PART•ONE

Introduction: Markets and Prices

Part 1 surveys the scope of microeconomics and introduces some basic concepts and tools. Chapter 1 discusses the range of problems that micro-economics addresses, and the kinds of answers it can provide. It also explains what a market is, how we determine the boundaries of a market, and how we measure market price.

Chapter 2 covers one of the most important tools of microeconomics: supply-demand analysis. We explain how a competitive market works and how supply and demand determine the prices and quantities of goods and services. We also show how supply-demand analysis can be used to deter-mine the effects of changing market conditions, including government intervention.

• **microeconomics** Branch of economics that deals with the behavior of individual economic units—consumers, firms, workers, and investors—as well as the markets that these units comprise.

• **macroeconomics** Branch of economics that deals with aggregate economic variables, such as the level and growth rate of national output, interest rates, unemployment, and inflation.

1.1 THE THEMES OF MICROECONOMICS

The Rolling Stones once said: "You can't always get what you want." This is true. For most people (even Mick Jagger), that there are limits to what you can have or do is a simple fact of life learned in early childhood. For economists, however, it can be an obsession.

Much of microeconomics is about *limits*—the limited incomes that consumers can spend on goods and services, the limited budgets and technical know-how that firms can use to produce things, and the limited number of hours in a week that workers can allocate to labor or leisure. But microeconomics is also about *ways to make the most of these limits*. More precisely, it is about *the allocation of scarce resources*. For example, microeconomics explains how consumers can best allocate their limited incomes to the various goods and services available for purchase. It explains how workers can best allocate their time to labor instead of leisure, or to one job instead of another. And it explains how firms can best allocate limited financial resources to hiring additional workers versus buying new machinery, and to producing one set of products versus another.

In a planned economy such as that of Cuba, North Korea, or the former Soviet Union, these allocation decisions are made mostly by the government. Firms are told what and how much to produce, and how to produce it; workers have little flexibility in choice of jobs, hours worked, or even where they live; and consumers typically have a very limited set of goods to choose from. As a result, many of the tools and concepts of microeconomics are of limited relevance in those countries.

Trade-Offs

In modern market economies, consumers, workers, and firms have much more flexibility and choice when it comes to allocating scarce resources. Microeconomics describes the *trade-offs* that consumers, workers, and firms face, and *shows how these trade-offs are best made*.

The idea of making optimal trade-offs is an important theme in microeconomics—one that you will encounter throughout this book. Let's look at it in more detail.

Consumers Consumers have limited incomes, which can be spent on a wide variety of goods and services, or saved for the future. *Consumer theory*, the subject matter of Chapters 3, 4, and 5 of this book, describes how consumers, based on their preferences, maximize their well-being by trading off the purchase of more of some goods for the purchase of less of others. We will also see how consumers decide how much of their incomes to save, thereby trading off current consumption for future consumption.

Workers Workers also face constraints and make trade-offs. First, people must decide whether and when to enter the workforce. Because the kinds of jobs—and corresponding pay scales—available to a worker depend in part on educational attainment and accumulated skills, one must trade off working now (and earning an immediate income) for continued education (and the hope of earning a higher future income). Second, workers face trade-offs in their choice of employment. For example, while some people choose to work for large corporations that offer job security but limited potential for advancement, others prefer to work for small companies where there is more opportunity for advancement

but less security. Finally, workers must sometimes decide how many hours per week they wish to work, thereby trading off labor for leisure.

Firms Firms also face limits in terms of the kinds of products that they can produce, and the resources available to produce them. General Motors, for example, is very good at producing cars and trucks, but it does not have the ability to produce airplanes, computers, or pharmaceuticals. It is also constrained in terms of financial resources and the current production capacity of its factories. Given these constraints, GM must decide how many of each type of vehicle to produce. If it wants to produce a larger total number of cars and trucks next year or the year after, it must decide whether to hire more workers, build new factories, or do both. The *theory of the firm*, the subject matter of Chapters 6 and 7, describes how these trade-offs can best be made.

Prices and Markets

A second important theme of microeconomics is the role of *prices*. All of the trade-offs described above are based on the prices faced by consumers, workers, or firms. For example, a consumer trades off beef for chicken based partly on his or her preferences for each one, but also on their prices. Likewise, workers trade off labor for leisure based in part on the "price" that they can get for their labor—i.e., the *wage*. And firms decide whether to hire more workers or purchase more machines based in part on wage rates and machine prices.

Microeconomics also describes how prices are determined. In a centrally planned economy, prices are set by the government. In a market economy, prices are determined by the interactions of consumers, workers, and firms. These interactions occur in *markets*—collections of buyers and sellers that together determine the price of a good. In the automobile market, for example, car prices are affected by competition among Ford, General Motors, Toyota, and other manufacturers, and also by the demands of consumers. The central role of markets is the third important theme of microeconomics. We will say more about the nature and operation of markets shortly.

Theories and Models

Like any science, economics is concerned with the *explanations* of observed phenomena. Why, for example, do firms tend to hire or lay off workers when the prices of their raw materials change? How many workers are likely to be hired or laid off by a firm or an industry if the price of raw materials increases by, say, 10 percent?

In economics, as in other sciences, explanation and prediction are based on *theories*. Theories are developed to explain observed phenomena in terms of a set of basic rules and assumptions. The *theory of the firm*, for example, begins with a simple assumption—firms try to maximize their profits. The theory uses this assumption to explain how firms choose the amounts of labor, capital, and raw materials that they use for production and the amount of output they produce. It also explains how these choices depend on the *prices* of inputs, such as labor, capital, and raw materials, and the prices that firms can receive for their outputs.

Economic theories are also the basis for making predictions. Thus the theory of the firm tells us whether a firm's output level will increase or decrease in response to an increase in wage rates or a decrease in the price of raw materials. With the application of statistical and econometric techniques, theories can be used to construct models from which quantitative predictions can be made.

A *model* is a mathematical representation, based on economic theory, of a firm, a market, or some other entity. For example, we might develop a model of a particular firm and use it to predict *by how much* the firm's output level will change as a result of, say, a 10-percent drop in the price of raw materials.

Statistics and econometrics also let us measure the *accuracy* of our predictions. For example, suppose we predict that a 10-percent drop in the price of raw materials will lead to a 5-percent increase in output. Are we sure that the increase in output will be exactly 5 percent, or might it be somewhere between 3 and 7 percent? Quantifying the accuracy of a prediction can be as important as the prediction itself.

No theory, whether in economics, physics, or any other science, is perfectly correct. The usefulness and validity of a theory depend on whether it succeeds in explaining and predicting the set of phenomena that it is intended to explain and predict. Theories, therefore, are continually tested against observation. As a result of this testing, they are often modified or refined and occasionally even discarded. The process of testing and refining theories is central to the development of economics as a science.

When evaluating a theory, it is important to keep in mind that it is invariably imperfect. This is the case in every branch of science. In physics, for example, Boyle's law relates the volume, temperature, and pressure of a gas.[2] The law is based on the assumption that individual molecules of a gas behave as though they were tiny, elastic billiard balls. Physicists today know that gas molecules do not, in fact, always behave like billiard balls, which is why Boyle's law breaks down under extremes of pressure and temperature. Under most conditions, however, it does an excellent job of predicting how the temperature of a gas will change when the pressure and volume change, and it is therefore an essential tool for engineers and scientists.

The situation is much the same in economics. For example, because firms do not maximize their profits all the time, the theory of the firm has had only limited success in explaining certain aspects of firms' behavior, such as the timing of capital investment decisions. Nonetheless, the theory does explain a broad range of phenomena regarding the behavior, growth, and evolution of firms and industries, and has thus become an important tool for managers and policymakers.

Positive versus Normative Analysis

Microeconomics is concerned with both *positive* and *normative* questions. Positive questions deal with explanation and prediction, normative questions with what *ought* to be. Suppose the U.S. government imposes a quota on the import of foreign cars. What will happen to the price, production, and sales of cars? What impact will this policy change have on American consumers? On workers in the automobile industry? These questions belong to the realm of **positive analysis**: statements that describe relationships of cause and effect.

• **positive analysis** Analysis describing relationships of cause and effect.

Positive analysis is central to microeconomics. As we explained above, theories are developed to explain phenomena, tested against observations, and used to construct models from which predictions are made. The use of economic theory for prediction is important both for the managers of firms and for public

----

[2]Robert Boyle (1627–1691) was a British chemist and physicist who discovered experimentally that pressure (P), volume (V), and temperature (T) were related in the following way: $PV = RT$, where R is a constant. Later, physicists derived this relationship as a consequence of the kinetic theory of gases, which describes the movement of gas molecules in statistical terms.

policy. Suppose the federal government is considering raising the tax on gasoline. The change would affect the price of gasoline, consumers' purchasing choices for small or large cars, the amount of driving that people do, and so on. To plan sensibly, oil companies, automobile companies, producers of automobile parts, and firms in the tourist industry would all need to estimate the impact of the change. Government policymakers would also need quantitative estimates of the effects. They would want to determine the costs imposed on consumers (perhaps broken down by income categories); the effects on profits and employment in the oil, automobile, and tourist industries; and the amount of tax revenue likely to be collected each year.

Sometimes we want to go beyond explanation and prediction to ask such questions as "What is best?" This involves **normative analysis**, which is also important for both managers of firms and those making public policy. Again, consider a new tax on gasoline. Automobile companies would want to determine the best (profit-maximizing) mix of large and small cars to produce once the tax is in place. Specifically, how much money should be invested to make cars more fuel-efficient? For policymakers, the primary issue is likely to be whether the tax is in the public interest. The same policy objectives (say, an increase in tax revenues and a decrease in dependence on imported oil) might be met more cheaply with a different kind of tax, such as a tariff on imported oil.

• **normative analysis** Analysis examining questions of what ought to be.

Normative analysis is not only concerned with alternative policy options; it also involves the design of particular policy choices. For example, suppose it has been decided that a gasoline tax is desirable. Balancing costs and benefits, we then ask what is the optimal size of the tax.

Normative analysis is often supplemented by value judgments. For example, a comparison between a gasoline tax and an oil import tariff might conclude that the gasoline tax will be easier to administer but will have a greater impact on lower-income consumers. At that point, society must make a value judgment, weighing equity against economic efficiency. When value judgments are involved, microeconomics cannot tell us what the best policy is. However, it can clarify the trade-offs and thereby help to illuminate the issues and sharpen the debate.

1.2 WHAT IS A MARKET?

We can divide individual economic units into two broad groups according to function—*buyers* and *sellers*. Buyers include consumers, who purchase goods and services, and firms, which buy labor, capital, and raw materials that they use to produce goods and services. Sellers include firms, which sell their goods and services; workers, who sell their labor services; and resource owners, who rent land or sell mineral resources to firms. Clearly, most people and most firms act as both buyers and sellers, but we will find it helpful to think of them as simply buyers when they are buying something and sellers when they are selling something.

Together, buyers and sellers interact to form *markets*. A **market** is *the collection of buyers and sellers that, through their actual or potential interactions, determine the price of a product or set of products.* In the market for personal computers, for example, the buyers are business firms, households, and students; the sellers are Hewlett-Packard, Lenovo, Dell, Apple, and a number of other firms. Note that a market includes more than an *industry*. *An industry is a collection of firms that sell the same or closely related products.* In effect, an industry is the supply side of the market.

• **market** Collection of buyers and sellers that, through their actual or potential interactions, determine the price of a product or set of products.

• **market definition**
Determination of the buyers, sellers, and range of products that should be included in a particular market.

Economists are often concerned with **market definition**—with determining which buyers and sellers should be included in a particular market. When defining a market, *potential* interactions of buyers and sellers can be just as important as *actual* ones. An example of this is the market for gold. A New Yorker who wants to buy gold is unlikely to travel to Zurich to do so. Most buyers of gold in New York will interact only with sellers in New York. But because the cost of transporting gold is small relative to its value, buyers of gold in New York *could* purchase their gold in Zurich if the prices there were significantly lower.

• **arbitrage** Practice of buying at a low price at one location and selling at a higher price in another.

Significant differences in the price of a commodity create a potential for **arbitrage**: buying at a low price in one location and selling at a higher price somewhere else. The possibility of arbitrage prevents the prices of gold in New York and Zurich from differing significantly and creates a world market for gold.

Markets are at the center of economic activity, and many of the most interesting issues in economics concern the functioning of markets. For example, why do only a few firms compete with one another in some markets, while in others a great many firms compete? Are consumers necessarily better off if there are many firms? If so, should the government intervene in markets with only a few firms? Why have prices in some markets risen or fallen rapidly, while in other markets prices have hardly changed at all? And which markets offer the best opportunities for an entrepreneur thinking of going into business?

Competitive versus Noncompetitive Markets

• **perfectly competitive market** Market with many buyers and sellers, so that no single buyer or seller has a significant impact on price.

In this book, we study the behavior of both competitive and noncompetitive markets. A **perfectly competitive market** has many buyers and sellers, so that no single buyer or seller has a significant impact on price. Most agricultural markets are close to being perfectly competitive. For example, thousands of farmers produce wheat, which thousands of buyers purchase to produce flour and other products. As a result, no single farmer and no single buyer can significantly affect the price of wheat.

Many other markets are competitive enough to be treated as if they were perfectly competitive. The world market for copper, for example, contains a few dozen major producers. That number is enough for the impact on price to be small if any one producer goes out of business. The same is true for many other natural resource markets, such as those for coal, iron, tin, or lumber.

Other markets containing a small number of producers may still be treated as competitive for purposes of analysis. For example, the U.S. airline industry contains several dozen firms, but most routes are served by only a few firms. Nonetheless, because competition among those firms is often fierce, for some purposes airline markets can be treated as competitive. Finally, some markets contain many producers but are *noncompetitive*; that is, individual firms can jointly affect the price. The world oil market is one example. Since the early 1970s, that market has been dominated by the OPEC cartel. (A *cartel* is a group of producers that acts collectively.)

Market Price

• **market price** Price prevailing in a competitive market.

Markets make possible transactions between buyers and sellers. Quantities of a good are sold at specific prices. In a perfectly competitive market, a single price—the **market price**—will usually prevail. The price of wheat in Kansas City and the price of gold in New York are two examples. These prices are usually

easy to measure. For example, you can find the price of corn, wheat, or gold each day in the business section of a newspaper.

In markets that are not perfectly competitive, different firms might charge different prices for the same product. This might happen because one firm is trying to win customers from its competitors, or because customers have brand loyalties that allow some firms to charge higher prices than others. For example, two brands of laundry detergent might be sold in the same supermarket at different prices. Or two supermarkets in the same town might sell the same brand of laundry detergent at different prices. In cases such as this, when we refer to the market price, we will mean the price averaged across brands or supermarkets.

The market prices of most goods will fluctuate over time, and for many goods the fluctuations can be rapid. This is particularly true for goods sold in competitive markets. The stock market, for example, is highly competitive because there are typically many buyers and sellers for any one stock. As anyone who has invested in the stock market knows, the price of any particular stock fluctuates from minute to minute and can rise or fall substantially during a single day. Likewise, the prices of commodities such as wheat, soybeans, coffee, oil, gold, silver, and lumber can rise or fall dramatically in a day or a week.

Market Definition—The Extent of a Market

As we saw, *market definition* identifies which buyers and sellers should be included in a given market. However, to determine which buyers and sellers to include, we must first determine the **extent of a market**—its *boundaries*, both *geographically* and in terms of the *range of products* to be included in it.

• **extent of a market**
Boundaries of a market, both geographical and in terms of range of products produced and sold within it.

/ɔktein/
辛烷

When we refer to the market for gasoline, for example, we must be clear about its geographic boundaries. Are we referring to downtown Los Angeles, southern California, or the entire United States? We must also be clear about the range of products to which we are referring. Should regular-octane and high-octane premium gasoline be included in the same market? Gasoline and diesel fuel?

For some goods, it makes sense to talk about a market only in terms of very restrictive geographic boundaries. Housing is a good example. Most people who work in downtown Chicago will look for housing within commuting distance. They will not look at homes 200 or 300 miles away, even though those homes might be much cheaper. And homes (together with the land they are sitting on) 200 miles away cannot be easily moved closer to Chicago. Thus the housing market in Chicago is separate and distinct from, say, that in Cleveland, Houston, Atlanta, or Philadelphia. Likewise, retail gasoline markets, though less limited geographically, are still regional because of the expense of shipping gasoline over long distances. Thus the market for gasoline in southern California is distinct from that in northern Illinois. On the other hand, as we mentioned earlier, gold is bought and sold in a world market; the possibility of arbitrage prevents the price from differing significantly from one location to another.

We must also think carefully about the range of products to include in a market. For example, there is a market for single-lens reflex (SLR) digital cameras, and many brands compete in that market. But what about compact "point-and-shoot" digital cameras? Should they be considered part of the same market? Probably not, because they are typically used for different purposes and so do not compete with SLR cameras. Gasoline is another example. Regular- and premium-octane gasolines might be considered part of the same market because most consumers can use either. Diesel fuel, however, is not

part of this market because cars that use regular gasoline cannot use diesel fuel, and vice versa.[3]

Market definition is important for two reasons:

- A company must understand who its actual and potential competitors are for the various products that it sells or might sell in the future. It must also know the product boundaries and geographical boundaries of its market in order to set price, determine advertising budgets, and make capital investment decisions.

- Market definition can be important for public policy decisions. Should the government allow a merger or acquisition involving companies that produce similar products, or should it challenge it? The answer depends on the impact of that merger or acquisition on future competition and prices; often this can be evaluated only by defining a market.

EXAMPLE 1.1   **Markets for Prescription Drugs**

The development of a new drug by a pharmaceutical company is an expensive venture. It begins with large expenditures on research and development, then requires various stages of laboratory and clinical testing, and, if the new drug is finally approved, marketing, production, and sales. At that point, the firm faces the important problem of determining the price of the new drug.

Pricing depends on the preferences and medical needs of the consumers who will be buying the drug, the characteristics of the drug, and the number and characteristics of *competing* drugs. Pricing a new drug, therefore, requires a good understanding of the market in which it will be sold.

In the pharmaceutical industry, market boundaries are sometimes easy to determine, and sometimes not so easy to determine. Markets are usually defined in terms of *therapeutic classes* of drugs. For example, there is a market for *antiulcer drugs* that is very clearly defined. For some time, there were four competitors in the market: Tagamet, Zantac, Axid, and Pepcid. All four drugs work in roughly the same way: They cause the stomach to produce less hydrochloric acid. They differ slightly in terms of their side effects and their interactions with other drugs that a patient might be taking, but in most cases they could be readily substituted for each other.[4]

Another example of a clearly defined pharmaceutical market is the market for *anticholesterol* drugs. There are several major products in the U.S. market: the leading brand is Pfizer's Lipitor, followed by Vytorin (Merck), Pravachol (Bristol-Myers Squibb), Zocor (also Merck), and Lescol (Novartis). These drugs all do pretty much the same thing (reduce blood cholesterol levels) and work in pretty

---

[3]How can we determine the extent of a market? Since the market is where the price of a good is established, one approach focuses on market prices. We ask whether product prices in different geographic regions (or for different product types) are approximately the same, or whether they tend to move together. If either is the case, we place them in the same market. For a more detailed discussion, see George J. Stigler and Robert A. Sherwin, "The Extent of the Market," *Journal of Law and Economics* 27 (October 1985): 555–85.

[4]As we will see in Example 10.1, more recently Prilosec, Prevacid, and then Nexium entered the market. These are also antiulcer drugs, but work on a different biochemical mechanism.

much the same way. While their side effects and interactions differ somewhat, they are all close substitutes. Thus when Pfizer sets the price of Lipitor, it must be concerned not only with the willingness of patients (and their insurance companies) to pay, but also with the prices and characteristics of the competing drugs. Likewise, a drug company that is considering whether to develop a new anti-cholesterol drug knows that if it commits itself to the investment and succeeds, it will have to compete with the other existing drugs. The company can use this information to project its potential revenues from the new drug, and thereby evaluate the investment.

Sometimes, however, pharmaceutical market boundaries are more ambiguous. Consider *painkillers*, a category that includes aspirin, acetaminophen (sold under the brand name Tylenol but also sold generically), ibuprofen (sold under such brand names as Motrin and Advil but also sold generically), naproxen (sold by prescription but also sold over the counter by the brand name Aleve), and Voltaren (a more powerful prescription drug produced by Novartis). There are many types of painkillers, and some work better than others for certain types of pain (e.g., headaches, arthritis, muscle aches, etc.). Side effects likewise differ. While some types of painkillers are used more frequently for certain symptoms or conditions, there is considerable spillover. For example, depending on the severity of the pain and the pain tolerance of the patient, a toothache might be treated with any of the painkillers listed above. This substitutability makes the boundaries of the painkiller market difficult to define.

EXAMPLE 1.2   The Market for Sweeteners

In 1990, the Archer-Daniels-Midland Company (ADM) acquired the Clinton Corn Processing Company (CCP).[5] ADM was a large company that produced many agricultural products, one of which was high-fructose corn syrup (HFCS). CCP was another major U.S. corn syrup producer. The U.S. Department of Justice (DOJ) challenged the acquisition on the grounds that it would lead to a dominant producer of corn syrup with the power to push prices above competitive levels. Indeed, ADM and CCP together accounted for over 70 percent of U.S. corn syrup production.

ADM fought the DOJ decision, and the case went to court. The basic issue was whether corn syrup represented a distinct market. If it did, the combined market share of ADM and CCP would have been about 40 percent, and the DOJ's concern might have been warranted. ADM, however, argued that the correct market definition was much broader—a market for sweeteners which included sugar as well as corn syrup. Because the ADM–CCP combined share of a sweetener market would have been quite small, there would be no concern about the company's power to raise prices.

ADM argued that sugar and corn syrup should be considered part of the same market because they are used interchangeably to sweeten a vast array of food products, such as soft drinks, spaghetti sauce, and pancake syrup. ADM also showed that as the level of prices for corn syrup and sugar fluctuated, industrial food producers would change the proportions of each sweetener that they used in their products. In October 1990, a federal judge agreed with ADM's argument

[5]This example is based on F. M. Scherer, "Archer-Daniels-Midland and Clinton Corn Processing," Case C16-92-1126, John F. Kennedy School of Government, Harvard University, 1992.

that sugar and corn syrup were both part of a broad market for sweeteners. The acquisition was allowed to go through.

Sugar and corn syrup continue to be used interchangeably to satisfy Americans' strong taste for sweetened foods. In 2004, per-capita consumption of sweeteners in the U.S. was about 140 pounds per person, of which sugar accounted for 62 pounds and corn syrup 78 pounds.

1.3 REAL VERSUS NOMINAL PRICES

We often want to compare the price of a good today with what it was in the past or is likely to be in the future. To make such a comparison meaningful, we need to measure prices relative to an *overall price level*. In absolute terms, the price of a dozen eggs is many times higher today than it was 50 years ago. Relative to prices overall, however, it is actually lower. Therefore, we must be careful to correct for inflation when comparing prices across time. This means measuring prices in *real* rather than *nominal* terms.

• **nominal price** Absolute price of a good, unadjusted for inflation.

The **nominal price** of a good (sometimes called its "current-dollar" price) is its absolute price. For example, the nominal price of a pound of butter was about $0.87 in 1970, $1.88 in 1980, about $1.99 in 1990, and about $3.40 in 2007. These are the prices you would have seen in supermarkets in those years. The **real price** of a good (sometimes called its "constant-dollar" price) is the price relative to an aggregate measure of prices. In other words, it is the price adjusted for inflation.

• **real price** Price of a good relative to an aggregate measure of prices; price adjusted for inflation.

For consumer goods, the aggregate measure of prices most often used is the **Consumer Price Index (CPI)**. The CPI is calculated by the U.S. Bureau of Labor Statistics by surveying retail prices, and is published monthly. It records how the cost of a large market basket of goods purchased by a "typical" consumer changes over time. Percentage changes in the CPI measure the rate of inflation in the economy.

• **Consumer Price Index** Measure of the aggregate price level.

Sometimes we are interested in the prices of raw materials and other intermediate products bought by firms, as well as in finished products sold at wholesale to retail stores. In this case, the aggregate measure of prices often used is the **Producer Price Index (PPI)**. The PPI is also calculated by the U.S. Bureau of Labor Statistics and published monthly, and records how, on average, prices at the wholesale level change over time. Percentage changes in the PPI measure cost inflation and predict future changes in the CPI.

• **Producer Price Index** Measure of the aggregate price level for intermediate products and wholesale goods.

So which price index should you use to convert nominal prices to real prices? It depends on the type of product you are examining. If it is a product or service normally purchased by consumers, use the CPI. If instead it is a product normally purchased by businesses, use the PPI.

Because we are examining the price of butter in supermarkets, the relevant price index is the CPI. After correcting for inflation, do we find that the price of butter was more expensive in 2007 than in 1970? To find out, let's calculate the 2007 price of butter in terms of 1970 dollars. The CPI was 38.8 in 1970 and rose to about 205.8 in 2007. (There was considerable inflation in the United States during the 1970s and early 1980s.) In 1970 dollars, the price of butter was

$$\frac{38.8}{205.8} \times \$3.40 = \$0.64$$

In real terms, therefore, the price of butter was lower in 2007 than it was in 1970.[6] Put another way, the nominal price of butter went up by about 290 percent, while the CPI went up 430 percent. Relative to the aggregate price level, butter prices fell.

In this book, we will usually be concerned with real rather than nominal prices because consumer choices involve analyses of price comparisons. These relative prices can most easily be evaluated if there is a common basis of comparison. Stating all prices in real terms achieves this objective. Thus, even though we will often measure prices in dollars, we will be thinking in terms of the real purchasing power of those dollars.

EXAMPLE 1.3   The Price of Eggs and the Price of a College Education

In 1970, Grade A large eggs cost about 61 cents a dozen. In the same year, the average annual cost of a college education at a private four-year college, including room and board, was about $2530. By 2007, the price of eggs had risen to $1.64 a dozen, and the average cost of a college education was $27,560. In real terms, were eggs more expensive in 2007 than in 1970? Had a college education become more expensive?

Table 1.1 shows the nominal price of eggs, the nominal cost of a college education, and the CPI for 1970–2007. (The CPI is based on 1983 = 100.) Also shown are the *real* prices of eggs and college education in 1970 dollars, calculated as follows:

$$\text{Real price of eggs in 1980} = \frac{\text{CPI}_{1970}}{\text{CPI}_{1980}} \times \text{nominal price in 1980}$$

$$\text{Real price of eggs in 1990} = \frac{\text{CPI}_{1970}}{\text{CPI}_{1990}} \times \text{nominal price in 1990}$$

and so forth.

TABLE 1.1   The Real Price of Eggs and of a College Education[7]

	1970	1980	1990	2000	2007
Consumer Price Index	38.8	82.4	130.7	172.2	205.8
Nominal Prices					
Grade A Large Eggs	$0.61	$0.84	$1.01	$0.91	$1.64
College Education	$2530	$4912	$12,018	$20,186	$27,560
Real Prices ($1970)					
Grade A Large Eggs	$0.61	$0.40	$0.30	$0.21	$0.31
College Education	$2530	$2313	$3568	$4548	$5196

The table shows clearly that the real cost of a college education rose (by 105 percent) during this period, while the real cost of eggs fell (by 49 percent). It is

---

[6]Two good sources of data on the national economy are the *Economic Report of the President* and the *Statistical Abstract of the United States*. Both are published annually and are available from the U.S. Government Printing Office.

[7]You can get data on the cost of a college education by visiting the National Center for Educational Statistics and download the Digest of Education Statistics at **http://nces.ed.gov**. Historical and current data on the average retail price of eggs can be obtained from the Bureau of Labor Statistics (BLS) at **http://www.bls.gov**, by selecting CPI—Average Price Data.

these relative changes in prices that are important for the choices that consumers make, not the fact that both eggs and college cost more in nominal dollars today than they did in 1970.

In the table, we calculated real prices in terms of 1970 dollars, but we could just as easily have calculated them in terms of dollars of some other base year. For example, suppose we want to calculate the real price of eggs in *1990 dollars*. Then:

$$\text{Real price of eggs in 1970} = \frac{CPI_{1990}}{CPI_{1970}} \times \text{nominal price in 1970}$$

$$= \frac{130.7}{38.8} \times 0.61 = 2.05$$

$$\text{Real price of eggs in 2007} = \frac{CPI_{1990}}{CPI_{2007}} \times \text{nominal price in 2007}$$

$$= \frac{130.7}{205.8} \times 1.64 = 1.04$$

$$\text{Percentage change in real price} = \frac{\text{real price in 2007} - \text{real price in 1970}}{\text{real price in 1970}}$$

$$= \frac{1.04 - 2.05}{2.05} = -0.49$$

Notice that the percentage decline in real price is 49 percent whether we use 1970 dollars or 1990 dollars as the base year.

EXAMPLE 1.4   ## The Minimum Wage

The federal minimum wage—first instituted in 1938 at a level of 25 cents per hour—has been increased periodically over the years. From 1991 through 1995, for example, it was $4.25 an hour. Congress voted to raise it to $4.75 in 1996 and then to $5.15 in 1997. Legislation in 2007 to increase the minimum wage yet again would raise it to $6.55 an hour in 2008 and $7.25 in 2009.[8]

Figure 1.1 shows the minimum wage from 1938 through 2010, both in nominal terms and in 2000 constant dollars. Note that although the legislated minimum wage has steadily increased, in real terms the minimum wage today is not much different from what is was in the 1950s.

Nonetheless, the 2007 decision to increase the minimum wage was a difficult one. Although the higher minimum wage would provide a better standard of living for those workers who had been paid below the minimum, some analysts feared that it would also lead to increased unemployment among young and unskilled workers. The decision to increase the minimum wage, therefore, raises both normative and positive issues. The normative issue is whether any loss of teenage and low-skilled jobs is outweighed by two factors: (1) the direct benefits to those workers who now earn more as a result; and (2) any indirect benefits to other workers whose wages might be increased along with the wages of those at the bottom of the pay scale.

---

[8]Some states also have minimum wages that are higher than the federal minimum wage. For example, in 2007 the minimum wage in Massachusetts was $7.50 per hour, in New York it was $7.15, and in California it was $7.50 and scheduled to increase to $8.00 in 2008. You can learn more about the minimum wage at **http://www.dol.gov**.
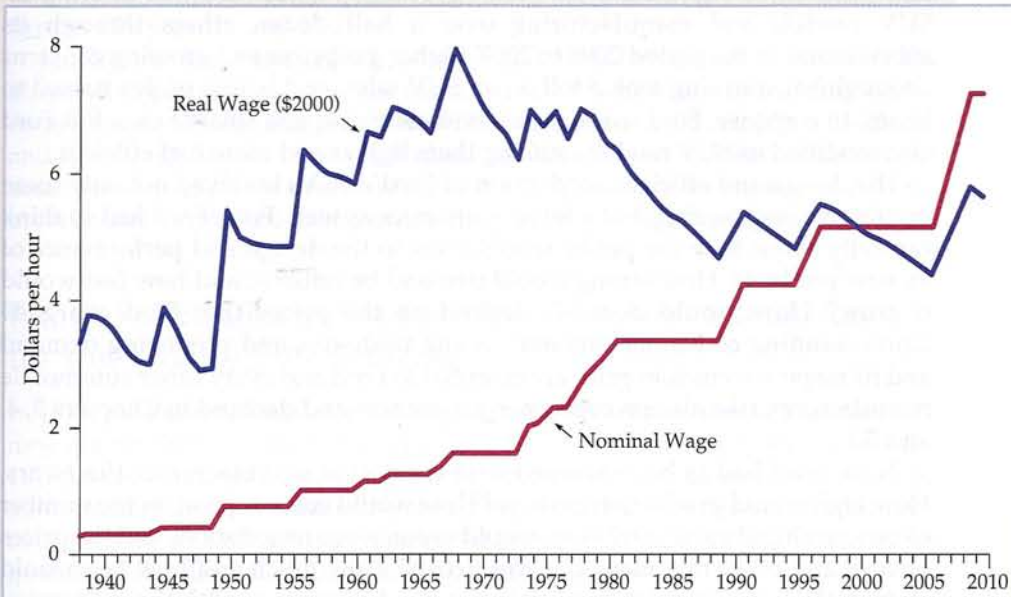
FIGURE 1.1 **The Minimum Wage**

In nominal terms, the minimum wage has increased steadily over the past 70 years. However, in real terms its expected 2010 level is below that of the 1970s.

An important positive issue is how many fewer workers (if any) would be able to get jobs with a higher minimum wage. As we will see in Chapter 14, this issue is still hotly debated. Statistical studies have suggested that an increase in the minimum wage of about 10 percent would increase teenage unemployment by 1 to 2 percent. (The actual increase from $5.15 to $7.25 represents a 41-percent increase.) However, one review of the evidence questions whether there are any significant unemployment effects.[9]

1.4 WHY STUDY MICROECONOMICS?

We think that after reading this book you will have no doubt about the importance and broad applicability of microeconomics. In fact, one of our major goals is to show you how to apply microeconomic principles to actual decision-making problems. Nonetheless, some extra motivation early on never hurts. Here are two examples that not only show the use of microeconomics in practice, but also provide a preview of this book.

Corporate Decision Making: Ford's Sport Utility Vehicles

In 1991, the Ford Motor Company introduced the Explorer, which became the best-selling sport utility vehicle (SUV) in the United States. In 1997, Ford introduced the Expedition, a larger and roomier SUV. This car was also a big success

---

[9]The first study is David Neumark and William Wascher, "Employment Effects of Minimum and Subminimum Wages: Panel Data on State Minimum Wage Laws," *Industrial and Labor Relations Review* 46 (October 1992): 55–81. A review of the literature appears in David Card and Alan Krueger, *Myth and Measurement: The New Economics of the Minimum Wage* (Princeton: Princeton University Press, 1995).

and contributed significantly to Ford's profits. By 2002, Ford was offering six SUV models and manufacturing over a half dozen others through its subsidiaries. In the period 2005 to 2007, higher gas prices and growing concerns about global warming took a toll on all SUV sales, and Ford's profits turned to losses. In response, Ford worked on developing new and smaller cars. But Ford also modified its SUV models, making them lighter and more fuel efficient.

The design and efficient production of Ford's SUVs involved not only some impressive engineering, but a lot of economics as well. First, Ford had to think carefully about how the public would react to the design and performance of its new products. How strong would demand be initially, and how fast would it grow? How would demand depend on the prices that Ford charged? Understanding consumer preferences and trade-offs and predicting demand and its responsiveness to price are essential to Ford and every other automobile manufacturer. (We discuss consumer preferences and demand in Chapters 3, 4, and 5.)

Next, Ford had to be concerned with the cost of manufacturing these cars. How high would production costs be? How would costs depend on the number of cars produced each year? How would union wage negotiations and the prices of steel and other raw materials affect costs? How much and how fast would costs decline as managers and workers gained experience with the production process? And to maximize profits, how many of these cars should Ford plan to produce each year? (We discuss production and cost in Chapters 6 and 7 and the profit-maximizing choice of output in Chapter 8.)

Ford also had to design a pricing strategy and consider how competitors would react to it. For example, should Ford charge a low price for the basic stripped-down version of the Explorer but high prices for individual options, such as leather seats? Or would it be more profitable to make these options "standard" items and charge a higher price for the whole package? Whatever strategy Ford chose, how were competitors likely to react? Would DaimlerChrysler try to undercut Ford by lowering the price of its Jeep Grand Cherokee? Might Ford be able to deter DaimlerChrysler or GM from lowering prices by threatening to respond with its own price cuts? (We discuss pricing in Chapters 10 and 11 and competitive strategy in Chapters 12 and 13.)

Because its SUV product line required large investments in new capital equipment, Ford had to consider both the risks and possible outcomes of its decisions. Some of this risk was due to uncertainty over the future price of gasoline (higher gasoline prices would reduce the demand for heavy vehicles). Some was due to uncertainty over the wages that Ford would have to pay its workers. What would happen if world oil prices doubled or tripled, or if the U.S. government imposed a heavy tax on gasoline? How much bargaining power would unions have, and how might union demands affect wage rates? How should Ford take these uncertainties into account when making investment decisions? (Commodity markets and the effects of taxes are discussed in Chapters 2 and 9. Labor markets and union power are discussed in Chapter 14. Investment decisions and the role of uncertainty are discussed in Chapters 5 and 15.)

Ford also had to worry about organizational problems. Ford is an integrated firm in which separate divisions produce engines and parts and then assemble finished cars. How should managers of different divisions be rewarded? What price should the assembly division be charged for engines that it receives from another division? Should all parts be obtained from the upstream divisions, or should some be purchased from outside firms?

(We discuss internal pricing and organizational incentives for the integrated firm in Chapters 11 and 17.)

Finally, Ford had to think about its relationship to the government and the effects of regulatory policies. For example, all of Ford's cars must meet federal emissions standards, and production-line operations must comply with health and safety regulations. How might these regulations and standards change over time? How might they affect costs and profits? (We discuss the role of government in limiting pollution and promoting health and safety in Chapter 18.)

Public Policy Design: Automobile Emission Standards for the Twenty-First Century

In 1970, the Federal Clean Air Act imposed strict tailpipe emission standards on new automobiles. These standards have become increasingly stringent—the 1970 levels of nitrogen oxides, hydrocarbons, and carbon monoxide emitted by automobiles had been reduced by about 90 percent by 1999. Now, as the number of cars on the roads keeps increasing, the government must consider how stringent these standards should be in the coming years.

The design of a program like the Clean Air Act involves a careful analysis of the ecological and health effects of auto emissions. But it also involves a good deal of economics. First, the government must evaluate the monetary impact of the program on consumers. Emission standards affect the cost both of purchasing a car (catalytic converters would be necessary, which would raise the cost of cars) and of operating it (gas mileage would be lower, and converters would have to be repaired and maintained). Because consumers ultimately bear much of this added cost, it is important to know how it affects their standards of living. This means analyzing consumer preferences and demand. For example, would consumers drive less and spend more of their income on other goods? If so, would they be nearly as well off? (Consumer preferences and demand are discussed in Chapters 3 and 4.)

To answer these questions, the government must determine how new standards will affect the cost of producing cars. Might automobile producers minimize cost increases by using new lightweight materials? (Production and cost are discussed in Chapters 6 and 7.) Then the government needs to know how changes in production costs will affect the production levels and prices of new automobiles. Are the additional costs absorbed by manufacturers or passed on to consumers in the form of higher prices? (Output determination is discussed in Chapter 8 and pricing in Chapters 10 through 13.)

Finally, the government must ask why the problems related to air pollution are not solved by our market-oriented economy. The answer is that much of the cost of air pollution is external to the firm. If firms do not find it in their self-interest to deal adequately with auto emissions, what is the best way to alter their incentives? Should standards be set, or is it more economical to impose air pollution fees? How do we decide what people will pay to clean up the environment when there is no explicit market for clean air? Is the political process likely to solve these problems? The ultimate question is whether the auto emissions control program makes sense on a cost-benefit basis. Are the aesthetic, health, and other benefits of clean air worth the higher cost of automobiles? (These problems are discussed in Chapter 18.)

These are just two examples of how microeconomics can be applied in the arenas of private and public-policy decision making. You will discover many more applications as you read this book.

SUMMARY

1. Microeconomics is concerned with the decisions made by individual economic units—consumers, workers, investors, owners of resources, and business firms. It is also concerned with the interaction of consumers and firms to form markets and industries.

2. Microeconomics relies heavily on the use of theory, which can (by simplification) help to explain how economic units behave and to predict what behavior will occur in the future. Models are mathematical representations of theories that can help in this explanation and prediction process.

3. Microeconomics is concerned with positive questions that have to do with the explanation and prediction of phenomena. But microeconomics is also important for normative analysis, in which we ask what choices are best—for a firm or for society as a whole. Normative analyses must often be combined with individual value judgments because issues of equity and fairness as well as of economic efficiency may be involved.

4. A *market* refers to a collection of buyers and sellers who interact, and to the possibility for sales and purchases that result from that interaction. Microeconomics involves the study of both perfectly competitive markets, in which no single buyer or seller has an impact on price, and noncompetitive markets, in which individual entities can affect price.

5. The market price is established by the interaction of buyers and sellers. In a perfectly competitive market, a single price will usually prevail. In markets that are not perfectly competitive, different sellers might charge different prices. In this case, the market price refers to the average prevailing price.

6. When discussing a market, we must be clear about its extent in terms of both its geographic boundaries and the range of products to be included in it. Some markets (e.g., housing) are highly localized, whereas others (e.g., gold) are global in nature.

7. To account for the effects of inflation, we measure real (or constant-dollar) prices, rather than nominal (or current-dollar) prices. Real prices use an aggregate price index, such as the CPI, to correct for inflation.

QUESTIONS FOR REVIEW

1. It is often said that a good theory is one that can be refuted by an empirical, data-oriented study. Explain why a theory that cannot be evaluated empirically is not a good theory.

2. Which of the following two statements involves positive economic analysis and which normative? How do the two kinds of analysis differ?
   a. Gasoline rationing (allocating to each individual a maximum amount of gasoline that can be purchased each year) is poor social policy because it interferes with the workings of the competitive market system. *positive*
   b. Gasoline rationing is a policy under which more people are made worse off than are made better off. *normative*

3. Suppose the price of regular-octane gasoline were 20 cents per gallon higher in New Jersey than in Oklahoma. Do you think there would be an opportunity for arbitrage (i.e., that firms could buy gas in Oklahoma and then sell it at a profit in New Jersey)? Why or why not?

4. In Example 1.3, what economic forces explain why the real price of eggs has fallen while the real price of a college education has increased? How have these changes affected consumer choices? *inflation*

5. Suppose that the Japanese yen rises against the U.S. dollar—that is, it will take more dollars to buy a given amount of Japanese yen. Explain why this increase simultaneously increases the real price of Japanese cars for U.S. consumers and lowers the real price of U.S. automobiles for Japanese consumers.

6. The price of long-distance telephone service fell from 40 cents per minute in 1996 to 22 cents per minute in 1999, a 45-percent (18 cents/40 cents) decrease. The Consumer Price Index increased by 10 percent over this period. What happened to the real price of telephone service? ✓

EXERCISES
because there is no significant difference in price

1. Decide whether each of the following statements is true or false and explain why:
   a. Fast-food chains like McDonald's, Burger King, and Wendy's operate all over the United States. Therefore, the market for fast food is a national market. *false* ⓕT
   b. People generally buy clothing in the city in which they live. Therefore, there is a clothing market in, say, Atlanta that is distinct from the clothing market in Los Angeles. ⓕT
   c. Some consumers strongly prefer Pepsi and some strongly prefer Coke. Therefore, there is no single market for colas. F

2. The following table shows the average retail price of butter and the Consumer Price Index from 1980 to 2000, scaled so that the CPI = 100 in 1980.

	1980	1985	1990	1995	2000
CPI	100	130.58	158.56	184.95	208.98
Retail price of butter (salted, grade AA, per lb.)	$1.88	$2.12	$1.99	$1.61	$2.52

a. Calculate the real price of butter in 1980 dollars. Has the real price increased/decreased/stayed the same from 1980 to 2000?

b. What is the percentage change in the real price (1980 dollars) from 1980 to 2000?

c. Convert the CPI into 1990 = 100 and determine the real price of butter in 1990 dollars.

d. What is the percentage change in real price (1990 dollars) from 1980 to 2000? Compare this with your answer in (b). What do you notice? Explain.

3. At the time this book went to print, the minimum wage was $5.85. To find the current value of the CPI, go to **http://www.bls.gov/cpi/home.htm**. Click on Consumer Price Index-All Urban Consumers (Current Series) and select U.S. All items. This will give you the CPI from 1913 to the present.

a. With these values, calculate the current real minimum wage in 1990 dollars.

b. Stated in real 1990 dollars, what is the percentage change in the real minimum wage from 1985 to the present?