

# Price elasticity of supply

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*Not to be confused with [Price elasticity of demand](#).*

**Price elasticity of supply** (**PES** or **E<sub>s</sub>**) is a measure used in economics to show the responsiveness, or elasticity, of the quantity supplied of a good or service to a change in its price or cost.

The elasticity is represented in numerical form, and is defined as the percentage change in the quantity supplied divided by the percentage change in price.

When the coefficient is less than one, the said good can be described as *inelastic*; when the coefficient is greater than one, the supply can be described as *elastic*.<sup>[1]</sup> An elasticity of zero indicates that quantity supplied does not respond to a price change: it is "fixed" in supply. Such goods often have no labor component or are not produced, limiting the short run prospects of expansion. If the coefficient is exactly one, the good is said to be *unitary elastic*.

The quantity of goods supplied can, in the short term, be different from the amount produced, as manufacturers will have stocks which they can build up or run down.

## Determinants[[edit](#)]

### Availability of raw materials

For example, availability may cap the amount of gold that can be produced in a country regardless of price. Likewise, the price of [Van Gogh](#) paintings is unlikely to affect their supply.<sup>[2]</sup>

### Length and complexity of production

Much depends on the complexity of the production process. Textile production is relatively simple. The labor is largely unskilled and production facilities are little more than buildings – no special structures are needed. Thus the PES for textiles is elastic. On the other hand, the PES for specific types of motor vehicles is relatively inelastic. Auto manufacture is a multi-stage process that requires specialized equipment, skilled labor, a large suppliers network and large R&D costs.<sup>[3]</sup>

### Mobility of factors

If the factors of production are easily available and if a producer producing one good can switch their resources and put it towards the creation of a product in demand, then it can be said that the PES is relatively elastic. The inverse applies to this, to make it relatively inelastic.

### Time to respond

The more time a producer has to respond to price changes the more elastic the supply.<sup>[2][3]</sup>

Supply is normally more elastic in the [long run](#) than in the [short run](#) for produced goods, since it is generally assumed that in the long run all [factors of production](#) can be utilized to increase supply, whereas in the short run only labor can be increased, and even then,

changes may be prohibitively costly.<sup>[1]</sup> For example, a cotton farmer cannot immediately (i.e. in the short run) respond to an increase in the price of soybeans because of the time it would take to procure the necessary land.

#### Excess capacity

A producer who has unused capacity can (and will) quickly respond to price changes in his market assuming that variable factors are readily available.<sup>[1]</sup>

#### Inventories

A producer who has a supply of goods or available storage capacity can quickly increase supply to market.

Various research methods are used to calculate price elasticities in real life, including analysis of historic sales data, both public and private, and use of present-day surveys of customers' preferences to build up [test markets](#) capable of modelling elasticity such changes. Alternatively, [conjoint analysis](#) (a ranking of users' preferences which can then be statistically analysed) may be used.<sup>[4]</sup>

### Selected supply elasticities [\[edit\]](#)

- Heating Oil: 1.57 (Short Run)<sup>[6]</sup>
- Gasoline: 1.61 (Short Run)<sup>[6]</sup>
- Tobacco: 7.0 (Long Run)<sup>[6]</sup>
- Housing: 1.6–3.7 (Long Run)<sup>[6]</sup>
- Cotton
  - 0.3 (Short Run)<sup>[7]</sup>
  - 1.0 (Long Run)<sup>[7]</sup>
- Steel: 1.2 (Long Run, from Minimills)<sup>[8]</sup>

**Price elasticity of supply (Pes)** measures the relationship between change in quantity supplied and a change in price.

- If supply is **elastic**, producers can increase output without a rise in cost or a time delay
- If supply is **inelastic**, firms find it hard to change production in a given time period.

The formula for price elasticity of supply is:

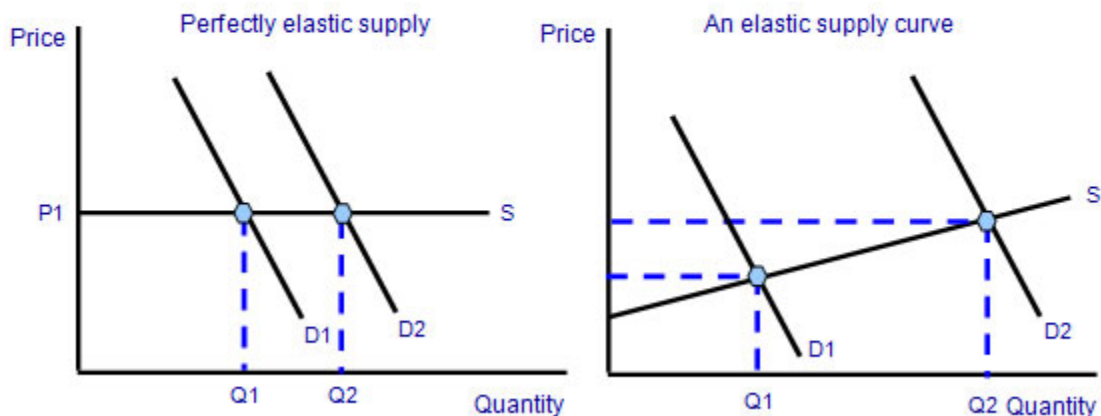
*Percentage change in quantity supplied divided by the percentage change in price*

- When  $Pes > 1$ , then supply is price elastic
- When  $Pes < 1$ , then supply is price inelastic
- When  $Pes = 0$ , supply is perfectly inelastic
- When  $Pes = \text{infinity}$ , supply is perfectly elastic following a change in demand

**What factors affect the elasticity of supply?**

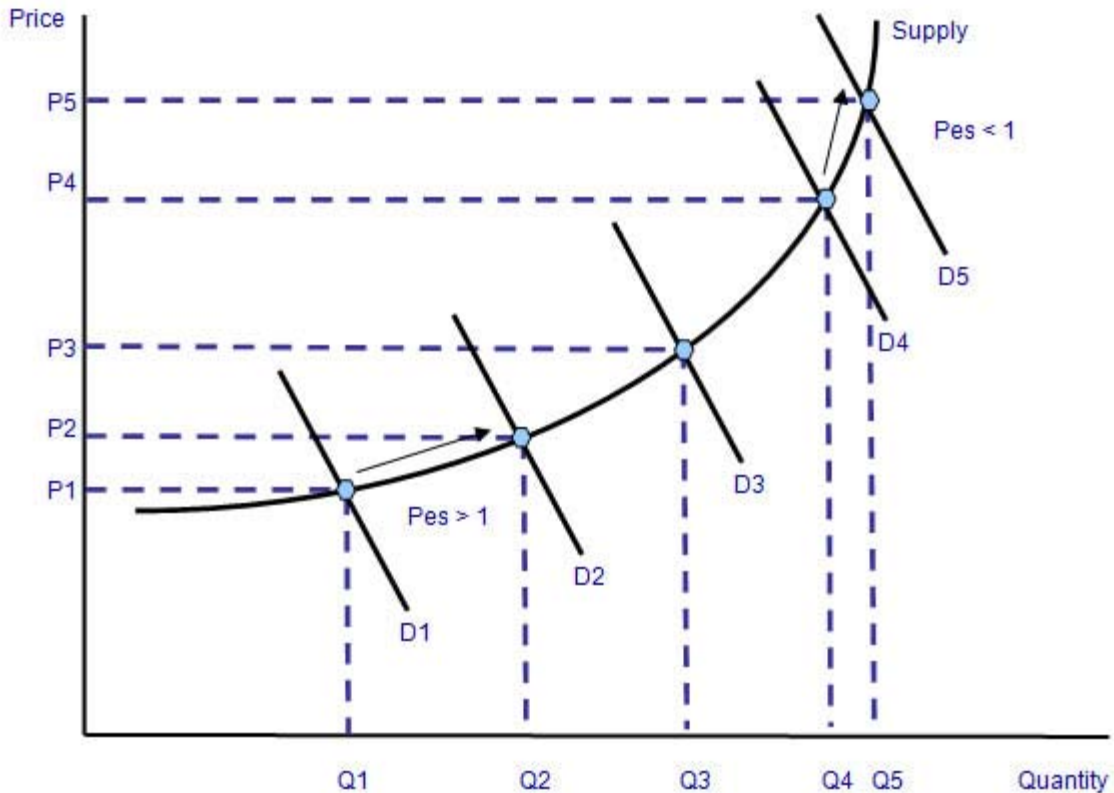
- **Spare production capacity:** If there is plenty of **spare capacity** then a business can increase output without a rise in costs and supply will be elastic in response to a change in demand. The supply of goods and services is most elastic during a recession, when there is plenty of spare labour and capital resources.
- **Stocks of finished products and components:** If stocks of raw materials and finished products are at a high level then a firm is able to respond to a change in demand – supply will be elastic. Conversely when stocks are low, dwindling supplies force prices higher because of scarcity in the market.
- **The ease and cost of factor substitution:** If both capital and labour are **occupationally mobile** then the elasticity of supply for a product is higher than if capital and labour cannot easily be switched. A good example might be a printing press which can switch easily between printing magazines and greetings cards.
- **Time period and production speed:** Supply is more price elastic the longer the **time period** that a firm is allowed to adjust its production levels. In some agricultural markets the **momentary supply** is fixed and is determined mainly by planting decisions made months before, and also climatic conditions, which affect the production yield. In contrast the supply of milk is price elastic because of a short time span from cows producing milk and products reaching the market place.

If  $P_{es}$  is inelastic: it will be difficult for suppliers to react swiftly to changes in price  
 If  $P_{es}$  is elastic – supply can react quickly to changes in price



### The non-linear supply curve

In the diagram below, the price elasticity of supply is high at low levels of demand (e.g.  $D_1$  and  $D_2$ ) but when demand is high, elasticity of supply is much lower (e.g.  $D_4$  and  $D_5$ ) – the main reason would be that at peak periods, suppliers reach capacity limits and find it hard to increase output in the short run.



### Elasticity of demand and supply and price changes - a quick summary

Elasticity determines how much a shift changes quantity versus price.

- If D increases and S is perfectly inelastic, then price rises and quantity doesn't change.
- If S increases and D is perfectly inelastic, then price falls and quantity doesn't change.
- If D increases and S is perfectly elastic, then price stays the same and quantity rises.
- If S increases and D is perfectly elastic, then price stays the same and quantity rises.