Chapter 5
Elasticity and Its Applications

Review Questions

What is elasticity and why do economists use the concept?
ANSWER: Elasticity is a measure of relative responsiveness of supply or demand to changes in one of the determinants of supply or demand. Economists use the concept in order to analyze the percentage change in supply or demand that occurs as a result of a 1 percent change in a determinant. It allows economists to conduct a quantitative analysis of supply and demand rather than simply a qualitative analysis.

Why do economists use elasticity instead of slope to measure the response of quantity to changes in price?
ANSWER: The slope measures the ratio of absolute changes, and therefore is sensitive to units of measurement, while the elasticity measures ratios of percentage changes, and therefore is a pure number, independent of units of measurement.

What is the price elasticity of demand? What are the determinants of price elasticity of demand, and how does each affect elasticity?
ANSWER: The price elasticity of demand is a measure of how much the quantity demanded responds to a change in price. It is defined as the percentage change in quantity demanded divided by the percentage change in price. If the elasticity is greater than 1, the good is said to be elastic and if elasticity is less than one the good is said to be inelastic. If elasticity is exactly equal to 1, the good is unitary elastic.

Determinants of price elasticity of demand include:
(1) Whether the good is a luxury or a necessity. Luxuries tend to have higher price elasticities of demand and necessities tend to have small price elasticities of demand.
(2) Availability of close substitutes. Goods with close substitutes tend to have more elastic demand than do goods without close substitutes.
(3) Definition of the market. Narrowly defined markets tend to have more elastic demand, and broadly defined markets tend to have less elastic demand.
(4) Time horizon. The longer the time horizon over which demand is measured, the greater is the ability of buyers of the good to find substitutes for products whose prices have risen. Therefore, the longer the time horizon, ceteris paribus, the larger is the elasticity of demand.

Consider the following pairs of goods. Which would you expect to have the more elastic demand? Why?
a. water or diamonds
b. insulin or nasal decongestant spray
c. food in general or breakfast cereal
d. gasoline over the course of a week or gasoline over the course of a year
e. personal computers or IBM personal computers
ANSWER: a. Diamonds are luxuries, and water is a necessity. Therefore, diamonds have the more elastic demand.
b. Insulin has no close substitutes, but decongestant spray does. Therefore, nasal decongestant spray has the more elastic demand.
c. Breakfast cereal has more substitutes than does food in general. Therefore, breakfast cereal has the more elastic demand.
d. The longer the time period, the more elastic demand. Therefore, gasoline over the course of a year has the more elastic demand.
e. There are more substitutes for IBM personal computers than there are for personal computers. Therefore, IBM personal computers have the more elastic demand.

When the price of PCs was $2,000, consumers bought 500. When the price fell to $1,200, consumers bought 1,500. What was the price elasticity of demand between these two prices, calculated with the midpoint method?

ANSWER: The midpoint method gives the percentage change in quantity demanded as 100, and the percentage change in price as 50. Therefore the elasticity of demand is 2.

You are a Ford dealer, and you know that the price elasticity of demand for Ford cars is 1.5. What will happen to your total revenue from Ford car sales if you raise your prices?

ANSWER: Because price elasticity of demand for Fords is greater than 1, an increase in price will reduce total revenue. ATTENTION: Revenue is NOT profit!

List the following goods in order of increasing price elasticity of demand: Coca-Cola, beverages, cola drinks, soft drinks.

ANSWER: In order of increasing price elasticity of demand, the list is: beverages, soft drinks, cola drinks, Coca-Cola. The ranking is based on how narrowly defined the market is.

Using the midpoint method, compute the elasticity of demand between points A and B. Is this portion of the curve elastic or inelastic? Interpret your answer with regard to price and quantity demanded. Now compute the elasticity of demand between points B and C. Is this portion of the curve elastic or inelastic?

ANSWER: In the section of the demand curve from A to B, the elasticity of demand would be 2.5 = \( \frac{((100-300)/(100+300)/2))}{((18-12)/(18+12)/2)) = -1/0.4 \). This would be an elastic portion of the curve. This would mean that for every 1 percent change in price, quantity demanded would change by 2.5 percent.

In the section of the demand curve from B to C, the elasticity of demand would be .75. This would be an inelastic portion of the curve. This would mean that for every 1 percent change in price, quantity demanded would change by .75 percent.
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Suppose you are the manager of a theater. You currently charge the same admission price to all customers, regardless of age. You hire an economist to determine the price elasticity of demand for admissions by age, and he tells you that at the current price, demand by adults is inelastic and demand by children is elastic. If you want to increase your total revenue by adjusting admission prices, how should they be adjusted?

ANSWER: Since the demand for admissions by adults is inelastic, if you raise the price of admission, your total revenue will increase from that group. However, since the demand by children is elastic, raising the admission price will reduce total revenue from that group. The solution is a 2-tier price system, with higher prices for adults and lower prices for children.

You have just been hired by Rainbow Crayons, Inc. as a marketing specialist. The CEO comes to you for advice on how to raise revenue. She wants to know if the company should lower product prices or raise product prices to increase revenue. What information must you know? If you have this information, what do you advise?

ANSWER: The first thing you need to know is the elasticity of demand for your product. If you find that the elasticity of demand for crayons is inelastic, then you would recommend that a price increase would be in order for total revenue to rise. If you find that demand is elastic, you should recommend a price decrease for total revenue to rise.

You are an economist working for the telephone company. You discover that demand for phone calls during business hours is inelastic, and demand for phone calls during evening hours is elastic. How could your company use this information to increase its total revenue?

ANSWER: In order to increase total revenue, the telephone company should increase the cost of phone calls during business hours, and decrease the cost of phone calls during evening hours.

Define income elasticity of demand. What does it measure? What does it mean if the income elasticity is positive; negative; small; large?

ANSWER: The income elasticity of demand is defined as the percentage change in quantity demanded divided by the percentage change in income. It measures how the quantity demanded changes as income changes. Normal goods have positive income elasticities. Inferior goods have negative income elasticities. Necessities tend to have small income elasticities and luxuries tend to have large income elasticities.

Define cross-price elasticity of demand. What does it measure? What does it means if the cross-price elasticity is negative; positive?

ANSWER: Cross-price elasticity of demand is defined as the percentage change in the quantity demanded of good 1 divided by the percentage change in the price of good 2. It measures how the quantity demanded of one good changes as the price of another good changes. If two goods are substitute goods, the cross-price elasticity would be positive. If two goods are complement goods, the cross-price elasticity would be negative.

What is the price elasticity of supply? What are the determinants of the price elasticity of supply, and how does each affect elasticity?

ANSWER: The price elasticity of supply measures how much the quantity supplied responds to changes in the price, and is equal to the percentage change in quantity supplied divided by the percentage change in price. If elasticity is greater than 1, the supply curve is elastic; if less than 1, the supply curve is inelastic; and if equal to 1, the supply curve is unit elastic.

Price elasticity of supply depends on the flexibility of sellers to changes in price. For resources like land of a specific type and location, there is practically no flexibility. For manufactured products, there is greater flexibility. In most markets, the time period over which supply is
measured is a key determinant. Over short time periods, supply curves tend to be less elastic, and over longer periods, supply curves tend to be more elastic.

Why do farmers suffer declines in their total revenues when they become more productive as a group? ANSWER: Increases in productivity cause the supply curve to shift to the right, lowering the equilibrium market price. Since demand for agricultural products is inelastic, a reduction in price also reduces total revenue.

On the graph shown, rate the supply curves from shortest time frame to longest time frame. Which curve is the most inelastic; the most elastic?

ANSWER: From shortest time frame to longest would be in this order: $S_1$, $S_2$, $S_3$.

$S_1$ is the most inelastic - it is perfectly inelastic. $S_3$ is the most elastic supply curve.