

Economics

6th edition

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Microeconomics

SIXTH EDITION

Chapter 6

Elasticity: The Responsiveness of
Demand and Supply

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The Price Elasticity of Demand and Its Measurement

We define an **elasticity**, a measure of how much one economic variable response to changes in another economic variable, based on *percentage changes* in the variables.

Price elasticity of demand

the price elasticity of demand, the responsiveness of the quantity demanded to a change in price:

$$\text{Price elasticity of demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

Since price and quantity change in opposite directions on the demand curve, the price elasticity of demand is a negative number.

- However, we are usually interested in the relative size of elasticities, we often compare their absolute values.

Price elasticity of demand terminology

Demand is **price elastic** if its price elasticity of demand is larger (in absolute value) than 1.

- So a 10 percent increase in price would result in a greater than 10 percent decrease in quantity demanded.

Demand is **price inelastic**, if its price elasticity of demand is smaller (in absolute value) than 1.

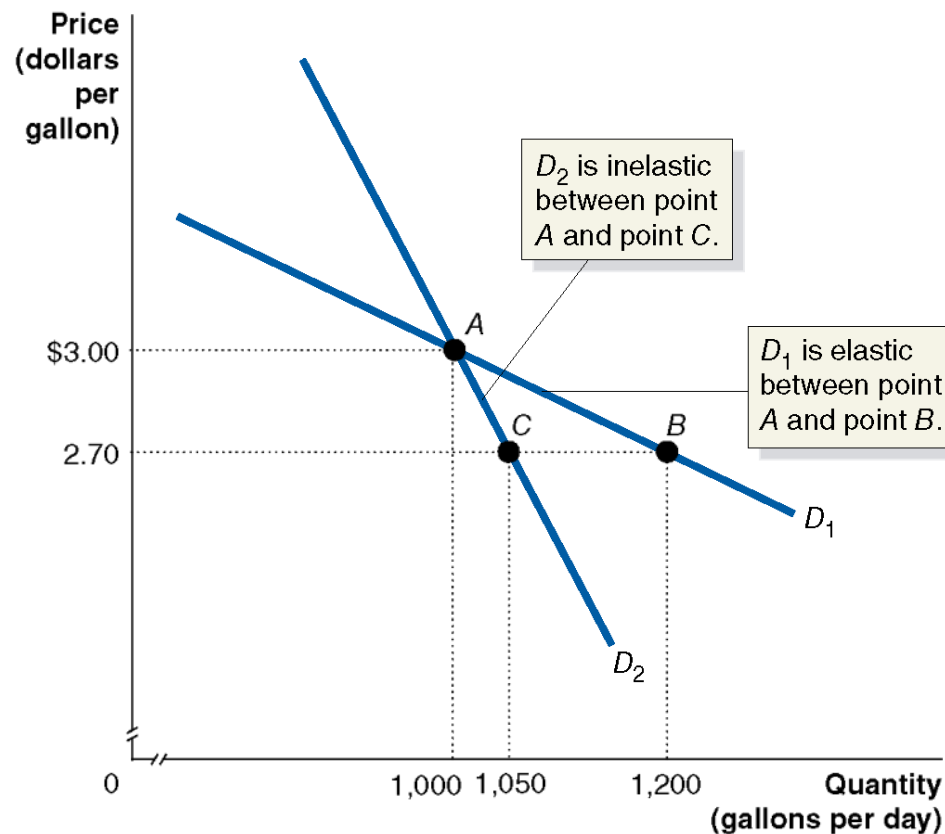
- That is, close to zero, indicating that quantity demanded changes little in response to a price change.

Demand is **unit price elastic** if the price elasticity of demand is exactly equal to (negative) 1.

Example: Elastic and inelastic demand

Along D_1 , cutting the price from \$3.00 to \$2.70 increases the number of gallons sold from 1,000 per day to 1,200 per day; demand is elastic between point A and point B .

Along D_2 , cutting the price from \$3.00 to \$2.70 increases the number of gallons sold from 1,000 per day only to 1,050 per day; demand is inelastic between point A and point C .



Polar cases

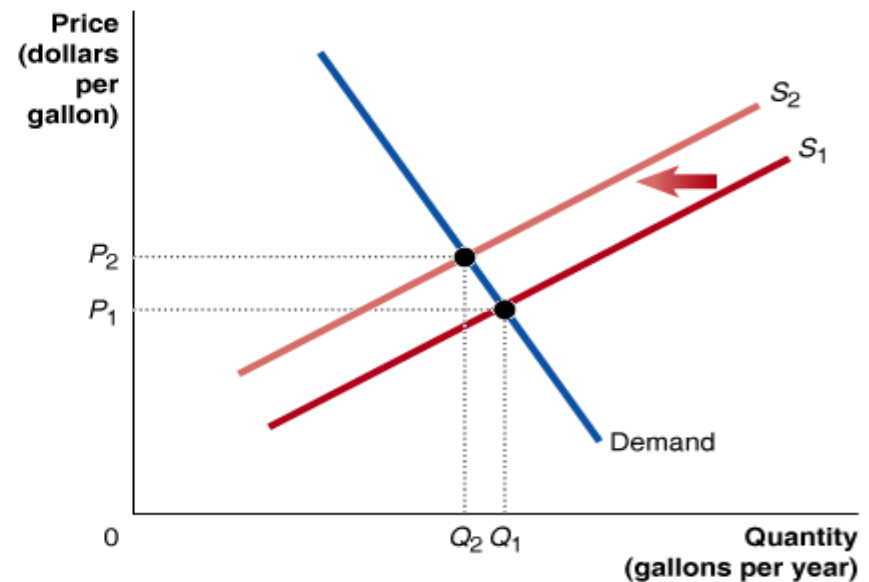
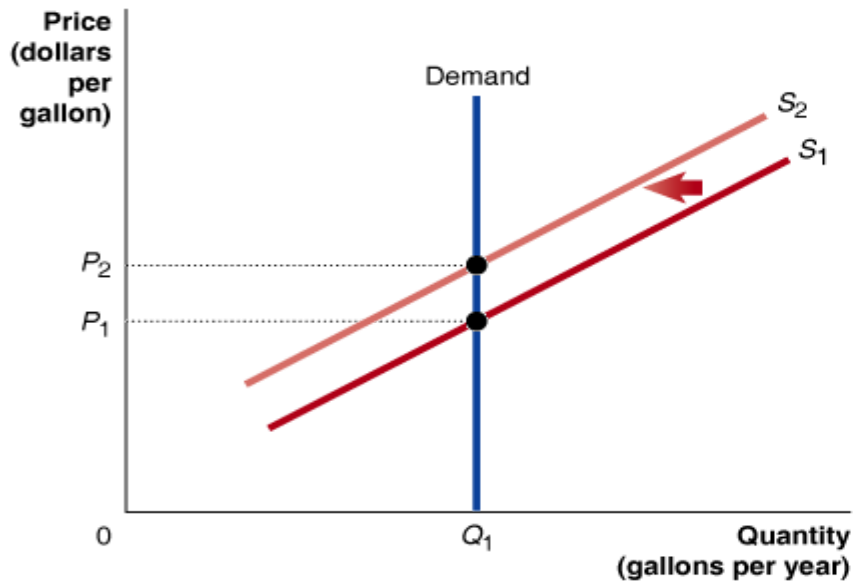
Perfectly inelastic demand: The case where the quantity demanded is completely unresponsive to price and the price elasticity of demand equals zero.

Perfectly elastic demand: The case where the quantity demanded is infinitely responsive to price and the price elasticity of demand equals infinity.

Note: very few products actually have perfectly inelastic demand curves or perfectly elastic demand curves.

Practice

Consider the following problem: use a demand and supply graph to show how a decrease in supply affects the equilibrium quantity of gasoline. Assume that the gasoline is inelastic. Which panel shows this?



Example: Estimated real-world price elasticities of demand

Product	Estimated Elasticity	Product	Estimated Elasticity
Books (Barnes & Noble)	-4.00	Water (residential use)	-0.38
Books (Amazon)	-0.60	Chicken	-0.37
DVDs (Amazon)	-3.10	Cocaine	-0.28
Post Raisin Bran	-2.50	Cigarettes	-0.25
Automobiles	-1.95	Beer	-0.29
Tide (liquid detergent)	-3.92	Catholic school attendance	-0.19
Coca-Cola	-1.22	Residential natural gas	-0.09
Grapes	-1.18	Gasoline	-0.06
Restaurant meals	-0.67	Milk	-0.04
Health insurance (low-income households)	-0.65	Sugar	-0.04
Bread	-0.40		

The Determinants of the Price Elasticity of Demand

Why do some goods have a high price elasticity of demand, while others have a low price elasticity of demand? There are several characteristics of the good, of the market, etc. that determine this.

1, The availability of close substitutes

If a product has more substitutes available, it will have more elastic demand.

- *Example: There are few substitutes for gasoline, so its price elasticity of demand is low.*
- *Example: There are many substitutes for Nikes (Reeboks, Adidas, etc.), so their price elasticity of demand is high.*

2, a luxury or a necessity

People are more flexible with luxuries than necessities, so price elasticity of demand is higher for luxuries.

Example: Many people consider milk and bread necessities; they will buy them every week almost regardless of the price.

Example: Tickets to a concert are a luxury.

3, The share of a good in a consumer's budget

If a good is a small portion of your budget, you will likely not be very sensitive to its price.

Example: You might buy table salt once a year or less; changes in its price will not affect very much how much you buy.

Practice

John lives in small town where there is only one Mexican restaurant. Which of the following is likely to be true about the price elasticity of demand for meal at the Mexican restaurant?

A, Demand is likely to be relatively elastic

B, Demand is likely to be relatively inelastic.

Practice

Which of the following goods would have the most inelastic demand?

A, ski vacations

B, bread

C, luxury cars

D, big screen TV

The Relationship between Price Elasticity of Demand and Total Revenue

If you are a business owner, you need to decide how to price your product.

- “How many customers will I gain if I cut my price?”
- “What will happen to my *total revenue* if I cut my price?”

Total revenue: The total amount of funds received by a seller of a good or service, calculated by multiplying the price per unit by the number of units sold.

Knowing the price elasticity of demand for your product can help to answer these questions.

Effect of cutting price with different elasticities

Suppose demand for your product is relatively price inelastic.

- Customers are not very sensitive to the price of your product.
- As you decrease the price, you expect to gain few additional customers.
- The few additional customers do not compensate for the lost revenue, so overall revenue goes down.

Example: The relationship between price elasticity and total revenue

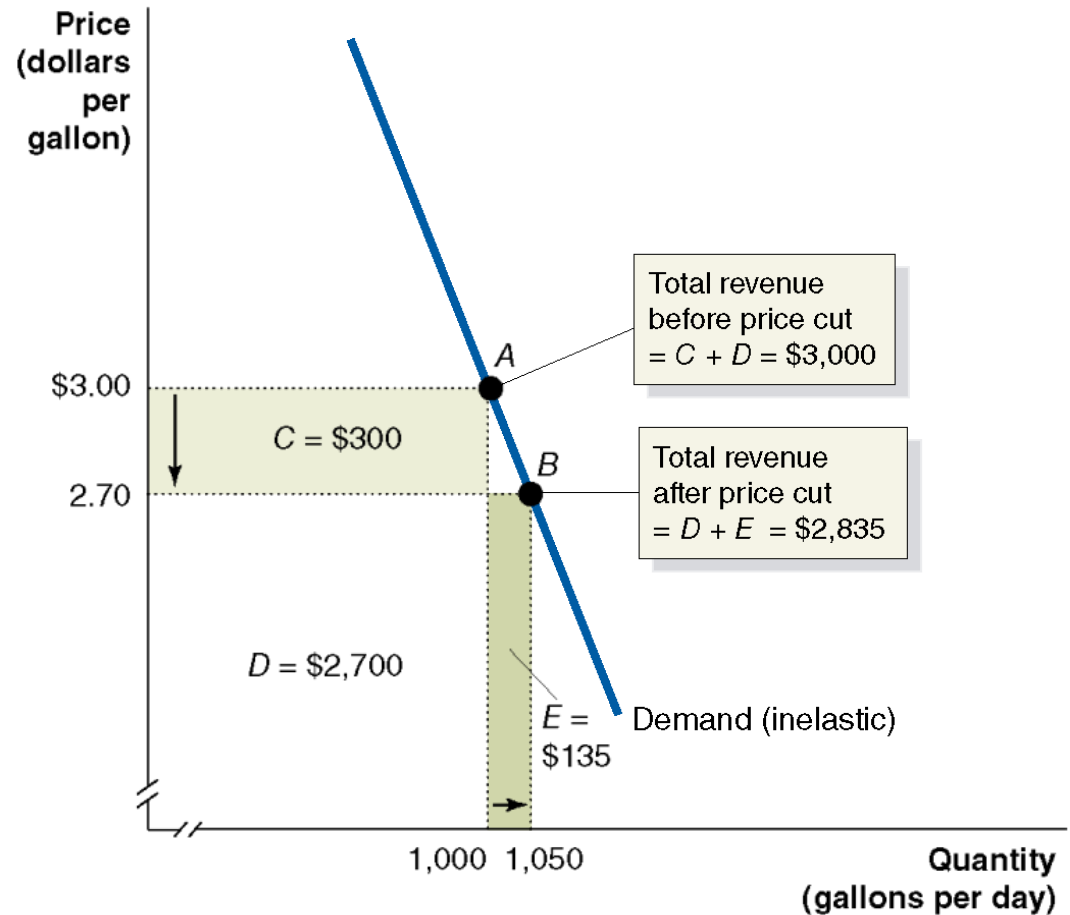
Revenue before price cut
(at A):

$$1,000 \times \$3.00 \\ = \$3,000$$

Revenue after price cut (at B):

$$1,050 \times \$2.70 \\ = \$2,835$$

The decrease in price does not generate enough extra customers (area E) to offset revenue loss (area C).



Effect of cutting price with different elasticities

Suppose demand for your product is relatively price elastic.

- Customers are very sensitive to the price of your product.
- As you decrease the price, you expect to gain many additional customers.
- The many additional customers more than compensate for the lost revenue, so overall revenue goes up.

Example: The relationship between price elasticity and total revenue

Revenue before price cut (at

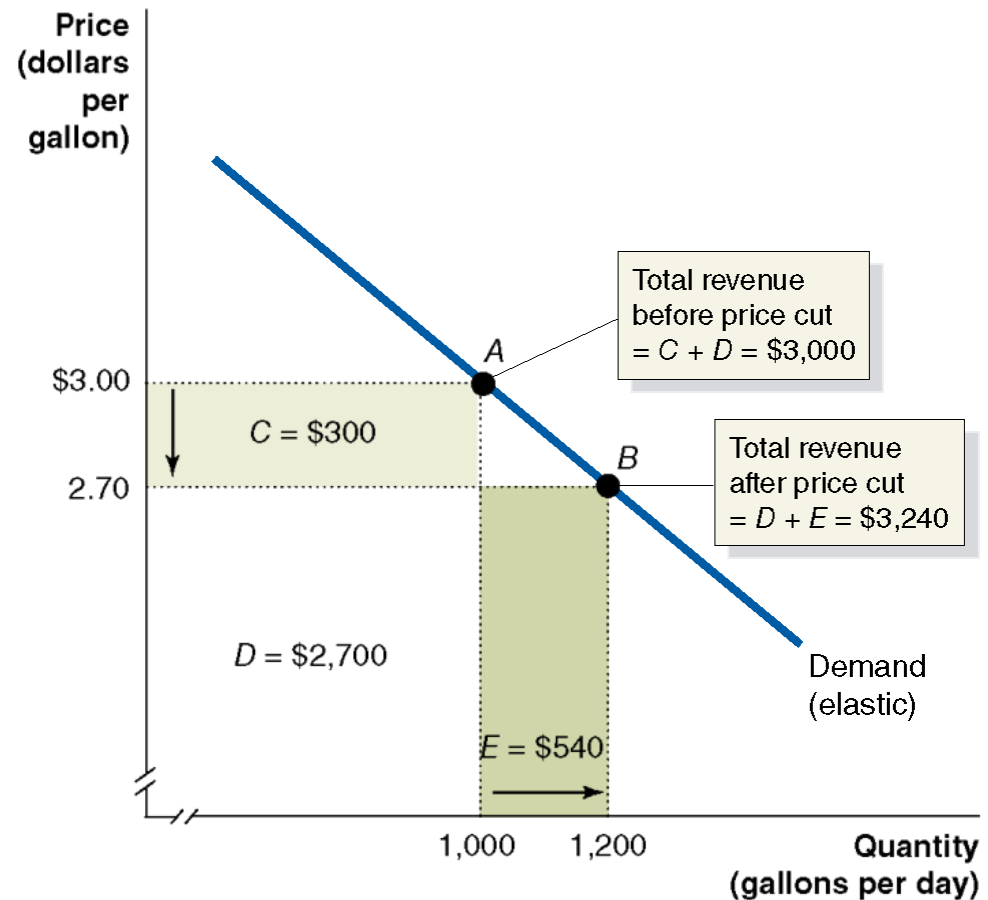
A):

$$1,000 \times \$3.00 \\ = \$3,000$$

Revenue after price cut (at B):

$$1,200 \times \$2.70 \\ = \$3,240$$

The decrease in price *does* generate enough extra customers (area E) to more than offset revenue loss (area C).



Why are elasticity and total revenue related?

The formula for price elasticity of demand is :

$$\text{Price elasticity of demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

So if this is greater than 1 (in absolute terms) then quantity demanded goes up by a higher percentage than price, raising the revenue.

A special case occurs when price elasticity of demand is -1: the percentage change in quantity demanded equals the percentage change in price so revenue does not change

Estimating price elasticity of demand

We can see that knowing the price elasticity of demand would be very useful for a firm. But how can a firm know this information?

- For a well-established product, economists can use historical data to estimate the demand curve.

To calculate the price elasticity of demand for a new product, firms often rely on market experiments.

- With market experiments, firms try different prices and observe the change in quantity demanded that results.