

Objectives

Define, calculate, and explain the factors that influence

- the price elasticity of demand
- the cross elasticity of demand
- the income elasticity of demand
- the elasticity of supply

Price Elasticity of Demand

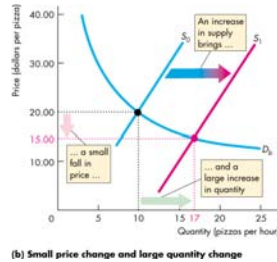
If Demand is "steep", a change in supply brings a small increase in the quantity demanded and a large fall in price.

The graph shows a steep downward-sloping demand curve (D_D) and an upward-sloping supply curve (S_1). A shift to the right to S_2 is shown. The initial equilibrium is at a price of 20.00 and quantity of 10. The new equilibrium is at a price of 5.00 and quantity of 13. Annotations indicate: '... a large fall in price' (from 20.00 to 5.00) and '... and a small increase in quantity' (from 10 to 13). A label 'An increase in supply brings...' points to the shift from S_1 to S_2 .

(a) Large price change and small quantity change

Price Elasticity of Demand

If demand is "flat", a change in supply brings a large increase in the quantity demanded and a small fall in price.



Price Elasticity of Demand

The **price elasticity of demand** is a units-free measure of the responsiveness of the quantity demanded of a good to a change in its price when all other influences on buyers' plans remain the same.

Calculating Elasticity

$$e = \frac{\% \Delta \text{ quantity demanded}}{\% \Delta \text{ price}}$$

Price Elasticity of Demand

$$\% \Delta Q = \Delta Q / Q_{\text{avg}}$$

$$= 2/10$$

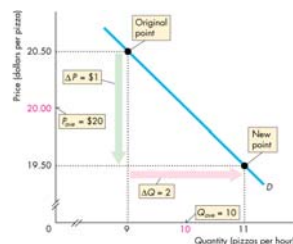
$$= .2$$

$$\% \Delta P = \Delta P / P_{\text{avg}}$$

$$= \$1/\$20$$

$$= .05$$

$$e = .2/.05 = 4$$



Price Elasticity of Demand

- By using the *average price* and *average quantity*, we get the same elasticity value regardless of whether the price rises or falls.
- Changing the units of measurement of price or quantity leaves the elasticity value the same ("units free").
- Although the formula yields a negative value for elasticity because price and quantity move in opposite directions, we report the absolute value.

Price Elasticity of Demand

Inelastic and Elastic Demand

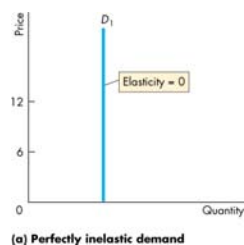
if $e > 1$: elastic

if $e = 1$: unit elastic

if $e < 1$: inelastic

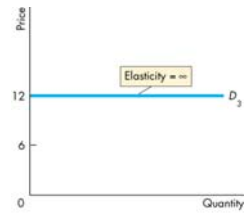
Price Elasticity of Demand

Perfectly inelastic demand has a vertical demand curve.



Price Elasticity of Demand

Perfectly elastic demand is a horizontal demand curve

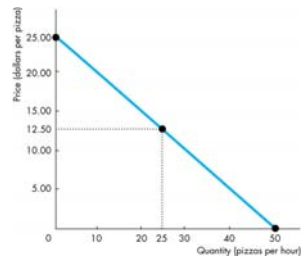


(c) Perfectly elastic demand

Price Elasticity of Demand

Elasticity Along a Straight-Line Demand Curve

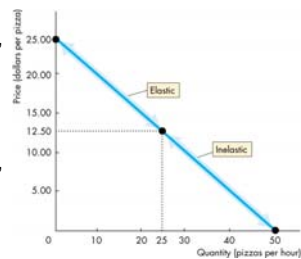
demand becomes less elastic as the price falls along a linear demand curve.

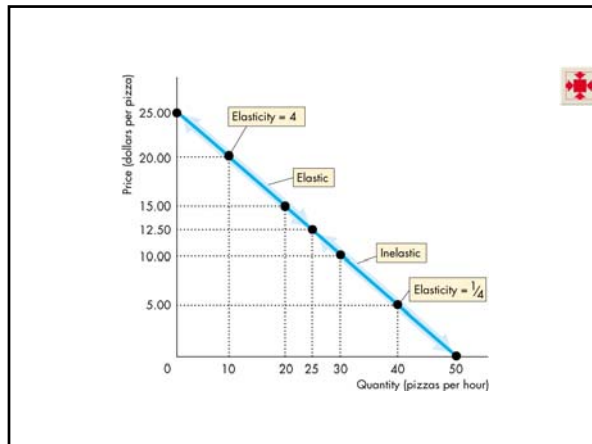


Price Elasticity of Demand

At prices above the mid-point of the demand curve, demand is elastic.

At prices below the mid-point of the demand curve, demand is inelastic.





Price Elasticity of Demand

Total Revenue and Elasticity

The **total revenue** from the sale of good or service equals the price of the good multiplied by the quantity sold.

When the price changes, total revenue also changes.

But a higher price doesn't always increase total revenue.

Price Elasticity of Demand

The change in total revenue due to a change in price depends on the elasticity of demand

$$\begin{aligned}\% \Delta TR &= \% \Delta P + \% \Delta Q \\ &= \% \Delta P - \% \Delta P(e) \\ &= \% \Delta P(1-e)\end{aligned}$$

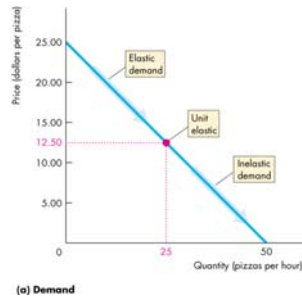
- If demand is elastic ($e > 1$),
 - P increase → TR decreases
 - P decrease → TR increases
- If demand is inelastic ($e < 1$),
 - P increase → TR increases
 - P decrease → TR decreases
- If demand is unitary elastic,
 - A price increase or decrease leaves total revenue unchanged.

Price Elasticity of Demand

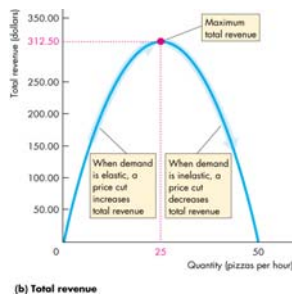
As the price falls from \$25 to \$12.50, demand is elastic, and total revenue increases

At \$12.50, demand is unit elastic and total revenue stops increasing.

As the price falls from \$12.50 to zero, demand is inelastic, and total revenue decreases.



Price Elasticity of Demand



Price Elasticity of Demand

The elasticity of demand for a good depends on:

- The number & closeness of substitutes
- The proportion of income spent on the good
- The time elapsed since a price change

More Elasticities of Demand

Cross Elasticity of Demand

The **cross elasticity of demand** is a measure of the responsiveness of demand for a good to a change in the price of another good.

$$e_{xy} = \frac{\% \Delta \text{ quantity demanded for } x}{\% \Delta \text{ change in price of } y}$$

$e_{xy} > 0 \rightarrow$ substitutes $e_{xy} < 0 \rightarrow$ complements

More Elasticities of Demand

Income Elasticity of Demand

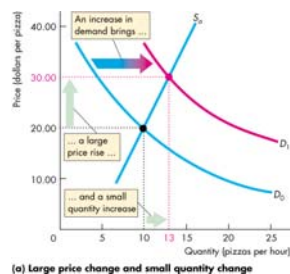
The **income elasticity** of demand measures how the quantity demanded of a good responds to a change in income, other things equal.

$$e_i = \frac{\% \Delta \text{ in quantity demanded}}{\% \Delta \text{ in income}}$$

$e_i > 0 \rightarrow$ normal good
 $e_i > 1 \rightarrow$ luxury good
 $e_i < 0 \rightarrow$ inferior good

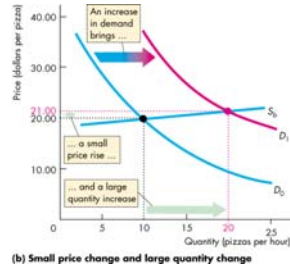
Price Elasticity of Supply

If supply is steep, a change in demand brings a small increase in the quantity supplied and a large rise in price.



Price Elasticity of Supply

If supply is "flat", a change in demand brings a large increase in the quantity supplied and a small rise in price.



(b) Small price change and large quantity change

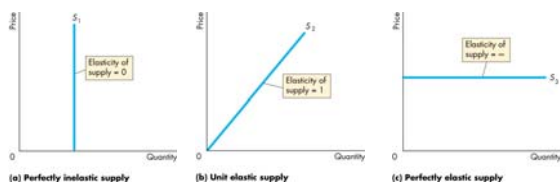
Elasticity of Supply

Elasticity of supply

measures the responsiveness of the quantity supplied to a change in the price of a good when all other influences on selling plans remain the same.

$$e_s = \frac{\% \Delta \text{ quantity supplied}}{\% \Delta \text{ price}}$$

Elasticity of Supply



(a) Perfectly inelastic supply

(b) Unit elastic supply

(c) Perfectly elastic supply

Elasticity of Supply

The Factors That Influence the Elasticity of Supply

Resource substitution possibilities

The time frame for supply decisions

Storage costs
