



CHAPTER 6

An Introduction to Macroeconomics

Learning Objectives

- LO6.1** Explain why economists focus on GDP, inflation, and unemployment when assessing the health of an entire economy.
- LO6.2** Discuss why sustained increases in living standards are a historically recent phenomenon.
- LO6.3** Identify why saving and investment are key factors in promoting rising living standards.
- LO6.4** Describe why economists believe that “shocks” and “sticky

and growth of an entire economy as well as a preview of the models that they use to help explain both long-run growth and short-run fluctuations. Because it is an overview chapter, it raises many unanswered questions. Subsequent chapters will explain these topics in much greater detail. **Page 136**

Performance and Policy

LO6.1 Explain why economists focus on GDP, inflation, and unemployment when assessing the health of an entire economy.

As you know from Chapter 1, macroeconomics studies the behavior of the economy as a whole. It is primarily concerned with two topics: long-run economic growth and the short-run fluctuations in output and employment that are often referred to as the **business cycle**. These phenomena are closely related because they happen simultaneously. Economies show a distinct growth trend that leads to higher output and higher standards of living in the long run, but in the short run there is considerable variability. Sometimes growth proceeds more rapidly and sometimes it proceeds more slowly. It may even turn negative for a while so that output and living standards actually decline, a situation referred to as a **recession**. That is precisely what happened in late 2007 and continued through 2008 and into 2009. The economy experienced what has come to be called the Great Recession.

To understand how economies operate and how their performance might be improved, economists collect and analyze economic data. An almost infinite number of data items can be looked at, including the amount of new construction taking place each month, how many ships laden with cargo are arriving at our ports each year, and how many new inventions have been patented in the last few weeks. That being said, macroeconomists tend to focus on just a few statistics when trying to assess the health and development of an economy. Chief among these are real GDP, unemployment, and inflation.

- **Real GDP, or real gross domestic product**, measures the value of final goods and services produced within the borders of a country during a specific period of time, typically a year. This statistic is very useful because it can tell us whether an economy's output is growing. For instance, if U.S. real GDP in one year is larger than in the previous year, we know that U.S. output increased from the first year to the next. To determine real GDP, government statisticians first calculate **nominal GDP**, which totals the dollar value of all goods and services produced within the borders of a country using *their current prices during the year that they were produced*. But because nominal GDP uses the prices in place in the year the output was produced, it suffers from a major problem: It can increase from one year to the next even if there is no increase in output. To see how, consider a commercial blacksmith who produced 10 iron spiral staircases last year and 10 identical staircases this year. Clearly, the blacksmith's output

did not change. But if the price of each staircase rose from \$10,000 last year to \$20,000 this year, nominal GDP increased from \$100,000 ($= 10 \times \$10,000$) to \$200,000 ($= 10 \times \$20,000$). Without knowing about the price increase, we might unwisely conclude that the output of staircases increased from 10 to 20. Real GDP statistically eliminates these kinds of price changes. As a result, we can compare real GDP numbers from one year to the next and really know if there is a change in output (rather than prices). Because more output means greater consumption possibilities—including not only the chance to consume more fun things such as movies, vacations, and video games, but also more serious things like better health care and safer roads—economists and policymakers are deeply committed to encouraging a large and growing real GDP.

- **Unemployment** is the state a person is in if he or she cannot get a job despite being willing to work and actively seeking work. High rates of unemployment are undesirable because they indicate that a nation is not using a large portion of its most important resource—the talents and skills of its people. Unemployment is a waste because we must count as a loss all the goods and services that unemployed workers could have produced if they had been working. Researchers have also drawn links between higher rates of unemployment and major social problems like higher crime rates and greater political unrest as well as higher rates of depression, heart disease, and other illnesses among unemployed individuals.
- **Inflation** is an increase in the overall level of prices. As an example, consider all the goods and services bought by a typical family over the course of one year. If the economy is experiencing inflation, it will cost the family more money to buy those goods and services this year than it cost to buy them last year. This can be

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troublesome for several reasons. First, if the family's income does not rise as fast as the prices of the goods and services that it consumes, it won't be able to purchase as much as it used to and its standard of living will fall. Along the same lines, a surprise jump in inflation reduces the purchasing power of people's savings. Savings that they believed would be able to buy them a specific amount of goods and services will turn out to buy them less than they expected due to the higher-than-expected prices.

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Because these statistics are the standards by which economists keep track of long-run growth and short-run fluctuations, we will spend a substantial amount of time in the next few chapters examining how these statistics are computed, how well they are able to capture the wellbeing of actual people, and how they vary both across countries and over time. Once they are understood, we will build on them in subsequent chapters by developing macroeconomic models of both long-run growth and short-run fluctuations. These will help us understand how policymakers attempt to maximize growth while minimizing unemployment and inflation.

Macroeconomic models also clarify many important questions about the powers and limits of government economic policy. These include:

- Can governments promote long-run economic growth?
- Can they reduce the severity of recessions by smoothing out short-run fluctuations?
- Are certain government policy tools such as manipulating interest rates (monetary policy) more effective at mitigating short-run fluctuations than other government policy tools such as changes in tax rates or levels of government spending (fiscal policy)?
- Is there a trade-off between lower rates of unemployment and higher rates of inflation?
- Does government policy work best when it is announced in advance or when it is a surprise?

The answers to these questions are of crucial importance because of the vast differences in economic performance experienced by national economies at different times. For instance, the amount of output generated by the U.S. economy grew at an average rate of 2.7 percent per year between 1995 and the start of the recession of 2007–2009, while the amount of output generated by the Japanese economy grew at an average rate of only 1.0 percent per year over the same time period. In 2008 and 2009, however, the U.S. economy lost 8 million jobs, and the unemployment rate rose from 4.6 percent to as high as 10.1 percent. A couple of years later, in 2011, the unemployment rate was 9.1 percent in the United States, 17.9 percent in Greece, 3.5 percent in South Korea, 9.3 percent in France, and 40.6 percent in Haiti. At the same time, the inflation rate was 3.0 percent in the United States, 1.3 percent in Norway, 14.0 percent in Kenya, 21.0 percent in Argentina, and 3.4 percent in Mexico.

Our models will help us understand why such large differences in rates of growth, unemployment, and inflation exist among countries and why those rates can change so substantially from one period to another. These models also will provide significant insights on how government policies can influence rates of growth, unemployment, and inflation.

QUICK REVIEW 6.1

- Macroeconomics studies long-run economic growth and short-run economic fluctuations.

- Macroeconomists focus their attention on three key economic statistics: real GDP, unemployment, and inflation.
- Macroeconomic models help to clarify many important questions about government economic policy.

The Miracle of Modern Economic Growth

LO6.2 Discuss why sustained increases in living standards are a historically unique phenomenon.

Rapid and sustained economic growth is a modern phenomenon. Before the Industrial Revolution began in the late 1700s in England, standards of living showed virtually no growth over hundreds or even thousands of years. For instance, the standard of living of the average Roman peasant was virtually the same at the start of the Roman Empire around the year 500 B.C. as it was at the end of the Roman Empire 1,000 years later. Similarly, historians and archaeologists have estimated that the standard of living enjoyed by the average Chinese peasant was essentially the same in the year A.D. 1800 as it was in the year A.D. 100.

That is not to say that the Roman and Chinese economies did not expand over time. They did. In fact, their total outputs of goods and services increased many times over. The problem was that as they did, their populations went up by similar proportions so that the amount of output *per person* remained virtually unchanged.

This historical pattern continued until the start of the Industrial Revolution, which ushered in not only factory production and automation but also massive increases in

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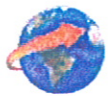
research and development so that new and better technologies were constantly being invented. The result was that output began to grow faster than the population. This meant that living standards began to rise as the amount of output *per person* increased.

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Not all countries experienced this phenomenon, but those that did were said to be experiencing **modern economic growth** (in which output per person rises) as compared with earlier times in which output (but not output per person) increased. Under modern economic growth, the annual increase in output per person is often not large, perhaps 2 percent per year in countries such as England that were the first to industrialize. But when compounded over time, an annual growth rate of 2 percent adds up very rapidly. Indeed, it implies that the standard of living will double every 35 years. So if the average citizen of a country enjoying 2 percent growth begins this year with an income of \$10,000, in 35 years that person will have an income of \$20,000. And 35 years after that there will be another doubling so that her income in 70 years will be \$40,000. And 35 years after that, the average citizen's income will double again to \$80,000. Such high rates of growth are amazing when compared to the period before modern economic growth when standards of living remained unchanged century after century.

The vast differences in living standards seen today between rich and poor countries are almost entirely the result of the fact that only some countries have experienced modern economic growth. Indeed, before the start of the Industrial Revolution in the late 1700s, living standards around the world were very similar, so much so that the average standard of living in the richest parts of the world was at most only two or three times higher than the standard of living in the poorest parts of the world. By contrast, the citizens of the richest nations today have material standards of living that are on average more than 50 times higher than those experienced by citizens of the poorest nations, as can be seen by the GDP per person data for the year 2011 given in Global Perspective 6.1.

Global Perspective 6.1 facilitates international comparisons of living standards by making three adjustments to each country's GDP. First, it converts each country's GDP from its own currency into U.S. dollars so that there is no confusion about the values of different currencies. Second, it divides each country's GDP measured in dollars by the size of its population. The resulting number, *GDP per person*, is the average amount of output each person in each country could have if each country's total output were divided equally among its citizens. It is a measure of each country's average standard of living. Third, the table uses a method called *purchasing power parity* to adjust for the fact that prices are much lower in some countries than others. By making this adjustment, we can trust that \$1 of GDP per person in the United States represents about the same quantity of goods and services as \$1 of GDP per person in any of the other countries. The resulting numbers—GDP per person adjusted for purchasing power parity—are presented in Global Perspective 6.1.



GLOBAL PERSPECTIVE 6.1

GDP per Person, Selected Countries

Country	GDP per Person, 2011 (U.S. dollars based on purchasing power parity)
Canada	35,496
United States	48,328
Japan	45,870
France	44,007
United Kingdom	38,811
South Korea	31,700
Saudi Arabia	21,196
Russia	12,993
Mexico	10,146
China	5,417
North Korea	1,800
India	1,514
Zimbabwe	752
Tanzania	566
Burundi	275

Source: International Monetary Fund, www.imf.org, for all countries except for North Korea, the estimate for which is from the *CIA World Factbook*, www.cia.gov.

QUICK REVIEW 6.2

- Before the Industrial Revolution, living standards did not show any sustained increases over time because any increase in output tended to be offset by an equally large increase in population.
- Since the Industrial Revolution, many nations have experienced *modern economic growth* in which output grows faster than population—so that living standards rise over time.

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Saving, Investment, and Choosing between Present and Future Consumption

LO6.3 Identify why saving and investment are key factors in promoting rising living standards.

At the heart of economic growth is the principle that to raise living standards over time, an economy must devote at least some fraction of its current output to increasing future output. As implied in Chapter 1, this process requires flows of both saving and investment, which we will define and discuss before returning to why they are so important for economic growth.

- **Saving** occurs when current consumption is less than current output (or when current spending is less than current income).
- **Investment** happens when resources are devoted to increasing future output—for instance by building a new research facility in which scientists invent the next generation of fuel-efficient automobiles or by constructing a modern, super-efficient factory. (A caution: In economics, the term “investment” differs from common usage. To understand why, be sure to read the Consider This box.)

When thinking about why saving and investment are so important for economic growth, the key point is that the amount of investment is ultimately limited by the amount of saving. The only way that more output can be directed at investment activities is if saving increases. But that, in turn, implies that individuals and society as a whole must make trade-offs between current and future consumption. This is true because the only way to pay for more investment—and the higher levels of future consumption that more investment can generate—is to increase present saving. But increased saving can only come at the price of reduced current consumption. Individuals and society as a whole must therefore wrestle with a choice between present consumption and future consumption. They must decide how to balance the reductions in current consumption required to fund current investment against the increases in future consumption that the added current investment will make possible.

Banks and Other Financial Institutions

Households are the principal source of savings. But businesses are the main economic investors. So how does the pool of savings generated by households when they spend less than they consume get transferred to businesses so that they can purchase newly created capital goods? The answer is through banks and other financial institutions such as mutual funds, pension plans, and insurance companies. These institutions collect the savings of households, rewarding savers with interest and dividends and sometimes capital gains (increases in asset values). The banks and other financial institutions then lend the funds to businesses, which invest in equipment, factories, and other capital goods.

CONSIDER THIS ...

Economic versus Financial Investment



Economics students often are confused by how the word “investment” is used in economics. This is understandable, because economists draw a distinction between “financial investment” and “economic investment.”

Financial investment captures what ordinary people mean when they say investment, namely, the purchase of assets like stocks, bonds, and real estate in the hope of reaping a financial gain. Anything of monetary value is an asset and, in everyday usage, people purchase—or “invest” in—assets hoping to receive a financial gain, either by eventually selling them at higher prices than they paid for them or by receiving a stream of payments from others who are allowed to use the asset. By contrast, when economists say “investment,” they are referring to **economic investment**, which relates to the creation and expansion of business enterprises. Specifically, economic investment only includes spending on the production and accumulation of newly created capital goods such as machinery, tools, factories, and warehouses. For example, economic investment will occur when the airplane shown in the accompanying photo is purchased by a commercial airline.

For economists, purely financial transactions, such as swapping cash for a stock or a bond, are not “investment.” Neither are the purchases of factories or apartment buildings built in previous years. These transactions simply transfer the ownership of financial assets or existing real assets from one party to another. They do not purchase newly created capital goods. As such, they are great examples of financial investment, but not of economic investment. So now that you know the difference, remember that purely financial transactions, like buying Google stock or a five-year-old factory, are indeed referred to as “investment”—except in economics!

Macroeconomics devotes considerable attention to money, banking, and financial institutions because a well-functioning financial system helps to promote economic growth and stability by encouraging saving and by properly directing that saving into the most productive possible

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investments. In contrast, a poorly functioning financial system can create serious problems for an economy.

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QUICK REVIEW 6.3

- An economy can only grow if it invests, and it can only invest if it saves some of its current output. Thus, saving is crucial to increasing investment and, consequently, future output.
- Banks and other financial institutions channel household savings toward businesses, which invest in equipment, factories, and other capital goods.

Uncertainty, Expectations, and Shocks

LO6.4 Describe why economists believe that “shocks” and “rainy days” are responsible for short-run fluctuations in output and employment.

Decisions about savings and investment are complicated by the fact that the future is uncertain. Investment projects sometimes produce disappointing results or even fail totally. As a result, firms spend considerable time trying to predict future trends so that they can, hopefully, invest only in projects that are likely to succeed. This implies that macroeconomics has to take into account **expectations** about the future.

The Importance of Expectations and Shocks

Expectations are hugely important for two reasons. The more obvious reason involves the effect that changing expectations have on current behavior. If firms grow more pessimistic about the future returns that are likely to come from current investments, they are going to invest less today than they would if they were more optimistic. Expectations therefore have a large effect on economic growth since increased pessimism will lead to less current investment and, subsequently, less future consumption.

The less-obvious reason that expectations are so important has to do with what happens when expectations are unmet. Firms are often forced to cope with **shocks**—situations in which they were expecting one thing to happen but then something else happened. For instance, consider a situation in which a firm decides to build a high-speed railroad that will shuttle passengers between Los Angeles and Las Vegas. The firm expects it to be very popular and make a handsome profit. But if it unexpectedly turns out to be unpopular and loses money, the railroad must figure out how to respond. Should the railroad go out of business completely? Should it attempt to see if it can turn a profit by hauling cargo instead of passengers? Is there a possibility that the venture might succeed if the firm borrows \$30 million from a bank to pay for a massive advertising campaign? These sorts of decisions are necessitated by the shock and surprise of having to deal with an unexpected situation.

Economies are exposed to both demand shocks and supply shocks. **Demand shocks** are unexpected changes in the demand for goods and services. **Supply shocks** are unexpected changes in the supply of goods and services. Note that the word *shock* only reveals that something unexpected has happened. It does not tell us whether what has happened is unexpectedly good or unexpectedly bad. To clarify this, economists use more specific terms. For instance, a *positive demand shock* refers to a situation in which demand turns out to be higher than expected, while a *negative demand shock* refers to a situation in which demand turns out to be lower than expected.

Demand Shocks and Sticky Prices

Economists believe that most short-run fluctuations in GDP and the business cycle are the result of demand shocks. Supply shocks do happen in some cases and are very important when they do occur. But we will focus most of our attention in this chapter and subsequent chapters on demand shocks, how they affect the economy, and how government policy may be able to help the economy adjust to them.

But why are demand shocks such a big problem? Why would we have to consider calling in the government to help deal with them? And why can't firms deal with demand shocks on their own?

The answer to these questions is that the prices of many goods and services are inflexible (slow to change, or “sticky”) in the short run. As we will explain, this implies that price changes do not quickly equalize the quantities demanded of such goods and services with their respective quantities supplied. Instead, because prices are inflexible, the economy is forced to respond in the short run to demand shocks primarily through changes in output and employment rather than through changes in prices.

Example: A Single Firm Dealing with Demand Shocks and Sticky Prices

Although an economy as a whole is vastly more complex than a single firm, an analogy that uses a single car factory will be helpful in explaining why demand shocks and inflexible prices are so important to understanding most of

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the short-run fluctuations that affect the entire economy. Consider a car manufacturing company named Buzzer Auto. Like most companies, Buzzer Auto is in business to try to make a profit. Part of turning a profit involves trying to develop accurate expectations about future market conditions. Consequently, Buzzer constantly does market research to estimate future demand conditions so that it will, hopefully, only build cars that people are going to want to buy.

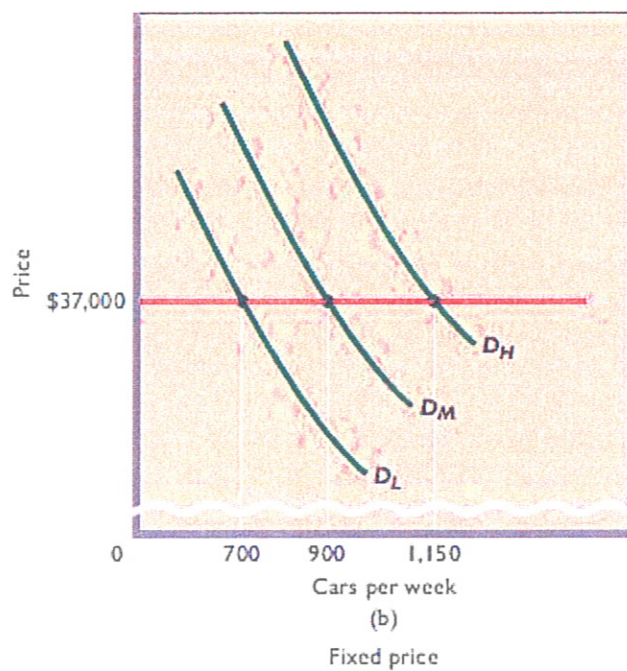
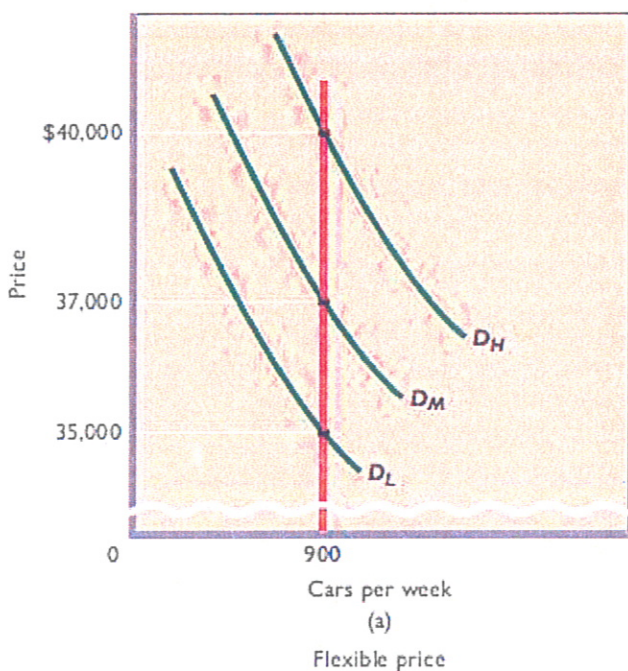
Setting Expectations After extensive market research, Buzzer concludes that it could earn a modest profit if it builds and staffs an appropriately sized factory to build an environmentally friendly SUV, which it decides to call the Prion. Buzzer's marketing economists collaborate with Buzzer's engineers and conclude that expected profits will be maximized if the firm builds a factory that has an optimal output rate of 900 cars per week. If the factory operates at this rate, it can produce Prions for only \$36,500 per vehicle. This is terrific because the firm's estimates for demand indicate that a supply of 900 vehicles per week can be sold at a price of \$37,000 per vehicle—meaning that if everything goes according to plan, Buzzer Auto should make an accounting profit of \$500 on each Prion that it produces and sells. Expecting these future conditions, Buzzer decides to build the factory, staff it with workers, and begin making the Prion.

Look at Figure 6.1a, which shows the market for Prions when the vertical supply curve for Prions is fixed at the factory's optimal output rate of 900 cars per week. Notice that we have drawn in three possible demand curves. D_L corresponds to low demand for the Prion; D_M corresponds to the medium level of demand that Buzzer's marketing economists are expecting to materialize; and D_H corresponds to high demand for the Prion. Figure 6.1a is consistent with the marketing economists' expectations: if all goes according to plan and the actual demand that materializes is D_M , the equilibrium price will in fact be \$37,000 per Prion and the equilibrium quantity demanded will be 900 cars per week. Thus, if all goes according to expectations, the factory will have exactly the right capacity to meet the expected quantity demanded at the sales price of \$37,000 per vehicle. In addition, the firm's books will show a profit of \$500 per vehicle on each of the 900 vehicles that it builds and expects to sell each week at that price.

Full Employment If There Are No Shocks Here is the key point. If expectations are always fulfilled, Buzzer Auto will never contribute to any of the short-run fluctuations in output and unemployment that affect real-world economies. First, if everything always goes according to plan and Buzzer Auto's expectations always come true, then the factory will always produce and sell at its optimal output rate of 900 cars per week. This would mean that it would never experience any fluctuations in output—either in the short run or in the long run. At the same time, since producing a constant output of 900 cars each week will always require the same number of workers, the factory's labor demand and employment should never vary. So if everything always goes according to plan, Buzzer Auto will never have any effect on unemployment because it will always hire a constant number of workers.

FIGURE 6.1 The effect of unexpected changes in demand under flexible and fixed prices. (a) If prices are flexible, then no matter what demand turns out to be, Buzzer Auto can continue to sell its optimal output of 900 cars per week since the equilibrium price will adjust to equalize the quantity demanded with the quantity supplied. (b) By contrast, if Buzzer Auto sticks with a fixed-price policy, then the quantity demanded will vary with the level of demand. At the

fixed price of \$37,000 per vehicle, the quantity demanded will be 700 cars per week if demand is D_L , 900 cars per week if demand is D_M , and 1,150 cars per week if demand is D_H .



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These facts imply that the short-run fluctuations in output and unemployment that we do see in the real world must be the result of shocks and things *not* going according to plan. In particular, business cycle fluctuations typically arise because the actual demand that materializes ends up being either lower or higher than what people were expecting. When this occurs, some adjustments will be necessary to bring quantity demanded and quantity supplied back into alignment. As we are about to explain, the nature of these adjustments varies hugely depending on whether prices are flexible or inflexible.

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Price Changes If There Are Demand Shocks and Flexible Prices Figure 6.1a illustrates the case of adjusting to unexpected changes in demand *when prices are flexible*. Here, if demand is unexpectedly low at D_L , the market price can adjust downward to \$35,000 per vehicle so that the quantity demanded at that price will still be equal to the factory's optimal output rate of 900 cars per week. On the other hand, if demand is unexpectedly high at D_H , the market price can adjust upward to \$40,000 per vehicle so that the quantity demanded will still be equal to the factory's optimal output rate of 900 cars per week. These adjustments imply that *if* the price of Prions is free to quickly adjust to new equilibrium levels in response to unexpected changes in demand, the factory could always operate at its optimal output rate of 900 cars per week. Only the amount of profit or loss will vary with demand.

Applying this logic to the economy as a whole, *if* the prices of goods and services could always adjust quickly to unexpected changes in demand, then the economy could always produce at its optimal capacity since prices would adjust to ensure that the quantity demanded of each good and service would always equal the quantity supplied. Simply put, if prices were fully flexible, there would be no short-run fluctuations in output. Production levels would remain constant and unemployment levels would not change because firms would always need the same number of workers to produce the same amount of output.

Output Changes If There Are Demand Shocks and Sticky Prices In reality, many prices in the economy are inflexible and are not able to change rapidly when demand changes unexpectedly. Consider the extreme case shown in Figure 6.1b, in which the price of Prions is totally inflexible, fixed at \$37,000 per Prion. Here, if demand unexpectedly falls from D_M to D_L , the quantity demanded at the fixed price of \$37,000 will only be 700 cars per week, which is 200 cars fewer than the factory's optimal output of 900 cars per week. On the other hand, if demand is unexpectedly high at D_H , the quantity demanded at the fixed price of \$37,000 will be 1,150 cars per week, which is 250 cars more than the factory's optimal output of 900 cars per week.

One way for companies to deal with these unexpected shifts in quantity demanded would be to try to adjust the factory's output to match them. That is, during weeks of low demand, Buzzer Auto could attempt to produce only 700 Prions, while during weeks of high demand it could try to produce 1,150 Prions. But this sort of flexible output strategy is very expensive because factories operate at their lowest costs when they are producing constantly at their optimal output levels; operating at either a higher or a lower production rate results in higher per-unit production costs.¹

Knowing this, manufacturing firms typically attempt to deal with unexpected changes in demand by maintaining an inventory. An **inventory** is a store of output that has been produced but not yet sold. Inventories are useful because they can be allowed to grow or decline in periods when demand is unexpectedly low or high—thereby allowing production to proceed smoothly even when demand is

variable. In our example, Buzzer Auto would maintain an inventory of unsold Prions. In weeks when demand is unexpectedly low, the inventory will increase by 200 Prions as the quantity demanded falls 200 vehicles short of the factory's optimal output. By contrast, during weeks when demand is unexpectedly high, the inventory will decrease as the quantity demanded exceeds the factory's optimal output by 250 cars. By allowing inventory levels to fluctuate with these unexpected shifts in demand, Buzzer Auto can respond by adjusting inventory levels rather than output levels. In addition, with any luck, the overall inventory level will stay roughly constant over time as unexpected increases and decreases in demand cancel each other out.

But consider what will happen if the firm experiences many successive weeks of unexpectedly low demand. For each such week, the firm's inventory of unsold Prions will increase by 200 cars. The firm's managers will not mind if

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this happens for a few weeks, but if it continues for many weeks, then the managers will be forced to cut production because, among other things, there will simply be no place to park so many unsold vehicles. More importantly, holding large numbers of unsold cars in inventory is unprofitable because while costs must be incurred to build an unsold car, an unsold car obviously brings in no revenue. Constantly rising inventories hurt firm profits and the management will want to reduce output if it sees inventories rising week after week due to unexpectedly low demand.

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Generalizing from a Single Firm to the Entire Economy

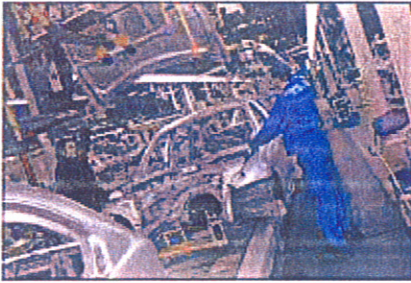
This simplified story about a single car company explains why economists believe that a combination of unexpected changes in demand and inflexible prices are the key to understanding the short-run fluctuations that affect real-world economies. If prices were flexible, then the firm could always operate at the factory's optimal output level because prices would always adjust to ensure that it could sell its optimal output of 900 cars per week no matter what happens to demand. But if prices are inflexible, then an unexpected decline in demand that persists for any length of time will result in increasing inventories that will eventually force the firm's management to cut production to less than the optimal output level of 900 cars per week. When this happens, not only will output fall, but unemployment will also rise. The firm will lay off workers because fewer employees will be needed to produce fewer cars.

Generalizing this story to the economy as a whole, if demand falls off for many goods and services across the entire economy for an extended period of time, then the firms that make those goods and services will be forced to cut production. Manufacturing firms that maintain inventories will do so as they find inventories piling up due to sluggish sales. And services firms will do so as they encounter slow sales for their services. As both manufacturing and service output declines, the economy will recede, with GDP falling and unemployment rising.

On the other hand, if demand is unexpectedly high for a prolonged period of time, the economy will boom and unemployment will fall. In the case of our Prius example, for each week that demand is unexpectedly high, inventories will fall by 250 cars. If this keeps happening week after week, inventories will start to run out and the firm will have to react by increasing production to more than the optimal output rate of 900 cars per week so that orders do not go unfilled. When this happens, GDP will increase as more cars per week are produced and unemployment will fall because the factory will need to hire more workers to produce the larger number of cars.

CONSIDER THIS ...

The Great Recession



In 2008 and 2009, the United States encountered its worst financial and economic crisis since the Great Depression of the 1930s.

The recession was so severe that it has been dubbed the Great Recession. The recession was triggered by a steep decline in housing prices and a crisis involving mortgage loans and the financial securities built on them. Several key U.S. financial institutions collapsed or nearly failed, and lending markets largely froze. Despite government bailout efforts, the financial crisis eventually spread to the broader economy. Employment fell by 8 million workers between 2007 and the end of 2009, and the unemployment rate rose from 4.6 percent to 10.1 percent over that same period. Economic growth slumped to 0.4 percent in 2008 and to a *negative* 2.4 percent in 2009, compared with the 2.7 percent annual increases occurring between 1995 and 2007.

And this is where Buzzer Auto comes into the picture. The situation in Figure 6.1b, where the price of Buzzer's autos is inflexible, is highly relevant to the Great Recession. Like Buzzer, actual auto producers such as GM, Ford, and Chrysler, as well as thousands of producers of other products across the economy, established their production capacity and set their expectations of product demand on the basis of normal times. But demand for their goods and services fell unexpectedly because of greater consumer difficulty in getting loans, declining consumer confidence, and eventually declining income. The economy's price level (essentially a weighted average of all prices) declined only slightly, and that was after the recession was well underway. Therefore, real output (not prices) took the major brunt of the decline of total demand in the economy. Output dropped, employment plummeted, and unemployment soared.

QUICK REVIEW 6.4

- Economic shocks occur when events unfold in ways that people were not expecting.
- Demand and supply shocks take place when demand or supply ends up being either higher or lower than expected.

- Real-world prices are often inflexible or “sticky” in the short run.
- When prices are sticky, the economy adjusts to demand shocks mostly through changes in output and employment (rather than through changes in prices).

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major rivals. Consider Coca-Cola and Pepsi. If Coca-Cola faces unexpectedly low demand for its product, it might be tempted to reduce its price in the hope that it can steal business away from Pepsi. But such a strategy would only work if Pepsi left its price alone when Coca-Cola cut its price. That, of course, is not likely. If Coca-Cola cuts its price, Pepsi will very likely cut its price in retaliation, doing its best to make sure that Coca-Cola doesn't steal away any of its customers. Thus, if Pepsi retaliates, Coca-Cola will only be made worse off by its decision to cut its price: It will not pick up much more business (because Pepsi also cut its price) and it will also be receiving less money for each bottle of Coke that it sells (because it lowered its own price.) Thus, firms that have to deal with the possibility of price wars often have sticky prices.

Categorizing Macroeconomic Models Using Price Stickiness

LO 6.6 Explain why the greater flexibility of prices at more periods causes economists to utilize different macroeconomic models for different time horizons.

We have now demonstrated why price stickiness is believed to have such a large role in short-run economic fluctuations. It should be noted, however, that price stickiness moderates over time. This is true because firms that choose to use a fixed-price policy in the short run do not have to stick with that policy permanently. In particular, if unexpected changes in demand begin to look permanent, many firms will allow their prices to change so that price changes (in addition to quantity changes) can help to equalize quantities supplied with quantities demanded.

For this reason, economists speak of “sticky prices” rather than “stuck prices.” Only in the very short run are prices totally inflexible. As time passes and prices are revised, the world looks much more like Figure 6.1a, in which prices are fully flexible, rather than Figure 6.1b, in which prices are totally inflexible. Indeed, the totally inflexible case shown in Figure 6.1b can be thought of as the extremely short-run response to an unexpected change in demand, while the fully flexible case shown in Figure 6.1a can be thought of as a longer-run response to an unexpected change in demand. In terms of time durations, the extreme short run can be thought of as the first few weeks and months after a demand shock, while the long run can be thought of as extending from many months to several years after a demand shock happens.

This realization is very useful in categorizing and understanding the differences between the various macroeconomic models that we will be presenting in subsequent chapters. For instance, the aggregate expenditures model presented in Chapter 11 assumes perfectly inflexible prices (and wages) and thus is a model in which prices are not just sticky but completely stuck. By contrast, the aggregate demand–aggregate supply model presented in Chapter 12 allows for flexible prices (with or without flexible wages) and is therefore useful for understanding how the economy behaves over longer periods of time.

As you study these various models, keep in mind that we need different models precisely because the economy behaves so differently depending on how much time has passed after a demand shock. The differences in behavior result from the fact that prices go from stuck in the extreme short run to fully flexible in the long run. Using different models for different stages in this process gives us much better insights into not only how economies actually behave but also how various government and central bank policies may have different effects in the short run when prices are fixed versus the long run when prices are flexible.

Where will we go from here? In the remainder of Part 3, we examine how economists measure GDP and why GDP has expanded over time. Then, we discuss the terminology of business cycles and explore the measurement and types of unemployment and inflation. At that point you will be well-prepared to examine the economic models, monetary considerations, and stabilization policies that lie at the heart of macroeconomics.

QUICK REVIEW 6.5

- Many commodity prices are extremely flexible and change constantly, but other prices in the economy change only very infrequently.
- Some prices are inflexible in order to please retail customers, others because rival firms are afraid that price changes may trigger a price war.
- Prices tend to become more flexible over time, so that as time passes, the economy can react to demand shocks with price changes as well as with output and employment changes.
- Different macroeconomics models are required for the short run, during which prices are inflexible (so that demand shocks lead almost exclusively to output and employment changes), and for longer periods, during which prices become increasingly flexible (so that demand shocks lead more to price changes rather than output and employment changes).

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SUMMARY

LO6.1 Explain why economists focus on GDP, inflation, and unemployment when assessing the health of an entire economy.

Macroeconomics studies long-run economic growth and short-run economic fluctuations.

Macroeconomists focus their attention on three key economic statistics: real GDP, unemployment, and inflation. Real GDP measures the value of all final goods and services produced in a country during a specific period of time. The unemployment rate measures the percentage of all workers who are not able to find paid employment despite being willing and able to work at currently available wages. The inflation rate measures the extent to which the overall level of prices is rising in the economy.

LO6.2 Discuss why sustained increases in living standards are a historically recent phenomenon.

Before the Industrial Revolution, living standards did not show any sustained increases over time. Economies grew, but any increase in output tended to be offset by an equally large increase in the population, so that the amount of output per person did not rise. By contrast, since the Industrial Revolution began in the late 1700s, many nations have experienced modern economic growth in which output grows faster than population—so that standards of living rise over time.

LO6.3 Identify why saving and investment are key factors in promoting rising living standards.

Macroeconomists believe that one of the keys to modern economic growth is the promotion of saving and investment (for economists, the purchase of capital goods). Investment activities increase the economy's future potential output level. But investment must be funded by saving, which is only possible if people are willing to reduce current consumption. Consequently, individuals and society face a trade-off between current consumption and future consumption since the only way to fund the investment necessary to increase future consumption is by reducing current consumption in order to gather the savings necessary to fund that investment. Banks and other financial institutions help to convert saving into investment by taking the savings generated by households and lending it to businesses that wish to make investments.

LO6.4 Describe why economists believe that “shocks” and “sticky prices” are responsible for short-run fluctuations in output and employment.

Expectations have an important effect on the economy for two reasons. First, if people and businesses are more positive about the future, they will save and invest more. Second, individuals and firms must make adjustments to shocks—situations in which expectations are unmet and the future does not turn out the way people were expecting. In particular, shocks often imply situations where the quantity supplied of a given good or service does not equal the quantity demanded of that good or service.

If prices were always flexible and capable of rapid adjustment, then dealing with situations in which quantities demanded did not equal quantities supplied would always be easy since prices could simply adjust to the market equilibrium price at which quantities demanded equal quantities supplied. Unfortunately, real-world prices are often inflexible (or “sticky”) in the short run so that the only way for the economy to adjust to such situations is through changes in output levels.

Sticky prices combine with shocks to drive short-run fluctuations in output and employment. Consider a negative demand shock in which demand is unexpectedly low. Because prices are fixed, the

lower-than-expected demand will result in unexpectedly slow sales. This will cause inventories to increase. If demand remains low for an extended period of time, inventory levels will become too high and firms will have to cut output and lay off workers. Thus, when prices are inflexible, the economy adjusts to unexpectedly low demand through changes in output and employment rather than through changes in prices (which are not possible when prices are inflexible).

LO6.5 Characterize the degree to which various prices in the economy are sticky.

Prices are inflexible in the short run for various reasons, two of which are discussed in this chapter. First, firms often attempt to set and maintain stable prices to please customers who like predictable prices because they make for easy planning (and who might become upset if prices were volatile). Second, a firm with just a few competitors may be reluctant to cut its price due to the fear of starting a price war, a situation in which its competitors retaliate by cutting their prices as well—thereby leaving the firm worse off than it was to begin with.

LO6.6 Explain why the greater flexibility of prices as time passes causes economists to utilize different macroeconomic models for different time horizons.

Price stickiness moderates over time. As a result, economists have found it sensible to build separate economic models for different time horizons. For instance, some models are designed to reflect the high degree of price inflexibility that occurs in the immediate short run, while other models reflect the high degree of price flexibility that occurs in the long run. The different models allow economists to have a better sense for how various government policies will affect the economy in the short run when prices are inflexible versus the long run when prices are flexible.