2008, meaning that it did not fulfill the two successive quarters rule. That wasn't satisfied until the last two quarters of 2008 both recorded a GDP contraction. As of January 2010, the U.S. economy continues in a recession according to the NBER. [1]

A very severe recession is referred to as a depression. How severe a recession has to be to be called a depression is also a matter of judgment. In fact in this regard there are no common rules of thumb or NBER pronouncements. Some recent suggestions in the press are that a depression is when output contracts by more than 10 percent or the recession lasts for more than two years. Based on the second definition and using NBER records dating the length of recessions, the United States experienced depressions from 1865 to 1867, 1873 to 1879, 1882 to 1885, 1910 to 1912, and 1929 to 1933. Using this definition, the current recession could be judged a depression if NBER dates the end of the contraction to a month after December 2009.

The opposite of a recession is an economic expansion or economic boom. Indeed, the NBER measures not only the contractions but the expansions as well because its primary purpose is to identify the U.S. economy's peaks and troughs (i.e., high points and low points). When moving from a peak to a trough the economy is in a recession, but when moving from a trough to a peak it is in an expansion or boom. The term used to describe all of these ups and downs over time is the business cycle.

The business cycle has been a feature of economies since economic activity has been measured. The NBER identifies recessions going back to the 1800s with the earliest listed in 1854. Overall, the NBER has classified thirty-four recessions since 1854 with an average duration of seventeen months. The longest

recession was sixty-five months from 1873 to 1879, a contraction notable enough to be called the Great Depression until another one came along to usurp it in the 1930s. On the upside, the average economic expansion in the United States during this period lasted thirty-eight months, with the longest being 120 months from 1991 to 2001. Interestingly, since 1982 the United States has experienced three of its longest expansions segmented only by relatively mild recessions in 1991 and 2001. This had led some observers to proclaim, "The business cycle is dead." Of course, that was until we headed into the current crisis. (See here for a complete listing of NBER recessions:http://www.nber.org/cycles/cyclesmain.html.)

The Recession of 2008–2009

Next, let's take a look at how the GDP growth figures look recently and see how they compare with previous periods. First, growth rates refer to the percentage change in real GDP, which means that the effects of inflation have been eliminated. The rates are almost always reported in annual terms (meaning the growth rate over a year) even when the period is defined as one quarter. In the United States and most other countries, GDP growth rates are reported every quarter, and that rate represents how much GDP would grow during a year if the rate of increase proceeded at the same pace as the growth during that quarter. Alternatively, annual growth rates can be reported as the percentage change in real GDP from the beginning to the end of the calendar year (January 1 to December 31).

Table 1.6 "U.S. Real GDP Growth and Unemployment Rate, 2007–2009" presents the quarterly real GDP growth rates from the beginning of 2007 to the end of 2009 and the corresponding unemployment rate that existed during the middle month of each quarter. Note first that in 2007, GDP growth was a respectable 2 to 3 percent and unemployment was below 5 percent, signs of a healthy economy. However, by the first quarter in 2008, GDP became negative although unemployment remained low. Growth rebounded to positive territory in the second quarter of 2008 while at the same time unemployment began to rise rapidly. At this time, there was great confusion about whether the U.S. economy was stalling or whether it was experiencing a temporary slowdown. By late 2008, though, speculation about an impending recession came to an end. Three successive quarters of significant GDP decline occurred between the second quarter of 2008 and the end of the first quarter in 2009, while the unemployment rate began to skyrocket. By the middle of 2009, the decline of GDP subsided and reversed to positive territory by the third quarter. However, the unemployment rate continued to rise, though at a slower pace. What happens next is anyone's guess, but to get a sense of the severity of this recession it is worth

analyzing at least two past recessions: that of 1981 to 1982 and the two that occurred in the 1930s, which together are known as the Great Depression.

Table 1.6 U.S. Real GDP Growth and Unemployment Rate, 2007–2009

Year.Quarter	Growth Rate (%)	Unemployment Rate (%)
2007.1	1.2	4.5
2007.2	3.2	4.5
2007.3	3.6	4.7
2007.4	2.1	4.7
2008.1	−0.7	4.8
2008.2	1.5	5.6
2008.3	−2.7	6.2
2008.4	−5.4	6.8
2009.1	−6.4	8.1
2009.2	−0.7	9.4
2009.3	2.2	9.7
2009.4	—	10.0

Sources: U.S. Bureau of Economic and Analysis and U.S. Department of Labor.

The Recession of 1980–1982

At a glance the current recession most resembles the recessionary period from 1980 to 1982. The NBER declared two recessions during that period; the first lasting from January to July 1980 and the second lasting from July 1981 to November 1982. As can be seen in Table 1.7 "U.S. Real GDP Growth and Unemployment Rate, 1980–1983", GDP growth moved like a roller coaster ride. Coming off a sluggish period of stagflation in the mid-1970s, unemployment began somewhat higher at around 6 percent, while growth in 1979 (not shown) was less than 1 percent in several quarters. Then in the second quarter of

1980, GDP plummeted by almost 8 percent, which is much more severe than anything in the current recession. Note that the largest quarterly decrease in the U.S. GDP in the post–World War II era was −10.4 percent in the first quarter of 1958. In the same quarter, unemployment soared, rising over a percentage point in just three months. However, this contraction was short-lived since the GDP fell only another 0.7 percent in the third quarter and then rebounded with substantial growth in the fourth quarter of 1980 and the first quarter of 1981. Notice that despite the very rapid increase in the GDP, unemployment hardly budged downward, remaining stubbornly fixed around 7.5 percent. The rapid expansion was short-lived, as the GDP tumbled again by over 3 percent in the second quarter of 1981 only to rise again by a healthy 5 percent in the third quarter. But once again, the economy plunged back into recession with substantial declines of 5 percent and over 6 percent for two successive quarters in the GDP in late 1981 and early 1982. Meanwhile, from mid-1981 until after the real rebound began in 1983, the unemployment rate continued to rise, reaching a peak of 10.8 percent in late 1982, the highest unemployment rate in the post–World War II period.

Table 1.7 U.S. Real GDP Growth and Unemployment Rate, 1980–1983

Year.Quarter	Growth Rate (%)	Unemployment Rate (%)
1980.1	+1.3	6.3
1980.2	−7.9	7.5
1980.3	−0.7	7.7
1980.4	+7.6	7.5
1981.1	+8.6	7.4
1981.2	−3.2	7.5
1981.3	+4.9	7.4
1981.4	−4.9	8.3
1982.1	−6.4	8.9
1982.2	+2.2	9.4

Year.Quarter	Growth Rate (%)	Unemployment Rate (%)
1982.3	−1.5	9.8
1982.4	+0.3	10.8
1983.1	+5.1	10.4
1983.2	+9.3	10.1
1983.3	+8.1	9.5
1983.4	+8.5	8.5

Sources: U.S. Bureau of Economics and Analysis (http://www.bea.gov) and U.S. Department of Labor (http://www.dol.gov).

If indeed the current recession turns out like the 1980 to 1983 episode, we might expect to see substantial swings in the GDP growth rates in future quarters in the United States. The ups and downs are analogous to a bicycle smoothly traversing along a smooth road when the rider suddenly hits a large obstruction. The obstruction jolts the bike to one side while the rider compensates to pull the bike upright. However, the compensation is often too much, and the bike swings rapidly to the opposite side. This too inspires an exaggerated response that pushes the bike again too quickly to the original side. In time, the rider regains his balance and directs the bike along a smooth trajectory. That is what we see in Table 1.7 "U.S. Real GDP Growth and Unemployment Rate, 1980–1983" of the last quarters in 1983, when rapid growth becomes persistent and unemployment finally begins to fall.

The other lesson from this comparison is to note how sluggishly unemployment seems to respond to a growing economy. In late 1980 and early 1981, unemployment didn't budge despite the rapid revival of economic growth. In 1983, it took almost a full year of very rapid GDP growth before the unemployment rate began to fall substantially. This slow response is why the unemployment rate is often called a lagging indicator of a recession; it responds only after the recession has already abated.

The Great Depression

During the current recession there have been many references to the Great Depression of the 1930s. One remark often heard is that this is the worst recession since the Great Depression. As we can see in Table

1.7 "U.S. Real GDP Growth and Unemployment Rate, 1980–1983", this is not quite accurate since the recession of the early 1980s can easily be said to have been worse than the current one...at least so far.

It is worth comparing numbers between the current period and the Depression years if only to learn how bad things really were during the 1930s. The Great Depression was a time that transformed attitudes and opinions around the world and can surely be credited with having established the necessary preconditions for the Second World War.

So let's take a look at how bad it really was. Once again, we'll consider the U.S. experience largely because the data are more readily available. However, it is worth remembering that all three of the economic downturns described here are notable in that they were worldwide in scope.

First of all, there is no quarterly data available for the 1930s as quarterly data in the United States first appeared in 1947. Indeed, there was no formal organized collection of data in the 1930s for a variable such as GDP. Thus the numbers presented by the U.S. Bureau of Economic and Analysis (BEA) were constructed by piecing together available data.

A second thing to realize is that annual GDP growth rates tend to have much less variance than quarterly data. In other words, the highs are not as high and the lows not as low. This is because the annual data are averaging the growth rates over the four quarters. Also, sometimes economic downturns occur at the end of one year and the beginning of the next so that the calendar year growth may still be positive in both years. For example in 2008, even though GDP growth was negative in three of four quarters, the annual GDP growth that year somehow registered a +0.4 percent. Also in 1980, despite an almost 8 percent GDP drop in the second quarter, the annual GDP growth that year was −0.3 percent. The same is true for 1982, which registered two quarters of negative GDP growth at −6.4 percent and −1.5 percent but still the GDP fell annually at only −1.9 percent.

With this caveat in mind, the U.S. GDP growth rates for the 1930s are astounding. From 1930 to 1933, the United States registered annual growth rates of −8.6 percent, −6.5 percent, −13.1 percent, and −1.3 percent. The unemployment rate, which is estimated to have been around 3 percent in the 1920s, rose quickly in 1930 to 8.9 percent and continued to rise rapidly to a height of almost 25 percent in 1933. Although growth returned with vigor in 1934 and for another four years, the unemployment rate remained high and only slowly fell to 14.3 percent by 1937.

Table 1.8 U.S. Real GDP Growth and Unemployment Rate, 1930–1940

Year	Growth Rate (%)	Unemployment Rate (%)
1930	−8.6	8.9
1931	−6.5	15.9
1932	−13.1	23.6
1933	−1.3	24.9
1934	+10.9	21.7
1935	+8.9	20.1
1936	+13.0	17.0
1937	+5.1	14.3
1938	−3.4	19.0
1939	+8.1	17.2
1940	+8.8	14.6

Sources: U.S. Bureau of Economics and Analysis and U.S. Department of Labor.

The NBER dated the first part of the Depression as having started in August 1929 and ending in March 1933. But a second wave came, another recession beginning in May 1937 and ending in June 1938. This caused GDP to fall by another 3.4 percent in 1938 while unemployment rose back above 15 percent for another two years.

The Great Depression is commonly used to refer to the economic crisis (or crises) that persisted for the entire decade of the 1930s, only truly coming to an end at the start of World War II. Even then it is worth mentioning that although GDP began to grow rapidly during World War II, with GDP growth from 1941 to 1943 at 17.1 percent, 18.5 percent, and 16.4 percent, respectively, and with U.S. unemployment falling to 1.2 percent in 1944, these data mask the fact that most of the extra production was for bullets and bombs and much of the most able part of the workforce was engaged in battle in the Atlantic and Pacific war

theaters. In other words, the movement out of the Great Depression was associated with a national emergency rather than a more secure and rising standard of living.

Although the data presented only cover the United States, the Great Depression was a worldwide phenomenon. Without digging too deeply into the data or just by taking a quick look at Wikipedia's article on the Great Depression, it reveals the following: unemployment in 1932 peaked at 29 percent in Australia, 27 percent in Canada, and 30 percent in Germany. In some towns with specialized production in the United Kingdom, unemployment rose as high as 70 percent.

Needless to say, the Great Depression was indeed "great" in the sense that it was the worst economic downturn the world experienced in the twentieth century. In comparison, the current recession, which is coming to be known as the Great Recession, comes nowhere close to the severity of the Great Depression...at least for the moment (as of January 2010). A more accurate description of the current recession is that it is the worst since the 1980s in the United States. However, we should always be mindful of a second downturn as was seen in the late 1930s. Even after things begin to improve, economies can suffer secondary collapses. Hopefully, demands will soon rebound, production will sluggishly increase, and unemployment rates will begin to fall around the world. We will soon see.

KEY TAKEAWAYS

- The business cycle refers to the cyclical pattern of economic expansions and contractions. Business cycles have been a persistent occurrence in all modern economies.
- The current recession, sometimes called the Great Recession, is comparable in GDP decline and unemployment increases in the United States to the recessions in the early 1980s.
- The Great Depression of the 1930s displayed much greater decreases in GDP, showed much larger increases in unemployment, and lasted for a longer period than any economic downturn in the United States since then.
- The largest annual decrease in the U.S. GDP during the Great Depression was −13.1 percent while the highest unemployment rate was 24.9 percent.
- The largest quarterly decrease in the U.S. GDP during the current recession was −6.4 percent while the highest unemployment rate was 10.1 percent.
- The largest quarterly decrease in the U.S. GDP since World War II was −10.4 percent in the first quarter of 1958, while the highest unemployment rate was 10.8 percent in 1982.

- Of the thirty-four U.S. recessions since 1854 classified by the NBER, the longest was sixty-five months in the 1870s, whereas the average length was seventeen months.
- Of all the U.S. expansions since 1854 classified by the NBER, the longest was 120 months in the 1990s whereas the average length was thirty-eight months.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. Approximately the worst U.S. quarterly economic growth performance between 2007 and 2009.

b. Approximately the worst U.S. quarterly economic growth performance between 1980 and 1983.

c. Approximately the worst U.S. annual economic growth performance between 1930 and 1940.

d. Approximately the best U.S. annual economic growth performance between 1930 and 1940.

e. Approximately the period of time generally known as the Great Depression.

f. Approximately the highest unemployment rate in the U.S. during the Great Depression.

g. Approximately the highest unemployment rate in Germany during the Great Depression.

h. Approximately the best U.S. annual economic growth performance in the midst of World War II.

i. The longest economic recession (in months) in the United States since 1854 as classified by the NBER.

j. The longest economic expansion (in months) in the United States since 1854 as classified by the NBER.

k. The term used to describe the cyclical pattern of economic expansions followed by economic contractions.

[1] See the National Bureau of Economic Research, http://www.nber.org/cycles.html.

1.5 International Macroeconomic Institutions: The IMF and the World Bank

LEARNING OBJECTIVES

1. Learn about the origins of the World Bank and the International Monetary Fund.
2. Understand the purpose of the International Monetary Fund both during the fixed exchange rate regime from 1945 to 1973 and after 1973.

After the Great Depression, one of the things policymakers thought was important was to return the international economy to a system of fixed exchange rates. Before the Depression (i.e., in the 1920s and before), the world mostly maintained a gold standard. Under such a system, a country establishes two rules: first, it fixes its currency value to a weight of gold; second, it establishes convertibility between the currency and gold. This means that any individual holding the national currency is allowed to cash in the currency for its equivalent in gold upon demand.

In essence, the gold standard derives from a system in which gold itself was used as a currency in exchange. Since gold was sufficiently rare and because it was inherently valuable to people, it was an ideal substance to use as a store of value and a medium of exchange (as was silver). However, once trucking gold around became more difficult, it became easier for governments to issue paper currency but to back up that currency with gold on reserve. Thus currency in circulation was just a representation of actual gold in the government's vault, and if a person ever wished to see that actual gold, he or she could simply demand conversion.

There is much that can be said about how a gold standard operates, but that discussion is reserved for a later chapter. For our purposes here, it is sufficient to explain that the gold standard was a system of fixed exchange rates. For example, before the 1930s the United States fixed the dollar at $20.67 per ounce of gold. During the same period, the United Kingdom fixed its currency at £4.24 per ounce. As a result of the gold-currency convertibility in both countries, this meant the dollar and pound were fixed to each other at a rate of $4.875/£.

During the Depression years, most countries dropped off the gold standard because the loss of confidence threatened a complete conversion of currency to gold and the depletion of national gold reserves. But, as World War II drew to a close, experts were assembled in Bretton Woods, New Hampshire, in the United States in 1944 to design a set of institutions that would help establish an effective international monetary

system and to prevent some of the adjustment catastrophes that occurred after World War I. One such catastrophe occurred in Germany in 1922 to 1923 when a floating German currency resulted in one of the worst hyperinflations in modern history. Photos from that period show people with wheelbarrows full of money being used to make basic purchases. One way to prevent a reoccurrence was to establish a system of fixed exchange rates. As will be shown later, an important benefit of fixed exchange rates is the potential for such a system to prevent excessive inflation.

The Bretton Woods Conference, more formally called the United Nations Monetary and Financial Conference, was held in July 1944. The purpose of the conference was to establish a set of institutions that would support international trade and investment and prevent some of the monetary instabilities that had plagued the world after World War I. The conference proposed three institutions, only two of which finally came into being.

The unsuccessful institution was the International Trade Organization (ITO), which was intended to promote the reduction of tariff barriers and to coordinate domestic policies so as to encourage a freer flow of goods between countries. Although a charter was drawn up for the ITO, the United States refused to sign onto it, fearing that it would subordinate too many of its domestic policies to international scrutiny. A subagreement of the ITO, the General Agreement on Tariffs and Trade (GATT), designed to promote multilateral tariff reductions, was established independently though.

The two successfully chartered institutions from the Bretton Woods Conference were the International Bank for Reconstruction and Development (IBRD) and the International Monetary Fund (IMF).

The IBRD is one component of a larger organization called the World Bank. Its purpose was to provide loans to countries to aid their reconstruction after World War II and to promote economic development. Much of its early efforts focused on reconstruction of the war-torn economies, but by the 1960s, its efforts were redirected to developing countries. The intent was to get countries back on their feet, economically speaking, as quickly as possible.

The second successfully chartered organization was the IMF. Its purpose was to monitor and maintain the stability of the fixed exchange rate system that was established. The system was not the revival of a gold standard but rather what is known as a gold-exchange standard. Under this system, the U.S. dollar was singled out as the international reserve currency. Forty-four of the forty-five ratifying countries agreed to

have their currency fixed to the dollar. The dollar in turn was fixed to gold at $35 per ounce. The countries also agreed not to exchange officially held gold deposits for currency as had been the practice under the gold standard. However, countries agreed that officially held gold could be exchanged between central banks.

Another important requirement designed to facilitate the expansion of international trade was that countries agreed not to put any restrictions or controls on the exchange of currencies when that exchange was intended for transactions on the current account. In other words, individuals would be free to exchange one currency for another if they wanted to import goods from another country. However, currency controls or restrictions were allowed for transactions recorded on the financial accounts. This allowed countries to prevent foreign purchases of businesses and companies or to prevent foreign banks from lending or borrowing money. These types of restrictions are commonly known as capital controls (also, currency controls and/or exchange restrictions). These controls were allowed largely because it was believed they were needed to help maintain the stability of the fixed exchange rate system.

The way a fixed exchange system operates in general, and the way the Bretton Woods gold exchange standard operated in particular, is covered in detail in Chapter 11 "Fixed Exchange Rates". For now I will simply state without explanation that to maintain a credible fixed exchange rate system requires regular intervention in the foreign exchange markets by country central banks. Sometimes to maintain the fixed rate a country might need to sell a substantial amount of U.S. dollars that it is holding on reserve. These reserves are U.S. dollar holdings that had been purchased earlier, but sometimes a country can run what is called a balance of payments deficit—that is, run out of dollar reserves and threaten the stability of the fixed exchange rate system.

At the Bretton Woods Conference, participants anticipated that this scenario would be a common occurrence and decided that a "fund" be established to essentially "bail out" countries that suffered from balance of payments problems. That fund was the IMF.

The IMF was created to help stabilize exchange rates in the fixed exchange rate system. In particular, member countries contribute reserves to the IMF, which is then enabled to lend money to countries suffering balance of payments problems. With these temporary loans, countries can avoid devaluations of their currencies or other adjustments that can affect the confidence in the monetary system. Because the

monies used by the IMF are contributions given by other countries in the group, it is expected that once a balance of payments problem subsides that the money will be repaid. To assure repayment the IMF typically establishes conditions, known as conditionality, for the recipients of the loans. These conditions generally involve changes in monetary and fiscal policies intended to eliminate the original problems with the balance of payments in the first place.

The role of the IMF has changed more recently though. The fixed exchange rate system, under which the IMF is designed to operate, collapsed in 1973. Since that time, most of the major currencies in the world—including the U.S. dollar, the British pound, the Japanese yen, and many others—are floating. When a currency is allowed to float, its value is determined by supply and demand in the private market and there is no longer any need for a country's central bank to intervene. This in turn means that a country can no longer get into a balance of payments problem since that balance is automatically achieved with the adjustment in the exchange rate value. In essence the raison d'être of the IMF disappeared with the collapse of the Bretton Woods system.

Curiously, the IMF did not fall out of existence. Instead, it reinvented itself as a kind of lender of last resort to national governments. After 1973, the IMF used its "fund" to assist national governments that had international debt problems. For example, a major debt crisis developed in the early 1980s when national governments of Mexico, Brazil, Venezuela, Argentina, and eventually many other nations were unable to pay the interest on their external debt, or the money they borrowed from other countries. Many of these loans were either taken by the national governments or were guaranteed by the national governments. This crisis, known as the Third World debt crisis, threatened to bring down the international financial system as a number of major banks had significant exposure of foreign loans that were ultimately defaulted on. The IMF stepped in to provide "structural adjustment programs" in this instance. So the IMF not only loaned money for countries experiencing balance of payments crises but also now provided loans to countries that could not pay back their foreign creditors. And also, because the IMF wanted to get its money back (meaning the money contributed by the member nations), the structural adjustment loans came with strings attached: IMF conditionality.

Since that time, the IMF has lent money to many countries suffering from external debt repayment problems. It stepped in to help Brazil and Argentina several times in the 1980s and later. It helped Mexico

during the peso crisis in 1994. It assisted countries during the Asian currency crisis of 1997 and helped Russia one year later when the Asian contagion swept through.

Although the IMF has come under much criticism, especially because conditionality is viewed by some as excessively onerous, it is worth remembering that the IMF makes loans, not grants. Thus it has the motivation to demand changes in policies that raise the chances of being repaid. These conditions have generally involved things like fiscal and monetary responsibility. That means reducing one's government budget deficit and curtailing the growth of the money supply. It also prescribed privatization that involves the sale or divestiture of state-owned enterprises. The free market orientation of these conditions came to be known as the Washington Consensus.

Also mitigating the criticisms is the fact that the countries that participate in IMF programs are free to accept the loans, or not. To illustrate the alternative, Malaysia was one country that refused to participate in an IMF structural adjustment program during the Asian currency crisis and as a result did not have to succumb to any conditions. Thus it is harder to criticize the IMF's conditions when the countries themselves have volunteered to participate. In exchange for what were often tens of billions of dollars in loans, these countries were able to maintain their good standing in the international financial community.

Although controversial, the IMF has played a significant role in maintaining the international financial system even after the collapse of fixed exchange rates. One last issue worth discussing in this introduction is the issue of moral hazard. In the past thirty years or so, almost every time a country has run into difficulty repaying its external debt, the IMF has stepped in to assure continued repayment. That behavior sends a signal to international investors that the risk of lending abroad is reduced. After all, if the country gets into trouble the IMF will lend the country money and the foreign creditors will still get their money back. The moral hazard refers to the fact that lending institutions in the developed countries may view the IMF like an insurance policy and thus make much riskier loans than they would have otherwise. In this way, the IMF could be contributing to the problem of international financial crisis rather than merely being the institution that helps clean up the mess.

KEY TAKEAWAYS

- The World Bank and the IMF were proposed during the Bretton Woods Conference in 1944.
- The main purpose of the World Bank is to provide loans for postwar reconstruction and economic development for developing countries.

- The main purpose of the IMF was to monitor the international fixed exchange rate system and to provide temporary loans to countries suffering balance of payments problems.
- Since the breakup of the Bretton Woods fixed exchange rate system in 1973, the IMF has mostly assisted countries by making structural adjustment loans to those that have difficulty repaying international debts.
- The IMF conditionalities are the often-criticized conditions that the IMF places on foreign governments accepting their loans. The free-market orientation of these conditions is known as the Washington Consensus.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. The name for the original division of the World Bank that describes its original purpose.

b. The name for the international institution that was designed to assist countries suffering from balance of payments problems.

c. The common name for the international institution whose primary function today is to make loans to countries to assist their economic development.

d. In the Bretton Woods system, these types of regulations were allowed for transactions recorded on the financial account.

e. This type of currency regime was implemented immediately after the collapse of the Bretton Woods system.

f. The term used for the conditions the IMF places on loans it makes to countries.

g. The term used for the type of loans made by the IMF to assist countries having difficulty making international debt repayments.

h. The term used to describe the standard free market package of conditions typically invoked by the IMF on loans it makes to countries.

Chapter 2: National Income and the Balance of Payments Accounts

The most important macroeconomic variable tracked by economists and the media is the gross domestic product (GDP). Whether it ought to be so important is another matter that is discussed in this chapter. But before that evaluation can occur, the GDP must be defined and interpreted. This chapter presents the national income identity, which defines the GDP. It also presents several other important national accounts, including the balance of payments, the twin-deficit identity, and the international investment position. These are the variables of prime concern in an international finance course.

2.1 National Income and Product Accounts

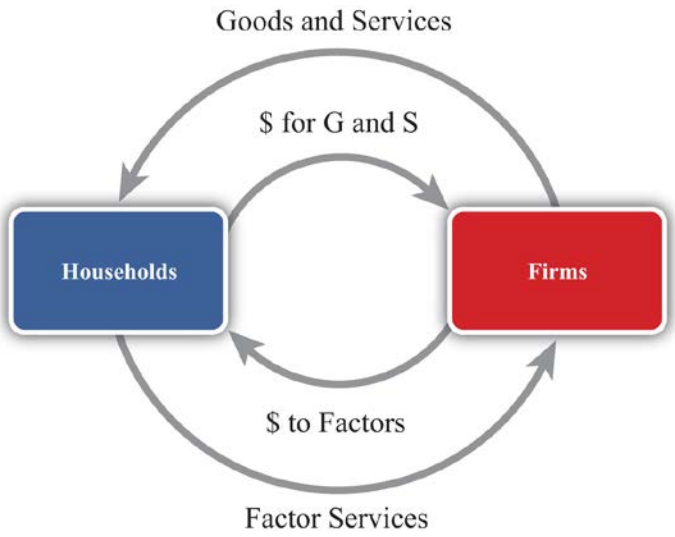
LEARNING OBJECTIVES

1. Define GDP and understand how it is used as a measure of economic well-being.
2. Recognize the limitations of GDP as a measure of well-being.

Many of the key aggregate variables used to describe an economy are presented in a country's National Income and Product Accounts (NIPA). National income represents the total amount of money that factors of production earn during the course of a year. This mainly includes payments of wages, rents, profits, and interest to workers and owners of capital and property. The national product refers to the value of output produced by an economy during the course of a year. National product, also called national output, represents the market value of all goods and services produced by firms in a country.

Because of the circular flow of money in exchange for goods and services in an economy, the value of aggregate output (the national product) should equal the value of aggregate income (national income). Consider the adjoining circular flow diagram, Figure 2.1 "A Circular Flow Diagram", describing a very simple economy. The economy is composed of two distinct groups: households and firms. Firms produce all the final goods and services in the economy using factor services (labor and capital) supplied by the households. The households, in turn, purchase the goods and services supplied by the firms. Thus goods and services move between the two groups in the counterclockwise direction. Exchanges are facilitated with the use of money for payments. Thus when firms sell goods and services, the households give the money to the firms in exchange. When the households supply labor and capital to firms, the firms give money to the households in exchange. Thus money flows between the two groups in a clockwise direction. National product measures the monetary flow along the top part of the diagram—that is, the monetary value of goods and services produced by firms in

Figure 2.1 A Circular Flow Diagram



the economy. National income measures the monetary flow along the bottom part of the diagram—that is, the monetary value of all factor services used in the production process. As long as there are no monetary leakages from the system, national income will equal national product.

The national product is commonly referred to as gross domestic product (GDP). GDP is defined as the value of all final goods and services produced within the borders of a country during some period of time, usually a year. A few things are worth emphasizing about this definition.

First, GDP is measured in terms of the monetary (or dollar) value at which the items exchange in the market. Second, it measures only *final* goods and services as opposed to intermediate goods. Thus wheat sold by a farmer to a flour mill will not be directly included as part of GDP since the value of the wheat will be included in the value of the flour that the mill sells to the bakery. The value of the flour will in turn be included in the value of the bread sold to the grocery store. Finally, the value of the bread will be included in the price charged by the grocery when the product is finally purchased by the consumer. Only the final bread sale should be included in GDP or else the intermediate values would overstate total production in the economy. Finally, GDP must be distinguished from another common measure of national output, gross national product (GNP).

Briefly, GDP measures all production within the borders of the country regardless of who owns the factors used in the production process. GNP measures all production achieved by domestic factors of production regardless of where that production takes place. For example, if a U.S. resident owns a factory in Malaysia and earns profits on the operation of that factory, then those profits would be counted as production by a U.S. factory owner and thus would be included in the U.S. GNP. However, since that production took place beyond U.S. borders, it would not be counted as the U.S. GDP. Alternatively, if a Dutch resident owns a factory in the United States, then the fraction of that production that accrues to the Dutch owner would be counted as part of the U.S. GDP since the production took place in the United States. It would not be counted as part of the U.S. GNP, however, since the production was done by a foreign factor owner.

GDP is probably the most widely reported and closely monitored aggregate statistic. GDP is a measure of the size of an economy. It tells us the total amount of "stuff" the economy produces. Since most of us, as individuals, prefer to have more stuff rather than less, it is straightforward to extend this to the national economy to argue that the higher the GDP, the better off the nation. For this simple reason, statisticians

track the growth rate of GDP. Rapid GDP growth is a sign of growing prosperity and economic strength. Falling GDP indicates a recession, and if GDP falls significantly, we call it an economic depression.

For a variety of reasons, GDP should be used only as a rough indicator of the prosperity or welfare of a nation. Indeed, many people contend that GDP is an inadequate measure of national prosperity. Below is a list of some of the reasons why GDP falls short as an indicator of national welfare.

1. GDP only measures the amount of goods and services produced during the year. It does not measure the value of goods and services left over from previous years. For example, used cars, two-year-old computers, old furniture, old houses, and so on are all useful and provide welfare to individuals for years after they are produced. Yet the value of these items is only included in GDP in the year in which they are produced. National wealth, on the other hand, measures the value of all goods, services, and assets available in an economy at a point in time and is perhaps a better measure of national economic well-being than GDP.
2. GDP, by itself, fails to recognize the size of the population that it must support. If we want to use GDP to provide a rough estimate of the average standard of living among individuals in the economy, then we ought to divide GDP by the population to get per capita GDP. This is often the way in which cross-country comparisons are made.
3. GDP gives no account of how the goods and services produced by the economy are distributed among members of the economy. One might prefer a lower GDP with a more equitable distribution to a higher GDP in which a small percentage of the population receives most of the product.
4. Measured GDP growth may overstate the growth of the standard of living since price level increases (inflation) would raise measured GDP. Thus even if the economy produces exactly the same amount of goods and services as the year before and prices of those goods rise, then GDP will rise as well. For this reason, real GDP is typically used to measure the growth rate of GDP. Real GDP divides nominal (or measured) GDP by the price level and is designed to eliminate some of the inflationary effects.
5. Sometimes, economies with high GDPs may also produce a large amount of negative production externalities. Pollution is one such negative externality. Thus one might prefer to have a lower GDP and less pollution than a higher GDP with more pollution. Some groups also argue that rapid GDP growth may involve severe depletion of natural resources, which may be unsustainable in the long run.
6. GDP often rises in the aftermath of natural disasters. Shortly after the Kobe earthquake in Japan in the 1990s, economists predicted that Japan's GDP would probably rise more rapidly. This is mostly because

of the surge of construction activities required to rebuild the damaged buildings. This illustrates why GDP growth may not be indicative of a healthy economy in some circumstances.

7. GDP measures the value of production in the economy rather than consumption, which is more important for economic well-being. As will be shown later, national production and consumption are equal when a country's trade balance is zero; however, if a country has a trade deficit, then its national consumption will exceed its production. Ideally, because consumption is pleasurable while production often is not, we should use the measure of national consumption to measure economic well-being rather than GDP.

KEY TAKEAWAYS

- GDP is defined as the value of all final goods and services produced within the borders of a country during some period of time, usually a year.
- The following are several important weaknesses of GDP as a measure of economic well-being:
  - GDP measures income, not wealth, and wealth is a better measure of economic well-being.
  - GDP does not account for income distribution effects that may be important to economic well-being.
  - GDP measures "bads" like pollution as well as "goods."
  - GDP measures production, not consumption, and consumption is more important to economic well-being.

EXERCISES

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"
   a. The term for the measure of national output occurring within the nation's borders.
   b. The term for the measure of national output that includes all production by domestic factors regardless of location.
   c. Of *income* or *wealth*, this term better describes the gross domestic product (GDP).
   d. Of *income* or *wealth*, this term better describes the gross national product (GNP).

e. The term used to describe the measure of GDP that takes account of price level changes or inflationary effects over time.

f. The term used to describe the measure of GDP that allows better income comparisons between countries that have different population sizes.

Many people argue that GDP is an inadequate measure of a nation's economic well-being. List five reasons why this may be so.

GDP is used widely as an indicator of the success and economic well-being of the people of a nation. However, for many reasons it is not the perfect indicator. Briefly comment on the following statements related to this issue:

a. Domestic spending is a better indicator of standard of living than GDP.

b. National wealth is a better indicator of standard of living than GDP.

2.2 National Income or Product Identity

LEARNING OBJECTIVES

1. Identify the components of GDP defined in the national income identity.
2. Understand why imports are subtracted in the national income identity.

The national income or product identity describes the way in which the gross domestic product (GDP) is measured, as the sum of expenditures in various broad spending categories. The identity, shown below, says that GDP is the sum of personal consumption expenditures (C), private investment expenditures (I), government consumption expenditures (G), and expenditures on exports (EX) minus expenditures on imports (IM):

$$GDP = C + I + G + EX - IM.$$

Personal consumption expenditures (C), or "consumption" for short, include goods and services purchased by domestic residents. These are further subdivided into durable goods, commodities that can be stored and that have an average life of at least three years; nondurable goods, all other commodities that can be stored; and services, commodities that cannot be stored and are consumed at the place and time of purchase. Consumption also includes foreign goods and services purchased by domestic households.

Private domestic investment (I), or "investment" for short, includes expenditures by businesses on fixed investment and any changes in business inventories. Fixed investment, both residential and nonresidential, consists of expenditures on commodities that will be used in a production process for more than one year. It covers all investment by private businesses and by nonprofit institutions, regardless of whether the investment is owned by domestic residents or not. Nonresidential investment includes new construction, business purchases of new machinery, equipment, furniture, and vehicles from other domestic firms and from the rest of the world. Residential investment consists of private structures, improvements to existing units, and mobile homes. Note that this term does not include financial investments made by individuals or businesses. For example, one purchase of stock as an "investment" is not counted here.

Government expenditures include purchases of goods, services, and structures from domestic firms and from the rest of the world by federal, state, and local government. This category includes compensation paid to government employees, tuition payments for higher education, and charges for medical care.

Transfer payments, such as social insurance payments, government medical insurance payments, subsidies, and government aid are *not* included as a part of government expenditures.

Exports consist of goods and services that are sold to nonresidents.

Imports include goods and services purchased from the rest of the world.

The difference between exports and imports ($EX - IM$) is often referred to as net exports. Receipts and payments of factor income and transfer payments to the rest of the world (net) are excluded from net exports. Including these terms changes the trade balance definition and reclassifies national output as growth national product (GNP).

The Role of Imports in the National Income Identity

It is important to emphasize why imports are subtracted in the national income identity because it can lead to serious misinterpretations. First, one might infer (incorrectly) from the identity that imports are subtracted because they represent a cost to the economy. This argument often arises because of the typical political emphasis on jobs or employment. Thus higher imports imply that goods that might have been produced at home are now being produced abroad. This could represent an opportunity cost to the economy and justify subtracting imports in the identity. However, this argument is wrong.

The second misinterpretation that sometimes arises is to use the identity to suggest a relationship between imports and GDP growth. Thus it is common for economists to report that GDP grew at a slower than expected rate last quarter because imports rose faster than expected. The identity suggests this relationship because, obviously, if imports rise, GDP falls. However, this interpretation is also wrong.

The actual reason why imports are subtracted in the national income identity is because imports appear in the identity as hidden elements in consumption, investment, government, and exports. Thus imports must be subtracted to assure that only domestically produced goods are being counted. Consider the following details.

When consumption expenditures, investment expenditures, government expenditures, and exports are measured, they are measured without accounting for where the purchased goods were actually made. Thus consumption expenditures (C) measures domestic expenditures on both domestically produced and foreign-produced goods. For example, if a U.S. resident buys a television imported from Korea, that purchase would be included in domestic consumption expenditures. Likewise, if a business purchases a microscope made in Germany, that purchase would be included in domestic investment. When the

government buys foreign goods abroad to provide supplies for its foreign embassies, those purchases are included in government expenditures. Finally, if an intermediate product is imported, used to produce another good, and then exported, the value of the original imports will be included in the value of domestic exports.

This suggests that we could rewrite the national income identity in the following way:
$GDP = (CD + CF) + (ID + IF) + (GD + GF) + (EXD + EXF) - IM,$

where *CD* represents consumption expenditures on domestically produced goods, *CF* represents consumption expenditures on foreign-produced goods, *ID* represents investment expenditures on domestically produced goods, *IF* represents investment expenditures on foreign-produced goods, *GD* represents government expenditures on domestically produced goods, *GF* represents government expenditures on foreign-produced goods, *EXD* represents export expenditures on domestically produced goods, and *EXF* represents export expenditures on previously imported intermediate goods. Finally, we note that all imported goods are used in consumption, investment, or government or are ultimately exported, thus
$IM = CF + IF + GF + EXF.$

Plugging this expression into the identity above yields
$GDP = CD + ID + GD + EXD$

and indicates that GDP does not depend on imports at all.

The reason imports are subtracted in the standard national income identity is because they have already been included as part of consumption, investment, government spending, and exports. If imports were not subtracted, GDP would be overstated. Because of the way the variables are measured, the national income identity is written such that imports are added and then subtracted again.

This exercise should also clarify why the previously described misinterpretations were indeed wrong. Since imports do not affect the value of GDP in the first place, they cannot represent an opportunity cost, nor do they directly or necessarily influence the size of GDP growth.

KEY TAKEAWAYS

- GDP can be decomposed into consumption expenditures, investment expenditures, government expenditures, and exports of goods and services minus imports of goods and services.
- Investment in GDP identity measures physical investment, not financial investment.

- Government includes all levels of government and only expenditures on goods and services. Transfer payments are not included in the government term in the national income identity.
- Imports are subtracted in the national income identity because imported items are already measured as a part of consumption, investment and government expenditures, and as a component of exports. This means that imports have no direct impact on the level of GDP. The national income identity does not imply that rising imports cause falling GDP.

EXERCISES

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

   a. A measure of the value of all capital equipment and services purchased during a year.

   b. The term for the goods and services sold to residents of foreign countries.

   c. The component of GDP that includes household purchases of durable goods, nondurable goods, and services.

   d. The component of GDP that includes purchases by businesses for physical capital equipment used in the production process.

   e. The government spending in the GDP identity does not count these types of government expenditures.

   f. Of *true* or *false*, imported goods and services are counted once in the *C*, *I*, *G*, or *EX* terms of the GDP identity.

2. The national income identity says that gross domestic product is given by consumption expenditures, plus investment expenditures, plus government expenditures, plus exports, minus imports. In short, this is written as $GDP = C + I + G + EX - IM$.
   Consider each of the following expenditures below. Indicate in which category or categories (*C*, *I*, *G*, *EX*, or *IM*) the item would be accounted for in the United States.

Product	Category
a. German resident purchase of a U.S.-made tennis racket	

Product	Category
b. U.S. firm purchase of a U.S.-made office copy machine	
c. Salaries to U.S. troops in Iraq	
d. School spending by county government	
e. U.S. household purchase of imported clothing	

What is the gross domestic product in a country whose goods and services balance is a $300 billion deficit, consumption is $900 billion, investment is $300 billion, and government spending is $500 billion?

Below are the economic data for the fictional country of Sandia. Write out the national income identity. Verify whether Sandia's data satisfy the identity.

TABLE 2.1 SANDIA'S ECONOMIC DATA (BILLIONS OF DOLLARS)

Gross Domestic Product	400
Imports of Goods and Services	140
Investment Spending	20
Private Saving	30
Exports of Goods and Services	100
Government Transfers	40
Government Tax Revenues	140
Government Spending	140
Consumption Spending	280

2.3 U.S. National Income Statistics (2007–2008)

LEARNING OBJECTIVE

1. Learn the recent values for U.S. GDP and the relative shares of its major components.

To have a solid understanding of the international economy, it is useful to know the absolute and relative sizes of some key macroeconomic variables like the gross domestic product (GDP). For example, it is worthwhile to know that the U.S. economy is the largest in the world because its annual GDP is about $14 trillion, not $14 million or $14 billion. It can also be useful to know about how much of an economy's output each year is consumed, invested, or purchased by the government. Although knowing that the U.S. government expenditures in 2008 were about $2.9 trillion is not so important, knowing that government expenditures made up about 20 percent of GDP can be useful to know.

Table 2.2 "U.S. Gross Domestic Product (in Billions of Dollars)" contains U.S. statistics for the national income and product accounts for the years 2007 and 2008. The table provides the numerical breakdown of GDP not only into its broad components (*C*, *I*, *G*, etc.) but also into their major subcategories. For example, consumption expenditures are broken into three main subcategories: durable goods, nondurable goods, and services. The left-hand column indicates which value corresponds to the variables used in the identity.

Table 2.2 U.S. Gross Domestic Product (in Billions of Dollars)

		2007	2008	2008 (Percentage of GDP)
GDP	Gross domestic product	13,807.5	14,280.7	100.0
C	Personal consumption expenditures	9,710.2	10,058.5	70.4
	Durable goods	1,082.8	1,022.8	7.2
	Nondurable goods	2,833.0	2,966.9	20.8
	Services	5,794.4	6,068.9	42.5
I	Gross private domestic investment	2,134.0	2,004.1	14.0
	Nonresidential	1,503.8	1,556.2	10.9

		2007	2008	2008 (Percentage of GDP)
	Structures	480.3	556.3	3.9
	Equipment and software	1,023.5	999.9	7.0
	Residential	630.2	487.8	3.4
	Change in business inventories	−3.6	−39.9	−0.0
	Government consumption expenditures and gross investment	2,674.8	2,883.2	20.2
	Federal	979.3	1,071.2	7.5
	National defense	662.2	734.3	5.1
	Nondefense	317.1	336.9	2.4
G	State and local	1,695.5	1,812.1	12.6
	Exports	1,662.4	1,867.8	13.1
	Goods	1,149.2	1,289.6	9.0
EX	Services	513.2	578.2	4.0
	Imports	2,370.2	2,533.0	17.7
	Goods	1,985.2	2,117.0	14.8
IM	Services	385.1	415.9	2.9

Source: Bureau of Economic Analysis, National Economic Accounts, Gross Domestic Product (GDP), at http://www.bea.gov/national/nipaweb/Index.asp.

There are a number of important things to recognize and remember about these numbers.

First, it is useful to know that U.S. GDP in 2008 was just over $14 trillion (or $14,000 billion). This is measured in 2008 prices and is referred to as nominal GDP. This number is useful to recall, first because it can be used in to judge relative country sizes if you happen to come across another country's GDP

figure. The number will also be useful in comparison with U.S. GDP in the future. Thus if in 2020 you read that U.S. GDP is $20 trillion, you'll be able to recall that back in 2008 it was just $14 trillion. Also, note that between 2007 and 2008, the United States added over $600 billion to GDP.

The next thing to note about the numbers is that consumption expenditures are the largest component of U.S. GDP, making up about 70 percent of output in 2008. That percentage is relatively constant over time, even as the economy moves between recessions and boom times (although it is up slightly from 68 percent in 1997). Notice also that services is the largest subcategory in consumption. This category includes health care, insurance, transportation, entertainment, and so on.

Gross private domestic investment, "investment" for short, accounted for just 14 percent of GDP in 2008. This figure is down from almost 17 percent just two years before and is reflective of the slide into the economic recession. As GDP began to fall at the end of 2008, prospects for future business opportunities also turned sour, and so investment spending also fell. As the recession continued into 2009, we can expect that number to fall even further the next year.

The investment component of GDP is often the target of considerable concern in the United States. Investment represents how much the country is adding to the capital stock. Since capital is an input into production, in general the more capital equipment available, the greater will be the national output. Thus investment spending is viewed as an indicator of future GDP growth. Perhaps the higher is investment, the faster the economy will grow in the future.

One concern about the U.S. investment level is that, as a percentage of GDP, it is lower than in many countries in Europe, especially in China and other Asian economies. In many European countries, it is above 20 percent of GDP. The investment figure is closer to 30 percent in Japan and over 35 percent in China. There was a fear among some observers, especially in the 1980s and early 1990s, that lower U.S. investment relative to the rest of the world would ultimately lead to slower growth. That this projection has not been borne out should indicate that higher investment is not sufficient by itself to assure higher growth.

Government expenditures on goods and services in the United States amounted to 20 percent of GDP in 2008. Due to the recession and the large government stimulus package in 2009, we can expect this number will rise considerably next year. Recall that this figure includes state, local, and federal spending

but excludes transfer payments. When transfer payments are included, government spending plus transfers as a percentage of GDP exceeds 30 percent in the United States.

Two things are worth noting. First, the state and local spending is almost twice the level of federal spending. Second, most of the federal spending is on defense-related goods and services.

Exports in the United States accounted for 13 percent of GDP in 2008 (up from 10 percent in 2003) and are closing in on the $2 trillion level. Imports into the United States are at $2.5 trillion, amounting to almost 18 percent of GDP. In terms of the dollar value of trade, the United States is the largest importer and exporter of goods and services in the world. However, relative to many other countries, the United States trades less as a percentage of GDP.

KEY TAKEAWAYS

- U.S. GDP stands at just over $14 trillion per year in 2008.
- U.S. consumption is about 70 percent of GDP; investment, 14 percent; government expenditures, 20 percent; exports, 13 percent; and imports, about 18 percent.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. The approximate share of U.S. consumption as a share of U.S. GDP in 2008.

b. The approximate share of U.S. investment as a share of U.S. GDP in 2008.

c. The approximate share of U.S. government spending as a share of U.S. GDP in 2008.

d. The approximate share of U.S. exports of goods and services as a share of U.S. GDP in 2008.

e. The approximate share of U.S. imports of goods and services as a share of U.S. GDP in 2008.

f. This main category represents the largest share of GDP spending in the U.S. economy.

2.4 Balance of Payments Accounts: Definitions

LEARNING OBJECTIVES

1. Learn the variety of ways exports and imports are classified in the balance of payments accounts.
2. Understand the distinction between GDP and GNP.

The balance of payments accounts is a record of all international transactions that are undertaken between residents of one country and residents of other countries during the year. The accounts are divided into several subaccounts, the most important being the current account and the financial account. The current account is often further subdivided into the merchandise trade account and the service account. These are each briefly defined in Table 2.3 "Balance of Payments Accounts Summary".

Table 2.3 Balance of Payments Accounts Summary

Current Account	Record of all international transactions for **goods and services**, **income payments and receipts**, **and unilateral transfers**. The current account is used in the national income identity for GNP.
Merchandise Trade Account	Record of all international transactions for **goods only**. Goods include physical items like autos, steel, food, clothes, appliances, furniture, etc.
Services Account	Record of all international transactions for **services only**. Services include transportation, insurance, hotel, restaurant, legal, consulting, etc.
Goods and Services Account	Record of all international transactions for **goods and services only**. The goods and services account is used in the national income identity for GDP.
Financial Account	Record of all international transactions for **assets**. Assets include bonds, Treasury bills, bank deposits, stocks, currency, real estate, etc.

The balance on each of these accounts is found by taking the difference between exports and imports.

Current Account

The current account (CA) balance is defined as $CA = EX^{G,S,IPR,UT} - IM^{G,S,IPR,UT}$where the G,S,IPR,UT superscript is meant to include exports and imports of goods (G), services (S), income payments and receipts (IPR), and unilateral transfers (UT). If$CA > 0$, then exports of goods and services exceed imports and the country has a current account surplus. If $CA < 0$, then imports exceed exports and the country has a current account deficit.

Income payments represent the money earned (i.e., income) by foreign residents on their investments in the United States. For example, if a British company owns an office building in the United States and

brings back to the United Kingdom a share of the profit earned there as a part of its income, then this is classified as an income payment on the current account of the balance of payments.

Income receipts represent the money earned by domestic residents on their investments abroad. For example, if a U.S. company owns an assembly plant in Costa Rica and brings back to the United States a share of the profit earned there as a part of its income, then this is classified as an income receipt on the current account of the balance of payments.

It may be helpful to think of income payments and receipts as payments for entrepreneurial services. For example, a British company running an office building is providing the management services and taking the risks associated with operating the property. In exchange for these services, the company is entitled to a stream of the profit that is earned. Thus income payments are classified as an import, the import of a service. Similarly, the U.S. company operating the assembly plant in Costa Rica is also providing entrepreneurial services for which it receives income. Since in this case the United States is exporting a service, income receipts are classified as a U.S. export.

Unilateral transfers represent payments that are made or received that do not have an offsetting product flow in the opposite direction. Normally, when a good is exported, for example, the good is exchanged for currency such that the value of the good and the value of the currency are equal. Thus there is an outflow and an inflow of equal value. An accountant would record both sides of this transaction, as will be seen in the next section. However, with a unilateral transfer, money flows out, but nothing comes back in exchange or vice versa. The primary examples of unilateral transfers are remittances and foreign aid. Remittances occur when a person in one country transfers money to a relative in another country and receives nothing in return. Foreign aid also involves a transfer, expecting nothing in return.

Merchandise Trade Balance

The merchandise trade balance (or goods balance) can be defined as $GB = EXG - IMG$, where we record only the export and import of merchandise goods. If $GB > 0$, the country would have a (merchandise) trade surplus. If $GB < 0$, the country has a trade deficit.

Services Balance

The service balance can be defined as $SB = EXS - IMS$, where we record only the export and import of services. If $SB > 0$, the country has a service surplus. If $SB < 0$, the country has a service deficit.

Goods and Services Balance

The goods and services balance (or goods balance) can be defined as $GSB = EXG\&S - IMG\&S$, where we record the export and import of both merchandise goods and services. If $GSB > 0$, the country would have a goods and services (G&S) surplus. If $GB < 0$, the country has a G&S deficit. Note that sometimes people will refer to the difference $EXG\&S - IMG\&S$ as net exports. Often when this term is used the person is referencing the goods and services balance.

Here it is important to point out that when you hear a reference to a country's trade balance, it could mean the merchandise trade balance, or it could mean the goods and services balance, or it could even mean the current account balance.

Occasionally, one will hear trade deficit figures reported in the U.S. press followed by a comment that the deficit figures refer to the "broad" measure of trade between countries. In this case, the numbers reported refer to the current account deficit rather than the merchandise trade deficit. This usage is developing for a couple of reasons. First of all, at one time, around thirty years ago or more, there was very little international trade in services. At that time, it was common to report the merchandise trade balance since that accounted for most of the international trade. In the past decade or so, service trade has been growing much more rapidly than goods trade and it is now becoming a significant component of international trade. In the United States, service trade exceeds 30 percent of total trade. Thus a more complete record of a country's international trade is found in its current account balance rather than its merchandise trade account.

But there is a problem with reporting and calling it the current account deficit because most people don't know what the current account is. There is a greater chance that people will recognize the trade deficit (although most could probably not define it either) than will recognize the current account deficit. Thus the alternative of choice among commentators is to call the current account deficit a trade deficit and then define it briefly as a "broad" measure of trade.

A simple solution would be to call the current account balance the "trade balance" since it is a record of all trade in goods and services and to call the merchandise trade balance the "merchandise goods balance," or the "goods balance" for short. I will ascribe to this convention throughout this text in the hope that it might catch on.

GDP versus GNP

There are two well-known measures of the national income of a country: GDP and GNP. Both represent the total value of output in a country during a year, only measured in slightly different ways. It is worthwhile to understand the distinction between the two and what adjustments must be made to measure one or the other.

Conceptually, the gross domestic product (GDP) represents the value of all goods and services produced within the borders of the country. The gross national product (GNP) represents the value of all goods and services produced by domestic factors of production.

Thus production in the United States by a foreign-owned company is counted as a part of U.S. GDP since the productive activity took place within the U.S. borders, even though the income earned from that activity does not go to a U.S. citizen. Similarly, production by a U.S. company abroad will generate income for U.S. citizens, but that production does not count as a part of GDP since the productive activity generating that income occurred abroad. This production will count as a part of GNP though since the income goes to a U.S. citizen.

The way GDP versus GNP is measured is by including different items in the export and import terms. As noted above, GDP includes only exports and imports of goods and services, implying also that GDP excludes income payments and receipts and unilateral transfers. When these latter items are included in the national income identity and the current account balance is used for $EX - IM$, the national income variable becomes the GNP. Thus the GNP measure includes income payments and receipts and unilateral transfers. In so doing, GNP counts as additions to national income the profit made by U.S. citizens on its foreign operations (income receipts are added to GNP) and subtracts the profit made by foreign companies earning money on operations in the U.S. (income payments are subtracted).

To clarify, the national income identities for GDP and GNP are as follows:

$GDP = C + I + G + EXG\&S - IMG\&S$

and

$GNP = C + I + G + EXG,S,IPR,UT - IMG,S,IPR,UT.$

Financial Account Balance

Finally, the financial account balance can be defined as $KA = EXA - IMA$, where $EXA$and IMA refer to the export and import of assets, respectively. If $KA > 0$, then the country is exporting more assets than it is

importing and it has a financial account surplus. If $KA < 0$, then the country has a financial account deficit.

The financial account records all international trade in assets. Assets represent all forms of ownership claims in things that have value. They include bonds, Treasury bills, stocks, mutual funds, bank deposits, real estate, currency, and other types of financial instruments. Perhaps a clearer way to describe exports of assets is to say that*domestic assets are sold to foreigners*, whereas *imports of assets mean foreign assets that are purchased by domestic residents*.

It is useful to differentiate between two different types of assets. First, some assets represent IOUs (i.e., I owe you). In the case of bonds, savings accounts, Treasury bills, and so on, the purchaser of the asset agrees to give money to the seller of the asset in return for an interest payment plus the return of the principal at some time in the future. These asset purchases represent borrowing and lending. When the U.S. government sells a Treasury bill (T-bill), for example, it is borrowing money from the purchaser of the T-bill and agrees to pay back the principal and interest in the future. The Treasury bill certificate, held by the purchaser of the asset, is an IOU, a promissory note to repay principal plus interest at a predetermined time in the future.

The second type of asset represents ownership shares in a business or property, which is held in the expectation that it will realize a positive rate of return in the future. Assets, such as common stock, give the purchaser an ownership share in a corporation and entitle the owner to a stream of dividend payments in the future if the company is profitable. The future sale of the stock may also generate a capital gain if the future sales price is higher than the purchase price. Similarly, real estate purchases—say, of an office building—entitle the owner to the future stream of rental payments by the tenants in the building. Owner-occupied real estate, although it does not generate a stream of rental payments, does generate a stream of housing services for the occupant-owners. In either case, if real estate is sold later at a higher price, a capital gain on the investment will accrue.

An important distinction exists between assets classified as IOUs and assets consisting of ownership shares in a business or property. First of all, IOUs involve a contractual obligation to repay principal plus interest according to the terms of the contract or agreement. Failure to do so is referred to as a default on the part of the borrower and is likely to result in legal action to force repayment. Thus international asset purchases categorized as IOUs represent international borrowing and lending.

Ownership shares, on the other hand, carry no such obligation for repayment of the original investment and no guarantee that the asset will generate a positive rate of return. The risk is borne entirely by the purchaser of the asset. If the business is profitable, if numerous tenants can be found, or if real estate values rise over time, then the purchaser of the asset will make money. If the business is unprofitable, office space cannot be leased, or real estate values fall, then the purchaser will lose money. In the case of international transactions for ownership shares, there is no resulting international obligation for repayment.

KEY TAKEAWAYS

- The *trade balance* may describe a variety of different ways to account for the difference between exports and imports.
- The current account is the broadest measure of trade flows between countries encompassing goods, services, income payments and receipts, and unilateral transfers.
- The merchandise trade balance is a more narrow measure of trade between countries encompassing only traded goods.
- Net exports often refer to the balance on goods and services alone.
- GDP is a measure of national income that includes all production that occurs within the borders of a country. It is measured by using the goods and services balance for exports and imports.
- GNP is a measure of national income that includes all production by U.S. citizens that occurs anywhere in the world. It is measured by using the current account balance for exports and imports.
- The financial account balance measures all exports and imports of assets, which means foreign purchases of domestic assets and domestic purchases of foreign assets.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. A record of all international transactions for goods and services.

b. A record of all international transactions for assets.

c. The name of the balance of payments account that records transactions for goods.

d. The term used to describe the profit earned by domestic residents on their foreign business operations.
e. The term used to describe the profit earned by foreign residents on their domestic business operations.
f. The term used to describe remittances because they do not have a corresponding product flow to offset the money export or import.
g. Of *net importer* or *net exporter* of services, this describes a country that has more income payments than income receipts.
h. This measure of national output includes only the imports and exports of goods and services in its trade balance.
i. This measure of national output includes income payments and receipts in its trade balance.

2.5 Recording Transactions on the Balance of Payments

LEARNING OBJECTIVES

1. Learn how individual transactions between a foreign and domestic resident are recorded on the balance of payments accounts.
2. Learn the interrelationship between a country's current account balance and its financial account balance and how to interpret current account deficits and surpluses in terms of the associated financial flows.

In this section, we demonstrate how international transactions are recorded on the balance of payment accounts. The balance of payments accounts can be presented in ledger form with two columns. One column is used to record credit entries. The second column is used to record debit entries.

Almost every transaction involves an exchange between two individuals of two items believed to be of equal value. [1] Thus if one person exchanges $20 for a baseball bat with another person, then the two items of equal value are the $20 of currency and the baseball bat. The debit and credit columns in the ledger are used to record each side of every transaction. This means that every transaction must result in a credit and debit entry of equal value.

By convention, every credit entry has a "+" placed before it, while every debit entry has a "–" placed before it. The plus on the credit side generally means that money is being received in exchange for that item, while the minus on the debit side indicates a monetary payment for that item. This interpretation in the balance of payments accounts can be misleading, however, since in many international transactions, as when currencies are exchanged, money is involved on both sides of the transaction. There are two simple rules of thumb to help classify entries on the balance of payments:

1. Any time an item (good, service, or asset) is *exported* from a country, the value of that item is recorded as a credit entry on the balance of payments.
2. Any time an item is *imported* into a country, the value of that item is recorded as a debit entry on the balance of payments.

In the following examples, we will consider entries on the U.S. balance of payments accounts. Since it is a U.S. account, the values of all entries are denominated in U.S. dollars. Note that each transaction between a U.S. resident and a foreign resident would result in an entry on both the domestic and the foreign balance of payments accounts, but we will look at only one country's accounts.

Finally, we will classify entries in the balance of payments accounts into one of the two major subaccounts, the current account or the financial account. Any time an item in a transaction is a good or a service, the value of that item will be recorded in the current account. Any time an item in a transaction is an asset, the value of that item will be recorded in the financial account.

Note that in June 1999, what was previously called the "capital account" was renamed the "financial account" in the U.S. balance of payments. A capital account stills exists but now includes only exchanges in nonproduced, nonfinancial assets. This category is very small, including such items as debt forgiveness and transfers by migrants. However, for some time, it will be common for individuals to use the term "capital account" to refer to the present "financial account." So be warned.

A Simple Exchange Story

Consider two individuals, one a resident of the United States, the other a resident of Japan. We will follow them through a series of hypothetical transactions and look at how each of these transactions would be recorded on the balance of payments. The exercise will provide insight into the relationship between the current account and the financial account and give us a mechanism for interpreting trade deficits and surpluses.

Step 1: We begin by assuming that each individual wishes to purchase something in the other country. The U.S. resident wants to buy something in Japan and thus needs Japanese currency (yen) to make the purchase. The Japanese resident wants to buy something in the United States and thus needs U.S. currency (dollars) to make the purchase. Therefore, the first step in the story must involve an exchange of currencies.

So let's suppose the U.S. resident exchanges $1,000 for ¥112,000 on the foreign exchange market at a spot exchange rate of 112 ¥/$. The transaction can be recorded by noting the following:

1. The transaction involves an exchange of currency for currency. Since currency is an asset, both sides of the transaction are recorded on the financial account.
2. The currency exported is $1,000 in U.S. currency. Hence, we have made a credit entry in the financial account in the table below. What matters is not whether the item leaves the country, but that the ownership changes from a U.S. resident to a foreign resident.
3. The currency imported into the country is the ¥112,000. We record this as a debit entry on the financial account and value it at the current exchange value, which is $1,000 as noted in the table.

	U.S. Balance of Payments ($)	
	Credits (+)	Debits (−)
Step 1	Current Account	0
Financial Account	+1,000 ($ currency)	−1,000 (¥ currency)

Step 2: Next, let's assume that the U.S. resident uses his ¥112,000 to purchase a camera from a store in Japan and then brings it back to the United States. Since the transaction is between the U.S. resident and the Japanese store owner, it is an international transaction and must be recorded on the balance of payments. The item exported in this case is the Japanese currency. We'll assume that there has been no change in the exchange rate and thus the currency is still valued at $1,000. This is recorded as a credit entry on the financial account and labeled "¥ currency" in the table below. The item being imported into the United States is a camera. Since a camera is a merchandise good and is valued at ¥112,000 = $1,000, the import is recorded as a debit entry on the current account in the table below.

	U.S. Balance of Payments ($)	
	Credits (+)	Debits (−)
Step 2	Current Account	0
Financial Account	+1,000 (¥ currency)	0

Step 3a: Next, let's assume that the Japanese resident uses his $1,000 to purchase a computer from a store in the United States and then brings it back to Japan. The computer, valued at $1,000, is being exported out of the United States and is considered a merchandise good. Therefore, a credit entry of $1,000 is made in the following table on the current account and labeled as "computer." The other side of the transaction is the $1,000 of U.S. currency being given to the U.S. store owner by the Japanese resident. Since the currency, worth $1,000, is being imported and is an asset, a $1,000 debit entry is made in the table on the financial account and labeled "$ currency."

	U.S. Balance of Payments ($)	
	Credits (+)	Debits (−)
Step 3a		

Step 3a	U.S. Balance of Payments ($)	
	Credits (+)	Debits (−)
	Current Account	+1,000 (computer)
Financial Account	0	−1,000 ($ currency)

Summary Statistics (after Steps 1, 2, and 3a)

We can construct summary statistics for the entries that have occurred so far by summing the debit and credit entries in each account and eliminating double entries. In the following table, we show all the transactions that have been recorded. The sum of credits in the current account is the $1,000 computer. The sum of debits in the current account is the $1,000 camera. On the financial account there are two credit entries of $1,000, one representing U.S. currency and the other representing Japanese currency. There are two identical entries on the debit side. Since there is a U.S. currency debit and credit entry of equal value, this means that the net flow of currency is zero. The dollars that left the country came back in subsequent transactions. The same is true for Japanese currency. When reporting the summary statistics, the dollar and yen currency financial account entries would cancel, leaving a net export of assets equal to zero and the net inflow of assets equal to zero as well.

Summary 1, 2, 3a	U.S. Balance of Payments ($)	
	Credits (+)	Debits (−)
	Current Account	+1,000 (computer)
Financial Account	+1,000 ($ currency), +1,000 (¥ currency)	−1,000 ($ currency), −1,000 (¥ currency)

After cancellations, then, the summary balance of payments statistics would look as in the following table.

Summary 1, 2, 3a	U.S. Balance of Payments ($)	
	Credits (+)	Debits (−)
	Current Account	+1,000 (computer)
Financial Account	0	0

The current account balance is found by summing the credit and debit entries representing exports and imports, respectively. This corresponds to the difference between exports and imports of goods and services. In this example, the current account (or trade) balance is $CA = \$1{,}000 - \$1{,}000 = 0$. This means the trade account is balanced—exports equal imports.

The financial account balance is also found by summing the credit and debit entries. Since both entries are zero, the financial account balance is also zero.

Step 3b: Step 3b is meant to substitute for step 3a. In this case, we imagine that the Japanese resident decided to do something other than purchase a computer with the previously acquired $1,000. Instead, let's suppose that the Japanese resident decides to save his money by investing in a U.S. savings bond. In this case, $1,000 is paid to the U.S. government in return for a U.S. savings bond certificate (an IOU) that specifies the terms of the agreement (i.e., the period of the loan, interest rate, etc.). The transaction is recorded on the financial account as a credit entry of $1,000 representing the savings bond that is exported from the country and a debit entry of $1,000 of U.S. currency that is imported back into the country.

Step 3b	U.S. Balance of Payments ($)	
	Credits (+)	Debits (−)
Current Account	0	
Financial Account	+1,000 (U.S. savings bond)	−1,000 ($ currency)

Summary Statistics (after Steps 1, 2, and 3b)

We can construct summary statistics assuming that steps 1, 2, and 3b have taken place. This is shown in the following table. The sum of credits in the current account in this case is zero since there are no exports of goods or services. The sum of debits in the current account is the $1,000 camera.

On the financial account, there are three credit entries of $1,000: one representing U.S. currency, the other representing Japanese currency, and the third representing the U.S. savings bond. There are two $1,000 entries on the debit side: one representing U.S. currency and the other representing Japanese currency. Again, the dollar and yen currency financial account entries would cancel, leaving only a net export of assets equal to the $1,000 savings bond. The net inflow of assets is equal to zero.

	U.S. Balance of Payments ($)	
	Credits (+)	Debits (−)
Summary 1, 2, 3b	Current Account	0
Financial Account	+1,000 ($ currency), +1,000 (¥ currency), +1,000 (U.S. savings bond)	−1,000 ($ currency), −1,000 (¥ currency)

After cancellations, the summary balance of payments statistics would look like the following table.

	U.S. Balance of Payments ($)	
	Credits (+)	Debits (−)
Summary 1, 2, 3b	Current Account	0
Financial Account	+1,000 (U.S. savings bond)	0

The current account balance is found by summing the credit and debit entries representing exports and imports, respectively. This corresponds to the difference between exports and imports of goods and services. In this example, the current account (or trade) balance is $CA = \$0 - \$1{,}000 = -\$1{,}000$. This means there is a trade deficit of $1,000. Imports of goods and services exceed exports of goods and services.

The financial account balance is also found by summing the credit and debit entries. In this example, the financial account balance is $KA = \$1{,}000 - \$0 = +\$1{,}000$. This means the financial account has a surplus of $1,000. Exports of assets exceed imports of assets.

Important Lessons from the Exchange Story

The exercise above teaches a number of important lessons. The first lesson follows from the summary statistics, suggesting that the following relationship must hold true:
current account balance + financial account balance = 0.

In the first set of summary statistics (1, 2, 3a), both the current account and the financial account had a balance of zero. In the second example (1, 2, 3b), the current account had a deficit of $1,000 while the financial account had a surplus of $1,000.

This implies that anytime a country has a current account deficit, it *must* have a financial account surplus of equal value. When a country has a current account surplus, it *must* have a financial account deficit of equal value. And when a country has balanced trade (a balanced current account), then it *must* have balance on its financial account.

It is worth emphasizing that this relationship is *not* an economic theory. An economic theory could be right or it could be wrong. This relationship is an accounting identity. (That's why an identity symbol rather than an equal sign is typically used in the formula above.) An accounting identity is true by definition.

Of course, the identity is valid only if we use the *true* (or actual) current account and financial account balances. What countries report as their trade statistics are only the *measured* values for these trade balances, not necessarily the true values.

Statisticians and accountants attempt to measure international transactions as accurately as possible. Their objective is to record the true values or to measure trade and financial flows as accurately as possible. However, a quick look at any country's balance of payments statistics reveals that the balance on the current account plus the balance on the financial account rarely, if ever, sums to zero. The reason is not that the identity is wrong but rather that not all the international transactions on the balance of payments are accounted for properly. Measurement errors are common.

These errors are reported in a line in the balance of payments labeled "statistical discrepancy." The statistical discrepancy represents the amount that must be added or subtracted to force the measured current account balance and the measured financial account balance to zero. In other words, in terms of the measured balances on the balance of payments accounts, the following relationship will hold:

current account balance + financial account balance + statistical discrepancy = 0.

The second lesson from this example is that imbalances (deficits and surpluses) on the balance of payments accounts arise as a result of a series of mutually voluntary transactions in which equally valued items are traded for each other. This is an important point because it is often incorrectly interpreted that a trade deficit implies that unfair trade is taking place. After all, the logic goes, when imports exceed exports, foreigners are *not* buying as many of our goods as we are buying of theirs. That's unequal exchange and that's unfair.

The story and logic are partially correct but incomplete. The logic of the argument focuses exclusively on trade in goods and services but ignores trade in assets. Thus it *is*true that when imports of goods exceed exports, we are buying more foreign goods and services than foreigners are buying of ours. However, at the same time, a current account deficit implies a financial account surplus. A financial account surplus, in turn, means that foreigners are buying more of our assets than we are buying of theirs. Thus when there is unequal exchange on the trade account, there must be equally opposite unequal exchange on the financial account. In the aggregate, imbalances on a current account, a trade account, or a financial account do not represent unequal exchanges between countries.

KEY TAKEAWAYS

- Every transaction between a domestic and foreign resident can be recorded as a debit and credit entry of equal value on the balance of payments accounts.
- All components of transactions that involve assets, including currency flows, are recorded on the financial account; all other items are recorded on the current account.
- All trade deficits on a country's current account implies an equally sized financial account surplus, while all trade surpluses implies an equally sized financial account deficit.
- In the aggregate, imbalances on a current account, a trade account, or a financial account do not represent unequal exchanges, or inequities, between countries.

EXERCISES

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"
   a. The balance on a country's financial account when its current account has a deficit of $80 billion.
   b. A country's financial account balance when its trade balance is −$60 billion, its service balance is +$25 billion, and its unilateral transfer and income account has a surplus of +$10 billion.
   c. The international transactions for shares of stock in corporations (in excess of 10 percent of the company's value) or for real estate.
   d. Of *credit* or *debit*, this is how exports are recorded on the balance of payments.

e. Of *current account* or *financial account*, this is where an export of a clock will be recorded.

f. Of *current account* or *financial account*, this is where an import of currency from your aunt in Paraguay will be recorded.

Use the information below from the 1997 U.S. national income accounts to calculate the following. (Assume the balance on income and unilateral transfers was zero.)

a. Current account balance: _____

b. Merchandise trade balance: _____

c. Service balance: _____

d. Net income payments and receipts: _____

e. Goods and services balance: _____

TABLE 2.4 U.S. NATIONAL INCOME STATISTICS, 1997 (BILLIONS OF DOLLARS)

Gross Domestic Product	8,080
Exports of Goods and Services	934
Merchandise Exports	678
Income Receipts	257
Imports of Goods and Services	1,043
Merchandise Imports	877
Income Payments	244
Net Unilateral Transfers	−45

[1] An exception is the case of unilateral transfers. These transfers include pension payments to domestic citizens living abroad, foreign aid, remittances, and other types of currency transfers that do not include an item on the reverse side being traded.

2.6 U.S. Balance of Payments Statistics (2008)

LEARNING OBJECTIVE

1. Learn the recent values for U.S. balance of payments statistics and the ways transactions are classified on both the current account and the financial account.

One of the most informative ways to learn about a country's balance of payments statistics is to take a careful look at them for a particular year. We will do that here for the U.S. balance of payments (U.S. BoP) statistics for 2008. Below we present an abbreviated version of the U.S. BoP statistics.

The line numbers refer to the line item on the complete Bureau of Economic Analysis (BEA) report. All debit entries have a minus sign, and all credit entries have a plus sign. A brief description of each line item is provided below where all values are rounded downward for easy reference with the table. To see the entries for every line or for more recent statistics, see the U.S. Department of Commerce, Bureau of Economic Analysis Web site, located at http://www.bea.gov.

Table 2.5 U.S. Balance of Payments, 2008 (Millions of Dollars Seasonally Adjusted)

Line Number	Category	Value (credits [+], debits [−])
Current Account		
1	Exports of goods, services, and income receipts	+2,591,233
3	Goods	+1,276,994
4	Services	+549,602
13	Income receipts on U.S. assets abroad	+761,593
14	Direct investment receipts	+370,747
15	Other private receipts	+385,940
16	U.S. government receipts	+4,906
18	Imports of goods, services, and income	−3,168,938
20	Goods	−2,117,245

Line Number	Category	Value (credits [+], debits [−])
21	Services	−405,287
30	Income payments on foreign assets in the United States	−636,043
31	Direct investment payments	−120,862
32	Other private payments	−349,871
33	U.S. government payments	−165,310
35	Unilateral transfers, net	−128,363
Capital Account		
39	Capital account transactions, net	+953
Financial Account		
40	U.S. assets abroad (increase/financial outflow [−])	−106
41	U.S. official reserve assets	−4,848
46	U.S. government assets	−529,615
50	U.S. private assets	+534,357
51	Direct investment	−332,012
52	Foreign securities	+60,761
53	U.S. claims reported by U.S. nonbanks	+372,229
54	U.S. claims reported by U.S. banks	+433,379
55	Foreign assets in the United States (increase/financial inflow [+])	+534,071
56	Foreign official assets in the United States	+487,021

Line Number	Category	Value (credits [+], debits [−])
63	Other foreign assets in the United States, net	+47,050
64	Direct investment	+319,737
65	U.S. Treasury securities	+196,619
66	U.S. securities other than T-bills	−126,737
67	U.S. currency	+29,187
68	U.S. liabilities reported by U.S. nonbanks	−45,167
69	U.S. liabilities reported by U.S. banks	−326,589
71	Statistical discrepancy (sum of above with sign reversed)	+200,055

Below we provide a brief description of each line item that appears on this abbreviated balance of payments record.

Current Account

Line 1, $2.59 trillion, shows the value of all U.S. exports of goods, services, and income. This value is equal to the sum of lines 3, 4, and 13.

Line 3, $1.27 trillion, shows exports of merchandise goods. This includes any physical items that leave the country.

Line 4, $549 billion, shows exports of services to foreigners. This category includes travel services, passenger fares, royalties, license fees, insurance legal services, and other private services.

Line 13, $761 billion, shows income receipts on U.S. assets abroad. This represents profits and interest earned by U.S. residents on investments in other countries. In a sense, these are payments for services rendered where the services include entrepreneurial services in the case of foreign-operated factories, or monetary services in the case of interest and dividend payments on foreign securities. This line is included in a measure of gross national product (GNP) since this income is accruing to U.S. factors of production. However, the line is excluded from a measure of gross domestic product (GDP) since production did not

take place within the borders of the country. Income receipts are divided into four subcategories: direct investment receipts, other private receipts, U.S. government receipts, and compensation of employees.

Line 14, $370 billion, shows direct investment receipts. This represents profit earned by U.S. companies on foreign direct investment (FDI), where FDI is defined as a greater than 10 percent ownership share in a foreign company. Note that this is not new investments but rather the profit and dividends earned on previous investments.

Line 15, $385 billion, shows other private receipts. This category includes interest and profit earned by individuals, businesses, investment companies, mutual funds, pension plans, and so on. In effect, all private investment income that accrues on investments worth less than 10 percent of a company would be included here.

Line 16, $4.9 billion, shows U.S. government income receipts. This refers to interest and other income earned by government investments abroad. Notice that this item is very small compared to the other two income categories.

Line 18, $3.1 trillion, records imports of goods, services, and income. This value is equal to the sum of lines 20, 21, and 30.

Line 20, $2.1 trillion, shows imports of merchandise goods. Notice that goods imports make up about two-thirds of total imports.

Line 21, $405 billion, shows imports of services such as travel services, passenger fares, insurance, and so on.

Line 30, $636 billion, shows income payments on foreign assets in the United States. This corresponds to income earned by foreigners who operate companies in the United States or income earned on other U.S.-based assets held by foreigners. This entry is further divided into four components: direct investment payments, other private payments, U.S. government payments, and compensation of employees.

Line 31, $120 billion, records direct investment payments to foreigners in the United States. This represents profit earned on foreign direct investment by foreign residents' companies, where FDI is defined as a greater than 10 percent ownership share in a U.S. company. Note that this is not new investments but rather the profit and dividends earned on previous investments.

Line 32, $349 billion, reports other private payments. This category includes interest and profit earned by individuals, businesses, investment companies, mutual funds, pension plans, and so on. In effect, all

private investment income that accrues on investments worth less than 10 percent of a company would be included here.

Line 33, $165 billion, records payments made by the U.S. government to foreigners. This item represents mostly interest payments on U.S. Treasury bills owned by foreigners.

Line 35, $128 billion, records net unilateral transfers. These transfers refer to government grants to foreign nations, government pension payments, and private remittances to family and friends abroad. A debit entry here means that the net transfers are outbound, that is, more transfers are made from the U.S. to individuals abroad than are made in the reverse direction.

Capital Account

Line 39, $953 million, represents net capital account transactions.

Financial Account

Line 40, $106 million, shows the value of purchases of foreign assets by U.S. residents, hence it is referred to as a capital outflow. The line is the sum of U.S. official reserve assets (line 41), U.S. government assets (line 46), and U.S. private assets (line 50).

Line 41, $4.8 billion, represents net U.S. official reserve transactions. Any purchases or sales of foreign currency in a foreign exchange intervention by the central bank would be recorded here. Since the item is a debit entry, it means that the U.S. central bank made net purchases of foreign assets (currencies) in 2008.

It is worth noting that this line is more important for a country maintaining a fixed exchange rate. To maintain a credible fixed exchange rate, central banks must periodically participate in the foreign exchange market. This line measures the extent of that participation and is sometimes referred to as the "balance of payments" in a fixed exchange rate system.

Line 46, $529 billion, represents net purchases of assets by the U.S. government, though not by the Federal Reserve.

Line 50, $534 billion, shows private purchases of foreign assets by U.S. residents. It is the primary component of total U.S. assets abroad. The item is composed of direct investment (line 51), foreign securities (line 52), U.S. claims reported by U.S. nonbanks (line 53), and U.S. claims reported by U.S. banks (line 54).

Line 51, $332 billion, shows direct investment by U.S. residents abroad. It would include purchases of factories, stocks, and so on by U.S. businesses and affiliates in foreign countries as long as there is a controlling interest in excess of 10 percent voting share.

Line 52, $60 billion, shows net purchases of foreign stocks and bonds by U.S. individuals and businesses when there is no controlling interest in the foreign company. Most purchases by U.S. mutual funds, pension funds, and insurance companies would be classified here.

Line 53, $372 billion, shows U.S. resident purchases of foreign assets reported by nonbanks.

Line 54, $433 billion, reports U.S. resident purchases of foreign assets reported by U.S. banks. This may include items like foreign currency denominated demand deposits held by U.S. businesses and individuals in U.S. banks.

Line 55, $534 billion, shows the sum total of foreign assets in the United States. This item refers to all purchases of U.S. assets by foreign residents, thus, it is listed as a capital inflow. This line is composed of the sum of foreign official assets in the United States (line 56), and other foreign assets in the United States (line 63).

Line 56, $487 billion, refers to purchases of U.S. assets by foreign governments or foreign central banks.

Line 63, $47 billion, refers to all other foreign assets purchases of U.S. assets and is the main component of capital inflows. It is composed of direct investment (line 64), U.S. Treasury securities (line 65), U.S. securities other than T-bills (line 66), U.S. currency (line 67), U.S. liabilities reported by U.S. nonbanks (line 68), and U.S. liabilities reported by U.S. banks (line 69).

Line 64, $319 billion, refers to purchases of U.S. factories and stocks when there is a greater than 10 percent ownership share.

Line 65, $196 billion, shows total purchases of U.S. Treasury bills by foreigners. This corresponds to foreign loans to the U.S. government.

Line 66, $126 billion, shows non-U.S. Treasury bill and nondirect investment purchases of stocks and bonds by foreigners.

Line 67, $29 billion, a credit entry, represents U.S. currency that has been repatriated (net). Typically, this flow is a credit indicating an outflow of U.S. currency. Because of the expectation that the U.S. dollar will remain stable in value, it is often held by residents in inflationary countries to prevent the deterioration of purchasing power. It is estimated that over $270 billion of U.S. currency circulates abroad and is used in

exchange for foreign goods and services or simply held to store value. The value on line 67 represents only the amount that flowed back in 2007.

Line 68, $45 billion, shows deposits and purchases of U.S. assets by foreigners reported by U.S. nonbanks.

Line 69, $326 billion, reports deposits and purchases of U.S. assets by foreigners reported by U.S. banks. Thus if a foreign resident opens a checking account in a U.S. bank denominated in U.S. dollars, that value would be recorded here.

Line 71, $200 billion, represents the statistical discrepancy. It is the sum of all the above items with the sign reversed. It is included to satisfy the accounting requirement that all debit entries be balanced by credit entries of equal value. Thus when the statistical discrepancy is included, the balance on the complete balance of payments is zero.

Summary Balances on the U.S. Balance of Payments (2008)

Table 2.6 "Balances on the U.S. Balance of Payments, 2008 (Millions of Dollars Seasonally Adjusted) (Credits [+], Debits [−])" reports a number of noteworthy balance of payments "balances" for 2008. In effect these subaccount balances allow us to identify net inflows or outflows of specific categories of goods, services, income, and assets.

Table 2.6 Balances on the U.S. Balance of Payments, 2008 (Millions of Dollars Seasonally Adjusted) (Credits [+], Debits [−])

Lines 1 + 18 + 35	Current account balance	−706, 068
Lines 3 + 20	Trade (goods) balance	−840, 251
Lines 4 + 21	Services balance	+144, 315
Lines 3 + 4 + 20 + 21	Goods and services balance	−695, 936
Lines 12 + 29 (not listed)	Investment income balance	+118, 231
Lines 40 + 55	Financial account balance	+533, 965
Line 71	Statistical discrepancy	+200,055

The sum of lines 1, 18, and 35 (i.e., exports of goods, services, and income; imports of goods, services, and income; and unilateral transfers [maintaining signs]) represents the current account (CA) balance. In 2008 in the United States, the CA balance was −706 billion dollars where the minus sign indicates a deficit. Thus the United States recorded a current account deficit of $706 billion. Note that the current account balance is often reported as the "trade balance using a broad measure of international trade." Because unilateral transfers are relatively small and because investment income can be interpreted as payments for a service, it is common to say that a current account deficit means that imports of goods and services exceed exports of goods and services.

The sum of lines 3 and 20 (i.e., exports of goods and imports of goods) is known as the merchandise trade balance, or just trade balance for short. In 2008, the United States recorded a trade deficit of over $840 billion. This means that the United States imported more physical goods than it exported.

The sum of lines 4 and 21, service exports and service imports, represents the service trade balance or just service balance. The table shows that the United States recorded a service surplus of over $144 billion in 2008. In other words, the U.S. exports more services than it imports from the rest of the world.

The sum of lines 2 and 19 (not listed), exports of goods and services and imports of goods and services, is a noteworthy trade balance because this difference is used in the national income identity for GDP. In contrast, the national income identity for GNP includes the current account balance instead. In 2008, the United States recorded a goods and services trade deficit of over $695 billion.

The sum of lines 12 and 29 (not listed), income receipts on U.S. assets abroad and income payments on foreign assets in the United States, represents the balance on investment income. In 2008, there was a recorded investment income surplus of over $118 billion in the United States. This means that U.S. residents earned more on their investments abroad than foreigners earned on their investments in the United States.

The sum of lines 40 and 55, U.S. assets abroad and foreign assets in the United States, represents the financial account balance. In 2008, the United States recorded a financial account surplus of over $533 billion. A surplus on capital account means that foreigners are buying more U.S. assets than U.S. residents are buying of foreign assets. These asset purchases, in part, represent international borrowing and lending. In this regard, a capital account surplus implies that the United States is borrowing money from the rest of the world.

Finally, line 71 records the 2008 U.S. statistical discrepancy as a $200 billion credit entry. This implies that recorded debit entries on the balance of payments exceeded recorded credit entries. Thus an additional $200 billion credit entry is needed to make the accounts balance. This is the largest statistical discrepancy recorded since the BEA records began in 1960.

The presence of a statistical discrepancy means that there are international transactions that have taken place but have not been recorded or accounted for properly. One might conclude that the size of the errors is $200 billion, but this does not follow. The discrepancy only records the net effect. It is conceivable that $400 billion of credit entries and $200 billion of debit entries were missed. Or possibly, $800 billion of debit entries and $600 billion of credit entries were missed. In each case, the difference is $200 billion dollars, but clearly the amount of error is substantially more in the latter case.

Based on the way the balance of payments data are collected, it seems likely that the primary source of the statistical discrepancy is on the capital account side rather than the current account side. This is because trade in goods, the primary component of the current account, is measured directly and completely by customs officials, while capital account data are acquired through surveys completed by major banks and financial institutions. This does not mean that errors cannot occur, however. Goods trade is tangible and thus is easier to monitor. Capital transactions, in contrast, can be accomplished electronically and invisibly and thus are more prone to measurement errors. Service and income transactions on the current account are also likely to exhibit the same difficulty in monitoring, implying that errors in the current account are more likely to arise in these subcategories.

KEY TAKEAWAYS

- The U.S. balance of payments records transactions on both the current and financial accounts concluding with several important balances.
- The United States had a current account deficit of $706 billion in 2008.
- The U.S. had a merchandise trade deficit that was larger than its current account deficit at over $840 billion in 2008.
- The U.S. had a financial account surplus of over $533 billion.
- The statistical discrepancy at $200 billion in 2008 demonstrates that all international transactions are not being recorded since the sum of the balance on the current account and the financial accounts does not equal zero.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. The value of the statistical discrepancy if a country has a current account deficit of $250 billion and a financial account surplus of $230 billion.

b. The approximate value of the U.S. current account deficit in 2008.

c. The approximate value of the U.S. merchandise trade deficit in 2008.

d. Of *U.S. domestic residents* or *foreign residents*, this group profited more on its foreign investments because the United States ran a surplus on its investment income balance.

e. The approximate value of the U.S. financial account surplus in 2008.

f. The approximate value of the statistical discrepancy in the U.S. balance of payments in 2008.

2.7 The Twin-Deficit Identity

LEARNING OBJECTIVES

1. Learn the interrelationship between a country's government budget balance (deficit) and its current account balance (deficit).
2. Interpret the interrelationships of trade balances and budget balances in terms of the sources and uses of funds in the financial system.

One of the important relationships among aggregate economic variables is the so-called twin-deficit identity, a term in reference to a country's government budget deficit and a simultaneous current account deficit. The name for this identity became commonplace during the 1980s and 1990s because at that time the United States experienced deficits in both of these accounts. Now, as we will see later, the identity will be a misnomer in many circumstances since there is no reason that "twin" deficits need to always appear together on these two national accounts. In fact, some countries will, at times, experience a deficit on one account and a surplus on the other. Also, at times, a country will experience a surplus on both accounts.

Thus a better title to this section would be "The Relationship between a Country's Government Budget Deficit and Its Current Account Deficit." However, since 2004, the United States finds itself back in the twin-deficit scenario, and since "twin-deficit identity" rolls off the tongue much more easily, we will stick to this title.

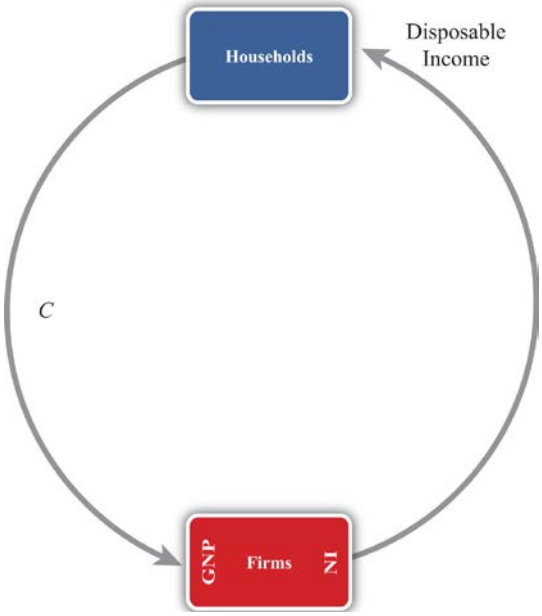
To understand this identity it will be helpful to take a much more careful look at the national income identity. This time I will build up the identity in a stepwise fashion using a circular flow diagram to better visualize the flows of money within an economy. A circular flow diagram is typically one of the first principles shown to students in an introductory macroeconomics class. Its purpose is to show the flow of money between the major players (or agents) within an economy. Circular flow diagrams can be either simple or complex depending on how many agents one introduces into the system and how finely one wishes to break down the monetary flows.

Circular Flow: Version 1

The simplest version of a circular flow diagram considers an economy consisting of two agents: households and firms. We imagine that firms produce goods and services using labor as an input.

The flow of money is shown in Figure 2.2 "The Simplest Circular Flow". The *C* arrow represents the dollar value of consumption expenditures made by households to purchase the goods and services produced and sold by firms. (The goods and services flow could be represented by an arrow in the opposite direction to *C*, but we leave that out for simplicity.) Since we assume in this case that there are only households buying goods, all GNP consists of *C*. The money that flows to firms from sales of consumption goods is given to the workers in exchange for their labor services. This monetary flow is represented by the arrow labeled “disposable income.” Disposable income is all the money households have to spend, which in this case is equal to the national income (NI).

Figure 2.2 The Simplest Circular Flow

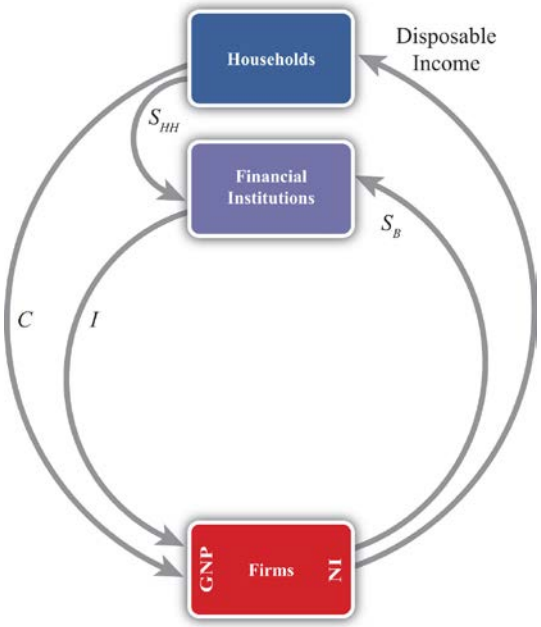


Note especially that we use GNP rather than GDP as our measure of national income so that flows with the rest of the world later are properly defined.

Circular Flow: Version 2

The circular flow can be extended one step by adding financial institutions in Figure 2.3 "The Circular Flow Adding Financial Institutions". Financial institutions represent any company that facilitates borrowing and lending; the prime example is a bank. However, they may also include investment companies, pension funds, and mutual funds. The presence of financial institutions allows some money to be diverted from the consumption flow. In Figure 2.3 "The Circular Flow Adding Financial

Figure 2.3 The Circular Flow Adding Financial Institutions



Institutions", these diversions are represented by S_{HH}, representing household savings and S_B, representing business saving. Some of the revenue earned by firms is not actually given out to workers in the form of wages. Instead some money is "retained" in the form of profit and excess earnings. These retained earnings are generally used to purchase investment goods to help an industry replace worn-out capital equipment and to add new capital. Much of these retained earnings may be used directly to purchase new capital equipment, although some of it will be saved by depositing it in a financial institution. For simplicity we will imagine that all such business saving flows through the financial system, hence the S_B arrow. In addition, households generally hold back some of their income from spending and deposit it into pension plans, savings accounts, and so on. Thus we include the arrow from households. The easiest way to think of the diagram is to imagine that financial institutions take deposits from firms and households and then lend out the money to finance investment spending, I. With some exceptions, this is the way it will often work. One notable exception is that some of the money lent by banks is often used to finance consumption rather than investment. This occurs whenever households finance consumption spending using a credit card. However, we can avoid this complication by defining S_{HH} as being "net" savings, where the net means "after subtracting household borrowing." With this definition in mind, it should be clear that S_{HH} can be negative—that is, its flow reversed—if household borrowing exceeds household saving.

We can now identify several important relationships. The first one relates to an important decision made by households. They choose how much of their disposable income should be spent on consumption and how much should be saved. You may recall from previous courses that the fraction of income spent on consumption goods (from an extra dollar of income) is called the marginal propensity to consume, while the fraction of income saved is called the marginal propensity to save.

A second relationship is shown on the left side of the Firms box. This indicates that GNP is equal to the sum of C and I. This version of the national income identity would only be valid if there were no government sector and no trade with the rest of the world.

A third important relationship is shown by noting the flow of money in and out of the financial sector. There we see two arrows flowing in (i.e., S_{HH} and S_B) and one flow outward (i.e., I). This leads to the identity

$$S_{HH} + S_B = I,$$

indicating that the sum of household and business saving equals investment. A more common simplification of this relationship is shown by noting the following:
$SP = SHH + SB$,

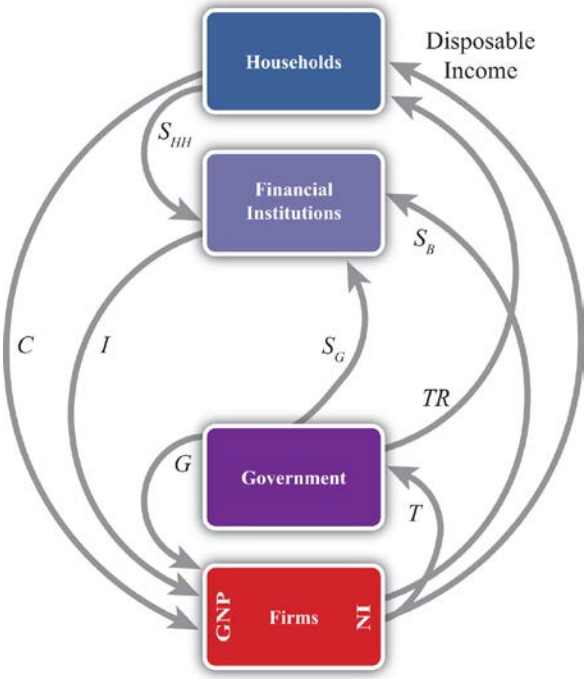
where SP is called private saving. Thus private saving equals the sum of household saving and business saving. This will simplify the above identity to
$SP = I$,

or simply, private saving equals investment. Note that the term "private" is used here to distinguish it from government (or public sector) saving, which we'll include next.

Circular Flow: Version 3

Next, let's add in the government sector in Figure 2.4 "The Circular Flow Adding Government". The government is shown both to take money out of the circular flow and to inject money back in. Money is withdrawn first in the form of taxes (T). In the adjoining diagram, taxes are represented as a flow of money directly from firms, as if it is entirely a tax on income. This is a simplification since in reality taxes are collected in many forms from many different agents. For example, governments collect profit taxes from firms and financial institutions, sales and property taxes from households, and tariffs on traded goods (not included yet). All of these taxes are assumed to be lumped together in the T flow and withdrawn directly from national income.

Figure 2.4 The Circular Flow Adding Government



Tax revenues (TR) can be spent in two separate ways. The TR flow represents transfer payments injected into the household income stream. Transfer payments include social security paid to retired workers, Medicaid and welfare payments, unemployment, and so on. These are government expenditures that do not exchange for a particular good or service. The second type of expenditure is G. G represents spending

by government for the purchase of goods and services produced by firms. It includes defense spending, education, police and fire protection, and so on.

The final monetary flow, shown flowing out of the government, is labeled SG and refers to government saving. It should be obvious that the money collected by government in the form of taxes need not always equal government expenditures. In the event that tax revenues exceed expenditures, the government would have extra money left over. We imagine that this money would be saved in the financial sector since it is always better to collect interest when possible. Hence we draw the flow of excess funds, government saving (SG), flowing from government into the financial sector.

We can now represent the flow of funds in and out of the government sector with the following identity: $SG = T - TR - G$.

When T exceeds the sum of TR and G, the government has extra saving that flows into the financial sector. These funds would then be available to lend out and finance additional investment.

Of course, what is more typical of many governments is for the sum of TR and G to exceed tax revenue, T. In this case, the flow of government saving (SG) would be negative and would be represented in the diagram as a flow in the opposite direction. In this case, the government would be borrowing money from the financial sector to finance its excess expenditures. We would also say that the government is running a budget deficit.

In short, negative government saving, that is, $SG < 0$, implies a government budget deficit, which the government finances by borrowing from the financial sector.

Otherwise, positive government saving, that is, $SG > 0$, implies a government budget surplus, which results either in additions to saving or a repayment of previous debt.

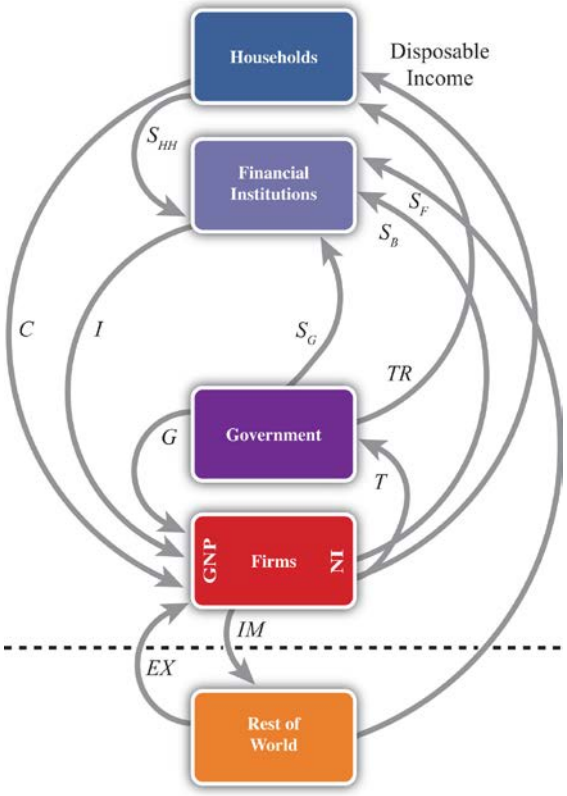
Next, in this version of the circular flow, we can represent the national income identity as the flow of money into firms. In this case, GNP equals the sum of C, I, and G. This version would only be Accurate when there is no trade with the rest of the world.

Lastly, with government included, we must rewrite the relationship representing the flows in and out of the financial sector. This now becomes
$SHH + SB + SG = I$.

This identity says that the sum of household, business, and government saving must equal private investment expenditures.

Circular Flow: Version 4

Figure 2.5 The Circular Flow Adding the RoW



The final circular flow diagram shown in Figure 2.5 "The Circular Flow Adding the RoW" extends the previous version to include trade flows with the rest of the world. The rest of the world (RoW) is shown at the very bottom of the adjoining diagram, below the dotted line, which represents the border. Trade with the RoW consists first of exports of goods, services, income and transfers, and expenditures on exports (*EX*), represented by a flow into firms since money is being used by foreigners to purchase the exported products. Second, imports of goods, services, income and transfers, and imports (*IM*) are subtracted from firms, resulting in an arrow from firms to the RoW. This adjustment accounts for the fact that measured expenditures made by households, the government, and firms in a open economy will consist of purchases of both domestic and imported goods. Thus the *C*, *I*, and *G* flows will include their purchases of imports, and these should not be included as part of GNP. In essence, the money used to buy imported products is redirected to the foreign firms, hence we have the outflow of money. (For a more complete explanation see Chapter 2 "National Income and the Balance of Payments Accounts", Section 2.1 "National Income and Product Accounts".)

This completes the national income identity with all major sectors included and now becomes
$GNP = C + I + G + EX - IM$,

which is represented by the flow of money into (and away from) firms on the left side of the diagram. However, as noted elsewhere, $EX - IM$, the balance on the current account, need not be equal to zero. If $EX - IM > 0$, then the country would have a current account (CA) surplus, whereas if $EX - IM < 0$ the country would have a CA deficit.

Consider when $EX - IM < 0$. In this case, more money flows out to purchase imports than flows back in to purchase exports. Essentially, there is a loss of money to the RoW despite some exceptions; however, this money does not remain outside the country. Instead, it is brought right back in and deposited into financial institutions (shown as the S_F flow on the diagram). In other words, it is saved. This saving represents the country's financial account surplus, which is equal and opposite to the CA deficit (see Chapter 2 "National Income and the Balance of Payments Accounts",Section 2.5 "Recording Transactions on the Balance of Payments" for a more complete explanation).

The key point is that foreign saving offsets the CA deficit. This can be represented by the relationship showing the inflows and outflows from the RoW, namely,
$SF = IM - EX$.

This says that foreign saving equals the CA deficit. From the perspective of the foreigners, we would refer to S_F as money saved or lent to the domestic country. From the perspective of the domestic country, S_F would be considered money borrowed from the RoW.

Clearly, since a country may run a surplus on trade (i.e., $EX - IM > 0$), S_F could also be negative. In this case, the RoW would either be dissaving, meaning it is withdrawing previously accumulated saving from the domestic country, or the RoW would be borrowing money from the domestic country. This would occur if a domestic bank makes a loan to someone abroad. Alternatively, from the perspective of the domestic country, we can say it is lending money to the RoW when $S_F < 0$.

Finally, the Twin-Deficit Identity

The twin-deficit identity is derived by accounting for the monetary flows in and out of the financial sector in version four of the circular flow. This results in the following identity:
$SHH + SB + SG + SF = I$.

This says that the sum of household saving, business saving, government saving, and foreign saving must equal private investment spending. An equivalent version can be written by recalling that household plus business saving equals private saving to get
$SP + SG + SF = I$.

The identity is best interpreted by noting that there are four key sources for funds in the financial sector that are not part of the consumption stream. The pool of funds to finance investment can be drawn from

households, businesses, the government, or from the RoW. Also, the sum of all funds not used for consumption must be equal to the amount spent on investment goods.

It is important to note that this relationship is an accounting identity. This means that the relationship must be true as long as all variables are measured properly. This is *not* an economic theory, which is a proposition that may or may not be true. In practice, this identity rarely adds up, however, because the variables are not typically measured accurately.

To turn this identity into the "twin-deficit" identity, we must merely take note of several previous definitions. Recall that

$$SG = T - TR - G, SF = IM - EX,$$

and

$$SP = SHH + SB.$$

Plugging these into identity 1 above yields

$$SP + T - TR - G + IM - EX = I.$$

Reorder these to get the following twin-deficit identity:

$$(SP - I) + (IM - EX) = (G + TR - T).$$

This is a popular way of writing the twin-deficit identity since it explicitly indicates two deficits. If the second expression $(IM - EX) > 0$, then the country has a current account deficit (i.e., a trade deficit). If the right-hand-side expression $(G + TR - T) > 0$, then the country has a government budget deficit. The expression in total, then, demonstrates that these two deficits are related to each other according to this accounting identity. Indeed, the difference between the government budget deficit and the trade deficit must equal the difference between private saving and investment as shown here:

$$(SP - I) = (G + TR - T) - (IM - EX).$$

The Twin-Deficit Relationship in the United States and China

Perhaps the best way to get a feel for the twin-deficit relationship in a country is to look at the numbers. Table 2.7 "U.S. Twin-Deficit Figures (GDP), 1997–2008" and Table 2.8 "China Twin-Deficit Figures (GDP), 1997–2007" show values for the twin-deficit identity in the United States and in China over the past ten years or so. All values are presented as a percentage of GDP. Also, because the data on the balance of payments never add up, which results in a statistical discrepancy term, the twin-deficit identity numbers do not add up. To avoid that problem, the private saving numbers presented are not the

actual reported values but the values saving would have to be to assure the twin-deficit identity adds up—that is, it is derived as a residual value.

Table 2.7 U.S. Twin-Deficit Figures (GDP), 1997–2008

	$(S_P - I)$ + Current Account Deficit = Govt. Budget Deficit			
Year	**Private Saving* (%)**	**Investment (%)**	**Current Account Deficit (%)**	**Govt. Budget Deficit (%)**
2008	13.5	14.0	4.7	4.2
2007	11.7	15.4	5.3	1.6
2006	12.1	16.7	6.1	1.5
2005	12.9	16.5	6.1	2.5
2004	14.0	16.1	5.5	3.4
2003	14.0	15.2	4.8	3.6
2002	13.4	15.1	4.4	2.7
2001	11.6	15.9	3.8	−0.5
2000	11.0	17.7	4.2	−2.4
1999	12.6	17.5	3.2	−1.7
1998	13.8	17.3	2.4	−1.0
1997	15.2	16.7	1.7	0.2
*** Private saving is calculated as a residual.**				

Source: U.S. Bureau of Economic Analysis, National Economic Accounts, Frequently Requested NIPA Tables. See U.S. BEA interactive tables for the years indicated at http://www.bea.gov/national/nipaweb/SelectTable.asp?Popular=Y.

Table 2.8 China Twin-Deficit Figures (GDP), 1997–2007

	$(S_P - I)$ + Current Account Deficit = Govt. Budget Deficit

Year	Private Saving* (%)	Investment (%)	Current Account Deficit (%)	Govt. Budget Deficit (%)
2007	53.0	42.3	−11.3	−0.6
2006	52.8	42.6	−9.4	0.8
2005	51.1	42.7	−7.2	1.2
2004	48.1	43.2	−3.6	1.3
2003	46.0	41.0	−2.8	2.2
2002	43.0	37.9	−2.4	2.6
2001	40.1	36.5	−1.3	2.3
2000	39.5	35.3	−1.7	2.5
1999	39.6	36.2	−1.4	1.9
1998	40.2	36.2	−2.9	1.1
1997	40.6	36.7	−3.1	0.7
*** Private saving is calculated as a residual.**				

Source: China Data Online, China Statistical Yearbook. See China Statistical Yearbooks located at http://chinadataonline.org/member/yearbooksp/default.asp?StartYear=1981&EndYear=2009&IFFirst=yes&page=2.

The twin-deficit numbers reveal some interesting patterns. As of the most recent data (2008), the United States has twin deficits, with a CA deficit of 4.7 percent of GDP and a government budget deficit of 4.2 percent. Since these numbers are almost equal, it is as if the U.S. government deficit, which must be financed with borrowing, is being financed by borrowed funds from abroad. In the previous year, 2007, government borrowing requirements were much lower, at 1.6 percent, but borrowing from foreigners was higher at 5.3 percent. The extra borrowing allowed the U.S. savings rate to remain much lower than the private investment requirement. We can interpret this year as one in which private investment was mostly financed with borrowings from abroad.

The United States has had twin deficits since 2001, when it finished a four-year run with a trade deficit and a government budget surplus. This demonstrates that twin "deficits" do not always arise despite the label used to describe the identity. During the budget surplus years the government was able to retire some of its outstanding debt, but the country also ran CA deficits implying, essentially, borrowings from foreigners. As in 2007, these years also describe periods in which foreign borrowings are used to maintain a higher investment level than can be sustained with the lower national savings rate.

In contrast, consider the twin-deficit numbers calculated in the same way for China during the same period. The differences with the U.S. numbers are striking. The two things that stand out immediately are the significantly higher values for private saving and investment. Instead of numbers in the midteens in the United States, China's percentages are in the midforties to low fifties. Again, the savings terms are calculated as residuals, so there may be some error there, but nonetheless it is clear that China both saves and invests about three times more than the United States as a percentage of GDP. Because it invests so much more, the implication from the national income identity is that China consumes much less than the United States as a percentage. Indeed, China's consumption figures (not shown) are usually less than 50 percent of GDP.

Indeed, this is why China and many other Asian economies are described as high-saving and low-consuming countries. The United States in comparison is described as a high-consumption country and low-saving country.

The negative number on China's CA deficit in all the years means that China has run a trade surplus. A surplus means it is lending money abroad and forgoing consumption, by another 11 percent in 2007. (This will be explained in more detail in Chapter 3 "The Whole Truth about Trade Imbalances".) Also, the negative number for China's budget balance means that it was running a government budget surplus in 2007. So in 2007, China had twin surpluses—a much rarer occurrence—rather than twin deficits. In previous years China didn't have twin anything: running trade surpluses that were increasing through the past decade, and government budget deficits.

It is worth reflecting briefly on the large investment and trade surpluses in China in comparison with the United States. The U.S. per capita GDP is about $47,000. Comprising that per person production is about 15 percent that goes into investment. That still leaves a considerable percentage left for the consumption and government spending that enhance Americans' standard of living. In contrast, China's per capita

GDP, in purchasing power parity (PPP) terms, is about $6,000. Per person, it produces much less than in the United States. But curiously, despite being a much poorer country, the high investment rate means that it consumes and spends on government programs a much smaller percentage of its income than the United States; perhaps as little as $3,000 per person.

This seems to fly in the face of simple logic. One might expect that a richer country like the United States would save more and consume less since it can do so while still maintaining a high standard of living. For a poorer country like China, we might expect it would save less and try to consume a larger proportion of its income in order to catch up (i.e., in terms of its standard of living) with the rest of the world. Instead, it is the exact opposite.

KEY TAKEAWAYS

- Twin deficits occur when a country has both a current account deficit and a government budget deficit at the same time.
- When twin deficits occur, the sum of net private saving ($S_p - I$) and the current account deficit must equal the government budget deficit.
- A government budget deficit represents a use of funds drawn from the financial sector.
- A trade deficit represents a source of funds for the financial sector.
- Private saving represents a source of funds for the financial sector.
- Private investment represents a use of funds drawn from the financial sector.
- The United States has run twin deficits for the past seven years. It can be reasonably described as a low-investment, low-saving, and high-consumption country.
- China has mostly run trade surpluses and budget deficits in the past decade. It can be reasonably described as a high-investment, high-saving, and low-consumption country.

EXERCISES

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. An excess of government receipts over expenditures.

b. National income minus taxes plus transfer payments.

c. The level of government spending when the government deficit is $100 billion, transfer payments are $800 billion, and tax revenues are $1,300 billion.
d. The four different sources of saving described in this chapter.
e. Of *deficit*, *surplus*, or *balance*, the balance on the current account if the expression *IM* − *EX* in the twin-deficit identity is positive.
f. Of *deficit*, *surplus*, or *balance*, the balance on the government budget if the expression (*G* + *TR* − *T*) in the twin-deficit identity is positive.

What is the government's budget balance if government spending is $40 billion, private saving is $60 billion, government transfer payments are $10 billion, private investment is $80 billion, and tax revenues are $50 billion? Show your work.

Below are the economic data for the fictional country of Sandia. Write out the twin-deficit identity. Verify whether Sandia's data satisfy the identity.

TABLE 2.9 SANDIA'S ECONOMIC DATA (BILLIONS OF DOLLARS)

Gross Domestic Product	400
Imports of Goods and Services	140
Investment Spending	20
Private Saving	30
Exports of Goods and Services	100
Government Transfers	40
Government Tax Revenues	140
Government Spending	140
Consumption Spending	280

Japan once argued that the main reason the United States had large trade deficits during the 1980s and 1990s was because of its large federal government budget deficit. If the United States wanted to reduce its trade deficit, Japan said, then the United States

should reduce its budget deficit. Use the twin-deficit identity to answer the following questions:

a. Explain what also would have to hold for there to be a direct relationship between budget deficit changes and trade deficit changes.

b. Is it possible to account for a reduction in the federal government budget deficit and a simultaneous increase in the current account deficit? Explain.

c. Is it possible to reduce the federal government budget deficit, maintain the same level of net private saving (i.e., $Sp - I$), and still experience an increase in the current account deficit? Explain.

Explain whether the following economic changes are consistent with the twin-deficit identity. Assume ceteris paribus, meaning all other variables in the identity remain fixed.

a. A $10 billion increase in the government budget deficit and a $10 billion increase in the current account deficit.

b. A $50 billion decrease in the government budget deficit and a $50 billion increase in private investment.

c. A $10 billion increase each in the government budget surplus, the current account deficit, private saving, and private investment.

d. A $30 billion increase in the current account surplus and a $30 billion increase in the government budget deficit.

Refer to the table below to answer the following questions:

a. Use the twin-deficit identity to fill in the blank values in the table below for the three fictitious countries.

	Private Saving (S_P)	Investment	Current Account Deficit	Government Budget Deficit
Metis	500	500		200
Thebe		150	0	300
Leda	75	100	0	

b. Which country is best described as financing its government budget deficit with domestic saving?

c. Which country is best described as financing its government budget deficit with foreign saving?

d. Which country is best described as financing extra domestic investment with government saving?

2.8 International Investment Position

LEARNING OBJECTIVES

1. Learn how to define and interpret a country's international investment position.
2. Understand how the international investment position is updated from year to year.

A country's international investment position (IIP) is like a balance sheet in that it shows the total holdings of foreign assets by domestic residents and the total holdings of domestic assets by foreign residents at a point in time. In the International Monetary Fund's (IMF) financial statistics, these are listed as domestic assets (foreign assets held by domestic residents) and domestic liabilities (domestic assets owned by foreign residents). The financial account balance, whose counterpart is the current account balance, is more like an income statement that shows the changes in asset holdings during the past year. In other words, the financial account balance consists of flow variables since it records changes in the country's asset holdings during the year, while the international asset position of a country consists of stock variables since it records the total value of assets at a point in time.

A country's net international asset position may be in surplus, deficit, or balance. If in surplus, then the value of foreign assets (debt and equity) held by domestic residents exceeds the value of domestic assets held by foreigners. Alternatively, we could say that domestic assets exceed domestic liabilities. This country would then be referred to as acreditor country. If the reverse is true, so that domestic liabilities to foreigners exceed domestic assets, then the country would be called a debtor country.

Asset holdings may consist of either debt obligations or equity claims. Debt consists of IOUs (i.e., I owe you) in which two parties sign a contract agreeing to an initial transfer of money from the lender to the borrower followed by a repayment according to an agreed schedule. The debt contract establishes an obligation for the borrower to repay principal and interest in the future. Equity claims represent ownership shares in potentially productive assets. Equity holdings do not establish obligations between parties, at least not in the form of guaranteed repayments. Once ownership in an asset is transferred from seller to buyer, all advantages and disadvantages of the asset are transferred as well.

Debt and equity obligations always pose several risks. The first risk with debt obligations is the risk of possible default (either total or partial). To the lender, default risk means that the IOU will not be repaid at all, that it will be repaid only in part, or that it is repaid over a much longer period of time than originally contracted. The risk of default to the borrower is that future borrowing will likely become

unavailable. The advantage of default to the borrower, of course, is that not all the borrowed money is repaid. The second risk posed by debt is that the real value of the repayments may be different than expected. This can arise because of unexpected inflation or unexpected currency changes. Consider inflation first. If inflation is higher than expected, then the real value of debt repayment (if the nominal interest rate is fixed) will be lower than originally expected. This will be an advantage to the borrower, who repays less in real terms, and a disadvantage to the lender, who receives less in real terms. If inflation turns out to be less than expected, then the advantages are reversed. Next, consider currency fluctuations. Suppose a domestic resident, who receives income in the domestic currency, borrows foreign currency in the international market. If the domestic currency depreciates, then the value of the repayments in domestic currency terms will rise even though the foreign currency repayment value remains the same. Thus currency depreciations can be harmful to borrowers of foreign currency. A similar problem can arise for a lender. Suppose a domestic resident purchases foreign currency and then lends it to a foreign resident (note that this is the equivalent of saving money abroad). If the domestic currency appreciates, then foreign savings, once cashed in, will purchase fewer domestic goods and the lender will lose.

The risk of equity purchases arises whenever the asset's rate of return is less than expected. This can happen for a number of different reasons. First, if the equity purchases are direct investment in a business, then the return on that investment will depend on how well the business performs. If the market is vibrant and management is good, then the investment will be profitable. Otherwise, the rate of return on the investment could be negative. All the risk, however, is borne by the investor. The same holds true for stock purchases. Returns on stocks may be positive or negative, but it is the purchaser who bears full responsibility for the return on the investment. Equity purchases can suffer from exchange rate risk as well. When foreign equities are purchased, their rate of return in terms of domestic currency will depend on the currency value. If the foreign currency in which assets are denominated falls substantially in value, then the value of those assets falls along with it.

The U.S. International Investment Position

The United States is the largest debtor nation in the world. This means that its international investment position is in deficit and the monetary value of that deficit is larger than that of any other country in the world. The data for the U.S. international investment position in 2008 are available in this U.S. BEA international investment position spreadsheet. [1] At market values the preliminary estimate for 2008 is

that the U.S. was in debt to the rest of the world in the amount of $3.469 trillion. (Refer to cell I22 in spreadsheet.) Excluding financial derivatives that refer to interest rate and foreign exchange contracts, the United States was in debt in the amount −$3.628 trillion (cell I24).

Note that this valuation is the U.S. "net" investment position, meaning that it is the difference between the sum total value of foreign assets owned by U.S. residents (U.S. assets abroad) minus U.S. assets owned by foreigners (foreign-owned assets in the United States). The first of these, U.S. assets abroad, represents our purchases of foreign equities and money we have lent to foreigners. The total value stood at $19.888 trillion in 2008 using market value methods (cell I26). The second, foreign-owned assets in the United States, represents foreign purchases of U.S. equities and money foreigners have lent to us or, equivalently, that we have borrowed. The total in 2008 stood at $23.357 trillion (cell I50).

The size of the U.S. debt position causes worry for some. Thirty years ago the United States had a sizable creditor position. However, as a result of trade deficits run throughout the 1980s and 1990s, the United States quickly turned from a net creditor to a net debtor. The changeover occurred in 1989. In the early 1990s, the size of this debt position was not too large compared to the size of the economy; however, by the late 1990s and early 2000s, the debt ballooned. In 2008, the U.S. debt position stood at 24.6 percent of GDP, which interestingly is down slightly from 24.9 percent of GDP in 2002 despite annual current account deficits since then. The reason for these changes is changes in the valuations of assets, as reflected in stock market prices, real estate price changes, and changes in the exchange rate.

Notice in the 2008 BEA IIP spreadsheet that the investment position is derived from the 2007 position in the following way. First, the current account deficit caused an addition to U.S. external debt of $505 billion (cell D22). Changes in asset prices both here and abroad further increased U.S. external debt by $720 billion (cell E22). This could be because either real estate prices abroad fell by more than in the United States or security prices abroad fell by more than in the United States. Next, there was another increase of $583 billion in external U.S. debt because of changes in exchange rates. In this case, an appreciation of the U.S. dollar increased the values of foreign-held U.S. assets and reduced the value of U.S.-held foreign assets. Finally, U.S. external debt decreased by $479 billion due to other factors that don't neatly fit into the first two categories. (See footnote 2 in the BEA IIP spreadsheet.)

For several reasons, the debt is not a cause for great worry, although it is growing quickly. First, despite its large numerical size, the U.S. international debt position is still less than 25 percent of its annual GDP.

Although this is large enough to be worrisome, especially with a trend toward a future increase, it is not nearly as large as some other countries have experienced in the past. In Argentina and Brazil, international debt positions exceeded 60 percent of their GDPs. For some less-developed countries, international debt at times has exceeded 100 percent of their annual GDP.

A second important point is that much of our international obligations are denominated in our own home currency. This means that when international debts (principal + interest) are paid to foreigners, they will be paid in U.S. currency rather than foreign currency. This relieves the U.S. from the requirement to sell products abroad to acquire sufficient foreign currency to repay its debts. Many other countries that have experienced international debt crises have had great problems financing interest and principal repayments especially when bad economic times make it difficult to maintain foreign sales.

Finally, it is worth noting that, despite the name applied to it, our international "debt" position does not correspond entirely to "debt" in the term's common usage. Recall that debt commonly refers to obligations that must be repaid with interest in the future. Although a sizable share of our outstanding obligations is in the form of debt, another component is in equities. That means some of the money "owed" to foreigners is simply the value of their shares of stock in U.S. companies. These equities either will make money or will not be based on the success of the business, but they do not require a formal obligation for repayment in the future.

KEY TAKEAWAYS

- The IIP measures the difference between the total value of domestic holdings of foreign assets and the value of foreign assets held in the domestic country. If the IIP is negative, we say the country is a debtor country. If the IIP is positive, we say the country is a creditor country.
- Asset holdings include both debt and equities. Debt involves an obligation to repay principal and interest, whereas equities involve either profit or loss to the foreign asset holder.
- The U.S. IIP stands at $3.5 trillion in 2008, making the United States the largest debtor nation in the world.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. A complete record of a country's holdings of foreign assets and foreigners' holdings of domestic assets at a point in time.

b. The term describing a country whose total domestic assets held abroad exceed total domestic liabilities held by foreigners.

c. The term describing a country whose total domestic liabilities held by foreigners exceed total domestic assets held abroad.

d. The name for the type of asset that establishes an obligation for the borrower to repay principal and interest in the future.

e. The name for the type of asset that represents ownership shares in potentially productive assets.

[1] The data for the U.S. international investment position are available from the Bureau of Economic Analysis, International Economic Accounts, International Investment Position, at http://www.bea.gov/international/xls/intinv08_t1.xls.

Chapter 3: The Whole Truth about Trade Imbalances

One of the most misinterpreted and misunderstood concepts in international finance is the implication of a country's trade deficit or surplus. Often it is incorrectly presumed that a trade deficit is problematic while a trade surplus is a sign of economic strength. This chapter walks the reader through a thorough investigation of trade imbalances—what they mean and how to interpret them. The chapter concludes that trade deficits can indeed be a big problem for a country, but not always. Trade surpluses can also be a sign of strength, but again, not always. Whether a trade imbalance for a particular country should be viewed as good, bad, or benign depends on many other economic circumstances. This chapter spells out what those circumstances are.

3.1 Overview of Trade Imbalances

LEARNING OBJECTIVE

1. Recognize that trade deficits are not inherently bad and trade surpluses are not inherently good for a country.

There is a popular and pervasive myth about international trade. The myth, simply stated, is that trade deficits are bad and trade surpluses are good. Good or bad for whom, one might ask? Well, for the entire country.

The presence of a trade deficit, or an increase in the trade deficit in a previous month or quarter, is commonly reported as a sign of distress. Similarly, a decrease in a trade deficit, or the presence of or increase in a trade surplus, is commonly viewed as a sign of strength in an economy.

Unfortunately, these perceptions and beliefs are somewhat misguided. In general, it is simply not true that a trade deficit is a sign of a weak economy and a trade surplus is a sign of a strong economy. Merely knowing that a country has a trade deficit, or that a trade deficit is rising, is not enough information to say anything about the current or future prospects for a country—and yet that is precisely how the statistics are often reported.

The truth about trade deficits is that sometimes they are good, sometimes they are bad, but most times, they are benign (i.e., they just don't matter). There are situations in which trade deficits could be interpreted as a sign of a strong thriving economy. There are other situations in which trade deficits could be indicative of economic problems. In most situations, however, trade deficits are not large enough to warrant a positive or negative interpretation. In this case, they should be viewed without interest. These same points apply to trade surpluses as well.

The purpose of this chapter is to explain, clearly and intuitively, the circumstances in which trade imbalances should be interpreted as good and the circumstances in which they are bad. The section will show situations in which trade deficits can indeed lead to long-term harm for an economy. However, it will also show cases in which trade deficits significantly improve a country's long-term economic prospects. We will highlight cases in which trade surpluses are appropriate and a sign of strength for a country, and we will show other cases in which trade surpluses may correspond to current demise or even an eventual collapse of an economy.

Most important, one should realize after reading this chapter that merely knowing that a country has a trade deficit or surplus is not enough information to say anything substantive about the strength of a country or its economic prospects.

KEY TAKEAWAY

- Trade deficits or trade surpluses can be good, bad, or benign depending on the underlying economic circumstances.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. Of *good*, *bad*, or *benign*, this is what the common myth is about the nature of trade deficits.

b. Of *good*, *bad*, or *benign*, this is what the common myth is about the nature of trade surpluses.

c. Of *good*, *bad*, *benign*, or *all of the above*, in general, this is what trade deficits can be.

d. Of *good*, *bad*, *benign*, or *all of the above*, in general, this is what trade surpluses can be.

e. Of *good*, *bad*, *benign*, or *all of the above*, perhaps most of the time, this is what trade deficits are.

f. Of *good*, *bad*, *benign*, or *all of the above*, perhaps most of the time, this is what trade surpluses are.

3.2 Trade Imbalances and Jobs

LEARNING OBJECTIVE

1. Learn why trade deficits may not be related to job losses in a country.

One of the main reasons trade deficits are considered deleterious is because of a common argument that trade deficits result in job losses. The rationale behind this argument is simple and convincing. There are two parts to the story that begin with the definition of a trade deficit.

First, a trade deficit arises whenever imports exceed exports. One simple reason for an imbalance of this kind is that imports are too large or at least larger than they would be under balanced trade. The most common reason offered in developed countries for why imports are too large is that low import prices arise because less-developed countries have exceedingly low wages paid to workers, lax health and safety standards, or more lenient environmental policies, all of which contribute to a veritable flood of imports. The effect of excessive imports is said to be the purchase of cheaper foreign goods by domestic consumers rather than purchasing the slightly more expensive domestic varieties. As demand for domestic firms' products falls, these firms are forced to downsize, resulting in the layoff of domestic workers. Thus it is said that trade deficits cause the loss of domestic jobs.

The second story argues that the reason imports exceed exports is because exports are too low; they are smaller than they should be. The most common reason given for low exports, especially in the developed countries, is the relatively high barriers to trade in developing countries. Although many countries participate in the World Trade Organization (WTO), the average applied tariffs still remain considerably higher in developing countries.

The effect of insufficient exports is that products that could be produced and sold abroad are not produced and sold abroad because of the barriers to trade. If the barriers were only removed, then exports would expand and jobs would be created in the country.

Thus since both of these stories can operate simultaneously, most observers are convinced that trade deficits indeed will cause job losses. Turn the deficit around, perhaps so much so as to induce a trade surplus, and this logic suggests that more jobs will be created.

This argument is very convincing because there is an element of truth to it. Changes in import and export patterns will certainly have competitive impacts on some industries and could produce temporary job losses. However, this doesn't mean that a country with a trade deficit generates fewer overall jobs than a

country with a trade surplus. Nor does it mean that increases in a country's trade deficit will necessarily lead to economy-wide job losses.

One reason job losses may not occur has to do with the deceptive nature of the previous job loss stories. The stories are convincing as far as they go, but unfortunately, they don't go far enough. In other words, the job loss stories have some validity, but they are incomplete; they don't tell the full story, and as a result they tend to mislead.

The rest of the story (as Paul Harvey would have said) is to recognize that when trade deficits arise on the current account, there is an equal and opposite trade surplus on the financial account of the balance of payments. A financial account surplus means that foreigners are purchasing domestic assets. Some of these purchases consist of equities such as stocks and real estate, while other asset purchases involve the lending of money as when foreigners purchase a government bond. In any case, that money flows back into the deficit country and ultimately is spent by someone. That someone could be the previous holder of the real estate or it could be the domestic government. When it is spent, it creates demands for goods and services that in turn create jobs in those industries.

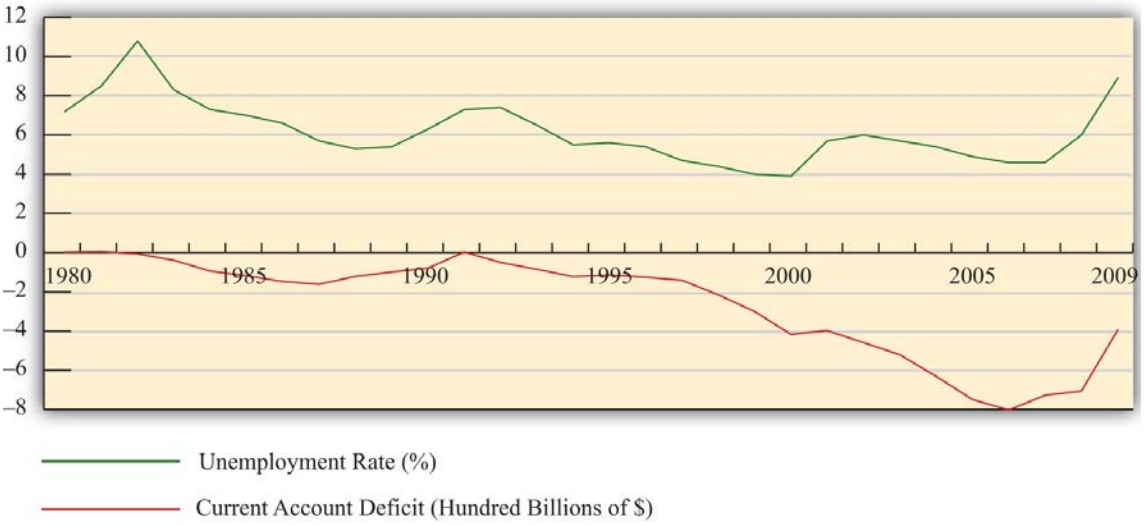
Now consider for a moment the following thought experiment. Suppose we could instantly change the behavior of the foreign lenders generating the financial account surplus (and the related trade deficit). Suppose they decide at once *not* to lend the money to the government or *not* to purchase real estate but instead decide to purchase domestic goods. The increase in goods purchases by foreigners would imply that export demand and hence exports will rise. Indeed, they will rise sufficiently to eliminate the trade deficit. And because of the increase in exports, jobs will be created in the export industries. However, at the same time export jobs are created, other jobs in the economy are being lost. That's because now less money is there to purchase the real estate or to lend to the government. Thus the elimination of the trade deficit doesn't create jobs in the aggregate, but it will change which sectors have more and less demand for its products. In other words, changes in the trade deficit will ultimately affect only where the jobs are in the economy (i.e., in which industries), not how many jobs there are.

The one exception to this, and one of the main reasons the job loss stories remain so convincing, is when there are rapid changes in the trade deficit or surplus. Rapid changes, like the thought experiment above, would require adjustments of workers between industries. During that adjustment process, some workers will be temporarily unemployed. If that adjustment involves an increase in the trade deficit or a decrease

in the trade surplus, the temporary jobs effect will be very noticeable in the tradable products industries. However, if the adjustment involves a decrease in the deficit or an increase in the surplus, then the job losses will more likely occur in the nontradable products sectors and it will be difficult to connect those job losses to the changes in the trade balance.

To provide some validation of this point—that is, that changes in the trade balances do not have effects on the aggregate number of jobs in an economy—consider Figure 3.1 "U.S. Trade Deficits and Unemployment, 1980–2009", showing two U.S. macroeconomic variables plotted over the past twenty years: the current account balance and the national unemployment rate. Now if the jobs stories suggesting that trade deficits cause job losses were true, we might expect to see an inverse relationship between the trade balance and the unemployment rate. Alternatively, if an increase in a country's trade deficit causes job losses in the economy, we might expect an increase in the unemployment rate to occur as well. Similarly, a decrease in the trade deficit should create jobs and lead to a decrease in the unemployment rate.

Figure 3.1 U.S. Trade Deficits and Unemployment, 1980–2009



Interesting, what Figure 3.1 "U.S. Trade Deficits and Unemployment, 1980–2009" shows is that during the periods when the U.S. trade deficit is rising (i.e., the trade balance is falling), the unemployment rate is falling; whereas when the trade deficit is falling, the unemployment rate is rising. This is precisely the opposite effect one would expect if the job-loss stories of trade deficits were true.

Of course this evidence does not prove that trade deficits will reduce unemployment in every country in all circumstances. However, the evidence does suggest that it is inappropriate to jump to the popular conclusion that trade deficits are bad for jobs and thus bad for the economy.

KEY TAKEAWAYS

- Trade deficits are often incorrectly presumed to cause job losses in an economy.
- The job-loss stories suggest that trade deficits arise due to excessive imports or insufficient exports and that by eliminating a deficit a country can create jobs in the economy.
- The job-loss story is incomplete though because it ignores the demand and jobs caused by the financial account surplus.
- When all effects of trade imbalances are accounted for, trade deficits may cause no more than temporary job losses in transition but not affect the aggregate level of jobs in an economy.
- Evidence from the United States over the past twenty years is used to show that the relationship between trade deficits and the unemployment rate is the opposite from what the popular "trade deficits cause job losses" stories would suggest.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. Of *too large*, *too small*, or *just right*, concerns about trade deficits sometimes suggest this about imports.

b. The import effect on trade deficits is sometimes said to be caused by this wage phenomenon in foreign countries.

c. The import effect on trade deficits is sometimes said to be caused by this environmental legal phenomenon in foreign countries.

d. Of *too large*, *too small*, or *just right*, concerns about trade deficits sometimes suggest this about exports.

e. The export effect on trade deficits is sometimes said to be caused by this trade barrier phenomenon in foreign countries.

f. The “trade deficits cause job losses” story ignores the effects of international transactions recorded on this balance of payments account.

g. Of *increase*, *decrease*, or *stay the same*, this has been the typical corresponding change in the U.S. unemployment rate whenever the U.S. trade deficit was rising since 1980.

3.3 The National Welfare Effects of Trade Imbalances

LEARNING OBJECTIVES

1. Understand the long-term implications of trade imbalances.
2. Identify conditions under which trade imbalances are detrimental, beneficial, or benign.

In this section, a series of simple scenarios (or stories) are presented to demonstrate how the well-being of a country may be affected when it runs a trade imbalance. The scenarios compare national output with domestic spending over two periods of time under alternative assumptions about the country's trade imbalance and its economic growth rate between the two periods. After each aggregate scenario is presented, we also provide an analogous situation from the point of view of an individual. Finally we present an evaluation of each scenario and indicate countries that may be displaying similar trade patterns.

Two periods are used as a simple way to introduce the dynamic characteristics of trade imbalances. The amount of time between the two periods can be varied to provide alternative interpretations. Thus the two periods could be labeled as *today* and*tomorrow*, *this year and next year*, or *this generation and next generation*.

We assume that all trade imbalances correspond to debt obligations or IOUs (i.e., I owe you). In other words, the financial account imbalances that offset the trade imbalances will be interpreted as international borrowing and lending rather than, say, foreign direct investment flows or real estate purchases.

Afterward, we will comment on how the interpretations of these scenarios may change with the alternative type of asset flow.

National welfare is best measured by the amount of goods and services that are "consumed" by households. What we care about, ultimately, is the standard of living obtainable by the average citizen, which is affected not by how much the nation produces but by how much it consumes.

Although gross domestic product (GDP)is often used as a proxy for national welfare, it is an inadequate indicator for many reasons, especially when a country runs trade imbalances. To quickly see why, consider the extreme situation in which a country runs the largest trade surplus possible. This would arise if a country exports all of its GDP and imports nothing. The country's trade surplus would then equal its

GDP, but the citizens in the country would have no food, clothing, or anything else to consume. The standard of living would be nonexistent.

To avoid this problem we use domestic spending (DS), or the sum of domestic consumption, investment, and government spending, as a proxy for national welfare. More formally, let

$$DS = C + I + G,$$

where C, I, and G are defined as in the national income accounts. Recall from Chapter 2 "National Income and the Balance of Payments Accounts" that C, I, and G each can be segmented into spending on domestically produced goods and services and spending on imported goods and services. Thus domestic spending includes imported goods in the measure of national welfare. This is appropriate since imported goods are consumed by domestic citizens and add to their well-being and standard of living.

One problem with using domestic spending as a proxy for average living standards is the inclusion of investment (note that this problem would also arise using GDP as a proxy). Investment spending measures the value of goods and services used as inputs into the productive process. As such, these items do not directly raise the well-being of citizens, at least not in the present period. To clarify this point, consider an isolated, self-sufficient corn farmer. Each year the farmer harvests corn, using part of it to sustain the family during the year, while allocating some of the kernels to use as seed corn for the following year. Clearly, the more kernels the farmer saves for next year's crop, the less corn the family will have to consume this year. As with the farmer, the same goes for the nation: the more that is invested today, the lower will be today's standard of living, ceteris paribus. Thus we must use domestic spending cautiously as a measure of national welfare and take note of changes in investment spending if it occurs.

The analysis below will focus on the interpretation of differences between national income (GDP) and domestic spending under different scenarios concerning the trade imbalance. The relationship between them can be shown by rewriting the national income identity.

The national income identity is written as

$$GDP = C + I + G + EX - IM.$$

Substituting the term for domestic spending yields

$$GDP = DS + EX - IM,$$

and rearranging it gives

$$EX - IM = GDP - DS.$$

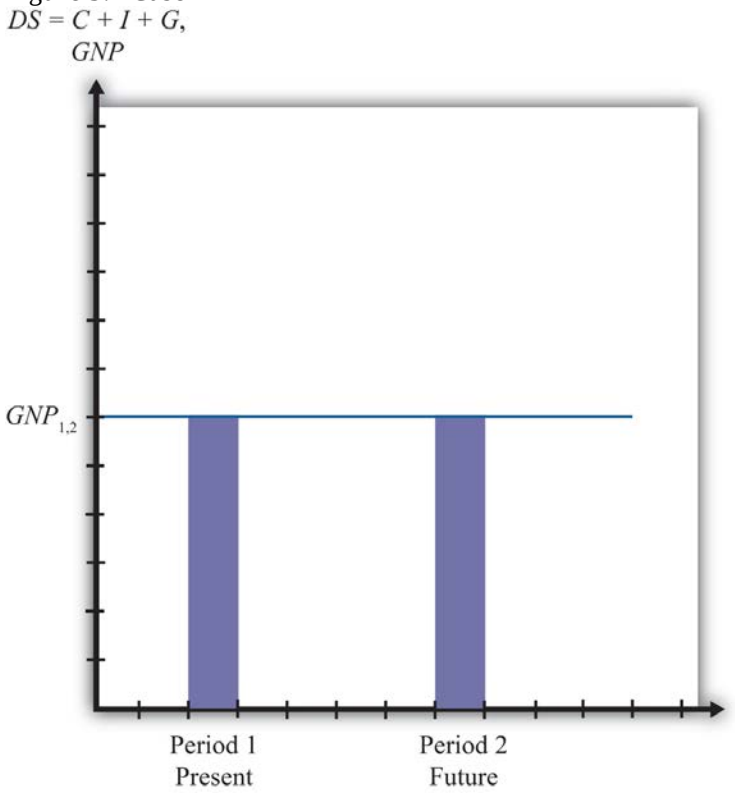
The last expression implies that when a country has a current account (or trade) surplus, GDP must exceed domestic spending by the equivalent amount. Similarly, when a country has a trade deficit, domestic spending exceeds GDP.

Note that to be completely accurate, we should use growth national product (GNP) rather than GDP in the analysis. This is because we are interpreting $EX - IM$ as the current account balance that includes income payments and receipts. With income flows included on the trade side, the measure of national output we get is GNP not GDP. Because conceptually both are measures of national output, we will use GNP in everthing that follows in this section.

Case 1: No Trade Imbalances; No GNP Growth between Periods

Case one, what we will call the base case, is used to demonstrate how GNP compares with domestic spending in the simplest scenario. Here we assume that the country does not run a trade deficit or surplus in either of the two periods and that no GNP growth occurs between periods. No trade imbalance implies that no net international borrowing or lending occurs on the financial account. The case mimics how things would look if the country were in autarky and did not trade with the rest of the world.

Figure 3.2 Case 1



Note from Figure 3.2 "Case 1" that domestic spending is exactly equal to GNP in both periods. Since domestic spending is used to measure national welfare, we see that the average standard of living remains unchanged between the two

periods. Overall, nothing very interesting happens in this case, but it will be useful for comparison purposes.

The Individual Analogy

Consider an individual named Rajiv. For an individual, GNP is analogous to Rajiv's annual income since his income represents the value of goods and services produced with his labor services. Domestic spending is analogous to the value of the goods and services purchased by Rajiv during the year. It corresponds to Rajiv's consumption of goods and services that serves as a proxy for his welfare level. Trade for an individual occurs whenever a transaction occurs with someone outside his household.

Let's assume for simplicity that Rajiv earns $30,000 per year. The assumption of no GNP growth in the base case implies that he continues to earn $30,000 in the second period and thus experiences no income growth. The assumption of no trade imbalances implies that Rajiv engages in no borrowing or lending outside of his household. That implies that he spends all of his income on consumption goods and thus purchases $30,000 worth of goods and services. This level of consumption remains the same in both periods, implying that his standard of living is unchanged.

Another way of interpreting balanced trade for an individual is to imagine that he exports $30,000 worth of labor services and afterward imports $30,000 worth of consumption goods and services. Since exports equal imports, trade is balanced.

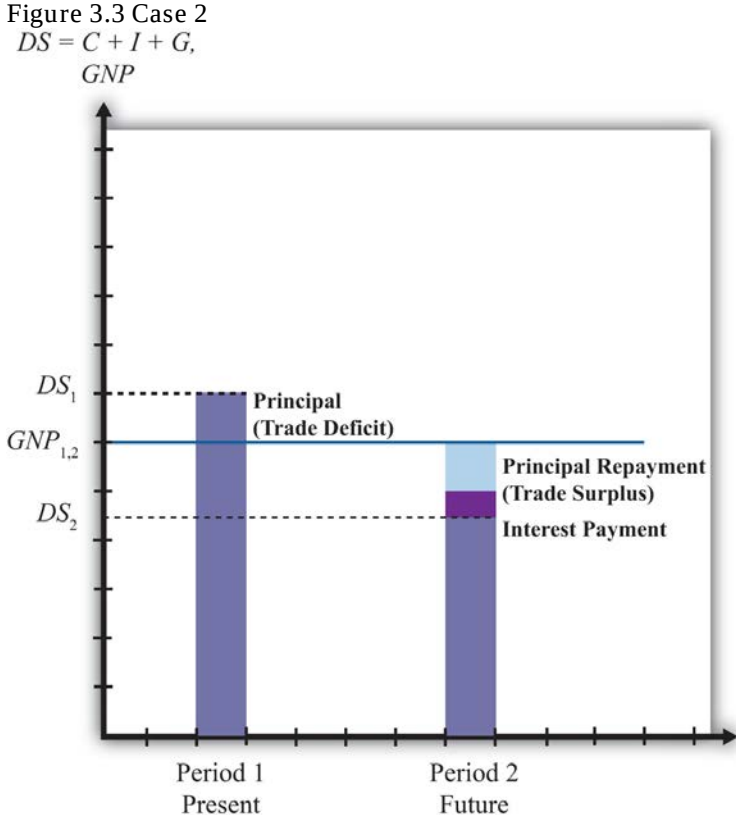
Case 2: Current Account Deficit Period 1; No GDP Growth between Periods

In this case, we assume that the country runs a current account (or trade) deficit in the first period. We'll also assume that the resultant financial account surplus corresponds to borrowing from the rest of the world, rather than asset purchases. These borrowed funds are assumed to be repaid in their entirety in the second period. In other words, we'll assume that loans are taken out in the first period and that the principal and interest are repaid completely in the second period. We also assume that there is no GNP growth between periods.

As shown in Figure 3.3 "Case 2", the trade deficit in the first period implies that domestic spending, DS_1, exceeds GNP_1. The difference between DS_1 and GNP_1represents the current account deficit as well as the value of the outstanding principal on the foreign loans. The extra consumption the country can enjoy is possible because it borrows funds from abroad and uses them to purchase extra imports. The result is the

potential for a higher standard of living in the country in the period in which it runs a current account deficit if the extra funds are not directed into domestic investment.

Figure 3.3 Case 2



In the second period, the borrowed funds must be repaid with interest. The repayment reduces domestic spending below the level of GNP by the amount of the principal and interest repayment as shown by the light-colored areas in the diagram. [1] Since GNP does not change between the two periods, DS_2 will lie below GNP_1. What this means is that the average standard of living can fall during the period in which the loan repayment is being made.

This outcome highlights perhaps the most important concern about trade deficits. The fear is that large and persistent trade deficits may require a significant fall in living standards when the loans finally come due. If the periods are stretched between two generations, then there is an intergenerational concern. A country running large trade deficits may raise living standards for the current generation, only to reduce them for the next generation. It is then as if the parents' consumption binge is being subsidized by their children.

The Individual Analogy

In case two, our individual, Rajiv, would again have a $30,000 income in two successive periods. In the first period, suppose Rajiv borrows money, perhaps by running up charges on his credit card. Suppose these charges amount to $5,000 and that the interest rate is a generous 10 percent. Assuming Rajiv does not save money in the first period, his consumption level in the first period would be the sum of his income and his borrowed funds. Thus he would enjoy $35,000 worth of goods and services reflecting a standard of living higher than his actual income.

In the second period, Rajiv must pay back the $5,000 in loans plus the interest charges, which, at a 10 percent interest rate, would amount to $500. Thus $5,500 of Rajiv's $30,000 income would go toward debt repayment, leaving him with only $24,500 to spend on consumption.

In this case, extra consumption, or a higher living standard in period one, is achieved by sacrificing a lower living standard in the future.

Note that in the first period Rajiv imports more goods and services in consumption than he exports in terms of labor services. Hence, this corresponds to a trade deficit. In the second period, Rajiv imports fewer goods and services in consumption than the labor services he exports; hence, this corresponds to a trade surplus.

Evaluation

Case two reflects legitimate concerns about countries that run large or persistent trade deficits. The case highlights the fact that trade deficits, which arise from international borrowing, may require a reduced average standard of living for the country in the future when the loans must be repaid.

An example of this situation would be Mexico during the 1970s and 1980s. Mexico ran sizeable current account deficits in the 1970s as it borrowed liberally in international markets.

In the early 1980s, higher interest rates reduced its ability to fulfill its obligations to repay principal and interest on its outstanding loans. Their effective default precipitated the third world debt crisis of the 1980s. During the 1980s, as arrangements were made for an orderly, though incomplete, repayment of Mexico's loans, the country ran sizeable current account surpluses. As in case two here, Mexico's current account deficits in the 1970s allowed it to raise its average living standards, above what would have been possible otherwise, while its current account surpluses in the 1980s forced a substantial reduction in living standards.

It is worth emphasizing that current account deficits are not detrimental in the periods in which the deficits are occurring. In fact, current account deficits correspond to higher consumption, investment, and government spending levels than would be possible under balanced trade. Instead, current account deficits pose a problem only when the debt repayment occurs, which is when the country is running current account surpluses. Trade deficits raise national welfare in the periods in which they occur, while trade surpluses reduce welfare in the periods in which they occur.

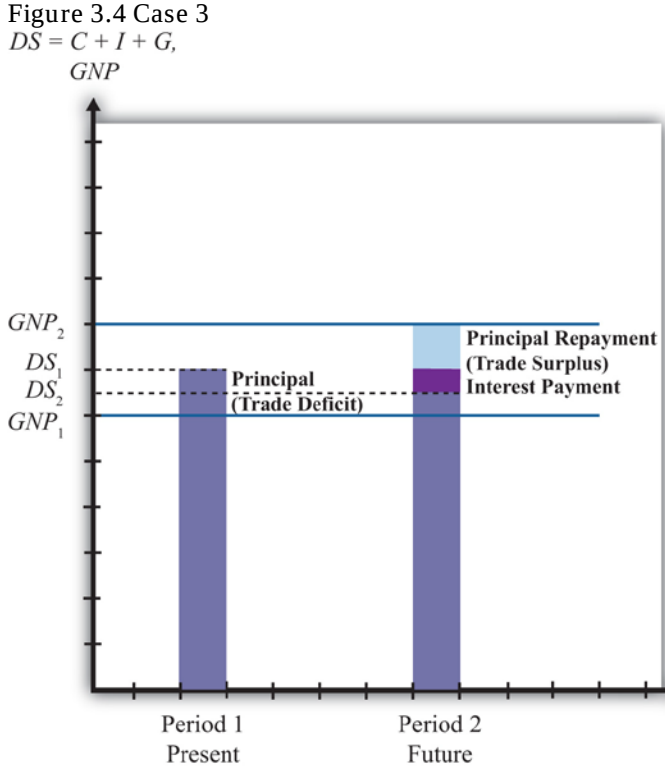
In other words, in terms of the national welfare effects, the problem here isn't large or persistent trade deficits but rather the large and persistent trade surpluses that might arise in the future as a result.

It is also worth noting that trade deficits in this case need not be a problem in the long run if they are not too large. Just as an individual may make a choice to substitute future consumption for present consumption, so might a nation. For example, an individual may reasonably decide while young to take exotic vacations, engage in daredevilish activities, or maybe purchase a fast car, even if it means taking out sizeable loans. Better to enjoy life while healthy, he may reason, even if it means that he will have to forgo similar vacations or activities when he is older. Similarly, a nation, through an aggregation of similar individual decisions, may "choose" to consume above its income today even though it requires reduced consumption tomorrow. As long as the future reduced consumption "costs" are borne by the individuals who choose to overconsume today, deficits for a nation need not be a problem. However, if the decision to overconsume is made through excessive government spending, then the burden of reduced consumption could fall on the future generation of taxpayers, in which case there would be an intergenerational welfare transfer.

Case 3: Current Account Deficit Period 1; Positive GDP Growth between Periods

In the third case, we assume, as in case two, that the country runs a trade deficit in the first period, that the trade deficit corresponds to borrowing from the rest of the world, and that in period two all the loans are repaid with interest. What differs here is that we will assume GNP growth occurs between the first and second periods. As we'll see, growth can significantly affect the long-term effects of trade deficits.

Figure 3.4 Case 3



In Figure 3.4 "Case 3", note that the first period domestic spending (DS_1) lies above GNP in the first period (GNP_1). This arises because a trade deficit implies that the country is borrowing from the rest of the world, allowing it to spend (and consume) more than it produces.

In the second period, we assume that GNP has grown to GNP_2 as shown in the graph. The principal and interest from first period loans are repaid, which lowers domestic spending to DS_2. Note that since domestic spending is less than GNP_2, the country must be running a trade surplus. Also note that the trade surplus implies that consumption and the average standard of living are reduced below the level that is obtainable with balanced trade in that period. In a sense, the trade deficit has a similar long-term detrimental effect as in case two.

However, it is possible that the first period trade deficit, in this case, may actually be generating a long-term benefit. Suppose for a moment that this country's balanced trade outcome over two periods would look like the base case. In that case, balanced trade prevails but no GDP growth occurs, leaving the country with the same standard of living in both periods. Such a country may be able to achieve an outcome like case three if it borrows money from the rest of the world in period one—thus running a current account deficit—and uses those funds to purchase investment goods, which may in turn stimulate GNP growth. If GNP rises sufficiently, the country will achieve a level of domestic spending that exceeds the level that would have been obtained in the base case.

Indeed, it is even possible for a country's standard of living to be increased in the long term entirely because it runs a trade deficit. In case three, imagine that all the borrowed funds in period one are used for investment. This means that even though domestic spending rises, the average standard of living would remain unchanged relative to the base case because investment goods generate no immediate consumption pleasures. In period two, the higher level of domestic spending may be used for increased consumption that would cause an increase in the country's average living standards. Thus the country is better off in both the short term and long term with the unbalanced trade scenario compared to the balanced trade case.

The Individual Analogy

The third case is analogous to our individual Rajiv with, say, a $30,000 income in period one. The trade deficit in the first period means that he borrows money using his credit card to purchase an additional, say, $5,000 worth of "imported" consumption goods. Thus in period one the person's consumption and standard of living are higher than reflected by his income.

In the second period, the GNP rises, corresponding to an increase in Rajiv's income. Let say that his income rises to $40,000 in the second period. We'll also assume that all credit card loans must be repaid

along with 10 percent interest charges in the second period. Consumption spending for Rajiv is now below his income. Subtracting the $5,000 principal repayment and the $500 interest payment from his $40,000 income yields consumption of $34,500.

The investment story above is similar to the case in which an individual takes out $5,000 in student loans in period one and earns an advanced degree that allows him to acquire a better-paying job. Assuming the educational investment does not add to his consumption pleasures (a seemingly reasonable assumption for many students), his welfare is unaffected by the additional spending that occurs in period one. However, his welfare is increased in period two since he is able to consume an additional $4,500 worth of goods and services even after paying back the student loans with interest.

Evaluation

The lesson of case three is that trade deficits, even if large or persistent, will not cause long-term harm to a nation's average standard of living if the country grows rapidly enough. Rapid economic growth is often a cure-all for problems associated with trade deficits.

In some cases, it is possible for growth to be induced by investment spending made possible by borrowing money in international markets. A trade deficit that arises in this circumstance could represent economic salvation for a country rather than a sign of economic weakness.

Consider a less-developed country. Countries are classified as less developed because their average incomes are very low. Indeed, although many less-developed countries, or LDCs, have a small, wealthy upper class, most of the population lives in relative poverty. Individuals who are poor rarely save very much of their incomes, therefore, LDCs generally have relatively small pools of funds at home that can be used to finance domestic investment. If investment is necessary to fuel industrialization and economic growth, as is often the case especially in early stages of development, an LDC might be forced to a slow or nonexistent growth path if it restricts itself to balanced trade and limits its international borrowing.

On the other hand, if an LDC borrows money in international financial markets, it will run a trade deficit by default. If these borrowed funds are used for productive investment, which in turn stimulates sufficient GDP growth, then the country may be able to raise average living standards even after repaying the

principal and interest on international loans. Thus trade deficits can be a good thing for less-developed countries.

The same lesson can be applied to the economies in transition in the former Soviet bloc. These countries suffered from a lack of infrastructure and a dilapidated industrial base after the collapse of the Soviet Union. One obvious way to spur economic growth in the transition is to replace the capital stock with new investment: build new factories, install modern equipment, improve the roads, improve telecommunications, and so on. However, with income falling rapidly after the collapse, there were few internal sources to fund this replacement investment. It was also not obvious which sectors were the best to invest in. Nevertheless, one potential option was for these countries to borrow funds on international financial markets. Trade deficits that would occur under this scenario could be justified as an appropriate way to stimulate rapid economic growth.

Of course, just because trade deficits *can* induce economic growth and generate long-term benefits for a country doesn't mean that a trade deficit *will* spur long-term economic growth. Sometimes investments are made in inappropriate industries. Sometimes external shocks cause once profitable industries to collapse. Sometimes borrowed international funds are squandered by government officials and used to purchase large estates and big cars. For many reasons good intentions, and good theory, do not always produce good results. Thus a country that runs large and persistent trade deficits, hoping to produce the favorable outcome shown in case three, might find itself with the unfavorable outcome shown in case two.

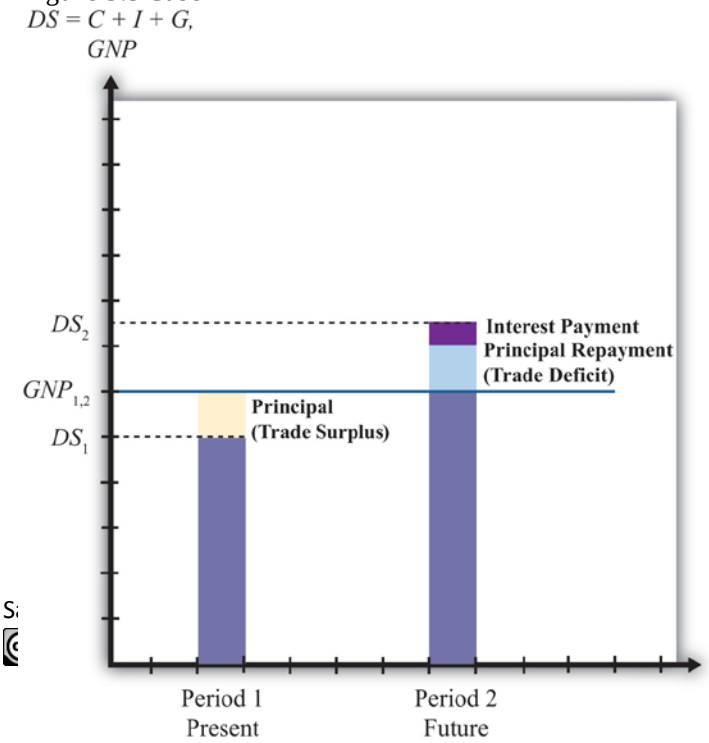
Finally, a country running trade deficits could find itself with the favorable outcome even if it doesn't use borrowed international funds to raise domestic investment. The United States, for example, has had rather large trade deficits since 1982. By the late 1980s, the United States achieved the status of the largest debtor nation in the world. During the same period, domestic investment remained relatively low especially in comparison to other developed nations in the world. One may quickly conclude that since investment was not noticeably increased during the period, the United States may be heading for the detrimental outcome. However, the United States maintained steady GNP growth during the 1980s and 1990s, except during the recession year in 1992. As long as growth proceeds rapidly enough, for whatever reason, even a country with persistent deficits can wind up with the beneficial outcome.

Case 4: Current Account Surplus Period 1; No GDP Growth between Periods

In this case, we assume that the country runs a trade surplus in the first period and that no GDP growth occurs between periods. A surplus implies that exports exceed imports of goods and services and that the country has a financial account deficit. We will assume that the financial account deficit corresponds entirely to loans made to the rest of the world. We can also refer to these loans as savings, since the loans imply that someone in the country is forgoing current consumption. In the future, these savings will be redeemed along with the interest collected in the interim. We shall assume that all of these loans are repaid to the country with interest in the second period.

In Figure 3.5 "Case 4", we see that in the first period, when the trade surplus is run, domestic spending (DS_1) is less than national income or GDP. This occurs because the country is lending rather than consuming some of the money available from production. The excess of exports over imports represents goods that could have been used for domestic consumption, investment, and government spending but are instead being consumed by foreigners. This means that a current account surplus reduces a country's potential for consumption and investment below what is achievable in balanced trade. If the trade surplus substitutes for domestic consumption and government spending, then the trade surplus will reduce the country's average standard of living. If the trade surplus substitutes for domestic investment, average living standards would not be affected, but the potential for future growth can be reduced. In this sense, trade surpluses can be viewed as a sign of weakness for an economy, especially in the short run during the periods when surpluses are run. Surpluses can reduce living standards and the potential for future growth.

Figure 3.5 Case 4



Nevertheless, this does not mean that countries should not run trade surpluses or that trade surpluses are necessarily detrimental over a longer period. As shown in the diagram, when period two arrives the country redeems its past loans with interest. This will force the country to run a trade deficit, and domestic spending (DS_2) will exceed GDP. The trade deficit implies imports

exceed exports, and these additional imports can be used to raise domestic consumption, investment, and government spending. If the deficit leads to greater consumption and government spending, then the country's average standard of living will rise above what is achievable in balanced trade. If the deficit leads to greater investment, then the country's potential for GDP growth in the third period (not shown) is enhanced.

Briefly, this case describes the situation in which a country forgoes first period consumption and investment so that in period two it can enjoy even greater consumption and investment.

The Individual Analogy

Consider our individual, Rajiv, who has an annual income of $30,000 over two periods. This corresponds to the constant GDP in the above example. Rajiv would run a trade surplus in period one if he lends money to others. One way to achieve this is simply to put money into a savings account in the local bank. Suppose Rajiv deposits $5,000 into a savings account. That money is then used by the bank to make loans to other individuals and businesses. Thus in essence Rajiv is making loans to them with the bank acting as an intermediary. The $5,000 also represents money that Rajiv does not use to buy goods and services. Thus in period one Rajiv exports $30,000 of labor services, but imports only $25,000 of consumption goods. The excess is loaned to others so that they may be consumed instead in the first period. It is clear that Rajiv's standard of living at $25,000 is lower in the first period than the $30,000 he could have achieved had he not deposited money into savings.

In the second period, we imagine that Rajiv again earns $30,000 and withdraws all the money plus interest from the savings account. Suppose he had earned 10 percent interest between the periods. In this case, his withdrawal would amount to $5,500. This means that in period two Rajiv can consume $35,500 worth of goods and services. This outcome also implies that Rajiv's domestic spending capability exceeds his income and so he must be running a trade deficit. In this case, Rajiv's imports of goods and services at $35,500 exceed his exports of $30,000 worth of labor services; thus he has a trade deficit.

Is this outcome good or bad for Rajiv? Most would consider this a good outcome. One might argue that Rajiv has prudently saved some of his income for a later time when he may have a greater need. The story may seem even more prudent if Rajiv suffered a significant drop in income in the second period to, say, $20,000. In this case, the savings would allow Rajiv to maintain his consumption at nearly the same level in both periods despite the shock to his income stream. This corresponds to the words of wisdom that one

should *save for a rainy day*. Savings can certainly allow an individual to smooth his consumption stream over time.

Alternatively, one might consider the two periods of the story to be middle age and retirement. In this case, it would make sense to save money out of one's income in middle age so that one can draw on those savings and their accumulated earnings during retirement when one's income has fallen to zero.

On the other hand, excessive saving in the first period might make Rajiv seem miserly. Few people would advise that one save so much as to put oneself into poverty or to reduce one's living standard below some reasonable norm. Excessive prudence can seem inappropriate as well.

Evaluation

The prime example of a country that mimics the first period of case four is Japan during the 1980s and 1990s. Japan ran sizeable trade surpluses during those two decades. As this story suggests, the flip side of the trade surplus is a financial account deficit that implied a considerable increase in the amount of loans that Japan made to the rest of the world. Although Japan's trade surplus has often been touted as a sign of strength, an important thing to keep in mind is that Japan's trade surpluses implied lower consumption and government purchases, and thus a lower standard of living than would have been possible with balanced trade. Although trade surpluses can also result in lower investment, this effect was not apparent for Japan. During those two decades of investment, spending as a percentage of GDP always exceeded 25 percent, higher than most other developed countries.

These surpluses may turn out to be especially advantageous for Japan as it progresses in the twenty-first century. First of all, it is clear that Japan's surpluses did not usher in an era of continual and rapid GDP growth. By the early 1990s, Japan's economy had become stagnant and finally began to contract by 1998. However, rather than allowing a decline in GDP to cause a reduction in living standards, Japan could use its sizeable external savings surplus to maintain consumption at the level achieved previously. Of course, this would require that Japan increase its domestic consumption and begin to run a trade deficit, two things that did not occur even by 2009.

In another respect, Japan's trade surpluses may be advantageous over the longer run. Japan, along with most other developed nations, will experience a dramatic demographic shift over the next three decades. Its retired population will continue to grow as a percentage of the total population of the baby boomers reach retirement and people continue to live longer. The size of the Japan's working population will

consequently decline as a percentage of the population. This implies an increasing burden on Japan's pay-as-you-go social retirement system as a smaller number of workers will be available per retiree to fund retiree benefits. If at that time Japan draws down its accumulated foreign savings and runs trade deficits, it will be able to boost the average consumption level of its population while reducing the need to raise tax burdens to fund its social programs. Of course, this outcome may never be realized if Japan's economy does not rebound strongly from its recent stagnant condition.

Overall, regardless of the outcome, Japan's economy today, faced with a potentially severe recession, is certainly in a stronger position by virtue of its accumulated foreign savings than it would be if it had run trade deficits during the past two decades.

Summary

These stories suggest that trade imbalances, when evaluated in terms of their momentary effects and their long-term economic consequences, can be either good, bad, or benign, depending on the circumstances. Trade deficits may signal excessive borrowing that could in the future lead to possible default, or worse, an excessive reduction in living standards needed to repay the accumulated debt. In this case, the trade deficit is clearly bad for the nation. Alternatively, trade deficits may represent a country that is merely drawing down previously accumulated foreign savings or selling other productive assets, in which case there is no potential for default or reduced living standards in the future. Here, the trade deficit is either immaterial or even beneficial in that the nation is able to achieve a higher current living standard because of the deficit. Trade deficits might also make an expansion of domestic investment possible, which could spur future economic growth sufficiently to make repayment consistent with growing living standards. In this case, trade deficits are clearly good as they stimulate future economic prosperity. Finally, in a free market economy, trade deficits may simply reflect the aggregated choices of many individuals to forgo future consumption to achieve more current consumption. In this case, the trade deficit should be viewed as immaterial since it merely reflects the free choices of the nation's people.

On the other hand, a trade surplus may correspond to prudent foreign saving and purchases of foreign productive assets, which may be used to support a growing retired population in the future. In this case, the trade surplus is a good thing for the nation. The trade surplus might also represent a period of repayment of past debt. This outcome may be acceptable if achieved together with growing living standards. However, if the surplus arises in a period of slow growth or falling GDP, then the surplus

would correspond to painful reductions in living standards, which is clearly a bad outcome for the country. Finally, the trade surplus may occur as a result of the aggregated choices of many individuals who have acquired greater past consumption by forgoing current consumption. In this case, the surplus should be viewed as immaterial to the nation as a whole.

KEY TAKEAWAYS

- Domestic spending measures the total value of purchases of goods and services in a country regardless of where the goods and services were produced. As such, it is a better way to measure the "consumption" in an economy affecting the nation's standard of living as compared to "production" or GDP.
- When a country has a current account deficit, its national consumption exceeds its national production. When a country has a current account surplus, its national production exceeds its national consumption.
- Trade deficits become a problem over time if accumulated borrowings result in a substantial reduction in consumption and standard of living for its citizens during the repayment periods.
- The problems associated with a deficit occur not when the trade deficit is being run but in later periods when a trade surplus becomes necessary.
- Trade deficit problems are mitigated with GNP growth. The faster GNP grows, the lesser the decline in future consumption during the repayment period.

EXERCISES

1. Consider the Japanese economy over two periods of time: first period (today) and second period (the future). Suppose Japanese GDP today is $2,000 billion (we'll use the U.S. dollar rather than the yen). Suppose Japan runs a current account surplus of 5 percent of GDP in the first period and lends money at the market interest rate of 5 percent.

a. What is the value of domestic spending on *C*, *I*, and *G* in the first period?

b. What would be the value of domestic spending in Japan in the second period if all the first period loans are repaid with interest and no economic growth occurs between periods?

Consider the following situations describing the actions of an individual household. Explain whether each situation is analogous to a country running a trade deficit, a trade surplus, or neither. Briefly explain why.

a. A student takes out a bank loan to finance a spring break vacation.

b. A family sells an antique watch to finance a purchase of 100 shares of a "hot" stock.

c. A retired couple cashes in a portion of their savings to finance their daily living expenses.

d. A carpenter builds a deck for a dentist in exchange for dental checkups for his kids.

e. A family pays off the last $3,000 of its student loans.

Suppose that each situation listed is the dominant effect on a country's balance of payments. Indicate by filling in the blank spaces whether the current account and capital account will be in *surplus* or *deficit*.

	Current Account Balance	Financial Account Balance
a. A country is a net borrower from the rest of the world		
b. A country is repaying past debts		
c. A country exports more goods and services than it imports		
d. A country sells foreign assets and repatriates the proceeds		
e. A country is a net lender to the rest of the world		
f. A country earns more income on foreign assets than foreigners earn in its country		

[1] In actuality, the interest repayment component may be included as part of domestic spending since interest represents a payment for services received—those services being the privilege of consuming earlier. However, since this service is unlikely to raise one's standard of living in period two, we have excluded it from domestic spending.

3.4 Some Further Complications

LEARNING OBJECTIVE

1. Recognize how the long-term consequences of trade deficits change when they are financed by equity rather than debt.

The analysis of trade imbalances is further complicated by the fact that not all financial flows are debt obligations or IOUs (i.e., I owe you). In the previous stories, we assumed that all financial account transactions corresponded to international lending or borrowing. In actuality, many international asset transactions involve sales or purchases of productive assets. For example, if a foreigner purchases shares of Microsoft stock in the U.S. market, the transaction would be recorded as a credit entry on the financial account and would add to a financial account surplus. However, in this case we could not claim that someone in the United States borrowed money from the rest of the world because there is no obligation to repay principal and interest in the future. Instead the foreign purchaser of the U.S. asset has purchased an ownership claim in a U.S. corporation that entitles him to the future stream of dividends plus capital gains if he sells the stock later at a higher price. If the company is profitable in the future, then the investors will earn a positive return. However, if the company suffers economic losses in the future, then the dividends may be discontinued and the stock's price may fall. Alternatively, the U.S. dollar could experience a significant depreciation. The end result could be losses for the foreign investor and a negative rate of return. In either case the foreign investor is not "entitled" to a return of his original investment or any additional return beyond. This same type of relationship arises for international real estate transactions and for foreign direct investment, which occurs when a foreign firm substantially owns and operates a company in another country.

To the extent that financial account flows correspond to asset purchases without repayment obligations, the stories above change somewhat. For example, suppose a country runs a trade deficit in period one and suppose further that the resulting financial account surplus corresponds to foreign purchases of U.S. real estate and businesses. In the first period, a country's standard of living could be raised above what is possible with balanced trade—not by borrowing money but by selling ownership claims on productive assets. In the second period, the country's standard of living need not be reduced since there is no repayment obligation.

This case is analogous to an individual who sells his watch at a pawnshop. In that period he is able to buy more than his income because he has divested some of his previously accumulated wealth. In the following period, he can once again make purchases equal to his income and thus need not suffer a reduction in his living standards.

The implication here is that nondebt asset flows may be less problematic than international loans because they do not require a reduction in living standards in the future. Of course, in this case, there is an additional concern that the country that sells off its assets may also be losing control of its productive assets and thus its citizens will not be the ones to earn positive returns on these domestic activities. This concern should be tempered for a few reasons. First, foreign-owned firms remain subject to the laws of the domestic country. Countries can prevent exorbitant profit taking by applying profit taxes. What's more, the foreign owners do not enjoy voting privileges and thus have less say over laws that might affect them. Second, foreign-owned firms generate employment opportunities for domestic citizens, and that serves to benefit the country. Finally, owners of firms, whether foreign or domestic, are generally motivated by similar desires—namely, to make the business successful— and successful businesses generally benefit the owners, the employees, and the consumers of the product.

As an example, consider the purchase in the 1980s of Rockefeller Center in New York City by a group of Japanese investors. Rockefeller Center is a centrally located building in New York City whose owners lease office space to businesses that wish to locate their offices there. Any owner of the building must compete with other businesses leasing office space throughout the city and thus must provide as high a quality and as low a price as possible. If the owners manage the property well and provide quality services, then they will have a lot of tenants and they will make a profit. If they provide poor services, then businesses will move out and the owners will lose money. Thus it really shouldn't matter to the tenants whether the owners are American or Japanese, only whether they are good managers of the office space. Similarly, the owners, regardless of nationality, will hire workers to maintain the facilities. These workers will benefit if the management is good and will suffer if it is poor, regardless of the owners' nationality. Finally, if the owners of the building are successful, then they deserve to earn a profit or return on their investment. If they provide poor services at high prices, then they will deserve to make a loss. Indeed, it shouldn't matter to anyone whether the owners are American or Japanese nationals.

KEY TAKEAWAY

- A trade deficit financed by sales of equity rather than debt does not require a repayment in the future or a subsequent decline in consumption. However, it does imply that a flow of the profits from domestic activities will accrue to foreigners rather than domestic residents.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. The full form of the abbreviation "IOU."

b. The terms representing the two broad types of assets; one is related to borrowing and lending and the other is related to ownership.

c. The type of asset represented by a bank certificate of deposit.

d. The type of asset represented by a common or preferred share of stock.

e. The type of asset represented by a checking account deposit.

f. The type of asset represented by the deed to a private golf course.

g. International purchases of this type of asset require repayment of principal and interest in the future.

h. International purchases of this type of asset do not require repayment of principal and interest.

3.5 How to Evaluate Trade Imbalances

LEARNING OBJECTIVE

1. Identify the conditions determining when a nation's trade imbalance is good, bad, or benign.

Review of Trade Imbalance Interpretations

A quick reading of business and financial newspapers and magazines often reveals a number of misunderstandings about economic relationships. One of the most notable is the widespread conviction that trade deficits are a troubling economic condition that indicates weakness in an economy, while trade surpluses are a sign of strength for an economy. Although these beliefs are well founded in some circumstances, they are not valid as a general principle. A careful look at the implications of trade imbalances reveals that trade deficits can, at times, be an indicator of rising economic stature, while trade surpluses can be associated with economic disaster. In many other cases, perhaps most, trade imbalances are simply benign—that is, they do not represent a serious threat or imply a notable benefit.

There are several reasons why misunderstandings about trade imbalances persist. The first problem relates to the terminology. A deficit, regardless of the context, sounds bad. To say that a business's books are in deficit, that a government's budget is in deficit, or that a country's trade balance is in deficit, simply sounds bad. A surplus, in contrast, sounds pretty good. For a business, clearly we'd prefer a surplus, to be in the black, to make a profit. Likewise, a budget surplus or a trade surplus must be good as well.

Lastly, *balance* seems either neutral or possibly the ideal condition worth striving for. From an accountant's perspective, balance is often the goal. Debits must equal credits, and the books must balance. Surely, this terminology must contribute to the confusion, at least in a small way, but it is not accurate in describing trade imbalances in general.

A second reason for misunderstandings, especially with regard to deficits, may be a sense of injustice or inequity because foreigners are unwilling to buy as many of our goods as we buy of theirs. Fairness would seem to require reciprocity in international exchanges and therefore balanced trade. This misunderstanding could be easily corrected if only observers were aware that a country's balance of payments, which includes trade in goods, services, *and assets*, is always in balance. There are no unequal exchanges even when a country runs a trade deficit.

A third reason for the misunderstanding is that trade deficits are indeed bad for some countries in some situations while surpluses are sometimes associated with good economic outcomes. One needs only to

note the many international debt crises experienced by countries after they had run persistent and very large trade deficits. One could also look at the very high growth rates of Japan in the 1980s and China in the last few decades for examples of countries with large trade surpluses that have seemingly fared very well.

However, despite these examples, one should not conclude that any country that has a trade deficit or whose trade deficit is rising is necessarily in a potentially dangerous situation; nor should we think that just because a country has a trade surplus that it is necessarily economically healthy. To see why, we must recognize that trade imbalances represent more than just an imbalance in goods and services trade.

Any imbalance in goods and services trade implies an equal and opposite imbalance in asset trade. When a country runs a trade deficit (more exhaustively labeled a *current account* deficit), it is also running a financial account surplus; similarly, a trade surplus corresponds to a financial account deficit. Imbalances on the financial account mean that a country is a net seller of international assets (if a financial account surplus) or a net buyer of international assets (if a financial account deficit).

One way to distinguish among good, bad, or benign trade imbalances is to recognize the circumstances in which it is good, bad, or benign to be a net international borrower or lender, a net purchaser, or seller of ownership shares in businesses and properties.

The International Investment Position

An evaluation of a country's trade imbalance should begin by identifying the country's net international asset or investment position. The investment position is like a balance sheet in that it shows the total holdings of foreign assets by domestic residents and the total holdings of domestic assets by foreign residents at a point in time. In the International Monetary Fund's (IMF) financial statistics, these are listed as domestic assets (foreign assets held by domestic residents) and domestic liabilities (domestic assets owned by foreign residents). In contrast, the financial account balance is more like an income statement that shows the changes in asset holdings during the past year. In other words, the international asset position of a country consists of stock variables while the financial account balance consists of flow variables.

A country's net international investment balance may either be in a debtor position, a creditor position, or in balance. If in a creditor position, then the value of foreign assets (debt and equity) held by domestic residents exceeds the value of domestic assets held by foreigners. Alternatively, we could say that

domestic assets exceed domestic liabilities. If the reverse is true, so that domestic liabilities to foreigners exceed domestic assets, then the country would be called a debtor nation.

Asset holdings may consist of either debt obligations or equity claims. Debt consists of IOUs in which two parties sign a contract agreeing to an initial transfer of money from the lender to the borrower followed by a repayment according to an agreed schedule. The debt contract establishes an obligation for the borrower to repay principal and interest in the future. Equity claims represent ownership shares in potentially productive assets. Equity holdings do not establish obligations between parties, at least not in the form of guaranteed repayments. Once ownership in an asset is transferred from seller to buyer, all advantages and disadvantages of the asset are transferred as well.

Debt and equity obligations always pose several risks. The first risk with debt obligations is the risk of possible default (either total or partial). To the lender, default risk means that the IOU will not be repaid at all, that it will be repaid only in part, or that it is repaid over a much longer period than originally contracted. To the borrower, the risk of default is that future borrowing will likely become unavailable. In contrast, the advantage of default to the borrower is that not all the borrowed money is repaid.

The second risk posed by debt is that the real value of the repayments may be different than expected. This can arise because of unexpected inflation or unexpected currency value changes. Consider inflation first. If inflation is higher than expected, then the real value of debt repayment (if the nominal interest rate is fixed) will be lower than originally expected. This will be an advantage to the borrower (debtor), who repays less in real terms, and a disadvantage to the lender (creditor), who receives less in real terms. If inflation turns out to be less than expected, then the advantages are reversed.

Next, consider currency fluctuations. Suppose a domestic resident, who receives income in the domestic currency, borrows foreign currency in the international market. If the domestic currency depreciates, then the value of the repayments in domestic currency terms will rise even though the foreign currency repayment value remains the same. Thus currency depreciations can be harmful to borrowers of foreign currency. A similar problem can arise for a lender. Suppose a domestic resident purchases foreign currency and then lends it to a foreign resident (note in this case the domestic resident is saving money abroad). Afterward, if the domestic currency appreciates, then foreign savings, once cashed in, will purchase fewer domestic goods and the lender will lose.

Similarly, various risks arise with equity purchases internationally because the asset's rate of return may turn out to be less than expected. This can happen for a number of different reasons. First, if the equity purchases are direct investment in a business, then the return on that investment will depend on how well the business performs. If the market is vibrant and management is good, then the investment will be profitable. Otherwise, the rate of return on the investment could be negative; the foreign investor could lose money. In this case, all the risk is borne by the investor, however. The same holds for stock purchases. Returns on stocks may be positive or negative, but it is the purchaser who bears full responsibility for the return on the investment. As with debt, equity purchases can suffer from exchange rate risk as well. When foreign equities are purchased, their rate of return in terms of domestic currency will depend on the currency value. If the foreign currency in which assets are denominated falls substantially in value, then the value of those assets falls along with it.

Four Trade Imbalance Scenarios

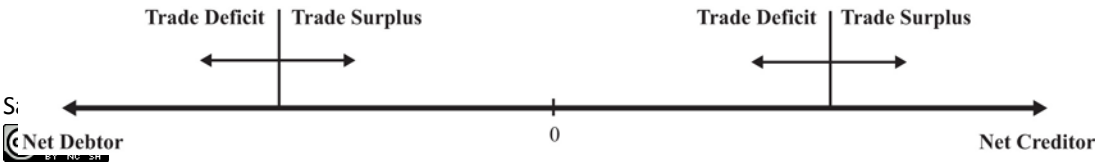
There are four possible situations that a country might face. It may be

1. a debtor nation with a trade deficit,
2. a debtor nation with a trade surplus,
3. a creditor nation with a trade deficit,
4. a creditor nation with a trade surplus.

Figure 3.6 "International Asset Positions" depicts a range of possible international investment positions. On the far left of the image, a country would be a net debtor nation, while on the far right, it would be a net creditor nation. A trade deficit or surplus run in a particular year will cause a change in the nation's asset position assuming there are no capital gains or losses on net foreign investments. A trade deficit would generally cause a leftward movement in the nation's investment position implying either a reduction in its net creditor position or an increase in its net debtor position. A trade surplus would cause a rightward shift in a country's investment position implying either an increase in its net creditor position or a decrease in its net debtor position.

An exception to this rule occurs whenever there are changes in the market value of foreign assets and when the investm

Figure 3.6 International Asset Positions



ent position is calculated using current market values rather than original cost. For example, suppose a country has balanced trade in a particular year and is a net creditor nation. If the investment position is evaluated using original cost, then since the current account is balanced, there would be no change in the investment position. However, if the investment position is evaluated at current market values, then the position can change even with balanced trade. In this case, changes in the investment position arise due to capital gains or losses. Real estate or property valuations may change, portfolio investments in stock markets may rise or fall, and currency value changes may also affect the values of national assets and liabilities.

The pros and cons of a national trade imbalance will depend on which of the four situations describes the current condition of the country. We'll consider each case in turn next.

Case 1: Net Debtor Nation Running a Current Account Deficit

This is perhaps the most common situation in the world, or at least this type of case gets the most attention. The main reason is that large trade deficits run persistently by countries, which are also large debtor nations, can eventually be unsustainable. Examples of international debt crises are widespread. They include the third world debt crisis of the early 1980s, the Mexican crisis in 1994, and the Asian crisis in 1997.

However, not all trade deficits nor all debtor countries face eventual default or severe economic adjustment. Indeed, for some countries, a net debtor position with current account deficits may be an ideal economic situation. To distinguish the good cases from the bad requires us to think about situations in which debt is good or bad.

As mentioned earlier, a current account deficit means that a country is able to spend more on goods and services than it produces during the year. The additional spending can result in increases in consumption, investment, and/or government spending. The country accomplishes this as a net debtor country by borrowing from the rest of the world (incurring debt), or by selling some of its productive assets (equities).

Let's consider a few scenarios.

First, suppose the current account deficit is financed by borrowing money from the rest of the world (i.e., incurring debt). Suppose the additional spending over income is on consumption and government goods and services. In this case, the advantage of the deficit is that the country is able to consume more private

and public goods while it is running the deficit. This would enhance the nation's average standard of living during the period the deficit is being run. The disadvantage is that the loans that finance the increase in the standard of living must be repaid in the future. During the repayment period, the country would run a current account surplus, resulting in national spending below national income. This might require a reduction in the country's average standard of living in the future.

This scenario is less worrisome if the choices are being made by private citizens. In this case, individuals are freely choosing to trade off future consumption for current consumption. However, if the additional spending is primarily on government goods and services, then it will be the nation's taxpayers who will be forced to repay government debt in the future by reducing their average living standards. In other words, the future taxpayers' well-being will be reduced to pay for the extra benefits accruing to today's taxpayers. Possible reductions in future living standards can be mitigated or eliminated if the economy grows sufficiently fast. If national income is high enough in the future, then average living standards could still rise even after subtracting repayment of principal and interest. Thus trade deficits are less worrisome when both current and future economic growth are more rapid.

One way to stimulate economic growth is by increasing spending on domestic investment. If the borrowed funds that result when a country runs a current account deficit are used for investment rather than consumption or if the government spending is on infrastructure, education, or other types of human and physical capital, then the prospects for economic growth are enhanced.

Indeed, for many less-developed countries and countries in transition from a socialist to capitalist market, current account deficits represent potential salvation rather than a curse. Most poor countries suffer from low national savings rates (due to low income) and inadequate tax collection systems. One obvious way to finance investment in these countries is by borrowing from developed countries that have much higher national savings rates. As long as the investments prove to be effective, much more rapid economic growth may be possible.

Thus trade deficits for transitional and less-developed economies are not necessarily worrisome and may even be a sign of strength if they are accompanied by rising domestic investment and/or rising government expenditures on infrastructure.

The main problem with trade deficits arises when they result in a very large international debt position. (Arguably, one could claim that international debt greater than 50 percent of GDP is very large.) In this

circumstance, it can lead to a crisis in the form of a default on international obligations. However, the international debt position figures include both debt and equities, and only the debt can be defaulted on. Equities, or ownership shares, may yield positive or negative returns but do not represent the same type of contractual obligations. A country would never be forced to repay foreign security holders for its losses simply because its value on the market dropped. Thus a proper evaluation of the potential for default should only look at the net international "debt" position after excluding the net position on equities.

Default becomes more likely the larger the external debt relative to the countries' ability to repay. Ability to repay can be measured in several ways. First, one can look at net debt relative to GDP. Since it measures annual national income, GDP represents the size of the pool from which repayment of principal and interest is drawn—the larger the pool, the greater the ability of the country to repay. Alternatively, the lower the country's net debt to GDP ratio, the greater the country's ability to repay.

A second method to evaluate ability to repay is to consider net debt as a percentage of exports of goods and services. This is especially relevant when international debt is denominated in foreign currencies. In this case, the primary method to acquire foreign currencies to make repayment of debt is through the export of goods and services. (The alternative method is to sell domestic assets.) Thus the potential for default may rise if the country's ratio of net external debt to exports is larger.

Notice, though, that the variable to look at to evaluate the risk of default is the net debt position, *not* the trade deficit. The trade deficit merely reveals the change in the net debt position during the past year and does not record total outstanding obligations. In addition, a trade deficit can be run even while the net "debt" position falls. This could occur if the trade deficit is financed primarily with net equity sales rather than net debt obligations. Thus the trade deficit, by itself, does not reveal a complete picture regarding the potential for default.

Next, we should consider what problems are associated with default. Interestingly, it is not really default itself that is immediately problematic but the actions taken to avoid default. If default on international debt does occur, international relationships with creditor countries would generally suffer. Foreign banks that are not repaid on past loans will be reluctant to provide loans in the future. For a less-developed country that needs foreign loans to finance productive investment, these funds may be cut off for a long period and thus negatively affect the country's prospects for economic growth. On the positive side, default is a benefit for the defaulting country in the short-run since it means that borrowed funds are not

repaid. Thus the country enjoys the benefits of greater spending during the previous periods when trade deficits are run but does not have to suffer the consequences of debt repayment. With regard to the country's international debt position, default would cause an immediate discrete reduction in the country's debt position.

The real problem arises when economic shocks suddenly raise external obligations on principal and interest, making a debt that was once sustainable suddenly unsustainable. In these cases, it is the effort made to avoid default that is the true source of the problem.

Inability to repay foreign debt arises either if the value of payments suddenly increases or if the income used to finance those payments suddenly falls. Currency depreciations are a common way in which the value of repayments can suddenly rise. If foreign debt is denominated in foreign currency, then domestic currency depreciation implies an appreciation in the value of external debt. If the currency depreciation is large enough, a country may become suddenly unable to make interest and principal repayments. Note, however, that if external debt were denominated in domestic currency, then the depreciation would have no effect on the value of interest and principal repayments. This implies that countries with large external debts are in greater danger of default if (1) their currency value is highly volatile and (2) the external debt is largely denominated in foreign currency.

A second way in which foreign interest obligations can suddenly rise is if the obligations have variable interest rates and if the interest rates suddenly rise. This was one of the problems faced by third world countries during the debt crisis in the early 1980s. Loans received from the U.S. and European banks carried variable interest rates to reduce the risk to the banks from unexpected inflation. When restrictive monetary policy in the United States pushed up U.S. interest rates, interest obligations by foreign countries also suddenly rose. Thus international debt with variable interest rates potentially raises the likelihood of default.

Default can also occur if a country's ability to repay suddenly falls. This can occur if the country enters into a recession. Recessions imply falling GDP, which reduces the pool of funds available for repayment. If the recession is induced by a reduction in exports, perhaps because of recessions in major trading partner countries, then the ability to finance foreign interest and principal repayments is reduced. Thus a recession in the midst of a large international debt position can risk potential default on international obligations.

But what are the problems associated with a sudden increase in debt repayment if default on the debt does not occur? The problem, really, is that the country might suddenly have to begin running current account surpluses to maintain repayments of its international obligations. Remember that trade deficits mean that the country can spend more than its income. By itself, that's a good thing. Current account surpluses, though, mean that the country must spend less than its income. That's the bad thing, especially if it occurs in the face of an economic recession.

Indeed, this is one of the problems the U.S. economy is facing in the midst of the current recession. As the U.S. GDP began to fall in the fall of 2008, the U.S. trade deficit also fell. For the "trade deficits are bad" folks, this would seem to be a good thing. However, it really indicated that not only was U.S. production falling but, because its trade deficit was also falling, its consumption was falling even faster. In terms of standard of living, the drop in the U.S. trade deficit implied a worsening of the economic conditions of its citizens.

However, since this problem arises only when a net debtor country runs a current account surplus, we'll take up this case in the next section. Note well though that the problems associated with a trade deficit run by a net debtor country are generally not visible during the period in which the trade deficit is run. It is more likely that a large international debt will pose problems in the future if or when substantial repayment begins.

In summary, the problem of trade deficits run by a net debtor country is more worrisome

1. the larger the net debtor position,
2. the larger the net debt (rather than equity) position,
3. the larger the CA deficit (greater than 5 percent of GDP is large according to some, although large deficit with small net debtor position is less worrisome),
4. the more net debt is government obligations or government backed,
5. the larger the government deficit,
6. if a high percentage of debt is denominated in foreign currency and if the exchange rate has or will depreciate substantially,
7. if rising net debt precedes slower GDP growth,
8. if rising net debt correlates with falling investment,

9. if deficits correspond to "excessive" increase in ($C + G$) per capita (especially if G is not capital investment),
10. if interest rate on external debt is variable,
11. if a large recession is imminent.

The situation is benign or beneficial if the reverse occurs.

Case 2: Net Debtor Nation Running a Current Account Surplus

This case generally corresponds to a country in the process of repaying past debt. Alternatively, foreigners may be divesting themselves of domestic equity assets (i.e., selling previously purchased equities, like stocks and real estate, back to domestic residents). In either case, the trade surplus will reduce the country's net debtor position and will require that domestic spending is less than national income. This case is especially problematic if it arises because currency depreciation has forced a sudden change in the country's required repayments on international debt. This is the outcome when a series of trade deficits proves to be unsustainable. What unsustainability means is that the deficits can no longer be continued. Once external financing is no longer available, the country would not have the option to roll over past obligations. In this case, in the absence of default, the country's net repayment on current debt would rise and push the financial account into deficit and hence the trade account into surplus.

When this turnaround occurs rapidly, the country suddenly changes from a state in which it spends more on consumption, investment, and government than its income to a state in which it spends less on these items than its income. Even if GDP stayed the same, the country would suffer severe reductions in its standard of living and reductions in its investment spending. The rapid reduction in domestic demands is generally sufficient to plunge the economy into a recession as well. This reduction in GDP further exacerbates the problem.

This problematic outcome is made worse nationally when most of the debt repayment obligations are by the domestic government or if the external obligations are government-backed. A government that must suddenly make larger than expected repayments of debt must finance it either by raising taxes or by reducing government benefits. The burden of the repayment is then borne by the general population because it must all come from taxpayers. Exactly who suffers more or less will depend on the nature of the budget adjustments, although it often seems that poorer segments of the population bear the brunt of the adjustment costs.

If the sudden increase in debt repayment were primarily by private firms, then the burdens would fall on the associates of those firms rather than the general population. If this occurs on a small scale, we can view this as normal adjustments in a free market system: some firms always go bust, forcing dislocations of labor and capital. The general population in this case would not bear the burden of adjustment unless they are affiliated with the affected firms.

However, even if the debt repayment burden is private and even if the government had not previously guaranteed that debt, the government may feel compelled to intervene with assistance if many private firms are negatively affected. This will perhaps be even more likely if the affected private debt is held by major national banks. Default by enough banks can threaten the integrity of the banking system. Government intervention to save the banks would mean that the general population would essentially bear the burdens of private mistakes.

This kind of rapid reversal is precisely what happened to Indonesia, Thailand, Malaysia, and South Korea in the aftermath of the Asian currency crisis in 1997. Afterward, these countries recorded substantial current account surpluses. These surpluses should not be viewed as a sign of strong vibrant economies; rather, they reflect countries that are in the midst of recessions, struggling to repay their past obligations, and that are now suffering a reduction in average living standards as a consequence.

The most severe consequences of a current account surplus as described above arise when the change from trade deficit to surplus is abrupt. If, on the other hand, the transition is smooth and gradual, then the economy may not suffer noticeably at all. For example, consider a country that has financed a period of extra spending on infrastructure and private investment by running trade deficits and has become a net international debtor nation. However, once the investments begin to take off, fueling rapid economic growth, the country begins to repay more past debt than the new debt that it incurs each period. In this case, the country could make a smooth transition from a trade deficit to a trade surplus. As long as GDP growth continued sufficiently fast, the nation might not even need to suffer reductions in its average living standards even though it is spending less than its income during the repayment period.

In summary, the situation of a net debtor nation running current account surpluses is more worrisome if

1. surpluses follow default,
2. GDP growth rate is low or negative,
3. the investment rate is low or falling,

4. real $C + G$ per capita is falling,
5. surplus corresponds to rising net debt and larger equity sales.

The situation is benign or beneficial if the reverse occurs.

Case 3: Net Creditor Nation Running a Current Account Surplus

A net creditor country with trade surpluses is channeling savings to the rest of the world either through lending or through the purchase of foreign productive assets. The situation is generally viewed as prudent but may have some unpleasant consequences. Recall that a country with a trade surplus is spending less on consumption, investment, and government combined than its national income. The excess is being saved abroad. Net creditor status means that the country has more total savings abroad than foreigners have in their country.

The first problem may arise if the surplus corresponds to the substitution of foreign investment for domestic investment. In an era of relatively free capital mobility, countries may decide that the rate of return is higher and the risk is lower on foreign investments compared to domestic investments. If domestic investment falls as a result, future growth prospects for the country are reduced as well. This situation has been a problem in Russia and other transition economies. As these economies increased their private ownership of assets, a small number of people became extremely wealthy. In a well-functioning economy with good future business prospects, wealth is often invested internally helping to fuel domestic growth. However, in many transition economies, wealth holders decided that it was too risky to invest domestically because uncertainty about future growth potential was very low. So instead, they saved their money abroad, essentially financing investment in much healthier and less risky economies.

China is another creditor country running a trade surplus today. It is, however, in a different situation than Russia or the transition economies in the 1990s. China's internal investment rate is very high and its growth rate has been phenomenal over the past twenty years or more. The fact that it has a trade surplus means that as a nation it is saving even more than necessary to finance its already high investment levels. The excess it is lending abroad, thereby raising its international creditor position. (SeeChapter 1 "Introductory Finance Issues: Current Patterns, Past History, and International Institutions" for more details.) If it was to redirect that saving domestically, it may not be able to fuel additional growth since their investment spending is already so high. Their trade surplus also means that its average standard of

living is well below what is possible because it is saving the surplus abroad rather than spending it on consumption or government goods at home.

A second problem arises even if domestic investment remains high. With domestic investment kept high, the cost of the large surpluses must be felt as a reduction in consumption and government spending. In this case, a large trade surplus leads to a reduction in average living standards for the country. This is a point worth emphasizing. Countries that run trade surpluses suffer a reduction in living standards, not an increase, relative to the case of balanced trade.

Another potential problem with being a net creditor country is the risk associated with international lending and asset purchases. First of all, foreign direct investments may not pay off as hoped or expected. Portfolio investments in foreign stock markets can suddenly be reduced in value if the foreign stock market crashes. On international loans, foreign nations may default on all or part of the outstanding loans, may defer payments, or may be forced to reschedule payments. This is a more likely event if the outstanding loans are to foreign countries with national external debts that may prove unsustainable. If the foreign country suffers rapid currency depreciation and if the foreign loans are denominated in domestic currency, then the foreign country may be forced to default. Defaults may also occur if the foreign debtor countries suffer severe recessions. The creditor nation in these cases is the one that must suffer the losses.

It was this situation that was especially serious for the United States at the onset of the third world debt crisis in the early 1980s. At that time, a number of large U.S. banks had a considerable proportion of their asset portfolios as loans to third world countries. Had these countries defaulted en masse, it would have threatened the solvency of these banks and could have led to a serious banking crisis in the U.S. economy.

Alternatively, suppose the surplus country has made external loans in the foreign countries' currency. If the foreign currency depreciates, even if only gradually, then the value of the foreign assets falls in terms of the domestic currency. The realized rates of return on these assets could then become negative, falling far short of returns on comparable domestic assets.

This is the dilemma that China faces today. The Chinese government has accumulated almost $1 trillion of U.S. Treasury bonds as a result of its persistent current account surpluses over the past decade. All of this debt is denominated in U.S. dollars, making it subject to exchange rate risk. If the Chinese relent to U.S. pressure to allow their fixed currency value appreciate to the U.S. dollar, then the value of these U.S.

assets falls in value and reduces their future returns. The Chinese are also worried about the potential for future U.S. inflation due to the expansionary monetary policy used during the current economic crisis. If inflation does arise in the future, the value of the trillion dollars of foreign debt would also be reduced. This situation is epitomized with a popular parable that says, "If you owe me a thousand dollars, then *you* have a problem, but if you owe me a million dollars, then *I* have a problem." Even though the United States is the debtor and the Chinese the creditor, the Chinese now have a problem because they may have lent too much to the United States.

In summary, the situation of a net creditor nation running current account surpluses is worrisome if the

1. net credit position is very large,
2. current account surplus is very large,
3. GDP growth rate is low,
4. investment rate is low or falling,
5. $C + G$ per capita is low or falling,
6. surplus involves lending denominated in a foreign currency that may afterward depreciate,
7. domestic currency has appreciated substantially,
8. foreign asset values have fallen substantially.

The situation is benign or beneficial if the reverse occurs.

Case 4: Net Creditor Nation Running a Current Account Deficit

In general, a deficit run by a country that is a net creditor is least likely to be problematic. Essentially, this describes a country that is drawing down previously accumulated savings. The deficit also implies that the country is spending more than its income. This situation is especially good if it allows the country to maintain living standards during a recession. This case would also be good if a country with a rapidly aging population is drawing down previous savings to maintain average living standards.

The current account deficit can cause problems if as in case one, the deficit corresponds to falling investment and increases in consumption and government expenditures. If these changes occur while the economy continues to grow, then it may indicate potential problems for future economic growth. However, if the same changes occur while the economy is in a recession, then the effect would be to maintain average living standards by drawing down external savings. If this occurs only during the recession, then the long-term effect on growth would be mitigated.

This case can be a problem if the net creditor position is extremely large. A large amount of foreign savings can always potentially drop in value given currency fluctuations as described above in case three. However, the current account deficit only serves to reduce this potential problem since it reduces the country's net creditor position.

In summary, the situation of a net creditor nation running current account deficits is worrisome if

1. the net creditor status is smaller and the deficit is larger (although this is generally less worrisome than if the country were a net debtor),
2. investment is falling (although a temporary drop in investment is likely in a recession),
3. $C + G$ per capita is rising rapidly.

The situation is benign or beneficial if the reverse occurs.

KEY TAKEAWAYS

- Since trade deficits are not always bad and trade surpluses not always good, it is important to know how to judge a country's trade imbalance.
- Trade deficits are more worrisome when a country is a large international debtor and when growth or prospective growth is low.
- Trade deficits are less worrisome if international debt is low or if the country is a creditor nation.
- Trade deficits are less worrisome if they accompany increased investment and other stimuli to economic growth.
- Trade surpluses are more worrisome when the foreign credits reduce domestic investment sufficiently to reduce growth.
- Trade surpluses are more worrisome when future repayments will likely be lower than anticipated. This can occur if the credits are exceedingly large or denominated in foreign currency.
- Trade surpluses are more worrisome when they arise suddenly in association with a large international debtor position.

EXERCISES

1. Suppose the hypothetical country of Avalon has a current account deficit of $20 billion this year. From the two scenarios listed in each part below, identify which scenario would

make this deficit more worrisome to an economic analyst and which scenario would be less worrisome. Briefly explain why.

a. Scenario 1: Avalon's GDP is $80 billion dollars per year.

Scenario 2: Avalon's GDP is $800 billion per year.

b. Scenario 1: Avalon is a net debtor country.

Scenario 2: Avalon is a net creditor country.

c. Scenario 1: Avalon's annual consumption spending is 50 percent of GDP.

Scenario 2: Avalon's annual consumption spending is 90 percent of GDP.

d. Scenario 1: Avalon's GDP grew 1 percent last year.

Scenario 2: Avalon's GDP grew 10 percent last year.

Below are the economic data for five fictitious countries running trade deficits. Dollar amounts are in billions, and percentages are relative to GDP.

	Alpha (%)	Beta (%)	Gamma (%)	Delta (%)	Epsilon (%)
GDP	$260	$340	$135	$400	$840
Trade Deficit (TD)	9.1	9.7	2.5	5.7	6.0
Projected GDP Growth	+2.0	+10.2	+3.0	+1.0	+5.5
Net International Investment Position (IIP)	75 debtor	30 creditor	20 debtor	60 debtor	5 debtor
Domestic Investment (I)	18	35	16	13	27

Suppose you work for the International Monetary Fund, and it has asked you to assess which two of these five countries' trade deficits are most likely to pose future repayment problems. Provide a brief explanation justifying your assessment.

Consider the fictitious country of Malamar. Economic data for Malamar are presented in the table below. Note that Malamar is currently running a trade deficit of $60 billion.

Trade Deficit (TD)	$60 billion
GDP	$1,000 billion
GDP Growth—Past 3 Years (Growth −)	−1.2%
Projected GDP Growth—Next 3 Years (Growth +)	8.5%
Net International Investment Position (IIP)	−$800 billion (debtor)
Domestic Investment (I)	$350 billion

In the table below, reference the above data (either directly or in combination) in the first column and indicate in the second column whether this information tends to make Malamar's deficit *more*worrisome or *less* worrisome. One example is provided to illustrate.

Data	More or Less Worrisome
TD/GDP = 6 percent	More

Consider the following statements concerning current account balances. Explain in what sense, if any, the statements are valid. In what sense, if any, are the statements misguided?

a. A current account deficit implies that our nation is giving away money to the rest of the world.

b. A current account deficit indicates that a country has exported jobs to the rest of the world.

c. A current account deficit implies that the nation must have a reduced standard of living in the future.

Chapter 4: Foreign Exchange Markets and Rates of Return

People trade one national currency for another for one reason: they want to do something with the other currency. What they might do consists of one of two things: either they wish to spend the money, acquiring goods and services, or they wish to invest the money.

This chapter introduces the foreign exchange market for currency trades. It highlights some of the more obvious, although sometimes confusing, features and then turns attention to the motivations of foreign investors. One of the prime motivations for investing in another country is because one hopes to make more money on an investment abroad. How an investor calculates and compares those rates of returns are explored in this chapter.

4.1 The Forex: Participants and Objectives

LEARNING OBJECTIVE

1. Learn who participates in foreign exchange markets and why.

The foreign exchange market (Forex) is not a market like the New York Stock Exchange, where daily trades of stock are conducted in a central location. Instead, the Forex refers to the activities of major international banks that engage in currency trading. These banks act as intermediaries between the true buyers and sellers of currencies (i.e., governments, businesses, and individuals). These banks will hold foreign currency deposits and stand ready to exchange these for domestic currency upon demand. The exchange rate (ER) will be determined independently by each bank but will essentially be determined by supply and demand in the market. In other words, the bank sets the exchange rate at each moment to equalize its supply of foreign currency with the market demand. Each bank makes money by collecting a transactions fee for its "exchange services."

It is useful to categorize two distinct groups of participants in the Forex, those whose transactions are recorded on the current account (importers and exporters) and those whose transactions are recorded on the financial account (investors).

Importers and Exporters

Anyone who imports or exports goods and services will need to exchange currencies to make the transactions. This includes tourists who travel abroad; their transactions would appear as services in the current account. These businesses and individuals will engage in currency trades daily; however, these transactions are small in comparison to those made by investors.

International Investors, Banks, Arbitrageurs, and Others

Most of the daily currencies transactions are made by investors. These investors, be they investment companies, insurance companies, banks, or others, are making currency transactions to realize a greater return on their investments or holdings. Many of these companies are responsible for managing the savings of others. Pension plans and mutual funds buy and sell billions of dollars worth of assets daily. Banks, in the temporary possession of the deposits of others, do the same. Insurance companies manage large portfolios that act as their capital to be used to pay off claims on accidents, casualties, and deaths. More and more of these companies look internationally to make the most of their investments.

It is estimated by the Bank of International Settlements that over $3 trillion (or $3,000 billion) worth of currency is traded every day. Only about $60 to $100 billion of trade in goods and services takes place daily worldwide. This suggests that many of the currency exchanges are done by international investors rather than importers and exporters.

Investment Objectives

Investors generally have three broad concerns when an investment is made. They care about how much money the investment will earn over time, they care about how risky the investment is, and they care about how liquid, or convertible, the asset is.

1. Rate of return (RoR). The percentage change in the value of an asset over some period.

   Investors purchase assets as a way of saving for the future. Anytime an asset is purchased, the purchaser is forgoing current consumption for future consumption. To make such a transaction worthwhile the investors hope (sometimes expect) to have more money for future consumption than the amount they give up in the present. Thus investors would like to have as high a rate of return on their investments as possible.

   Example 1: Suppose a Picasso painting is purchased in 1996 for $500,000. One year later, the painting is resold for $600,000. The rate of return is calculated as:

   [(600,000 – 500,000))/ 500,000] x 100 = (100,000/500,000) x 100 = 0.20 x 100 = 20%

   Example 2: $1,000 is placed in a savings account for one year at an annual interest rate of 10 percent. The interest earned after one year is $1,000 × 0.10 = $100. Thus the value of the account after one year is $1,100. The rate of return is:

   (1100 – 1000 / 1000) x 100 = (100/1000) x 100 = 0.10 x 100 = 10%

   This means that the rate of return on a domestic interest-bearing account is merely the interest rate.

2. **Risk**. The second primary concern of investors is the riskiness of the assets. Generally, the greater the expected rate of return, the greater the risk. Invest in an oil wildcat endeavor and you might get a 1,000 percent return on your investment—that is, if you strike oil. The chances of doing so are likely to be very low, however. Thus a key concern of investors is how to manage the trade-off between risk and return.
3. **Liquidity**. Liquidity essentially means the speed with which assets can be converted to cash. Insurance companies need to have assets that are fairly liquid in the event that they need to pay out a large number

of claims. Banks also need to be able to make payouts to their depositors, who may request their money back at any time.

KEY TAKEAWAYS

- Participants in the foreign exchange markets can be classified into traders and investors.
- Traders export or import goods and services whose transactions appear on the current account of the balance of payments.
- Investors purchase or sell assets whose transactions appear on the financial account of the balance of payments.
- The three main concerns for any investor are first to obtain a high rate of return, second to minimize the risk of default, and third to maintain an acceptable degree of liquidity.
- The rate of return on an asset is the percentage change in its value over a period.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"
   a. This group enters the foreign exchange market to make transactions that will be recorded on the current account.
   b. This group enters the foreign exchange market to make transactions that will be recorded on the financial account.
   c. The percentage change in the value of an asset over some period.
   d. The term used to describe the ease with which an asset can be converted to cash.
   e. The term used to describe the possibility that an asset will not return what is originally expected.
   f. A list of three main objectives for international investors.
   g. The rate of return on a share of stock whose value rises during the year from $5.50 per share to $6.50 per share.
   h. The rate of return on a commercial office building that was purchased one year ago for $650,000 and sold today for $600,000.

4.2 Exchange Rate: Definitions

LEARNING OBJECTIVE

1. Learn some of the basic definitions regarding currency markets and exchange rates.

Anyone who has ever traveled to another country has probably had to deal with an exchange rate between two currencies. (I say "probably" because a person who travels from, say, Italy to Spain continues to use euros.) In a sense, exchange rates are very simple. However, despite their simplicity they never fail to generate confusion. To overcome that confusion this chapter begins by offering straightforward definitions and several rules of thumb that can help with these problems.

The exchange rate (ER) represents the number of units of one currency that exchanges for a unit of another. There are two ways to express an exchange rate between two currencies (e.g., between the U.S. dollar [$] and the British pound [£]). One can either write $/£ or £/$. These are reciprocals of each other. Thus if E is the $/£ exchange rate and V is the £/$ exchange rate, then $E = 1/V$.

For example, on January 6, 2010, the following exchange rates prevailed:

$E_{\$/£} = 1.59$, which implies $V_{£/\$} = 0.63$,

and

$V_{¥/\$} = 92.7$, which implies $E_{\$/¥} = 0.0108$.

Currency Value

It is important to note that the value of a currency is always given in terms of another currency. Thus the value of a U.S. dollar in terms of British pounds is the £/$ exchange rate. The value of the Japanese yen in terms of dollar is the $/¥ exchange rate.

Note that we always express the value of all items in terms of something else. Thus the value of a quart of milk is given in dollars, not in quarts of milk. The value of car is also given in dollar terms, not in terms of cars. Similarly, the value of a dollar is given in terms of something else, usually another currency. Hence, the rupee/dollar exchange rate gives us the value of the dollar in terms of rupees.

This definition is especially useful to remember when one is dealing with unfamiliar currencies. Thus the value of the euro (€) in terms of British pounds is given as the £/€ exchange rate.

Similarly, the peso/euro exchange rate refers to the value of the euro in terms of pesos.

Currency appreciation means that a currency *appreciates* with respect to another when *its value rises* in terms of the other. The dollar appreciates with respect to the yen if the ¥/$ exchange rate rises.

Currency depreciation, on the other hand, means that a currency *depreciates* with respect to another when *its value falls* in terms of the other. The dollar depreciates with respect to the yen if the ¥/$ exchange rate falls.

Note that if the ¥/$ rate rises, then its reciprocal, the $/¥ rate, falls. Since the $/¥ rate represents the value of the yen in terms of dollars, this means that when the dollar appreciates with respect to the yen, the yen must depreciate with respect to the dollar.

The rate of appreciation (or depreciation) is the percentage change in the value of a currency over some period.

Example 1: U.S. dollar (US$) to the Canadian dollar (C$)
On January 6, 2010, $EC_{\$/US\$} = 1.03$.

On January 6, 2009, $EC_{\$/US\$} = 1.19$.

Use the percentage change formula, (new value − old value)/old value:

(1.03-1.19)/1.19 = -0.16 / 1.19 = -0.134

Multiply by 100 to write as a percentage to get

$-0.134 \times 100 = -13.4\%$.

Since we have calculated the change in the value of the U.S. dollar in terms of Canadian dollar, and since the percentage change is negative, this means that the dollar has depreciated by 13.4 percent with respect to the C$ during the previous year.

Example 2: U.S. dollar ($) to the Pakistani rupee (R)
On January 6, 2010, $E_{R/\$} = 84.7$.

On January 6, 2010, $E_{R/\$} = 79.1$.

Use the percentage change formula, (new value − old value)/old value:

$(84.7 - 79.1) / 79.1 = +5.6 / 79.1 = +0.071$

Multiply by 100 to write as a percentage to get
$+0.071 \times 100 = +7.1\%$.

Since we have calculated the change in the value of the U.S. dollar, in terms of rupees, and since the percentage change is positive, this means that the dollar has appreciated by 7.1 percent with respect to the Pakistani rupee during the past year.

Other Exchange Rate Terms

Arbitrage generally means buying a product when its price is low and then reselling it after its price rises in order to make a profit. Currency arbitrage means buying a currency in one market (e.g., New York) at a low price and reselling, moments later, in another market (e.g., London) at a higher price.

The spot exchange rate refers to the exchange rate that prevails *on the spot*, that is, for trades to take place immediately. (Technically, it is for trades that occur within two days.)

The forward exchange rate refers to the rate that appears on a contract to exchange currencies either 30, 60, 90, or 180 days in the future.

For example, a corporation might sign a contract with a bank to buy euros for U.S. dollars sixty days from now at a predetermined ER. The predetermined rate is called the sixty-day forward rate. Forward contracts can be used to reduce exchange rate risk.

For example, suppose an importer of BMWs is expecting a shipment in sixty days. Suppose that upon arrival the importer must pay €1,000,000 and the current spot ER is 1.20 $/€.

Thus if the payment were made today it would cost $1,200,000. Suppose further that the importer is fearful of a U.S. dollar depreciation. He doesn't currently have the $1,200,000 but expects to earn more than enough in sales over the next two months. If the U.S. dollar falls in value to, say, 1.30 $/€ within sixty days, how much would it cost the importer in dollars to purchase the BMW shipment?

The shipment would still cost €1,000,000. To find out how much this is in dollars, multiply €1,000,000 by 1.30 $/€ to get $1,300,000.

Note that this is $100,000 more for the cars simply because the U.S. dollar value changed.

One way the importer could protect himself against this potential loss is to purchase a forward contract to buy euros for U.S. dollars in sixty days. The ER on the forward contract will likely be different from the current spot ER. In part, its value will reflect market expectations about the degree to which currency values will change in the next two months. Suppose the current sixty-day forward ER is 1.25 $/€, reflecting the expectation that the U.S. dollar value will fall. If the importer purchases a sixty-day contract to buy €1,000,000, it will cost him $1,250,000 (i.e., $1,000,000 × 1.25 $/€). Although this is higher than what it would cost if the exchange were made today, the importer does not have the cash available to make the trade today, and the forward contract would protect the importer from an even greater U.S. dollar depreciation.

When the forward ER is such that a forward trade costs more than a spot trade today costs, there is said to be a forward premium. If the reverse were true, such that the forward trade were cheaper than a spot trade, then there is a forward discount.

A currency trader is hedging if he or she enters into a forward contract to protect oneself from a downside loss. However, by hedging the trader also forfeits the potential for an upside gain. Suppose in the story above that the spot ER falls rather than rises. Suppose the ER fell to 1.10 $/€. In this case, had the importer waited, the €1,000,000 would only have cost $1,100,000 (i.e., $1,000,000 × 1.10 $/€). Thus hedging protects against loss but at the same time eliminates potential unexpected gain.

KEY TAKEAWAYS

- An exchange rate denominated *x*/*y* gives the value of *y* in terms of *x*. When an exchange rate denominated *x*/*y* rises, then *y* has appreciated in value in terms of*x*, while *x* has depreciated in terms of *y*.
- Spot exchange rates represent the exchange rate prevailing for currency trades today. Forward, or future, exchange rates represent the exchange values on trades that will take place in the future to fulfill a predetermined contract.
- Currency arbitrage occurs when someone buys a currency at a low price and sells shortly afterward at a higher price to make a profit.
- Hedging refers to actions taken to reduce the risk associated with currency trades.

EXERCISES

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is “a tax on imports,” then the correct question is “What is a tariff?”
   a. The term used to describe an increase in the value of the yen.
   b. This currency value is expressed by the euro/peso exchange rate.
   c. This has happened to the value of the U.S. dollar if the dollar/euro exchange rate rises from 1.10 $/€ to 1.20 $/€.
   d. The term used to describe the process of buying low and selling high to make a profit.
   e. The term used to describe the exchange rate that appears on a contract to exchange currencies either 30, 60, 90, or 180 days in the future.

f. The term used to describe the exchange rate that prevails for (almost) immediate trades.

g. The term used to describe process of protecting oneself from the riskiness of exchange rate movements.

Use the exchange rate data in the table to answer the following questions. The first two exchange rates are the spot rates on those dates. The third exchange rate is the one-year forward exchange rate as of February 2004.

	February 4, 2003	February 4, 2004	Forward February 4, 2005
United States–Europe	1.08 $/€	1.25 $/€	1.24 $/€
South Africa–United States	8.55 rand/$	6.95 rand/$	7.42 rand/$

a. Calculate the rate of change in the euro value relative to the dollar between 2003 and 2004.

b. Calculate the rate of change in the dollar value relative to the euro between 2003 and 2004.

c. Calculate the rate of change in the dollar value relative to the South African rand between 2003 and 2004.

d. Calculate the expected change in the dollar value relative to the euro between 2004 and 2005.

e. Calculate the expected change in the dollar value relative to the rand between 2004 and 2005.

4.3 Calculating Rate of Returns on International Investments

LEARNING OBJECTIVE

1. Learn how to calculate the rate of return (RoR) for a domestic deposit and a foreign deposit.

Suppose that an investor holding U.S. dollars must decide between two investments of equal risk and liquidity. Suppose one potential investment is a one-yearcertificate of deposit (CD) issued by a U.S. bank while a second potential investment is a one-year CD issued by a British bank. For simplicity we'll assume that interest is calculated on both CDs using a simple interest rather than with a compounding formula. A CD is a type of deposit that provides a higher rate of interest to the depositor in return for a promise to keep the money deposited for a fixed amount of time. The time period could be six months, one year, two years, or any other period decided by the bank. If the depositor wants to withdraw the money earlier, she must pay a penalty.

Since we imagine that an investor wants to obtain the highest rate of return (RoR) possible, given acceptable risk and liquidity characteristics, that investor will choose the investment with the highest rate of return. If the investor acted naively, she might simply compare interest rates between the two investments and choose the one that is higher. However, this would not necessarily be the best choice. To see why, we need to walk through the calculation of rates of return on these two investments.

First, we need to collect some data, which we will do in general terms rather than use specific values. Examples with actual values are presented in a later section.

Let $E_{\$/£}$ = the spot ER.$E_{\$/£}e$ = the expected ER one year from now.$i_{\$}$ = the one-year interest rate on a CD in the United States (in decimal form).$i_{£}$ = the one-year interest rate on a CD in Britain (in decimal form).

U.S. Rate of Return

The rate of return on the U.S. CD is simply the interest rate on that deposit. More formally,
$RoR_{\$} = i_{\$}$.

This is because the interest rate describes the percentage increase in the value of the deposit over the course of the year. It is also simple because there is no need to convert currencies.

British Rate of Return

The rate of return on the British CD is more difficult to determine. If a U.S. investor, with dollars, wants to invest in the British CD, she must first exchange dollars for pounds on the spot market and then use the British pound (£) to purchase the British CD. After one year, she must convert pounds back to dollars at

the exchange rate that prevails then. The rate of return on that investment is the percentage change in dollar value during the year. To calculate this we can follow the procedure below.

Suppose the investor has *P* dollars to invest (*P* for principal).

Step 1: Convert the dollars to pounds.

$$P / E_{\$/£}$$

is the number of pounds the investor will have at the beginning of the year.

Step 2: Purchase the British CD and earn interest in pounds during the year.

$$(P / E_{\$/£})(1+i_{£})$$

is the number of pounds the investor will have at the end of the year. The first term in parentheses returns the principal. The second term is the interest payment.

Step 3: Convert the principal plus interest back into dollars in one year.

$$(P/E_{\$/£})\ (1+i_{£})\ E^{e}_{\$/£}$$

is the number of dollars the investor can expect to have at the end of the year.

The rate of return in dollar terms from this British investment can be found by calculating the expected percentage change in the value of the investor's dollar assets over the year, as shown below:

$$RoR_{£} = \frac{P / E_{\$/£}(1+i_{£})\ E^{e}_{\$/£} - P}{P}$$

After factoring out the *P*, this reduces to

$$RoR_{£} = \frac{E^{e}_{\$/£}}{E_{\$/£}}(1+i_{£}) - 1$$

Thus the rate of return on the foreign investment is more complicated because the set of transactions is more complicated. For the U.S. investment, the depositor simply deposits the dollars and earns dollar interest at the rate given by the interest rate. However, for the foreign deposit, the investor must first convert currency, then deposit the money abroad earning interest in foreign currency units, and finally reconvert the currency back to dollars. The rate of return depends not only on the foreign interest rate but also on the spot exchange rate and the expected exchange rate one year in the future.

Note that according to the formula, the rate of return on the foreign deposit is positively related to changes in the foreign interest rate and the expected foreign currency value and negatively related to the spot foreign currency value.

KEY TAKEAWAYS

- For a dollar investor, the rate of return on a U.S. deposit is equal to the interest rate: $RoR_{\$} = i_{\$}$.
- For a dollar investor, the rate of return on a foreign deposit depends on the foreign interest rate, the spot exchange rate, and the exchange rate expected to prevail at the time the deposit is redeemed: In particular $RoR_{£} = \frac{E^{e}_{\$/£}}{E_{\$/£}}(1+i_{£})-1$

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"
   a. These three variables influence the rate of return on a foreign deposit.
   b. For a U.S. dollar investor, this is the rate of return on a U.S. dollar deposit yielding 3 percent per year.
   c. The term used to describe the exchange rate predicted to prevail at some point in the future.
   d. The term for the type of bank deposit that offers a higher yield on a deposit that is maintained for a predetermined period of time.

4.4 Interpretation of the Rate of Return Formula

LEARNING OBJECTIVE

1. Break down the rate of return on foreign deposits into three distinct components.

Although the derivation of the rate of return formula is fairly straightforward, it does not lend itself easily to interpretation or intuition. By applying some algebraic "tricks," it is possible to rewrite the British rate of return formula in a form that is much more intuitive.

Step 1: Begin with the British rate of return formula derived in Chapter 4 "Foreign Exchange Markets and Rates of Return", Section 4.3 "Calculating Rate of Returns on International Investments":

$$RoR_{£} = \frac{E^{e}_{\$/£}}{E_{\$/£}}(1+i_{£}) - 1$$

Step 2: Factor out the term in parentheses. Add $i_{£}$ and then subtract it as well. Mathematically, a term does not change in value if you add and subtract the same value:

$$RoR_{£} = \frac{E^{e}_{\$/£}}{E_{\$/£}} + i_{£}\frac{E^{e}_{\$/£}}{E_{\$/£}} - 1 + i_{£} - i_{£}$$

Step 3: Change the (-1) in the expression to its equivalent, $-E_{\$/£}/E_{\$/£}$. Also change $-i_{£}$ to its equivalent, $-i_{£}(E_{\$/£}/E_{\$/£})$. Since $-E_{\$/£}/E_{\$/£} = 1$, these changes do not change the value of the rate of return expression:

$$RoR_{£} = \frac{E^{e}_{\$/£}}{E_{\$/£}} + i_{£}\frac{E^{e}_{\$/£}}{E_{\$/£}} - \frac{E_{\$/£}}{E_{\$/£}} + i_{£} - i_{£}\frac{E_{\$/£}}{E_{\$/£}}$$

Step 4: Rearrange the expression:

$$RoR_{£} = i_{£} + \frac{E^{e}_{\$/£}}{E_{\$/£}} - \frac{E_{\$/£}}{E_{\$/£}} + i_{£}\frac{E^{e}_{\$/£}}{E_{\$/£}} - i_{£}\frac{E_{\$/£}}{E_{\$/£}}$$

Step 5: Simplify by combining terms with common denominators:

$$RoR_{£} = i_{£} + \frac{E^{e}_{\$/£} - E_{\$/£}}{E_{\$/£}} + i_{£}\frac{E^{e}_{\$/£} - E_{\$/£}}{E_{\$/£}}$$

Step 6: Factor out the percentage change in the exchange rate term:

$$RoR_{£} = i_{£} + (1 + i_{£}) \frac{E^{e}_{\$/£} - E_{\$/£}}{E_{\$/£}}$$

This formula shows that the expected rate of return on the British asset depends on two things, the British interest rate and the expected percentage change in the value of the pound. Notice that if $(E^{e}_{\$/£} - E_{\$/£}) / E_{\$/£}$ is a positive number, then the expected \$/£ ER is greater than the current spot ER, which means that one expects a pound appreciation in the future. Furthermore, $(E^{e}_{\$/£} - E_{\$/£}) / E_{\$/£}$ represents the expected rate of appreciation of the pound during the following year. Similarly, if $(E^{e}_{\$/£} - E_{\$/£}) / E_{\$/£}$ were negative, then it corresponds to the expected rate of depreciation of the pound during the subsequent year.

The expected rate of change in the pound value is multiplied by $(1 + i_{£})$, which generally corresponds to a principal and interest component in a rate of return calculation.

To make sense of this expression, it is useful to consider a series of simple numerical examples.

Suppose the following values prevail,

$i_{£}$	5% per year
$E^{e}_{\$/£}$	1.1 \$/£
$E_{\$/£}$	1.0 \$/£

Plugging these into the rate of return formula yields

$$RoR_{£} = 0.05 + (1 + 0.05) \frac{1.10 - 1.00}{1.00}, \infty$$

which simplifies to

$$RoR_{£} = 0.05 + (1 + 0.05) \times 0.10 = .155 \text{ or } 15.5\%.$$

Note that because of the exchange rate change, the rate of return on the British asset is considerably higher than the 5 percent interest rate.

To decompose these effects suppose that the British asset yielded no interest whatsoever.

This would occur if the individual held pound currency for the year rather than purchasing a CD. In this case, the rate of return formula reduces to

$$RoR_{£} = 0.0 + (1 + 0.0) \times 0.10 = .10 \text{ or } 10\%.$$

This means that 10 percent of the rate of return arises solely because of the pound appreciation. Essentially an investor in this case gains because of currency arbitrage over time. Remember that arbitrage means buying something when its price is low, selling it when its price is high, and thus making a profit on the series of transactions. In this case, the investor buys pounds at the start of the year, when their price (in terms of dollars) is low, and then resells them at the end of the year when their price is higher.

Next, suppose that there was no exchange rate change during the year, but there was a 5 percent interest rate on the British asset. In this case, the rate of return becomes

$$RoR_{£} = 0.05 + (1 + 0.05) \times 0.0 = .05 \text{ or } 5\%.$$

Thus with no change in the exchange rate, the rate of return reduces to the interest rate on the asset.

Finally, let's look back at the rate of return formula:

$$RoR_{£} = i_{£} + (1 + i_{£}) \frac{E^{e}_{\$/£} - E_{\$/£}}{E_{\$/£}}$$

The first term simply gives the contribution to the total rate of return that derives solely from the interest rate on the foreign asset. The second set of terms has the percentage change in the exchange rate times one plus the interest rate. It corresponds to the contribution to the rate of return that arises solely due to the exchange rate change. The one plus interest rate term means that the exchange rate return can be separated into two components, a principal component and an interest component.

Suppose the exchange rate change is positive. In this case, the principal that is originally deposited will grow in value by the percentage exchange rate change. But the principal also accrues interest and as the £ value rises, the interest value, in dollar terms, also rises.

Thus the second set of terms represents the percentage increase in the value of one's principal and interest that arises solely from the change in the exchange rate.

KEY TAKEAWAYS

- The rate of return on a foreign deposit consists of three components: the interest rate itself, the change in the value of the principal due to the exchange rate change, and the change in the value of the interest due to the exchange rate change.
- Another formula, but one that is equivalent to the one in the previous section, for the rate of return on a foreign deposit is : $RoR_{£} = i_{£} + (1 + i_{£}) \frac{E^{e}_{\$/£} - E_{\$/£}}{E_{\$/£}}$

EXERCISES

1. Consider the following data. Suppose the expected exchange rates are the average expectations by investors for exchange rates in one year. Imagine that the interest rates are for equally risky assets and are annual rates.

	United States	Australia	Singapore
Current Exchange Rate	–	1.80 A$/US$	1.75 S$/US$
Expected Exchange Rate	–	1.90 A$/US$	1.65 S$/US$
Current Interest Rate (%)	2.0	4.0	1.0

a. Calculate the rate of return for a U.S. dollar investor investing in the Australian deposit for one year.

b. Calculate the rate of return for a U.S. dollar investor investing in the Singapore deposit for one year.

c. Among these three options (United States, Australia, and Singapore), which is the best place for the investor to invest? Which is the worst place?

The covered interest parity condition substitutes the forward exchange rate for the expected exchange rate. The condition is labeled “covered” because the forward contract assures a certain rate of return (i.e., without risk) on foreign deposits. The table below lists a spot exchange rate, a ninety-day forward rate, and a ninety-day money market interest rate in Germany and Canada. Use this information to answer the following questions.

	Germany	Canada

	Germany	Canada
Spot Exchange Rate	0.5841 $/DM	0.7451 US$/C$
90-Day Forward Exchange Rate	0.5807 $/DM	0.7446 US$/C$
90-Day Interest Rate (%)	1.442	0.875

What would the U.S. ninety-day interest rate have to be for the United States to have the highest rate of return for a U.S. investor? (Use the exact formulas to calculate the rates of return.)

4.5 Applying the Rate of Return Formulas

LEARNING OBJECTIVE

1. Learn how to apply numerical values for exchange rates and interest rates to the rate of return formulas to determine the best international investment.

Use the data in the tables below to calculate in which country it would have been best to purchase a one-year interest-bearing asset. [1]

Example 1

Consider the following data for interest rates and exchange rates in the United States and Britain:

$i_{\$}$	2.37% per year
$i_{£}$	4.83 % per year
$E^{04}_{\$/£}$	1.96 \$/£
$E^{05}_{\$/£}$	1.75 \$/£

We imagine that the decision is to be made in 2004, looking forward into 2005. However, we calculate this in hindsight after we know what the 2005 exchange rate is. Thus we plug in the 2005 rate for the expected exchange rate and use the 2004 rate as the current spot rate. Thus the ex-post (i.e., after the fact) rate of return on British deposits is given by

$$RoR_{£} = 0.0483 + (1 + 0.0483)\frac{1.75 - 1.96}{1.96}$$

which simplifies to

$$RoR_{£} = 0.0483 + (1 + 0.0483)(-0.1071) = -0.064 \text{ or } -6.4\%.$$

A negative rate of return means that the investor would have lost money (in dollar terms) by purchasing the British asset.

Since $RoR_{\$} = 2.37\% > RoR_{£} = -6.4\%$, the investor seeking the highest rate of return should have deposited her money in the U.S. account.

Example 2

Consider the following data for interest rates and exchange rates in the United States and Japan.

$i_{\$}$	2.37 % per year

$i_{¥}$	0.02 % per year
$E^{04}{}_{¥/\$}$	104 ¥ / $
$E^{05}{}_{¥/\$}$	120 ¥ / $

Again, imagine that the decision is to be made in 2004, looking forward into 2005. However, we calculate this in hindsight after we know what the 2005 exchange is. Thus we plug in the 2005 rate for the expected exchange rate and use the 2004 rate as the current spot rate. Note also that the interest rate in Japan *really* was 0.02 percent. It was virtually zero.

Before calculating the rate of return, it is necessary to convert the exchange rate to the yen equivalent rather than the dollar equivalent. Thus

$$E^{04}{}_{\$/¥} = 1104 = 0.0096 \text{ and } E^{05}{}_{\$/¥} = 1120 = 0.0083.$$

Now, the ex-post (i.e., after the fact) rate of return on Japanese deposits is given by

$$RoR_{¥} = 0.0002 + (1 + 0.0002)\frac{0.0083 - 0.0096}{0.0096}$$

which simplifies to

$$RoR_{¥} - 0.0002 + (1 + 0.0002)(-0.1354) = -0.1352 \text{ or } -13.52\%.$$

A negative rate of return means that the investor would have lost money (in dollar terms) by purchasing the Japanese asset.

Since $RoR_{\$} = 2.37\% > RoR_{¥} = -13.52\%$, the investor seeking the highest rate of return should have deposited his money in the U.S. account.

Example 3

Consider the following data for interest rates and exchange rates in the United States and South Korea. Note that South Korean currency is in won (W).

i_S	2.37% per year

i_W	4.04% per year
$E^{04}{}_{W/\$}$	1,059 W/$
$E^{05}{}_{W/\$}$	1,026 W/$

As in the preceding examples, the decision is to be made in 2004, looking forward to 2005. However, since the previous year interest rate is not listed, we use the current short-term interest rate. Before calculating the rate of return, it is necessary to convert the exchange rate to the won equivalent rather than the dollar equivalent. Thus

$$E^{04}{}_{\$/W} = \frac{1}{1059} = 0.000944 \text{ and } E^{05}{}_{\$/W} = \frac{1}{1026} = 0.000975.$$

Now, the ex-post (i.e., after the fact) rate of return on Italian deposits is given by

$$RoR_W = 0.0404 + (1+0.0404)\frac{0.000975 - 0.000944}{0.000944}$$

which simplifies to

$$RoR_W = 0.0404 + (1 + 0.0404)(0.0328) = 0.0746 \text{ or } +7.46\%.$$

In this case, the positive rate of return means an investor would have made money (in dollar terms) by purchasing the South Korean asset.

Also, since $RoR_\$ = 2.37$ percent $< RoR_W = 7.46$ percent, the investor seeking the highest rate of return should have deposited his money in the South Korean account.

KEY TAKEAWAY

- An investor should choose the deposit or asset that promises the highest expected rate of return assuming equivalent risk and liquidity characteristics.

EXERCISES

1. Consider the following data collected on February 9, 2004. The interest rate given is for a one-year money market deposit. The spot exchange rate is the rate for February 9. The expected exchange rate is the one-year forward rate. Express each answer as a percentage.

$i_{£}$	2.5%
$E_{US\$/C\$}$	0.7541 US$/C$
$E^{e}_{US\$/C\$}$	0[0].7468 US$/C$

a. Use both RoR formulas (one from Chapter 4 "Foreign Exchange Markets and Rates of Return", Section 4.3 "Calculating Rate of Returns on International Investments", the other from Chapter 4 "Foreign Exchange Markets and Rates of Return", Section 4.4 "Interpretation of the Rate of Return Formula", Step 5) to calculate the expected rate of return on the Canadian money market deposit and show that both formulas generate the same answer.

b. What part of the rate of return arises only due to the interest earned on the deposit?

c. What part of the rate of return arises from the percentage change in the value of the principal due to the change in the exchange rate?

d. What component of the rate of return arises from the percentage change in the value of the interest payments due to the change in the exchange rate?

Consider the following data collected on February 9, 2004. The interest rate given is for a one-year money market deposit. The spot exchange rate is the rate for February 9. The expected exchange rate is the one-year forward rate. Express each answer as a percentage.

$i_{£}$	4.5%
$E_{\$/£}$	1.8574 $/£
$E^{e}_{\$/£}$	1.7956 $/£

Use both RoR formulas (one from Chapter 4 "Foreign Exchange Markets and Rates of Return", Section 4.3 "Calculating Rate of Returns on International Investments", the other from Chapter 4 "Foreign Exchange Markets and Rates of Return", Section 4.4 "Interpretation of the Rate of Return Formula", Step 5) to calculate the expected rate of return on the British money market deposit and show that both formulas generate the same answer.

a. What part of the rate of return arises only due to the interest earned on the deposit?

b. What part of the rate of return arises from the percentage change in the value of the principal due to the change in the exchange rate?
c. What component of the rate of return arises from the percentage change in the value of the interest payments due to the change in the exchange rate?

[1] These numbers were taken from the *Economist*, Weekly Indicators, December 17, 2005, p. 90, http://www.economist.com.

Chapter 5: Interest Rate Parity

Interest rate parity is one of the most important theories in international finance because it is probably the best way to explain how exchange rate values are determined and why they fluctuate as they do. Most of the international currency exchanges occur for investment purposes, and therefore understanding the prime motivations for international investment is critical.

The chapter applies the rate of return formula developed in Chapter 4 "Foreign Exchange Markets and Rates of Return" and shows how changes in the determinants of the rate of return on assets affect investor behavior on the foreign exchange market, which in turn affects the value of the exchange rate. The model is described in two different ways: first, using simple supply and demand curves; and second, using a rate of return diagram that will be used later with the development of a more elaborate macro model of the economy.

5.1 Overview of Interest Rate Parity

LEARNING OBJECTIVES

1. Define the interest rate parity condition.
2. Learn the asset approach to exchange rate determination.

Interest rate parity (IRP) is a theory used to explain the value and movements of exchange rates. It is also known as the asset approach to exchange rate determination. The interest rate parity theory assumes that the actions of international investors—motivated by cross-country differences in rates of return on comparable assets—induce changes in the spot exchange rate. In another vein, IRP suggests that transactions on a country's financial account affect the value of the exchange rate on the foreign exchange (Forex) market. This contrasts with the purchasing power parity theory, which assumes that the actions of importers and exporters, whose transactions are recorded on the current account, induce changes in the exchange rate.

Interest Rate Parity Condition

Interest rate parity refers to a condition of equality between the rates of return on comparable assets between two countries. The term is somewhat of a misnomer on the basis of how it is being described here, as it should really be called rate of return parity. The term developed in an era when the world was in a system of fixed exchange rates. Under those circumstances, and as will be demonstrated in a later chapter, rate of return parity did mean the equalization of interest rates. However, when exchange rates can fluctuate, interest rate parity becomes rate of return parity, but the name was never changed.

In terms of the rates of return formulas developed in Chapter 4 "Foreign Exchange Markets and Rates of Return", interest rate parity holds when the rate of return on dollar deposits is just equal to the expected rate of return on British deposits, that is, when $RoR_{\$} = RoR_{£}$.

Plugging in the above formula yields

$$i_{\$} = i_{£} + (1+i_{£}) \frac{E^{e}_{\$/£} - E_{\$/£}}{E_{\$/£}}$$

This condition is often simplified in many textbooks by dropping the final term in which the British interest rate is multiplied by the exchange rate change. The logic is that the final term is usually very small especially when interest rates are low. The *approximate version* of the IRP condition then is

$$i_{\$} - i_{£} = \frac{E^{e}_{\$/£} - E_{\$/£}}{E_{\$/£}}$$

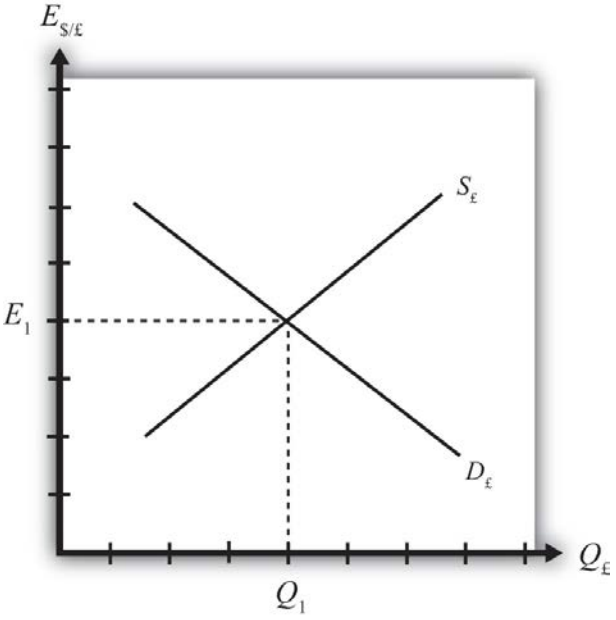
One should be careful, however. The approximate version would not be a good approximation when interest rates in a country are high. For example, back in 1997, short-term interest rates were 60 percent per year in Russia and 75 percent per year in Turkey. With these interest rates, the approximate formula would not give an accurate representation of rates of return.

Interest Rate Parity Theory

Investor behavior in asset markets that results in interest parity can also explain why the exchange rate may rise and fall in response to market changes. In other words, interest parity can be used to develop a model of exchange rate determination. This is known as the asset approach, or the interest rate parity model.

The first step is to reinterpret the rate of return calculations described previously in more general (aggregate) terms. Thus instead of using the interest rate on a one-year certificate of deposit (CD), we will interpret the interest rates in the two countries as the average interest rates that currently prevail. Similarly, we will imagine that the expected exchange rate is the average expectation across many different individual investors. The rates of return then are the average expected rates of return on a wide variety of assets between two countries.

Figure 5.1 The Forex for British Pounds



Next, we imagine that investors trade currencies in the foreign exchange (Forex) market. Each day, some investors come to a market ready to supply a currency in exchange for another, while others come to demand currency in exchange for another.

Consider the market for British pounds (£) in New York depicted in Figure 5.1 "The Forex for British Pounds". We measure the supply and demand of pounds along the horizontal axis and the price of pounds (i.e., the exchange rate $E_{\$/£}$) on the vertical axis. Let $S_£$ represent the supply

of pounds in exchange for dollars at all different exchange rates that might prevail. The supply is generally by British investors who demand dollars to purchase dollar denominated assets. However, supply of pounds might also come from U.S. investors who decide to convert previously acquired pound currency. Let $D_{£}$ the demand for pounds in exchange for dollars at all different exchange rates that might prevail. The demand is generally by U.S. investors who supply dollars to purchase pound-denominated assets. Of course, demand may also come from British investors who decide to convert previously purchased dollars. Recall that

$$RoR_{£} = i_{£} + (1+i£) \frac{E^{e}_{\$/£} - E_{\$/£}}{E_{\$/£}},$$

which implies that as $E_{\$/£}$ rises, $RoR_{£}$ falls. This means that British investors would seek to supply more pounds at higher pound values but U.S. investors would demand fewer pounds at higher pound values. This explains why the supply curve slopes upward and the demand curve slopes downward.

The intersection of supply and demand specifies the equilibrium exchange rate (E_1) and the quantity of pounds (Q_1) traded in the market. When the Forex is at equilibrium, it must be that interest rate parity is satisfied. This is true because the violation of interest rate parity will cause investors to shift funds from one country to another, thereby causing a change in the exchange rate. This process is described in more detail in Chapter 5 "Interest Rate Parity", Section 5.2 "Comparative Statics in the IRP Theory".

KEY TAKEAWAYS

- Interest rate parity in a floating exchange system means the equalization of rates of return on comparable assets between two different countries.
- Interest rate parity is satisfied when the foreign exchange market is in equilibrium, or in other words, IRP holds when the supply of currency is equal to the demand in the Forex.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is “a tax on imports,” then the correct question is “What is a tariff?”

a. This theory of exchange rate determination is also known as the asset approach.

b. The name of the condition in which rates of return on comparable assets in different countries are equal.

c. Of *greater*, *less*, or *equal*, this is how the supply of pounds compares to the demand for pounds in the foreign exchange market when interest rate parity holds.

5.2 Comparative Statics in the IRP Theory

LEARNING OBJECTIVE

1. Learn how changes in interest rates and expected exchange rates can influence international investment decisions and affect the exchange rate value.

Comparative statics refers to an exercise in a model that assesses how changes in an exogenous variable will affect the values of the endogenous variables. The endogenous variables are those whose values are determined in the equilibrium. In the IRP model, the endogenous variables are the exchange rate value and—of lesser importance—the quantity of currencies exchanged on the Forex market. The exogenous variables are those whose values are given beforehand and are known by the model's decision makers. In the IRP model, the exogenous variables are those that influence the positions of the rate of return curves, including the U.S. interest rate, the British interest rate, and the expected future exchange rate. Another way to describe this is that the endogenous variable values are determined within the model, while the exogenous variable values are determined outside of the model.

Comparative statics exercises enable one to answer a question like "What would happen to the exchange rate if there were an increase in U.S. interest rates?" When assessing a question like this, economists will invariably invoke the ceteris paribus assumption. Ceteris paribus means that we assume all other exogenous variables are maintained at their original values when we change the variable of interest. Thus if we assess what would happen to the exchange rate (an endogenous variable) if there were an increase in the U.S. interest rate (an exogenous variable) while invoking ceteris paribus, then ceteris paribus means keeping the original values for the other exogenous variables (in this case, the British interest rate and the expected future exchange rate) fixed.

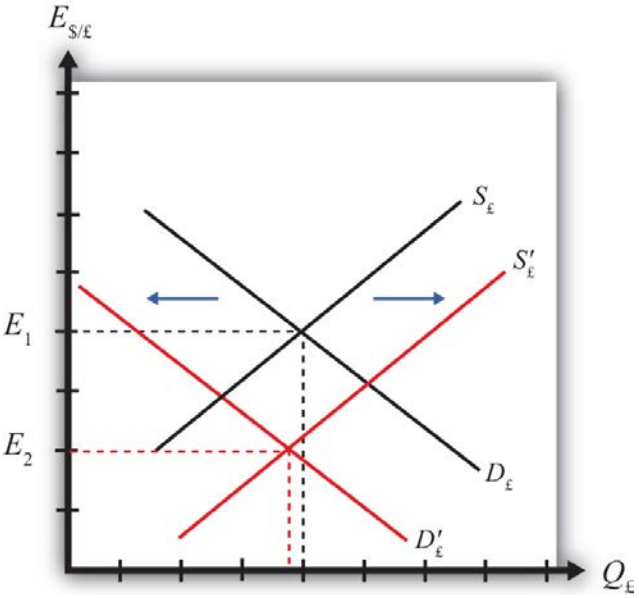
It is useful to think of a comparative statics exercise as a controlled economic experiment. In the sciences, one can test propositions by controlling the environment of a physical system in such a way that one can isolate the particular cause-and-effect relationship. Thus, to test whether a ball and a feather will fall at the same rate in a frictionless vacuum, experimenters could create a vacuum environment and measure the rate of descent of the ball versus the feather. In economic systems, such experiments are virtually impossible because one can never eliminate all the "frictions."

However, by creating mathematical economic systems (i.e., an economic model), it becomes possible to conduct similar types of "experiments." A comparative statics exercise allows one to isolate how a change

in one exogenous variable affects the value of the equilibrium variable while controlling for changes in other variables that might also affect the outcome.

The Effect of Changes in U.S. Interest Rates on the Spot Exchange Rate

Figure 5.2 Effects of a U.S. Interest Rate Increase



Suppose that the Forex is initially in equilibrium such that $S_£ = D_£$ at the exchange rate E_1. Now let average U.S. interest rates ($i_\$$) rise, ceteris paribus. The increase in interest rates raises the rate of return on U.S. assets ($RoR_\$$), which at the original exchange rate causes the rate of return on U.S. assets to exceed the rate of return on British assets ($RoR_\$ > RoR_£$). This will raise the supply of pounds on the Forex as British investors seek the higher average return on U.S. assets. It will also lower the demand for British pounds (£) by U.S. investors who decide to invest at home rather than abroad.

Thus in terms of the Forex market depicted in Figure 5.2 "Effects of a U.S. Interest Rate Increase", $S_£$ shifts right (black to red) while $D_£$ shifts left (black to red). The equilibrium exchange rate falls to E_2. This means that the increase in U.S. interest rates causes a pound depreciation and a dollar appreciation. As the exchange rate falls, $RoR_£$ rises since

$$RoR_£ = \frac{E^e_{\$/£}}{E_{\$/£}} (1+i_£) - 1$$

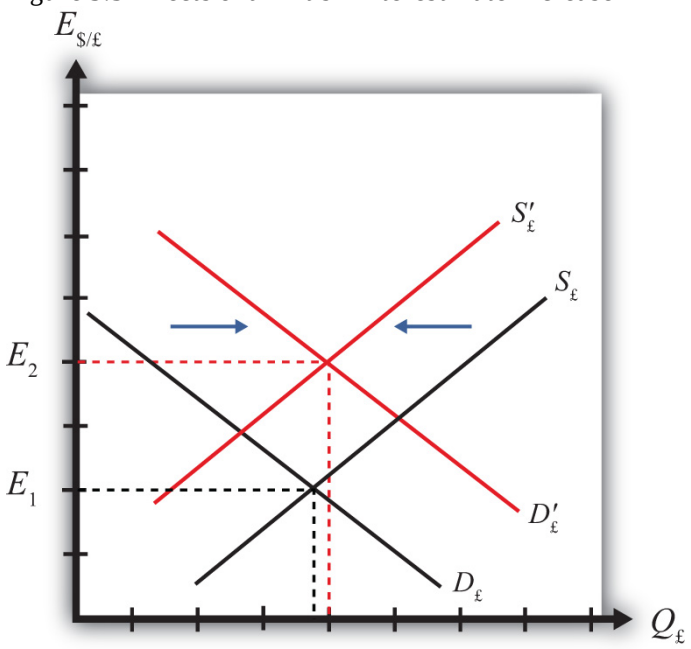
$RoR_£$ continues to rise until the interest parity condition, $RoR_\$ = RoR_£$, again holds.

The Effect of Changes in British Interest Rates on the Spot Exchange Rate

Suppose that the Forex is initially in equilibrium such that $S_£ = D_£$ at the exchange rate E_1 shown in Figure 5.3 "Effects of a British Interest Rate Increase". Now let average British interest rates ($i_£$) rise, ceteris paribus. The increase in interest rates raises the rate of return on British assets ($RoR_£$), which at the original exchange rate causes the rate of return on British assets to exceed the rate of return on U.S. assets ($RoR_£ > RoR_\$$).

This will raise the demand for pounds on the Forex as U.S. investors seek the higher average return on British assets. It will also lower the supply of British pounds by British investors who decide to invest at home rather than abroad. Thus in terms of the graph, $D_£$ shifts right (black to red) while $S_£$ shifts left (black to red). The equilibrium exchange rate rises to E_2. This means that the increase in British interest rates causes a pound appreciation and a dollar depreciation. As the exchange rate rises, $RoR_£$ falls since $\mathrm{RoR}_£ = \frac{E^e_{\$/£}(1+i_£)}{E_{\$/£}} - 1$

Figure 5.3 Effects of a British Interest Rate Increase



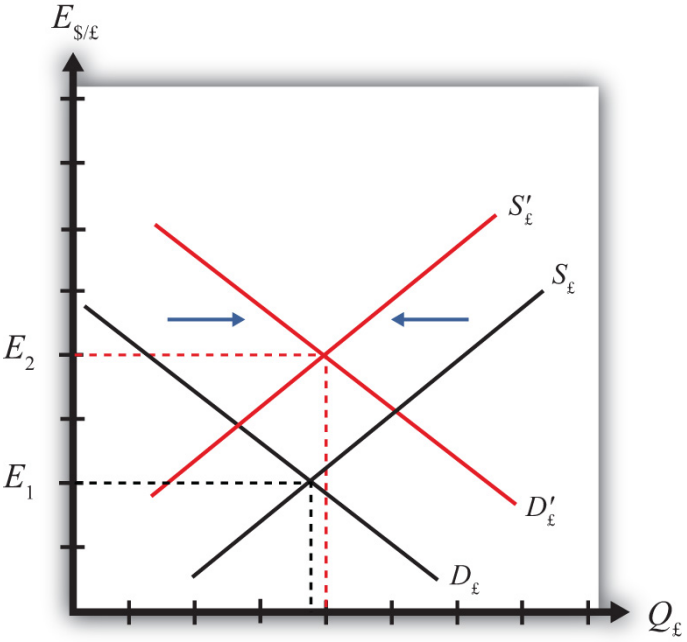
$RoR_£$ continues to fall until the interest parity condition, $RoR_\$ = RoR_£$, again holds.

The Effect of Changes in the Expected Exchange Rate on the Spot Exchange Rate

Suppose that the Forex is initially in equilibrium such that $S_£ = D_£$ at the exchange rate E_1. Now suppose investors suddenly raise their expected future exchange rate ($E_{\$/£}e$), ceteris paribus. This means that if investors had expected the pound to appreciate, they now expect it to appreciate more. Likewise, if investors had expected the dollar to depreciate, they now expect it to depreciate more. Also, if they had expected the pound to depreciate, they now expect it to depreciate less. Likewise, if they had expected the dollar to appreciate, they now expect it to appreciate less.

This change might occur because new information is released. For example, the British Central Bank might release information that suggests an increased chance that the pound will rise in value in the future. The increase in the expected exchange rate raises the rate of return on British assets ($RoR_£$), which at the original exchange rate causes the rate of return on British assets to exceed the rate of return on U.S. assets ($RoR_£ > RoR_\$$). This will raise the demand for the pound on the Forex as U.S. investors seek the higher average return on British assets. It will also lower the supply of British pounds by British investors who decide to invest at home rather than abroad. Thus, as depicted in Figure 5.4 "Effects of a Change in the Expected Exchange Rate", $D_£$ shifts right (black to red) while $S_£$ shifts left (black to red). The equilibrium exchange rate rises to E_2. This means that the increase in the expected exchange rate ($E_{\$/£}e$) causes a pound appreciation and a dollar depreciation.

Figure 5.4 Effects of a Change in the Expected Exchange Rate



This is a case of self-fulfilling expectations. If investors suddenly think the pound will appreciate more in the future and if they act on that belief, then the pound will begin to rise in the present, hence fulfilling their expectations. As the exchange rate rises, $RoR_£$ falls since

$$RoR_£ = \frac{E^e_{\$/£}}{E_{\$/£}}(1+i_£) - 1$$

$RoR_£$ continues to fall until the interest parity condition, $RoR_\$ = RoR_£$, again holds.

KEY TAKEAWAYS

- An increase in U.S. interest rates causes a pound depreciation and a dollar appreciation.
- An increase in British interest rates causes a pound appreciation and a dollar depreciation.
- An increase in the expected exchange rate ($E_{\$/£}e$) causes a pound appreciation and a dollar depreciation.

EXERCISES

1. Consider the economic changes listed along the left column of the following table. Indicate the effect of each change on the variables listed in the first row. Use insights from the interest rate parity model to determine the answers. Assume floating exchange rates. You do not need to show your work. Use the following notation:

   + the variable increases

   – the variable decreases

   0 the variable does not change

   A the variable change is ambiguous (i.e., it may rise, it may fall)

	U.S. Dollar Value	$E_{\$/€}$
a. A decrease in U.S. interest rates		
b. An increase in expected U.S. economic growth that raises expected asset values		
c. An expected increase in European stock values		

2. On February 5, 2004, the *Wall Street Journal* reported that Asian central banks were considering selling a significant share of their U.S. government bond holdings. It was estimated at the time that foreign central banks owned over $800 billion in U.S. Treasury bonds, or one-fifth of all U.S. federal government debt. Taiwan was considering using some of its foreign reserves to help its businesses purchase U.S. machinery.

a. What is the likely effect on the U.S. dollar value if Taiwan implements its plan? Explain.

b. What effect would this transaction have on the U.S. trade deficit? Explain.

c. How would the answer to part a change if the Taiwanese government used sales of its foreign reserves to help its businesses purchase Taiwanese-produced machinery? Explain.

5.3 Forex Equilibrium with the Rate of Return Diagram

LEARNING OBJECTIVE

1. Use the rate of return plots to represent the interest rate parity equilibrium in the foreign exchange market.

An alternative graphical approach is sometimes used to depict the equilibrium exchange rate in the foreign exchange (Forex) market. The graph is called the rate of return diagram since it depicts rates of return for assets in two separate countries as functions of the exchange rate. The equilibrium condition depicted in the diagram represents the interest rate parity condition. In effect, the diagram identifies the equilibrium exchange rate that must prevail to satisfy the interest rate parity condition.

Recall the rate of return formulas for deposits in two separate countries. Consider an investor, holding U.S. dollars, comparing the purchase of a one-year certificate of deposit (CD) at a U.S. bank with a one-year CD issued by a British bank. The rate of return on the U.S. deposit works out simply to be the U.S. interest rate shown below:

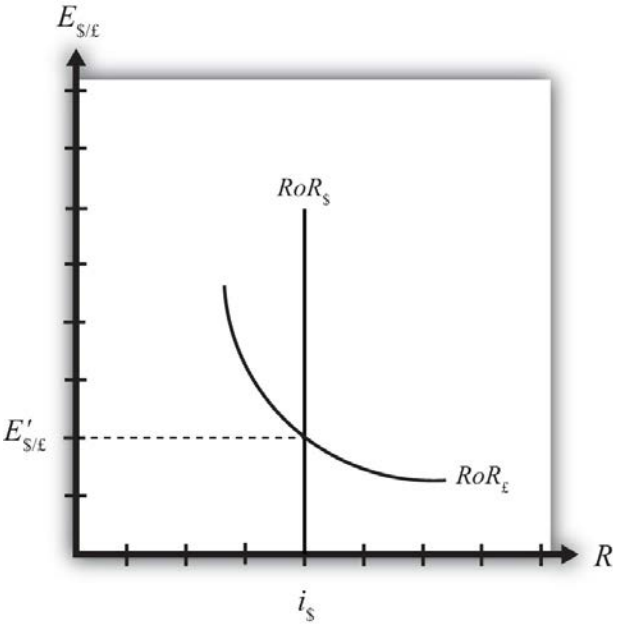
$$RoR_{\$} = i_{\$}.$$

The rate of return on the British asset, however, is a more complicated formula that depends on the British interest rate ($i_{£}$), the spot exchange rate ($E_{\$/£}$), and the expected exchange rate ($E_{\$/£}e$). In its simplest form it is written as follows:

$$\text{RoR}_{£} = \frac{E^{e}_{\$/£}}{E_{\$/£}}(1+i_{£}) - 1$$

In Figure 5.5 "Rate of Return Diagram", we plot both RoR equations with respect to the exchange rate ($E_{\$/£}$). Since $RoR_{\$}$ is not a function (i.e., not dependent) on the exchange rate, it is drawn as a vertical line at the level of the U.S. interest rate ($i_{\$}$). This simply means that as the exchange rate rises or falls, the $RoR_{\$}$ always remains immutably fixed at the U.S. interest rate.

Figure 5.5 Rate of Return Diagram



The $RoR_{£}$, however, is a function of the exchange rate. Indeed, the relationship is negative since $E_{\$/£}$ is in the denominator of the equation. This means that as $E_{\$/£}$rises, $RoR_{£}$ falls, and vice versa.

The intuition behind this negative relationship is obtained by looking at the alternative (equivalent) formula for $RoR_{£}$:

$$RoR_{£} = i_{£} + \frac{E^{e}_{\$/£} - E_{\$/£}}{E_{\$/£}} (1+i_{£})$$

Recall that the exchange rate ratio represents the expected percentage change in the value of the pound. Suppose, as an example, that this term were positive. That would mean the investor believes the pound will appreciate during the term of the investment. Furthermore, since it is an expected appreciation of the pound, it will add to the total rate of return on the British investment. Next, suppose the spot exchange rate ($E_{\$/£}$) rises today. Assuming ceteris paribus, as we always do in these exercises, the expected exchange rate remains fixed. That will mean the numerator of the exchange rate expression will fall in value, as will the value of the entire expression. The interpretation of this change is that the investor's expected appreciation of the pound falls, which in turn lowers the overall rate of return. Hence, we get the negative relationship between the \$/£ exchange rate and $RoR_{£}$.

The intersection of the two RoR curves in the diagram identifies the unique exchange rate $E'_{\$/£}$ that equalizes rates of return between the two countries. This exchange rate is in equilibrium because any deviations away from interest rate parity (IRP) will motivate changes in investor behavior and force the exchange back to the level necessary to achieve IRP. The equilibrium adjustment story is next.

KEY TAKEAWAYS

- The rates of return are plotted with respect to the exchange rate. The domestic rate of return does not depend on the exchange rate and hence is drawn as a vertical line. The foreign rate of return is negatively related to the value of the foreign currency.

- The intersection of the rates of return identifies the exchange rate that satisfies the interest rate parity condition.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. Of *positive*, *negative*, or *zero*, the relationship between the U.S. interest rate and the rate of return on U.S. assets.

b. Of *positive*, *negative*, or *zero*, the relationship between the exchange rate ($E_{\$/£}$) and the rate of return on U.S. assets.

c. Of *positive*, *negative*, or *zero*, the relationship between the exchange rate ($E_{\$/£}$) and the rate of return on British assets.

d. The name of the endogenous variable whose value is determined at the intersection of two rate of return curves.

5.4 Exchange Rate Equilibrium Stories with the RoR Diagram

LEARNING OBJECTIVE

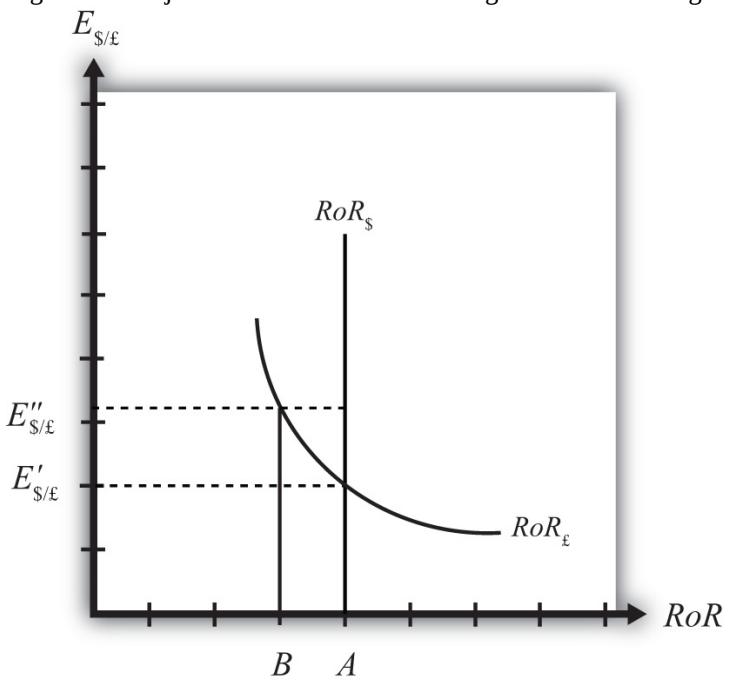
1. Learn how adjustment to equilibrium is described in the interest rate parity model.

Any equilibrium in economics has an associated behavioral story to explain the forces that will move the endogenous variable to the equilibrium value. In the foreign exchange (Forex) model, the endogenous variable is the exchange rate. This is the variable that is determined as a solution in the model and will change to achieve the equilibrium. Variables that do not change in the adjustment to the equilibrium are the exogenous variables. In this model, the exogenous variables are $E_{\$/£}e$, $i_{\$}$, and $i_{£}$. Changes in the exogenous variables are necessary to cause an adjustment to a new equilibrium. However, in telling an equilibrium story, it is typical to simply assume that the endogenous variable is not at the equilibrium (for some unstated reason) and then explain how and why the variable will adjust to the equilibrium value.

Exchange Rate Too High

Suppose, for some unspecified reason, the exchange rate is currently at $E''_{\$/£}$ as shown in Figure 5.6 "Adjustment When the Exchange Rate Is Too High". The equilibrium exchange rate is at $E'_{\$/£}$ since at this rate, rates of return are equal and interest rate parity (IRP) is satisfied. Thus at $E''_{\$/£}$ the exchange rate is too high. Since the exchange rate, as written, is the value of the pound, we can also say that the pound value is too high relative to the dollar to satisfy IRP.

Figure 5.6 Adjustment When the Exchange Rate Is Too High



With the exchange rate at $E''_{\$/£}$, the rate of return on the dollar, $RoR_{\$}$, is given by the value A along the horizontal axis. This will be the value of the U.S. interest rate. The rate of return on the pound, $RoR_{£}$ is given by the value B, however.

This means that $RoR_{£} < RoR_{\$}$ and IRP does not hold. Under this circumstance, higher returns on deposits in the United States will motivate investors to invest funds in the United States rather than Britain. This will raise the supply of pounds on the Forex as British investors seek the higher average return on U.S. assets. It will also lower the demand for British pounds (£) by U.S. investors who decide to invest at home rather than abroad. Both changes in the Forex market will lower the value of the pound and raise the U.S. dollar value, reflected as a reduction in $E_{\$/£}$.

In more straightforward terms, when the rate of return on dollar deposits is higher than on British deposits, investors will increase demand for the higher RoR currency and reduce demand for the other. The change in demand on the Forex raises the value of the currency whose RoR was initially higher (the U.S. dollar in this case) and lowers the other currency value (the British pound).

As the exchange rate falls from $E''_{\$/£}$ to $E'_{\$/£}$, $RoR_{£}$ begins to rise up, from B to A. This occurs because $RoR_{£}$ is negatively related to changes in the exchange rate. Once the exchange rate falls to $E'_{\$/£}$, $RoR_{£}$ will become equal to $RoR_{\$}$ at A and IRP will hold. At this point there are no further pressures in the Forex for the exchange rate to change, hence the Forex is in equilibrium at $E'_{\$/£}$.

Exchange Rate Too Low

If the exchange rate is lower than the equilibrium rate, then the adjustment will proceed in the opposite direction. At any exchange rate below $E'_{\$/£}$ in the diagram, $RoR_{£} > RoR_{\$}$. This condition will inspire investors to move their funds to Britain with the higher rate of return. The subsequent increase in the demand for pounds will raise the value of the pound on the Forex and $E_{\$/£}$ will rise (consequently, the dollar value will fall). The exchange rate will continue to rise and the rate of return on pounds will fall until $RoR_{£} = RoR_{\$}$ (IRP holds again) at $E'_{\$/£}$.

KEY TAKEAWAYS

- In the interest rate parity model, when the $/£ exchange rate is less than the equilibrium rate, the rate of return on British deposits exceeds the RoR on U.S. deposits. That inspires investors to demand more pounds on the Forex to take advantage of the higher RoR. Thus the $/£ exchange rate rises (i.e., the pound appreciates) until the equilibrium is reached when interest rate parity holds.
- In the interest rate parity model, when the $/£ exchange rate is greater than the equilibrium rate, the rate of return on U.S. deposits exceeds the RoR on British deposits. That inspires investors to

demand more U.S. dollars on the Forex to take advantage of the higher RoR. Thus the $/£ exchange rate falls (i.e., the dollar appreciates) until the equilibrium is reached when interest rate parity holds.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. Of *increase*, *decrease*, or *stay the same*, the expected effect on the exchange rate ($E_{\$/£}$) if the rate of return on pound assets is greater than the rate of return on dollar assets.

b. Of *increase*, *decrease*, or *stay the same*, the expected effect on the exchange rate ($E_{\$/£}$) if the rate of return on U.S. assets is greater than the rate of return on British assets.

c. Of *increase*, *decrease*, or *stay the same*, the expected effect on the value of the dollar if the rate of return on pound assets is greater than the rate of return on dollar assets.

d. Of *increase*, *decrease*, or *stay the same*, the expected effect on the value of the dollar if the rate of return on U.S. assets is greater than the rate of return on British assets.

e. Of *increase*, *decrease*, or *stay the same*, the expected effect on the value of the dollar if the rate of return on U.S. assets is equal to the rate of return on British assets.

5.5 Exchange Rate Effects of Changes in U.S. Interest Rates Using the RoR Diagram

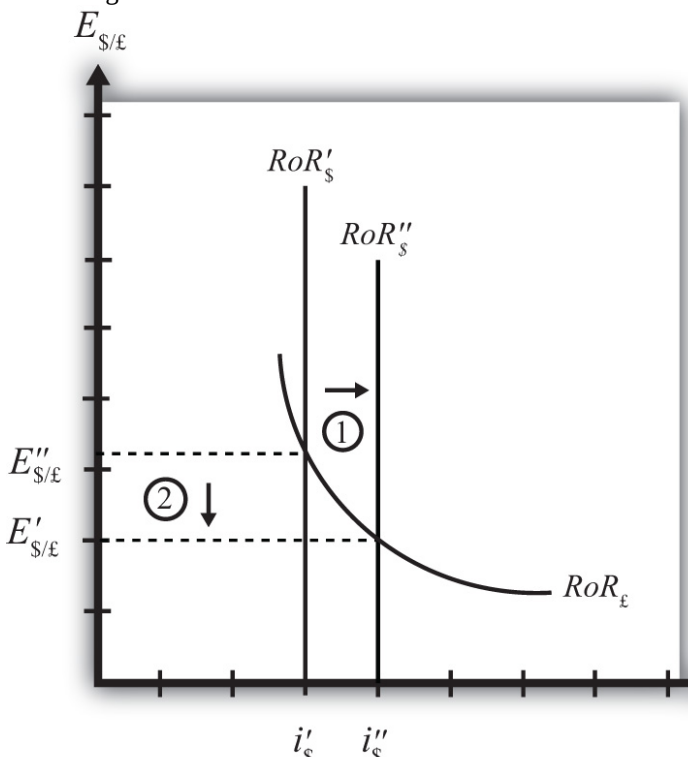
LEARNING OBJECTIVE

1. Learn the effects of changes in the foreign interest rate on the value of the domestic and foreign currency using the interest rate parity model.

Suppose that the foreign exchange market (Forex) is initially in equilibrium such that $RoR_{£} = RoR_{\$}$ (i.e., interest rate parity holds) at an initial equilibrium exchange rate given by $E'_{\$/£}$. The initial equilibrium is depicted in Figure 5.7 "Effects of a U.S. Interest Rate Increase in a RoR Diagram". Next, suppose U.S. interest rates rise, ceteris paribus. Ceteris paribus means we assume all other exogenous variables remain fixed at their original values. In this model, the British interest rate ($i_{£}$) and the expected exchange rate ($E_{\$/£}e$) both remain fixed as U.S. interest rates rise.

The increase in U.S. interest rates will shift the U.S. RoR line to the right from $RoR'_{\$}$to $RoR''_{\$}$ as indicated by step 1 in Figure 5.7 "Effects of a U.S. Interest Rate Increase in a RoR Diagram". Immediately after the increase and before the exchange rate changes, $RoR_{\$} > RoR_{£}$. The adjustment to the new equilibrium will follow the "exchange rate too high" equilibrium story earlier. Accordingly, higher U.S. interest rates will make U.S. dollar investments more attractive to investors, leading to an increase in demand for dollars on the Forex resulting in an appreciation of the dollar, a depreciation of the pound, and a decrease in $E_{\$/£}$. The exchange rate will fall to the new equilibrium rate$E''_{\$/£}$ as indicated by step 2 in the figure.

Figure 5.7 Effects of a U.S. Interest Rate Increase in a RoR Diagram



In summary, an increase in the U.S. interest rate will raise the rate of return on dollars above the rate of return on pounds, lead investors to shift investments to U.S.

assets, and result in a decrease in the $/£ exchange rate (i.e., an appreciation of the U.S. dollar and a depreciation of the British pound).

In contrast, a decrease in U.S. interest rates will lower the rate of return on dollars below the rate of return on pounds, lead investors to shift investments to British assets, and result in an increase in the $/£ exchange rate (i.e., a depreciation of the U.S. dollar and an appreciation of the British pound).

KEY TAKEAWAYS

- An increase in U.S. interest rates will result in a decrease in the $/£ exchange rate (i.e., an appreciation of the U.S. dollar and a depreciation of the British pound).
- A decrease in U.S. interest rates will result in an increase in the $/£ exchange rate (i.e., a depreciation of the U.S. dollar and an appreciation of the British pound).

EXERCISE

1. Consider the economic change listed along the top row of the following table. In the empty boxes, indicate the effect of each change, sequentially, on the variables listed in the first column. For example, a decrease in U.S. interest rates will cause a decrease in the rate of return (RoR) on U.S. assets. Therefore a "–" is placed in the first cell under the "A Decrease in U.S. Interest Rates" column of the table. Next in sequence, answer how the RoR on euro assets will be affected. Use the interest rate parity model to determine the answers. You do not need to show your work. Use the following notation:

+ the variable increases

– the variable decreases

0 the variable does not change

A the variable change is ambiguous (i.e., it may rise, it may fall)

	A Decrease in U.S. Interest Rates
RoR on U.S. Assets	–
RoR on Euro Assets	
Demand for U.S. Dollars on the Forex	

	A Decrease in U.S. Interest Rates
Demand for Euros on the Forex	
U.S. Dollar Value	
Euro Value	
$E_{\$/€}$	

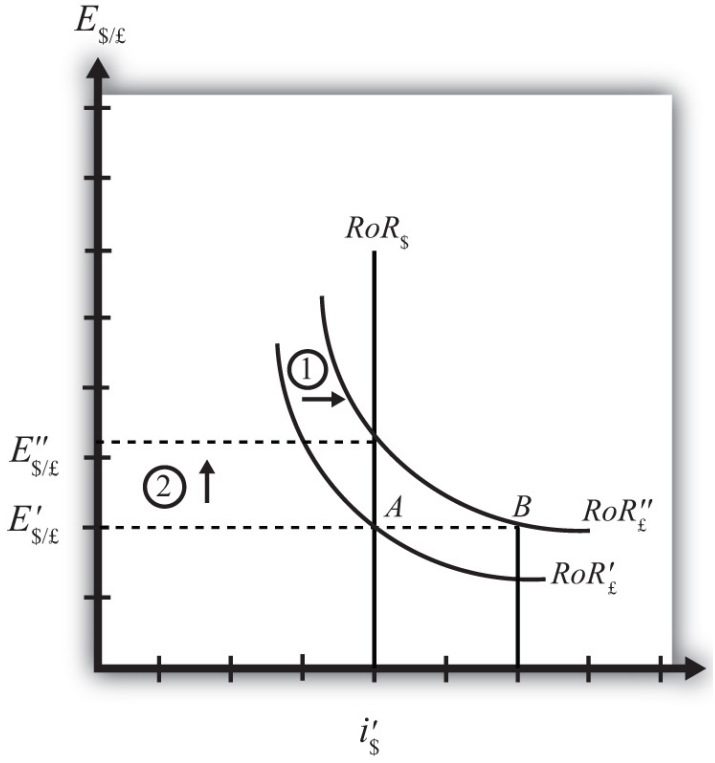
5.6 Exchange Rate Effects of Changes in Foreign Interest Rates Using the RoR Diagram

LEARNING OBJECTIVE

1. Learn the effects of changes in the foreign interest rate on the value of the domestic and foreign currency using the interest rate parity model.

Suppose that the foreign exchange market (Forex) is initially in equilibrium such that $RoR_{£} = RoR_{\$}$ (i.e., interest rate parity holds) at an initial equilibrium exchange rate given by $E'_{\$/£}$. The initial equilibrium is depicted in Figure 5.8 "Effects of a British Interest Rate Increase in a RoR Diagram". Next, suppose British interest rates rise, ceteris paribus. Ceteris paribus means we assume all other exogenous variables remain fixed at their original values. In this model, the U.S. interest rate ($i_{\$}$) and the expected exchange rate ($E_{\$/£}e$) both remain fixed as British interest rates rise.

Figure 5.8 Effects of a British Interest Rate Increase in a RoR Diagram



The increase in British interest rates ($i_{£}$) will shift the British RoR line to the right from $RoR'_{£}$ to $RoR''_{£}$ as indicated by step 1 in the figure.

The reason for the shift can be seen by looking at the simple rate of return formula:

$$RoR_{£} = \frac{E^{e}_{\$/£}}{E_{\$/£}}(1+i_{£}) - 1$$

Suppose one is at the original equilibrium with exchange rate $E'_{\$/£}$. Looking at the formula, an increase in $i_{£}$ clearly raises the value of $RoR_{£}$ for any fixed values of $E_{\$/£}e$. This could be represented as a shift to the right on the diagram, as from A to B. Once at B with a new interest rate, one could perform the exercise used to plot out the downward sloping RoR curve

(see Chapter 5 "Interest Rate Parity", Section 5.3 "Forex Equilibrium with the Rate of Return Diagram"). The result would be a curve, like the original, but shifted entirely to the right.

Immediately after the increase and before the exchange rate changes, $RoR_{£} > RoR_{\$}$. The adjustment to the new equilibrium will follow the "exchange rate too low" equilibrium story presented in Chapter 5 "Interest Rate Parity", Section 5.4 "Exchange Rate Equilibrium Stories with the RoR Diagram". Accordingly, higher British interest rates will make British pound investments more attractive to investors, leading to an increase in demand for pounds on the Forex, and resulting in an appreciation of the pound, a depreciation of the dollar, and an increase in $E_{\$/£}$. The exchange rate will rise to the new equilibrium rate $E''_{\$/£}$ as indicated by step 2.

In summary, an increase in British interest rates will raise the rate of return on pounds above the rate of return on dollars, lead investors to shift investments to British assets, and result in an increase in the $/£ exchange rate (i.e., an appreciation of the British pound and a depreciation of the U.S. dollar).

In contrast, a decrease in British interest rates will lower the rate of return on British pounds below the rate of return on dollars, lead investors to shift investments to U.S. assets, and result in a decrease in the $/£ exchange rate (i.e., a depreciation of the British pound and an appreciation of the U.S. dollar.

KEY TAKEAWAYS

- An increase in British interest rates will result in an increase in the $/£ exchange rate (i.e., an appreciation of the British pound and a depreciation of the U.S. dollar).
- A decrease in British interest rates will result in a decrease in the $/£ exchange rate (i.e., a depreciation of the British pound and an appreciation of the U.S. dollar).

EXERCISE

1. Consider the economic change listed along the top row of the following table. In the empty boxes, indicate the effect of each change, sequentially, on the variables listed in the first column. For example, a decrease in U.S. interest rates will cause a decrease in the rate of return (RoR) on U.S. assets. Therefore a "–" is placed in the first box of the table. Next in sequence, answer how the RoR on euro assets will be affected. Use the interest rate parity model to determine the answers. You do not need to show your work. Use the following notation:

   + the variable increases

– the variable decreases

0 the variable does not change

A the variable change is ambiguous (i.e., it may rise, it may fall)

	A Decrease in Euro Interest Rates
RoR on U.S. Assets	–
RoR on Euro Assets	
Demand for U.S. Dollars on the Forex	
Demand for Euros on the Forex	
U.S. Dollar Value	
Euro Value	
$E_{\$/€}$	

5.7 Exchange Rate Effects of Changes in the Expected Exchange Rate Using the RoR Diagram

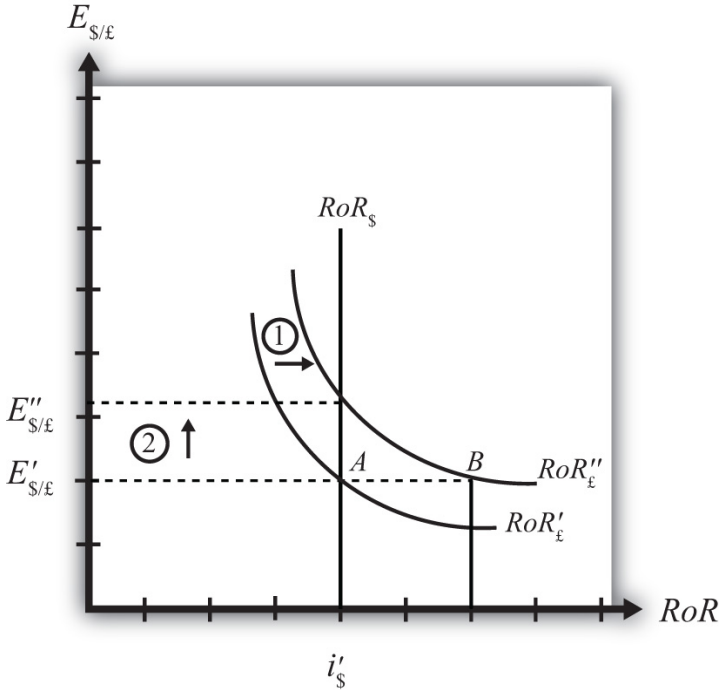
LEARNING OBJECTIVE

1. Learn the effects of changes in the expected future currency value on the spot value of the domestic and foreign currency using the interest rate parity model.

Suppose that the foreign exchange market (Forex) is initially in equilibrium such that $RoR_{£} = RoR_{\$}$ (i.e., interest rate parity holds) at an initial equilibrium exchange rate given by $E'_{\$/£}$. The initial equilibrium is depicted in Figure 5.9 "Effects of an Expected Exchange Rate Change in a RoR Diagram". Next, suppose investors' beliefs shift so that $E_{\$/£}e$ rises, ceteris paribus. Ceteris paribus means we assume all other exogenous variables remain fixed at their original values. In this model, the U.S. interest rate ($i_{\$}$) and the British interest rate ($i_{£}$) both remain fixed as the expected exchange rate rises.

An expected exchange rate increase means that if investors had expected the pound to appreciate, they now expect it to appreciate even more. Likewise, if investors had expected the dollar to depreciate, they now expect it to depreciate more. Alternatively, if they had expected the pound to depreciate, they now expect it to depreciate less.

Figure 5.9 Effects of an Expected Exchange Rate Change in a the RoR Diagram



Likewise, if they had expected dollar to appreciate, they now expect it to appreciate less. This change might occur because new information is released. For example, the British Central Bank might release information that suggests an increased chance that the pound will rise in value in the future.

The increase in the expected exchange rate ($E_{\$/£}e$) will shift the British RoR line to the right

from $RoR'_{£}$ to $RoR''_{£}$ as indicated by step 1 in the figure.

The reason for the shift can be seen by looking at the simple rate of return formula:

$$RoR_{£} = \frac{E^{e}_{\$/£}}{E_{\$/£}} (1 + i_{£}) - 1$$

Suppose one is at the original equilibrium with exchange rate $E'_{\$/£}$. Looking at the formula, an increase in $E_{\$/£}e$ clearly raises the value of $RoR_{£}$ for any fixed values of $i_{£}$. This could be represented as a shift to the right on the diagram from A to B. Once at B with a new expected exchange rate, one could perform the exercise used to plot out the downward sloping RoR curve. The result would be a curve, like the original, but shifted entirely to the right.

Immediately after the increase and before the exchange rate changes, $RoR_{£} > RoR_{\$}$. The adjustment to the new equilibrium will follow the "exchange rate too low" equilibrium story presented in Chapter 5 "Interest Rate Parity", Section 5.4 "Exchange Rate Equilibrium Stories with the RoR Diagram". Accordingly, higher expected British rates of return will make British pound investments more attractive to investors, leading to an increase in demand for pounds on the Forex and resulting in an appreciation of the pound, a depreciation of the dollar, and an increase in $E_{\$/£}$. The exchange rate will rise to the new equilibrium rate $E''_{\$/£}$ as indicated by step 2.

In summary, an increase in the expected future \$/£ exchange rate will raise the rate of return on pounds above the rate of return on dollars, lead investors to shift investments to British assets, and result in an increase in the \$/£ exchange rate (i.e., an appreciation of the British pound and a depreciation of the U.S. dollar).

In contrast, a decrease in the expected future \$/£ exchange rate will lower the rate of return on British pounds below the rate of return on dollars, lead investors to shift investments to U.S. assets, and result in a decrease in the \$/£ exchange rate (i.e., a depreciation of the British pound and an appreciation of the U.S. dollar).

KEY TAKEAWAYS

- An increase in the expected future pound value (with respect to the U.S. dollar) will result in an increase in the spot \$/£ exchange rate (i.e., an appreciation of the British pound and a depreciation of the U.S. dollar).

- A decrease in the expected future pound value (with respect to the U.S. dollar) will result in a decrease in the spot $/£ exchange rate (i.e., a depreciation of the British pound and an appreciation of the U.S. dollar).

EXERCISE

1. Consider the economic change listed along the top row of the following table. In the empty boxes, indicate the effect of the change, sequentially, on the variables listed in the first column. For example, a decrease in U.S. interest rates will cause a decrease in the rate of return (RoR) on U.S. assets. Therefore a "–" is placed in the first box of the table. Next in sequence, answer how the RoR on euro assets will be affected. Use the interest rate parity model to determine the answers. You do not need to show your work. Use the following notation:

   + the variable increases

   – the variable decreases

   0 the variable does not change

   A the variable change is ambiguous (i.e., it may rise, it may fall)

	A Reduction in Next Year's Expected Dollar Value
RoR on U.S. Assets	–
RoR on Euro Assets	
Demand for U.S. Dollars on the Forex	
Demand for Euros on the Forex	
U.S. Dollar Value	
Euro Value	
$E_{\$/€}$	

Chapter 6: Purchasing Power Parity

Purchasing power parity is both a theory about exchange rate determination and a tool to make more accurate comparisons of data between countries. It is probably more important in its latter role since as a theory it performs pretty poorly. Its poor performance arises largely because its simple form depends on several assumptions that are not likely to hold in the real world and because the amount of foreign exchange activity due to importer and exporter demands is much less than the amount of activity due to investor demands. Nonetheless, the theory remains important to provide the background for its use as a tool for cross-country comparisons of income and wages, which is used by international organizations like the World Bank in presenting much of their international data.

6.1 Overview of Purchasing Power Parity (PPP)

LEARNING OBJECTIVES

1. Identify the conditions under which the law of one price holds.
2. Identify the conditions under which purchasing power parity holds.

Purchasing power parity (PPP) is a theory of exchange rate determination and a way to compare the average costs of goods and services between countries. The theory assumes that the actions of importers and exporters (motivated by cross-country price differences) induce changes in the spot exchange rate. In another vein, PPP suggests that transactions on a country's current account affect the value of the exchange rate on the foreign exchange (Forex) market. This is in contrast with the interest rate parity theory, which assumes that the actions of investors (whose transactions are recorded on the capital account) induce changes in the exchange rate.

PPP theory is based on an extension and variation of the "law of one price" as applied to the aggregate economy. To explain the theory it is best to first review the idea behind the law of one price.

The Law of One Price (LoOP)

The law of one price says that identical goods should sell for the same price in two separate markets when there are no transportation costs and no differential taxes applied in the two markets. Consider the following information about movie video tapes sold in the U.S. and Mexican markets.

Price of videos in U.S. market ($P^v_\$$)	$20
Price of videos in Mexican market (P^v_p)	P150
Spot exchange rate ($E_{p/\$}$)	10 P/$

The dollar price of videos sold in Mexico can be calculated by dividing the video price in pesos by the spot exchange rate as show:

$$\frac{P^v_p}{E_{p/\$}}\left[\frac{\text{peso/video}}{\text{peso/\$}} = \frac{\text{peso}}{\text{video}} \times \frac{\$}{\text{peso}} = \frac{\$}{\text{video}}\right] = \frac{150}{10} = \$15\text{/video.}$$

To see why the peso price is divided by the exchange rate rather than multiplied, notice the conversion of units shown in the brackets. If the law of one price held, then the dollar price in Mexico should match the

price in the United States. Since the dollar price of the video is less than the dollar price in the United States, the law of one price *does not hold* in this circumstance.

The next question to ask is what might happen as a result of the discrepancy in prices. Well, as long as there are no costs incurred to transport the goods, there is a profit-making opportunity through trade. For example, U.S. travelers in Mexico who recognize that identical video titles are selling there for 25 percent less might buy videos in Mexico and bring them back to the United States to sell. This is an example of "goods arbitrage." An arbitrage opportunity arises whenever one can buy something at a low price in one location, resell it at a higher price, and thus make a profit.

Using basic supply and demand theory, the increase in demand for videos in Mexico would push up the price of videos. The increase in supply of videos on the U.S. market would force the price down in the United States. In the end, the price of videos in Mexico may rise to, say, p180 while the price of videos in the United States may fall to $18. At these new prices *the law of one price holds* since

$$\frac{P_{\text{p}}^{v}}{E_{\text{p/\$}}} = \frac{180}{10} = \$18 = P_{\$}^{v}.$$

The idea in the law of one price is that identical goods selling in an integrated market in which there are no transportation costs, no differential taxes or subsidies, and no tariffs or other trade barriers should sell at identical prices. If different prices prevailed, then there would be profit-making opportunities by buying the good in the low price market and reselling it in the high price market. If entrepreneurs took advantage of this arbitrage opportunity, then the prices would converge to equality.

Of course, for many reasons the law of one price does not hold even between markets within a country. The price of beer, gasoline, and stereos will likely be different in New York City and in Los Angeles. The price of these items will also be different in other countries when converted at current exchange rates. The simple reason for the discrepancies is that there are costs to transport goods between locations, there are different taxes applied in different states and different countries, nontradable input prices may vary, and people do not have perfect information about the prices of goods in all markets at all times. Thus to refer to this as an economic "law" does seem to exaggerate its validity.

From LoOP to PPP

The purchasing power parity theory is really just the law of one price applied in the aggregate but with a slight twist added. If it makes sense from the law of one price that identical goods should sell for identical prices in different markets, then the law ought to hold for all identical goods sold in both markets.

First, let's define the variable $CB_{\$}$ to represent the cost of a basket of goods in the United States denominated in dollars. For simplicity we could imagine using the same basket of goods used in the construction of the U.S. consumer price index ($CPI_{\$}$). The consumer price index (CPI) uses a market basket of goods that are purchased by an average household during a specified period. The basket is determined by surveying the quantity of different items purchased by many different households. One can then determine, on average, how many units of bread, milk, cheese, rent, electricity, and so on are purchased by the typical household. You might imagine it's as if all products are purchased in a grocery store with items being placed in a basket before the purchase is made. $CB_{\$}$ then represents the dollar cost of purchasing all the items in the market basket. We will similarly define CB_{p} to be the cost of a market basket of goods in Mexico denominated in pesos.

Now if the law of one price holds for each individual item in the market basket, then it should hold for the market baskets as well. In other words,

$$\frac{P_{\text{p}}^{v}}{E_{\text{p/\$}}} = P_{\$}^{v} \Rightarrow \frac{CB_{\text{p}}}{E_{\text{p/\$}}} = CB_{\$}.$$

Rewriting the right-hand side equation allows us to put the relationship in the form commonly used to describe absolute purchasing power parity, which is

$$E_{\text{p/\$}}^{\text{PPP}} = \frac{CB_{\text{p}}}{CB_{\$}}.$$

If this condition holds between two countries, then we would say PPP is satisfied. The condition says that the PPP exchange rate (pesos per dollar) will equal the ratio of the costs of the two market baskets of goods denominated in local currency units. Note that the reciprocal relationship $E_{\$/\text{p}}^{\text{PPP}} = \frac{CB_{\$}}{CB_{\text{p}}}$ is also valid.

Because the cost of a market basket of goods is used in the construction of the country's consumer price index, PPP is often written as a relationship between the exchange rate and the country's price indices. However, it is not possible merely to substitute the price index directly for the cost of the market basket

used above. To see why, we will review the construction of the CPI in Chapter 6 "Purchasing Power Parity", Section 6.2 "The Consumer Price Index (CPI) and PPP".

KEY TAKEAWAYS

- The law of one price says that identical goods should sell for identical prices in two different markets when converted at the current exchange rate and when there are no transportation costs and no differential taxes applied.
- The purchasing power parity theory is an aggregated version of the law of one price.
- The purchasing power parity condition says that identical market baskets should sell for identical prices in two different markets when converted at the current exchange rate and when there are no transportation costs and no differential taxes applied.

EXERCISES

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. The exchange rate value if toothpaste costs $2.50 in the United States and 30 pesos in Mexico and the law of one price holds.

b. The exchange rate value if a market basket costs $450 in the United States and 5,400 pesos in Mexico and purchasing power parity holds.

c. The term used to describe a collection of goods and services consumed by a typical consumer.

d. The term used to distinguish PPP based on price levels rather than inflation rates.

e. The term used to describe the economic principle that identical goods should sell at identical prices in different markets.

Use the information in the table below to answer the following question. Show your work.

	The *Economist* Price per Issue	Exchange Rate (December 2, 1999)
United States	$3.95	–
Canada	C$ 4.95	1.47 C$/$

	The *Economist* Price per Issue	Exchange Rate (December 2, 1999)
Japan	¥920	102 ¥/$

Calculate the implied purchasing power parity exchange rates between Canada and the United States and between Japan and the United States based on the price of the *Economist* magazine.

6.2 The Consumer Price Index (CPI) and PPP

LEARNING OBJECTIVE

1. Learn the relationship between the consumer price index and the PPP exchange rate.

The consumer price index (CPI) is an index that measures the average level of prices of goods and services in an economy relative to a base year. To track only what happens to prices, the quantities of goods purchased is assumed to remain fixed from year to year. This is accomplished by determining—with survey methods—the average quantities of all goods and services purchased by a typical household during some period. The quantities of all of these goods together are referred to as the average market basket. For example, the survey might find that the average household in one month purchases 10 gallons of gas, 15 cans of beer, 3.2 gallons of milk, 2.6 pounds of butter, and so on. The basket of goods would also contain items like health and auto insurance, housing services, utility services, and many other items. We can describe the market basket easily as a collection or set of quantities (Q_1, Q_2, Q_3,..., Qn). Here Q_1may be the quantity of gasoline, Q_2 the quantity of beer, and so on. The set has $n$different quantity entries, implying that there are n different items in the market basket.

The cost of the market basket is found by surveying the average prices for each of the $n$products in the market in question. This survey would yield a collection or set of prices (P_1, P_2, P_3,..., Pn). The cost of the market basket is then found by summing the product of the price and quantity for each item. That is, $CB = P_1Q_1 + P_2Q_2 + P_3Q_3 + ... + PnQn$, or

$$CB = \sum_{i-1}^{n} P_i Q_i.$$

The first year in which the index is constructed is called the base year. Suppose 1982 is the base year for the United States. Let $CBYY$ represent the cost of the market basket evaluated at the prices that prevail in the year (YY) (e.g., CB_{09} is the cost of a market basket evaluated in 2009 prices). The CPI is derived according to the following formula:

$$CPI_{YY} = \frac{CB_{YY}}{CB_{82}} \times 100,$$

where $CPIYY$ is the CPI in the year (YY). The term is multiplied by 100 by convention, probably because it reduces the need to use digits after a decimal point. Notice that the CPI in the base year is equal to 100—

that is, $CPI_{82} = 100$—because $CB_{82}/CB_{82} = 1$. This is true for all indices—they are by convention set to 100 in the base year.

The CPI in a different year (either earlier or later) represents the ratio of the cost of the market basket in that year relative to the cost of the same basket in the base year. If in 1982 the cost of the market basket rises, then the CPI will rise above 100. If the cost of the market basket falls, then the CPI would fall below 100.

If the CPI rises, it does not mean that the prices of all the goods in the market basket have risen. Some prices may rise more or less. Some prices may even fall. The CPI measures the average price change of goods and services in the basket.

The inflation rate for an economy is the percentage change in the CPI during a year. Thus if CPI_{08} on January 1, 2008, and CPI_{09} on January 1, 2009, are the price indices, then the inflation rate during 2008 is given by

$$\pi_{08} = \frac{CPI_{09} - CPI_{08}}{CPI_{08}} \times 100.$$

PPP Using the CPI

The purchasing power parity relationship can be written using the CPI with some small adjustments. First, consider the following ratio of 2009 consumer price indices between Mexico and the United States:

$$\frac{CPI_{\text{P}}^{09}}{CPI_{\$}^{09}} = \frac{CB_{\text{P}}^{09}/CB_{\text{P}}^{08}}{CB_{\$}^{09}/CB_{\$}^{08}} = \frac{CB_{\text{P}}^{09}}{CB_{\$}^{09}}\frac{CB_{\$}^{08}}{CB_{\text{P}}^{08}} = \frac{CB_{\text{P}}^{09}/CB_{\$}^{09}}{CB_{\text{P}}^{08}/CB_{\$}^{08}}.$$

Given that the base year is 2008, the ratio is written in terms of the market basket costs on the right-hand side and then rewritten into another form. The far right-hand side expression now reflects the purchasing power parity exchange rates in 2009 divided by the PPP exchange rate in 2008, the base year. In other words,

$$\frac{CPI_{\text{P}}^{09}}{CPI_{\$}^{08}} = \frac{CB_{\text{P}}^{09}/CB_{\$}^{09}}{CB_{\text{P}}^{08}/CB_{\$}^{09}} = \frac{{}^{09}E_{\text{P}/\$}^{\text{PPP}}}{{}^{08}E_{\text{P}/\$}^{\text{PPP}}}.$$

So, in general, if you want to use the consumer price indices for two countries to derive the PPP exchange rate for 2009, you must apply the following formula, derived by rewriting the above as

$$ {}^{09}E^{PPP}_{p/\$} = {}^{base}E^{PPP}_{p/\$} x \frac{CPI^{09}_{p}}{CPI^{09}_{\$}} , $$

Where ${}^{base}E^{PPP}_{p/\$}$ represents the PPP exchange rate that prevails in the base year between the two countries. Note that in order for this formula to work correctly, the CPIs in both countries must share the same base year. If they did not, a more complex formula would need to be derived.

KEY TAKEAWAYS

- A country's consumer price index in year (YY) is derived as the ratio of the market basket cost in year (YY) and the market basket cost in the base year.
- The PPP exchange rate between two countries can be written as the ratio of the their consumer price indices in that year multiplied by an adjustment factor given by the PPP exchange rate in the base year of the countries' CPIs.

EXERCISE

1. Suppose a consumer purchases the following products each week: ten gallons of gas, fifteen cans of beer, three gallons of milk, and two pounds of butter. Suppose in the initial week the prices of the products are $3 per gallon of gas, $2 per can of beer, $4 per gallon of milk, and $4 per pound of butter. Suppose one year later the prices of the same products are $2 per gallon of gas, $3 per can of beer, $5 per gallon of milk, and $5 per pound of butter.

a. Calculate the cost of a weekly market basket in the initial base period.

b. Calculate the cost of a market basket one year later.

c. Construct the price index value for both years.

d. What is the inflation rate between the two years?

6.3 PPP as a Theory of Exchange Rate Determination

LEARNING OBJECTIVE

1. Learn how adjustment to equilibrium occurs in the PPP model.

The purchasing power parity (PPP) relationship becomes a theory of exchange rate determination by introducing assumptions about the behavior of importers and exporters in response to changes in the relative costs of national market baskets. Recall the story of the law of one price, when the price of a good differed between two countries' markets and there was an incentive for profit-seeking individuals to buy the good in the low price market and resell it in the high price market. Similarly, if a market basket containing many different goods and services costs more in one market than another, we should likewise expect profit-seeking individuals to buy the relatively cheaper goods in the low-cost market and resell them in the higher-priced market. If the law of one price leads to the equalization of the prices of a good between two markets, then it seems reasonable to conclude that PPP, describing the equality of market baskets across countries, should also hold.

However, adjustment within the PPP theory occurs with a twist compared to adjustment in the law of one price story. In the law of one price story, goods arbitrage in a particular product was expected to affect the prices of the goods in the two markets. The twist that's included in the PPP theory is that arbitrage, occurring across a range of goods and services in the market basket, will affect the exchange rate rather than the market prices.

PPP Equilibrium Story

To see why the PPP relationship represents an equilibrium, we need to tell an equilibrium story. An equilibrium story in an economic model is an explanation of how the behavior of individuals will cause the equilibrium condition to be satisfied. The equilibrium condition is the PPP equation written as

$$E_{\text{p/\$}}^{\text{PPP}} = \frac{CB_{\text{p}}}{CB_{\text{\$}}}.$$

The endogenous variable in the PPP theory is the exchange rate. Thus we need to explain why the exchange rate will change if it is not in equilibrium. In general there are always two versions of an equilibrium story, one in which the endogenous variable ($E_{\text{p/\$}}$ here) is too high and one in which it is too low.

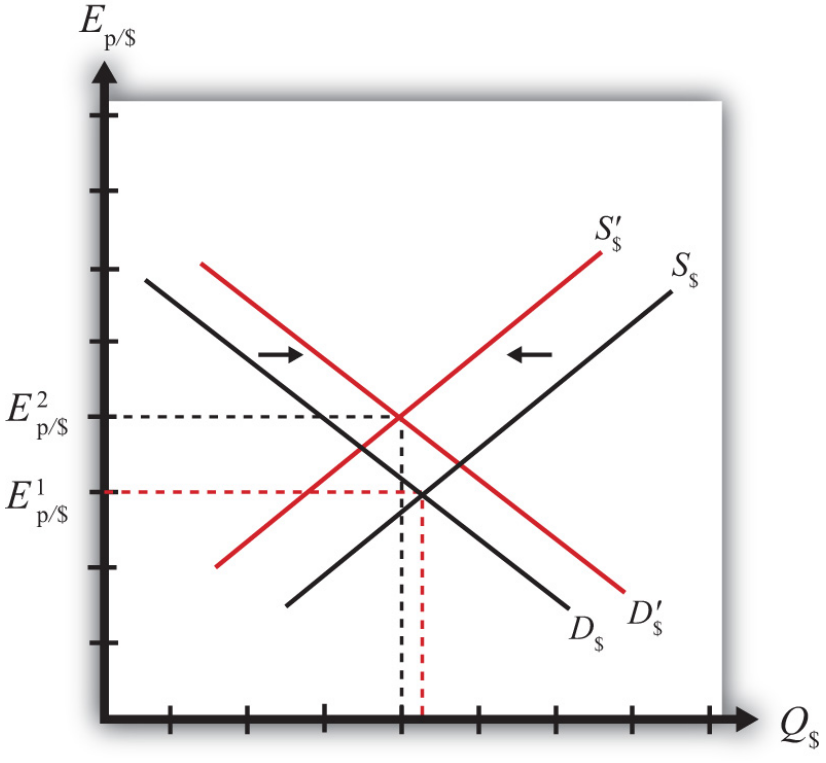
PPP equilibrium story 1. Let's consider the case in which the exchange rate is too low to be in equilibrium. This means that

$$E_{\text{p/\$}} < \frac{CB_{\text{p}}}{CB_{\$}} \Rightarrow CB_{\$} E_{\text{p/\$}} < CB_{\text{p}},$$

where $E_{\text{p/\$}}$ is the exchange rate that prevails on the spot market. Since it is less than the ratio of the market basket costs in Mexico and the United States, it is also less than the PPP exchange rate. The right side of the expression is rewritten to show that the cost of a market basket in the United States evaluated in pesos (i.e., $CB_{\$}E_{\text{p/\$}}$) is less than the cost of the market basket in Mexico also evaluated in pesos. Thus it is cheaper to buy the basket in the United States, or in other words, it is more profitable to sell items in the market basket in Mexico.

The PPP theory now suggests that the cheaper basket in the United States will lead to an increase in demand for goods in the U.S. market basket by Mexico. As a consequence, it will increase the demand for U.S. dollars on the foreign exchange (Forex) market. Dollars are needed because purchases of U.S. goods require U.S. dollars. Alternatively, U.S. exporters will realize that goods sold in the United States can be sold at a higher price in Mexico. If these goods are sold in pesos, the U.S. exporters will want to convert the proceeds back to dollars. Thus there is an increase in U.S. dollar demand (by Mexican importers) and an increase in peso supply (by U.S. exporters) on the Forex. This effect is represented by a rightward shift in the U.S. dollar

Figure 6.1 Forex Adjustment When $E_{\text{p/\$}}$ Is Low



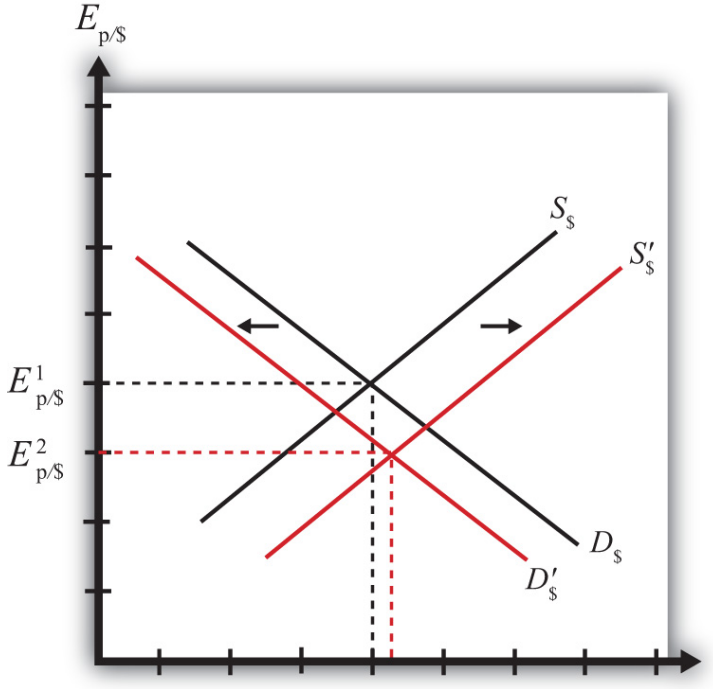
demand curve in Figure 6.1 "Forex Adjustment When ". At the same time, U.S. consumers will reduce their demand for the pricier Mexican goods. This will reduce the supply of dollars (in exchange for pesos) on the Forex, which is represented by a leftward shift in the U.S. dollar supply curve in the Forex market. Both the shift in demand and supply will cause an increase in the value of the dollar and thus the exchange rate ($E_{p/\$}$) will rise. As long as the U.S. market basket remains cheaper, excess demand for the dollar will persist and the exchange rate will continue to rise. The pressure for change ceases once the exchange rate rises enough to equalize the cost of market baskets between the two countries and PPP holds.

PPP equilibrium story 2. Now let's consider the other equilibrium story (i.e., the case in which the exchange rate is too high to be in equilibrium). This implies that

$$E_{p/\$} > \frac{CB_p}{CB_\$} \Rightarrow CB_\$ E_{p/\$} > CB_p.$$

The left-side expression says that the spot exchange rate is greater than the ratio of the costs of market baskets between Mexico and the United States. In other words, the exchange rate is above the PPP exchange rate. The right-side expression says that the cost of a U.S. market basket, converted to pesos at the current exchange rate, is greater than the cost of a Mexican market basket in pesos. Thus, on average, U.S. goods are relatively more expensive while Mexican goods are relatively cheaper.

Figure 6.2 Forex Adjustment When $E_{p/\$}$ Is High



The price discrepancies should lead consumers in the United States or importing firms to purchase less expensive goods in Mexico. To do so, they will raise the supply of dollars in the Forex in exchange for pesos. Thus the supply curve of dollars will shift to the right as shown

in Figure 6.2 "Forex Adjustment When ". At the same time, Mexican consumers would refrain from purchasing the more expensive U.S. goods. This would lead to a reduction in demand for dollars in exchange for pesos on the Forex. Hence, the demand curve for dollars shifts to the left. Due to the demand decrease and the supply increase, the exchange rate ($E_{\text{p/\$}}$) falls. This means that the dollar depreciates and the peso appreciates.

Extra demand for pesos will continue as long as goods and services remain cheaper in Mexico. However, as the peso appreciates (the dollar depreciates), the cost of Mexican goods rises relative to U.S. goods. The process ceases once the PPP exchange rate is reached and market baskets cost the same in both markets.

Adjustment to Price Level Changes under PPP

In the PPP theory, exchange rate changes are induced by changes in relative price levels between two countries. This is true because the quantities of the goods are always presumed to remain fixed in the market baskets. Therefore, the only way that the cost of the basket can change is if the goods' prices change. Since price level changes represent inflation rates, this means that differential inflation rates will induce exchange rate changes according to the theory.

If we imagine that a country begins with PPP, then the inequality given in equilibrium story 1, $CB_{\$}E_{\text{p/\$}} < CB_{\text{p}}$, can arise if the price level rises in Mexico (peso inflation), if the price level falls in the United States (dollar deflation), or if Mexican inflation is more rapid than U.S. inflation. According to the theory, the behavior of importers and exporters would now induce a dollar appreciation and a peso depreciation. In summary, an increase in Mexican prices relative to the change in U.S. prices (i.e., more rapid inflation in Mexico than in the United States) will cause the dollar to appreciate and the peso to depreciate according to the purchasing power parity theory.

Similarly, if a country begins with PPP, then the inequality given in equilibrium story 2, $CB_{\$}E_{\text{p/\$}} > CB_{\text{p}}$, can arise if the price level rises in the United States (dollar inflation), the price level falls in Mexico (peso deflation), or if U.S. inflation is more rapid than Mexican inflation. In this case, the inequality would affect the behavior of importers and exporters and induce a dollar depreciation and peso appreciation. In summary, more rapid inflation in the United States would cause the dollar to depreciate while the peso would appreciate.

KEY TAKEAWAYS

- An increase in Mexican prices relative to the change in U.S. prices (i.e., more rapid inflation in Mexico than in the United States) will cause the dollar to appreciate and the peso to depreciate according to the purchasing power parity theory.
- More rapid inflation in the United States would cause the dollar to depreciate while the peso would appreciate.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. Of *increase*, *decrease*, or *no change*, the effect on the demand for euros in the foreign exchange market if a market basket costs more in the United States than it does in Germany.

b. Of *increase*, *decrease*, or *no change*, the effect on the supply of dollars in the foreign exchange market if a market basket costs more in the United States than it does in Germany.

c. Of *increase*, *decrease*, or *no change*, the effect on the U.S. dollar value according to the PPP theory if a market basket costs $300 in the United States and €200 in Germany and the exchange rate is $E_{\$/€} = 1.30$.

d. Of *increase*, *decrease*, or *no change*, the effect on the euro value according to the PPP theory if a market basket costs €200 in Germany and ¥22,000 in Japan and the exchange rate is $E_{¥/€} = 115$.

e. Of *increase*, *decrease*, or *no change*, the effect on the euro value according to the PPP theory if a market basket costs €200 in Germany and ¥22,000 in Japan and the exchange rate is $E_{¥/€} = 100$.

6.4 Problems and Extensions of PPP

LEARNING OBJECTIVES

1. Identify the reasons why the PPP condition is rarely satisfied between two countries.
2. Learn the dynamic version of PPP.

Problems with the PPP Theory

The main problem with the purchasing power parity (PPP) theory is that the PPP condition is rarely satisfied within a country. There are quite a few reasons that can explain this and so, given the logic of the theory, which makes sense, economists have been reluctant to discard the theory on the basis of lack of supporting evidence. Below we consider some of the reasons PPP may not hold.

Transportation costs and trade restrictions. Since the PPP theory is derived from the law of one price, the same assumptions are needed for both theories. The law of one price assumes that there are no transportation costs and no differential taxes applied between the two markets. These mean that there can be no tariffs on imports or other types of restrictions on trade. Since transport costs and trade restrictions do exist in the real world, this would tend to drive prices for similar goods apart. Transport costs should make a good cheaper in the exporting market and more expensive in the importing market. Similarly, an import tariff would drive a wedge between the prices of an identical good in two trading countries' markets, raising it in the import market relative to the export market price. Thus the greater transportation costs and trade restrictions are between countries, the less likely for the costs of market baskets to be equalized.

Costs of nontradable inputs. Many items that are homogeneous nevertheless sell for different prices because they require a nontradable input in the production process. As an example, consider why the price of a McDonald's Big Mac hamburger sold in downtown New York City is higher than the price of the same product in the New York suburbs. Because the rent for restaurant space is much higher in the city center, the restaurant will pass along its higher costs in the form of higher prices. Substitute products in the city center (other fast food restaurants) will face the same high rental costs and thus will charge higher prices as well. Because it would be impractical (i.e., costly) to produce the burgers at a cheaper suburban location and then transport them for sale in the city, competition would not drive the prices together in the two locations.

Perfect information. The law of one price assumes that individuals have good, even perfect, information about the prices of goods in other markets. Only with this knowledge will profit seekers begin to export goods to the high price market and import goods from the low-priced market. Consider a case in which there is imperfect information. Perhaps some price deviations are known to traders but other deviations are not known, or maybe only a small group of traders know about a price discrepancy and that group is unable to achieve the scale of trade needed to equalize the prices for that product. (Perhaps they face capital constraints and can't borrow enough money to finance the scale of trade needed to equalize prices.) In either case, traders without information about price differences will not respond to the profit opportunities and thus prices will not be equalized. Thus the law of one price may not hold for some products, which would imply that PPP would not hold either.

Other market participants. Notice that in the PPP equilibrium stories, it is the behavior of profit-seeking importers and exporters that forces the exchange rate to adjust to the PPP level. These activities would be recorded on the current account of a country's balance of payments. Thus it is reasonable to say that the PPP theory is based on current account transactions. This contrasts with the interest rate parity theory in which the behavior of investors seeking the highest rates of return on investments motivates adjustments in the exchange rate. Since investors are trading assets, these transactions would appear on a country's capital account of its balance of payments. Thus the interest rate parity theory is based on capital account transactions.

It is estimated that there are approximately $1–2 trillion dollars worth of currency exchanged every day on international foreign exchange (Forex) markets. That's one-eighth of U.S. GDP, which is the value of production in the United States in an entire year. In addition, the $1–2 trillion estimate is made by counting only one side of each currency trade. Thus that's an enormous amount of trade. If one considers the total amount of world trade each year and then divides by 365, one can get the average amount of goods and services traded daily. This number is less than $100 billion dollars. This means that the amount of daily currency transactions is more than ten times the amount of daily trade. This fact would seem to suggest that the primary effect on the daily exchange rate must be caused by the actions of investors rather than importers and exporters. Thus the participation of other traders in the Forex market, who are motivated by other concerns, may lead the exchange rate to a value that is not consistent with PPP.

Relative PPP

There is an alternative version of the PPP theory called the "relative PPP theory." In essence this is a dynamic version of the absolute PPP theory. Since absolute PPP suggests that the exchange rate may respond to inflation, we can imagine that the exchange rate would change in a systematic way given that a continual change in the price level (inflation) is occurring.

In the relative PPP theory, exchange rate changes over time are assumed to be dependent on inflation rate differentials between countries according to the following formula:

$$\frac{E^2_{\text{p/\$}} - E^1_{\text{p/\$}}}{E^1_{\text{p/\$}}} = \pi_{\text{p}} - \pi_{\$}.$$

Here the percentage change in the dollar value between the first period and the second period is given on the left side. The right side gives the differences in the inflation rates between Mexico and the United States that were evaluated over the same time period. The implication of relative PPP is that if the Mexican inflation rate exceeds the U.S. inflation rate, then the dollar will appreciate by that differential over the same period. The logic of this theory is the same as in absolute PPP. Importers and exporters respond to variations in the relative costs of market baskets so as to maintain the law of one price, at least on average. If prices continue to rise faster in Mexico than in the United States, for example, price differences between the two countries would grow and the only way to keep up with PPP is for the dollar to appreciate continually versus the peso.

KEY TAKEAWAYS

- Purchasing power parity (PPP) will not be satisfied between countries when there are transportation costs, trade barriers (e.g., tariffs), differences in prices of nontradable inputs (e.g., rental space), imperfect information about current market conditions, and when other Forex market participants, such as investors, trade currencies for other reasons.
- Relative PPP is a dynamic version of the theory that relates currency appreciation or depreciation to differences in country inflation rates.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. The name for the PPP theory based on relative inflation rates between countries.

b. A type of trade cost whose presence is likely to cause deviations in the law of one price and PPP.

c. The term used to describe a kind of production input, of which office rental is one type.

d. Traders need to have information about this in other markets in order to take advantage of arbitrage opportunities.

6.5 PPP in the Long Run

LEARNING OBJECTIVE

1. Interpret the PPP theory as a projection of long-term tendencies in exchange rate values.

In general, the purchasing power parity (PPP) theory works miserably when applied to real-world data. In other words, it is rare for the PPP relationship to hold true between any two countries at any particular point in time. In most scientific disciplines, the failure of a theory to be supported by the data means the theory is refuted and should be thrown out or tossed away. However, economists have been reluctant to do that with the PPP theory. In part this is because the logic of the theory seems particularly sound. In part it's because there are so many "frictions" in the real world, such as tariffs, nontariff barriers, transportation costs, measurement problems, and so on that it would actually be surprising for the theory to work when applied directly to the data. (It is much like expecting an object to follow Newton's laws of motion while sitting on the ground.)

In addition, economists have conceived of an alternative way to interpret or apply the PPP theory to overcome the empirical testing problem. The trick is to think of PPP as a "long-run" theory of exchange rate determination rather than a short-run theory. Under such an interpretation, it is no longer necessary for PPP to hold at any point in time. Instead, the PPP exchange rate is thought to represent a target toward which the spot exchange rate is slowly drawn.

This long-run interpretation requires an assumption that importers and exporters cannot respond quickly to deviations in the cost of market baskets between countries. Instead of immediate responses to price differences between countries by engaging in arbitrage—buying at the low price and selling high—traders respond slowly to these price signals. Some reasons for the delay include imperfect information (traders are not aware of the price differences), long-term contracts (traders must wait till current contractual arrangements expire), and/or marketing costs (entry to new markets requires research and setup costs). In addition, we recognize that the exchange rate is not solely determined by trader behavior. Investors, who respond to different incentives, might cause persistent deviations from the PPP exchange rate even if traders continue to respond to the price differences.

When there is a delayed response, PPP no longer needs to hold at a particular point in time. However, the theory does imagine that traders eventually will adjust to the price differences (buying low and selling high), causing an eventual adjustment of the spot exchange rate toward the PPP rate. However, as

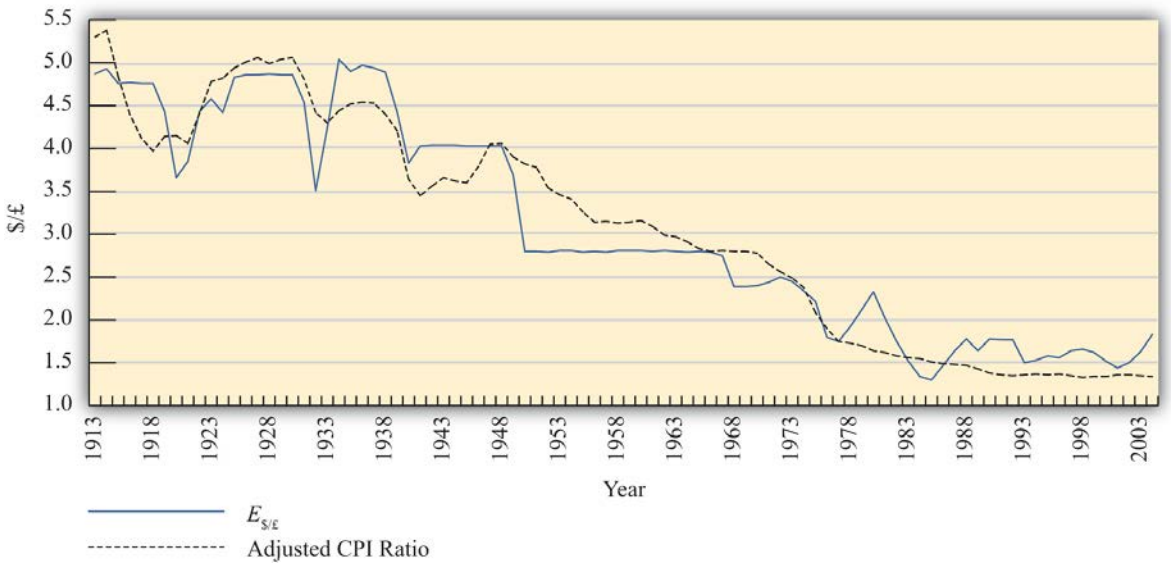
adjustment occurs, it is quite possible that the PPP exchange rate also continues to change. In this case, the spot exchange rate is adjusting toward a moving target.

How long will this adjustment take? In other words, how long is the long run? The term itself is generally used by economists to represent some “unspecified” long period of time; it might be several months, years, or even decades. Also, since the target, the PPP exchange rate, is constantly changing, it is quite possible that it is never reached. The adjustment process may never allow the exchange rate to catch up to the target even though it is constantly chasing it.

Perhaps the best way to see what the long-run PPP theory suggests is to considerFigure 6.3 "Hypothetical Long-Term Trend". The figure presents constructed data (i.e., made up) between two countries, A and B. The dotted black line shows the ratio of the costs of market baskets between the two countries over a long period, a century between 1904 and 2004. It displays a steady increase, indicating that prices have risen faster in country A relative to country B. The solid blue line shows a plot of the exchange rate between the two countries during the same period. If PPP were to hold at every point in time, then the exchange rate plot would lie directly on top of the market basket ratio plot. The fact that it does not means PPP did not hold all the time. In fact, PPP held only at times when the exchange rate plot crosses the market basket ratio plot; on the diagram this happened only twice during the century—not a very good record.

Nonetheless, despite performing poorly with respect to moment-by-moment PPP, the figure displays an obvious regularity. The trend of the exchange rate between the countries is almost precisely the trend in the market basket ratio; both move upward at about the same “average” rate. Sometimes the exchange rate is below the market basket ratio, even for a long period of time, but at other times, the exchange rate rises up above the market basket ratio.

Figure 6.4 U.S./UK Long-Term Trends



The ide a her e is that len gth

y exchange rate deviations from the market basket ratio (i.e., the PPP exchange rate) mean long periods of time in which the cost of goods is cheaper in one country than in another. Eventually, traders will respond to these price discrepancies and begin to import more from the less expensive country. This will lead to the increase in demand for that country's currency and cause the exchange rate to move back toward the market basket ratio. However, in the long-run version of the theory, this will take time, sometimes a considerable amount of time, even years or more.

To see how this relationship works in one real-world example, consider Figure 6.4 "U.S./UK Long-Term Trends". It plots the exchange rate ($E_{\$/£}$) between the U.S. dollar and the British pound between 1913 and 2004 together with an adjusted ratio of the countries' consumer price indices (CPIs) during the same period. [1] The adjusted ratio represents an estimate of the ratio of the costs of market baskets between the two countries.

In the diagram, the dotted black line represents the estimated ratio of market basket costs and the solid blue line is the exchange rate ($E_{\$/£}$). Note how closely the exchange rate tracks the trend in the market basket ratio. This remains true even though the exchange rate remained fixed during some lengthy periods of time, as in the 1950s and 1960s. While this depiction is just two countries over a long period, it is suggestive that the long-run version of PPP may have some validity.

More sophisticated empirical tests of the long-run version of PPP have shown mixed results, as some studies support the hypothesis while others tend to reject it. Regardless, there is much more support for this version of the theory than for the much more simplistic short-run version.

KEY TAKEAWAYS

- Under the long-run purchasing power parity (PPP) theory, the PPP exchange rate is thought to represent a target toward which the spot exchange rate is slowly drawn over time. The empirical evidence for this theory is mixed.
- Long-run data showing the trend in consumer price index (CPI) ratios between the United States and the United Kingdom relative to the $/£ exchange rate suggest some validity to the theory.

EXERCISE

1. **Jeopardy Questions**. As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"

a. The term used by economists to denote an unspecified point in time in the distant future.

b. The term used by economists to denote an unspecified point in time in the near future.

c. The term used to describe the general path along which a variable is changing.

d. Under this version of the PPP theory, the PPP exchange rate represents a target toward which the spot exchange rate is slowly drawn over time.

[1] A technical point: The ratio of CPIs is adjusted because the ratio of CPIs must be multiplied by the PPP exchange rate that prevailed in the base year for the two countries. However, the CPI series used has 1967 as the base year in the United Kingdom and 1974 as the base year in the United States. This would mean the CPI ratio should be multiplied by the ratio of the cost of a market basket in the United States in 1974 divided by the market basket cost in the United Kingdom in 1967. Unsurprisingly, I don't have that information. Thus I'll assume a number (1.75) that is somewhat greater than the actual exchange rate that prevailed at the time. The higher number may account for the fact that prices rose considerably between 1967 and 1974. In any case, it remains a guess.

6.6 Overvaluation and Undervaluation

LEARNING OBJECTIVE

1. Recognize how the terms *overvalued* and *undervalued* exchange rates are defined, applied, and interpreted.

It is quite common to hear people claim that a country's exchange rate is overvalued or undervalued. The first question one should ask when someone claims the exchange rate is overvalued is "overvalued with respect to what?" There are two common reference exchange rates often considered. The person may mean the exchange rate is overvalued with respect to purchasing power parity (PPP), or he may mean the exchange rate is overvalued relative to the rate presumed Needed to balance the current account (CA). The mere use of these terms suggests immediately that there is some "proper" value for the exchange rate. However, one should refrain from accepting this implication. As was previously discussed, PPP is unlikely to hold, even over very long periods, for a variety of very good reasons. Also, there is no reason to think that current account balance represents some equilibrium or goal for an economy: countries can run trade deficits or surpluses for an extended period and suffer no ill effects. Thus overvaluation or undervaluation of an exchange rate, for either reason (PPP or current account balance) should be thought of simply as something that happens. Of more interest is what it means when it happens.

Over- and Undervaluation with Respect to PPP

First let's consider over- and undervaluation with respect to PPP. The PPP exchange rate is defined as the rate that equalizes the cost of a market basket of goods between two countries. The PPP exchange rate between the Mexican peso and the U.S. dollar would be written as

$$E^{PPP}_{p/\$} = \frac{CB_p}{CB_\$},$$

which represents the PPP value of the U.S. dollar in terms of pesos.

If the U.S. dollar is overvalued with respect to the Mexican peso, then the spot exchange rate exceeds the PPP exchange rate:

$$E_{p/\$} > E^{PPP}_{p/\$}.$$

This will also mean the exchange rate exceeds the ratio of market basket costs:

$$E_{p/\$} > \frac{CB_p}{CB_\$};$$

therefore, the following will hold:

$$E_{\$/\text{£}} CB_{\text{£}} > CB_{\$}.$$

The left side (LS) of this expression represents the cost of a U.S. market basket converted to pesos at the current spot exchange rate. The right side (RS) is the cost of the basket in Mexico also evaluated in pesos. Since $LS > RS$, goods and services cost more on average in the United States than in Mexico at the current exchange rate. Thus for the U.S. dollar to be overvalued with respect to the peso means that goods and services are relatively more expensive in the United States than in Mexico. Of course, it also implies that goods and services are relatively cheaper in Mexico.

A simple guide to judge whether a currency is overvalued is to consider it from the perspective of a tourist. When the U.S. dollar is overvalued, a U.S. tourist traveling to Mexico will find that many products seem cheaper than in the United States, after converting at the spot exchange rate. Thus an overvalued currency will buy more in other countries.

An undervalued currency works in the opposite direction. When the U.S. dollar is undervalued, the cost of a basket of goods in the United States is lower than the cost in Mexico when evaluated at the current exchange rate. To a U.S. tourist, Mexican goods and services would seem more expensive on average. Thus an undervalued currency will buy less in other countries.

Finally, if the U.S. dollar is overvalued with respect to the Mexican peso, it follows that the peso is undervalued with respect to the dollar. In this case, since the U.S. tourists would find Mexican goods comparatively cheap, Mexican tourists would find U.S. goods to be comparatively expensive. If the U.S. dollar were undervalued, then the peso would be overvalued.

Is overvaluation or undervaluation good or bad? That depends on what a person is trying to achieve. For example, if the U.S. dollar is overvalued with respect to the peso, then a U.S. tourist traveling to Mexico will be very happy. In fact, the more overvalued the dollar is, the better. However, for an exporter of U.S. goods to Mexico, its price in peso terms will be higher the more overvalued is the dollar. Thus an overvalued dollar will likely reduce sales and profits for these U.S. firms.

Over- and Undervaluation with Respect to Current Account Balance

The second way over- and undervaluation is sometimes applied is in comparison to an exchange rate presumed necessary to induce trade balance, or balance on the current account. If one imagines that a

trade deficit, for example, arises primarily because a country imports too much or exports too little (rather than being driven by financial decisions tending to cause a financial account surplus), then one may also look for ways to either reduce imports or raise exports. A change in the exchange rate offers one viable method to affect trade flows.

Suppose the United States has a trade deficit (which it indeed has had for more than thirty years prior to 2010). If the U.S. dollar value were to fall—a dollar depreciation—then foreign goods would all become relatively more expensive to U.S. residents, tending to reduce U.S. imports. At the same time, a dollar depreciation would also cause U.S. goods to become relatively cheaper to foreign residents tending to raise U.S. exports.

Sometimes economists make numerical estimations as to how much the dollar value would have to fall to bring trade into balance. These estimations are enormously difficult to make for several reasons and should be interpreted and used with great caution, if at all. The primary reason is that many different factors on both the trade side and the financial side influence a country's trade imbalance besides just the exchange rate. The exchange rate that balances trade would depend on the values taken by all the other factors that also influence the trade balance. Different values for all the other variables would mean a different exchange rate needed to balance trade. Thus there isn't *one* exchange rate value that will balance trade. Instead, there is a different exchange rate value that will balance trade in each and every alternative circumstance. Indeed, even the current exchange rate—whatever that is—can balance trade if other factors change appropriately.

Despite these cautions, many observers will still contend that a country's currency needs to depreciate by some percentage to eliminate a trade deficit, or needs to appreciate to eliminate a trade surplus. When it is believed a depreciation of the currency is needed to balance trade, they will say the currency is overvalued. When it is believed an appreciation of the currency is needed to balance trade, they will say the currency is undervalued. However, in a floating exchange rate system, it is hard to argue that the exchange rate is at the "wrong" value since—with competition in the market—it will always be at the rate that equalizes supply and demand. In other words, the "proper" value for the exchange rate can be said to be *not* the one that will satisfy PPP or not the one that will generate trade balance but rather whatever rate currently prevails. Under this notion, a currency can never be over- or undervalued in a floating exchange rate system. Instead, the spot exchange rate is always at the "proper" value.

In a fixed exchange rate system, a government can sometimes intervene to maintain an exchange rate that is very different from what would arise if allowed to float. In these cases, large trade surpluses can arise because the government maintains an artificially low value for its currency. Calls for a revaluation (appreciation) of the currency, to promote a reduction in a trade surplus, are somewhat more appropriate in these cases since the market does not determine the exchange rate. Similarly, large deficits could be reduced with a devaluation (depreciation) of the currency.

KEY TAKEAWAYS

- A currency can be overvalued or undervalued with respect to two reference values: (1) the value that would satisfy purchasing power parity (PPP) or (2) the value that would generate current account balance.
- Use of the terms *overvaluation* and *undervaluation* suggests that there is a "proper" value for the exchange rate. However, there are often valid reasons why exchange rates will not conform to PPP or why trade imbalances will persist.
- In a floating exchange rate system, the "proper" exchange rate can be said to be the rate that equalizes supply and demand for currencies in exchange. Under this notion, there can never be an over- or undervalued exchange rate.

EXERCISES

1. Use the information in the table below to answer the question, "Is the U.S. dollar overvalued or undervalued with respect to the Canadian dollar and the Japanese yen in terms of purchases of the *Economist*?" State why it is overvalued or undervalued. Show your work.

	The *Economist* Price per Issue	Exchange Rate (December 2, 1999)
United States	$3.95	–
Canada	C$4.95	1.47 C$/$
Japan	¥920	102 ¥/$

2. Use the information in the table below to answer the following questions:

	Big Mac Price	Exchange Rate (June 4, 1998)

	Big Mac Price	Exchange Rate (June 4, 1998)
United States (dollar)	$2.53	–
South Korea (won)	W 2,600	1,475 W/$
Israel (shekel)	sh 12.50	3.70 sh/$
Poland (zloty)	zl 5.30	3.46 zl/$

a. Calculate whether the won, shekel, and zloty are overvalued or undervalued with respect to the U.S. dollar in terms of Big Mac purchases. Explain what it means to be overvalued or undervalued.

b. What would the exchange rates have to be in order to equalize Big Mac prices between South Korea and the United States, Israel and the United States, and Poland and the United States?

c. If in the long run the exchange rate moves to satisfy Big Mac purchasing power parity (PPP), will the won, shekel, and zloty appreciate or depreciate in terms of dollars? Explain the logic.

Use the information about the hourly wage for a high school principal and exchange rates to answer the following questions:

	Wage	Actual Exchange Rate	PPP Exchange Rate
United States	$25/hour	–	–
Mexico	P220/hour	10.9 p/$	7.5 p/$
Japan	¥3,000/hour	110 ¥/$	132 ¥/$

a. Calculate the hourly wage rate in dollars in Mexico and Japan using the actual exchange rates.

b. Calculate the hourly wage rate in dollars in Mexico and Japan using the PPP exchange rates.

c. Based on the information above, in which country is it best to be a high school principal? Which country is second best? Which is third best?

d. In terms of PPP, is the U.S. dollar overvalued or undervalued with respect to the peso and with respect to the yen?
e. According to the PPP theory, given the conditions above, would the dollar be expected to appreciate or depreciate with respect to the peso and with respect to the yen?

6.7 PPP and Cross-Country Comparisons

LEARNING OBJECTIVE

1. Learn why using PPP exchange rates to convert income data to a common currency is a better method for making cross-country comparisons.

Probably the most important application of purchasing power parity (PPP) exchange rates is in making cross-country comparisons of income, wages, or gross domestic product (GDP). Suppose that we would like to compare per capita GDP between two countries—say, the United States and China. In 2004, GDP in the United States was approximately $12 trillion; in China GDP was about ¥16 trillion. With a population in the United States of 290 million people, per capita U.S. GDP works out to $41,400 per person. China's population was approximately 1.3 billion people in 2004, so its GDP per capita works out to 11,500 yuan (¥) per person. However, we can't compare these two per capita figures since they are in different units—dollars and yuan. Thus we need to convert units, either turn dollars into yuan or yuan into dollars.

The simplest approach to make this conversion is to use the spot exchange rate that prevailed in 2004, which was 8.28 yuan per dollar. Converting yuan to dollars yields a per capita GDP for China of $1,390. Note that at $41,400 per person, U.S. per capita GDP was almost thirty times higher than China's. However, there is a problem using this method. One thing that is quickly recognized by Americans when they travel in and around China is that many goods and services seem considerably cheaper than they are in the United States. From a Chinese traveler's perspective, many U.S. goods would seem considerably more expensive. The implication is that although U.S. GDP per person is thirty times higher, that income may not purchase thirty times more goods and services in the U.S. because the prices of U.S. goods and services are so much higher when converted at the current exchange rate. Since presumably we are comparing per capita GDPs to compare how "well-off" people are in one country relative to another, these per capita figures will not accurately reflect these differences.

A solution is found in the purchasing power parity theory (PPP). When prices for similar goods differ as described in the previous paragraph, we would say the U.S. dollar is overvalued with respect to the yuan and with respect to PPP. At the same time, we would say the yuan is undervalued vis-à-vis the dollar. One way to reach comparable (or equalized) values of goods and services between the countries is to apply the

PPP exchange rate in the conversion. The PPP exchange rate is that exchange rate that would equalize the value of comparable market baskets of goods and services between two countries.

For example, the estimated PPP exchange rate between the U.S. dollar and yuan in 2004 was 1.85 ¥/$. If this exchange rate had prevailed between the countries, the prices of U.S. goods would seem, on average, to be approximately equal to the prices that prevailed in China. Now, if we use this exchange rate to make the conversion to dollars of GDP per capita in China, then we will get a number that reflects the purchasing power of Chinese income in terms of the prices that prevail in the United States—that is, in terms of prices that are equalized between the countries.

Thus if we take China's GDP per capita of ¥11,500 and convert to dollars with the PPP exchange rate, we get $6,250 per person. The units derived in this expression would typically be called "international dollars." What this means is that ¥11,500 will buy a bundle of goods and services in China that would cost $6,250 if purchased in the United States at U.S. prices. In other words, ¥11,500 is equal to $6,250 when the prices of goods and services are equalized between countries.

The PPP method of conversion is a much more accurate way of making cross-country comparisons of values between countries. In this example, although China's per capita GDP was still considerably lower than in the United States ($6,250 vs. $41,400), it is nonetheless four and a half times higher than using the spot exchange rate ($6,250 vs. $1,390). The higher value takes account of the differences in prices between the countries and thus better reflects the differences in purchasing power of per capita GDP.

The PPP conversion method has become the standard method used by the World Bank and others in making cross-country comparisons of GDP, GDP per capita, and average incomes and wages. For most comparisons concerning the size of economies or standards of living, using PPP is a more accurate method and can fundamentally change our perception of how countries compare. To see how, consider Table 6.1 "GDP Rankings (in Billions of Dollars), 2008", constructed from World Bank data. It shows a ranking of the top ten countries in total GDP converting to dollars using both the current exchange rate method and the PPP method.

Table 6.1 GDP Rankings (in Billions of Dollars), 2008

Rank	Country	Using Current Exchange Rate ($)	Country	Using PPP Exchange Rate ($)
1	United States	14,204	United States	14,204

Rank	Country	Using Current Exchange Rate ($)	Country	Using PPP Exchange Rate ($)
2	Japan	4,909	China	7,903
3	China	4,326	Japan	4,355
4	Germany	3,653	India	3,338
5	France	2,853	Germany	2,925
6	United Kingdom	2,646	Russia	2,288
7	Italy	2,293	United Kingdom	2,176
8	Brazil	1,613	France	2,112
9	Russia	1,608	Brazil	1,977
10	Spain	1,604	Italy	1,841
11	Canada	1,400	Mexico	1,542
12	India	1,217	Spain	1,456

The United States remains at the top of the list using both methods. However, several countries rise up in the rankings. China rises from the third largest economy using current exchange rates to the second largest using PPP. This means that in terms of the physical goods and services produced by the economies, China really does produce more than Japan. PPP conversion gives a better representation of the relative sizes of these countries.

Similarly, India rises from twelfth rank to fourth. Russia also moves up into sixth place from ninth. At the same time, Japan, Germany, the United Kingdom, France, Italy, Brazil, and Spain all move down in the rankings. Canada moves out of the top twelve, being replaced by Mexico, which rises up to eleventh.

For those countries whose GDP rises in value when converting by PPP (i.e., China, India, and Russia), their currencies are undervalued with respect to the U.S. dollar. So using the current exchange rate method underestimates the true size of their economies. For the other countries, their currencies are