

# Elasticity

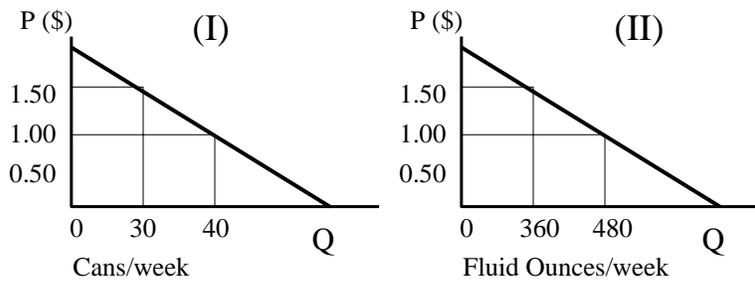
Why cheap beer gives you gonorrhoea, and other stories

## Price elasticity of demand

- The *price elasticity of demand* of a good measures the responsiveness of the quantity demanded of the good to changes in the price of that good.
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- Why don't we just use the slope?
  - It tells us about the price/quantity relationship
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## Slope is not “units free”

- Consider the demand curve for soda



- Response to a price fall from \$1.50 to \$1.00?

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## Price elasticity of demand

- Thus, instead we use elasticity of demand

- Example:

- As the price of soda decreases from \$1.50 to \$1 per can, the quantity demanded rises from 30 cans to 40 cans.

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- As the price of soda increases from \$1 to \$1.50 per can, the quantity demanded falls from 40 cans to 30 cans.

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## Calculating percent changes

- The *midpoint method* says to calculate percentage changes as a percentage of the average between starting and final values.
- Example:
  - As the price of soda increases from \$1 to \$1.50 per can, the quantity demanded falls from 30 cans to 20 cans.
    - As the price of soda increases by
    - ... the quantity demanded falls by
    - The price elasticity of demand is

## Types of elasticity of demand

### 1. Elastic Demand

- We call demand (at some point) *elastic*, if the quantity demanded is relatively *responsive* to changes in price.

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Example:

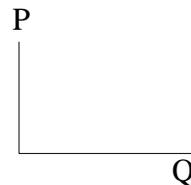
### 2. Perfectly Elastic Demand

- Price elasticity of demand =  $\infty$

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Example:



## Types of elasticity of demand

### 3. Inelastic Demand

- We call demand (at some point) *inelastic*, if the quantity demanded is relatively *unresponsive* to changes in price.

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Example:

### 4. Perfectly Inelastic Demand

- Price elasticity of demand = 0

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Example:



## Types of elasticity of demand

### 5. Unit Elastic Demand

- We call demand (at some point) *unit elastic*, if the quantity demanded changes proportionately to changes in price.

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## Factors affecting elasticity of demand

### 1. Availability of Substitutes

- If you can substitute easily demand is likely to be more elastic

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### 2. Importance in Budget

- Goods that make up a large fraction of budget tend to be more elastic

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## Factors affecting elasticity of demand

### 2. Necessity or Luxury

- Elasticity of demand tends to be low if the good is something you must have

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### 3. Time Duration

Short-Run:

Long-Run:

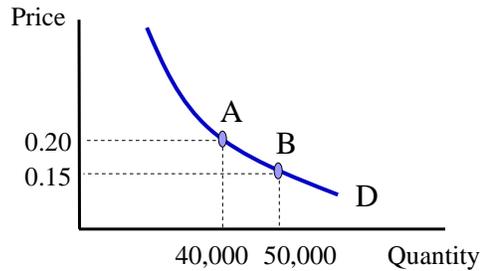
Example:

## Elasticity and total revenue

- Why do we care whether a good is elastic or inelastic?
- The elasticity can tell us something about what happens to total revenue as price changes

Example: price increase

- What happens to revenue if price rises?



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## Elasticity and total revenue

- Therefore, the overall effect on total revenue depends on which effect is bigger
- Elasticity tells us this

% rise in P > % fall in Q    % rise in P < % fall in Q

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## Elasticity and total revenue

Price decrease: change in price effect is negative and the quantity effect is positive

- Demand Elastic:
- Demand Inelastic:

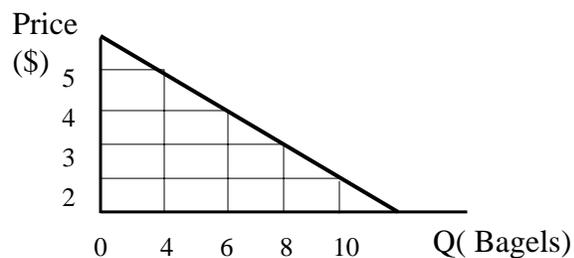
### Summary Table

| <u>Price Change</u> | <u>Elasticity (D)</u>                     | <u>Effect on TR</u> |
|---------------------|---|---------------------|
| Decrease            | Inelastic ( $\% \Delta Q < \% \Delta P$ ) |                     |
| Decrease            | Elastic ( $\% \Delta Q > \% \Delta P$ )   |                     |
| Increase            | Inelastic ( $\% \Delta Q < \% \Delta P$ ) |                     |
| Increase            | Elastic ( $\% \Delta Q > \% \Delta P$ )   |                     |

## Linear demand curves

- Elasticity changes along curve even if the slope doesn't

| P | Q  |
|---|----|
| 2 | 10 |
| 3 | 8  |
| 4 | 6  |
| 5 | 4  |



- Elasticity in 3 different regions
- \$4-\$5: elasticity of demand =
- \$3-\$4: elasticity of demand =
- \$2-\$3: elasticity of demand =

## Linear demand curves and revenue

What does this imply about Total Revenue?

**Above Midpoint** (elastic:  $\% \Delta Q > \% \Delta P$ )

- Decrease P, Increase Q
- Increase P, Decrease Q

**Below Midpoint** (inelastic:  $\% \Delta Q < \% \Delta P$ )

- Decrease P, Increase Q
- Increase P, Decrease Q

**At Midpoint** (unit elastic)

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## Other important elasticities

**Cross-price elasticity of demand:**

- The *cross-price elasticity of demand* between two goods measures the responsiveness of the quantity demanded of one good to changes in the price of another good.

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- It can be positive or negative.

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## Cross-price elasticity of demand

BY DAVID PITT

Associated Press Writer

**ATLANTA** — Cheap beer is a leading contributor to the spread of sexually transmitted diseases, according to a government report that says raising the tax on a six-pack by 20 cents could reduce gonorrhea by up to 9 percent.

The Centers for Disease Control

## Income elasticity of demand

- The *income elasticity of demand* of a good measures the responsiveness of the quantity demanded of the good to changes in income.

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- It can be positive or negative.

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## Price elasticity of supply

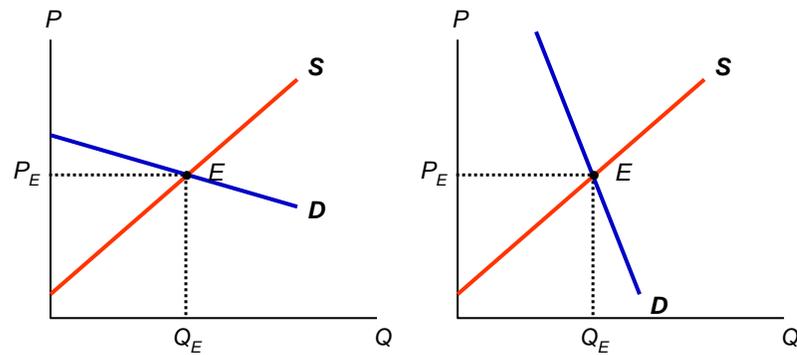
- The *price elasticity of supply* of a good measures the responsiveness of the quantity supplied of the good to changes in the price of that good.
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## Elasticity and deadweight loss

How bad are taxes?

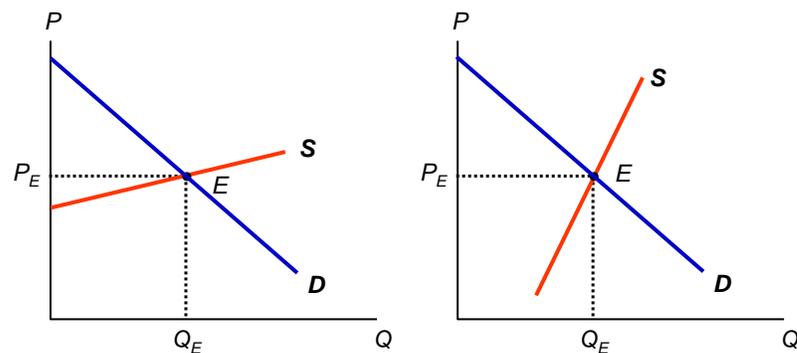
## Who bears the tax?

- The more inelastic demand is, the more of the tax falls on consumers.



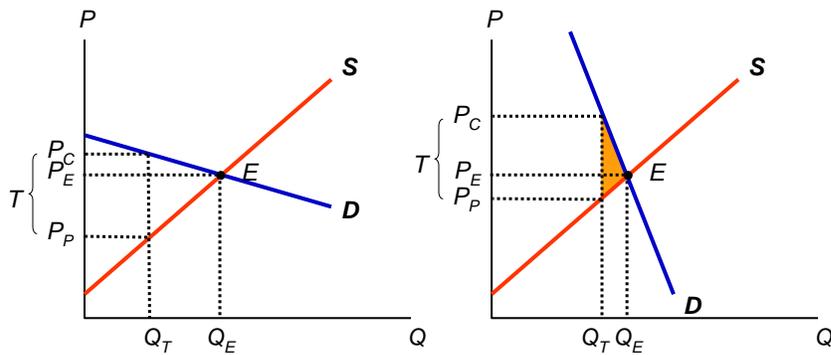
## Who bears the tax?

- The more inelastic supply is, the more of the tax falls on producers.



## How much deadweight loss?

- The more transactions are discouraged, the greater deadweight loss.



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