Performance and Policy

In order 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 given country during a given 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 the United States' real GDP in 2007 is larger than the United States' real GDP in 2006, then we know that U.S. output increased from 2006 to 2007. To get real GDP, government statisticians first calculate **nominal GDP,** which totals the dollar value of all goods and services produced within the borders of a given country using *their current prices during the year that they were produced.* But because nominal GDP uses current prices, 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 sculptor who produces 10 sculptures this year and 10 sculptures next year. Clearly, her output does not change. But if the price of sculptures rises from $10,000 this year to $20,000 next year, nominal GDP will rise from $100,000 (= 10 × $10,000) this year to $200,000 (= 10 × $20,000) next year because of the increase in prices. Real GDP corrects for 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 like 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 fraction 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 problematic 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 given amount of goods and services will turn out to buy them less than they expected due to the higher-than-expected prices.

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 well-being of actual people, and how they vary both across countries and over time. Once they are understood, we will build upon 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 like 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 seen across various 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 2007 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. Could Japan have done as well as the United States if it had pursued different economic policies? Similarly, in 2007, unemployment in the United States was only 4.6 percent of the labor force, while it was 8.7 percent in Germany, 7.2 percent in India, 12.8 percent in Poland, and 80 percent in Zimbabwe. At the same time, the inflation rate in the United States was 2.7 percent, compared with 26,470 percent in Zimbabwe! Our models will help us understand why such large differences in rates of growth, unemployment, and inflation exist and how government policies influence them.

The Miracle of Modern Economic Growth

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 1000 years later. Similarly, historians and archeologists 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 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.

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 2007 given in Global Perspective 23.1.

Global Perspective 23.1 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

GLOBAL PERSPECTIVE 23.1

GDP per Person, Selected Countries

Country	GDP per Person, 2007 (U.S. dollars based on purchasing power parity)
United States	$45,845
Canada	38,345
United Kingdom	35,134
Japan	33,576
France	33,187
South Korea	24,782
Saudi Arabia	23,243
Russia	14,692
Mexico	12,774
China	5,292
India	2,659
North Korea	1,900
Tanzania	1,256
Burundi	371
Zimbabwe	188

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

any of the other countries. The resulting numbers—GDP per person adjusted for purchasing power parity—are presented in Global Perspective 23.1. **(Key Question 2)**

Savings, Investment, and Choosing between Present and Future Consumption

At the heart of economic growth is the principle that in order 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 both savings and investment, which we will define and discuss before returning to why they are so important for economic growth.

- **Savings** are generated 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.

Economics students are often confused about the way the word "investment" is used in economics. This is because only 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 as the owner of their assets (as is the case with landlords who rent the property they own to tenants). By contrast, when economists say "investment," they are referring to the much more specific concept of **economic investment**, which has to do with the creation and expansion of business enterprises. Specifically, economic investment only includes money spent purchasing *newly created* capital goods such as machinery, tools, factories, and warehouses.

Indeed, as defined and measured by economists, purely financial transactions such as swapping cash for a stock or a bond are not "investment." Neither is the purchase by a firm of a factory built several years ago and previously used by another company. Both types of transactions simply transfer the ownership of old assets from one party to another. They do not pay for *newly created* capital goods. As such, they are great examples of *financial investment*, but are not examples of the narrower idea 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!

When thinking about why savings and investment are so important for economic growth, the key point is that the amount of economic investment (hereafter, simply "investment") is ultimately limited by the amount of savings. The only way that more output can be directed at investment activities is if savings increase. 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 savings in the present. But increased savings 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, deciding how to balance the reductions in current consumption that are necessary to fund current investment against the higher levels of future consumption that can result from more current investment.

Banks and Other Financial Institutions

Households are the principal source of savings. But businesses are the main economic investors. So how do the 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.

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 savings and by properly directing that savings into the most productive possible investments.

Uncertainty, Expectations, and Shocks

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.

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 Washington, D.C., and New York. They do so expecting 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. Please note that the word *shock* only tells us that something unexpected has happened. It does not tell us whether what has happened is unexpectedly good or unexpectedly bad. To make things more clear, 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.

Economists believe that most short-run fluctuations 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.

Although an economy as a whole is much 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 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.

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 23.1a, 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 23.1a 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.

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

FIGURE 23.1 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 1150 cars per week if demand is D_H.