

# Chapter 3



## The Concept of Elasticity and Consumer and Producer Surplus

### Chapter Objectives

*After reading this chapter you should be able to*

Understand that “elasticity,” the responsiveness of quantity to changes in price, is an important concept in economics.

Recognize the relationship between the concept of elasticity and the appearance of the demand curve.

Understand and show that a market equilibrium provides both buyers and sellers with benefits. Consumers pay less than they are willing to pay and producers make a profit. Economists call the former “consumer surplus” and the latter, “producer surplus.”

Recognize “deadweight loss,” a circumstance which comes into play when prices that are too high or too low create inefficiencies.

### Chapter Outline

Elasticity of Demand

Alternative Ways to Understand Elasticity

More on Elasticity

Consumer and Producer Surplus

Summary

---

We now change gears a bit and reconsider the individual supply and demand curves. Our focus here is on the ability of consumers and producers to react to price changes with changes in the amounts they wish to buy or sell. That ability to react, called *elasticity*, will be very important to us as we prepare to use the supply and demand model for issues. We will see how differently shaped demand curves will reflect the degree to which price changes affect quantity.

The last third of the chapter is central in our analysis of several issues. We will see how the supply and demand model can be used to explain why markets are effective in pleasing both consumers and producers. Though we know that consumers long for low prices and producers for high prices, we will see that when a consumer buys something from a producer, both can be pleased with the outcome. We will also see why the net benefit to society is lower when prices are not at equilibrium than it would be if equilibrium were at work.

## ELASTICITY OF DEMAND

### Intuition

In the previous chapter we saw that a change in supply or demand changes the equilibrium price–quantity combination, but we did not discuss which one changes more. For instance, if costs to a firm go up, it is reasonable to ask whether the firm will pass that price increase on to consumers or be willing to accept lower profits. Exploring this question brings in the concept of elasticity.

If the good is one that you need to survive and that has no good substitutes, or if it is one that you spend very little money on, the firm may be able to pass on its increased costs to you in the form of higher prices. On the other hand, if it is a luxury, that is, a good you can do without, if there are many other things that will serve just as well, or if you already spend a lot of your income on it and could not afford a price increase, you may buy a lot fewer. In this case the firm’s profits are eaten up.

#### elasticity

The responsiveness of quantity to a change in another variable.

#### price elasticity of demand

The responsiveness of quantity demanded to a change in price.

#### price elasticity of supply

The responsiveness of quantity supplied to a change in price.

#### income elasticity of demand

The responsiveness of quantity demanded to a change in income.

#### cross-price elasticity of demand

The responsiveness of quantity demanded of one good to a change in the price of another good.

### Definition of Elasticity and its Formula

There are many kinds of elasticity. In general, **elasticity** is the responsiveness of quantity to a change in another variable. The two most commonly referred to elasticities are the **price elasticity of demand** and the **price elasticity of supply**. Respectively, these are the responsiveness of quantity demanded to a change in price and the responsiveness of quantity supplied to a change in price. Other elasticities include the **income elasticity of demand** and the **cross-price elasticity of demand**. The former measures the responsiveness of quantity demanded to changes in income, and the latter measures the responsiveness of quantity demanded to changes in the price of another good.

The price elasticity of demand is measured by looking at how a percentage change in price affects the percentage change in quantity demanded. The formula for elasticity is

$$\text{Elasticity} = \frac{\% \Delta Q}{\% \Delta P} = \frac{\Delta Q / Q^*}{\Delta P / P^*}$$

where

% = percent

$\Delta$  = change

$P^*$  = price (read as “ $P$  star”)

$Q^*$  = quantity ( $Q$  star)

The other elasticities are similar in that the percentage change in either quantity demanded or quantity supplied is in the numerator and the percentage change in the price, income, or other price is in the denominator. Because the bulk of the issues that deal with elasticity deal with price elasticity of demand, we focus here on this particular form of the concept.

From here there are two ways of proceeding: we can explain everything in a great deal of mathematical detail or not. Guessing that the chorus is singing “not,” we will skip the math.

**elastic**

The condition of demand when the percentage change in quantity is larger than the percentage change in price.

**inelastic**

The condition of demand when the percentage change in quantity is smaller than the percentage change in price.

**unitary elastic**

The condition of demand when the percentage change in quantity is equal to the percentage change in price.

You will need now to follow the “English” explanations to understand and accept the conclusions about elasticity.

When you use the elasticity of demand formula you will always get a negative number for it. For our purposes we will simplify things by ignoring the negative sign. The negative sign appears because the demand curve is downward-sloping, and an increase in price will therefore cause a decrease in quantity. To illustrate, if a 5 percent increase in price leads to a 10 percent decrease in quantity, the elasticity fraction is  $-.10/.05$ . Since the important thing about elasticity is the value of the fraction itself, it is acceptable and less complicated for us to ignore the minus sign.

## Elasticity Labels

This brings us to an important distinction that will be vital when we look at issues that hinge on whether demand is elastic or inelastic—for example, whether increasing the tax on cigarettes leads to decreases in teen smoking. Economists say that demand is **elastic** when the percentage change in quantity is larger than the percentage change in price and **inelastic** when the percentage change in quantity is smaller than the percentage change in price. Looking at the formula, if the computed elasticity is greater than 1, then demand is elastic; when it is less than 1, then demand is inelastic. When the percentage change in quantity is the same as the percentage change in price (the computed elasticity is exactly 1), demand is **unitary elastic**.

## ALTERNATIVE WAYS TO UNDERSTAND ELASTICITY

To see this more clearly let’s look at it using three different thought processes. First we look at elasticity using the graph of our demand curve. Then we look at it using only words. Last, we look at it in terms of how much money is spent on the good.

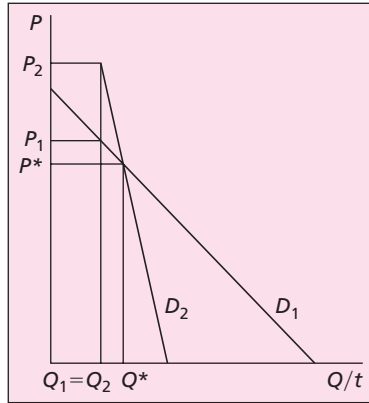
### The Graphical Explanation

We first examine the elasticity phenomenon using graphical skills. Figure 3.1 shows that the greater the slope of the demand curve, the greater the elasticity. This is *not* to say that slope and elasticity are the same thing; it just means that slope matters. To see that slope matters notice in Figure 3.1 that if we start at  $P^*$ ,  $Q^*$ , on both  $D_1$  and  $D_2$  the price increase necessary to reduce quantity to  $Q_1 = Q_2$  is greater when the demand curve is steeper. The price increase on the demand curve  $D_1$  is  $P_1 - P^*$ , and this is smaller than the price increase on the demand curve  $D_2$ , which is  $P_2 - P^*$ . Looking back at the formula,  $P^*$ ,  $Q^*$ , and  $\Delta Q$  are the same for both  $D_1$  and  $D_2$ , but the price change  $\Delta P$  is greater for the steeper demand curve. Since  $\Delta P$  appears in the denominator of the fraction, this means that elasticity is greater for the flatter demand curve.

Figure 3.2 shows that the higher the price, the greater the elasticity. The price increase from  $P_1$  to  $P_2$  causes a decrease in quantity from  $Q_1$  to  $Q_2$ . The same size increase in price from  $P_3$  to  $P_4$  causes the same size decrease in quantity from  $Q_3$  to  $Q_4$ . This is because the slope of this demand curve is the same at all those points. Looking at the formula again, we see it is the percentage changes that matter and not just the size of those changes. Even though the price increases and quantity decreases are the same, the percentage changes are very different.

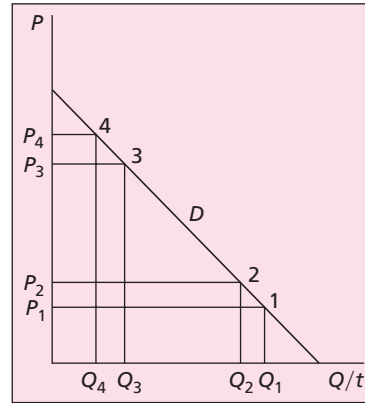
The percentage change in price from  $P_1$  to  $P_2$  is sizable (visually about 33 percent), while the percentage change in quantity from  $Q_1$  to  $Q_2$  is negligible (visually about 10 percent). Since the percentage change in the price is greater than the percentage change in the quantity, demand is inelastic here (elasticity is low). On the other hand, the percentage change in price from  $P_3$  to  $P_4$  is small (visually about 10 percent), whereas the percentage change in quantity from  $Q_3$  to  $Q_4$  is large (visually about 33 percent). As a result, demand here is elastic (elasticity is high).

**FIGURE 3.1** At the same point, if the demand curve is flatter, it is more elastic.



The elasticity of demand for the two demand curves is different at the point  $P^*, Q^*$  because the two have different slopes. The steeper one is less elastic; the flatter one is more elastic. We know this because a bigger price increase is required to generate an equal quantity decrease.

**FIGURE 3.2** The higher the price, the greater the elasticity.



The higher the price, the more elastic demand is. This can be seen because though the changes in prices and quantities are equal in the figure, the percentage changes in prices and quantities are not. The percentage change in price from point 3 to 4 is small but the percentage change in quantity is large, so elasticity is high. The percentage change in price from point 1 to 2 is large but the percentage change in quantity is small, so elasticity is low.

### The Verbal Explanation

Although the graphical explanation of elasticity is highly accurate, if it does not make sense to you, it is useless. Recall the original definition of elasticity (the reaction of quantity to a change in price). If you really need a product because there are no good substitutes (like insulin to a diabetic), you will hardly change the amount you buy when the price changes. Thus there is little, if any, reaction of quantity to changes in price. The demand curve for a good you “need” is going to be rather steep. If the good is a luxury item, you are more likely to eliminate it from your budget if it becomes overly expensive. In this case there is a substantial reaction of quantity to a change in price. The demand curve for a luxury is likely to be flatter.

In addition, price changes for goods that take up little of your income (like drinking water) are not likely to lead to big quantity changes. This is because even if their price increases greatly, you can easily afford those price increases. Goods that take up a significant portion of your income are more likely to have elastic demand because you are less able to afford large price increases. In this case goods with low prices are likely to have inelastic demand and goods with high prices are likely to have elastic demand.

### total expenditure rule

If the price and the amount you spend both go in the same direction, then demand is inelastic, whereas if they go in opposite directions, demand is elastic.

### Seeing Elasticity through Total Expenditures

If we wanted to, we could use math to show that if the price and the amount you spend both go in the same direction, then demand is inelastic. If they go in opposite directions, however, demand is elastic. This **total expenditure rule** of elasticity also allows us to quickly judge whether demand is elastic or inelastic. For instance, when the price of cigarettes goes up,

# Determinants of Elasticity of Demand

**Number and closeness of substitutes:** The more alternatives you have, the less likely you are to pay high prices for a good and the more likely you are to settle for an adequate alternative.

**Time:** The longer you have to come up with alternatives to paying high prices, the more likely it is you will shift to those alternatives.

smokers usually have to spend more on them. When the prices of luxuries go up, many of us spend less on them (because we do without them). In this way we can find out for ourselves whether our demand for a good is elastic or inelastic. All we need to do is to ask ourselves whether a price increase will cause us to spend more on that good.

## MORE ON ELASTICITY

### Determinants of Elasticity

Key factors of the three elasticity explanations are important in determining whether a good is elastic or inelastic. The first is the **number and closeness of substitutes**. When there are many substitutes that all serve nearly as well as the good in question, demand is likely to be more elastic because price increases induce changes to other goods. Whether price increases can be easily absorbed into a person's budget also matters. If price increases cannot be absorbed, it is likely that when they occur, significant quantity reductions will follow. And although timing was not mentioned above, given **time**, close substitutes can be found or invented, or methods to avoid the price increase will be developed.

### Elasticity and the Demand Curve

Elasticity is important because supply changes will have very different results depending on the elasticity of demand. As you can see from the figures on the next page, an identical supply change can affect only price (Figure 3.3), only quantity (Figure 3.4), price much more than quantity (Figure 3.5), or quantity much more than price (Figure 3.6).

In Figure 3.3 the demand curve is **perfectly inelastic** because price changes have no effect on quantity. In Figure 3.4 the demand curve is **perfectly elastic** because price cannot change. As we saw in Figure 3.2, a linear demand curve is elastic at high prices and inelastic at low prices. In Figure 3.5 demand is inelastic over the entire range shown because at every point the percentage change in price is larger than the percentage change in quantity. This will be true when the demand curve is nearly vertical. In Figure 3.6 demand is elastic over the entire range, because at every point the percentage change in price is smaller than the percentage change in quantity. This will be true when the demand curve is nearly horizontal.

If we look back at the elasticity formula, we can use this explanation to compute the appropriate elasticity numbers for each of these elasticity labels. For perfectly elastic demand the computed elasticity is  $\infty$  (infinity), while for perfectly inelastic demand the computed elasticity is 0 (zero). Remembering that unitary elastic demand computes to 1 (one), it makes sense that elastic demand will compute to greater than 1 but less than  $\infty$  and inelastic demand will compute to less than 1 but greater than 0.

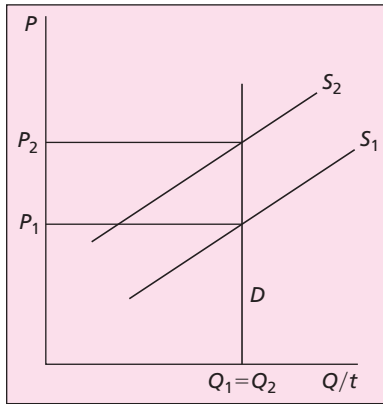
#### **perfectly inelastic**

The condition of demand when price changes have no effect on quantity.

#### **perfectly elastic**

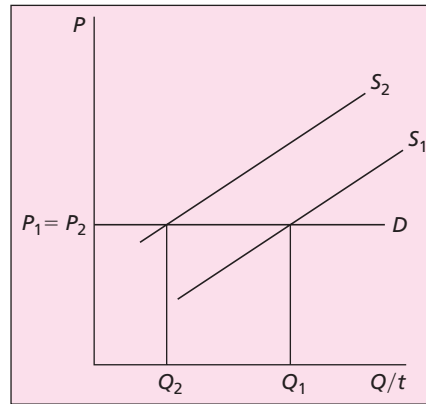
The condition of demand when price cannot change.

**FIGURE 3.3** Perfectly inelastic demand.



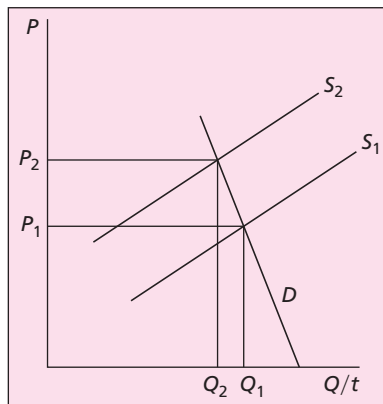
When the demand curve is vertical it is perfectly inelastic because there is no change in quantity regardless of a change in price.

**FIGURE 3.4** Perfectly elastic demand.



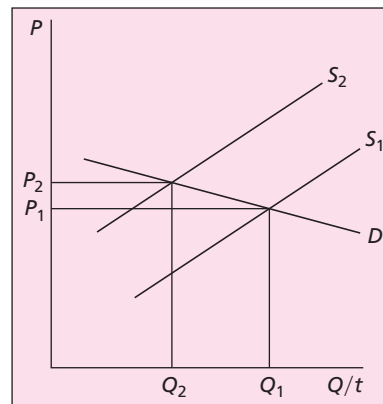
When the demand curve is horizontal it is perfectly elastic because there is no change in price regardless of a change in quantity.

**FIGURE 3.5** Inelastic demand.



Demand is inelastic on a curve that is nearly vertical as long as the price is low enough. Though demand can be elastic or inelastic on any linear demand curve, even steep ones, it is likely to be inelastic on steep ones because if you extend the demand curve from the vertical axis to horizontal axis, the lower half is inelastic, and this is all you see on figures like this one.

**FIGURE 3.6** Elastic demand.



Demand is elastic on a curve that is nearly horizontal as long as the price is high enough. Though demand can be elastic or inelastic on any linear demand curve, even reasonably flat ones, it is likely to be elastic on almost flat ones because if you extend the demand curve from the vertical axis to horizontal axis, the upper half is elastic, and this is all you see on figures like this one.

## CONSUMER AND PRODUCER SURPLUS

### Consumer Surplus

Most people think that when consumers buy goods only the firm is better off for the exchange. They do not often acknowledge that consumers are also better off. It turns out that consumers often get much more value than they part with. Look back to “All about Demand” in Chapter 2

and recall that the demand curve represents the marginal utility of the good. This means that the amount each additional unit of the good is worth to the consumer can be read from the demand curve.

Figure 3.7 indicates that if the demand curve represents your individual demand for water and you have none, you would value it at (be willing to pay) \$2 for the first glass. If you had the first glass in hand (or you already had drunk it), you would value the second glass at \$1.50, and so on. If you only had to pay 50 cents, you would buy four, but, more important, you would be getting value that you did not have to pay for. You would be getting \$2 worth of value for 50 cents; then you would be getting \$1.50 worth of value for only 50 cents. It is only when you pay 50 cents for the fourth one that the value will not exceed what you would have paid to get it. Economists call the value you get that is in excess of what you pay to get it

**consumer surplus**  
The value you get that is in excess of what you pay to get it.

**consumer surplus.**

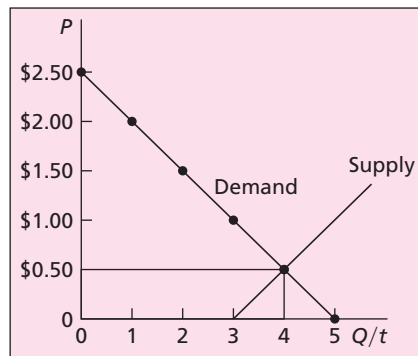
When the good is infinitely divisible (in this case, you can buy water in any fractional amount like 2.63478956 glasses of water) the consumer surplus is the area between the demand curve and the price line. In Figure 3.7 the consumer surplus is the triangle between the demand curve and the 50 cent price line and is \$4  $[(\$2.50 - \$0.50) \times 4 \times 1/2]$ .

**Producer Surplus**

Firms also benefit from exchange. In the Chapter 2 section “All about Supply” the supply curve is upward-sloping because it is the marginal cost curve and marginal cost is increasing. In Figure 3.8 the firm’s cost of producing the first unit of its product is \$1. The cost of producing the second, given that it already produced the first (its marginal cost), is \$1.50. The cost of producing the third, given that it already produced two, is \$2, and so on. Because it is getting \$1.50 for each unit it sells, the firm makes money on the first and second units. Again, as long as the good is infinitely divisible, the money that the firm makes over its costs is the area between the price line and the supply curve. Economists call the money the firm gets that is in excess of its marginal costs **producer surplus**. In Figure 3.8 the producer surplus is \$1  $[(\$1.50 - \$0.50) \times 2 \times 1/2]$ .

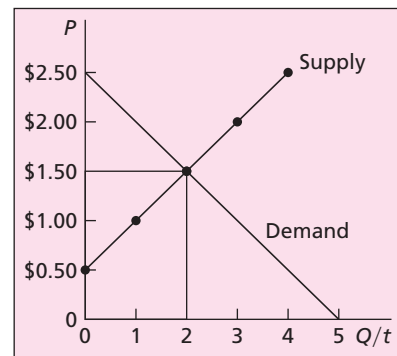
**producer surplus**  
The money the firm gets that is in excess of its marginal costs.

**FIGURE 3.7** Consumer surplus.



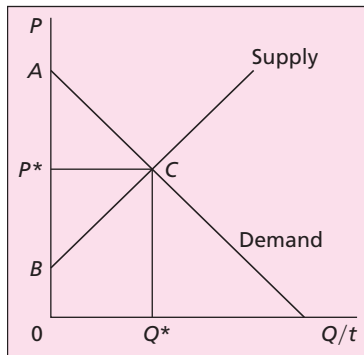
Consumer surplus exists when people value a good more than they have to pay for it. In the figure the consumer surplus is \$1.50 for the first glass, \$1 for the second, and \$.50 for the third.

**FIGURE 3.8** Producer surplus.



Producer surplus is the value that firms get more than it costs them. The supply curve is marginal cost, so if production is infinitely divisible, then the surplus is the area under the price line and above supply, which is \$1. If it is not infinitely divisible, then the firm makes a profit of \$.50 on the sale of the first and breaks even on the second.

**FIGURE 3.9**  
Consumer and producer surplus.



The consumer surplus is the difference between demand and the price,  $P^*AC$ , and producer surplus is the difference between the price line and the supply curve,  $BP^*C$ . This means that the market creates benefits to society of the combined area,  $BAC$ .

Because in this example the producer surplus is \$1 and the consumer surplus is \$1 [  $(\$2.50 - \$1.50) \times 2 \times 1/2$  ], both demonstrably benefit from the trade. The money that consumers pay firms is simultaneously more than it costs firms to make the good and less than consumers value the good. This is the underlying reason that free enterprise works as well as it does—all the participants leave the market at least as happy as they were when they came to it.

### Consumer and Producer Surplus in a Supply and Demand Model

As we move through the issue chapters you will see this kind of analysis over and over again. Since we will often be using letters instead of numbers in our examples, it will be useful to get some practice now. Figure 3.9 shows us that the value that consumers get from their purchase of  $Q^*$  of the good is the area under the demand curve,  $0ACQ^*$ . The money that consumers pay firms is the rectangle  $0P^*CQ^*$ . The variable cost to firms to make  $Q^*$  is the area under the supply curve  $0BCQ^*$ . The consumer surplus is the triangle  $P^*AC$  while the producer surplus is the triangle  $BP^*C$ . Without the sale of  $Q^*$  goods for  $P^*$  dollars, neither the consumer surplus nor the producer surplus would exist. This means that we can measure the benefit that society gets from the market as the triangle that is made up by the sum of the producer and consumer surplus,  $BAC$ .

### Deadweight Loss

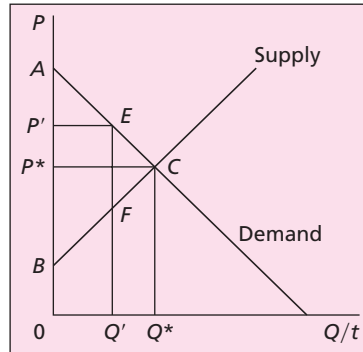
When the market is not at equilibrium the consumer surplus plus the producer surplus will not be as large. This triangle,  $ABC$ , is as big as it can be. If consumption is more than  $Q^*$ , then consumers are paying more than they think a product is worth, or producers are not meeting their marginal costs, or both. If consumption is less than  $Q^*$ , the consumers wish they could buy more (and they would get more consumer surplus), or firms wish they could sell more (and they would get more producer surplus), or both. If the triangle is smaller than  $ABC$ , then there is **deadweight loss**. This deadweight loss is the measure economists use to discuss the inefficiency of markets when a problem like air pollution exists or when government establishes an impediment to a free floating price, such as the minimum wage.

To see how deadweight loss fits our supply and demand diagram suppose that for some reason the price cannot be at  $P^*$  but is instead at  $P'$  (pronounced “ $P$  prime”). Figure 3.10 shows the impact of this when  $P'$  is greater than  $P^*$ , and Figure 3.11 shows the impact when  $P'$  is less than  $P^*$ . In either circumstance the new quantity will be less than equilibrium because consumers

**deadweight loss** —  
The loss in societal welfare associated with production being too little or too great.

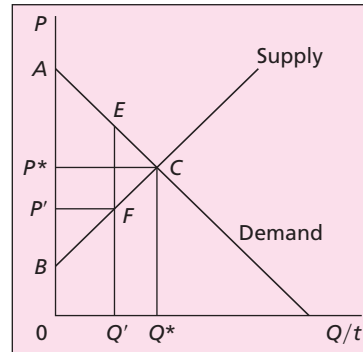


**FIGURE 3.10** Deadweight loss with a price higher than  $P^*$ .



If the price is higher than  $P^*$ , then the value that consumers get will be  $0AEQ'$ ; they will have to pay  $0P'EQ'$ ; and their consumer surplus will be only  $AP'E$ . It will cost producers  $0BFQ'$  to bring in  $0P'EQ'$ , so the producer surplus will be  $BP'EF$ . The sum of consumer and producer,  $BAEF$ , is less than it was at  $P^*$  (which was  $ABC$ ) by the amount  $FEC$ , and  $FEC$  is therefore the deadweight loss.

**FIGURE 3.11** Deadweight loss with a price lower than  $P^*$ .



If the price is lower than  $P^*$ , then the value that consumers get will be  $0AEQ'$ ; they will have to pay  $0P'FQ'$ ; and their consumer surplus will be only  $P'AEF$ . It will cost producers  $0BFQ'$  to bring in  $0P'FQ'$ , so the producer surplus will be  $BP'F$ . The sum of consumer and producer,  $BAEF$ , is less than it was at  $P^*$  (which was  $ABC$ ) by the amount  $FEC$ , and  $FEC$  is therefore the deadweight loss.

will not be willing to buy more than  $Q'$  (pronounced “ $Q$  prime”) at the higher  $P'$  in Figure 3.10 and producers will not be willing to sell more than  $Q'$  in Figure 3.11 at the lower  $P'$ .

In Figure 3.10 the price is higher than  $P^*$ . At that higher price, though producers will want to sell many more than the previous equilibrium quantity, consumers will want to buy fewer. Unless the consumers are compelled to buy things they do not want, they will buy only  $Q'$ . Given that we can find the consumer and producer surplus in this market and compare it to what it was in Figure 3.9. The area under the demand curve represents the value to the consumer of  $Q'$  goods and this is  $0AEQ'$ . The price  $P'$  times the quantity  $Q'$  is the amount of money consumers will pay to get  $Q'$ , and this is represented by the area  $0P'EQ'$ . The difference between these,  $P'AE$ , is the consumer surplus. It costs the producer  $0BFQ'$  in terms of variable costs to make these goods. The difference between the money consumers pay them and their costs,  $BP'EF$ , is the producer surplus. The sum of consumer and producer surplus in this case is  $BAEF$ , but this is less than  $ABC$ , which is what this sum was in Figure 3.9. This means that the area  $FEC$  is lost as a result of being at  $P'$  instead of  $P^*$ , and this is what economists call the deadweight loss of being at  $P'$  instead of  $P^*$ .

In Figure 3.11 the price is lower than  $P^*$ . At that lower price, though, producers will not want to sell as much as they did at the previous equilibrium and consumers will want to buy more. Unless producers are compelled to sell things they do not want to sell, they will produce only  $Q'$ . Again we can find the consumer and producer surplus in this market and compare it to what it was in Figure 3.9. The area under the demand curve still represents the value to the consumer of  $Q'$  goods and is still  $0AEQ'$ . The price  $P'$  times the quantity  $Q'$  is still the amount of money consumers will pay to get  $Q'$ , but this is now represented by the area  $0P'FQ'$ . The difference between these, the consumer surplus, is now  $P'AEF$ . Whereas the costs of the producer,  $0BFQ'$ , remain the same, the revenue has fallen so the producer surplus falls to  $BP'F$ . The sum of consumer and producer in this case is also  $BAEF$ , and this is still less than it was in Figure 3.9. The deadweight loss is again represented by the area  $FEC$ .

## Summary

This chapter expanded on the supply and demand model by showing the importance of the responsiveness of quantity to changes in price and how the model can be used to show that market exchange results in mutually beneficial results for consumers and producers.

In discussing elasticity we began by introducing the formula, defining the terms elastic and inelastic, and exploring why demand for some goods may be elastic while others may be inelastic. We then considered how elasticity of demand is determined by the number of close substitutes and the time available to generate them.

To conclude the chapter we discussed how we could use the supply and demand model to show that consumers and producers each benefit from a market transaction, and we showed how to measure the benefit each gets by defining consumer and producer surplus. Finally, we showed how we measure the inefficiency of being away from equilibrium by defining and illustrating the concept of deadweight loss.

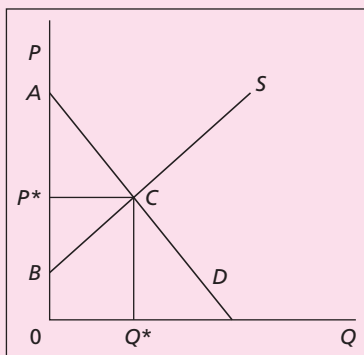
## Key Terms

consumer surplus, 37	income elasticity of demand, 32	price elasticity of supply, 32
cross-price elasticity of demand, 32	inelastic, 33	producer surplus, 37
deadweight loss, 38	perfectly elastic, 35	total expenditure rule, 34
elastic, 33	perfectly inelastic, 35	unitary elastic, 33
elasticity, 32	price elasticity of demand, 32	

## Issues Chapters You Are Ready For Now

Drugs and Prostitution, 162	International Trade: Does It Jeopardize American Jobs? 136	Minimum Wage, 291
The Environment, 175	Medicaid, 194	Rent Control, 299
Farm Policy, 284		Tobacco and Alcohol, 168
Health Care, 184		

## Quiz Yourself



- In the figure consumer surplus is
  - $OPCQ^*$
  - $OACQ^*$
  - $P^*AC$
  - $BP^*C$
- In the figure producer surplus is
  - $OPCQ^*$
  - $OACQ^*$
  - $P^*AC$
  - $BP^*C$

3. Consumer surplus is defined as
  - a. The value that consumers place on a good over the amount they pay for it.
  - b. The money that producers get from a good over the amount they are willing to sell it for.
  - c. When quantity supplied is greater than quantity demanded.
  - d. When quantity demanded is greater than quantity supplied.
4. Producer surplus is defined as
  - a. The value that consumers place on a good over the amount they pay for it.
  - b. The money that producers get from a good over the amount they are willing to sell it for.
  - c. When quantity supplied is greater than quantity demanded.
  - d. When quantity demanded is greater than quantity supplied.
5. Without a belief that the market has failed, which of the following will result in dead-weight loss:
  - a. A price below equilibrium.
  - b. A price above equilibrium.
  - c. A price at equilibrium.
  - d. Either (a) or (b).

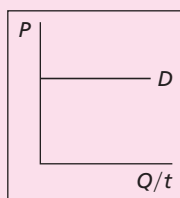


Figure 1

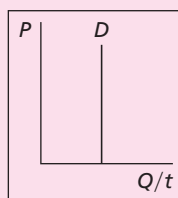


Figure 2

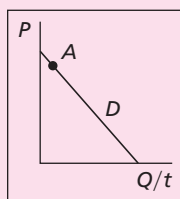


Figure 3

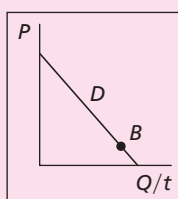


Figure 4

6. If demand is considered perfectly elastic, then the appropriate figure is
  - a. Figure 1.
  - b. Figure 2.
  - c. Figure 3.
  - d. Figure 4.
7. If demand is considered perfectly inelastic, then the appropriate figure is
  - a. Figure 1.
  - b. Figure 2.
  - c. Figure 3.
  - d. Figure 4.
8. At point A in Figure 3 demand is
  - a. Elastic.
  - b. Inelastic.
  - c. Perfectly inelastic.
  - d. Perfectly elastic.

9. At point *B* in Figure 4 demand is
  - a. Elastic.
  - b. Inelastic.
  - c. Perfectly inelastic.
  - d. Perfectly elastic.
10. If the price of a good increases by 10 percent and the quantity demanded decreases by 5 percent, then at that price the good is
  - a. Elastic.
  - b. Inelastic.
  - c. Perfectly inelastic.
  - d. Perfectly elastic.
11. Which of the following is true:
  - a. On a linear demand curve, the higher the price the more elastic is demand.
  - b. On a linear demand curve, elasticity is constant.
  - c. At the same price demand is more elastic on the steeper demand curve.
  - d. None.

**Think about This**

How does the concept of consumer and producer surplus help explain why economists generally favor free markets?

**Talk about This**

Use the concept of elasticity to analyze how high tuition would have to rise to get you to drop out of school or change schools. Would it matter if you were in a rural area with only one college or in an urban area with many?