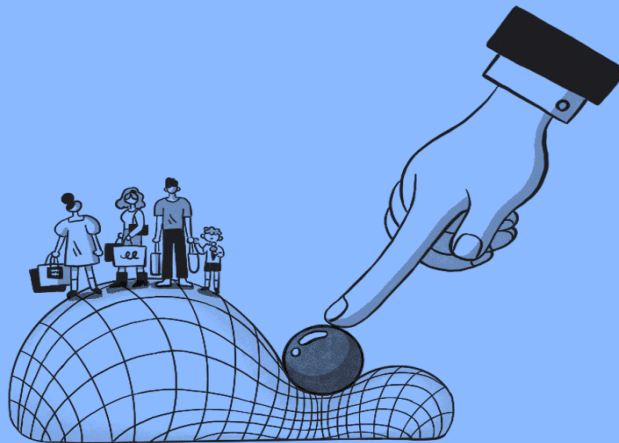




Elasticity



Elasticity

[i-,la-'sti-sə-tē]

A measure of a variable's sensitivity to a change in another variable, most commonly referring to demand as affected by other factors.

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Part 2

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The Midpoint Method: A Better Way to Calculate Percentage Changes and Elasticities

The midpoint formula is more accurate when calculating the price elasticity of demand.

$$\text{Price elasticity of demand} = \frac{(Q_2 - Q_1) / [(Q_2 + Q_1) / 2]}{(P_2 - P_1) / [(P_2 + P_1) / 2]}$$

Example: If the **price** of an ice cream cone increases from **\$2.00 to \$2.20** and the **amount** you buy falls from **10 to 8 cones**, then your elasticity of demand, using the midpoint formula, would be calculated as:

$$\frac{\frac{(10 - 8)}{(10 + 8) / 2}}{\frac{(2.20 - 2.00)}{(2.00 + 2.20) / 2}} = \frac{22\%}{9.5\%} = 2.32$$

Income Elasticity of Demand

- **Income elasticity of demand** measures how much the quantity demanded of a good responds to a change in consumers' income.



The illustration shows three stylized human figures standing on stacks of money. One figure on the left is looking up at a shopping bag icon. A dashed line connects the bag to the figure. Another figure on the right is reaching up towards the bag. A third figure at the bottom is also looking up. This visualizes the concept of income elasticity of demand, where changes in income (represented by the stacks of money) affect the quantity demanded (represented by the shopping bag).

Income Elasticity of Demand

['in-,kəm i-,la-'sti-sə-tē əv di-'mand]

The sensitivity of demand for a certain good to a change in the real income of consumers who buy that good.

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- It is computed as the **percentage change in the quantity demanded** **divided by** the **percentage change in income**.

$$\text{Income elasticity of demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in income}}$$

Inferior Goods

Off Brand ice cream



Travel by
Train



Travel by a
bicycle



Wick
stove



Normal Goods



Branded ice cream



Travel by
aeroplane



Travel by
car



Gas stove



Types of Goods

- **Normal Goods**: roses, cars, home services, name-brand clothing, laptop, and technology equipment.
- **Inferior Goods**: generic products, used cars, discount clothing, and canned foods.

Higher income raises the quantity **demande**d for normal goods but lowers the quantity **demande**d for inferior goods.

Normal Good



An *increase* in income...



increases demand.



A *decrease* in income...



decreases demand.

Inferior Good



An *increase* in income...



decreases demand.



A *decrease* in income...



increases demand.

Normal goods have positive income elasticities, while inferior goods have negative income elasticities

- Goods consumers regard as necessities tend to be income inelastic
 - Examples include food, fuel, clothing, and **medical services**.
- Goods consumers regard as luxuries tend to be income elastic.
 - Examples include sport cars, furs, and expensive foods.



- Asma's **income rises from 20,000 SR to 22,000 SR** and the **quantity of hamburger** she buys each week falls from **2 kg to 1 kg**.
- % change in quantity demanded = $(1-2)/1.5 = -.6667 = -$
66.67%
- % change in income = $(22,000-20,000)/21,000 = .0952 =$
9.52%
- income elasticity = $66.67\% / 9.52\% = -7.00$

So, Hamburger is an inferior good for Asma

Cross-price elasticity of demand

A measure of how much the **quantity demanded of one good** responds to a **change in the price of another good**, computed as the **percentage change in the quantity demanded of the first good** divided by the **percentage change in the price of the second good**

Cross Elasticity of Demand

['krɒs i-ˌlɑ-ˈsti-sə-tē əv di-ˈmænd]

An economic concept that measures the responsiveness in the quantity demanded of one good when the price for another good changes.

Cross Price
Elasticity of
Demand Formula



=

Percent Change in a Quantity of Good A
Percent Change in the Price of Good B



Substitutes have **positive cross-price** elasticities,
while **complements** have **negative cross-price**
elasticities

- A company producing **torches** and **batteries** is analyzing the cross-price elasticity of the two goods. For example, the **demand for torches was 10,000 when the price of batteries was \$10**, and the **demand rose to 15,000 when the price of batteries was reduced to \$8**.

- Percentage change in the number of torches

$$= [(15000 - 10000) / (15000 + 10000)] / 2 = 5000 / 12500 = 40\%$$

- Percentage change in price of batteries

$$= [(8 - 10) / (10 + 8)] / 2 = -2 / 9 = -22.22\%$$

Thus, cross-price elasticity of demand = $40\% / -22.22\% = -1.8$

Since the cross-price elasticity of demand for torches and batteries is **negative**, thus these two are **complementary** goods.

- The **price of apples** rises from **\$1.00** per Kg to **\$1.50** per Kg. As a result, the quantity of **oranges** demanded rises from **8,000** per week to **9,500**.
- **% change in quantity of oranges** demanded = $(9,500 - 8,000) / 8,750 = .1714 = \mathbf{17.14\%}$
- **% change in price of apples** = $(1.50 - 1.00) / 1.25 = .40 = \mathbf{40\%}$
- cross-price elasticity = $17.14\% / 40\% = \mathbf{0.43}$

Because the cross-price elasticity is **positive**, the two goods are **substitutes**

THE ELASTICITY OF SUPPLY

- **Price elasticity of supply** is a measure of how much the **quantity supplied** of a good responds to a **change in the price** of that good.
- Price elasticity of supply is the percentage change in quantity supplied resulting from a percent change in price.

PRICE ELASTICITY OF SUPPLY FORMULA

$$\text{PES} = \frac{\% \text{ Change in quantity supplied}}{\% \text{ Change in price}}$$

One of the important determinants of price elasticity of supply is the nature of the product itself. For example, goods that are essential for basic needs, such as food and clothing, tend to have a relatively inelastic supply, while luxury goods, such as jewelry and expensive cars, tend to have a more elastic supply.

- The price of rice increased from 2.85 JD per kg to 3.15 JD per kg and the quantity supplied rises from 9,000 to 11,000 kg per month.

- % change in price = $(3.15 - 2.85)/3.00 \times 100\% = 10\%$

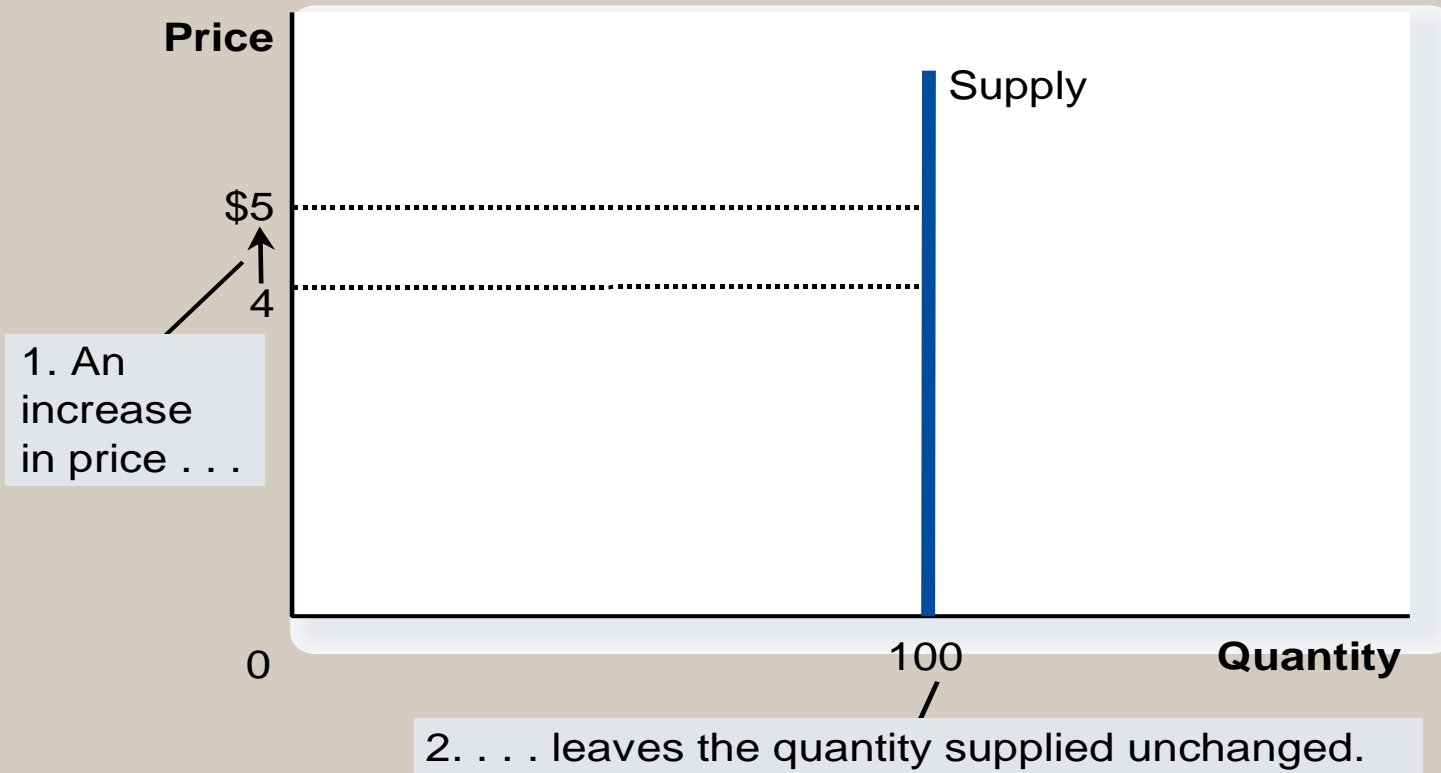
% change in quantity supplied = $(11,000 - 9,000)/10,000$

$\times 100\% = 20\%$

Price elasticity of supply = $(20\%)/(10\%) = 2$

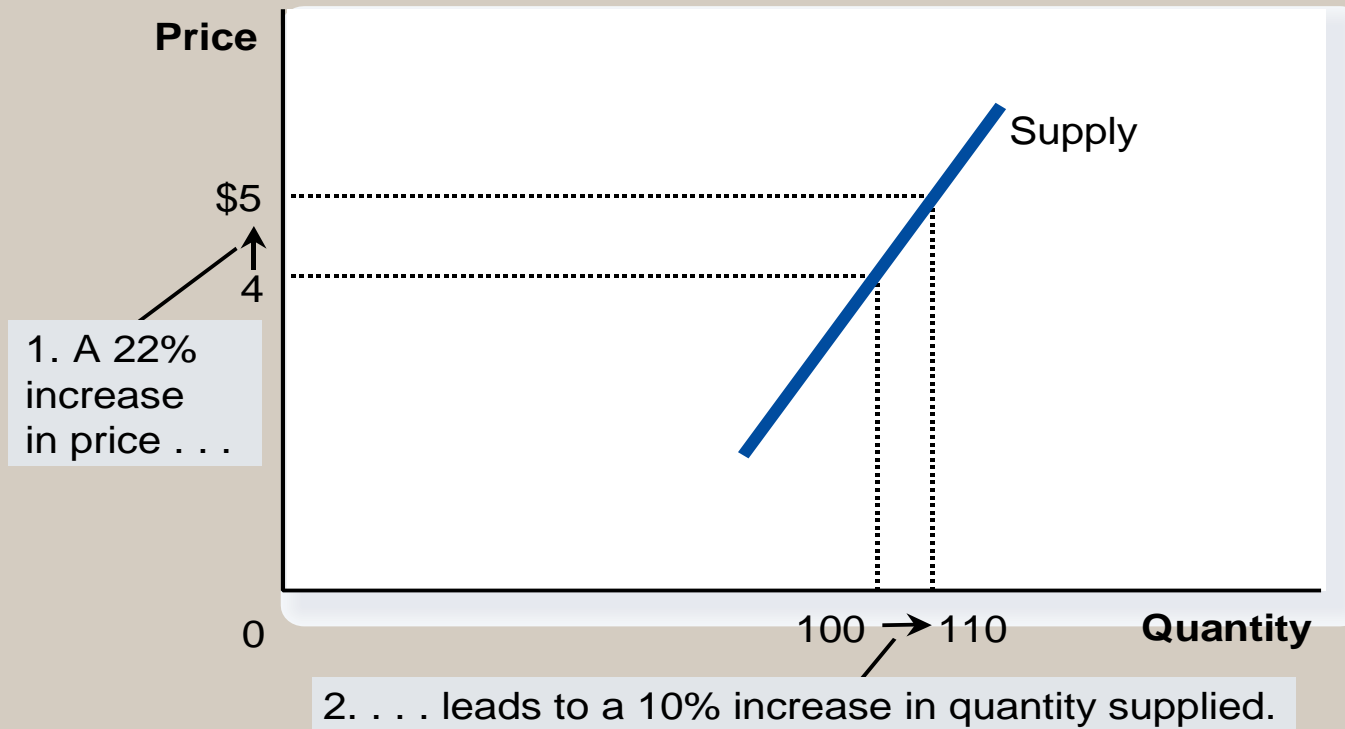
The Price Elasticity of Supply

(a) Perfectly Inelastic Supply: Elasticity Equals 0



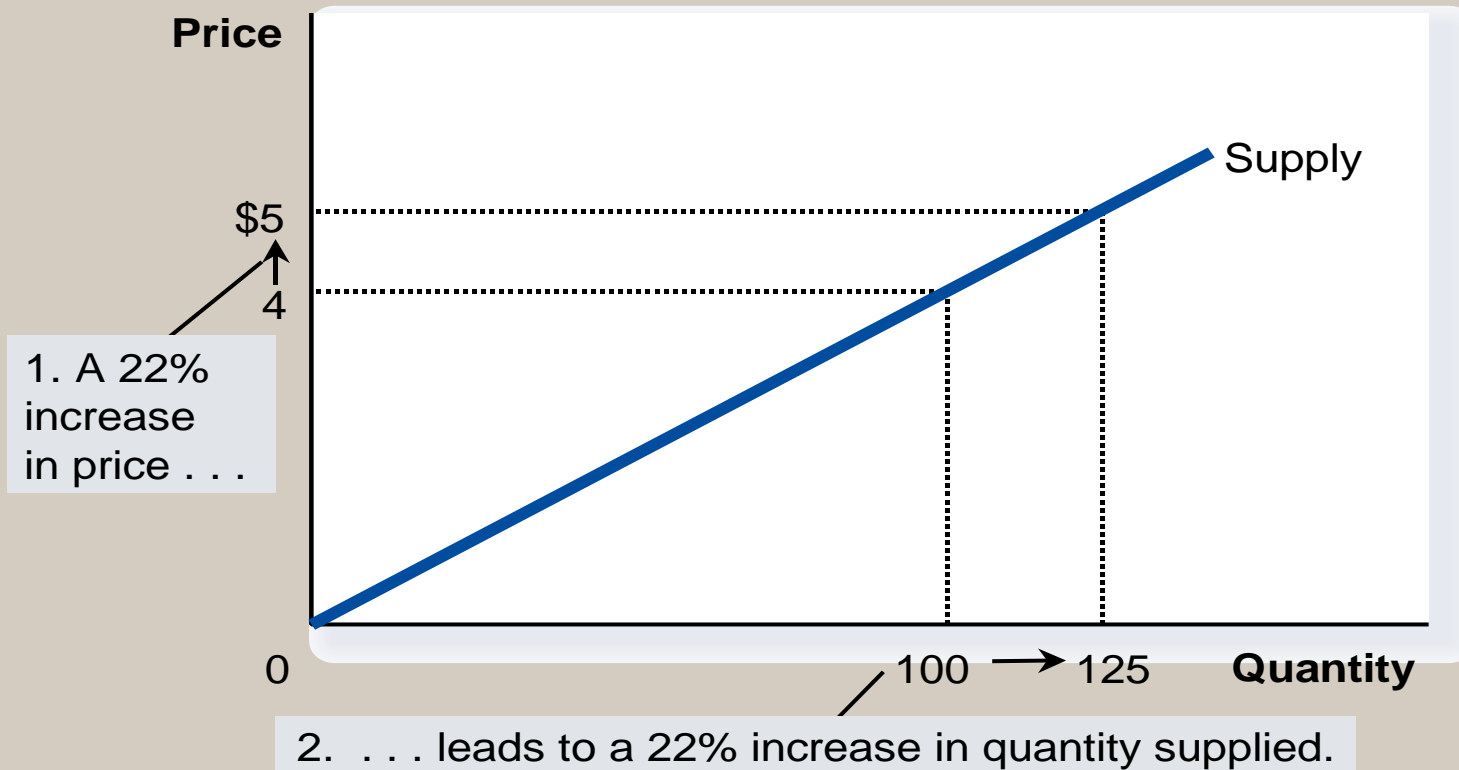
The Price Elasticity of Supply

(b) Inelastic Supply: Elasticity Is Less Than 1



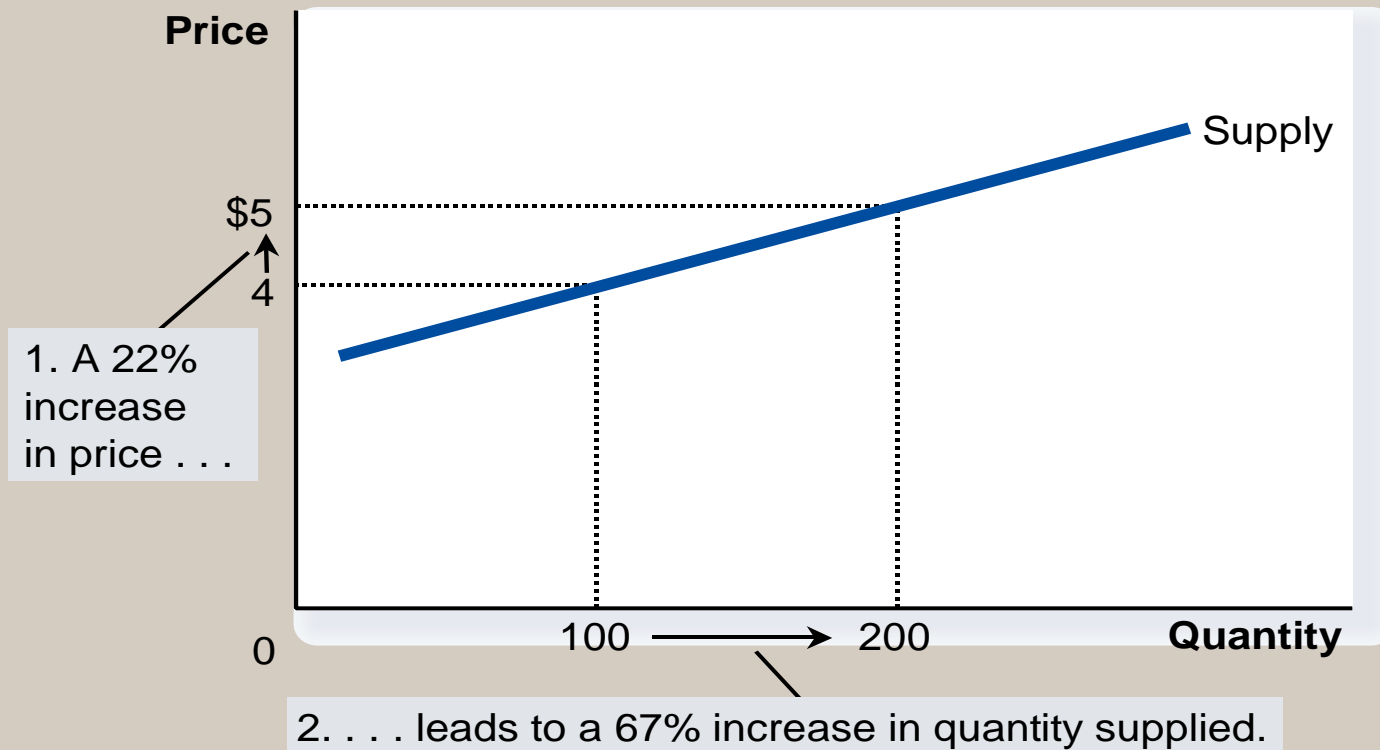
The Price Elasticity of Supply

(c) Unit Elastic Supply: Elasticity Equals 1



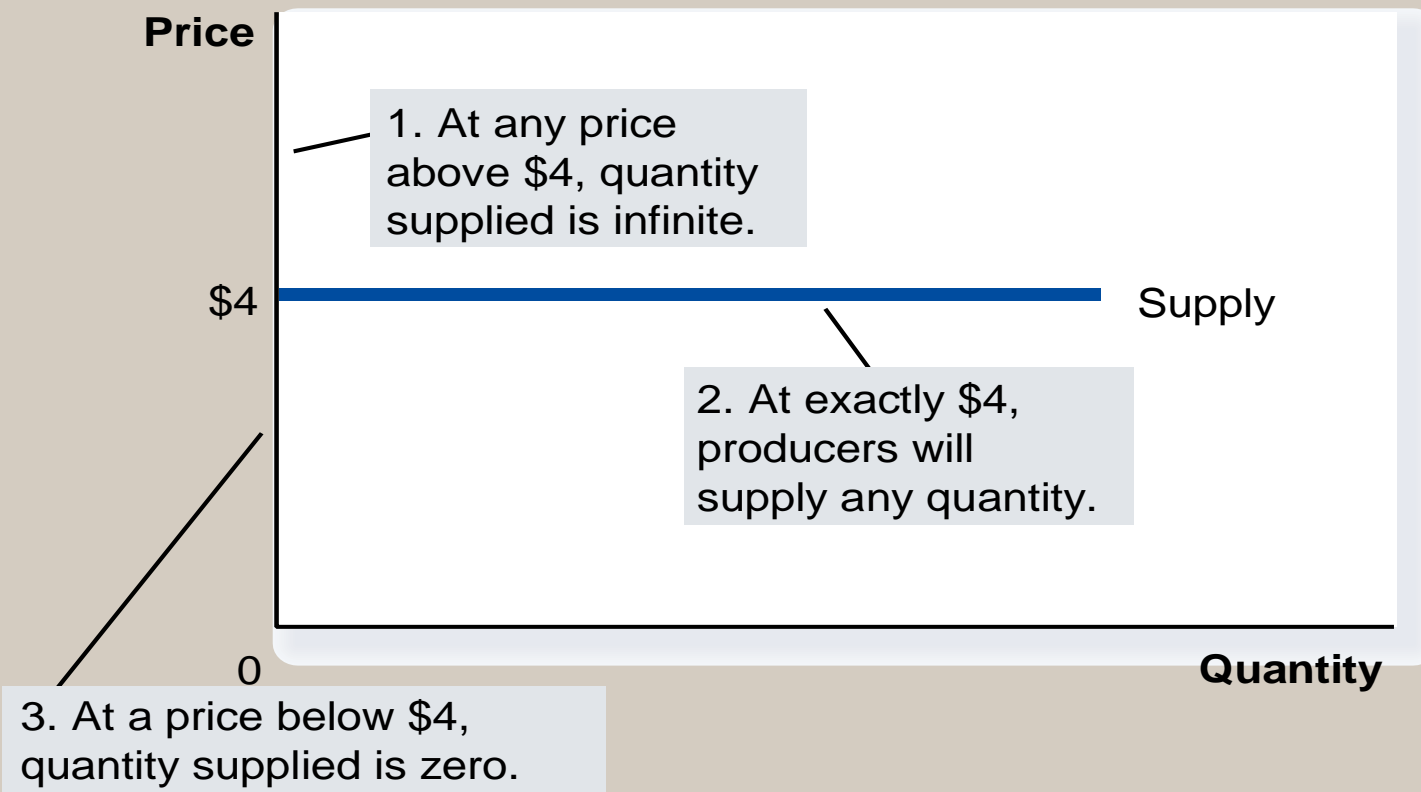
The Price Elasticity of Supply

(d) Elastic Supply: Elasticity Is Greater Than 1



The Price Elasticity of Supply

(e) Perfectly Elastic Supply: Elasticity Equals Infinity



TYPES OF ELASTICITY

- ❑ Elasticity is the degree of responsiveness in comparison to one variable to another variable

TYPES

INCOME ELASTICITY

- Change in demand due to change in real income
- Positive – normal goods
- Negative – inferior goods

CROSS ELASTICITY

- Change in demand due to change in price of other goods
- +ve means close substitute

PRICE ELASTICITY OF DEMAND

- Tells how a change in price impacts demand

PRICE ELASTICITY OF SUPPLY

- Tells about sensitivity of supply of product/service due to change in its market price