GLOBAL EDITION

Essential Foundations of Economics

SEVENTH EDITION

Robin Bade • Michael Parkin

ALWAYS LEARNING

PEARSON

Essential Foundations of

ECONOMICS

Producer Surplus

Producer surplus
The price of a good in excess of the marginal cost of producing it, summed over the quantity produced.

When the price exceeds marginal cost, the firm obtains a producer surplus. **Producer surplus** is the excess of the price of a good over the marginal cost of producing it, summed over the quantity produced.

Figure 6.7 illustrates the producer surplus for pizza producers. The supply curve of pizza tells us the quantity of pizza that producers plan to sell at each price. The supply curve also tells us the marginal cost of pizza at each quantity produced. If the price of a pizza is $10, producers plan to sell 10,000 pizzas a day. The total revenue from pizza is $100,000 per day.

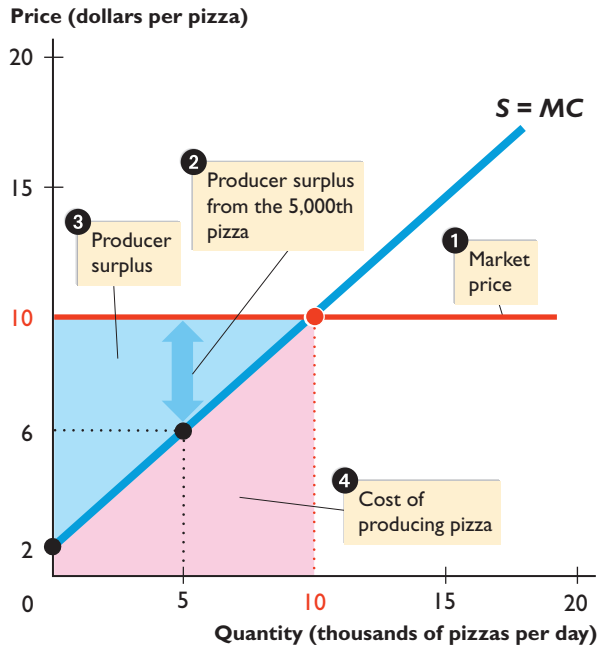
To calculate producer surplus, we must find the producer surplus on each pizza and add these surpluses together. For the 10,000th pizza, marginal cost equals $10 and producers receive $10, so the producer surplus on this pizza is zero. For the 5,000th pizza (highlighted in the figure), marginal cost is $6. So on this pizza, producer surplus is $10 minus $6, which is $4. For the first pizza, marginal cost is $2, so on this pizza, producer surplus is $10 minus $2, which is $8.

Producer surplus—the sum of the producer surpluses on the 10,000 pizzas that firms produce—is $40,000 a day, which is shown by the area of the blue triangle. The base of the triangle is 10,000 pizzas a day and its height is $8, so its area is (10,000 × $8) ÷ 2 = $40,000.

The total cost of producing pizza is the amount received from selling it, $100,000, minus the producer surplus, $40,000 (blue triangle), and is $60,000 (the red area). Producer surplus is the total amount received minus the total cost, or net benefit to producers.

FIGURE 6.7
Supply and Producer Surplus

1. The market price of a pizza is $10. At this price, producers plan to sell 10,000 pizzas a day and receive a total revenue of $100,000 a day.
2. The supply curve shows that the marginal cost of the 5,000th pizza a day is $6, so producers receive a producer surplus of $4 on the 5,000th pizza.
3. Producer surplus from the 10,000 pizzas sold is $40,000 a day—the area of the blue triangle.
4. The cost of producing 10,000 pizzas a day is the red area beneath the marginal cost curve. It equals total revenue of $100,000 minus producer surplus of $40,000 and is $60,000 a day.



CHECKPOINT 6.3

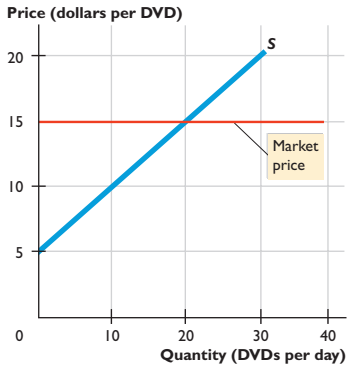
Distinguish between cost and price and define producer surplus.

Practice Problems

Figure 1 shows the supply curve of DVDs and the market price of a DVD.

1. What is the minimum supply price of the 20th DVD? Calculate the marginal cost of the 10th DVD and the producer surplus on the 10th DVD.
2. What is the quantity of DVDs sold? Calculate the producer surplus, the total revenue from the DVDs sold, and the cost of producing the DVDs sold.
3. If the price of a DVD falls to $10, what is the change in producer surplus?

FIGURE 1



In the News

Is Australia's ski season headed for a wipeout?
The Australian dollar has soared 26 percent against the U.S. dollar since last June, making those foreign lift tickets cheaper than those in Australia, and travel agents report a jump in interest in travel to North American ski destinations like Vail and Aspen.

Source: *The Wall Street Journal*, June 6, 2011

As Australians switch from skiing in Australia and flock to Vail and Aspen, how will the Australian ski operators' producer surplus change? How will the Vail and Aspen ski operators' producer surplus change?

Solutions to Practice Problems

1. The minimum supply price of the 20th DVD is the marginal cost of the 20th DVD, which is $15 (Figure 2). The marginal cost of the 10th DVD is equal to the minimum supply price for the 10th DVD, which is $10. The producer surplus on the 10th DVD is its market price minus the marginal cost of producing it, which is $15 − $10 = $5 (the blue arrow in Figure 2).
2. The quantity sold is 20 a day. Producer surplus equals ($15 − $5) × 20 ÷ 2, which is $100 (the area of the blue triangle in Figure 2). The total revenue is price multiplied by quantity sold. Total revenue is $15 × 20 = $300. The cost of producing DVDs equals total revenue minus producer surplus, which is $300 − $100 = $200 (the red area in Figure 2).
3. The quantity sold decreases to 10 a day. The producer surplus decreases to ($10 − $5) × 10 ÷ 2 = $25 (the area of the blue triangle in Figure 3). The change in producer surplus is a decrease of $75 (from $100 down to $25).

FIGURE 2

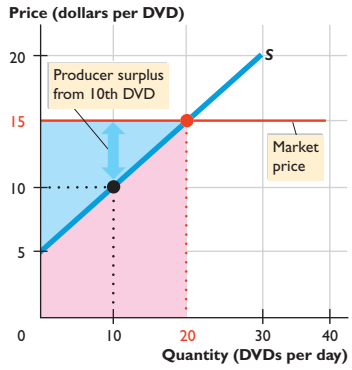
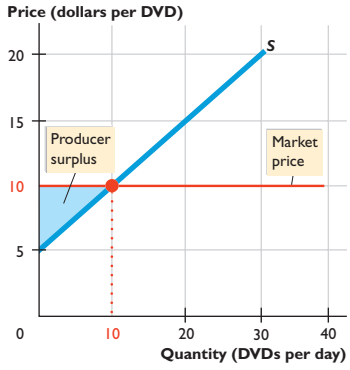


FIGURE 3



Solution to In the News

Producer surplus is the excess of the price of a good over the marginal cost of producing it, summed over the quantity produced.

In Australia, the demand for ski tickets decreases, the price and quantity of tickets sold decreases, and Australian ski operators' producer surplus decreases.

In Vail and Aspen, the demand for ski tickets increases, the price and quantity of tickets sold increases, and ski operators' producer surplus increases.

6.4 ARE MARKETS EFFICIENT?

Figure 6.8 shows the market for pizza. The demand curve is *D*, the supply curve is *S*, the equilibrium price is $10 a pizza, and the equilibrium quantity is 10,000 pizzas a day. The market forces that you studied in Chapter 4 (pp. 136–137) pull the pizza market to its equilibrium and coordinate the plans of buyers and sellers. But does this competitive equilibrium deliver the efficient quantity of pizza?

If the equilibrium is efficient, it does more than coordinate plans. It coordinates them in the best possible way. Resources are used to produce the quantity of pizza that people value most highly. It is not possible to produce more pizza without giving up some of another good or service that is valued more highly. And if a smaller quantity of pizza is produced, resources are used to produce some other good that is not valued as highly as the pizza that is forgone.

Marginal Benefit Equals Marginal Cost

To check whether the equilibrium in Figure 6.8 is efficient, recall the interpretation of the demand curve as a marginal benefit curve and the supply curve as a marginal cost curve. The demand curve tells us the marginal benefit from pizza. The supply curve tells us the marginal cost of pizza. Where the demand curve and the supply curve intersect, marginal benefit equals marginal cost.

FIGURE 6.8

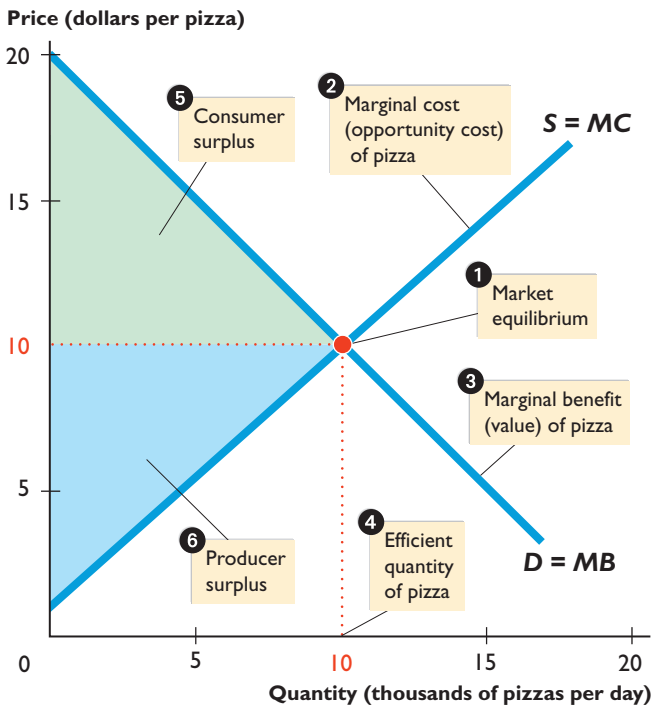
An Efficient Market for Pizza

❶ Market equilibrium occurs at a price of $10 a pizza and a quantity of 10,000 pizzas a day.

❷ The supply curve is also the marginal cost curve.

❸ The demand curve is also the marginal benefit curve.

Because at the market equilibrium, marginal benefit equals marginal cost, the ❹ efficient quantity of pizza is produced. The sum of the ❺ consumer surplus and ❻ producer surplus is maximized.



This condition—marginal benefit equals marginal cost—is the condition that delivers an efficient use of resources. Because a competitive equilibrium allocates resources to the activities that create the greatest possible value, it is efficient.

Total Surplus Is Maximized

Another way of checking that the equilibrium is efficient is to look at the total surplus that it generates. **Total surplus** is the sum of producer surplus and consumer surplus. A price above the equilibrium might increase producer surplus, but it would decrease consumer surplus by more. And a price below the equilibrium price might increase consumer surplus, but it would decrease producer surplus by more. The competitive equilibrium price maximizes total surplus.

Total surplus
The sum of producer surplus and consumer surplus.

In Figure 6.8, if production is less than 10,000 pizzas a day, someone is willing to buy a pizza for more than it costs to produce. Buyers and sellers will gain if production increases. If production exceeds 10,000 pizzas a day, it costs more to produce a pizza than anyone is willing to pay for it. Buyers and sellers will gain if production decreases. Only when 10,000 pizzas a day are produced is there no unexploited gain from changing the quantity of pizza produced, and total surplus is maximized.

Buyers and sellers each attempt to do the best they can for themselves—they pursue their self-interest. No one plans for an efficient outcome for society as a whole. No one worries about the social interest. Buyers seek the lowest possible price, and sellers seek the highest possible price. But as buyers and sellers pursue their self-interest, this astonishing outcome occurs: The social interest is served.

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. 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 effects of the invisible hand at work every day. Your campus bookstore is stuffed with texts at the start of each term. It has the quantities that it predicts students will buy. The coffee shop has the variety and quantities of drinks and snacks that people plan to buy. Your local clothing store has the sweatpants and socks and other items that you plan to buy. Truckloads of textbooks, coffee and cookies, and sweatpants and socks roll along our highways and bring these items to where you and your friends want to buy them. Firms that don't know you anticipate your wants and work hard to help you satisfy them.

No government organizes all this production, and no government auditor monitors producers to ensure that they serve the social interest. The allocation of scarce resources is not planned. It happens because prices adjust to make buying plans and selling plans compatible, and it happens in a way that sends resources to the uses in which they have the highest value.

Adam Smith explained why all this amazing activity occurs. "It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner," he wrote, "but from their regard to their own interest."

Publishing companies, coffee growers, garment manufacturers, and a host of other producers are led by their regard for *their* own interest to serve *your* interest.

EYE on the U.S. ECONOMY

The Invisible Hand and e-Commerce

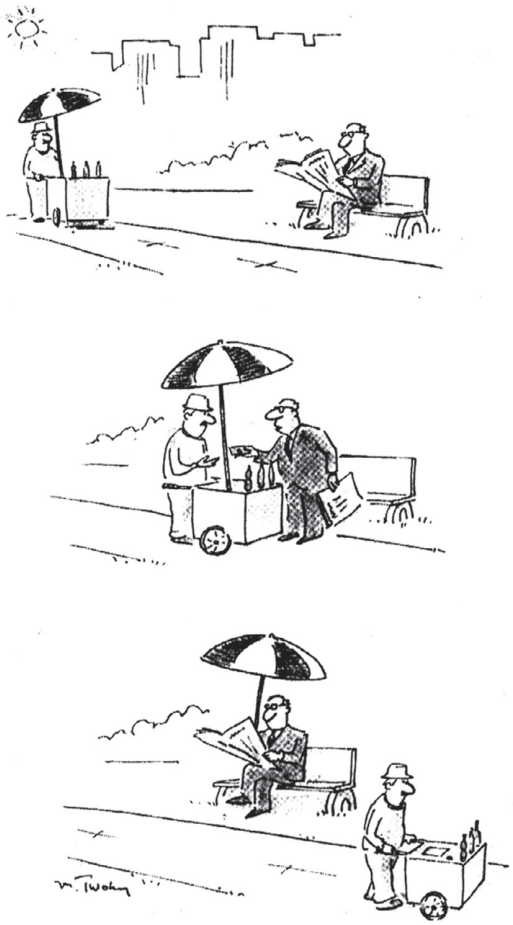
You can see Adam Smith's invisible hand idea in the cartoon.

On a hot sunny day, a cold-drinks vendor approaches a man sitting in a park reading a newspaper (the top frame). The vendor has both cold drinks and shade and an opportunity cost and a minimum supply-price of each item. The park bench reader has a marginal benefit from a cold drink and from shade.

A transaction occurs and the invisible hand does its work (the middle frame). The park bench reader buys the vendor's sun shade. This transaction tells us that the reader's marginal benefit from shade exceeds the vendor's marginal cost of shade.

After the transaction (bottom frame), the vendor obtains a producer surplus from selling the shade for more than its opportunity cost, and the reader obtains a consumer surplus from buying the shade for less than its marginal benefit. Both the buyer of shade and the seller are better off.

The umbrella has moved to its highest-valued use and the resource is being used efficiently.



The market economy performs activity similar to that illustrated in the cartoon to achieve an efficient allocation of resources. New technologies have cut the cost of using the Internet and during the past few years, hundreds of Web sites have been established that are dedicated to facilitating trade in all types of goods, services, and factors of production.

The electronic auction site eBay (http://www.ebay.com/), has brought a huge increase in consumer surplus and producer surplus, and helps to achieve ever-greater allocative efficiency.

Market Failure

Market failure occurs when a market delivers an inefficient outcome. Either too little of an item is produced—*underproduction*—or too much—*overproduction*.

Market failure
An inefficient market outcome.

Underproduction and Overproduction

When underproduction occurs, marginal benefit exceeds marginal cost. Items *not* produced are worth more than they cost. When overproduction occurs, marginal cost exceeds marginal benefit. Items produced cost more than they are worth.

Figure 6.9(a) illustrates underproduction at 5,000 pizzas a day. Every pizza between 5,000 and 9,999 is worth more than it costs to make but it is not produced. Figure 6.9(b) illustrates overproduction at 15,000 a day. Every pizza produced between 10,001 and 15,000 costs more to make than it is worth.

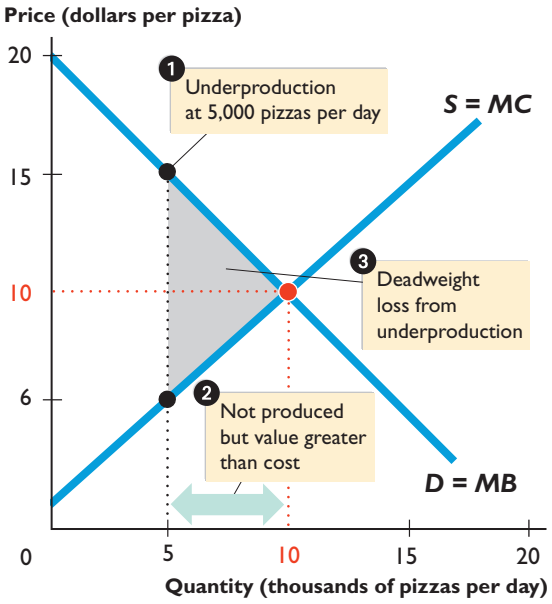
Deadweight Loss

A **deadweight loss** is the decrease in total surplus that results from inefficient underproduction or overproduction. The gray triangle in Figure 6.9(a) illustrates the deadweight loss from underproduction and in Figure 6.9(b) it shows the deadweight loss from overproduction. A deadweight loss is borne by the entire society. It is not a loss for producers and a gain for consumers. It is a *social* loss.

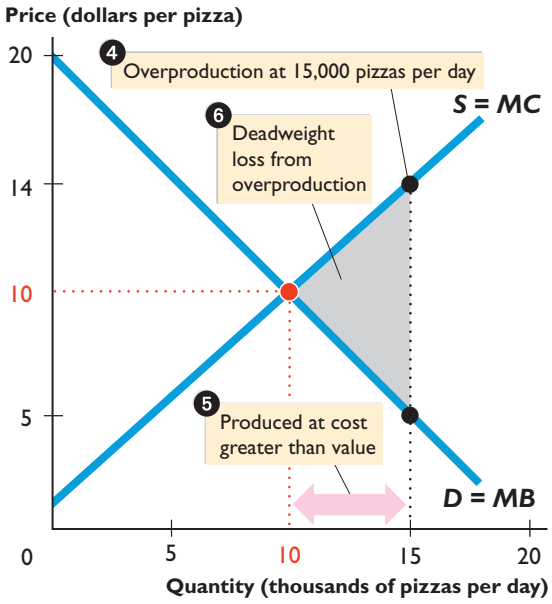
Deadweight loss
The decrease in total surplus that results from an inefficient underproduction or overproduction.

The deadweight loss from underproduction equals the area of the gray triangle in Figure 6.9(a). That area is \$22,500 [(\$15 − \$6) × 5,000 ÷ 2 = \$22,500]. Can you calculate the deadweight loss from overproduction in Figure 6.9(b)?

FIGURE 6.9
Inefficient Outcomes



(a) Underproduction



(b) Overproduction

❶ If production is 5,000 pizzas a day, ❷ pizzas not produced are worth more than they cost to make—there is inefficient underproduction. ❸ The gray triangle shows the deadweight loss that arises.

❹ If production is 15,000 pizzas a day, ❺ pizzas produced cost more to make than they are worth—there is inefficient overproduction. ❻ The gray triangle shows the deadweight loss that arises.