Elasticity: An Introduction

Student Alert: **Elasticity measures the *strength* of your response to a change in a variable.**

In many circumstances, it is not enough for an economist, policymaker, firm, or consumer to simply know the direction in which a variable will be moving. For example, if I am a producer, the law of demand tells me that if I increase the price of my good, the quantity demanded by consumers will decrease. The law of demand tells me the *direction* of the consumer response to the price change, but it does not tell me the *strength* of the consumer response. The law of demand doesn't tell me what will happen to my total revenue (the price of the good times the number of units sold). Whether total revenue increases or decreases depends on how responsive the quantity demanded is to the price change. Will total revenue increase or decrease by a little or a lot? Throughout the discipline of economics, in fact, the responsiveness of one variable to changes in another variable is an important piece of information. In general, *elasticity* is a measurement of how responsive one variable is to a change in another variable, *ceteris paribus* (holding all other variables constant).

Because elasticity measures responsiveness, changes in the variables are measured relative to some base or starting point. Each variable's change is measured as a percentage change. Consider the following elasticity measurements:

The price elasticity of demand, ε_d

$$\varepsilon_d = \frac{\text{percentage change in quantity demanded of Good X}}{\text{percentage change in price of Good X}}.$$

The income elasticity of demand, ε_I

$$\varepsilon_I = \frac{\text{percentage change in quantity demanded of Good X}}{\text{percentage change in income}}.$$

The cross-price elasticity of demand, ε_{CP}

$$\varepsilon_{CP} = \frac{\text{percentage change in quantity demanded of Good X}}{\text{percentage change in price of Good W}}.$$

The price elasticity of supply, ε_S

$$\varepsilon_S = \frac{\text{percentage change in quantity supplied of Good X}}{\text{percentage change in price of Good X}}.$$

Part A: Bonus Pay at Work

1. You have a job stocking items on the shelves at the local home improvement store. To increase productivity, your boss says a bonus will be paid based on how many items you put on the shelves each hour. Write the equation of the "elasticity of productivity" for this situation:

$$\varepsilon_{\text{productivity}} = \frac{\textit{percentage change in } \textbf{\textit{number of items stocked}}}{\textit{percentage change in } \textbf{\textit{pay}}}.$$

2. Assume your boss wants you to double your output, which would be a 100 percent increase in the number of items you shelve each hour. Underline the correct answer in each of these statements.

   (A) If your productivity is very responsive to a pay increase, then a given increase in your pay results in a large increase in your hourly output. In this case, your boss will need to increase the bonus pay by (*more than* / ***less than*** / *exactly*) 100 percent.

   (B) If your productivity is not very responsive to a pay increase, then a given increase in your pay results in a small increase in your hourly output. In this case, your boss will need to increase the bonus pay by (***more than*** / *less than* / *exactly*) 100 percent.

Part B: The Price Elasticity of Demand

It's easy to imagine that there are many applications for the elasticity concept. Here we will concentrate on the price elasticity of demand for goods and services. For convenience, the measure is repeated here:

$$\varepsilon_d = \frac{\text{percentage change in quantity demanded of Good X}}{\text{percentage change in price of Good X}}.$$

Note the following points:

- Price elasticity of demand is always measured *along* a demand curve. When measuring the responsiveness of quantity demanded to a change in price, all other variables must be held constant.
- Because of the law of demand, which states that price and quantity demanded move in opposite directions, when you calculate the value of the price elasticity of demand, expect it to be a negative number. When we interpret that value, we consider the absolute value of ε_d.
- Along a linear, downward sloping demand curve, there are price ranges over which demand is elastic, unit elastic, and inelastic.

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Table 2-3.1
Relationship between Changes in Quantity Demanded and Price

%ΔQd compared to %ΔP	Absolute value of ε_d	Interpretation
%ΔQd > %ΔP	> 1	Elastic
%ΔQd = %ΔP	= 1	Unit elastic
%ΔQd < %ΔP	< 1	Inelastic

Part C: Calculating the Arc Elasticity Coefficient

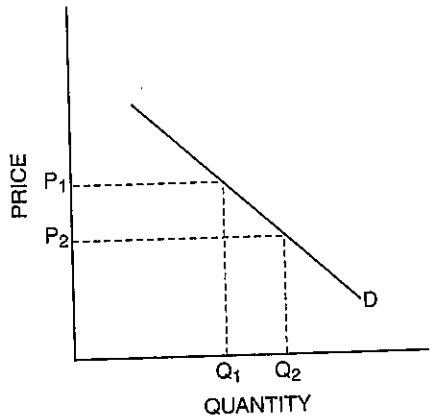
The arc elasticity calculation method is obtained when the midpoint or average price and quantity are used in the calculation. This is reflected in the formula below.

$$\varepsilon_d = \frac{\text{percentage change in quantity demanded}}{\text{percentage change in price}} = \frac{\left(\frac{Q_2 - Q_1}{(Q_2 + Q_1)/2}\right)}{\left(\frac{P_2 - P_1}{(P_2 + P_1)/2}\right)} = \frac{\left(\frac{\Delta Q}{(Q_2 + Q_1)/2}\right)}{\left(\frac{\Delta P}{(P_2 + P_1)/2}\right)}.$$

$$\varepsilon_d = \frac{\left(\frac{\text{the actual change in Q}}{\text{the average value of Q}}\right)}{\left(\frac{\text{the actual change in P}}{\text{the average value of P}}\right)}.$$

Suppose in Figure 2-3.1 that price is decreased from P_1 to P_2 and so quantity demanded increases from Q_1 to Q_2.

Figure 2-3.1
Calculating the Arc Elasticity Coefficient



Because price decreased, our calculations will show the percentage change in price is negative. Because quantity demanded increased, the percentage change in quantity demanded is positive. The ratio of the two percentage changes thus will have a negative value. When we interpret the calculated value of ε_d, we consider its absolute value in deciding whether demand over this price range is elastic, unit elastic, or inelastic. Note that we have used the average of the two prices and the two quantities. We have done this so that the elasticity measured will be the same whether we are moving from Q_1 to Q_2 or the other way around.

Part D: Coffee Problems

Suppose Moonbucks, a national coffee-house franchise, finally moves into the little town of Middleofnowhere. Moonbucks is the only supplier of coffee in town and faces the weekly demand schedule as shown in Table 2-3.2. Answer the questions that follow.

Table 2-3.2

Cups of Coffee Demanded per Week

Price (per cup)	Quantity demanded	Price (per cup)	Quantity demanded
$10	0	$4	120
$9	20	$3	140
$8	40	$2	160
$7	60	$1	180
$6	80	$0	200
$5	100		

3. What is the arc price elasticity of demand when the price changes from $1 to $2? ***−0.18***

$$\varepsilon_d = \frac{\left(\frac{(160-180)}{(160+180)/2}\right)}{\left(\frac{(\$2.00-\$1.00)}{(\$2.00+\$1.00)/2}\right)} = \frac{\frac{-20}{170}}{\frac{+\$1.00}{\$1.50}} = \frac{-11.8\%}{+66.7\%} = -0.18.$$

So, over this range of prices, demand is (*elastic / unit elastic /* ***inelastic***).

4. What is the arc price elasticity of demand when the price changes from $5 to $6? ***−1.22***

$$\varepsilon_d = \frac{\left(\frac{(80-100)}{(80+100)/2}\right)}{\left(\frac{(\$6.00-\$5.00)}{(\$6.00+\$5.00)/2}\right)} = \frac{\frac{-20}{90}}{\frac{+\$1.00}{\$5.50}} = \frac{-22.2\%}{+18.2\%} = -1.22.$$

So, over this range of prices, demand is (***elastic*** */ unit elastic / inelastic*).

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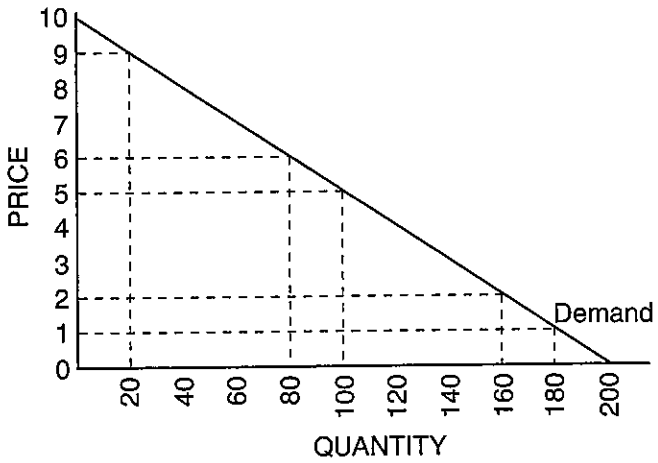
Part E: Comparing Slope and Price Elasticity of Demand

Now, consider Figure 2-3.2, which graphs the demand schedule given in Table 2-3.2.

Recall that the slope of a line is measured by the rise over the run: slope = rise / run = ΔP / ΔQ.

Figure 2-3.2
Elasticity of Demand for Coffee



5. Using your calculations of ΔP and ΔQ from Question 3, calculate the slope of the demand curve between the prices of $1 and $2.

$$Slope = \frac{\Delta P}{\Delta Q} = \frac{\$2 - \$1}{160 - 180} = \frac{+\$1}{-20} = -0.05.$$

6. Using your calculations of ΔP and ΔQ from Question 4, calculate the slope of the demand curve between the prices of $5 and $6.

$$Slope = \frac{\Delta P}{\Delta Q} = \frac{\$6 - \$5}{80 - 100} = \frac{+\$1}{-20} = -0.05.$$

7. The law of demand tells us that an increase in price results in a decrease in the quantity demanded. Questions 5 and 6 remind us that the slope of a straight line is *constant everywhere along the line.* Anywhere along this demand curve, a change in price of $1 generates a change in quantity demanded of 20 cups of coffee a week.

   You've now shown mathematically that while the slope of the demand curve is related to the price elasticity of demand, the two concepts are not the same thing. Briefly discuss the relationship between where you are along the demand curve and the price elasticity of demand. How does this tie into the notion of *responsiveness*?

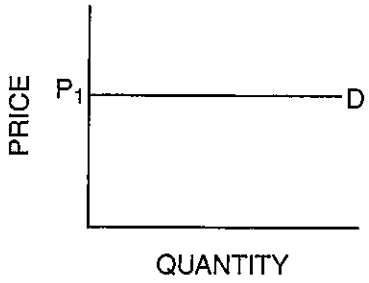
   The unit change in Q in response to a given dollar change in P will be the same all along a downward-sloping, straight-line demand curve because the curve has constant slope. You saw above that each $1 increase in P results in a 20-unit decrease in Q, no matter where you are on the demand curve. However, elasticity is quite different. How large a percentage change in P results from a $1 increase in P depends on where you are on the demand curve. If the initial P is a small value (like $1),

then a $1 increase is a larger percentage change in P. If the initial P is a large value (like $5), then a $1 increase is a smaller percentage change in P. The same is true for a 20-unit decrease in Q. If the initial Q is large (like 180), then you have a smaller percentage change in Q. But if the initial Q is small (like 100), then you have larger percentage change in Q. You will find that the value of ε_d varies all along the length of a downward-sloping, linear demand curve. At a high price, a given percentage change in P results in a larger percentage in Q. At a low price, that same percentage change in P results in a smaller percentage change in Q. If the demand curve is a downward-sloping straight line, the upper half of the demand curve is elastic, the lower half is inelastic, and the midpoint is unitary elastic.

Part F: Two Extreme Cases of Price Elasticity of Demand

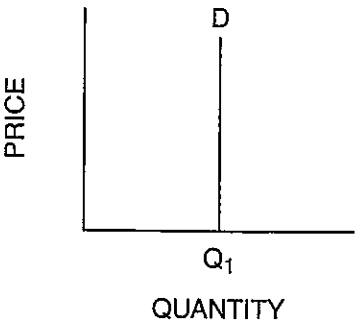
8. A horizontal demand curve is *perfectly elastic* because consumers will completely stop buying the good if the price is increased even by a small amount. This extreme case is shown by the demand curve facing a perfectly competitive firm. Such a firm can sell all it wants at the current market price (P_1), but if it raises its price it will lose all of its customers to other firms selling the same product at price P_1.

Figure 2-3.3
Perfectly Elastic Demand



9. A vertical demand curve is *perfectly inelastic* because consumers want to buy the same amount (Q_1) of the good, no matter what the price. If the price increases, there is no response by consumers. This extreme case is approximated by the demand for a life-saving drug for which there are no acceptable substitutes.

Figure 2-3.4
Perfectly Inelastic Demand



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Part G: Other Types of Elasticities

While the concept of price elasticity of demand captures most of the attention, an economist can create a measure of the elasticity that exists between any two variables. Three other elasticities that merit examination are income elasticity of demand, cross-price elasticity of demand, and price elasticity of supply.

The *income elasticity of demand* shows how responsive consumers are to a change in their income.

$$\varepsilon_I = \frac{\text{percentage change in quantity demanded of Good X}}{\text{percentage change in income}}.$$

Table 2-3.3 shows how economists interpret the value of ε_I:

Table 2-3.3
Income Elasticity of Demand

Value of ε_I	Interpretation
$\varepsilon_I > 0$	Good X is a normal (superior) good.
$\varepsilon_I < 0$	Good X is an inferior good.

A *normal good* is one for which income and demand move in the same direction. If income and demand move in opposite directions, the good is an *inferior good.*

10. Example: When income increases by 5 percent, the amount demanded of Tasty Cola increases by 3 percent and the amount demanded of Crusty Cola decreases by 2 percent. Answer these questions:

(A) The value of ε_I for Tasty Cola is ***+0.6***.

$$\varepsilon_I = \frac{+3\%}{+5\%} = +0.6$$

(B) The value of ε_I for Crusty Cola is ***−0.4***.

$$\varepsilon_I = \frac{-2\%}{+5\%} = -0.4$$

(C) Tasty Cola is considered a(n) (***normal*** / *inferior*) good.

(D) Crusty Cola is considered a(n) (*normal* / ***inferior***) good.

The *cross-price elasticity of demand* shows how responsive consumers of Good X are to a change in the price of some other good.

$$\varepsilon_{CP} = \frac{\text{percentage change in quantity demanded of Good X}}{\text{percentage change in price of Good W}}.$$

Table 2-3.4 shows how economists interpret the value of ε_{CP}:

Table 2-3.4
Cross-Price Elasticity of Demand

Value of ε_{CP}	Interpretation
$\varepsilon_{CP} > 0$	X and W are substitute goods.
$\varepsilon_{CP} = 0$	X and W are unrelated goods.
$\varepsilon_{CP} < 0$	X and W are complementary goods.

Hamburgers and pizzas are *substitute goods*; if the price of pizza rises, the amount of hamburgers demanded also rises. Ice cream and ice cream cones are *complementary goods*; if the price of ice cream falls, the amount of cones demanded rises.

11. Example: When the price of Good W increases by 4 percent, the amount demanded of Good A increases by 3 percent, the amount demanded of Good B falls by 2 percent, and the amount demanded of Good C is unchanged. Answer these questions:

(A) The value of ε_{CP} between Good A and Good W is ***+0.75***.

$$\varepsilon_{CP} = \frac{+3\%}{+4\%} = +0.75$$

(B) The value of ε_{CP} between Good B and Good W is ***−0.50***.

$$\varepsilon_{CP} = \frac{-2\%}{+4\%} = -0.50$$

(C) The value of ε_{CP} between Good C and Good W is ***+0.00***.

$$\varepsilon_{CP} = \frac{+0\%}{+4\%} = +0.00$$

(D) Good A and Good W are (***substitute*** / *unrelated* / *complementary*) goods.

(E) Good B and Good W are (*substitute* / *unrelated* / ***complementary***) goods.

(F) Good C and Good W are (*substitute* / ***unrelated*** / *complementary*) goods.

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The *price elasticity of supply* shows how responsive producers of Good X are to a change in the price of Good X. The law of supply tells us that the sign of ε_S will be positive because price and quantity supplied move in the same direction.

$$\varepsilon_S = \frac{\text{percentage change in quantity supplied of Good X}}{\text{percentage change in price of Good X}}.$$

Table 2-3.5 shows how economists interpret the value of ε_S:

Table 2-3.5
Price Elasticity of Supply

Value of ε_S	Interpretation
$\varepsilon_S > 1$	Supply is elastic over this price range.
$\varepsilon_S = 1$	Supply is unit elastic over this price range.
$\varepsilon_S < 1$	Supply is inelastic over this price range.

12. Example: Assume the price of bookcases increases by 5 percent.

(A) If the quantity supplied of bookcases increases by 8 percent, the value of ε_S is ***+1.6*** and the supply is (***elastic*** / *unit elastic* / *inelastic*) over this price range.

$$\varepsilon_s = \frac{+8\%}{+5\%} = +1.6$$

(B) If the quantity supplied of bookcases increases by 5 percent, the value of ε_S is ***+1.0*** and the supply is (*elastic* / ***unit elastic*** / *inelastic*) over this price range.

$$\varepsilon_s = \frac{+5\%}{+5\%} = +1.0$$

(C) If the quantity supplied of bookcases increases by 3 percent, the value of ε_S is ***+0.6*** and the supply is (*elastic* / *unit elastic* / ***inelastic***) over this price range.

$$\varepsilon_s = \frac{+3\%}{+5\%} = +0.6$$

The Determinants of Price Elasticity of Demand

Suppose we don't know the precise demand schedule for electricity and there is a 20 percent increase in the price of a kilowatt hour of electricity. We know that quantity demanded will decrease, but will it be by less than 20 percent (inelastic demand), exactly 20 percent (unit elastic demand), or more than 20 percent (elastic demand)? What factors influence the price elasticity of demand? (Remember, *ceteris paribus*!)

Part A: Presence of a Substitute Good or Service

Consider the following representative households in our market for electricity: Household A uses electricity for lighting, appliances, and heating. Household B uses electricity for lighting, appliances, and heating. It also has a heating system that can be switched to burn natural gas.

1. Household ___*B*___ will have the more elastic demand for electricity because of the presence of a ___*substitute*___ good.

2. Because Household A has no available substitutes, should we assume that the quantity demanded of electricity will remain unchanged given the increase in price? ___*No*___

   Do you think Household A's response will be relatively more elastic or inelastic than that of Household B? ___*Inelastic*___

3. Rate the following items in terms of their price elasticity of demand. Put a 1 in front of the good with the most elastic demand, a 3 in front of the item with the least elastic demand, and a 2 in front of the other good. Explain your reasoning.

   ___*3*___ Demand for insulin

   ___*1*___ Demand for Granny Smith apples

   ___*2*___ Demand for running shoes

   Rationale:
   The smaller the number of substitute goods, the less elastic is the demand for that good. Insulin has no substitutes. There are more substitutes for Granny Smith apples than for running shoes because Granny Smith is a particular type of apple, and running shoes include all running shoes. This is why the demand for Granny Smith apples is most elastic.

4. To summarize: demand is (***more*** / *less*) elastic for goods with many available substitutes.

Part B: Proportion of Income Spent on a Good or Service

Consider the following representative households in the electricity market: Household A has income of $1,200 per month and spends $300 a month on electricity. Household B has income of $3,600 per month and spends $300 a month on electricity.

5. Household ___A___ will have the more elastic demand for electricity because the expenditures on this good account for a (*smaller* / ***larger***) proportion of its income.

6. Illustrate your understanding of price elasticity of demand by placing a 1, 2, or 3 by each item below, denoting the most elastic (1) to the least elastic (3). Explain your reasoning.

   ___3___ Demand for chewing gum

   ___1___ Demand for automobiles

   ___2___ Demand for clothing

   Rationale:
   Autos take the largest proportion of income, then clothing, then chewing gum.

7. To summarize: goods that command a (*small* / ***large***) proportion of a consumer's income tend to be more price elastic.

Part C: Nature of the Good or Service

We expect that the price elasticity of demand will also vary with the nature of the good being considered. Is it a necessity? Is it a durable good? Are we considering the short run or the long run? Consider the following alternatives, and choose the option that correctly completes each statement.

8. The price elasticity of demand for cigarettes: a product that is considered to be a necessity will have a relatively price (*elastic* / ***inelastic***) demand.

9. The price elasticity of demand for automobiles: in the short run, consumers can postpone the purchase of durable goods, and so the demand for such goods will be relatively (***more*** / *less*) price elastic.

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10. Briefly summarize how the nature of the good—necessity, durable good, or luxury good—and the time frame over which demand is measured affect the price elasticity of demand for a good or a service.
Demand is more inelastic for items that are necessities and more elastic for items that are durable or luxuries. The longer the time frame, the more elastic is the demand for a good or a service.

Part D: Income Elasticity of Demand

Now, suppose that prices in the market for electricity remain constant, but consumers' income increases by 30 percent. Even though we may not know the precise demand schedule, we are able to use the concept of income elasticity of demand to speculate about what will happen to demand.

Recall the income elasticity of demand, ε_I:

$$\varepsilon_I = \frac{\text{percentage change in quantity demanded}}{\text{percentage change in income}}.$$

Note in this case, income and quantity demanded are the relevant variables. All other variables, including the price of electricity, are held constant.

11. In measurements of income elasticity, if income and quantity demanded move in opposite directions—that is, if one increases while the other decreases—then the income elasticity coefficient will be (*positive* / ***negative***).

12. Remember that if income increases, the demand for a normal good increases and the demand for an inferior good decreases. If the good is a normal good, income elasticity will be (*negative* / ***positive***). If it is an inferior good, income elasticity will be (***negative*** / *positive*).

Elasticity and Total Revenue

The income a firm receives from selling its good or services is called its *total revenue.* It also can be thought of as total consumer expenditure on that good or service.

Total revenue (TR) = Price (P) × quantity demanded (Qd).

Since price and quantity demanded were involved in our discussion of price elasticity of demand, it makes sense that total revenue somehow is related to the demand elasticity of the good or service the firm is selling. How strongly quantity demanded responds to a change in price will determine whether that price change leads to an increase or decrease in the firm's total revenue.

The law of demand tells us that a price increase will result in a decrease in quantity demanded. By itself, the higher price increases total revenue because the firm gets a higher price for each unit sold. But total revenue also is decreased because the firm will sell fewer units at the higher price. What happens to total revenue when price increases is determined by whether the effect of the higher price dominates the effect of the lower quantity demanded. Knowing the price elasticity of demand allows us to answer this important question. Table 2-5.1 presents the "total revenue test" related to the price elasticity of demand.

Table 2-5.1

Price Elasticity of Demand and Total Revenue

Category of price elasticity of demand	Relationship between price and total revenue
Elastic	P and TR move in opposite directions.
Inelastic	P and TR move in the same direction.
Unit elastic	TR is unaffected by a change in P.

1. Choose the correct answers in Table 2-5.2 to test your understanding of the "total revenue test."

Table 2-5.2
Price Elasticity of Demand and Total Revenue

	%ΔP	%ΔQd	Over this price range, demand is:	As a result of the ΔP, TR will:
(A)	+5%	–2%	*elastic / unit elastic /* ***inelastic***	***rise*** */ fall / not change*
(B)	+5%	–5%	*elastic /* ***unit elastic*** */ inelastic*	*rise / fall /* ***not change***
(C)	+5%	–8%	***elastic*** */ unit elastic / inelastic*	*rise /* ***fall*** */ not change*
(D)	–4%	+6%	***elastic*** */ unit elastic / inelastic*	***rise*** */ fall / not change*
(E)	–4%	+3%	*elastic / unit elastic /* ***inelastic***	*rise /* ***fall*** */ not change*
(F)	–4%	+4%	*elastic /* ***unit elastic*** */ inelastic*	*rise / fall /* ***not change***

You can use the total revenue test to determine the nature of price elasticity of demand without using percentage change values or calculating the value of the price elasticity of demand. Suppose when the price of calculators is increased from $15 to $17, the quantity demanded decreases from 10 million to 6 million calculators.

2. Complete Table 2-5.3 by determining the value of TR before and after the price change, then answer the questions that follow.

Table 2-5.3
Using Changes in TR to Identify Elasticity

	P	Qd	TR
(A) Old value	$15	10 million	***$150*** *million*
(B) New value	$17	6 million	***$102*** *million*

(C) How did TR change when P increased?

TR decreased when P increased over this price range.

(D) This indicates that demand over this price range is (***elastic*** */ unit elastic / inelastic*).

Note: The total revenue test in Table 2-5.1 is based on the price elasticity of demand. It is not related to the price elasticity of supply because if suppliers produce a lot more of their product when its price increases, that does not tell us how much of the product consumers are buying.

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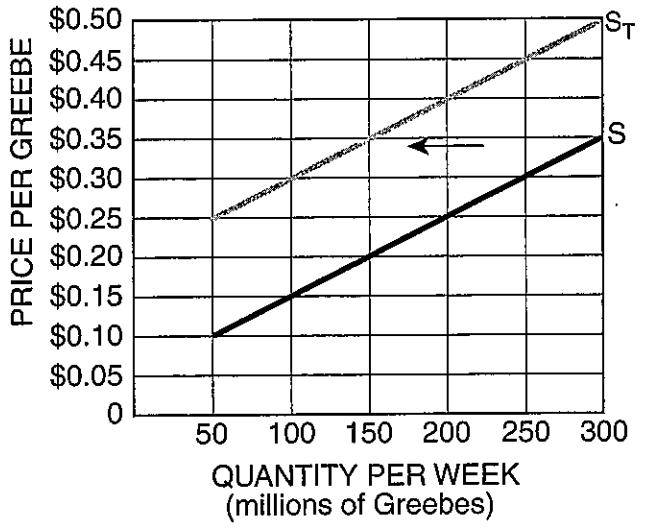
Excise Taxes

Table 2-6.1 and Figure 2-6.1 show the current supply of Greebes.

Table 2-6.1
Supply Schedule of Greebes

Quantity (millions)	Supply price before tax (per Greebe)	Supply price after tax (per Greebe)
50	$0.10	***$0.25***
100	$0.15	***$0.30***
150	$0.20	***$0.35***
200	$0.25	***$0.40***
250	$0.30	***$0.45***
300	$0.35	***$0.50***

Figure 2-6.1
Current Supply Schedule of Greebes



Now, suppose that in order to raise revenue for higher education, the government enacts an excise (sales) tax on sellers of $0.15 per Greebe. *This tax will result in a new supply curve for Greebes.* Since sellers will view this tax as an additional cost to them, there will be a decrease in supply. To determine where this new supply curve lies, reason as follows. Firms will try to pass the tax on to consumers through a higher price. If before the tax, firms were willing to supply 50 million Greebes at a price of $0.10, they would now be willing to

supply 50 million Greebes only if the price were $0.25. (Remember: $0.15 of the price of each Greebe sold is now going to go to the government. So, if the price is $0.25 and the government is getting $0.15 of this price, then the seller is receiving the remaining $0.10.)

1. Fill in the blank spaces in Table 2-6.1. In Figure 2-6.1 draw the new supply curve that results from the tax. Label the new supply curve S_T.

What will be the result of this excise tax on the equilibrium quantity of Greebes? On the equilibrium price paid by buyers? On the equilibrium price received by sellers? On the tax revenue received by the government? On the revenue kept by sellers after they give the government its tax revenue?

The answers to these important questions will depend on the price elasticity of demand for Greebes. The next section of this activity will help you determine the effects of a $0.15 per unit excise tax on Greebes under four different demand conditions.

Part A: Relatively Elastic and Relatively Inelastic Demand

Compare the demand curves in Figures 2-6.2 and 2-6.3. Demand curve D_1 is relatively more inelastic than demand curve D_2. Put another way, D_2 is relatively more elastic than D_1.

Figure 2-6.2
Relatively Inelastic Demand for Greebes

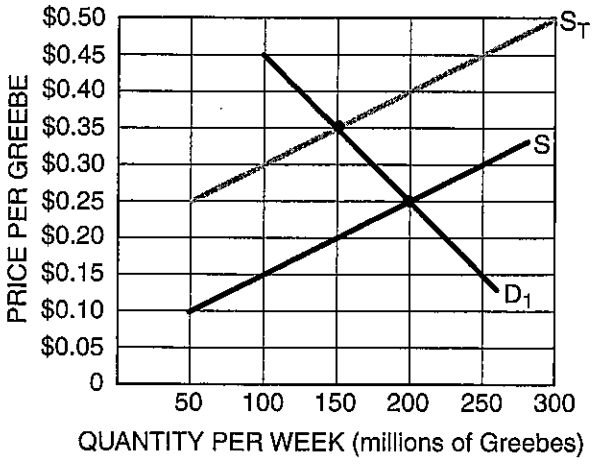
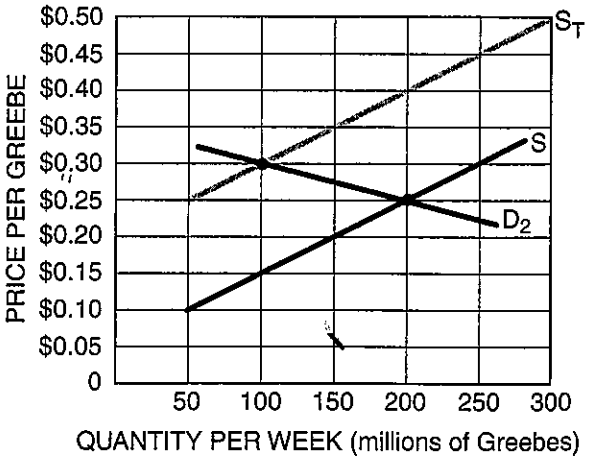


Figure 2-6.3
Relatively Elastic Demand for Greebes



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2. Complete Table 2-6.2, which compares conditions before the tax and after the tax based on demand curves D_1 and D_2. Remember, the government is placing a $0.15 per unit excise tax on the sellers of the good. You will need to add the new supply curve S_T to Figures 2-6.2 and 2-6.3.

Table 2-6.2
Comparing Effects of Tax Based on Price Elasticity of Demand

	Relatively inelastic demand D_1 Figure 2-6.2		Relatively elastic demand D_2 Figure 2-6.3	
	Before tax	After tax	Before tax	After tax
Equilibrium quantity	200 million	***150 million***	***200 million***	100 million
Equilibrium price	$0.25	***$0.35***	***$0.25***	$0.30
Total expenditure by consumers	***$50.0 million***	$52.5 million	$50.0 million	***$30.0 million***
Total revenue sellers get to keep	$50.0 million	***$30.0 million***	***$50.0 million***	$15.0 million
Total tax revenue to government	$0.0 million	***$22.5 million***	$0.0 million	***$15.0 million***

The incidence or burden of the excise tax refers to how the $0.15 per unit excise tax is shared between the buyers and the sellers. The incidence on the consumer is the increase in the equilibrium price resulting from the tax. The seller's incidence is that part of the tax not paid by consumers.

3. Under demand curve D_1, the incidence of the tax is ***$0.10*** per unit on consumers and ***$0.05*** per unit on sellers. Remember, these two values must add up to the per unit excise tax of $0.15.

4. Under demand curve D_2, the incidence of the tax is ***$0.05*** per unit on consumers and ***$0.10*** per unit on sellers. Remember, these two values must add up to the per unit excise tax of $0.15.

5. The incidence of the tax is greater on buyers if demand is relatively (***more*** / *less*) inelastic.

6. The incidence of the tax is greater on sellers if demand is relatively (*more* / ***less***) inelastic.