

Economics 101 – Section 5

Lecture 9
February 12

Price Elasticity of demand
Income Elasticity of demand
Cross price elasticity of demand

Figure 6 Elasticity and Straight-Line Demand Curves

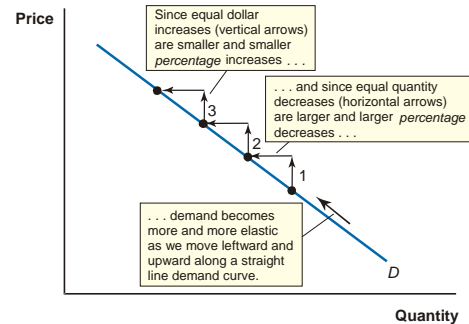
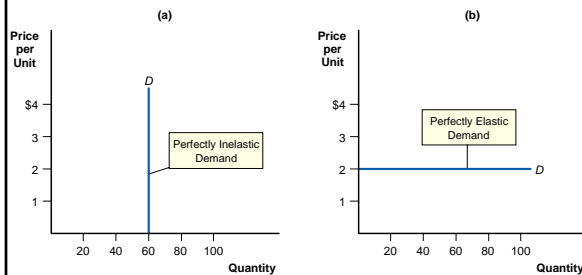


Figure 7 Extreme Cases of Demand



Elasticity

- When demand is price inelastic, total expenditure moves in the same direction as price.
- When demand is price elastic, total spending moves in the opposite direction as price.
- When demand is unitary elastic, total expenditure remains the same as price changes.

Elasticity and Expenditure

- When the price of a good increases then we will demand less of it
 - This is the law of demand
 - This does not mean the total amount spent on the good (i.e. total expenditure -TE) will decrease
- $$TE = P * Q$$
- Fewer goods are purchased but the price is higher
 - Whether expenditure increases or decreases will depend on the price elasticity of demand for the good

Table 1 Effects of Price Changes on Expenditure

Where demand is:	A price increase will:	A price decrease will:
Inelastic ($ E_D < 1$)	increase expenditure	decrease expenditure
unitary elastic ($ E_D = 1$)	cause no change in expenditure	cause no change in expenditure
elastic ($ E_D > 1$)	decrease expenditure	increase expenditure

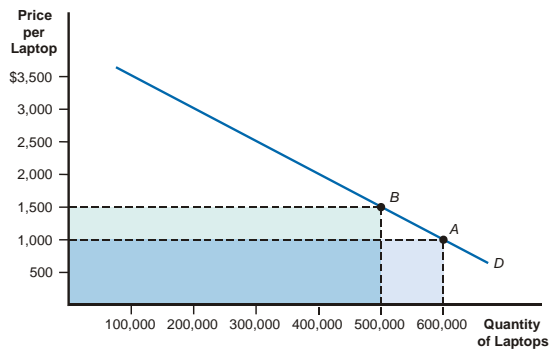
Table 2 Effects of Price Changes for Laptop Computers

Price per Laptop (P)	Quantity Demanded (per Month) (Q)	Total Monthly Expenditure (P * Q)
\$1,000	600,000	\$600 million
\$1,500	500,000	\$750 million
\$3,000	200,000	\$600 million
\$3,500	100,000	\$350 million

Elasticity and Expenditure

- At any point on the demand curve the area bounded by the price and quantity lines is equal to total expenditure

Figure 8 Elasticity and Total Expenditure



Determinants of Elasticity

- Availability of substitutes
 - When price of a good rises we look for substitutes, the easier it is to find a substitute the easier it is to adjust our purchases (less of the given good and more of the substitute)
 - Generally,
 - The more narrowly the good is defined, the easier it is to find substitutes, and the **more elastic** is demand for the good
 - The broader the good is defined, the harder it is to find substitutes, and the **less elastic** is demand

Determinants of Elasticity

- The more **necessary** a good is, the harder it is to find substitutes and the demand tends to be less elastic

- Examples
 - Insulin
 - Heroin for an addict
 - Gas for our vehicles
 - Short run vs. long run

Determinants of Elasticity

- Short-run elasticity
 - The quantity response is measured after only a short period of time (i.e. a few months)
 - Not much time to find substitutes
 - Price elasticity of gasoline in short-run ~ -0.2
- Long-run elasticity
 - The quantity response is measured after a longer period of time (i.e. a year +)
 - More time to find substitutes
 - Price elasticity of gasoline in long-run >-0.6

Income Elasticity of Demand

- The **income elasticity of demand** is the percentage change in quantity demanded divided by the percentage change in income holding all other variables constant

$$E_I = \frac{\% \Delta Q^{\text{Demanded}}}{\% \Delta \text{Income}}$$

Income Elasticity of Demand

- Note – Price elasticity of demand is always negative (satisfies the law of demand)
- However, income elasticity of demand could be negative or positive
- Recall our discussion about normal and inferior goods

Income Elasticity of Demand

- Inferior goods – demand decreases when income rises
 - Examples –
 - ramen noodles
 - Ground beef
 - Inferior goods have a negative income elasticity

$$E_I < 0 \text{ for inferior goods}$$

Income Elasticity of Demand

- Normal goods
 - As your income rises so does your demand for the good
 - Positive income elasticity
 - $E_I > 0$

Income Elasticity of Demand

- Normal goods can be broken into two categories
 - 1) Necessities – a good with an income elasticity of demand between 0 and 1
 - $0 < E_I < 1$
 - i.e. electricity
 - 2) Luxury goods – a good with an income elasticity of demand greater than 1
 - $E_I > 1$
 - Diamond jewelry
 - Ivory back scratchers

Cross-Price Elasticity of Demand

- Cross price elasticity of demand is the percentage change in the quantity demanded for a percentage change in the price of some other good while holding all other factors constant

$$E_{x,y} = \frac{\% \Delta Q_x^{\text{Demanded}}}{\% \Delta P_y}$$

Cross-Price Elasticity of Demand

- Recall our discussion on substitutes and complements
- If two goods are **substitutes** then the cross price elasticity of demand is positive
 - $E_{x,y} > 0$
 - Examples
 - Tea and coffee
 - Geo metros and Ford escorts

Cross-Price Elasticity of Demand

- If two goods are **complements** the cross-price elasticity of demand is negative
 - $E_{x,y} < 0$
 - Examples
 - Demand for SUVs and the price of gas
 - Shoes and the price of shoe laces
 - Televisions and the price of cable