

After studying this chapter, you will be able to:

- ◆ Define GDP and use the circular flow model to explain why GDP equals aggregate expenditure and aggregate income
- ◆ Explain how the Bureau of Economic Analysis measures U.S. GDP and real GDP
- ◆ Describe how real GDP is used to measure economic growth and fluctuations and explain the limitations of real GDP as a measure of economic well-being

21

MEASURING GDP AND ECONOMIC GROWTH

Will our economy expand more rapidly in 2011 or will it sink into another recession—a “double-dip”? Many U.S. corporations wanted to know the answers to these questions at the beginning of 2011. Google wanted to know whether to expand its server network and introduce new services or hold off on any new launches. Amazon.com wanted to know whether to increase its warehousing facilities. To assess the state of the economy and to make big decisions about business expansion, firms such as Google and Amazon use forecasts of GDP. What exactly is GDP and what does it tell us about the state of the economy?

Some countries are rich while others are poor. How do we compare economic well-being in one country with that in another? How can we make international comparisons of production? In this chapter, you will find out how economic statisticians at the Bureau of Economic Analysis measure GDP and the economic growth rate. You will also learn about the uses and the limitations of these measures. In *Reading Between the Lines* at the end of the chapter, we’ll look at some future scenarios for the U.S. economy.

Gross Domestic Product

What exactly is GDP, how is it calculated, what does it mean, and why do we care about it? You are going to discover the answers to these questions in this chapter. First, what *is* GDP?

GDP Defined

GDP, or **gross domestic product**, is the market value of the final goods and services produced within a country in a given time period. This definition has four parts:

- Market value
- Final goods and services
- Produced within a country
- In a given time period

We'll examine each in turn.

Market Value To measure total production, we must add together the production of apples and oranges, computers and popcorn. Just counting the items doesn't get us very far. For example, which is the greater total production: 100 apples and 50 oranges or 50 apples and 100 oranges?

GDP answers this question by valuing items at their *market values*—the prices at which items are traded in markets. If the price of an apple is 10 cents, then the market value of 50 apples is \$5. If the price of an orange is 20 cents, then the market value of 100 oranges is \$20. By using market prices to value production, we can add the apples and oranges together. The market value of 50 apples and 100 oranges is \$5 plus \$20, or \$25.

Final Goods and Services To calculate GDP, we value the *final goods and services* produced. A **final good** (or service) is an item that is bought by its final user during a specified time period. It contrasts with an **intermediate good** (or service), which is an item that is produced by one firm, bought by another firm, and used as a component of a final good or service.

For example, a Ford truck is a final good, but a Firestone tire on the truck is an intermediate good. A Dell computer is a final good, but an Intel Pentium chip inside it is an intermediate good.

If we were to add the value of intermediate goods and services produced to the value of final goods and services, we would count the same thing many times—a problem called *double counting*. The value of a truck already includes the value of the tires, and the value of a Dell PC already includes the value of the Pentium chip inside it.

Some goods can be an intermediate good in some situations and a final good in other situations. For example, the ice cream that you buy on a hot summer day is a final good, but the ice cream that a restaurant buys and uses to make sundaes is an intermediate good. The sundae is the final good. So whether a good is an intermediate good or a final good depends on what it is used for, not what it is.

Some items that people buy are neither final goods nor intermediate goods and they are not part of GDP. Examples of such items include financial assets—stocks and bonds—and secondhand goods—used cars or existing homes. A secondhand good was part of GDP in the year in which it was produced, but not in GDP this year.

Produced Within a Country Only goods and services that are produced *within a country* count as part of that country's GDP. Nike Corporation, a U.S. firm, produces sneakers in Vietnam, and the market value of those shoes is part of Vietnam's GDP, not part of U.S. GDP. Toyota, a Japanese firm, produces automobiles in Georgetown, Kentucky, and the value of this production is part of U.S. GDP, not part of Japan's GDP.

In a Given Time Period GDP measures the value of production *in a given time period*—normally either a quarter of a year—called the quarterly GDP data—or a year—called the annual GDP data.

GDP measures not only the value of total production but also total income and total expenditure. The equality between the value of total production and total income is important because it shows the direct link between productivity and living standards. Our standard of living rises when our incomes rise and we can afford to buy more goods and services. But we must produce more goods and services if we are to be able to buy more goods and services.

Rising incomes and a rising value of production go together. They are two aspects of the same phenomenon: increasing productivity. To see why, we study the circular flow of expenditure and income.

GDP and the Circular Flow of Expenditure and Income

Figure 21.1 illustrates the circular flow of expenditure and income. The economy consists of households, firms, governments, and the rest of the world (the rectangles), which trade in factor markets and goods (and services) markets. We focus first on households and firms.

Households and Firms Households sell and firms buy the services of labor, capital, and land in factor markets. For these factor services, firms pay income to households: wages for labor services, interest for the use of capital, and rent for the use of land. A fourth factor of production, entrepreneurship, receives profit.

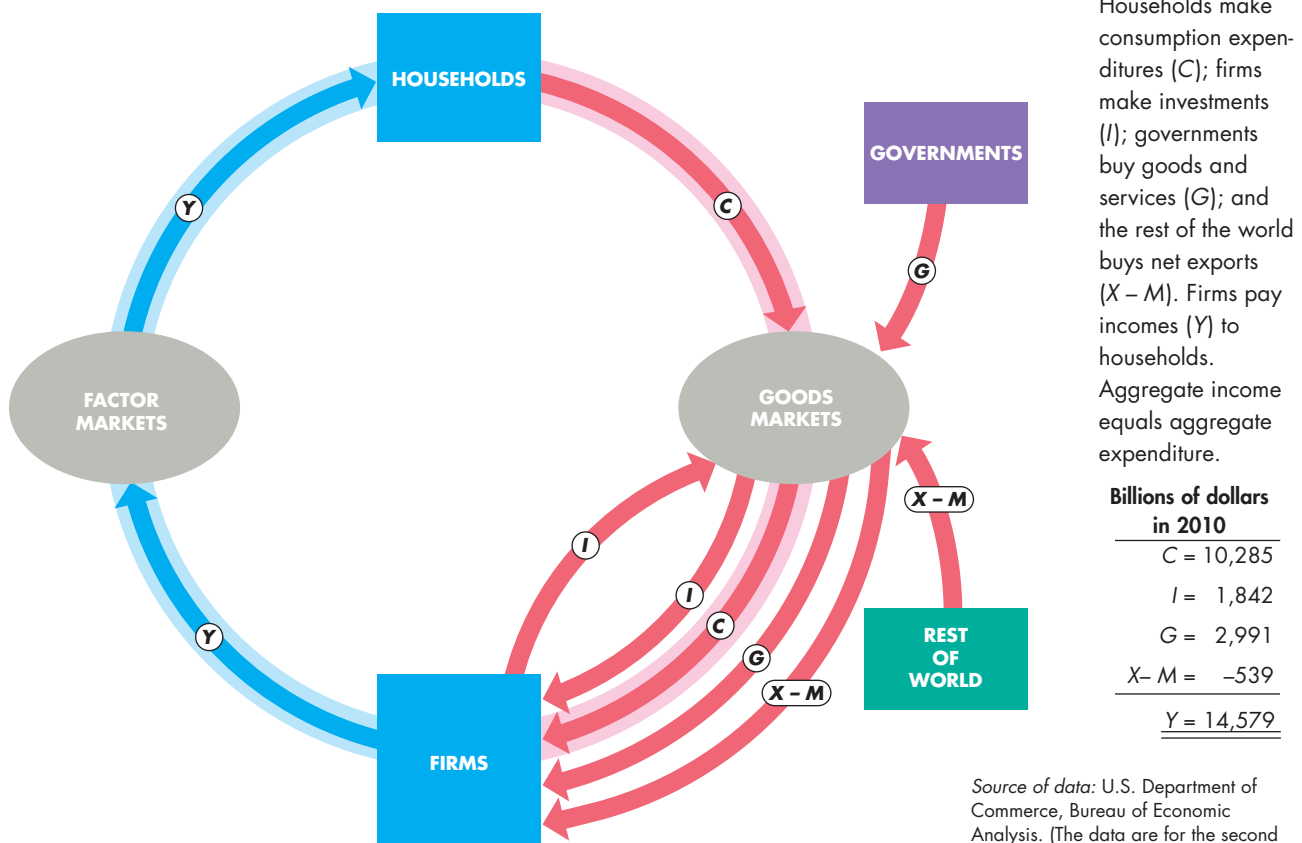
Firms' retained earnings—profits that are not distributed to households—are part of the household sector's income. You can think of retained earnings as

being income that households save and lend back to firms. Figure 21.1 shows the total income—*aggregate income*—received by households, including retained earnings, as the blue flow labeled *Y*.

Firms sell and households buy consumer goods and services—such as inline skates and haircuts—in the goods market. The total payment for these goods and services is **consumption expenditure**, shown by the red flow labeled *C*.

Firms buy and sell new capital equipment—such as computer systems, airplanes, trucks, and assembly line equipment—in the goods market. Some of what firms produce is not sold but is added to inventory. For example, if GM produces 1,000 cars and sells 950 of them, the other 50 cars remain in GM's inventory of unsold cars, which increases by 50 cars. When a firm adds unsold output to inventory, we can think of the firm as buying goods from itself. The

FIGURE 21.1 The Circular Flow of Expenditure and Income



Source of data: U.S. Department of Commerce, Bureau of Economic Analysis. (The data are for the second quarter of 2010 annual rate.)

purchase of new plant, equipment, and buildings and the additions to inventories are **investment**, shown by the red flow labeled *I*.

Governments Governments buy goods and services from firms and their expenditure on goods and services is called **government expenditure**. In Fig. 21.1, government expenditure is shown as the red flow *G*.

Governments finance their expenditure with taxes. But taxes are not part of the circular flow of expenditure and income. Governments also make financial transfers to households, such as Social Security benefits and unemployment benefits, and pay subsidies to firms. These financial transfers, like taxes, are not part of the circular flow of expenditure and income.

Rest of the World Firms in the United States sell goods and services to the rest of the world—**exports**—and buy goods and services from the rest of the world—**imports**. The value of exports (*X*) minus the value of imports (*M*) is called **net exports**, the red flow $X - M$ in Fig. 21.1. If net exports are positive, the net flow of goods and services is from U.S. firms to the rest of the world. If net exports are negative, the net flow of goods and services is from the rest of the world to U.S. firms.

GDP Equals Expenditure Equals Income Gross domestic product can be measured in two ways: By the total expenditure on goods and services or by the total income earned producing goods and services.

The total expenditure—**aggregate expenditure**—is the sum of the red flows in Fig. 21.1. Aggregate expenditure equals consumption expenditure plus investment plus government expenditure plus net exports.

Aggregate income is equal to the total amount paid for the services of the factors of production used to produce final goods and services—wages, interest, rent, and profit. The blue flow in Fig. 21.1 shows aggregate income. Because firms pay out as incomes (including retained profits) everything they receive from the sale of their output, aggregate income (the blue flow) equals aggregate expenditure (the sum of the red flows). That is,

$$Y = C + I + G + X - M.$$

The table in Fig. 21.1 shows the values of the expenditures for 2010 and that their sum is \$14,579 billion, which also equals aggregate income.

Because aggregate expenditure equals aggregate income, the two methods of measuring GDP give the same answer. So

GDP equals aggregate expenditure and equals aggregate income.

The circular flow model is the foundation on which the national economic accounts are built.

Why Is Domestic Product “Gross”?

“Gross” means before subtracting the depreciation of capital. The opposite of “gross” is “net,” which means after subtracting the depreciation of capital.

Depreciation is the decrease in the value of a firm’s capital that results from wear and tear and obsolescence. The total amount spent both buying new capital and replacing depreciated capital is called **gross investment**. The amount by which the value of capital increases is called **net investment**. Net investment equals gross investment minus depreciation.

For example, if an airline buys 5 new airplanes and retires 2 old airplanes from service, its gross investment is the value of the 5 new airplanes, depreciation is the value of the 2 old airplanes retired, and net investment is the value of 3 new airplanes.

Gross investment is one of the expenditures included in the expenditure approach to measuring GDP. So the resulting value of total product is a gross measure.

Gross profit, which is a firm’s profit before subtracting depreciation, is one of the incomes included in the income approach to measuring GDP. So again, the resulting value of total product is a gross measure.



REVIEW QUIZ

- 1 Define GDP and distinguish between a final good and an intermediate good. Provide examples.
- 2 Why does GDP equal aggregate income and also equal aggregate expenditure?
- 3 What is the distinction between gross and net?

You can work these questions in Study Plan 21.1 and get instant feedback.



Let’s now see how the ideas that you’ve just studied are used in practice. We’ll see how GDP and its components are measured in the United States today.