

# MICROECONOMICS

## CHAPTER 1

### The Market Economy

#### *What is to be done?*

—Lenin

When future historians look back on the close of the 20th century, one of the most sweeping changes they will note is the collapse of centrally planned economies in Eastern Europe. It is not far off to say that the Cold War between the United States and the Soviet Union was won not by the armies of the United States and its allies, but by the productive power of Western market economies. Mikhail Gorbachev, then leader of the Soviet Union, concluded that his country's economy could not afford to continue its global military competition with the United States. The Soviet economy was simply too inefficient. He set his country on a new, more market-oriented course, in the process touching off political and economic upheavals.

Why did centrally planned economies fail while market systems survived? Gorbachev's own words provide some insight. In a 1987 speech, four years before the Soviet Union's abandonment of communism, he noted that "One can see children using a loaf of bread as a ball in football." Presumably, Gorbachev was irked by the wastefulness of using bread for child's play. But even if Gorbachev was irritated by seeing the bread squandered, one still wonders why he bothered to bring it up in a major speech. To think about this issue, one must ask why the Soviet youngsters were playing with the bread in the first place. The answer is that Soviet consumers did not put much value on bread because the price they paid for it was very low. Provided that they could buy all the bread they wanted at this low price, why would consumers bother to economise on its use? If a

loaf of bread cost only the equivalent of a few pennies, *why not* let the children have a little fun by playing football with it!

We think that Gorbachev may have related this anecdote because he viewed it as symptomatic of the problems facing the Soviet economy. In 1987, the prices of all goods were set by central planners in Moscow. In many cases, commodities were priced so low that consumers felt no compunction about being wasteful. Moreover, many prices were set below production costs. In such cases, producers had little incentive to bring their wares to market: “[M]uch food rots long before it gets to the grocery store ... Supplies are sporadic—butter one day, none the next—so most shoppers cruise the stores daily and hoard whatever looks interesting, just in case” (Keller 1988, A6). Other economies based on the Soviet model experienced similar problems. Polish Prime Minister Zbigniew Messner, for example, complained “There are ... erroneous motivational systems, shortcomings in the organization of labour, lack of respect for social property” (Tagliabue 1987, 11). These difficulties were an important reason for the political upheavals that swept Eastern Europe, beginning in 1989 and ending with the overthrow of communism. Thinking about why centrally planned economies had such difficulties will help us define the subject matter of economics and the purpose of this book.

## **1.1 SCARCITY AND ECONOMICS**

The difficulties of the centrally planned societies were a consequence of the way in which they dealt with the phenomenon of scarcity. Virtually all resources are scarce, meaning that there are not enough of them to satisfy all the desires of all people. By “resources” we refer not only to natural resources (oil, trees, land, and water) but also to human resources (labour) and capital resources (machines and factories). An important implication of the presence of scarcity is that people and societies must make choices among a limited set of possibilities. The choice to have more of one thing, like bread, necessarily means

having less of other things. In the Soviet Union, these decisions were made by central planners; in effect, Gorbachev was complaining that this approach to dealing with scarcity was leading to undesirable results. Indeed, in a subsequent speech, he was more explicit: “The tendency to encompass every nook of life with detailed centralized planning and control literally straitjackets society.”

The problem of scarcity is not confined to centrally planned economies. All societies must make choices about how to use their scarce resources; the way that societies differ is in *how* these decisions are made. **Economics** is the study of how people and societies deal with scarcity. The subject of this book is **microeconomics**, which focuses on the economic behaviour of individual decision-making units. The prefix *micro*, which means “small,” is somewhat misleading. To be sure, microeconomists spend a lot of time analyzing the behaviour of relatively small decision makers, such as individual households and firms. But microeconomists are equally concerned with the big picture—how these individual decisions fit together and what kind of results they produce for society. However, we exclude a systematic treatment of how the economy-wide inflation and unemployment rates move over time (the business cycle). These topics belong in the realm of **macroeconomics**, which focuses on the behaviour of the economy as a whole, with relatively less attention devoted to the activities of individual units.

## THE THREE QUESTIONS

Because of scarcity, every society *inescapably* has to answer three questions:

### 1. What Is to Be Produced?

As already stressed, in the presence of scarcity, producing more of one thing means producing less of another. A society therefore has to choose how many compact disc players, ballpoint pens, missiles, and every other commodity it is going to produce. This

leads us to an important concept in economics: opportunity cost. When more of commodity *X* is produced, resources are used up. These resources could have been used to produce alternative commodities. The most highly valued of these foregone alternatives is the **opportunity cost** of *X*. Essentially, the opportunity cost of something is *what you give up* by having it.

US President Dwight Eisenhower showed a keen grasp of the concept of opportunity cost in this discussion of the true cost of defence:

Every gun that is made, every warship launched, every rocket fired signifies, in the final sense, a theft from those who hunger and are not fed, those who are cold and are not clothed. This world in arms is not spending money alone. It is spending the sinew of its labourers, the genius of its scientists, the hopes of its children (Ambrose 1984, 95).

The notion of opportunity cost is as applicable at the individual level as at the societal. Consider, for example, a peasant from China named Xiong Qiangyun, who proudly told a reporter that his son was in college: “It’s been expensive, so I haven’t been able to build a very nice house or buy a television. But my boy’s in college” (Kristof 1991, 15). The opportunity cost of the education of Mr. Qiangyun’s son was the consumer durables foregone by the rest of the family.

## **2. How Is It to Be Produced?**

In the children’s story of “The Three Little Pigs,” we are told that a house may be constructed out of straw, sticks, or brick. This illustrates the important point that even after deciding what we want to produce, we have to decide how to produce it. Should houses be constructed of wood or should brick be used instead, so that the wood can be used for fuel? Perhaps straw should be used for housing, but then less would be available for

fodder for livestock. Given that all resources are scarce, society must decide which resources to allocate to the production of various commodities.

### **3. Who Gets the Output?**

Because of scarcity, no one can have all of everything that he or she wants. Every society must develop some kind of mechanism for dividing up the output among its members. And in every society, the question of whether this mechanism leads to a “fair” distribution of the output is likely to be the subject of intense debate.

The way that our three questions are answered is referred to as the **allocation of resources**—how society’s resources are divided up among the various outputs, among the different organizations that produce these outputs, and among the members of society. Although every society has to decide how to allocate its resources, societies differ greatly in how these decisions are made. As noted earlier, in centrally planned economies these decisions are made by government bureaux. In contrast, the societies like Germany, France, the United Kingdom, the United States and Australia rely more heavily on a **market system**, in which resource allocation decisions are determined by the independent decisions of individual consumers and producers, without any central direction. Because the market system is the most important mechanism for resource allocation in Western societies, it is the main focus of this book. Our goal is to understand how markets work, and to develop criteria for evaluating market outcomes. (PC 1.1)

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## **1.2 MODELS**

The task that we have set ourselves appears daunting indeed. In any large economy there are millions of products, consumers, and firms. In a market system, consumers and firms all make their own decisions; we have to understand how these decisions are made and

how they fit together. How can we possibly hope to encompass all of this complexity? The answer is that we won't even try. Instead, we study how economies work using **models**, which are descriptions of phenomena that abstract from the details of reality. By "abstracting" from details we mean ignoring those details that are not directly essential to understanding the phenomenon at hand. That way we can concentrate on the really important factors. A classic example of a model is a road map. If you are trying to drive from Frankfurt to Cologne, you do *not* want a perfectly "realistic" description of the terrain that shows the location of every road, every house, and every hill. Such a map would be so complicated that it would be useless. Instead, you want a map that abstracts from most details of the terrain and shows only the main roads and where they intersect.

## **A MODEL OF EDUCATIONAL CHOICE**

You might never have thought about it this way, but like the Chinese peasant mentioned previously, your decision to attend university implicitly involved a choice in the presence of scarce resources. After all, you and your family only have so much money; spending it on tuition means having less available for other things. Even if tuition were zero, university would still be costly because your time has an opportunity cost—the time that you spend in education could be spent working, for example. Let's construct a model of the decision to attend university. Such an exercise will not only give you a good idea of what an economic model really is, but it will also introduce you to the way that economists typically approach problems.

Our simple model is based on the assumption that people make educational decisions on the basis of monetary costs and benefits. What are these monetary costs and benefits? As already suggested, some of the opportunity costs are explicit or direct (such as tuition and books); in addition we must take into account the opportunity costs of the student's time. On the benefits side, each year of education leads to some increase in the person's

earning capacity—better-educated people get higher-paying jobs. Our model posits that, before deciding to enrol in university each year, an individual considers the monetary costs and benefits of doing so. If the additional monetary benefits exceed the costs, he enrolls, and otherwise not. For example, if attending the first year of university costs €10,000 but this will enhance your lifetime earnings by €15,000, then you go to university. On the other hand, if it enhances your earnings by only €8,000, you do not. Why pay €10,000 to obtain a benefit of only €8,000?

Now, this model may strike you as being absurdly simple. It does not allow for the possibility that someone is in university just because his or her parents insisted on it. Neither does the model take into account that some people simply enjoy learning and are happy to pay tuition even if their future earnings aren't enhanced at all. However, the whole point of model building is to simplify as much as possible so that a problem is reduced to its essentials. Omission is the beginning of all good economic analysis. A model should not be judged on the basis of whether or not it is "true," but on whether the model is plausible and informative. If a model founded on the assumption that educational decisions are based on monetary returns gives us good predictions, then it is useful, even if it does not encompass every possible explanation or predict the behaviour of every single individual.

Sometimes, however, a model can be *too* simple for one's purposes. For instance, suppose that it is harder for students from poor families to borrow money than it is for those from rich families. Then students from poor families may not be able to borrow enough money for tuition, even though attending university would greatly enhance their earnings. If such borrowing constraints are really important, then a model that ignored them would not produce very good predictions about educational decisions. A model must be as simple as possible, but not simpler! How do you know if a particular model is too

simple? Unfortunately, there is no easy answer. If the model appears to be doing a good job of explaining the problem at hand, then there is no reason to complicate it further. Economists have found that models that explain educational decisions on the basis of financial returns do a pretty good job of predicting people's actual decisions. (See, for example, Blundell et al. 2000.)

So far, our model of educational decisions has used only words to describe the phenomenon; it is a verbal model. Verbal models are fine, but sometimes our understanding is enhanced when models are represented graphically. In Panel A of Figure 1.1, years of education are measured on the horizontal axis, and euros are measured on the vertical. The schedule labelled *MC* shows the cost of each *additional* year of school for a student whom we'll call Berthold. In economics, the word *marginal* is used to mean "additional," so the additional cost is called the *marginal cost*. The marginal cost is drawn sloping upward, reflecting the assumption that the additional cost of each year of education increases over time, perhaps because tuition rises or because foregone wages become higher as the student becomes more educated. The schedule *MB* shows the marginal monetary benefit of each year of schooling for Berthold. It is drawn sloping downward, which reflects the assumption that as more education is purchased, the amount by which it increases future earnings gets successively smaller. For example, the eighth year of schooling increases Berthold's lifetime earnings by €20,000. His 17th year increases lifetime earnings by €4,500, a smaller increase, but an increase nonetheless.

How much education does Berthold consume? Note that at any level of education to the left of 12 years, the marginal benefit exceeds the marginal cost. Hence, from a monetary point of view, taking another year of education makes sense. On the other hand, at any level of education to the right of 12 years, the marginal benefit is less than the marginal cost. Our model therefore predicts that Berthold will enrol in school for just 12



years, the point at which the marginal benefit of a year of education just equals its marginal cost. The notion that sensible decision making requires an individual to set marginal benefit equal to marginal cost is sometimes called the *equimarginal rule*, and it will be encountered in various guises throughout this book.

## **Figure 1.1**

### **A Model of Educational Choice**

Assuming that schooling decisions are based on monetary motives only, an individual attends only as long as the marginal benefit exceeds the marginal cost. In Panel A, to the right of 12 years the marginal cost exceeds the marginal benefit, so the student does not attend more than 12 years. Panel B embodies a prediction—if the marginal costs of school attendance fall, a person will spend more time in school.

Now suppose that Berthold's circumstances change. The marginal cost of each year of Berthold's education goes down, perhaps because of a decrease in current wage rates. (Remember, foregone wages are part of the cost of education.) Assuming that the marginal benefits stay the same, the new situation is depicted in Panel B. Similar logic to that of Panel A indicates that with lower costs Berthold chooses to be educated for 14 years. (He would attend two years of university.) A comparison of Panels A and B reveals an important function of models—they allow us to make predictions of how behaviour will change when circumstances change. This is crucial, because it permits us to *test* whether the model is doing a good job. As stressed above, if the model provides us with good predictions, it is fine. On the other hand, if the model is not consistent with real-world observations, it must either be modified or discarded altogether. As the Chinese leader Deng Ziaoping said, "Seek truth from facts."

Models can be mathematical as well as verbal or graphical. Let  $MB$  be the marginal benefit of each year of education, and  $MC$  the marginal cost. Then our main result is that people purchase education up to the point that the marginal benefit equals the marginal cost. This notion is expressed mathematically as

$$MB = MC.$$

The nice thing about mathematical equations is that they allow us to summarize a model very succinctly. In this book, we will rely on all three types of models: verbal, graphical, and mathematical. (PC 1.2)

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Interestingly, a methodology based on model building is by no means limited to economics. It is employed in “hard sciences” as well. The great theoretical physicist Stephen Hawking (1988, 11) observed, “A theory is a good theory if it satisfies two requirements: It must accurately describe a large class of observations on the basis of a *model* that contains only a few arbitrary elements, and it must make definite predictions about the results of future observation” (emphasis added). Like the economy, the physical world is too complicated to be studied without recourse to models.

## **POSITIVE AND NORMATIVE ANALYSIS**

We will use models for both positive and normative analysis. **Positive analysis** deals with statements of cause and effect. For example, a positive statement is “If the German government cuts tuition subsidies to students from middle-income households, then the number of such students attending university will decrease.” Note that a positive statement can in principle be confirmed or refuted by appeal to real world observations. In

this case, what you would have to do is determine whether enrolment of middle-income students actually fell after the subsidies were decreased.<sup>1</sup>

Positive statements do not indicate whether the phenomenon under consideration is “good” or “bad”—they merely attempt to describe the world. In contrast, **normative analysis** deals with statements that embody value judgements. The assertion “All individuals who want to attend university ought to have free tuition,” is a normative statement. One cannot confirm this statement by appealing to data; its validity depends upon one’s ethical views. Keeping positive and normative views separated is sometimes difficult, but it is worth trying very hard to do so. One’s views about how the world *is* should not be clouded by opinions on how it *ought* to be.

There are important links between normative and positive analysis. First, our normative views heavily influence the topics to which we apply positive analysis. Economists spend a lot more time studying the market for labour than the market for potatoes. This is due to an implicit ethical view that people are important, so that one should understand the forces determining their incomes. Second, the results of positive analysis can indicate how best to achieve one’s normative goals. For example, by itself the normative view that society ought to help the poor does not indicate what steps would be most effective in attaining that goal. Would a minimum wage, a food subsidy, or a progressive income tax be most effective? Only hard-headed positive analysis of the various alternatives can produce an answer. If your interest in economics is based on a desire to improve the current system in some fashion, that’s great. Just understand that a necessary first step is to understand how the system works.

### 1.3 THE WORKINGS OF A PRICE SYSTEM: A PREVIEW

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<sup>1</sup> This can be a tricky exercise, because you also have to account for other factors that may have changed at the same time that the subsidies were changed.

Now that you have been introduced to the methodology of model building, we are ready to return to our main task—seeing how the pieces of a market economy fit together.

## THE CIRCULAR FLOW MODEL

It is useful to think of the economy as consisting of two sectors: households and businesses. Households<sup>2</sup> own various productive resources—labour, capital, and land. Businesses use these resources as inputs to the production of goods and services. (Inputs are sometimes referred to as *factors*.) Households purchase goods and services from businesses. Where do households get the money to buy the goods and services? Households receive their incomes by supplying inputs to businesses. In effect, then, economic activity is circular. The money that households spend on goods and services comes back around to them in the form of income from the sales of inputs.

This concept is summarized in the **circular flow model** in Figure 1.2. The model consists of two circles. The inner circle shows physical flows—flows of goods and services, and of inputs. The outer circle shows monetary flows—expenditures that households make for goods and services, and that businesses make for inputs. Note that the physical and monetary flows go in opposite directions. When households supply their labour to businesses, this represents a flow of labour to the business sector, but a flow of wage income to the household sector. Similarly, when businesses supply goods and services to households, this represents a flow of physical goods from businesses to households, but a flow of expenditures from households to businesses.

The circular flow model indicates that markets somehow regulate the flows between the two sectors. Households and businesses “meet” in the goods market; the outcome determines what goods are produced. They “meet” again in the factor market; the

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<sup>2</sup> For convenience, we use the terms *household* and *individual* interchangeably, implicitly assuming that a household consisting of more than one person can be treated as a single decision-making unit.

outcome determines how things are produced (that is, what inputs are used). In addition, the factor market determines how much income households get for supplying their inputs; hence, it also determines who gets the goods and services that are produced. Thus, the circular flow model shows how a market economy answers the three fundamental questions posed by the existence of scarcity.

## **Figure 1.2**

### **The Circular Flow Model**

The circular-flow-of-income model illustrates that economic activity is circular. The inner circle shows the flows of physical goods and services and of inputs through the system. Firms supply goods and services that are demanded by households; households supply inputs that are demanded by businesses. The outer circle shows the flows of money. Households spend money on goods and services that flow to businesses as revenues; these revenues flow to households as payments for supplying their inputs.

Does the circular flow model summarize everything that goes on in a market economy?

The answer is certainly not, for at least three reasons:

- 1.** The model amalgamates all firms into a single sector. Hence, it ignores transactions that take place among firms—dairy farms sell cream to ice cream manufacturers, aluminium manufacturers sell aluminium to bicycle producers, and so on.
- 2.** The model assumes that all production takes place within businesses. In fact, important forms of production occur within households. For example, households produce “cleaning services,” using as inputs their own labour and capital in the form of machines such as vacuum cleaners.
- 3.** Perhaps most significantly, the circular flow model presented here ignores one of the most important forces in the economy—the government. Even in market-oriented

economies, the government plays an enormous role. In Denmark, the ratio of tax revenues to total output is 49 percent; in Belgium the figure is 47 percent; in the United Kingdom, 36 percent; in Sweden, 51% (European Commission, 2004) and in the United States it is 30 percent. Indeed, a sophisticated market system could not even exist without government. Why? Fundamentally, market transactions are trades—you give a person something you own (perhaps your labour) in return for something the other party owns. Such a system cannot function unless some agency is empowered to define and defend individuals' property rights. Otherwise, after the other person agreed to trade something to you, he could just steal it back. Thus, government provision of “law and order” is a necessary condition for the emergence of a market system.

We have shown that the circular flow model omits important aspects of reality. Does this mean that it is a bad model? Our earlier remarks suggest that if the model sheds light on the phenomenon in which we are interested, then there is no problem if it abstracts from other issues. In this sense, the circular flow model is successful. It is a simplification of the real world, but it is a useful one because it illuminates the relationships in which we are interested.

The circular flow model is this book's organizing device. From Chapter 2 up to and including Chapter 6 we deal with the household sector. We examine how households make their decisions both as demanders of goods and services, and as suppliers of inputs to firms. Chapters 7, 8, 9 and 10 look at businesses, both in their roles as suppliers of goods and services, and demanders of inputs. From Chapter 11 up to and including Chapter 17 we then look at markets, the institutions that mediate between households and firms. We study different types of markets, see how they operate, and evaluate the outcomes they produce.

## **THE SUPPLY AND DEMAND MODEL**

Our discussion of the circular flow model did not say much about how the activities of the household and business sectors are co-ordinated. Given that people make their decisions about what to buy and what to sell in isolation, what prevents business firms from producing purple scarves when households would rather have red shirts? What guarantees that the number of computer programmers employed by businesses will equal the number of people who want to be in that occupation? As our previous discussion of centrally planned economies indicated, *we cannot take it for granted that economic activity will end up being properly co-ordinated.*

In a market system, co-ordination is accomplished in a decentralized fashion by prices. How does this happen? Let us return to the commodity discussed at the beginning of this chapter—bread. Suppose that the current price of bread is €1.25 per loaf. Suppose further that at this price, bakers are producing more bread than households want to consume. In a market system, the bakers become aware of the fact that they are producing too much bread because it piles up on their shelves. In effect, there is a bread glut. As a consequence, the price of bread falls, perhaps to €1.10 per loaf. This price decrease has two effects. First, because it has become cheaper, households are willing to purchase more bread than before. Second, with a lower price, bakers are not willing to produce as much bread as they did before. Both effects tend to reduce the magnitude of the “glut.” Eventually, the price falls enough so that the number of loaves that people are willing to buy equals the number of loaves that firms are willing to produce. The price of bread has co-ordinated the activities of producers and consumers.

More generally, if “too much” of a commodity is being produced in a market system, its price falls; if “too little” is being produced, its price increases. The price remains stable only when a balance has been achieved between what producers are willing to produce and what consumers are willing to consume.

This model of how prices guide the behaviour of both producers and consumers is called the *supply and demand model*. Let us examine this model more carefully, using graphical techniques. We look first at the demand side of the market, next at supply, and then put them together.

## **Demand**

What factors influence households' decisions to consume a certain good? Continuing with the specific case of bread, our model-building methodology suggests that we should assemble the shortest possible list of factors that might affect the amount of bread that people want to consume during a given period of time.

**Price** We expect that as the price goes up, the quantity demanded goes down. As bread becomes more expensive, households turn to other goods, perhaps buying more croissants or brioches instead. The notion that price and quantity demanded normally are inversely related is called the *Law of Demand*.

**Income** Changes in income modify people's consumption opportunities. It is hard to say in advance, however, what effect such changes have upon consumption of a given good. One possibility is that as incomes go up, people use some of their additional income to purchase more bread. On the other hand, as incomes increase, people may consume less bread, perhaps spending their money on cake instead. If an increase in income increases demand (other things being the same), the good is called a *normal good*. If an increase in income decreases demand (other things being the same) the good is called an *inferior good*.

**Prices of Related Goods** Suppose the price of croissants goes up. If people can substitute bread for croissants, this increase in the price of croissants increases the amount of bread people wish to consume. Now suppose the price of butter goes up. If



people tend to consume bread and butter together, this tends to decrease the amount of bread consumed. Goods like bread and croissants are called *substitutes*; goods like bread and butter are called *complements*.

**Tastes** The extent to which people “like” a good also affects the amount they demand. Presumably, less bread is demanded by people concerned with weight problems than by those who are slim.

We have just completed a verbal model that suggests that a wide variety of things can affect demand. For purposes of constructing a graphical version of the model, it is useful to focus on the relationship between the quantity of a commodity demanded and its price. Suppose that we hold constant income, the prices of related goods, and tastes. We can imagine varying the price of bread and seeing how the quantity demanded changes under the assumption that the other relevant variables stay at their fixed values. A **demand schedule** (or **demand curve**) is the relation between the market price of a good and the quantity demanded of that good during a given time period, other things being the same. (Economists often use the Latin **ceteris paribus** for “other things being the same.”) In particular applications, one must always specify just what period of time is being considered, because generally different quantities of a commodity are demanded over a day, a month, a year, and so on.

A hypothetical demand schedule for bread is represented graphically by curve *D* in Figure 1.3. The horizontal axis measures the number of loaves of bread, and the price per loaf is measured on the vertical axis. Thus, for example, if the price is €1.30 per loaf, households are willing to consume 2 million loaves; when the price is only €0.80, they are willing to consume 5 million loaves. The downward slope of the demand schedule reflects the reasonable assumption that when the price goes up, the quantity demanded goes down, and vice versa.

### Figure 1.3

#### A Demand Curve

Schedule *D* shows the quantity of bread that people are willing to buy at each price, other things being the same. It is called the *demand curve* for bread.

### Figure 1.4

#### Shifting a Demand Curve

When the price of croissants increases, there will be a tendency to purchase more bread. This is reflected in an outward shift of the demand curve for bread.

As stressed above, the demand curve is drawn on the assumption that all other variables that might affect quantity demanded do not change. What happens if one of them does? Suppose, for example, that the price of croissants increases and, as a consequence, people want to buy more bread. In Figure 1.4, schedule *D* from Figure 1.3 (before the increase) is reproduced. Because of the increase in the price of croissants, at each price of bread people are willing to purchase more bread than they did previously. In effect, an increase in the price of croissants shifts each point on *D* to the right. The collection of new points is *D'*. Because *D'* shows how much people are willing to consume at each price, *ceteris paribus*, it is by definition the new demand curve.

More generally, a change in any variable that influences the demand for a good—except its own price—*shifts* the demand curve. A change in a good's own price, however, induces a *movement along* the demand curve, causing a change in quantity demanded. Economists have developed some terminology to help clarify this distinction. A *change in demand* refers to a shift of the entire demand schedule, as in Figure 1.4. A *change in quantity demanded* refers to a movement along a given demand curve, as occurs in Figure 1.3 when the price of bread increases from €0.80 to €1.30.

**Supply** Now let us consider the business part of the circular flow. What factors determine the quantity of a commodity that firms supply to the market during a given time period?

**Price** Typically, it is reasonable to assume that the higher the price per loaf of bread, the greater the quantity that firms are willing to supply. Higher prices make it profitable for firms to produce more output.

**Price of Inputs** Bread producers have to use inputs to produce bread—labour, flour, mixing bowls, and so on. If their input costs go up, the amount of bread that they can profitably supply at any given price goes down.

**Conditions of Production** The most important factor here is the state of technology. If there is a technological improvement in bread production, the supply increases.

As with the demand curve, it is useful to focus attention on the relationship between the quantity of a commodity supplied and the price, holding the other variables at fixed levels. The **supply schedule** is the relation between the market price and the amount of a good that producers are willing to supply during a given period of time, *ceteris paribus*.

A supply schedule for bread is depicted as *S* in Figure 1.5. Its upward slope reflects the assumption that the higher the price, the greater the quantity supplied, *ceteris paribus*.

When any variable that influences supply (other than the commodity's own price) changes, the supply schedule shifts. Suppose, for example, that the price of flour increases. This increase reduces the amount of bread that firms are willing to supply at any given price. The supply curve therefore shifts to the left. As depicted in Figure 1.6, the new supply curve is *S'*. In contrast, a change in the commodity's price induces a movement *along* the supply curve. Analogous to the terminology we introduced for

demand curves, a *change in supply* refers to a shift of the entire supply curve, and a *change in quantity supplied* refers to a movement along a given supply curve.

## Equilibrium

The demand and supply curves provide answers to a set of hypothetical questions: *If* the price of bread were €2 per loaf, how much would households be willing to purchase? *If* the price were €1.75 per loaf, how much would firms be willing to supply? Neither schedule by itself tells us the actual price and quantity. But taken together, the schedules do determine price and quantity.

In Figure 1.7 we superimpose demand schedule *D* from Figure 1.3 on supply schedule *S* from Figure 1.5. We want to find the price and output at which there is an **equilibrium**—a situation that will continue to persist because no one has any incentive to change his or her behaviour. Suppose the price is €1.30 per loaf. At this price, businesses are willing to supply 8 million loaves, but consumers are willing to purchase only 2 million. A price of €1.30 cannot be maintained, because firms want to supply more bread than consumers are willing to purchase. This excess supply tends to push the price down, as suggested by the arrows.

### Figure 1.5

#### A Supply Curve

Schedule *S* is the supply curve of bread. It shows the quantity that producers are willing to sell at each price.

### Figure 1.6

#### Shifting a Supply Curve

When the price of flour, an input to the production of bread, increases, producers are willing to sell less at any given price. As a consequence, the supply curve shifts inward, from  $S$  to  $S'$ .

Will a price of €0.80 per loaf successfully co-ordinate buyers and sellers? At this price, the quantity of bread demanded, 5 million loaves, exceeds the quantity supplied, 3 million. At a price of 80 cents, then, there isn't enough bread to go around. Because there is excess demand for bread, we expect the price to rise.

Similar reasoning suggests that any price at which the quantity supplied and quantity demanded are unequal cannot be an equilibrium. In Figure 1.7, quantity demanded equals quantity supplied at a price of €0.90. The associated output level is 4 million loaves. Unless something else in the system changes, this price and output combination will continue year after year. It is an equilibrium. Thus, Figure 1.7 demonstrates how price co-ordinates the activities of producers and households.

Suppose now that something else does change. For example, suppose that the price of flour increases. In Figure 1.8,  $D$  and  $S$  are reproduced from Figure 1.7, and the original equilibrium price and output are illustrated. Now, as a consequence of the increase in flour prices, the supply curve shifts to the left, say to  $S'$ . Given the new supply curve, €0.90 is no longer the equilibrium price. Rather, equilibrium is found at the intersection of  $D$  and  $S'$ , where the price is €1.10 and output 3 million loaves. Note that, as one might expect, the increase in flour prices leads to a higher price and smaller output. More generally, our model predicts that a change in any variable that affects supply or demand creates a new equilibrium combination of price and quantity. (PC 1.3)

(Include 'Progress Check 1.3' about here)

## Figure 1.7

## Price Determination by Supply and Demand

At any price above 90 cents, firms want to produce more than consumers are willing to purchase, so the price falls. At any price below 90 cents, consumers want to purchase more than firms are willing to produce, so the price increases. An equilibrium is obtained at a price of 90 cents, where quantity demanded equals quantity supplied.

### Figure 1.8

#### Effect of a Supply Shift on Price and Quantity

When flour becomes more expensive, the supply curve shifts to  $S'$ , and 90 cents is no longer the equilibrium price. The new equilibrium price is €1.10, where the new quantities demanded and supplied are equal.

## Supply and Demand for Inputs

So far we have been examining how supply and demand regulate the top part of the circular flow—the flow of goods from firms to households. The supply and demand model applies just as well to the bottom part, which focuses on the flow of inputs from households to firms. The main difference is that now the households are suppliers of inputs, and firms are demanders.

In Figure 1.9, for example, we measure the number of bakers on the horizontal axis. The price of bakers—their wage rate in euros per hour—is on the vertical. The supply curve of bakers,  $S$ , is drawn upward sloping, based on the assumption that as the rewards to being a baker increase, more people enter that profession, *ceteris paribus*. The demand for bakers,  $D$ , is drawn downward sloping, reflecting the assumption that as bakers become more expensive, firms hire fewer bakers, perhaps substituting machines for them. Using exactly the same sort of arguments as above, our model predicts that 6,200 people

choose to be bakers, and each makes a wage of €11.50 per hour. In this way, the wage rate co-ordinates economic activity in the labour market.

## **The Roles of Prices**

Our simple supply and demand model illustrates nicely several related roles that prices serve in a market economy:

### **Figure 1.9**

#### **Supply and Demand for an Input**

The supply and demand model also applies to productive inputs such as labour. The wage rate for bakers and the number of bakers are determined by the intersection of the demand and supply curves for bakers.

1. *Prices convey information.* Households do not have to know how bread is produced, and firms do not have to know why households use bread. Prices are signals that contain all the information needed to ensure consistency in the decisions of households and firms. For example, if flour becomes more expensive, no central directive is needed to ensure that people consume less bread. Rather, as illustrated in Figure 1.8, the price rises, which signals that bread is more costly and provides incentives for households to reduce their consumption. By signalling what is relatively scarce and what is relatively abundant, prices can efficiently channel production and consumption.

2. *Prices ration scarce resources.* If bread were free, a huge quantity of it would be demanded. Because the resources used to produce bread are scarce, the actual amount of bread has to be rationed among its potential users. Not everyone can have all the bread that they could possibly want. The bread must be rationed somehow; the price system accomplishes this in the following simple way: Everyone who is willing to pay the equilibrium price gets the good, and everyone who is not, does not. In this connection, it is

informative to ponder this headline from 1990: “Soviet Legislators Back Market Economy, but Balk at Bread Price Increase” (Keller 1990, A18). One can sympathize with the reluctance to raise bread prices, which had stayed constant for 30 years. Nevertheless, saying that you want to have markets without allowing prices to ration commodities is like saying you want to have a bath without using any water. Both belie a fundamental misunderstanding of how the process works.

3. *Prices determine incomes.* As noted above, a society somehow has to decide who gets what is produced. In a market system, your money income depends on the prices of the inputs that you supply to the market. As illustrated in Figure 1.9, this is determined both by the supplies and demands of the various inputs.

### **Is This All There Is to It?**

Now that you’ve seen how a supply and demand model deals with the problems associated with scarcity, you might be wondering if there is anything left to do. The answer is “quite a bit,” for several reasons.

First, we haven’t said much about where the supply and demand curves come from. We know that the demand for goods and the supply of inputs are the outcomes of household decision making, but how do households make their choices? Similarly, how do firms make their input and output decisions? What determines the shapes of demand and supply curves? Do demand curves *have* to slope down, and supply curves up?

Second, like *any* model, supply and demand does not explain every aspect of the real world. We have to spell out precisely the conditions under which supply and demand are likely to operate as in Figures 1.7 and 1.9. Equally important, for situations in which markets are not well characterized by supply and demand, we must formulate alternative models of resource allocation.

So, you’re off to a good start, but there is a lot more to do!



## CHAPTER SUMMARY

Scarcity is part of the basic human condition. Scarcity forces societies to decide what will be produced, how it will be produced, and who gets the output. Economics studies how people and societies deal with the problem of scarcity. The focus of microeconomics is on how individual households and firms make their decisions, and how these decisions get translated into social outcomes.

- Every society has to decide what is to be produced, how to produce it, and who gets the output.
- Because of the complexity of the real world, when economists want to understand some phenomenon, they construct a model—a description of reality that abstracts from all the details of reality.
- Models are used for positive analysis, that is, to make statements relating to cause and effect. They also deal with normative issues—issues that concern value judgements.
- The circular flow model shows how the business and household sectors are linked. Households supply inputs to firms; firms supply commodities to households.
- In a market economy, prices for inputs and commodities co-ordinate the activities of firms and households. Also, prices ration scarce resources and determine incomes.
- An important model of price determination is supply and demand. The demand curve shows how the quantity demanded varies with price, *ceteris paribus*. The supply curve shows how the quantity supplied varies with price, *ceteris paribus*. The intersection of the two curves determines the market price and the quantity exchanged.

## DISCUSSION QUESTIONS

1.1 Evaluate each of the following statements:

- a. A society can always produce more automobiles if it chooses to do so. Hence, there can never be any real scarcity of automobiles.
- b. Governments have the power to raise all the money they want by taxation. Hence, scarcity is not a problem for governments.
- c. Citizens of Sweden are lucky because they have free health care, while citizens of the United States have to pay for it.

**1.2** What is the opportunity cost of each of the following items?

- a. Enrolment in an economics course.
- b. Clean air.
- c. Queuing to get into a free concert.

**1.3** Suppose that the government introduced the following system of compulsory public service: Each university student would be required to withdraw from university for one year and participate in various projects such as forest reclamation. Participants would receive food and shelter, but no pay. How would you estimate the cost of this programme?

**1.4** After the fall of communism in East Germany, earnings opportunities for both men and women increased substantially. At the same time, the birth rate fell precipitously. When asked about her decision not to have a second child, a German woman named Karla Hofmann said, "A second child would mean we couldn't go on vacation" (Benjamin 1994, A1). Relate Hofmann's statement to the concept of opportunity cost. On the basis of Hofmann's statement, develop an equimarginal rule for the number of children to have.

**1.5** The Nobel prize winning economist Kenneth Arrow "graduated from City College in 1940. Employment opportunities for young graduates were rare at the time, so he

decided to pursue graduate work in statistics” (Tregarthen 1992, 82). Was Arrow’s behaviour consistent with the model of educational choice presented in Figure 1.1?

- 1.6** In preparation for the 2004 Olympic Games, the city of Athens, embarked upon a €6 billion programme of investment. Security was very important and workers in that sector secured a lucrative wage deal such that over a three year period leading up to the Games, their wages rose far more than in other sectors (EIRO, 2002). In addition, hotel workers pay per month rose from €490 to €677 in the month of the games (Carr, 2004). Use separate supply and demand model to represent the situation in each market.
- 1.7** In Europe, delays at airports are a common experience. Many observers attribute part of the problem to congestion on runways during peak hours. Explain how a market solution to this problem could be obtained.
- 1.8** An article about the market for marijuana made the following three observations: (a) In 1991, the price was \$80 an ounce; several years earlier the price was \$30 an ounce. (b) By 1991, marijuana smoking was no longer in vogue—“the great marijuana cloud has grown wispy ... as health concerns ... have risen above the desire to get giddy.” (c) “Relentless police pressure” had turned marijuana into a “scarce commodity” (Treaster 1991, A.1). Draw a set of supply and demand curves that are capable of reconciling these observations.
- 1.9** European law prohibits the buying and selling of body parts. In Western Europe there are approximately 40,000 patients waiting for kidney transplants. Approximately 5,000 kidneys are harvested from donors who die in a manner that makes their organs suitable for transplant. This donation rate only represents between a quarter and one third of all possible donations from similar types of death. (Council of Europe, 1999) How are body parts rationed under the status quo? How

would a market ration body parts? Do you think that it would be desirable to allow individuals to sell their internal organs?

**1.10** Suppose that the market demand curve for haircuts in some town is

$$D = 80 - 2P + 5I,$$

where  $D$  is quantity demanded per month,  $P$  is price per haircut, and  $I$  is consumer income (in tens of thousands of euros). The supply curve is

$$S = 4P,$$

where  $S$  is the quantity supplied per month.

- a. According to this model, are haircuts a normal or inferior good?
- b. Suppose  $I = 3$ . Find the equilibrium price and quantity of haircuts.
- c. Because of a recession,  $I$  falls to 2. What happens in the haircut market?

## Key Terms

### economics

The study of how people and societies deal with scarcity.

### microeconomics

The branch of economics focusing on the economic behaviour of individual decision-making units, such as households and firms, and how these individual decisions fit together.

### macroeconomics

The branch of economics focusing on the behaviour of the economy as a whole, especially inflation, unemployment, and business cycles.

### opportunity cost

The value of the most highly valued foregone alternative.

**allocation of resources**

How society's resources are divided among the various outputs, among the different organizations that produce these outputs, and among the members of society.

**market system**

A mode of organization in which resource allocation is determined by the independent decisions and actions of individual consumers and producers.

**model**

A simplified description of some aspect of the economy, often containing equations and graphs.

**positive analysis**

Descriptive statements of cause and effect.

**normative analysis**

Statements that embody value judgements.

**circular flow model**

A representation of how the business and household sectors are linked: the physical flows of commodities and inputs between businesses and households, and the expenditures for commodities and inputs going in the opposite direction.

**demand schedule**

The relation between the market price of a good and the quantity demanded of that good during a given time period, other things (such as income, tastes, and other prices) being the same.

**ceteris paribus**

Latin for “other things being the same”; an economic assumption holding all other variables constant in order to focus on the specified ones.

### **supply schedule**

The relation between the market price and the amount of a good that producers are willing to supply during a given period of time, *ceteris paribus*.

### **equilibrium**

A state of affairs that will persist because no one has any incentive to change his or her behaviour. In the supply and demand model, equilibrium is characterized by the equality of quantity supplied and quantity demanded at a particular price.

#### **1.1 PROGRESS CHECK**

Evaluate this statement: “Saudi Arabia can pump all the oil that it needs. Therefore, consumption of oil is free in Saudi Arabia.”

#### **1.2 PROGRESS CHECK**

Suppose that there is a reduction in the marginal monetary benefits to attending school. Use Panel A of Figure 1.1 to predict how this would affect educational decisions.

#### **1.3 PROGRESS CHECK**

Suppose the market for bread at a given time is correctly depicted by Figure 1.7. Suddenly, the price of butter increases substantially. Use the supply and demand model to predict what happens to the price of bread, and the number of loaves consumed.