CHAPTER   2   T W O

The Data of Macroeconomics

It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to fit facts.

— *Sherlock Holmes*

Scientists, economists, and detectives have much in common: they all want to figure out what's going on in the world around them. To do this, they rely on both theory and observation. They build theories in an attempt to make sense of what they see happening. They then turn to more systematic observation to evaluate the theories' validity. Only when theory and evidence come into line do they feel they understand the situation. This chapter discusses the types of observation that economists use to develop and test their theories.

Casual observation is one source of information about what's happening in the economy. When you go shopping, you see how fast prices are rising. When you look for a job, you learn whether firms are hiring. Because we are all participants in the economy, we get some sense of economic conditions as we go about our lives.

A century ago, economists monitoring the economy had little more to go on than these casual observations. Such fragmentary information made economic policymaking all the more difficult. One person's anecdote would suggest the economy was moving in one direction, while a different person's anecdote would suggest it was moving in another. Economists needed some way to combine many individual experiences into a coherent whole. There was an obvious solution: as the old quip goes, the plural of "anecdote" is "data."

Today, economic data offer a systematic and objective source of information, and almost every day the newspaper has a story about some newly released statistic. Most of these statistics are produced by the government. Various government agencies survey households and firms to learn about their economic activity—how much they are earning, what they are buying, what prices they are charging, whether they have a job or are looking for work, and so on. From these surveys, various statistics are computed that summarize the state of the economy. Economists use these statistics to study the economy; policymakers use them to monitor developments and formulate policies.

This chapter focuses on the three statistics that economists and policymakers use most often. **Gross domestic product**, or **GDP**, tells us the nation's total income

and the total expenditure on its output of goods and services. The **consumer price index**, or **CPI,** measures the level of prices. The **unemployment rate** tells us the fraction of workers who are unemployed. In the following pages, we see how these statistics are computed and what they tell us about the economy.

2-1 Measuring the Value of Economic Activity: Gross Domestic Product

Gross domestic product is often considered the best measure of how well the economy is performing. This statistic is computed every three months by the Bureau of Economic Analysis (a part of the U.S. Department of Commerce) from a large number of primary data sources. The goal of GDP is to summarize in a single number the dollar value of economic activity in a given period of time.

There are two ways to view this statistic. One way to view GDP is as *the total income of everyone in the economy*. Another way to view GDP is as *the total expenditure on the economy's output of goods and services*. From either viewpoint, it is clear why GDP is a gauge of economic performance. GDP measures something people care about—their incomes. Similarly, an economy with a large output of goods and services can better satisfy the demands of households, firms, and the government.

How can GDP measure both the economy's income and the expenditure on its output? The reason is that these two quantities are really the same: for the economy as a whole, income must equal expenditure. That fact, in turn, follows from an even more fundamental one: because every transaction has both a buyer and a seller, every dollar of expenditure by a buyer must become a dollar of income to a seller. When Joe paints Jane's house for $1,000, that $1,000 is income to Joe and expenditure by Jane. The transaction contributes $1,000 to GDP, regardless of whether we are adding up all income or adding up all expenditure.

To understand the meaning of GDP more fully, we turn to **national income accounting**, the accounting system used to measure GDP and many related statistics.

### Income, Expenditure, and the Circular Flow

Imagine an economy that produces a single good, bread, from a single input, labor. Figure 2-1 illustrates all the economic transactions that occur between households and firms in this economy.

The inner loop in Figure 2-1 represents the flows of bread and labor. The households sell their labor to the firms. The firms use the labor of their workers to produce bread, which the firms in turn sell to the households. Hence, labor flows from households to firms, and bread flows from firms to households.

The outer loop in Figure 2-1 represents the corresponding flow of dollars. The households buy bread from the firms. The firms use some of the revenue
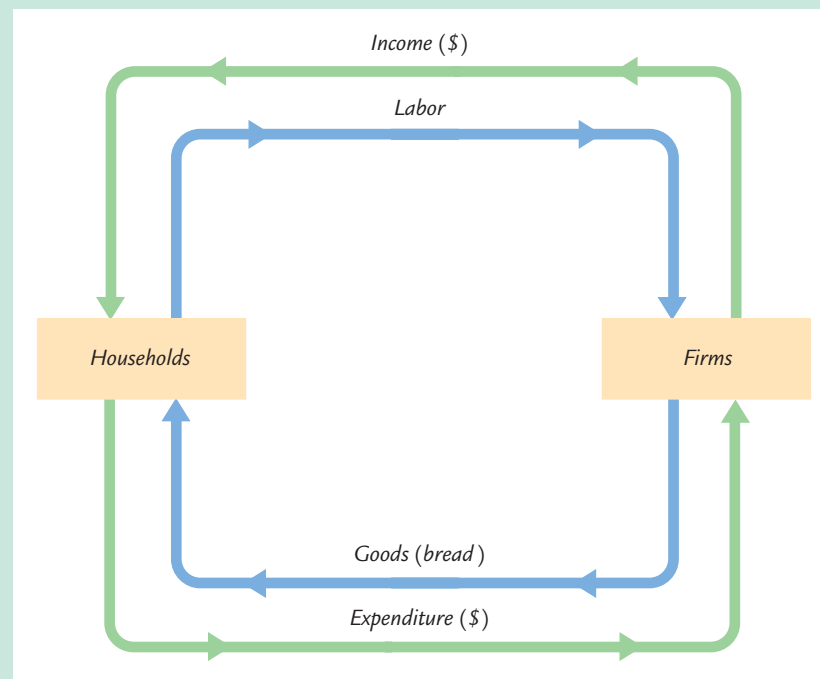
The Circular Flow This figure illustrates the flows between firms and households in an economy that produces one good, bread, from one input, labor. The inner loop represents the flows of labor and bread: households sell their labor to firms, and the firms sell the bread they produce to households. The outer loop represents the corresponding flows of dollars: households pay the firms for the bread, and the firms pay wages and profit to the households. In this economy, GDP is both the total expenditure on bread and the total income from the production of bread.

from these sales to pay the wages of their workers, and the remainder is the profit belonging to the owners of the firms (who themselves are part of the household sector). Hence, expenditure on bread flows from households to firms, and income in the form of wages and profit flows from firms to households.

GDP measures the flow of dollars in this economy. We can compute it in two ways. GDP is the total income from the production of bread, which equals the sum of wages and profit—the top half of the circular flow of dollars. GDP is also the total expenditure on purchases of bread—the bottom half of the circular flow of dollars. To compute GDP, we can look at either the flow of dollars from firms to households or the flow of dollars from households to firms.

These two ways of computing GDP must be equal because the expenditure of buyers on products is, by the rules of accounting, income to the sellers of those products. Every transaction that affects expenditure must affect income, and every transaction that affects income must affect expenditure. For example, suppose that a firm produces and sells one more loaf of bread to a household. Clearly this transaction raises total expenditure on bread, but it also has an equal effect on total income. If the firm produces the extra loaf without hiring any more labor (such as by making the production process more efficient), then profit increases. If the firm produces the extra loaf by hiring more labor, then wages increase. In both cases, expenditure and income increase equally.

FYI

Stocks and Flows

Many economic variables measure a quantity of something—a quantity of money, a quantity of goods, and so on. Economists distinguish between two types of quantity variables: stocks and flows. A **stock** is a quantity measured at a given point in time, whereas a **flow** is a quantity measured per unit of time.

The bathtub, shown in Figure 2-2, is the classic example used to illustrate stocks and flows. The amount of water in the tub is a stock: it is the quantity of water in the tub at a given point in time. The amount of water coming out of the faucet is a flow: it is the quantity of water being added to the tub per unit of time. Note that we measure stocks and flows in different units. We say that the bathtub contains 50 *gallons* of water, but that water is coming out of the faucet at 5 *gallons per minute*.

GDP is probably the most important flow variable in economics: it tells us how many dollars are flowing around the economy's circular flow per unit of time. When you hear someone say that the U.S. GDP is $10 trillion, you should understand that this means that it is $10 trillion *per year*. (Equivalently, we could say that U.S. GDP is $317,000 per second.)

Stocks and flows are often related. In the bathtub example, these relationships are clear. The stock of water in the tub represents the accumulation of the flow out of the faucet, and the flow of water represents the change in the stock. When building theories to explain economic variables, it is often useful to determine whether the variables are stocks or flows and whether any relationships link them.

Here are some examples of related stocks and flows that we study in future chapters:

➤ A person's wealth is a stock; income and expenditure are flows.

➤ The number of unemployed people is a stock; the number of people losing their jobs is a flow.

➤ The amount of capital in the economy is a stock; the amount of investment is a flow.

➤ The government debt is a stock; the government budget deficit is a flow.

figure 2-2
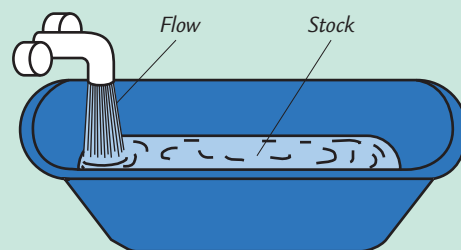
Flow   Stock

Stocks and Flows The amount of water in a bathtub is a stock: it is a quantity measured at a given moment in time. The amount of water coming out of the faucet is a flow: it is a quantity measured per unit of time.

Rules for Computing GDP

In an economy that produces only bread, we can compute GDP by adding up the total expenditure on bread. Real economies, however, include the production and sale of a vast number of goods and services. To compute GDP for such a complex economy, it will be helpful to have a more precise definition: *gross*

domestic product (GDP) is the market value of all final goods and services produced within an economy in a given period of time. To see how this definition is applied, let's discuss some of the rules that economists follow in constructing this statistic.

Adding Apples and Oranges The U.S. economy produces many different goods and services—hamburgers, haircuts, cars, computers, and so on. GDP combines the value of these goods and services into a single measure. The diversity of products in the economy complicates the calculation of GDP because different products have different values.

Suppose, for example, that the economy produces four apples and three oranges. How do we compute GDP? We could simply add apples and oranges and conclude that GDP equals seven pieces of fruit. But this makes sense only if we thought apples and oranges had equal value, which is generally not true. (This would be even clearer if the economy had produced four watermelons and three grapes.)

To compute the total value of different goods and services, the national income accounts use market prices because these prices reflect how much people are willing to pay for a good or service. Thus, if apples cost $0.50 each and oranges cost $1.00 each, GDP would be

$$\text{GDP} = (\text{Price of Apples} \times \text{Quantity of Apples})$$
$$+ (\text{Price of Oranges} \times \text{Quantity of Oranges})$$
$$= (\$0.50 \times 4) + (\$1.00 \times 3)$$
$$= \$5.00.$$

GDP equals $5.00—the value of all the apples, $2.00, plus the value of all the oranges, $3.00.

Used Goods When the Topps Company makes a package of baseball cards and sells it for 50 cents, that 50 cents is added to the nation's GDP. But what about when a collector sells a rare Mickey Mantle card to another collector for $500? That $500 is not part of GDP. GDP measures the value of currently produced goods and services. The sale of the Mickey Mantle card reflects the transfer of an asset, not an addition to the economy's income. Thus, the sale of used goods is not included as part of GDP.

The Treatment of Inventories Imagine that a bakery hires workers to produce more bread, pays their wages, and then fails to sell the additional bread. How does this transaction affect GDP?

The answer depends on what happens to the unsold bread. Let's first suppose that the bread spoils. In this case, the firm has paid more in wages but has not received any additional revenue, so the firm's profit is reduced by the amount that wages are increased. Total expenditure in the economy hasn't changed because no one buys the bread. Total income hasn't changed either—although more is distributed as wages and less as profit. Because the transaction affects neither expenditure nor income, it does not alter GDP.

Now suppose, instead, that the bread is put into inventory to be sold later. In this case, the transaction is treated differently. The owners of the firm are assumed to have "purchased" the bread for the firm's inventory, and the firm's profit is not

reduced by the additional wages it has paid. Because the higher wages raise total income, and greater spending on inventory raises total expenditure, the economy's GDP rises.

What happens later when the firm sells the bread out of inventory? This case is much like the sale of a used good. There is spending by bread consumers, but there is inventory disinvestment by the firm. This negative spending by the firm offsets the positive spending by consumers, so the sale out of inventory does not affect GDP.

The general rule is that when a firm increases its inventory of goods, this investment in inventory is counted as expenditure by the firm owners. Thus, production for inventory increases GDP just as much as production for final sale. A sale out of inventory, however, is a combination of positive spending (the purchase) and negative spending (inventory disinvestment), so it does not influence GDP. This treatment of inventories ensures that GDP reflects the economy's current production of goods and services.

Intermediate Goods and Value Added Many goods are produced in stages: raw materials are processed into intermediate goods by one firm and then sold to another firm for final processing. How should we treat such products when computing GDP? For example, suppose a cattle rancher sells one-quarter pound of meat to McDonald's for $0.50, and then McDonald's sells you a hamburger for $1.50. Should GDP include both the meat and the hamburger (a total of $2.00), or just the hamburger ($1.50)?

The answer is that GDP includes only the value of final goods. Thus, the hamburger is included in GDP but the meat is not: GDP increases by $1.50, not by $2.00. The reason is that the value of intermediate goods is already included as part of the market price of the final goods in which they are used. To add the intermediate goods to the final goods would be double counting—that is, the meat would be counted twice. Hence, GDP is the total value of final goods and services produced.

One way to compute the value of all final goods and services is to sum the value added at each stage of production. The **value added** of a firm equals the value of the firm's output less the value of the intermediate goods that the firm purchases. In the case of the hamburger, the value added of the rancher is $0.50 (assuming that the rancher bought no intermediate goods), and the value added of McDonald's is $1.50 − $0.50, or $1.00. Total value added is $0.50 + $1.00, which equals $1.50. For the economy as a whole, the sum of all value added must equal the value of all final goods and services. Hence, GDP is also the total value added of all firms in the economy.

Housing Services and Other Imputations Although most goods and services are valued at their market prices when computing GDP, some are not sold in the marketplace and therefore do not have market prices. If GDP is to include the value of these goods and services, we must use an estimate of their value. Such an estimate is called an **imputed value**.

Imputations are especially important for determining the value of housing. A person who rents a house is buying housing services and providing income for the landlord; the rent is part of GDP, both as expenditure by the renter and as income for the landlord. Many people, however, live in their own homes. Although they do not pay rent to a landlord, they are enjoying housing services similar to those that

renters purchase. To take account of the housing services enjoyed by homeowners, GDP includes the "rent" that these homeowners "pay" to themselves. Of course, homeowners do not in fact pay themselves this rent. The Department of Commerce estimates what the market rent for a house would be if it were rented and includes that imputed rent as part of GDP. This imputed rent is included both in the homeowner's expenditure and in the homeowner's income.

Imputations also arise in valuing government services. For example, police officers, firefighters, and senators provide services to the public. Giving a value to these services is difficult because they are not sold in a marketplace and therefore do not have a market price. The national income accounts include these services in GDP by valuing them at their cost. That is, the wages of these public servants are used as a measure of the value of their output.

In many cases, an imputation is called for in principle but, to keep things simple, is not made in practice. Because GDP includes the imputed rent on owner-occupied houses, one might expect it also to include the imputed rent on cars, lawn mowers, jewelry, and other durable goods owned by households. Yet the value of these rental services is left out of GDP. In addition, some of the output of the economy is produced and consumed at home and never enters the marketplace. For example, meals cooked at home are similar to meals cooked at a restaurant, yet the value added in meals at home is left out of GDP.

Finally, no imputation is made for the value of goods and services sold in the *underground economy*. The underground economy is the part of the economy that people hide from the government either because they wish to evade taxation or because the activity is illegal. Domestic workers paid "off the books" is one example. The illegal drug trade is another.

Because the imputations necessary for computing GDP are only approximate, and because the value of many goods and services is left out altogether, GDP is an imperfect measure of economic activity. These imperfections are most problematic when comparing standards of living across countries. The size of the underground economy, for instance, varies from country to country. Yet as long as the magnitude of these imperfections remains fairly constant over time, GDP is useful for comparing economic activity from year to year.

Real GDP Versus Nominal GDP

Economists use the rules just described to compute GDP, which values the economy's total output of goods and services. But is GDP a good measure of economic well-being? Consider once again the economy that produces only apples and oranges. In this economy GDP is the sum of the value of all the apples produced and the value of all the oranges produced. That is,

$$\text{GDP} = (\text{Price of Apples} \times \text{Quantity of Apples})$$
$$+ (\text{Price of Oranges} \times \text{Quantity of Oranges}).$$

Notice that GDP can increase either because prices rise or because quantities rise.

It is easy to see that GDP computed this way is not a good gauge of economic well-being. That is, this measure does not accurately reflect how well the

economy can satisfy the demands of households, firms, and the government. If all prices doubled without any change in quantities, GDP would double. Yet it would be misleading to say that the economy's ability to satisfy demands has doubled, because the quantity of every good produced remains the same. Economists call the value of goods and services measured at current prices **nominal GDP**.

A better measure of economic well-being would tally the economy's output of goods and services and would not be influenced by changes in prices. For this purpose, economists use **real GDP**, which is the value of goods and services measured using a constant set of prices. That is, real GDP shows what would have happened to expenditure on output if quantities had changed but prices had not.

To see how real GDP is computed, imagine we wanted to compare output in 2002 and output in 2003 in our apple-and-orange economy. We could begin by choosing a set of prices, called *base-year prices*, such as the prices that prevailed in 2002. Goods and services are then added up using these base-year prices to value the different goods in both years. Real GDP for 2002 would be

$$\text{Real GDP} = (2002 \text{ Price of Apples} \times 2002 \text{ Quantity of Apples})$$
$$+ (2002 \text{ Price of Oranges} \times 2002 \text{ Quantity of Oranges}).$$

Similarly, real GDP in 2003 would be

$$\text{Real GDP} = (2002 \text{ Price of Apples} \times 2003 \text{ Quantity of Apples})$$
$$+ (2002 \text{ Price of Oranges} \times 2003 \text{ Quantity of Oranges}).$$

And real GDP in 2004 would be

$$\text{Real GDP} = (2002 \text{ Price of Apples} \times 2004 \text{ Quantity of Apples})$$
$$+ (2002 \text{ Price of Oranges} \times 2004 \text{ Quantity of Oranges}).$$

Notice that 2002 prices are used to compute real GDP for all three years. Because the prices are held constant, real GDP varies from year to year only if the quantities produced vary. Because a society's ability to provide economic satisfaction for its members ultimately depends on the quantities of goods and services produced, real GDP provides a better measure of economic well-being than nominal GDP.

The GDP Deflator

From nominal GDP and real GDP we can compute a third statistic: the GDP deflator. The **GDP deflator**, also called the implicit price deflator for GDP, is defined as the ratio of nominal GDP to real GDP:

$$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}}.$$

The GDP deflator reflects what's happening to the overall level of prices in the economy.

To better understand this, consider again an economy with only one good, bread. If P is the price of bread and Q is the quantity sold, then nominal GDP is

the total number of dollars spent on bread in that year, $P \times Q$. Real GDP is the number of loaves of bread produced in that year times the price of bread in some base year, $P_{base} \times Q$. The GDP deflator is the price of bread in that year relative to the price of bread in the base year, P/P_{base}.

The definition of the GDP deflator allows us to separate nominal GDP into two parts: one part measures quantities (real GDP) and the other measures prices (the GDP deflator). That is,

$$\text{Nominal GDP} = \text{Real GDP} \times \text{GDP Deflator.}$$

Nominal GDP measures the current dollar value of the output of the economy. Real GDP measures output valued at constant prices. The GDP deflator measures the price of output relative to its price in the base year. We can also write this equation as

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{GDP Deflator}}.$$

In this form, you can see how the deflator earns its name: it is used to deflate (that is, take inflation out of) nominal GDP to yield real GDP.

Chain-Weighted Measures of Real GDP

We have been discussing real GDP as if the prices used to compute this measure never change from their base-year values. If this were truly the case, over time the prices would become more and more dated. For instance, the price of computers has fallen substantially in recent years, while the price of a year at college has risen. When valuing the production of computers and education, it would be misleading to use the prices that prevailed ten or twenty years ago.

To solve this problem, the Bureau of Economic Analysis used to update period-ically the prices used to compute real GDP. About every five years, a new base year was chosen. The prices were then held fixed and used to measure year-to-year changes in the production of goods and services until the base year was updated once again.

In 1995, the bureau announced a new policy for dealing with changes in the base year. In particular, it now emphasizes *chain-weighted* measures of real GDP. With these new measures, the base year changes continuously over time. In essence, average prices in 2001 and 2002 are used to measure real growth from 2001 to 2002; average prices in 2002 and 2003 are used to measure real growth from 2002 to 2003; and so on. These various year-to-year growth rates are then put together to form a "chain" that can be used to compare the output of goods and services between any two dates.

This new chain-weighted measure of real GDP is better than the more tradi-tional measure because it ensures that the prices used to compute real GDP are never far out of date. For most purposes, however, the differences are not impor-tant. It turns out that the two measures of real GDP are highly correlated with each other. The reason for this close association is that most relative prices change slowly over time. Thus, both measures of real GDP reflect the same thing: economy-wide changes in the production of goods and services.

FYI

Two Arithmetic Tricks for Working With Percentage Changes

For manipulating many relationships in economics, there is an arithmetic trick that is useful to know: *the percentage change of a product of two variables is approximately the sum of the percentage changes in each of the variables.*

To see how this trick works, consider an example. Let P denote the GDP deflator and Y denote real GDP. Nominal GDP is $P \times Y$. The trick states that

$$\text{Percentage Change in } (P \times Y)$$
$$\approx (\text{Percentage Change in } P)$$
$$+ (\text{Percentage Change in } Y).$$

For instance, suppose that in one year, real GDP is 100 and the GDP deflator is 2; the next year, real GDP is 103 and the GDP deflator is 2.1. We can calculate that real GDP rose by 3 percent and that the GDP deflator rose by 5 percent. Nominal GDP rose from 200 the first year to 216.3 the second year, an increase of 8.15 percent. Notice that the growth in nominal GDP (8.15 percent) is approximately the sum of the growth in the GDP deflator (5 percent) and the growth in real GDP (3 percent).[1]

A second arithmetic trick follows as a corollary to the first: *the percentage change of a ratio is approximately the percentage change in the numerator minus the percentage change in the denominator.* Again, consider an example. Let Y denote GDP and L denote the population, so that Y/L is GDP per person. The second trick states

$$\text{Percentage Change in } (Y/L)$$
$$\approx (\text{Percentage Change in } Y)$$
$$- (\text{Percentage Change in } L).$$

For instance, suppose that in the first year, Y is 100,000 and L is 100, so Y/L is 1,000; in the second year, Y is 110,000 and L is 103, so Y/L is 1,068. Notice that the growth in GDP per person (6.8 percent) is approximately the growth in income (10 percent) minus the growth in population (3 percent).

The Components of Expenditure

Economists and policymakers care not only about the economy's total output of goods and services but also about the allocation of this output among alternative uses. The national income accounts divide GDP into four broad categories of spending:

- ➤ Consumption (C)
- ➤ Investment (I)
- ➤ Government purchases (G)
- ➤ Net exports (NX).

Thus, letting Y stand for GDP,

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

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[1] *Mathematical note:* The proof that this trick works begins with the chain rule from calculus:
$$d(PY) = Y\, dP + P\, dY.$$
Now divide both sides of this equation by PY to obtain
$$d(PY)/(PY) = dP/P + dY/Y.$$
Notice that all three terms in this equation are percentage changes.

FYI

What Is Investment?

Newcomers to macroeconomics are sometimes confused by how macroeconomists use familiar words in new and specific ways. One example is the term "investment." The confusion arises because what looks like investment for an individual may not be investment for the economy as a whole. The general rule is that the economy's investment does not include purchases that merely reallocate existing assets among different individuals. Investment, as macroeconomists use the term, creates new capital.

Let's consider some examples. Suppose we observe these two events:

➤ Smith buys for himself a 100-year-old Victorian house.

➤ Jones builds for herself a brand-new contemporary house.

What is total investment here? Two houses, one house, or zero?

A macroeconomist seeing these two transactions counts only the Jones house as investment.

Smith's transaction has not created new housing for the economy; it has merely reallocated existing housing. Smith's purchase is investment for Smith, but it is disinvestment for the person selling the house. By contrast, Jones has added new housing to the economy; her new house is counted as investment.

Similarly, consider these two events:

➤ Gates buys $5 million in IBM stock from Buffett on the New York Stock Exchange.

➤ General Motors sells $10 million in stock to the public and uses the proceeds to build a new car factory.

Here, investment is $10 million. In the first transaction, Gates is investing in IBM stock, and Buffett is disinvesting; there is no investment for the economy. By contrast, General Motors is using some of the economy's output of goods and services to add to its stock of capital; hence, its new factory is counted as investment.

GDP is the sum of consumption, investment, government purchases, and net exports. Each dollar of GDP falls into one of these categories. This equation is an *identity*—an equation that must hold because of the way the variables are defined. It is called the **national income accounts identity**.

Consumption consists of the goods and services bought by households. It is divided into three subcategories: nondurable goods, durable goods, and services. Nondurable goods are goods that last only a short time, such as food and clothing. Durable goods are goods that last a long time, such as cars and TVs. Services include the work done for consumers by individuals and firms, such as haircuts and doctor visits.

Investment consists of goods bought for future use. Investment is also divided into three subcategories: business fixed investment, residential fixed investment, and inventory investment. Business fixed investment is the purchase of new plant and equipment by firms. Residential investment is the purchase of new housing by households and landlords. Inventory investment is the increase in firms' inventories of goods (if inventories are falling, inventory investment is negative).

Government purchases are the goods and services bought by federal, state, and local governments. This category includes such items as military equipment, highways, and the services that government workers provide. It does not include

transfer payments to individuals, such as Social Security and welfare. Because transfer payments reallocate existing income and are not made in exchange for goods and services, they are not part of GDP.

The last category, **net exports**, takes into account trade with other countries. Net exports are the value of goods and services exported to other countries minus the value of goods and services that foreigners provide us. Net exports represent the net expenditure from abroad on our goods and services, which provides income for domestic producers.

CASE STUDY

GDP and Its Components

In 2000 the GDP of the United States totaled about $10 trillion. This number is so large that it is almost impossible to comprehend. We can make it easier to understand by dividing it by the 2000 U.S. population of 275 million. In this way, we obtain GDP per person—the amount of expenditure for the average American—which equaled $36,174 in 2000.

table 2-1

GDP and the Components of Expenditure: 2000

	Total (billions of dollars)	Per Person (dollars)
Gross Domestic Product	**9,963.1**	**36,174**
Consumption	**6,757.3**	**24,534**
Nondurable goods	2,010.0	7,298
Durable goods	820.3	2,978
Services	3,927.0	14,258
Investment	**1,832.7**	**6,654**
Nonresidential fixed investment	1,362.2	4,946
Residential fixed investment	416.0	1,510
Inventory investment	54.5	198
Government Purchases	**1,743.7**	**6,331**
Federal	595.2	2,161
Defense	377.0	1,369
Nondefense	218.2	792
State and local	1,148.6	4,170
Net Exports	**−370.7**	**−1,346**
Exports	1,097.3	3,984
Imports	1,468.0	5,330

Source: U.S. Department of Commerce.

How did this GDP get used? Table 2-1 shows that about two-thirds of it, or $24,534 per person, was spent on consumption. Investment was $6,654 per person. Government purchases were $6,331 per person, $1,369 of which was spent by the federal government on national defense.

The average American bought $5,330 of goods imported from abroad and produced $3,984 of goods that were exported to other countries. Because the average American imported more than he exported, net exports were negative. Furthermore, because the average American earned less from selling to foreigners than he spent on foreign goods, the difference must have been financed by taking out loans from foreigners (or, equivalently, by selling them some assets). Thus, the average American borrowed $1,346 from abroad in 2000.

Other Measures of Income

The national income accounts include other measures of income that differ slightly in definition from GDP. It is important to be aware of the various measures, because economists and the press often refer to them.

To see how the alternative measures of income relate to one another, we start with GDP and add or subtract various quantities. To obtain *gross national product (GNP)*, we add receipts of factor income (wages, profit, and rent) from the rest of the world and subtract payments of factor income to the rest of the world:

GNP = GDP + Factor Payments From Abroad − Factor Payments to Abroad.

Whereas GDP measures the total income produced *domestically*, GNP measures the total income earned by *nationals* (residents of a nation). For instance, if a Japanese resident owns an apartment building in New York, the rental income he earns is part of U.S. GDP because it is earned in the United States. But because this rental income is a factor payment to abroad, it is not part of U.S. GNP. In the United States, factor payments from abroad and factor payments to abroad are similar in size—each representing about 3 percent of GDP—so GDP and GNP are quite close.

To obtain *net national product (NNP)*, we subtract the depreciation of capital—the amount of the economy's stock of plants, equipment, and residential structures that wears out during the year:

$$NNP = GNP − Depreciation.$$

In the national income accounts, depreciation is called the *consumption of fixed capital*. It equals about 10 percent of GNP. Because the depreciation of capital is a cost of producing the output of the economy, subtracting depreciation shows the net result of economic activity.

The next adjustment in the national income accounts is for indirect business taxes, such as sales taxes. These taxes, which make up about 10 percent of NNP, place a wedge between the price that consumers pay for a good and the price

that firms receive. Because firms never receive this tax wedge, it is not part of their income. Once we subtract indirect business taxes from NNP, we obtain a measure called *national income*:

$$\text{National Income} = \text{NNP} - \text{Indirect Business Taxes}.$$

National income measures how much everyone in the economy has earned.

The national income accounts divide national income into five components, depending on the way the income is earned. The five categories, and the percentage of national income paid in each category, are

➤ *Compensation of employees* (70%). The wages and fringe benefits earned by workers.

➤ *Proprietors' income* (9%). The income of noncorporate businesses, such as small farms, mom-and-pop stores, and law partnerships.

➤ *Rental income* (2%). The income that landlords receive, including the imputed rent that homeowners "pay" to themselves, less expenses, such as depreciation.

➤ *Corporate profits* (12%). The income of corporations after payments to their workers and creditors.

➤ *Net interest* (7%). The interest domestic businesses pay minus the interest they receive, plus interest earned from foreigners.

A series of adjustments takes us from national income to *personal income*, the amount of income that households and noncorporate businesses receive. Three of these adjustments are most important. First, we reduce national income by the amount that corporations earn but do not pay out, either because the corporations are retaining earnings or because they are paying taxes to the government. This adjustment is made by subtracting corporate profits (which equals the sum of corporate taxes, dividends, and retained earnings) and adding back dividends. Second, we increase national income by the net amount the government pays out in transfer payments. This adjustment equals government transfers to individuals minus social insurance contributions paid to the government. Third, we adjust national income to include the interest that households earn rather than the interest that businesses pay. This adjustment is made by adding personal interest income and subtracting net interest. (The difference between personal interest and net interest arises in part from the interest on the government debt.) Thus, personal income is

$$
\begin{aligned}
\text{Personal Income} = \text{ } &\text{National Income} \\
&- \text{Corporate Profits} \\
&- \text{Social Insurance Contributions} \\
&- \text{Net Interest} \\
&+ \text{Dividends} \\
&+ \text{Government Transfers to Individuals} \\
&+ \text{Personal Interest Income.}
\end{aligned}
$$

Next, if we subtract personal tax payments and certain nontax payments to the government (such as parking tickets), we obtain *disposable personal income*:

Disposable Personal Income
= Personal Income − Personal Tax and Nontax Payments.

We are interested in disposable personal income because it is the amount households and noncorporate businesses have available to spend after satisfying their tax obligations to the government.

The Seasonal Cycle and Seasonal Adjustment

Because real GDP and the other measures of income reflect how well the economy is performing, economists are interested in studying the quarter-to-quarter fluctuations in these variables. Yet when we start to do so, one fact leaps out: all these measures of income exhibit a regular seasonal pattern. The output of the economy rises during the year, reaching a peak in the fourth quarter (October, November, and December), and then falling in the first quarter (January, February, and March) of the next year. These regular seasonal changes are substantial. From the fourth quarter to the first quarter, real GDP falls on average about 8 percent.[2]

It is not surprising that real GDP follows a seasonal cycle. Some of these changes are attributable to changes in our ability to produce: for example, building homes is more difficult during the cold weather of winter than during other seasons. In addition, people have seasonal tastes: they have preferred times for such activities as vacations and holiday shopping.

When economists study fluctuations in real GDP and other economic variables, they often want to eliminate the portion of fluctuations caused by predictable seasonal changes. You will find that most of the economic statistics reported in the newspaper are *seasonally adjusted*. This means that the data have been adjusted to remove the regular seasonal fluctuations. (The precise statistical procedures used are too elaborate to bother with here, but in essence they involve subtracting those changes in income that are predictable simply from the change in season.) Therefore, when you observe a rise or fall in real GDP or any other data series, you must look beyond the seasonal cycle for the explanation.

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[2] Robert B. Barsky and Jeffrey A. Miron, "The Seasonal Cycle and the Business Cycle," *Journal of Political Economy* 97 (June 1989): 503-534.

2-2 Measuring the Cost of Living: The Consumer Price Index

A dollar today doesn't buy as much as it did 20 years ago. The cost of almost everything has gone up. This increase in the overall level of prices is called *inflation*, and it is one of the primary concerns of economists and policymakers. In later chapters we examine in detail the causes and effects of inflation. Here we discuss how economists measure changes in the cost of living.

The Price of a Basket of Goods

The most commonly used measure of the level of prices is the consumer price index (CPI). The Bureau of Labor Statistics, which is part of the U.S. Department of Labor, has the job of computing the CPI. It begins by collecting the prices of thousands of goods and services. Just as GDP turns the quantities of many goods and services into a single number measuring the value of production, the CPI turns the prices of many goods and services into a single index measuring the overall level of prices.

How should economists aggregate the many prices in the economy into a single index that reliably measures the price level? They could simply compute an average of all prices. Yet this approach would treat all goods and services equally. Because people buy more chicken than caviar, the price of chicken should have a greater weight in the CPI than the price of caviar. The Bureau of Labor Statistics weights different items by computing the price of a basket of goods and services purchased by a typical consumer. The CPI is the price of this basket of goods and services relative to the price of the same basket in some base year.

For example, suppose that the typical consumer buys 5 apples and 2 oranges every month. Then the basket of goods consists of 5 apples and 2 oranges, and the CPI is

$$\text{CPI} = \frac{(5 \times \text{Current Price of Apples}) + (2 \times \text{Current Price of Oranges})}{(5 \times 2002 \text{ Price of Apples}) + (2 \times 2002 \text{ Price of Oranges})}.$$

In this CPI, 2002 is the base year. The index tells us how much it costs now to buy 5 apples and 2 oranges relative to how much it cost to buy the same basket of fruit in 2002.

The consumer price index is the most closely watched index of prices, but it is not the only such index. Another is the producer price index, which measures the price of a typical basket of goods bought by firms rather than consumers. In addition to these overall price indices, the Bureau of Labor Statistics computes price indices for specific types of goods, such as food, housing, and energy.

The CPI Versus the GDP Deflator

Earlier in this chapter we saw another measure of prices—the implicit price deflator for GDP, which is the ratio of nominal GDP to real GDP. The GDP deflator and the CPI give somewhat different information about what's happening to the overall level of prices in the economy. There are three key differences between the two measures.

The first difference is that the GDP deflator measures the prices of all goods and services produced, whereas the CPI measures the prices of only the goods and services bought by consumers. Thus, an increase in the price of goods bought by firms or the government will show up in the GDP deflator but not in the CPI.

The second difference is that the GDP deflator includes only those goods produced domestically. Imported goods are not part of GDP and do not show up in the GDP deflator. Hence, an increase in the price of a Toyota made in Japan and sold in this country affects the CPI, because the Toyota is bought by consumers, but it does not affect the GDP deflator.

The third and most subtle difference results from the way the two measures aggregate the many prices in the economy. The CPI assigns fixed weights to the prices of different goods, whereas the GDP deflator assigns changing weights. In other words, the CPI is computed using a fixed basket of goods, whereas the GDP deflator allows the basket of goods to change over time as the composition of GDP changes. The following example shows how these approaches differ. Suppose that major frosts destroy the nation's orange crop. The quantity of oranges produced falls to zero, and the price of the few oranges that remain on grocers' shelves is driven sky-high. Because oranges are no longer part of GDP, the increase in the price of oranges does not show up in the GDP deflator. But because the CPI is computed with a fixed basket of goods that includes oranges, the increase in the price of oranges causes a substantial rise in the CPI.

Economists call a price index with a fixed basket of goods a *Laspeyres index* and a price index with a changing basket a *Paasche index*. Economic theorists have studied the properties of these different types of price indices to determine which is a better measure of the cost of living. The answer, it turns out, is that neither is clearly superior. When prices of different goods are changing by different amounts, a Laspeyres (fixed basket) index tends to overstate the increase in the cost of living because it does not take into account that consumers have the opportunity to substitute less expensive goods for more expensive ones. By contrast, a Paasche (changing basket) index tends to understate the increase in the cost of living. Although it accounts for the substitution of alternative goods, it does not reflect the reduction in consumers' welfare that may result from such substitutions.

The example of the destroyed orange crop shows the problems with Laspeyres and Paasche price indices. Because the CPI is a Laspeyres index, it overstates the impact of the increase in orange prices on consumers: by using a fixed basket of goods, it ignores consumers' ability to substitute apples for oranges. By contrast,

figure 2-3
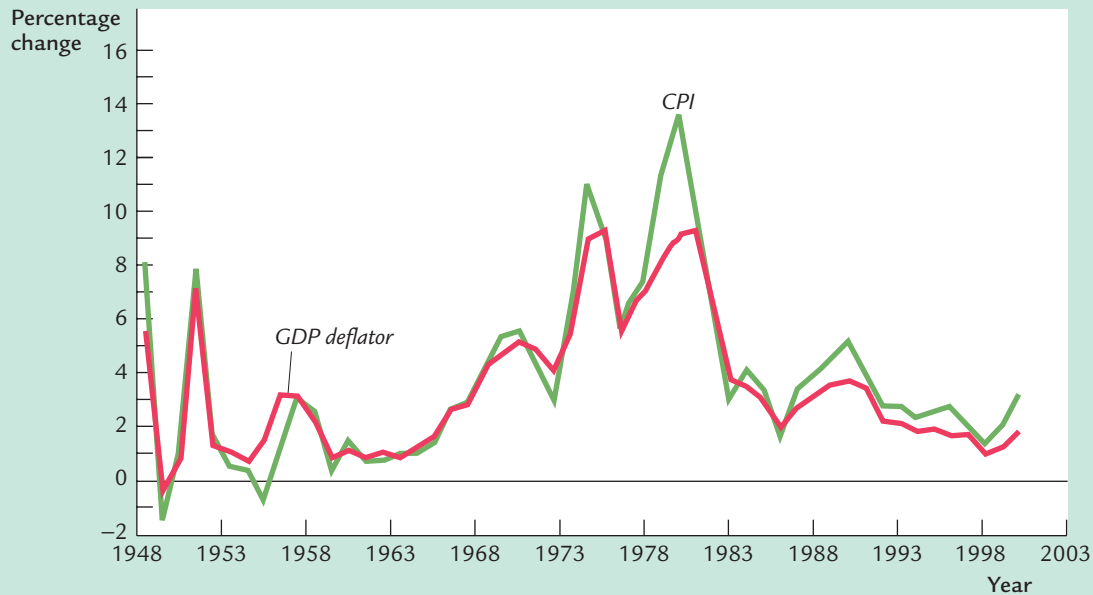
The GDP Deflator and the CPI This figure shows the percentage change in the GDP deflator and in the CPI for every year since 1948. Although these two measures of prices diverge at times, they usually tell the same story about how quickly prices are rising. Both the CPI and the GDP deflator show that prices rose slowly in most of the 1950s and 1960s, that they rose much more quickly in the 1970s, and that they rose slowly again in the 1980s and 1990s.

Source: U.S. Department of Commerce, U.S. Department of Labor.

because the GDP deflator is a Paasche index, it understates the impact on consumers: the GDP deflator shows no rise in prices, yet surely the higher price of oranges makes consumers worse off.

Luckily, the difference between the GDP deflator and the CPI is usually not large in practice. Figure 2-3 shows the percentage change in the GDP deflator and the percentage change in the CPI for each year since 1948. Both measures usually tell the same story about how quickly prices are rising.

CASE STUDY

Does the CPI Overstate Inflation?

The consumer price index is a closely watched measure of inflation. Policymakers in the Federal Reserve monitor the CPI when choosing monetary policy. In addition, many laws and private contracts have cost-of-living allowances, called *COLAs*, which use the CPI to adjust for changes in the price level. For instance,

Social Security benefits are adjusted automatically every year so that inflation will not erode the living standard of the elderly.

Because so much depends on the CPI, it is important to ensure that this measure of the price level is accurate. Many economists believe that, for a number of reasons, the CPI tends to overstate inflation.

One problem is the substitution bias we have already discussed. Because the CPI measures the price of a fixed basket of goods, it does not reflect the ability of consumers to substitute toward goods whose relative prices have fallen. Thus, when relative prices change, the true cost of living rises less rapidly than the CPI.

A second problem is the introduction of new goods. When a new good is introduced into the marketplace, consumers are better off, because they have more products from which to choose. In effect, the introduction of new goods increases the real value of the dollar. Yet this increase in the purchasing power of the dollar is not reflected in a lower CPI.

A third problem is unmeasured changes in quality. When a firm changes the quality of a good it sells, not all of the good's price change reflects a change in the cost of living. The Bureau of Economic Analysis does its best to account for changes in the quality of goods over time. For example, if Ford increases the horsepower of a particular car model from one year to the next, the CPI will reflect the change: the quality-adjusted price of the car will not rise as fast as the unadjusted price. Yet many changes in quality, such as comfort or safety, are hard to measure. If unmeasured quality improvement (rather than unmeasured quality deterioration) is typical, then the measured CPI rises faster than it should.

Because of these measurement problems, some economists have suggested revising laws to reduce the degree of indexation. For example, Social Security benefits could be indexed to CPI inflation minus 1 percent. Such a change would provide a rough way of offsetting these measurement problems. At the same time, it would automatically slow the growth in government spending.

In 1995, the Senate Finance Committee appointed a panel of five noted economists—Michael Boskin, Ellen Dulberger, Robert Gordon, Zvi Griliches, and Dale Jorgenson—to study the magnitude of the measurement error in the CPI. The panel concluded that the CPI was biased upward by 0.8 to 1.6 percentage points per year, with their "best estimate" being 1.1 percentage points. This report led to some changes in the way the CPI is calculated, so the bias is now thought to be slightly under 1 percentage point. The CPI still overstates inflation, but not by as much as it once did.[3]

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[3] For further discussion of these issues, see Matthew Shapiro and David Wilcox, "Mismeasurement in the Consumer Price Index: An Evaluation," *NBER Macroeconomics Annual*, 1996, and the symposium on "Measuring the CPI" in the Winter 1998 issue of *The Journal of Economic Perspectives*.

2-3 Measuring Joblessness: The Unemployment Rate

One aspect of economic performance is how well an economy uses its resources. Because an economy's workers are its chief resource, keeping workers employed is a paramount concern of economic policymakers. The unemployment rate is the statistic that measures the percentage of those people wanting to work who do not have jobs.

"Well, so long Eddie, the recession's over."

Drawing M. Stevens; © 1980 The New Yorker Magazine, Inc.

Every month the U.S. Bureau of Labor Statistics computes the unemployment rate and many other statistics that economists and policymakers use to monitor developments in the labor market. These statistics come from a survey of about 60,000 households. Based on the responses to survey questions, each adult (16 years and older) in each household is placed into one of three categories: employed, unemployed, or not in the labor force. A person is employed if he or she spent some of the previous week working at a paid job. A person is unemployed if he or she is not employed and has been looking for a job or is on temporary layoff. A person who fits into neither of the first two categories, such as a full-time student or retiree, is not in the labor force. A person who wants a job but has given up looking—a *discouraged worker*—is counted as not being in the labor force.

The **labor force** is defined as the sum of the employed and unemployed, and the unemployment rate is defined as the percentage of the labor force that is unemployed. That is,

$$\text{Labor Force} = \text{Number of Employed} + \text{Number of Unemployed,}$$

and

$$\text{Unemployment Rate} = \frac{\text{Number of Unemployed}}{\text{Labor Force}} \times 100.$$

A related statistic is the **labor-force participation rate**, the percentage of the adult population that is in the labor force:

$$\text{Labor-Force Participation Rate} = \frac{\text{Labor Force}}{\text{Adult Population}} \times 100.$$

The Bureau of Labor Statistics computes these statistics for the overall population and for groups within the population: men and women, whites and blacks, teenagers and prime-age workers.

figure 2-4

Population: 209.7 million (16 years and older)

Employed: 135.2 million

Not in labor force: 68.8 million

Unemployed: 5.7 million

Labor force

The Three Groups of the Population When the Bureau of Labor Statistics surveys the population, it places all adults into one of three categories: employed, unemployed, or not in the labor force. This figure shows the number of people in each category in 2000.

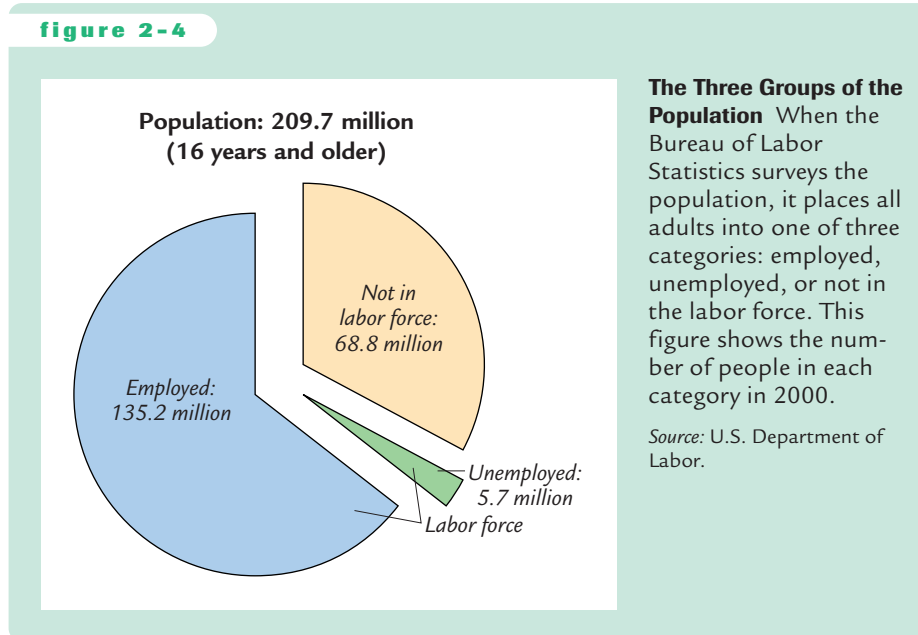*Source:* U.S. Department of Labor.

Figure 2-4 shows the breakdown of the population into the three categories for 2000. The statistics broke down as follows:

$$\text{Labor Force} = 135.2 + 5.7 = 140.9 \text{ million.}$$
$$\text{Unemployment Rate} = (5.7/140.9) \times 100 = 4.0\%.$$
$$\text{Labor-Force Participation Rate} = (140.9/209.7) \times 100 = 67.2\%.$$

Hence, about two-thirds of the adult population was in the labor force, and about 4 percent of those in the labor force did not have a job.

CASE STUDY

Unemployment, GDP, and Okun's Law

What relationship should we expect to find between unemployment and real GDP? Because employed workers help to produce goods and services and unemployed workers do not, increases in the unemployment rate should be associated with decreases in real GDP. This negative relationship between unemployment and GDP is called **Okun's law**, after Arthur Okun, the economist who first studied it.[4]

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[4] Arthur M. Okun, "Potential GNP: Its Measurement and Significance," in *Proceedings of the Business and Economics Statistics Section, American Statistical Association* (Washington, DC: American Statistical Association, 1962), 98–103; reprinted in Arthur M. Okun, *Economics for Policymaking* (Cambridge, MA: MIT Press, 1983), 145–158.

figure 2-5

Percentage change in real GDP
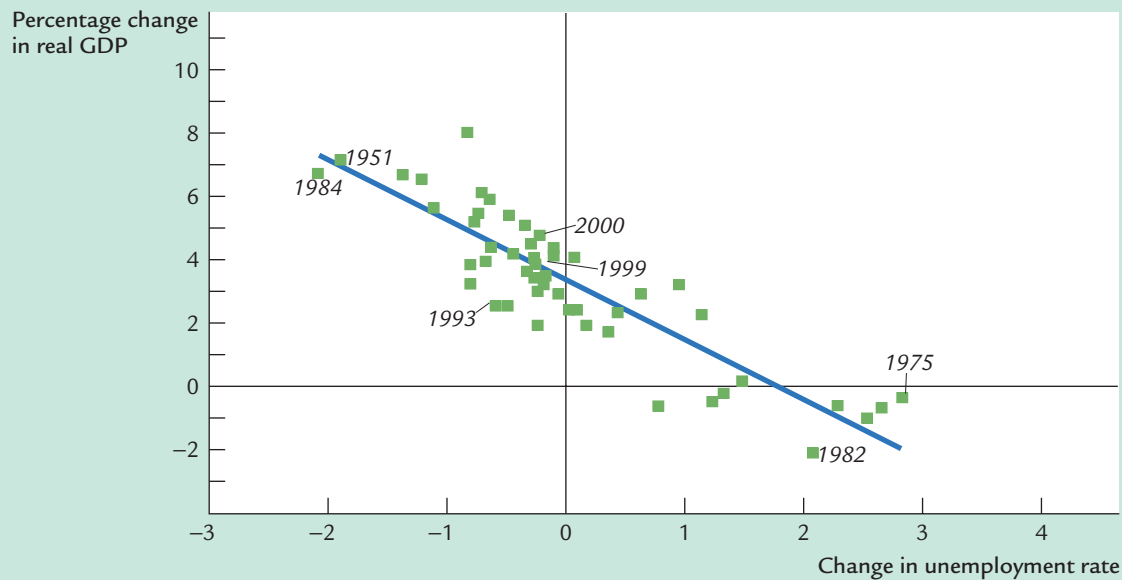
Okun's Law This figure is a scatterplot of the change in the unemployment rate on the horizontal axis and the percentage change in real GDP on the vertical axis, using data on the U.S economy. Each point represents one year. The negative correlation between these variables shows that increases in unemployment tend to be associated with lower-than-normal growth in real GDP.

Source: U.S. Department of Commerce, U.S. Department of Labor.

Figure 2-5 uses annual data for the United States to illustrate Okun's law. This figure is a scatterplot—a scatter of points where each point represents one observation (in this case, the data for a particular year). The horizontal axis represents the change in the unemployment rate from the previous year, and the vertical axis represents the percentage change in GDP. This figure shows clearly that year-to-year changes in the unemployment rate are closely associated with year-to-year changes in real GDP.

We can be more precise about the magnitude of the Okun's law relationship. The line drawn through the scatter of points (estimated with a statistical procedure called ordinary least squares) tells us that

Percentage Change in Real GDP

$$= 3\% - 2 \times \text{Change in the Unemployment Rate.}$$

If the unemployment rate remains the same, real GDP grows by about 3 percent; this normal growth in the production of goods and services is a result of growth in the labor force, capital accumulation, and technological progress. In addition, for every percentage point the unemployment rate rises, real GDP growth typi-

cally falls by 2 percent. Hence, if the unemployment rate rises from 6 to 8 percent, then real GDP growth would be

$$\text{Percentage Change in Real GDP} = 3\% - 2 \times (8\% - 6\%)$$
$$= -1\%.$$

In this case, Okun's law says that GDP would fall by 1 percent, indicating that the economy is in a recession.

2-4 Conclusion: From Economic Statistics to Economic Models

The three statistics discussed in this chapter—gross domestic product, the consumer price index, and the unemployment rate—quantify the performance of the economy. Public and private decisionmakers use these statistics to monitor changes in the economy and to formulate appropriate policies. Economists use these statistics to develop and test theories about how the economy works.

In the chapters that follow, we examine some of these theories. That is, we build models that explain how these variables are determined and how economic policy affects them. Having learned how to measure economic performance, we are now ready to learn how to explain it.

Summary

1. Gross domestic product (GDP) measures both the income of everyone in the economy and the total expenditure on the economy's output of goods and services.

2. Nominal GDP values goods and services at current prices. Real GDP values goods and services at constant prices. Real GDP rises only when the amount of goods and services has increased, whereas nominal GDP can rise either because output has increased or because prices have increased.

3. GDP is the sum of four categories of expenditure: consumption, investment, government purchases, and net exports.

4. The consumer price index (CPI) measures the price of a fixed basket of goods and services purchased by a typical consumer. Like the GDP deflator, which is the ratio of nominal GDP to real GDP, the CPI measures the overall level of prices.

5. The unemployment rate shows what fraction of those who would like to work do not have a job. When the unemployment rate rises, real GDP typically grows slower than its normal rate and may even fall.

38 | **P A R T I** Introduction

KEY CONCEPTS

Gross domestic product (GDP)

Consumer price index (CPI)

Unemployment rate

National income accounting

Stocks and flows

Value added

Imputed value

Nominal versus real GDP

GDP deflator

National income accounts identity

Consumption

Investment

Government purchases

Net exports

Labor force

Labor-force participation rate

Okun's law

QUESTIONS FOR REVIEW

1. List the two things that GDP measures. How can GDP measure two things at once?

2. What does the consumer price index measure?

3. List the three categories used by the Bureau of

Labor Statistics to classify everyone in the economy. How does the bureau compute the unemployment rate?

4. Explain Okun's law.

PROBLEMS AND APPLICATIONS

1. Look at the newspapers for the past few days. What new economic statistics have been released? How do you interpret these statistics?

2. A farmer grows a bushel of wheat and sells it to a miller for $1.00. The miller turns the wheat into flour and then sells the flour to a baker for $3.00. The baker uses the flour to make bread and sells the bread to an engineer for $6.00. The engineer eats the bread. What is the value added by each person? What is GDP?

3. Suppose a woman marries her butler. After they are married, her husband continues to wait on her as before, and she continues to support him as before (but as a husband rather than as an employee). How does the marriage affect GDP? How should it affect GDP?

4. Place each of the following transactions in one of the four components of expenditure: consumption, investment, government purchases, and net exports.

   a. Boeing sells an airplane to the Air Force.

   b. Boeing sells an airplane to American Airlines.

   c. Boeing sells an airplane to Air France.

   d. Boeing sells an airplane to Amelia Earhart.

   e. Boeing builds an airplane to be sold next year.

5. Find data on GDP and its components, and compute the percentage of GDP for the following components for 1950, 1975, and 2000.

   a. Personal consumption expenditures

   b. Gross private domestic investment

   c. Government purchases

   d. Net exports

   e. National defense purchases

   f. State and local purchases

   g. Imports

   Do you see any stable relationships in the data? Do you see any trends? (*Hint:* A good place to look for data is the statistical appendices of the *Economic Report of the President*, which is written each year by the Council of Economic Advisers. Alternatively, you can go to www.bea.doc.gov, which is the Web site of the Bureau of Economic Analysis.)

6. Consider an economy that produces and consumes bread and automobiles. In the following table are data for two different years.

	Year 2000	Year 2010
Price of an automobile	$50,000	$60,000
Price of a loaf of bread	$10	$20
Number of automobiles produced	100	120
Number of loaves of bread produced	500,000	400,000

a. Using the year 2000 as the base year, compute the following statistics for each year: nominal GDP, real GDP, the implicit price deflator for GDP, and a fixed-weight price index such as the CPI.

b. How much have prices risen between year 2000 and year 2010? Compare the answers given by the Laspeyres and Paasche price indices. Explain the difference.

c. Suppose you are a senator writing a bill to index Social Security and federal pensions. That is, your bill will adjust these benefits to offset changes in the cost of living. Will you use the GDP deflator or the CPI? Why?

7. Abby consumes only apples. In year 1, red apples cost $1 each, green apples cost $2 each, and Abby buys 10 red apples. In year 2, red apples cost $2, green apples cost $1, and Abby buys 10 green apples.

a. Compute a consumer price index for apples for each year. Assume that year 1 is the base year in which the consumer basket is fixed. How does your index change from year 1 to year 2?

b. Compute Abby's nominal spending on apples in each year. How does it change from year 1 to year 2?

c. Using year 1 as the base year, compute Abby's real spending on apples in each year. How does it change from year 1 to year 2?

d. Defining the implicit price deflator as nominal spending divided by real spending, compute the deflator for each year. How does the deflator change from year 1 to year 2?

e. Suppose that Abby is equally happy eating red or green apples. How much has the true cost of living increased for Abby? Compare this answer to your answers to parts (a) and (d). What does this example tell you about Laspeyres and Paasche price indexes?

8. Consider how each of the following events is likely to affect real GDP. Do you think the change in real GDP reflects a similar change in economic well-being?

a. A hurricane in Florida forces Disney World to shut down for a month.

b. The discovery of a new, easy-to-grow strain of wheat increases farm harvests.

c. Increased hostility between unions and management sparks a rash of strikes.

d. Firms throughout the economy experience falling demand, causing them to lay off workers.

e. Congress passes new environmental laws that prohibit firms from using production methods that emit large quantities of pollution.

f. More high-school students drop out of school to take jobs mowing lawns.

g. Fathers around the country reduce their workweeks to spend more time with their children.

9. In a speech that Senator Robert Kennedy gave when he was running for president in 1968, he said the following about GDP:

> [It] does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our courage, nor our wisdom, nor our devotion to our country. It measures everything, in short, except that which makes life worthwhile, and it can tell us everything about America except why we are proud that we are Americans.

Was Robert Kennedy right? If so, why do we care about GDP?