## After studying this chapter, you will be able to:

- Describe the alternative methods of allocating scarce resources
- Explain the connection between demand and marginal benefit and define consumer surplus; and explain the connection between supply and marginal cost and define producer surplus
- Explain the conditions under which markets are efficient and inefficient
- Explain the main ideas about fairness and evaluate claims that markets result in unfair outcomes

# 5 EFFICIENCY AND EQUITY

**Every time you decide to buy something, whether it's an everyday pizza or a** Valentine's Day rose, you express your view about how scarce resources should be used and you make choices in your *self-interest*. A pizza cook one block away and a Columbian rose grower 2,500 miles away make *their* self-interested choices about what to produce. Markets coordinate these self-interested choices. But do markets do a good job? Do they allocate resources between pizza and roses, and everything else, efficiently?

The market economy generates huge income inequality: *You* can afford to buy a pizza or give a rose, but they might be unaffordable luxuries for a pizza cook and a Columbian rose grower who supply them. Is this situation fair?

Efficiency and fairness (or equity) are the two dimensions of the *social interest*. So our central question in this chapter is: Do markets operate in the social interest?

You will learn how economists approach and answer this question by studying a model market for pizza. At the end of the chapter, in *Reading Between the Lines*, we return to the global market in which roses are traded and see whether this market allocates resources efficiently.

## Resource Allocation Methods

The goal of this chapter is to evaluate the ability of markets to allocate resources efficiently and fairly. But to see whether the market does a good job, we must compare it with its alternatives. Resources are scarce, so they must be allocated somehow. Trading in markets is just one of several alternative methods.

Resources might be allocated by

- Market price
- Command
- Majority rule
- Contest
- First-come, first-served
- Lottery
- Personal characteristics
- Force

Let's briefly examine each method.

### Market Price

When a market price allocates a scarce resource, the people who are willing and able to pay that price get the resource. Two kinds of people decide not to pay the market price: those who can afford to pay but choose not to buy and those who are too poor and simply can't afford to buy.

For many goods and services, distinguishing between those who choose not to buy and those who can't afford to buy doesn't matter. But for a few items, it does matter. For example, poor people can't afford to pay school fees and doctors' fees. Because poor people can't afford items that most people consider to be essential, these items are usually allocated by one of the other methods.

### Command

A **command system** allocates resources by the order (command) of someone in authority. In the U.S. economy, the command system is used extensively inside firms and government departments. For example, if you have a job, most likely someone tells you what to do. Your labor is allocated to specific tasks by a command.

A command system works well in organizations in which the lines of authority and responsibility are clear and it is easy to monitor the activities being performed. But a command system works badly when the range of activities to be monitored is large and when it is easy for people to fool those in authority. North Korea uses a command system and it works so badly that it even fails to deliver an adequate supply of food.

### Majority Rule

Majority rule allocates resources in the way that a majority of voters choose. Societies use majority rule to elect representative governments that make some of the biggest decisions. For example, majority rule decides the tax rates that end up allocating scarce resources between private use and public use. And majority rule decides how tax dollars are allocated among competing uses such as education and health care.

Majority rule works well when the decisions being made affect large numbers of people and self-interest must be suppressed to use resources most effectively.

### Contest

A contest allocates resources to a winner (or a group of winners). Sporting events use this method. Andy Roddick competes with other tennis professionals, and the winner gets the biggest payoff. But contests are more general than those in a sports arena, though we don't normally call them contests. For example, Bill Gates won a contest to provide the world's personal computer operating system.

Contests do a good job when the efforts of the "players" are hard to monitor and reward directly. When a manager offers everyone in the company the opportunity to win a big prize, people are motivated to work hard and try to become the winner. Only a few people end up with a big prize, but many people work harder in the process of trying to win. The total output produced by the workers is much greater than it would be without the contest.

### First-Come, First-Served

A first-come, first-served method allocates resources to those who are first in line. Many casual restaurants won't accept reservations. They use first-come, first-served to allocate their scarce tables. Highway space is allocated in this way too: The first to arrive at the on-ramp gets the road space. If too many

vehicles enter the highway, the speed slows and people wait in line for some space to become available.

First-come, first-served works best when, as in the above examples, a scarce resource can serve just one user at a time in a sequence. By serving the user who arrives first, this method minimizes the time spent waiting for the resource to become free.

### Lottery

Lotteries allocate resources to those who pick the winning number, draw the lucky cards, or come up lucky on some other gaming system. State lotteries and casinos reallocate millions of dollars worth of goods and services every year.

But lotteries are more widespread than jackpots and roulette wheels in casinos. They are used to allocate landing slots to airlines at some airports, places in the New York and Boston marathons, and have been used to allocate fishing rights and the electromagnetic spectrum used by cell phones.

Lotteries work best when there is no effective way to distinguish among potential users of a scarce resource.

### Personal Characteristics

When resources are allocated on the basis of personal characteristics, people with the "right" characteristics get the resources. Some of the resources that matter most to you are allocated in this way. For example, you will choose a marriage partner on the basis of personal characteristics. But this method can also be used in unacceptable ways. Allocating the best jobs to white, Anglo-Saxon males and discriminating against visible minorities and women is an example.

### Force

Force plays a crucial role, for both good and ill, in allocating scarce resources. Let's start with the ill.

War, the use of military force by one nation against another, has played an enormous role historically in allocating resources. The economic supremacy of European settlers in the Americas and Australia owes much to the use of this method.

Theft, the taking of the property of others without their consent, also plays a large role. Both large-scale organized crime and small-scale petty crime collectively allocate billions of dollars worth of resources annually.

But force plays a crucial positive role in allocating resources. It provides the state with an effective method of transferring wealth from the rich to the poor, and it provides the legal framework in which voluntary exchange in markets takes place.

A legal system is the foundation on which our market economy functions. Without courts to enforce contracts, it would not be possible to do business. But the courts could not enforce contracts without the ability to apply force if necessary. The state provides the ultimate force that enables the courts to do their work.

More broadly, the force of the state is essential to uphold the principle of the rule of law. This principle is the bedrock of civilized economic (and social and political) life. With the rule of law upheld, people can go about their daily economic lives with the assurance that their property will be protected—that they can sue for violations against their property (and be sued if they violate the property of others).

Free from the burden of protecting their property and confident in the knowledge that those with whom they trade will honor their agreements, people can get on with focusing on the activity in which they have a comparative advantage and trading for mutual gain.

## REVIEW QUIZ

1. Why do we need methods of allocating scarce resources?
2. Describe the alternative methods of allocating scarce resources.
3. Provide an example of each allocation method that illustrates when it works well.
4. Provide an example of each allocation method that illustrates when it works badly.

You can work these questions in Study Plan 5.1 and get instant feedback. myeconlab

In the next sections, we're going to see how a market can achieve an efficient use of resources, examine the obstacles to efficiency, and see how sometimes an alternative method might improve on the market. After looking at efficiency, we'll turn our attention to the more difficult issue of fairness.

## Benefit, Cost, and Surplus

Resources are allocated efficiently and in the *social interest* when they are used in the ways that people value most highly. You saw in Chapter 2 that this outcome occurs when the quantities produced are at the point on the *PPF* at which marginal benefit equals marginal cost (see pp. 33–35). We're now going to see whether competitive markets produce the efficient quantities.

We begin on the demand side of a market.

### Demand, Willingness to Pay, and Value

In everyday life, we talk about "getting value for money." When we use this expression, we are distinguishing between *value* and *price*. Value is what we get, and price is what we pay.

The value of one more unit of a good or service is its marginal benefit. We measure marginal benefit by the maximum price that is willingly paid for another unit of the good or service. But willingness to pay determines demand. *A demand curve is a marginal benefit curve.*

In Fig. 5.1(a), Lisa is willing to pay $1 for the 30th slice of pizza and $1 is her marginal benefit from that slice. In Fig. 5.1(b), Nick is willing to pay $1 for the 10th slice of pizza and $1 is his marginal benefit from that slice. But at what quantity is the market willing to pay $1 for the marginal slice? The answer is provided by the *market demand curve.*

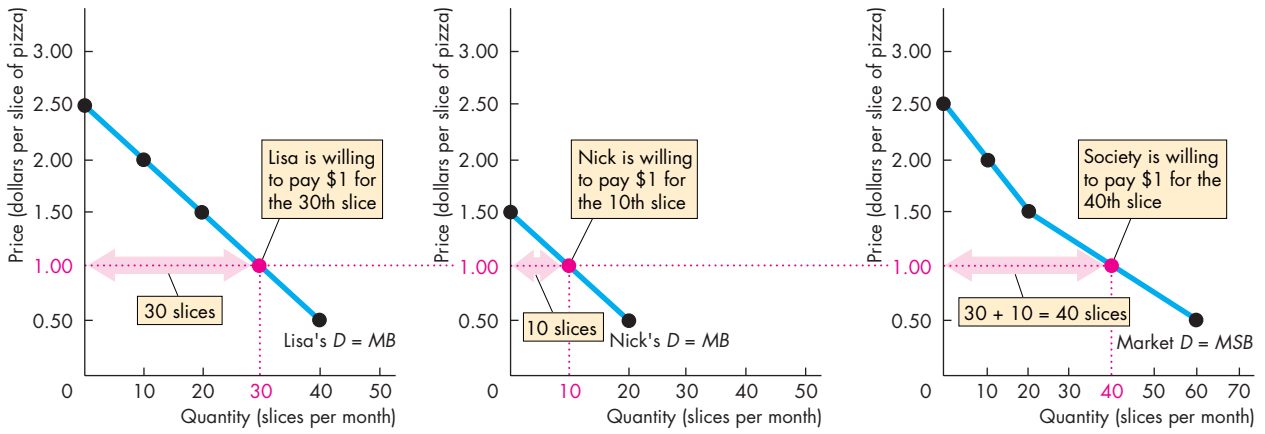
### Individual Demand and Market Demand

The relationship between the price of a good and the quantity demanded by one person is called *individual demand*. And the relationship between the price of a good and the quantity demanded by all buyers is called *market demand*.

**The market demand curve is the horizontal sum of the individual demand curves and is formed by adding the quantities demanded by all the individuals at each price.**

Figure 5.1(c) illustrates the market demand for pizza if Lisa and Nick are the only people in the market. Lisa's demand curve in part (a) and Nick's demand curve in part (b) sum horizontally to the market demand curve in part (c).

**FIGURE 5.1** Individual Demand, Market Demand, and Marginal Social Benefit




**(a) Lisa's demand** **(b) Nick's demand** **(c) Market demand**

At a price of $1 a slice, the quantity demanded by Lisa is 30 slices and the quantity demanded by Nick is 10 slices, so the quantity demanded by the market is 40 slices. Lisa's demand curve in part (a) and Nick's demand curve in part (b) sum horizontally to the market demand curve in part (c). The market demand curve is the marginal social benefit (*MSB*) curve.

myeconlab animation

At a price of $1 a slice, Lisa demands 30 slices and Nick demands 10 slices, so the market quantity demanded at $1 a slice is 40 slices.

For Lisa and Nick, their demand curves are their marginal benefit curves. For society, the market demand curve is the marginal benefit curve. We call the marginal benefit to the entire society *marginal social benefit*. So the market demand curve is also the *marginal social benefit* (*MSB*) *curve*.

## Consumer Surplus

We don't always have to pay as much as we are willing to pay. We get a bargain. When people buy something for less than it is worth to them, they receive a consumer surplus. **Consumer surplus** is the excess of the benefit received from a good over the amount paid for it. We can calculate consumer surplus as the marginal benefit (or value) of a good minus its price, summed over the quantity bought.

Figure 5.2(a) shows Lisa's consumer surplus from pizza when the price is $1 a slice. At this price, she buys 30 slices a month because the 30th slice is worth exactly $1 to her. But Lisa is willing to pay $2 for the 10th slice, so her marginal benefit from this slice is $1 more than she pays for it—she receives a surplus of $1 on the 10th slice.

Lisa's consumer surplus is the sum of the surpluses on *all of the slices she buys*. This sum is the area of the green triangle—the area below the demand curve and above the market price line. The area of this triangle is equal to its base (30 slices) multiplied by its height ($1.50) divided by 2, which is $22.50. The area of the blue rectangle in Fig. 5.2(a) shows what Lisa pays for 30 slices of pizza.

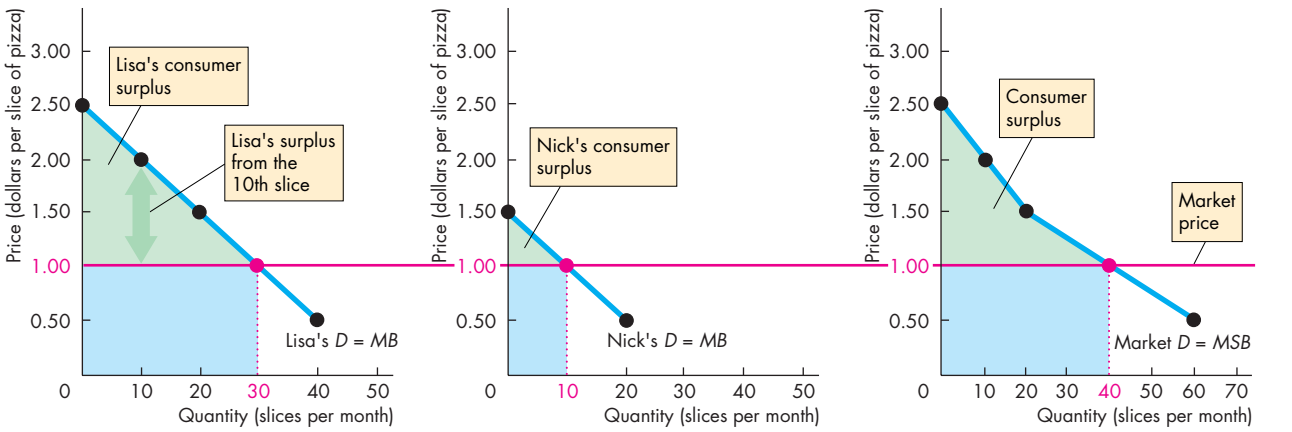
Figure 5.2(b) shows Nick's consumer surplus, and part (c) shows the consumer surplus for the market. The consumer surplus for the market is the sum of the consumer surpluses of Lisa and Nick.

All goods and services have decreasing marginal benefit, so people receive more benefit from their consumption than the amount they pay.

## Supply and Marginal Cost

Your next task is to see how market supply reflects marginal cost. The connection between supply and cost closely parallels the related ideas about demand and benefit that you've just studied. Firms are in business to make a profit. To do so, they must sell

**FIGURE 5.2** Demand and Consumer Surplus




**(a) Lisa's consumer surplus** **(b) Nick's consumer surplus** **(c) Market consumer surplus**

Lisa is willing to pay $2.00 for her 10th slice of pizza in part (a). At a market price of $1 a slice, Lisa receives a surplus of $1 on the 10th slice. The green triangle shows her consumer surplus on the 30 slices she buys at $1 a slice.

The green triangle in part (b) shows Nick's consumer surplus on the 10 slices that he buys at $1 a slice. The green area in part (c) shows the consumer surplus for the market. The blue rectangles show the amounts spent on pizza.

myeconlab animation

their output for a price that exceeds the cost of production. Let's investigate the relationship between cost and price.

## Supply, Cost, and Minimum Supply-Price

Firms make a profit when they receive more from the sale of a good or service than the cost of producing it. Just as consumers distinguish between value and price, so producers distinguish between *cost* and *price*. Cost is what a firm gives up when it produces a good or service and price is what a firm receives when it sells the good or service.

The cost of producing one more unit of a good or service is its marginal cost. Marginal cost is the minimum price that producers must receive to induce them to offer one more unit of a good or service for sale. But the minimum supply-price determines supply. *A supply curve is a marginal cost curve.*

In Fig. 5.3(a), Max is willing to produce the 100th pizza for $15, his marginal cost of that pizza. In Fig. 5.3(b), Mario is willing to produce the 50th pizza for $15, his marginal cost of that pizza.

What quantity is this market willing to produce for $15 a pizza? The answer is provided by the *market supply curve.*

## Individual Supply and Market Supply

The relationship between the price of a good and the quantity supplied by one producer is called *individual supply*. And the relationship between the price of a good and the quantity supplied by all producers is called *market supply*.

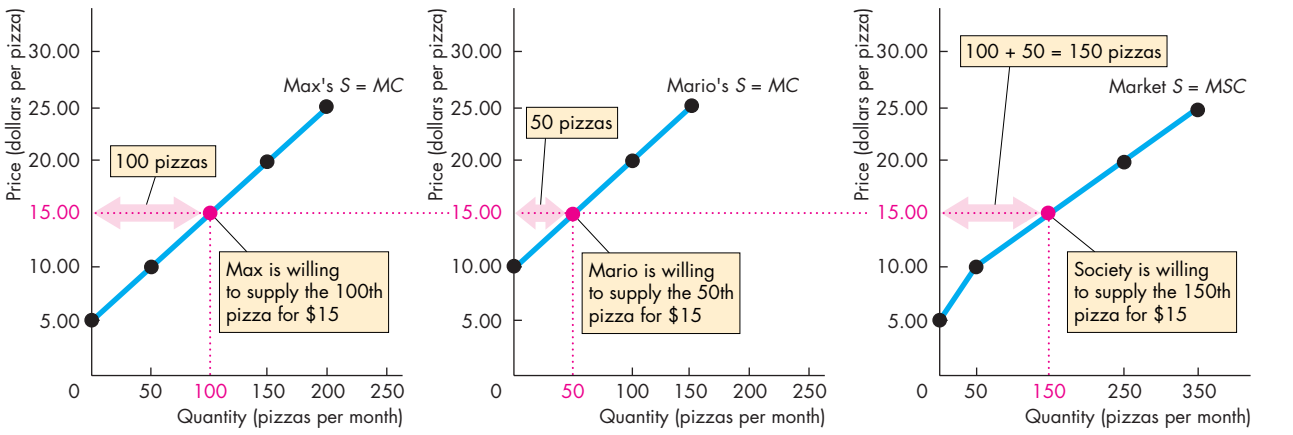
The market supply curve is the horizontal sum of the individual supply curves and is formed by adding the quantities supplied by all the producers at each price.

Figure 5.3(c) illustrates the market supply of pizzas if Max and Mario are the only producers. Max's supply curve in part (a) and Mario's supply curve in part (b) sum horizontally to the market supply curve in part (c).

At a price of $15 a pizza, Max supplies 100 pizzas and Mario supplies 50 pizzas, so the quantity supplied by the market at $15 a pizza is 150 pizzas.

For Max and Mario, their supply curves are their marginal cost curves. For society, the market supply curve is the marginal cost curve. We call the society's marginal cost *marginal social cost*. So the market supply curve is also the *marginal social cost (MSC) curve*.

**FIGURE 5.3** Individual Supply, Market Supply, and Marginal Social Cost




**(a) Max's supply** **(b) Mario's supply** **(c) Market supply**

At a price of $15 a pizza, the quantity supplied by Max is 100 pizzas and the quantity supplied by Mario is 50 pizzas, so the quantity supplied by the market is 150 pizzas. Max's supply curve in part (a) and Mario's supply curve in part (b) sum horizontally to the market supply curve in part (c). The market supply curve is the marginal social cost (*MSC*) curve.

myeconlab animation

## Producer Surplus

When price exceeds marginal cost, the firm receives a producer surplus. **Producer surplus** is the excess of the amount received from the sale of a good or service over the cost of producing it. It is calculated as the price received minus the marginal cost (or minimum supply-price), summed over the quantity sold.

Figure 5.4(a) shows Max's producer surplus from pizza when the price is $15 a pizza. At this price, he sells 100 pizzas a month because the 100th pizza costs him $15 to produce. But Max is willing to produce the 50th pizza for his marginal cost, which is $10, so he receives a surplus of $5 on this pizza.

Max's producer surplus is the sum of the surpluses on the pizzas he sells. This sum is the area of the blue triangle—the area below the market price and above the supply curve. The area of this triangle is equal to its base (100) multiplied by its height ($10) divided by 2, which is $500.

The red area below the supply curve in Fig. 5.4(a) shows what it costs Max to produce 100 pizzas.

The area of the blue triangle in Fig. 5.4(b) shows Mario's producer surplus and the blue area in Fig. 5.4(c) shows the producer surplus for the market.

The producer surplus for the market is the sum of the producer surpluses of Max and Mario.

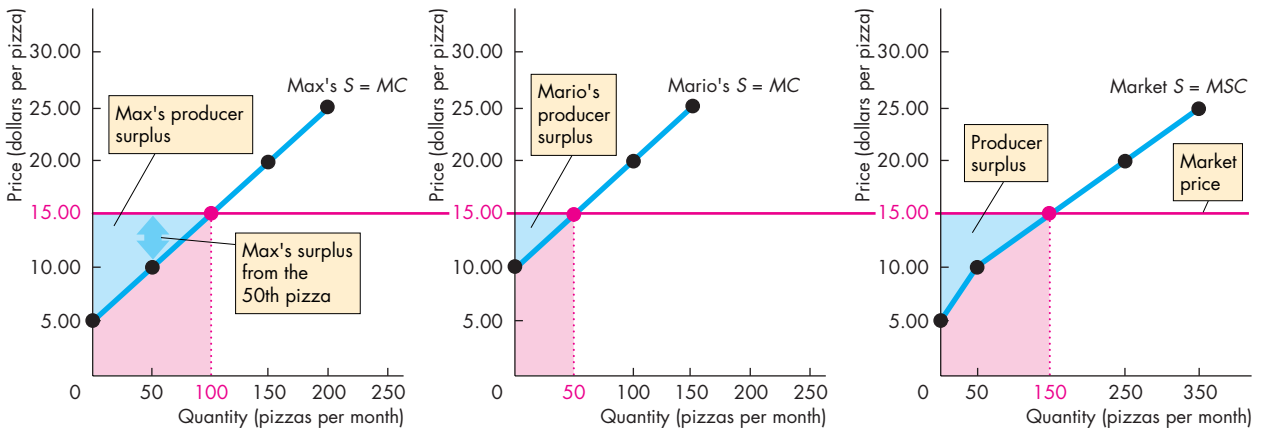
Consumer surplus and producer surplus can be used to measure the efficiency of a market. Let's see how we can use these concepts to study the efficiency of a competitive market.

## REVIEW QUIZ

1. What is the relationship between the marginal benefit, value, and demand?
2. What is the relationship between individual demand and market demand?
3. What is consumer surplus? How is it measured?
4. What is the relationship between the marginal cost, minimum supply-price, and supply?
5. What is the relationship between individual supply and market supply?
6. What is producer surplus? How is it measured?

You can work these questions in Study Plan 5.2 and get instant feedback. myeconlab

**FIGURE 5.4** Supply and Producer Surplus




**(a) Max's producer surplus** **(b) Mario's producer surplus** **(c) Market producer surplus**

Max is willing to produce the 50th pizza for $10 in part (a). At a market price of $15 a pizza, Max gets a surplus of $5 on the 50th pizza. The blue triangle shows his producer surplus on the 100 pizzas he sells at $15 each. The blue triangle in part (b) shows Mario's producer surplus on the 50 pizzas that he sells at $15 each. The blue area in part (c) shows producer surplus for the market. The red areas show the cost of producing the pizzas sold.

myeconlab animation

## Is the Competitive Market Efficient?

Figure 5.5(a) shows the market for pizza. The market forces that you studied in Chapter 3 (pp. 66–67) pull the pizza market to its equilibrium price of $15 a pizza and equilibrium quantity of 10,000 pizzas a day. Buyers enjoy a consumer surplus (green area) and sellers enjoy a producer surplus (blue area), but is this competitive equilibrium efficient?

### Efficiency of Competitive Equilibrium

You've seen that the market demand curve for a good or service tells us the marginal social benefit from it. You've also seen that the market supply curve of a good or service tells us the marginal social cost of producing it.

Equilibrium in a competitive market occurs when the quantity demanded equals the quantity supplied at the intersection of the demand curve and the supply curve. At this intersection point, marginal social benefit on the demand curve equals marginal social cost on the supply curve. This equality is the condition for allocative efficiency. So in equilibrium, a competitive market achieves allocative efficiency.

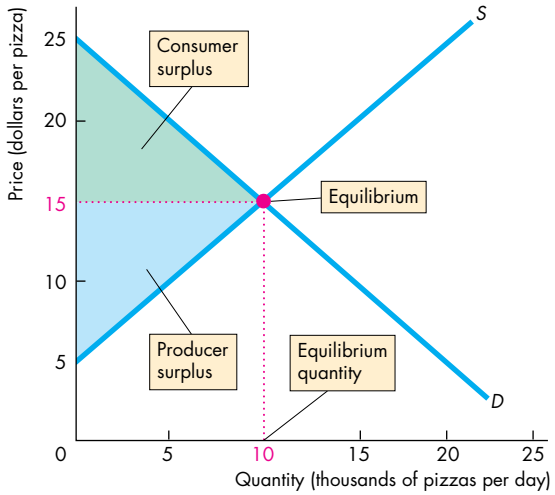
Figure 5.5 illustrates the efficiency of competitive equilibrium. The demand curve and the supply curve intersect in part (a) and marginal social benefit equals marginal social cost in part (b).

If production is less than 10,000 pizzas a day, the marginal pizza is valued more highly than it costs to produce. If production exceeds 10,000 pizzas a day, the marginal pizza costs more to produce than the value that consumers place on it. Only when 10,000 pizzas a day are produced is the marginal pizza worth exactly what it costs.

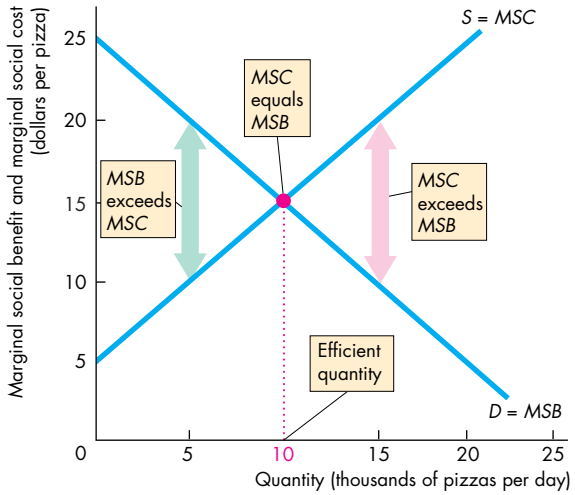
The competitive market pushes the quantity of pizzas produced to its efficient level of 10,000 a day. If production is less than 10,000 pizzas a day, a shortage raises the price, which increases production. If production exceeds 10,000 pizzas a day, a surplus of pizzas lowers the price, which decreases production. So a competitive pizza market is efficient.

Figure 5.5(a) also shows the consumer surplus and producer surplus. The sum of consumer surplus and producer surplus is called **total surplus**. When the efficient quantity is produced, total surplus is maximized. Buyers and sellers acting in their self-interest end up promoting the social interest.

**FIGURE 5.5** An Efficient Market for Pizza




**(a) Equilibrium and surpluses**




**(b) Efficiency**

Competitive equilibrium in part (a) occurs when the quantity demanded equals the quantity supplied. Resources are used efficiently in part (b) when marginal social benefit, *MSB*, equals marginal social cost, *MSC*. Total surplus, which is the sum of consumer surplus (the green triangle) and producer surplus (the blue triangle) is maximized.

The efficient quantity in part (b) is the same as the equilibrium quantity in part (a). The competitive pizza market produces the efficient quantity of pizzas.

myeconlab animation

## Economics in Action

### The Invisible Hand

Writing in his *Wealth of Nations* in 1776, Adam Smith was the first to suggest that competitive markets send resources to the uses in which they have the highest value (see p. 51). Smith believed that each participant in a competitive market is "led by an invisible hand to promote an end [the efficient use of resources] which was no part of his intention."

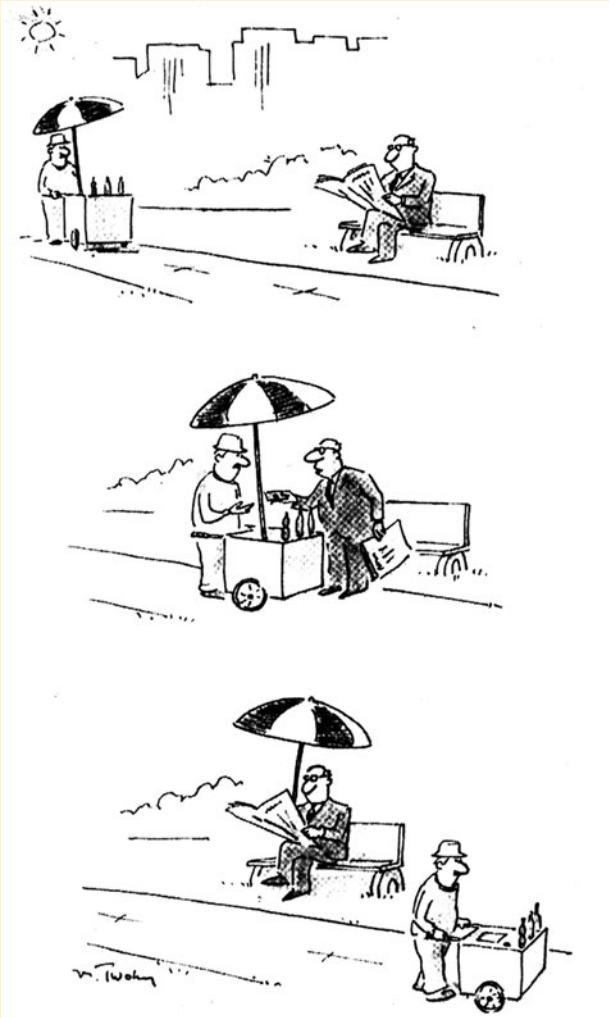
You can see the invisible hand at work in the cartoon and in the world today.

**Umbrella for Sale** The cold drinks vendor has cold drinks and shade and he has a marginal cost and a minimum supply-price of each. The reader on the park bench has a marginal benefit and willingness to pay for each. The reader's marginal benefit from shade exceeds the vendor's marginal cost; but the vendor's marginal cost of a cold drink exceeds the reader's marginal benefit. They trade the umbrella. The vendor gets a producer surplus from selling the shade for more than its marginal cost, and the reader gets a consumer surplus from buying the shade for less than its marginal benefit. Both are better off and the umbrella has moved to its highest-valued use.

**The Invisible Hand at Work Today** The market economy relentlessly performs the activity illustrated in the cartoon to achieve an efficient allocation of resources.

A Florida frost cuts the supply of tomatoes. With fewer tomatoes available, the marginal social benefit increases. A shortage of tomatoes raises their price, so the market allocates the smaller quantity available to the people who value them most highly.

A new technology cuts the cost of producing a smart phone. With a lower production cost, the supply of smart phones increases and the price of a smart phone falls. The lower price encourages an increase in the quantity demanded of this now less-costly tool. The marginal social benefit from a smart phone is brought to equality with its marginal social cost.



© The New Yorker Collection 1985 Mike Twohy from cartoonbank.com. All Rights Reserved.

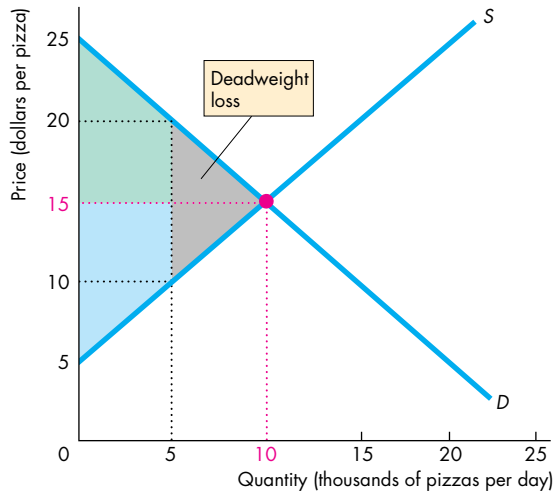
## Market Failure

Markets do not always achieve an efficient outcome. We call a situation in which a market delivers an inefficient outcome one of **market failure**. Market failure can occur because too little of an item is produced (underproduction) or too much is produced (overproduction). We'll describe these two market failure outcomes and then see why they arise.

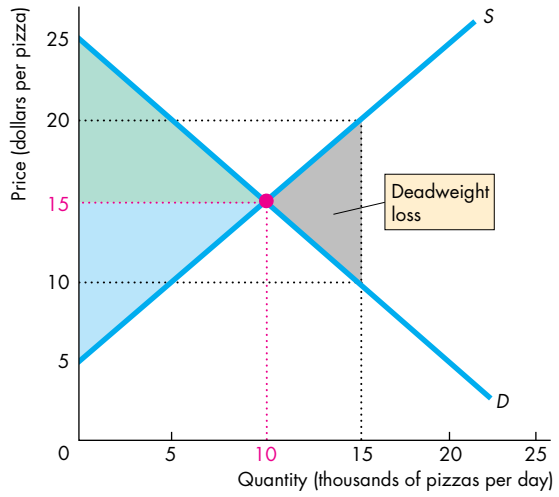
**Underproduction** In Fig. 5.6(a), the quantity of pizzas produced is 5,000 a day. At this quantity, consumers are willing to pay $20 for a pizza that costs only $10 to produce. By producing only 5,000 pizzas a day, total surplus is smaller than its maximum possible level. The quantity produced is inefficient—there is underproduction.

We measure the scale of inefficiency by **deadweight loss**, which is the decrease in total surplus that results

**FIGURE 5.6** Underproduction and Overproduction




**(a) Underproduction**




**(b) Overproduction**

If 5,000 pizzas a day are produced, in part (a), total surplus (the sum of the green and blue areas) is smaller than its maximum by the amount of the deadweight loss (the gray triangle). At all quantities below 10,000 pizzas a day, the benefit from one more pizza exceeds its cost.

If 15,000 pizzas a day are produced, in part (b), total surplus is also smaller than its maximum by the amount of the deadweight loss. At all quantities in excess of 10,000 pizzas a day, the cost of one more pizza exceeds its benefit.

myeconlab animation

from an inefficient level of production. The gray triangle in Fig. 5.6(a) shows the deadweight loss.

**Overproduction** In Fig. 5.6(b), the quantity of pizzas produced is 15,000 a day. At this quantity, consumers are willing to pay only $10 for a pizza that costs $20 to produce. By producing the 15,000th pizza, $10 of resources are wasted. Again, the gray triangle shows the deadweight loss, which reduces the total surplus to less than its maximum.

Inefficient production creates a deadweight loss that is borne by the entire society: It is a social loss.

## Sources of Market Failure

Obstacles to efficiency that bring market failure and create deadweight losses are

- Price and quantity regulations
- Taxes and subsidies
- Externalities
- Public goods and common resources
- Monopoly
- High transactions costs

**Price and Quantity Regulations** *Price regulations* that put a cap on the rent a landlord is permitted to charge and laws that require employers to pay a minimum wage sometimes block the price adjustments that balance the quantity demanded and the quantity supplied and lead to underproduction. *Quantity regulations* that limit the amount that a farm is permitted to produce also lead to underproduction.

**Taxes and Subsidies** *Taxes* increase the prices paid by buyers and lower the prices received by sellers. So taxes decrease the quantity produced and lead to underproduction. *Subsidies*, which are payments by the government to producers, decrease the prices paid by buyers and increase the prices received by sellers. So subsidies increase the quantity produced and lead to overproduction.

**Externalities** An *externality* is a cost or a benefit that affects someone other than the seller or the buyer. An *external cost* arises when an electric utility burns coal and emits carbon dioxide. The utility doesn't consider the cost of climate change when it decides how much power to produce. The result is overproduction. An *external benefit* arises when an apartment owner installs a smoke detector and decreases her neighbor's

fire risk. She doesn't consider the benefit to her neighbor when she decides how many detectors to install. The result is underproduction.

**Public Goods and Common Resources** A *public good* is a good or service that is consumed simultaneously by everyone even if they don't pay for it. National defense is an example. Competitive markets would underproduce national defense because it is in each person's interest to free ride on everyone else and avoid paying for her or his share of such a good.

A *common resource* is owned by no one but is available to be used by everyone. Atlantic salmon is an example. It is in everyone's self-interest to ignore the costs they impose on others when they decide how much of a common resource to use. The result is that the resource is overused.

**Monopoly** A *monopoly* is a firm that is the sole provider of a good or service. Local water supply and cable television are supplied by firms that are monopolies. The monopoly's self-interest is to maximize its profit. Because the monopoly has no competitors, it can set the price to achieve its self-interested goal. To achieve its goal, a monopoly produces too little and charges too high a price. It leads to underproduction.

**High Transactions Costs** When you go to Starbucks, you pay for more than the coffee. You pay your share of the cost of the barrista's time, the espresso maker, and the decor. When you buy your first apartment, you will pay for more than the apartment. You will buy the services of a realtor and a lawyer. Economists call the costs of the services that enable a market to bring buyers and sellers together **transactions costs**.

It is costly to operate *any* market so to use market price to allocate resources, it must be worth bearing the transactions costs. Some markets are too costly to operate. For example, it is too costly to operate a market in time slots on a local tennis court. Instead of a market, the court uses first-come, first-served: You hang around until the court becomes vacant and "pay" with your waiting time. When transactions costs are high, the market might underproduce.

You now know the conditions under which resource allocation is efficient. You've seen how a competitive market can be efficient, and you've seen some obstacles to efficiency. Can alternative allocation methods improve on the market?

## Alternatives to the Market

When a market is inefficient, can one of the alternative nonmarket methods that we described at the beginning of this chapter do a better job? Sometimes it can.

Often, majority rule might be used in an attempt to improve the allocation of resources. But majority rule has its own shortcomings. A group that pursues the self-interest of its members can become the majority. For example, a price or quantity regulation that creates inefficiency is almost always the result of a self-interested group becoming the majority and imposing costs on the minority. Also, with majority rule, votes must be translated into actions by bureaucrats who have their own agendas based on their self-interest.

Managers in firms issue commands and avoid the transactions costs that they would incur if they went to a market every time they needed a job done.

First-come, first-served works best in some situations. Think about the scene at a busy ATM. Instead of waiting in line people might trade places at a "market" price. But someone would need to ensure that trades were honored. At a busy ATM, first-come, first-served is the most efficient arrangement.

There is no one efficient mechanism that allocates all resources efficiently. But markets, when supplemented by other mechanisms such as majority rule, command systems, and first-come, first-served, do an amazingly good job.

## REVIEW QUIZ

1. Do competitive markets use resources efficiently? Explain why or why not.
2. What is deadweight loss and under what conditions does it occur?
3. What are the obstacles to achieving an efficient allocation of resources in the market economy?

You can work these questions in Study Plan 5.3 and get instant feedback. myeconlab

Is an efficient allocation of resources also a fair allocation? Does the competitive market provide people with fair incomes for their work? Do people always pay a fair price for the things they buy? Don't we need the government to step into some competitive markets to prevent the price from rising too high or falling too low? Let's now study these questions.

## Is the Competitive Market Fair?

When a natural disaster strikes, such as a severe winter storm or a hurricane, the prices of many essential items jump. The reason prices jump is that the demand and willingness to pay for these items has increased, but the supply has not changed. So the higher prices achieve an efficient allocation of scarce resources. News reports of these price hikes almost never talk about efficiency. Instead, they talk about equity or fairness. The claim that is often made is that it is unfair for profit-seeking dealers to cheat the victims of natural disaster.

Similarly, when low-skilled people work for a wage that is below what most would regard as a "living wage," the media and politicians talk of employers taking unfair advantage of their workers.

How do we decide whether something is fair or unfair? You know when you *think* something is unfair, but how do you *know?* What are the *principles* of fairness?

Philosophers have tried for centuries to answer this question. Economists have offered their answers too. But before we look at the proposed answers, you should know that there is no universally agreed upon answer.

Economists agree about efficiency. That is, they agree that it makes sense to make the economic pie as large as possible and to produce it at the lowest possible cost. But they do not agree about equity. That is, they do not agree about what are fair shares of the economic pie for all the people who make it. The reason is that ideas about fairness are not exclusively economic ideas. They touch on politics, ethics, and religion. Nevertheless, economists have thought about these issues and have a contribution to make. Let's examine the views of economists on this topic.

To think about fairness, think of economic life as a game—a serious game. All ideas about fairness can be divided into two broad groups. They are

- It's not fair if the *result* isn't fair.
- It's not fair if the *rules* aren't fair.

### It's Not Fair If the *Result* Isn't Fair

The earliest efforts to establish a principle of fairness were based on the view that the result is what matters. The general idea was that it is unfair if people's incomes are too unequal. For example, it is unfair that a bank president earns millions of dollars a year while a bank teller earns only thousands of dollars. It is unfair that a store owner makes a larger profit and her customers pay higher prices in the aftermath of a winter storm.

During the nineteenth century, economists thought they had made the incredible discovery: Efficiency requires equality of incomes. To make the economic pie as large as possible, it must be cut into equal pieces, one for each person. This idea turns out to be wrong. But there is a lesson in the reason that it is wrong, so this idea is worth a closer look.

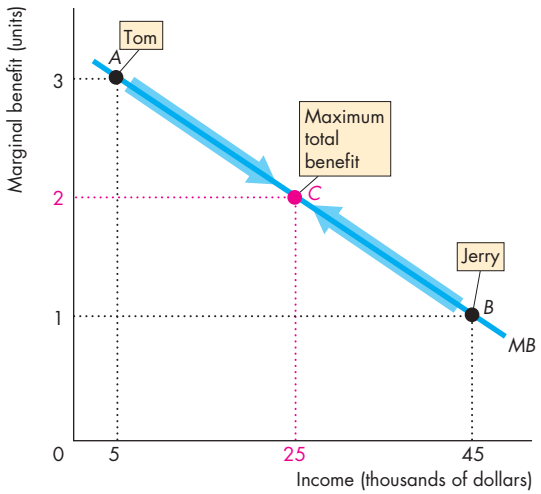
**Utilitarianism** The nineteenth-century idea that only equality brings efficiency is called *utilitarianism*. **Utilitarianism** is a principle that states that we should strive to achieve "the greatest happiness for the greatest number." The people who developed this idea were known as utilitarians. They included the most eminent thinkers, such as Jeremy Bentham and John Stuart Mill.

Utilitarians argued that to achieve "the greatest happiness for the greatest number," income must be transferred from the rich to the poor up to the point of complete equality—to the point at which there are no rich and no poor.

They reasoned in the following way: First, everyone has the same basic wants and a similar capacity to enjoy life. Second, the greater a person's income, the smaller is the marginal benefit of a dollar. The millionth dollar spent by a rich person brings a smaller marginal benefit to that person than the marginal benefit that the thousandth dollar spent brings to a poorer person. So by transferring a dollar from the millionaire to the poorer person, more is gained than is lost. The two people added together are better off.

Figure 5.7 illustrates this utilitarian idea. Tom and Jerry have the same marginal benefit curve, *MB*. (Marginal benefit is measured on the same scale of 1 to 3 for both Tom and Jerry.) Tom is at point *A*. He earns $5,000 a year, and his marginal benefit from a dollar is 3 units. Jerry is at point *B*. He earns $45,000 a year, and his marginal benefit from a dollar is 1 unit. If a dollar is transferred from Jerry to Tom, Jerry loses 1 unit of marginal benefit and Tom gains 3 units. So together, Tom and Jerry are better off—they are sharing the economic pie more efficiently. If a second dollar is transferred, the same thing happens: Tom gains more than Jerry loses. And the same is true for every dollar transferred until they both reach point *C*. At point *C*, Tom and Jerry have $25,000

**FIGURE 5.7** Utilitarian Fairness




Tom earns $5,000 and has 3 units of marginal benefit at point *A*. Jerry earns $45,000 and has 1 unit of marginal benefit at point *B*. If income is transferred from Jerry to Tom, Jerry's loss is less than Tom's gain. Only when each of them has $25,000 and 2 units of marginal benefit (at point *C*) can the sum of their total benefit increase no further.

myeconlab animation

each and a marginal benefit of 2 units. Now they are sharing the economic pie in the most efficient way. It brings the greatest happiness to Tom and Jerry.

**The Big Tradeoff** One big problem with the utilitarian ideal of complete equality is that it ignores the costs of making income transfers. Recognizing the costs of making income transfers leads to what is called the **big tradeoff**, which is a tradeoff between efficiency and fairness.

The big tradeoff is based on the following facts. Income can be transferred from people with high incomes to people with low incomes only by taxing the high incomes. Taxing people's income from employment makes them work less. It results in the quantity of labor being less than the efficient quantity. Taxing people's income from capital makes them save less. It results in the quantity of capital being less than the efficient quantity. With smaller quantities of both labor and capital, the quantity of goods and services produced is less than the efficient quantity. The economic pie shrinks.

The tradeoff is between the size of the economic pie and the degree of equality with which it is shared. The greater the amount of income redistribution through income taxes, the greater is the inefficiency—the smaller is the economic pie.

There is a second source of inefficiency. A dollar taken from a rich person does not end up as a dollar in the hands of a poorer person. Some of the dollar is spent on administration of the tax and transfer system. The cost of tax-collecting agencies, such as the Internal Revenue Service (IRS), and welfare-administering agencies, such as the Centers for Medicare and Medicaid, must be paid with some of the taxes collected. Also, taxpayers hire accountants, auditors, and lawyers to help them ensure that they pay the correct amount of taxes. These activities use skilled labor and capital resources that could otherwise be used to produce goods and services that people value.

When all these costs are taken into account, taking a dollar from a rich person does not give a dollar to a poor person. It is possible that with high taxes, people with low incomes might end up being worse off. Suppose, for example, that highly taxed entrepreneurs decide to work less hard and shut down some of their businesses. Low-income workers get fired and must seek other, perhaps even lower-paid, work.

Today, because of the big tradeoff, no one says that fairness requires equality of incomes.

**Make the Poorest as Well Off as Possible** A new solution to the big-tradeoff problem was proposed by philosopher John Rawls in a classic book entitled *A Theory of Justice*, published in 1971. Rawls says that, taking all the costs of income transfers into account, the fair distribution of the economic pie is the one that makes the poorest person as well off as possible. The incomes of rich people should be taxed, and after paying the costs of administering the tax and transfer system, what is left should be transferred to the poor. But the taxes must not be so high that they make the economic pie shrink to the point at which the poorest person ends up with a smaller piece. A bigger share of a smaller pie can be less than a smaller share of a bigger pie. The goal is to make the piece enjoyed by the poorest person as big as possible. Most likely, this piece will not be an equal share.

The "fair results" idea requires a change in the results after the game is over. Some economists say that these changes are themselves unfair and propose a different way of thinking about fairness.

## It's Not Fair If the *Rules* Aren't Fair

The idea that it's not fair if the rules aren't fair is based on a fundamental principle that seems to be hardwired into the human brain: the symmetry principle. The **symmetry principle** is the requirement that people in similar situations be treated similarly. It is the moral principle that lies at the center of all the big religions and that says, in some form or other, "Behave toward other people in the way you expect them to behave toward you."

In economic life, this principle translates into *equality of opportunity*. But equality of opportunity to do what? This question is answered by the philosopher Robert Nozick in a book entitled *Anarchy, State, and Utopia*, published in 1974.

Nozick argues that the idea of fairness as an outcome or result cannot work and that fairness must be based on the fairness of the rules. He suggests that fairness obeys two rules:

1. The state must enforce laws that establish and protect private property.
2. Private property may be transferred from one person to another only by voluntary exchange.

The first rule says that everything that is valuable must be owned by individuals and that the state must ensure that theft is prevented. The second rule says that the only legitimate way a person can acquire property is to buy it in exchange for something else that the person owns. If these rules, which are the only fair rules, are followed, then the result is fair. It doesn't matter how unequally the economic pie is shared, provided that the pie is made by people, each one of whom voluntarily provides services in exchange for the share of the pie offered in compensation.

These rules satisfy the symmetry principle. If these rules are not followed, the symmetry principle is broken. You can see these facts by imagining a world in which the laws are not followed.

First, suppose that some resources or goods are not owned. They are common property. Then everyone is free to participate in a grab to use them. The strongest will prevail. But when the strongest prevails, the strongest effectively *owns* the resources or goods in question and prevents others from enjoying them.

Second, suppose that we do not insist on voluntary exchange for transferring ownership of resources from one person to another. The alternative is *involuntary* transfer. In simple language, the alternative is theft.

Both of these situations violate the symmetry principle. Only the strong acquire what they want. The weak end up with only the resources and goods that the strong don't want.

In a majority-rule political system, the strong are those in the majority or those with enough resources to influence opinion and achieve a majority.

In contrast, if the two rules of fairness are followed, everyone, strong and weak, is treated in a similar way. All individuals are free to use their resources and human skills to create things that are valued by themselves and others and to exchange the fruits of their efforts with all others. This set of arrangements is the only one that obeys the symmetry principle.

**Fairness and Efficiency** If private property rights are enforced and if voluntary exchange takes place in a competitive market, resources will be allocated efficiently if there are no

1. Price and quantity regulations
2. Taxes and subsidies
3. Externalities
4. Public goods and common resources
5. Monopolies
6. High transactions costs

And according to the Nozick rules, the resulting distribution of income and wealth will be fair. Let's study an example to check the claim that if resources are allocated efficiently, they are also allocated fairly.

## Case Study: A Water Shortage in a Natural Disaster

An earthquake has broken the pipes that deliver drinking water to a city. Bottled water is available, but there is no tap water. What is the fair way to allocate the bottled water?

**Market Price** Suppose that if the water is allocated by market price, the price jumps to $8 a bottle—five times its normal price. At this price, the people who own water can make a large profit by selling it. People who are willing and able to pay $8 a bottle get the water. And because most people can't afford the $8 price, they end up either without water or consuming just a few drops a day.

You can see that the water is being used efficiently. There is a fixed amount available, some people are willing to pay $8 to get a bottle, and the water goes

to those people. The people who own and sell water receive a large producer surplus and total surplus is maximized.

In the rules view, the outcome is fair. No one is denied the water they are willing to pay for. In the results view, the outcome would most likely be regarded as unfair. The lucky owners of water make a killing, and the poorest end up the thirstiest.

**Nonmarket Methods** Suppose that by a majority vote, the citizens decide that the government will buy all the water, pay for it with a tax, and use one of the nonmarket methods to allocate the water to the citizens. The possibilities now are

***Command*** Someone decides who is the most deserving and needy. Perhaps everyone is given an equal share. Or perhaps government officials and their families end up with most of the water.

***Contest*** Bottles of water are prizes that go to those who are best at a particular contest.

***First-come, first-served*** Water goes to the first off the mark or to those who place the lowest value on their time and can afford to wait in line.

***Lottery*** Water goes to those in luck.

***Personal characteristics*** Water goes to those with the "right" characteristics. Perhaps the old, the young, or pregnant women get the water.

Except by chance, none of these methods delivers an allocation of water that is either fair or efficient. It is unfair in the rules view because the distribution involves involuntary transfers of resources among citizens. It is unfair in the results view because the poorest don't end up being made as well off as possible.

The allocation is inefficient for two reasons. First, resources have been used to operate the allocation scheme. Second, some people are willing to pay for more water than the quantity they have been allocated and others have been allocated more water than they are willing to pay for.

The second source of inefficiency can be overcome if, after the nonmarket allocation, people are permitted to trade water at its market price. Those who value the water they have at less than the market price sell, and people who are willing to pay the market price to obtain more water buy. Those who value the water most highly are the ones who consume it.

**Market Price with Taxes** Another approach is to allocate the scarce water using the market price but then to alter the redistribution of buying power by taxing the sellers and providing benefits to the poor.

Suppose water owners are taxed on each bottle sold and the revenue from these taxes is given to the poorest people. People are then free, starting from this new distribution of buying power, to trade water at the market price.

Because the owners of water are taxed on what they sell, they have a weaker incentive to offer water for sale and the supply decreases. The equilibrium price rises to more than $8 a bottle. There is now a deadweight loss in the market for water—similar to the loss that arises from underproduction on pp. 113–114. (We study the effects of a tax and show its inefficiency in Chapter 6 on pp. 133–138.)

So the tax is inefficient. In the rules view, the tax is also unfair because it forces the owners of water to make a transfer to others. In the results view, the outcome might be regarded as being fair.

This brief case study illustrates the complexity of ideas about fairness. Economists have a clear criterion of efficiency but no comparably clear criterion of fairness. Most economists regard Nozick as being too extreme and want a fair tax system, but there is no consensus about what a fair tax system looks like.

## REVIEW QUIZ

1. What are the two big approaches to thinking about fairness?
2. What is the utilitarian idea of fairness and what is wrong with it?
3. Explain the big tradeoff. What idea of fairness has been developed to deal with it?
4. What is the idea of fairness based on fair rules?

You can work these questions in Study Plan 5.4 and get instant feedback. myeconlab

You've now studied efficiency and equity (fairness), the two biggest issues that run through the whole of economics. *Reading Between the Lines* on pp. 120–121 looks at an example of an efficient market in our economy today. At many points throughout this book—and in your life—you will return to and use the ideas you've learned in this chapter. We start in the next chapter where we study some sources of *in*efficiency and *un*fairness.

# Is the Global Market for Roses Efficient?

## More Ash Fallout: 10 Million Roses Ruined

http://www.cbsnews.com
April 19, 2010

NAIROBI, Kenya—Daniel Oyier has been eating only once a day since an ash-belching volcano more than 5,000 miles away caused him to be laid off from his $4-a-day job packing red roses and white lilies for export to Paris and Amsterdam.

Some 5,000 day laborers in Kenya have been without work since the ash cloud from Iceland shut down air traffic across Europe, showing how one event can have drastic consequences in distant lands in today's global economy. …

Kenya has thrown away 10 million flowers—mostly roses—since the volcano eruption. …

The world's biggest flower auction in the Dutch town of Aalsmeer saw a drop of 15 percent in flowers sold on Monday as a result of flight disruptions from the volcanic ash cloud. …

Farmers have been forced to find alternative routes to get their products to market—even at a loss. They flew 1,000 metric tons of flowers to Spain on Monday, from where it would be transported by road to Paris and Amsterdam. …

Other flower-growing regions have seen sales fall because of the eruption. …

Willem Verhoogt [a South African exporter said his firm was] … supposed to export 11,000 pounds of fresh cut flowers mainly to Europe, and to the United States via flights through Europe.

"All together, it could be between 10 to 15 tons that won't go in the end," he said. "We've advised farmers not to pick flowers anymore."

Used with permission of The Associated Press. Copyright © 2010. All rights reserved. The Associated Press contributed to this report.

### ESSENCE OF THE STORY

- In April 2010, the global fresh flower market was disrupted by the ash cloud from an erupting volcano in Iceland that shut down Europe's air traffic.
- Many of the world's flowers are traded at auction in the Dutch town of Aalsmeer, which saw a drop of 15 percent in the quantity of flowers sold.
- 5,000 workers in Kenya who pick and pack flowers were without work.
- Kenya's flower growers threw away 10 million flowers—mostly roses.
- South African flower growers were prevented from shipping as much as 15 tons of fresh cut flowers to Europe and the United States.
- Some farmers found alternative but more costly routes to get their flowers to market.

# ECONOMIC ANALYSIS

- Roses are traded in a global market.
- Most of the roses sold in the United States come from Columbia and Ecuador, but the world's largest cut flower market is in Aalsmeer, Holland, where 75 percent of the world's flowers are traded every day.
- On a normal day, flowers arrive by air from Africa, Central and South America, the Middle East, and Asia and are traded at auction, and then delivered by air to the United States, Canada, and other destinations.
- Figure 1 illustrates the market on a normal day. The demand and marginal benefit curve is $D_0 = MSB_0$; the supply and marginal cost curve is $S_0 = MSC_0$; and the auction finds the equilibrium and efficient outcome.
- April 19, 2010, was not a normal day. The eruption of a volcano in Iceland closed northern Europe's air transportation. Flowers could not be transported either in or out of Holland by air.
- Alternative but more costly arrangements were quickly made to fly flowers in and out of Athens (Greece) and Madrid (Spain) and transport them by truck from these cities to Aalsmeer.
- Figure 2 shows the situation on April 19. Supply decreased because the cost of inbound transportation increased. Demand decreased because the cost of outbound transportation increased.
- The demand and marginal benefit curve is $D_1 = MSB_1$; the supply and marginal cost curve is $S_1 = MSC_1$; and the auction finds the new equilibrium and efficient outcome.

Traders in the flower auction at Aalsmeer, Holland, find the equilibrium prices.

- It turned out that the quantity decreased by 20 percent (from 20 million to 16 million), but the price was unchanged. Both demand and supply were influenced by the loss of air transportation and decreased by the same amount.
- Consumer surplus (the green triangle) and producer surplus (the blue triangle) shrank on April 19, but the total surplus was at its maximum given the circumstances.

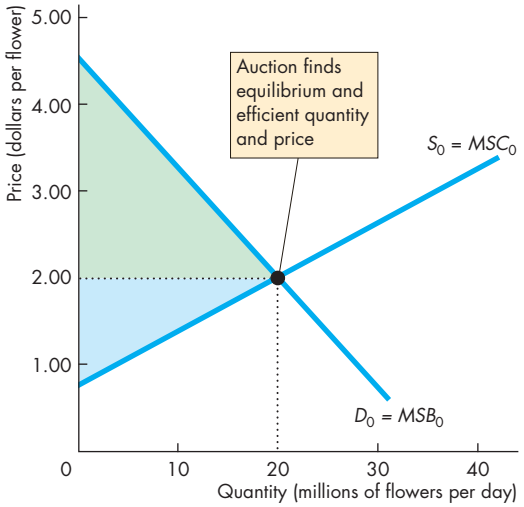



**Figure 1 Aalsmeer flower market: Normal day**

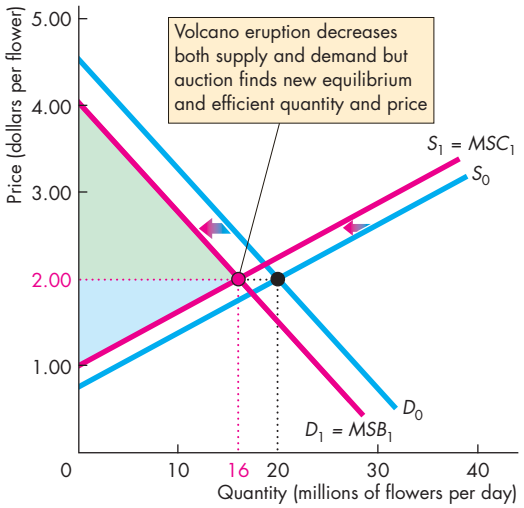



**Figure 2 Aalsmeer flower market: April 19, 2010**

# SUMMARY

## Key Points

### Resource Allocation Methods (pp. 106–107)

- Because resources are scarce, some mechanism must allocate them.
- The alternative allocation methods are market price; command; majority rule; contest; first-come, first-served; lottery; personal characteristics; and force.

Working Study Plan Problems 1 and 2 will give you a better understanding of resource allocation methods.

### Benefit, Cost, and Surplus (pp. 108–111)

- The maximum price willingly paid is marginal benefit, so a demand curve is also a marginal benefit curve.
- The market demand curve is the horizontal sum of the individual demand curves and is the marginal social benefit curve.
- Value is what people are *willing to* pay; price is what people *must* pay.
- Consumer surplus is the excess of the benefit received from a good or service over the amount paid for it.
- The minimum supply-price is marginal cost, so a supply curve is also a marginal cost curve.
- The market supply curve is the horizontal sum of the individual supply curves and is the marginal social cost curve.
- Cost is what producers pay; price is what producers receive.
- Producer surplus is the excess of the amount received from the sale of a good or service over the cost of producing it.

Working Study Plan Problems 3 to 10 will give you a better understanding of benefit, cost, and surplus.

### Is the Competitive Market Efficient? (pp. 112–115)

- In a competitive equilibrium, marginal social benefit equals marginal social cost and resource allocation is efficient.
- Buyers and sellers acting in their self-interest end up promoting the social interest.
- Total surplus, consumer surplus plus producer surplus, is maximized.
- Producing less than or more than the efficient quantity creates deadweight loss.
- Price and quantity regulations; taxes and subsidies; externalities; public goods and common resources; monopoly; and high transactions costs can lead to market failure.

Working Study Plan Problems 11 to 13 will give you a better understanding of the efficiency of competitive markets.

### Is the Competitive Market Fair? (pp. 116–119)

- Ideas about fairness can be divided into two groups: fair *results* and fair *rules*.
- Fair-results ideas require income transfers from the rich to the poor.
- Fair-rules ideas require property rights and voluntary exchange.

Working Study Plan Problems 14 and 15 will give you a better understanding of the fairness of competitive markets.

## Key Terms

Big tradeoff, 117
Command system, 106
Consumer surplus, 109
Deadweight loss, 113
Market failure, 113
Producer surplus, 111
Symmetry principle, 118
Total surplus, 112
Transactions costs, 115
Utilitarianism, 116

# STUDY PLAN PROBLEMS AND APPLICATIONS

myeconlab You can work Problems 1 to 17 in MyEconLab Chapter 5 Study Plan and get instant feedback.

## Resource Allocation Methods (Study Plan 5.1)

Use the following information to work Problems 1 and 2.

At Chez Panisse, the restaurant in Berkeley that is credited with having created California cuisine, reservations are essential. At Mandarin Dynasty, a restaurant near the University of California San Diego, reservations are recommended. At Eli Cannon's, a restaurant in Middletown, Connecticut, reservations are not accepted.

1. a. Describe the method of allocating scarce table resources at these three restaurants.
   b. Why do you think restaurants have different reservations policies?
2. Why do you think restaurants don't use the market price to allocate their tables?

## Benefit, Cost, and Surplus (Study Plan 5.2)

Use the following table to work Problems 3 to 5.

The table gives the demand schedules for train travel for the only buyers in the market, Ann, Beth, and Cy.

| Price (dollars per mile) | Quantity demanded (miles) | | |
|---|---|---|---|
| | Ann | Beth | Cy |
| 3 | 30 | 25 | 20 |
| 4 | 25 | 20 | 15 |
| 5 | 20 | 15 | 10 |
| 6 | 15 | 10 | 5 |
| 7 | 10 | 5 | 0 |
| 8 | 5 | 0 | 0 |
| 9 | 0 | 0 | 0 |

3. a. Construct the market demand schedule.
   b. What are the maximum price that Ann, Beth, and Cy are willing to pay to travel 20 miles? Why?
4. a. What is the marginal social benefit when the total distance travelled is 60 miles?
   b. What is the marginal private benefit for each person when they travel a total distance of 60 miles and how many miles does each of the people travel?
5. a. What is each traveler's consumer surplus when the price is $4 a mile?
   b. What is the market consumer surplus when the price is $4 a mile?

Use the following table to work Problems 6 to 8.

The table gives the supply schedules of hot air balloon rides for the only sellers in the market, Xavier, Yasmin, and Zack.

| Price (dollars per ride) | Quantity supplied (rides per week) | | |
|---|---|---|---|
| | Xavier | Yasmin | Zack |
| 100 | 30 | 25 | 20 |
| 90 | 25 | 20 | 15 |
| 80 | 20 | 15 | 10 |
| 70 | 15 | 10 | 5 |
| 60 | 10 | 5 | 0 |
| 50 | 5 | 0 | 0 |
| 40 | 0 | 0 | 0 |

6. a. Construct the market supply schedule.
   b. What are the minimum prices that Xavier, Yasmin, and Zack are willing to accept to supply 20 rides? Why?
7. a. What is the marginal social cost when the total number of rides is 30?
   b. What is the marginal cost for each supplier when the total number of rides is 30 and how many rides does each of the firms supply?
8. When the price is $70 a ride,
   a. What is each firm's producer surplus?
   b. What is the market producer surplus?

Use the following news clip to work Problems 9 and 10.

**eBay Saves Billions for Bidders**

If you think you would save money by bidding on eBay auctions, you would likely be right. Two Maryland researchers calculated the difference between the actual purchase price paid for auction items and the top price bidders stated they were willing to pay. They found that the difference averaged at least $4 per auction.

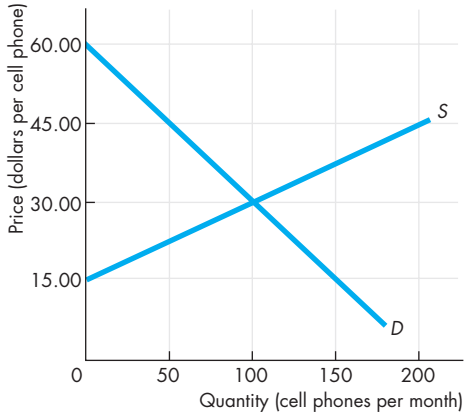
Source: *InformationWeek*, January 28, 2008

9. What method is used to allocate goods on eBay? How does the allocation method used by eBay auctions influence consumer surplus?
10. a. Can an eBay auction give the seller a surplus?

b. On a graph show the consumer surplus and producer surplus from an eBay auction.

## Is the Competitive Market Efficient? (Study Plan 5.3)

11. The figure illustrates the competitive market for cell phones.




a. What are the equilibrium price and equilibrium quantity of cell phones?
b. Shade in and label the consumer surplus at the competitive equilibrium.
c. Shade in and label the producer surplus at the competitive equilibrium.
d. Calculate total surplus at the competitive equilibrium.
e. Is the competitive market for cell phones efficient?

12. The table gives the demand and supply schedules for sunscreen.

| Price (dollars per bottle) | Quantity demanded (bottles per day) | Quantity supplied (bottles per day) |
|---|---|---|
| 0 | 400 | 0 |
| 5 | 300 | 100 |
| 10 | 200 | 200 |
| 15 | 100 | 300 |
| 20 | 0 | 400 |

Sunscreen factories are required to limit production to 100 bottles a day.

a. What is the maximum price that consumers are willing to pay for the 100th bottle?
b. What is the minimum price that producers are willing to accept for the 100th bottle?
c. Describe the situation in this market.

13. Explain why each restaurant in Problem 1 might be using an efficient allocation method.

## Is the Competitive Market Fair? (Study Plan 5.4)

14. Explain why the allocation method used by each restaurant in Problem 1 is fair or not fair.
15. In Problem 12, how can the 100 bottles available be allocated to beach-goers? Which possible methods would be fair and which would be unfair?

## Economics in the News (Study Plan 5.N)

16. **The World's Largest Tulip and Flower Market**

Every day 20 million tulips, roses, and other cut flowers are auctioned at the Dutch market called *The Bloemenveiling*. Each day 55,000 Dutch auctions take place, matching buyers and sellers.

Source: Tulip-Bulbs.com

A Dutch auction is one in which the auctioneer starts by announcing the highest price. If no one offers to buy the flowers, the auctioneer lowers the price until a buyer is found.

a. What method is used to allocate flowers at the Bloemenveiling?
b. How does a Dutch flower auction influence consumer surplus and producer surplus?
c. Are the flower auctions at the Bloemenveiling efficient?

17. **Wii Sells Out Across Japan**

After a two-month TV-ad blitz for Wii in Japan, demand was expected to be much higher than supply. Yodobashi Camera was selling Wii games on a first-come, first-served basis. Eager customers showed up early and those who tried to join the line after 6 or 7 a.m. were turned away—many rushed off to the smaller stores that were holding raffles to decide who got a Wii.

Source: *Gamespot News*, December 1, 2006

a. Why was the quantity demanded of Wii expected to exceed the quantity supplied?
b. Did Nintendo produce the efficient quantity of Wii? Explain.
c. Can you think of reasons why Nintendo might want to underproduce and leave the market with fewer Wii than people want to buy?
d. What are the two methods of resource allocation described in the news clip? Is either method of allocating Wii efficient?
e. What do you think some of the people who managed to buy a Wii did with it?
f. Explain which is the fairer method of allocating the Wii: the market price or the two methods described in the news clip.

# ADDITIONAL PROBLEMS AND APPLICATIONS

myeconlab You can work these problems in MyEconLab if assigned by your instructor.

## Resource Allocation Methods

18. At McDonald's, no reservations are accepted; at Puck's at St. Louis Art Museum, reservations are accepted; at the Bissell Mansion restaurant, reservations are essential. Describe the method of allocating table resources in these three restaurants. Why do you think restaurants have different reservations policies?

## Benefit, Cost, and Surplus

Use the following table to work Problems 19 to 22. The table gives the supply schedules for jet-ski rides by the only suppliers: Rick, Sam, and Tom.

| Price (dollars per ride) | Quantity supplied (rides per day) | | |
|---|---|---|---|
| | Rick | Sam | Tom |
| 10.00 | 0 | 0 | 0 |
| 12.50 | 5 | 0 | 0 |
| 15.00 | 10 | 5 | 0 |
| 17.50 | 15 | 10 | 5 |
| 20.00 | 20 | 15 | 10 |

19. What is each owner's minimum supply-price of 10 rides a day?
20. Which owner has the largest producer surplus when the price of a ride is $17.50? Explain.
21. What is the marginal social cost of 45 rides a day?
22. Construct the market supply schedule of jet-ski rides.

Use the following table to work Problems 23 and 24.

The table gives the demand and supply schedules for sandwiches.

| Price (dollars per sandwich) | Quantity demanded (sandwiches per hour) | Quantity supplied (sandwiches per hour) |
|---|---|---|
| 0 | 300 | 0 |
| 1 | 250 | 50 |
| 2 | 200 | 100 |
| 3 | 150 | 150 |
| 4 | 100 | 200 |
| 5 | 50 | 250 |
| 6 | 0 | 300 |

23. a. What is the maximum price that consumers are willing to pay for the 200th sandwich?
    b. What is the minimum price that producers are willing to accept for the 200th sandwich?
    c. If 200 sandwiches a day are available, what is the total surplus?

## Is the Competitive Market Efficient?

24. a. If the sandwich market is efficient, what is the consumer surplus, what is the producer surplus, and what is the total surplus?
    b. If the demand for sandwiches increases and sandwich makers produce the efficient quantity, what happens to producer surplus and deadweight loss?

Use the following news clip to work Problems 25 to 27.

**The Right Price for Digital Music**

Apple's $1.29-for-the-latest-songs model isn't perfect and isn't it too much to pay for music that appeals to just a few people? What we need is a system that will be profitable but fair to music lovers. The solution: Price song downloads according to demand. The more people who download a particular song, the higher will be the price of that song; The fewer people who buy a particular song, the lower will be the price of that song. That is a free-market solution—the market would determine the price.

Source: *Slate*, December 5, 2005

Assume that the marginal social cost of downloading a song from the iTunes Store is zero. (This assumption means that the cost of operating the iTunes Store doesn't change if people download more songs.)

25. a. Draw a graph of the market for downloadable music with a price of $1.29 for all the latest songs. On your graph, show consumer surplus and producer surplus.
    b. With a price of $1.29 for all the latest songs, is the market efficient or inefficient? If it is inefficient, show the deadweight loss on your graph.
26. If the pricing scheme described in the news clip were adopted, how would consumer surplus, producer surplus, and the deadweight loss change?
27. a. If the pricing scheme described in the news clip were adopted, would the market be efficient or inefficient? Explain.

b. Is the pricing scheme described in the news clip a "free-market solution"? Explain.

### Is the Competitive Market Fair?

28. The winner of the men's and women's tennis singles at the U.S. Open is paid twice as much as the runner-up, but it takes two players to have a singles final. Is the compensation arrangement fair?

### Economics in the News

29. After you have studied *Reading Between the Lines* on pp. 120–121 answer the following questions.
    a. What is the method used to allocate the world's cut flowers?
    b. Who benefits from this method of resource allocation: buyers, sellers, or both? Explain your answer using the ideas of marginal social benefit, marginal social cost, consumer surplus, and producer surplus.
    c. On April 19, 2010, when the equilibrium quantity of cut flowers decreased by 20 percent, why was the outcome still efficient? Why was there not underproduction and a deadweight loss?
    d. If the government of Holland placed a limit of 15 million a day on the quantity of flowers traded at Aalsmeer, would there be underproduction and a deadweight loss created? Explain your answer.

Use the following news clip to work Problems 30 and 31.

**Fight over Water Rates; Escondido Farmers Say Increase would Put Them out of Business**

Agricultural users of water pay less than residential and business users. Since 1993, water rates have increased by more than 90 percent for residential customers and by only 50 percent for agricultural users.

Source: *The San Diego Union-Tribune*, June 14, 2006

30. a. Do you think that the allocation of water between agricultural and residential users is likely to be efficient? Explain your answer.
    b. If agricultural users paid a higher price, would the allocation of resources be more efficient?
    c. If agricultural users paid a higher price, what would happen to consumer surplus and producer surplus from water?
31. Is the difference in price paid by agricultural and residential users fair?
32. **MYTH: Price-Gouging Is Bad**

    Mississippi cracked down on gougers after Hurricane Katrina. John Shepperson was one of the "gougers" authorities arrested. Shepperson lives in Kentucky and he watched news reports about Katrina and learned that people desperately needed things. Shepperson thought he could help and make some money, too, so he bought 19 generators. He rented a U-Haul and drove 600 miles to an area of Mississippi that was left without power. He offered to sell his generators for twice what he had paid for them, and people were eager to buy. Police confiscated his generators, though, and Shepperson was jailed for four days for price-gouging.

    Source: *ABC News*, May 12, 2006

    a. Explain how the invisible hand (Shepperson) actually reduced deadweight loss in the market for generators following Katrina.
    b. Evaluate the "fairness" of Shepperson's actions.

Use the following information to work Problems 33 and 34.

Only 1 percent of the world supply of water is fit for human consumption. Some places have more water than they can use; some could use much more than they have. The 1 percent available would be sufficient if only it were in the right place.

33. a. What is the major problem in achieving an efficient use of the world's water?
    b. If there were a global market in water, like there is in oil, how do you think the market would be organized?
    c. Would a free world market in water achieve an efficient use of the world's water resources? Explain why or why not.
34. Would a free world market in water achieve a fair use of the world's water resources? Explain why or why not and be clear about the concept of fairness that you are using.
35. **"Two Buck Chuck" Wine Cult**

    "Two Buck Chuck," is a cheap, good wine. After a year flooding the West Coast market, it is still being sold by the case to wine lovers. An overabundance of grapes has made the wine cheap to bottle—about 5 million cases so far.

    Source: *CBS*, June 2, 2003

    How has "Two Buck Chuck" influenced the consumer surplus from wine, the producer surplus for its producer, and the producer surplus for the producers of other wines?