

[Go to lesson page](#)

## Key points

- **Infinite elasticity**, or **perfect elasticity**, is the extreme case where either the quantity demanded or supplied changes by an infinite amount in response to any change in price.
- **Zero elasticity**, or **perfect inelasticity**, is the extreme case where a percentage change in price—no matter how large—results in zero change in quantity.
- **Constant unitary elasticity** in either a supply or demand curve means a price change of 1% results in a quantity change of 1%.

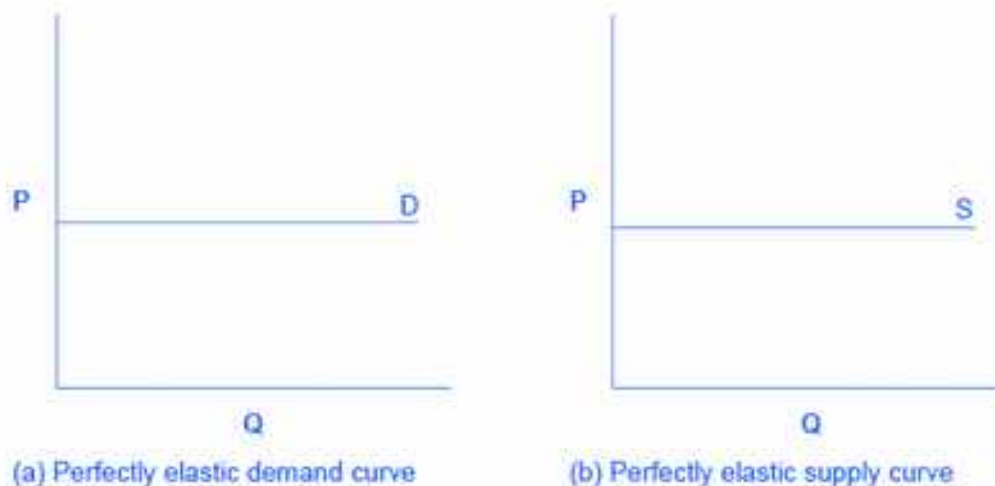
## Extreme cases of elasticity

There are two extreme cases of elasticity—when elasticity equals zero and when it is infinite. A third unique situation is constant unitary elasticity.

*Infinite elasticity*, or *perfect elasticity*, is when either the quantity demanded,  $Q_d$  or supplied,  $Q_s$  changes by an infinite amount in response to any change in price at all. In both cases, the demand curve and supply curve, respectively, are horizontal as shown in the diagram below.

While perfectly elastic supply curves are unrealistic, goods with readily available inputs and whose production can be easily expanded will feature highly elastic supply curves. Examples include pizza, bread, books, and pencils. Similarly, perfectly elastic demand is an extreme example. But, luxury goods—goods that take a large share of individuals' income—and goods with many substitutes are likely to have highly elastic demand curves. Examples of such goods are Caribbean cruises and sports vehicles.

Infinite elasticity



Two graphs, side by side, show that perfectly elastic demand and perfectly elastic supply are both straight, horizontal lines.

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*Zero elasticity*, or *perfect inelasticity*, is when a percentage change in price, no matter how large, results in zero change in quantity. Notice that in this case, the demand and supply curves—shown in the diagram below—are vertical.

While a perfectly inelastic supply is unlikely, goods with limited supply of inputs are likely to feature highly inelastic supply curves. Examples include diamond rings or housing in prime locations such as apartments facing Central Park in New York City. Similarly, perfectly inelastic demand is unrealistic, but necessities with no close substitutes are likely to have highly inelastic

demand curves. This is the case with life-saving drugs and gasoline.

Zero elasticity



Two graphs show that zero elasticity of supply and zero elasticity of demand are straight, vertical lines.

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*Constant unitary elasticity*, in either a supply or demand curve, occurs when a price change of 1% results in a quantity change of 1%. The diagram below shows a demand curve with constant unit elasticity. As we move down the demand curve from A to B, the price falls by 33%, and quantity demanded rises by 33%. As you move from B to C, the price falls by 25%, and the quantity demanded rises by 25%. As you move from C to D, the price falls by 16%, and the quantity rises by 16%. Notice that in absolute value, the declines in price as you step down the demand curve are not identical. Instead, the price falls by \$3 from A to B, by a smaller amount of \$1.50 from B to C, and by a still smaller amount of \$0.75 from C to D. As a result, a demand curve with constant unitary elasticity moves from a steeper slope on the left to a flatter slope on the right with a curved shape overall.

Constant unitary elasticity demand curve



This graph shows how a demand curve with unitary elasticity at all points will always be a curved line.

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Unlike a demand curve with unitary elasticity, a supply curve with unitary elasticity is represented by a straight line. Moving up the supply curve from left to right, each increase in quantity of 30—from 90 to 120 to 150 to 180—is equal in absolute value. However, in percentage value, the steps decrease—from 33.3% to 25% to 16.7%—because the original quantity points in each percentage calculation are getting larger and larger, which expands the denominator in the elasticity calculation. Consider the price changes moving up the supply curve in the diagram below. From points D to E to F to G, on the supply curve, each step of \$1.50 is the same in absolute value. However, if the price changes are measured in percentage change terms, they decrease—from 33.3% to 25% to 16.7%—because the original price points in each percentage calculation are getting larger and larger in value. Along the constant unitary elasticity supply curve, the percentage quantity increases on the horizontal axis exactly match the percentage price increases on the vertical axis—so this supply curve has a constant unitary elasticity at all points.

Constant unitary elasticity supply curve



This graph shows that a supply curve with unitary elasticity at all points will always be a straight line.

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## Summary

- *Infinite elasticity*, or *perfect elasticity*, is the extreme case where either the quantity demanded or supplied changes by an infinite amount in response to any change in price.
- *Zero elasticity*, or *perfect inelasticity*, is the extreme case where a percentage change in price—no matter how large—results in zero change in quantity.
- *Constant unitary elasticity* in either a supply or demand curve means a price change of 1%

results in a quantity change of 1%.

## Self-check questions

Why is a demand curve with constant unitary elasticity concave?

[\[Show solution.\]](#)

A demand curve with constant unitary elasticity is concave because at high prices, a 1% decrease in price results in more than a 1% increase in quantity. As we move down the demand curve, price drops and the 1% decrease in price causes less than a 1% increase in quantity.

Why is a supply curve with constant unitary elasticity a straight line?

[\[Show solution.\]](#)

A supply curve with constant unitary elasticity is a straight line because the curve slopes upward and both price and quantity increase proportionally.

## Review questions

- Describe the general appearance of a demand or a supply curve with zero elasticity.
- Describe the general appearance of a demand or a supply curve with infinite elasticity.

## Critical-thinking question

Can you think of an industry or product with near infinite elasticity of supply in the short term?

That is, what is an industry that could increase  $Q_s$  almost without limit in response to an increase in the price?

## Problems

- The supply of paintings by Leonardo Da Vinci—who painted the *Mona Lisa* and *The Last Supper* and died in 1519—is highly inelastic. Sketch a supply and demand diagram, paying attention to the appropriate elasticities, illustrating that demand for these paintings will determine the price.
- A certain stadium for professional football has 70,000 seats. What is the shape of the supply curve for tickets to football games at that stadium? Explain.
- When someone's kidneys fail, the person needs to have medical treatment with a dialysis machine—unless or until they receive a kidney transplant—or they will die. Sketch a supply and demand diagram, paying attention to the appropriate elasticities, to illustrate that the supply of such dialysis machines will primarily determine the price.

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