



Supply Elasticity

BECO 3310 Fall 2025

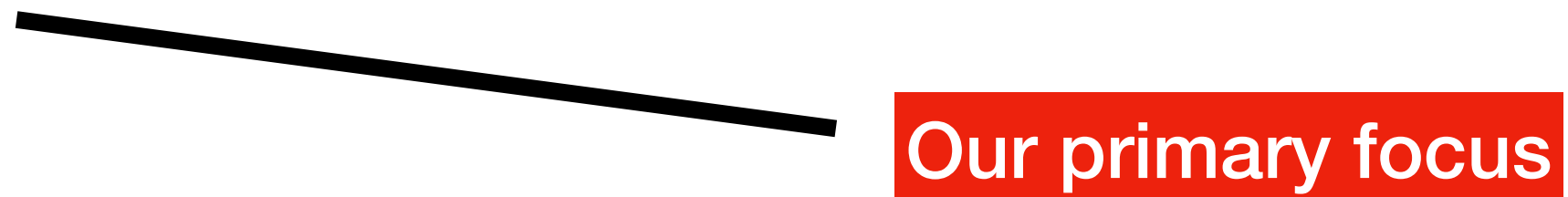



Re 

Elasticity

- A measure of how responsive one variable is to a change in another variable.
 - Given a change in variable “A,” by how much does variable “B” change?
- A measure of the responsiveness of the quantity demanded or supplied of a good, to a change in one of its determinants.

3 Types of Demand Elasticity

1. Price Elasticity of Demand 
 2. Income Elasticity of Demand
 3. Cross-Price Elasticity of Demand
-  Secondary focus

Price Elasticity of Demand

- Calculating Price Elasticity of Demand:

$$E_d = \frac{\textit{Percentage Change in Quantity Demanded}}{\textit{Percentage Change in Price}}$$

$$E_d = \frac{\% \Delta Q_d}{\% \Delta P}$$



SUPPLY ELASTICITY

Types of Demand Elasticity

1. Price Elasticity of supply



Our primary focus

Price Elasticity of Supply

- A measure of how responsive quantity supplied of a good is to a change in the price of the good itself.
- It is calculated as the percentage change in quantity supplied divided by the percentage change in price.

Price Elasticity of Supply

- Calculating Price Elasticity of Supply:

$$E_s = \frac{\textit{Percentage Change in Quantity Supplied}}{\textit{Percentage Change in Price}}$$

$$E_s = \frac{\% \Delta Q_s}{\% \Delta P}$$

Price Elasticity of Supply

- Percentage Change in Quantity Supplied:

$$\% \Delta Q_s = \frac{Q_{new} - Q_{old}}{Q_{old}} * 100$$

- Percentage Change in Price

$$\% \Delta P = \frac{P_{new} - P_{old}}{P_{old}} * 100$$

EXAMPLE A

- Quantity is originally 20 and changes to 10.
- Price is originally 15 and changes to 10.

$$\% \Delta Q_s = \frac{(10 - 20)}{20} * 100$$

$$\% \Delta P = \frac{(10 - 15)}{15} * 100$$

EXAMPLE A

- Quantity is originally 20 and changes to 10.
- Price is originally 15 and changes to 10.

$$\% \Delta Q_s = \frac{(10 - 20)}{20} * 100 = - 50 \%$$

$$\% \Delta P = \frac{(10 - 15)}{15} * 100 = - 33.33 \%$$

EXAMPLE A

- Quantity is originally 20 and changes to 10.
- Price is originally 15 and changes to 10.

$$E_s = \frac{\% \Delta Q_s}{\% \Delta P} = \frac{-50\%}{-33.33\%}$$

EXAMPLE A

- Quantity is originally 20 and changes to 10.
- Price is originally 15 and changes to 10.

$$E_s = \frac{\% \Delta Q_s}{\% \Delta P} = \frac{-50\%}{-33.33\%} = 1.5\%$$

EXAMPLE A

- What does that 1.5% mean?
- If the price decreases by 1%, the quantity supplied will decrease by 1.5%.
- Likewise, if the price increases by 1%, the quantity supplied will increase by 1.5%.

EXAMPLE A

- What does that 1.5% mean?
- **If the price decreases by 1%, the quantity supplied will decrease by 1.5%.**
- **Likewise, if the price increases by 1%, the quantity supplied will increase by 1.5%.**
- Notice the relationship between price and quantity in supply elasticity vs. demand elasticity!

Elasticity of Supply

- **Midpoint Formula**

- Another way to calculate price elasticity of supply.
- This offers the benefit of calculating from the same base.
- We get the same elasticity for both directions (increase or decrease in price) without having to switch the numbers in the equation.

$$E_s = \frac{(Q_2 - Q_1) / [(Q_2 + Q_1) / 2]}{(P_2 - P_1) / [(P_2 + P_1) / 2]}$$

EXAMPLE A: Midpoint formula

- Quantity is originally 20 and changes to 10.
- Price is originally 15 and changes to 10.

$$E_s = \frac{(10 - 20)/[(10 + 20)/2]}{(10 - 15)/[(10 + 15)/2]} = \frac{(-10)/(15)}{(-5)/12.5} = \frac{-.6}{-.4} \approx 1.5 \%$$

Price Elasticity of Supply

- Why is the elasticity positive (1.5) ?
 - Increasing marginal cost!
 - Price is positively related to quantity supplied.
 - The higher the price, the more I want to sell, and vice-versa.
- Elasticities of Supply are ***always*** positive.
 - We don't even have to worry about taking absolute values!



Elastic, Inelastic, & Unit-Elastic Supply

Elastic, Inelastic, & Unit-Elastic Demand

- $E_s > 1$: Elastic Supply
- $E_s < 1$: Inelastic Supply
- $E_s = 1$: Unit-Elastic Supply

Elastic Supply

- $E_s > 1$
 - The quantity supplied is relatively more responsive to a change in price.
 - A 1% change in price will lead to a greater than 1% change in quantity supplied.
- $E_s > \infty$
 - Perfectly Elastic Supply
 - At price “P”, producers will supply any quantity.
 - If the price increases above “P”, infinite quantity is supplied.
 - If the price decreases below “P”, quantity supplied is zero.

Inelastic Supply

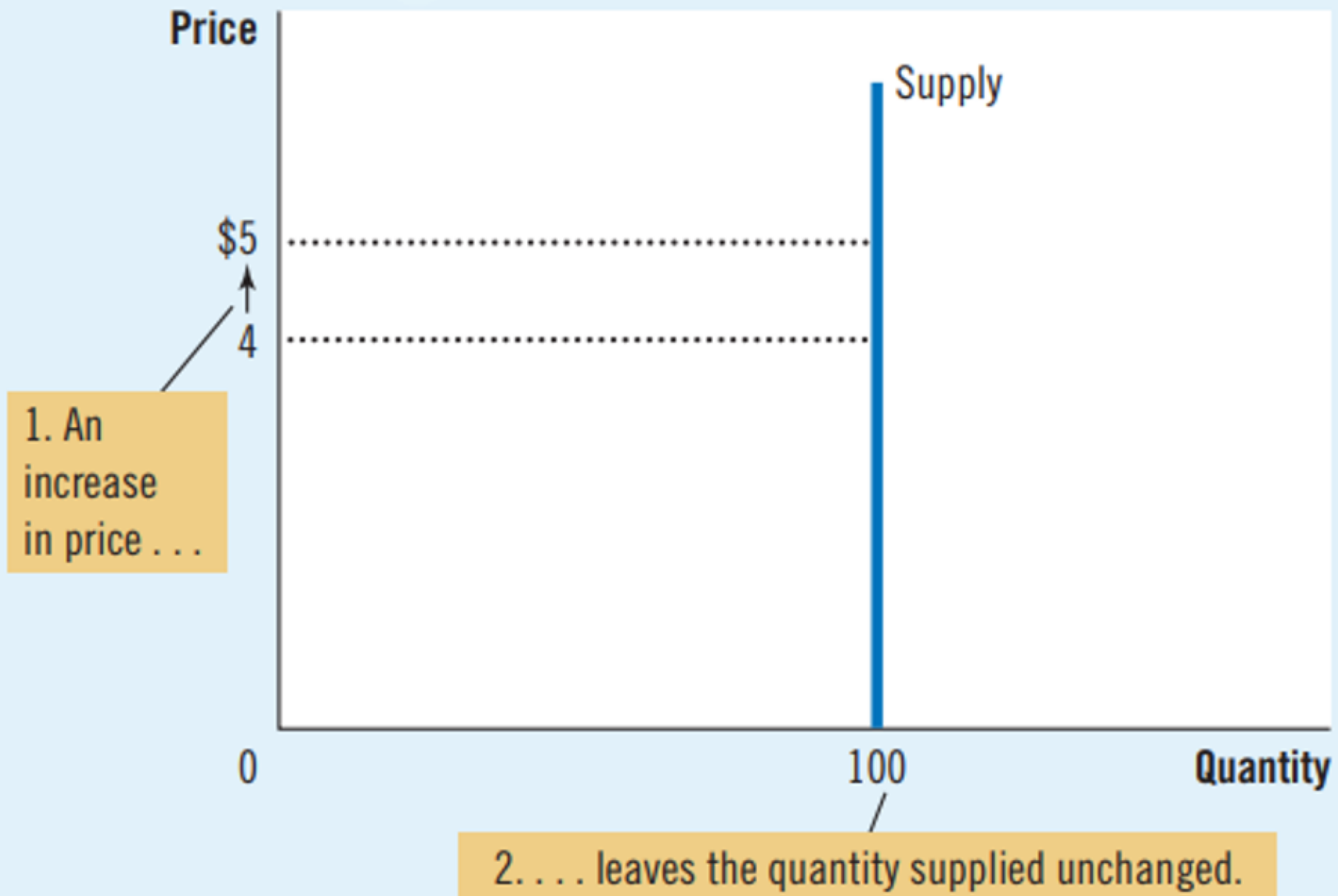
- $E_s < 1$
 - The quantity supplied is relatively less responsive to a change in price.
 - A 1% change in price will lead to a less than 1% change in quantity supplied.
- $E_s = 0$
 - Perfectly Inelastic Supply
 - The quantity supplied will never change following a change in price.

Unit-Elastic Supply

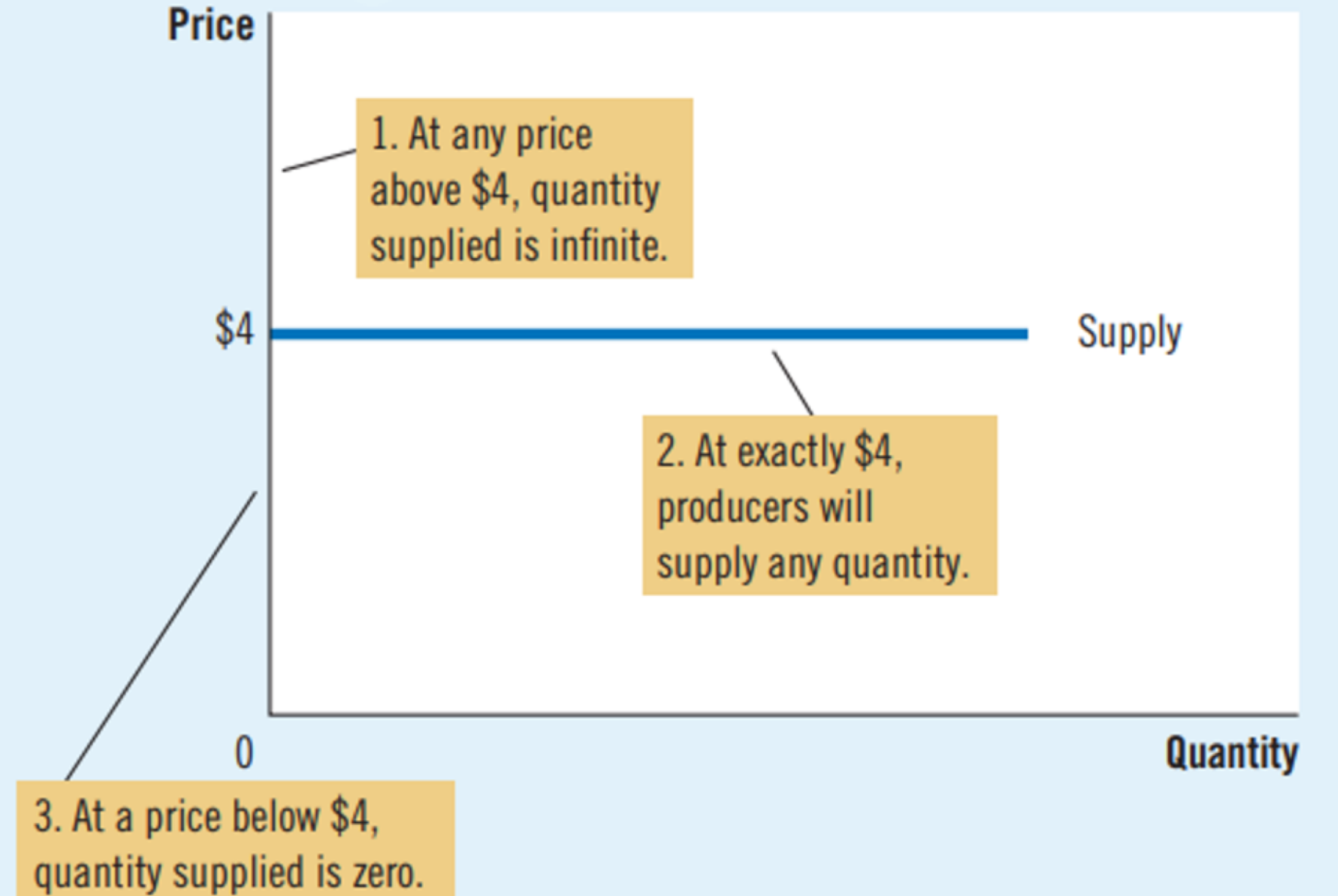
- $E_s = 1$
 - The quantity supplied is equally responsive to a change in price.
 - A 1% change in price will lead to a 1% change in quantity supplied.

Extreme cases

Perfectly Inelastic Supply: Elasticity Equals 0

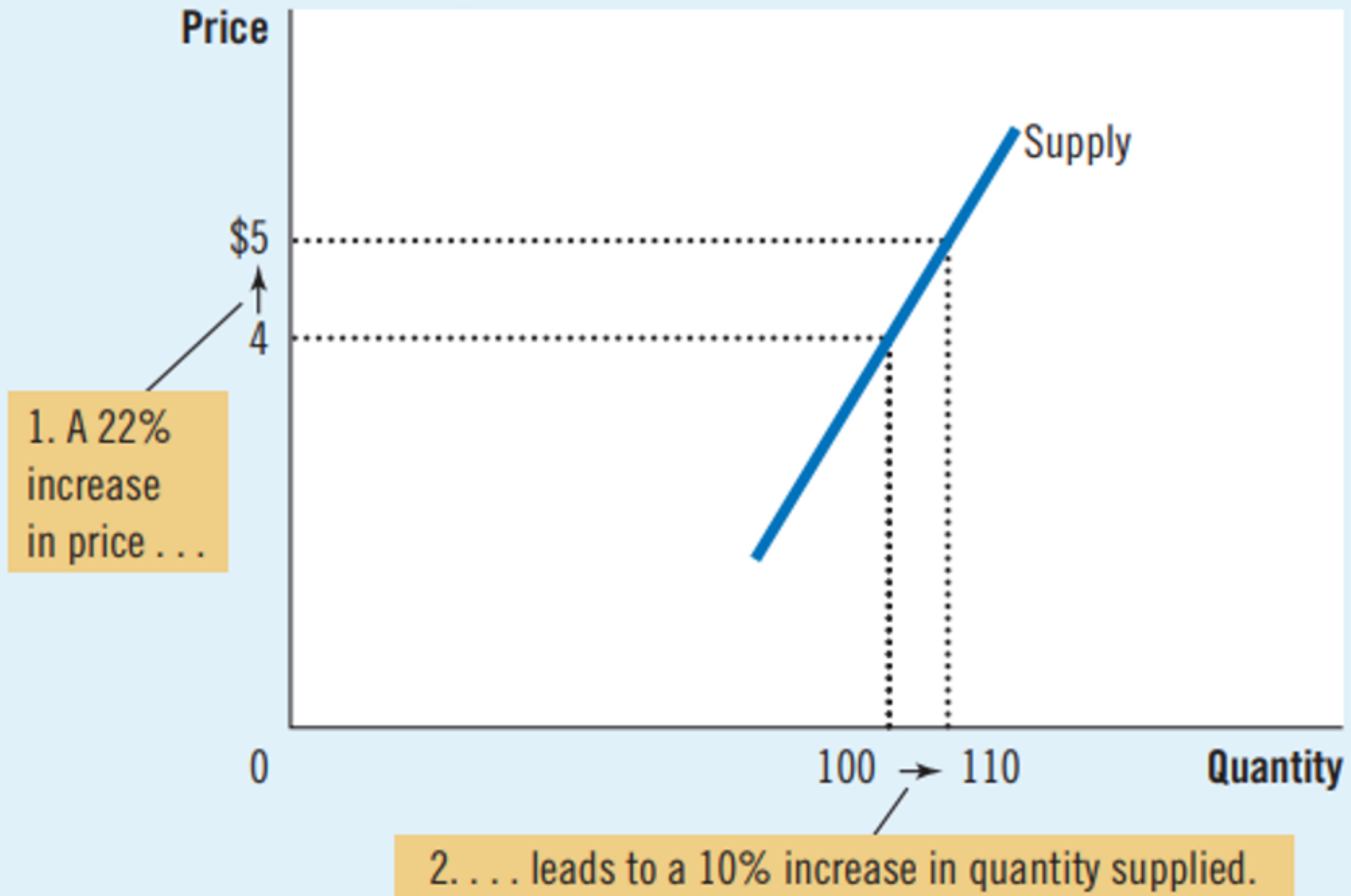


Perfectly Elastic Supply: Elasticity Equals Infinity

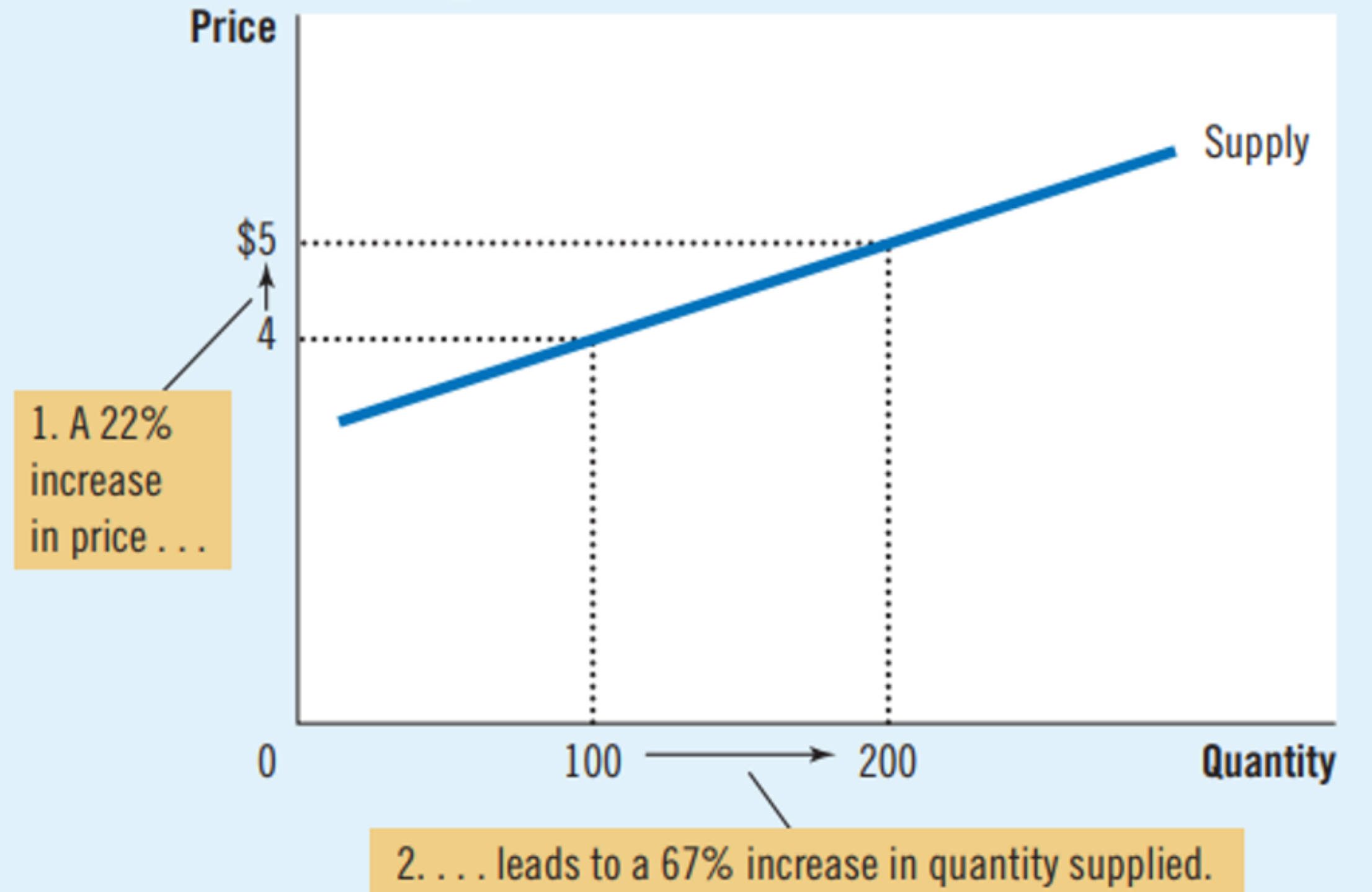


Typical cases

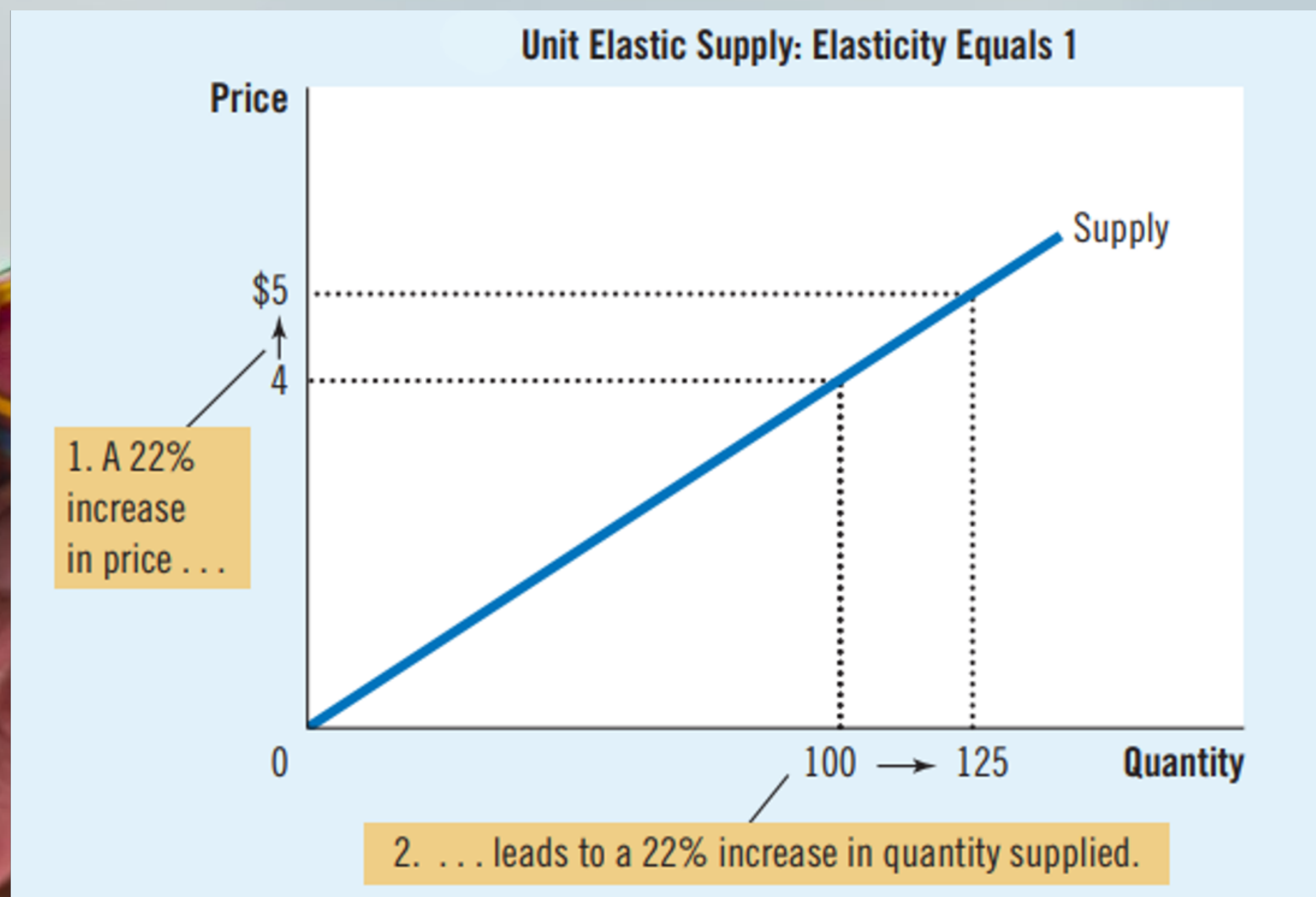
Inelastic Supply: Elasticity Is Less Than 1



Elastic Supply: Elasticity Is Greater Than 1



Less typical case





Determinants of Supply Elasticity

Determinants of Supply Elasticity

- Time Horizon (only one we're going to look at).
 - A good with a long-time horizon will have a more elastic supply.
- Or, in the long run, supply tends to become more elastic.
 - This is because firms need time to make changes since a lot of their capital and costs are fixed in the short run.
 - It's hard to completely change your production habits, or build/expand your factory.

Time Horizon & Elasticity

- Immediate Period
 - Producer's inputs are fixed. They cannot increase their use to increase quantity supplied.
- Short Run
 - At least one input is fixed, but others can be changed, allowing producers to increase quantity supplied by a small amount.
- Long Run
 - All inputs of production can be changed. Producers can increase quantity supplied by a lot.

Time Horizon & Elasticity

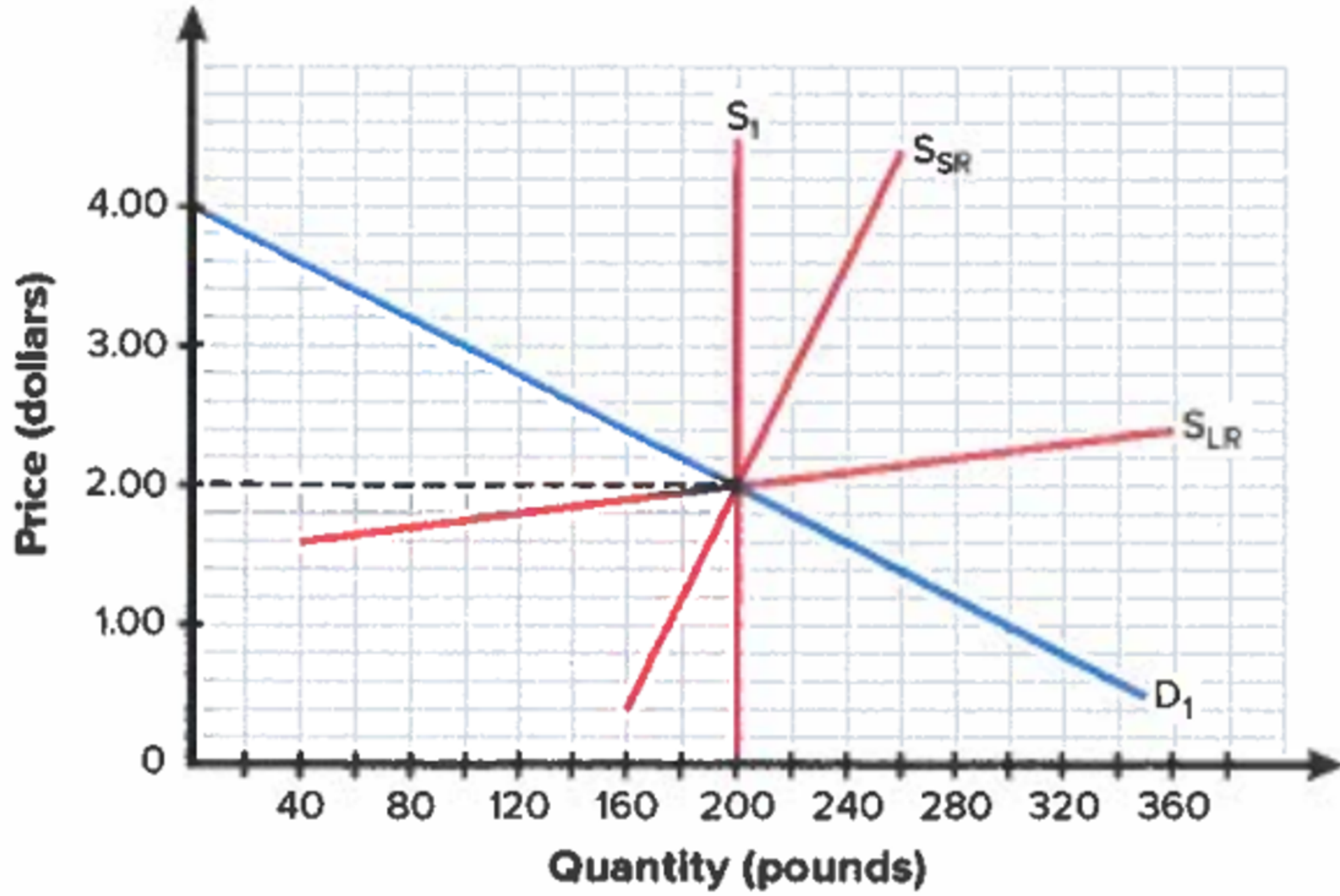
- Ex: Bakery
 - Assume you own a bakery and demand for bread increases.
 - In the immediate period, you can't change your production habits.
 - In the short run, you can hire more employees to bake more bread, but you can't increase the actual size of your bakery.
 - In the long run, you can buy a larger oven to make more bread, or even lease more space, and boost production even more.

Example C:

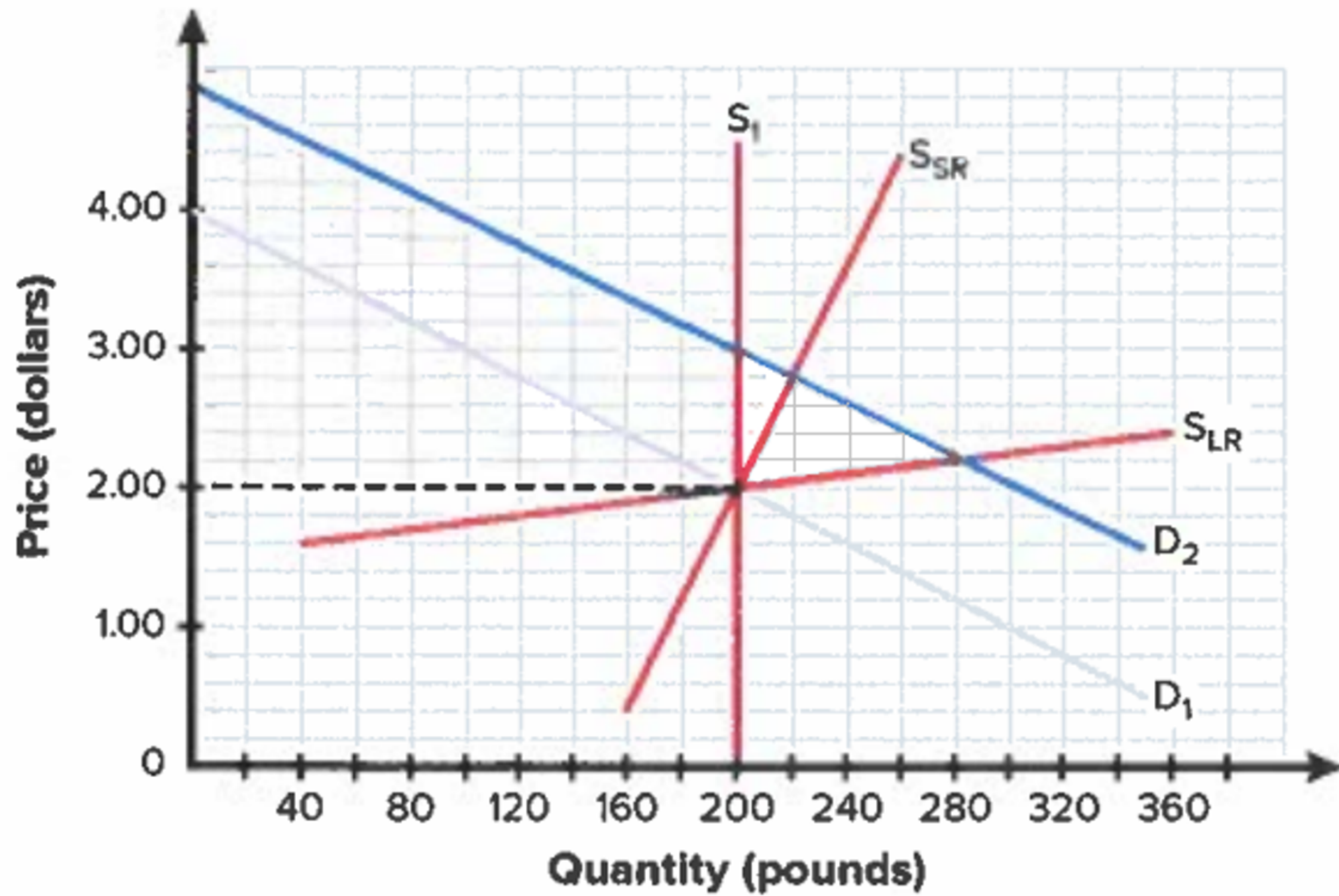
- Suppose there is an increase in demand for corn.
- What happens to the equilibrium P & Q in the immediate period, short-run, & long-run?
- Why does supply respond this way?



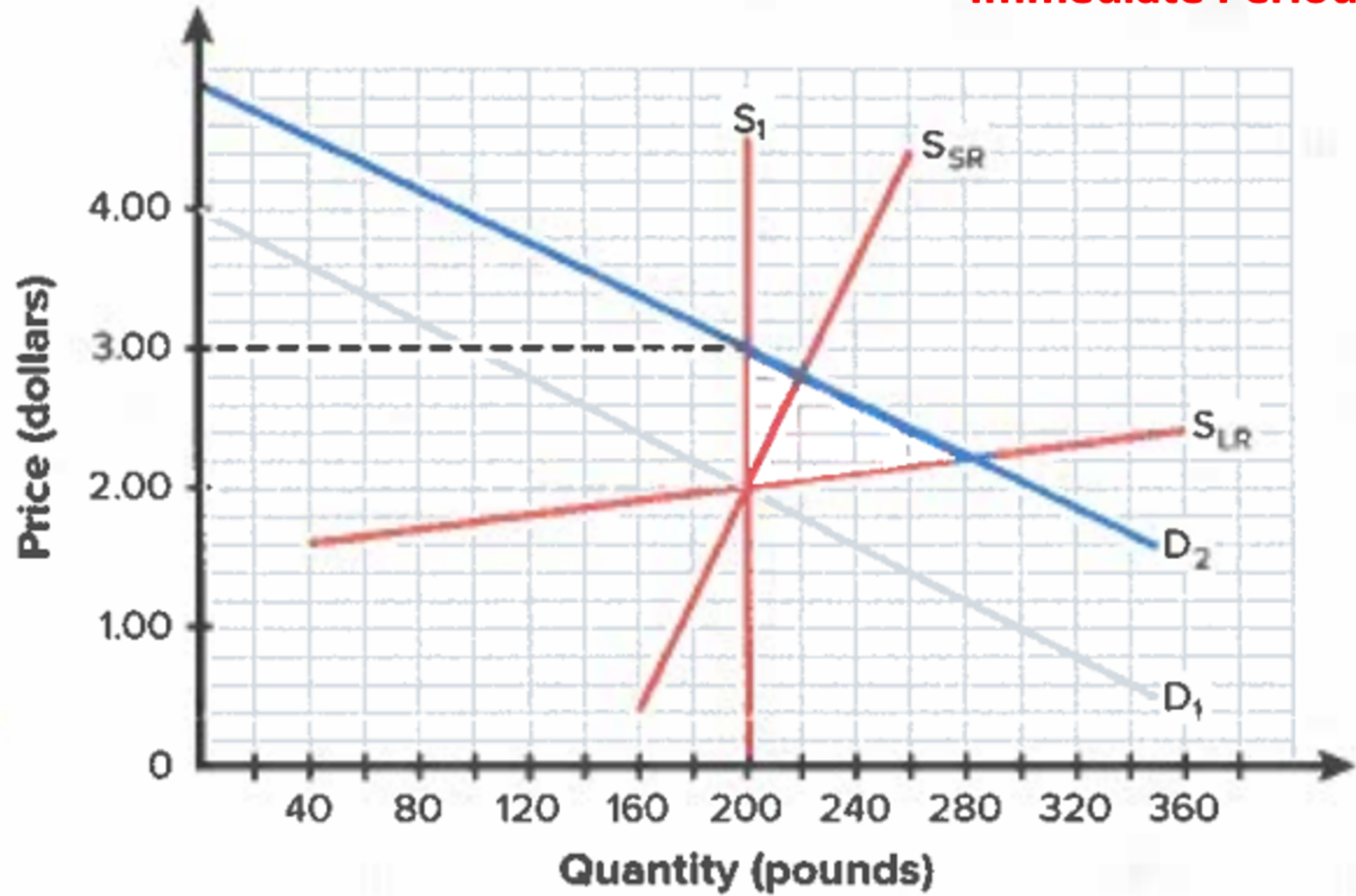
Market for Corn



Market for Corn

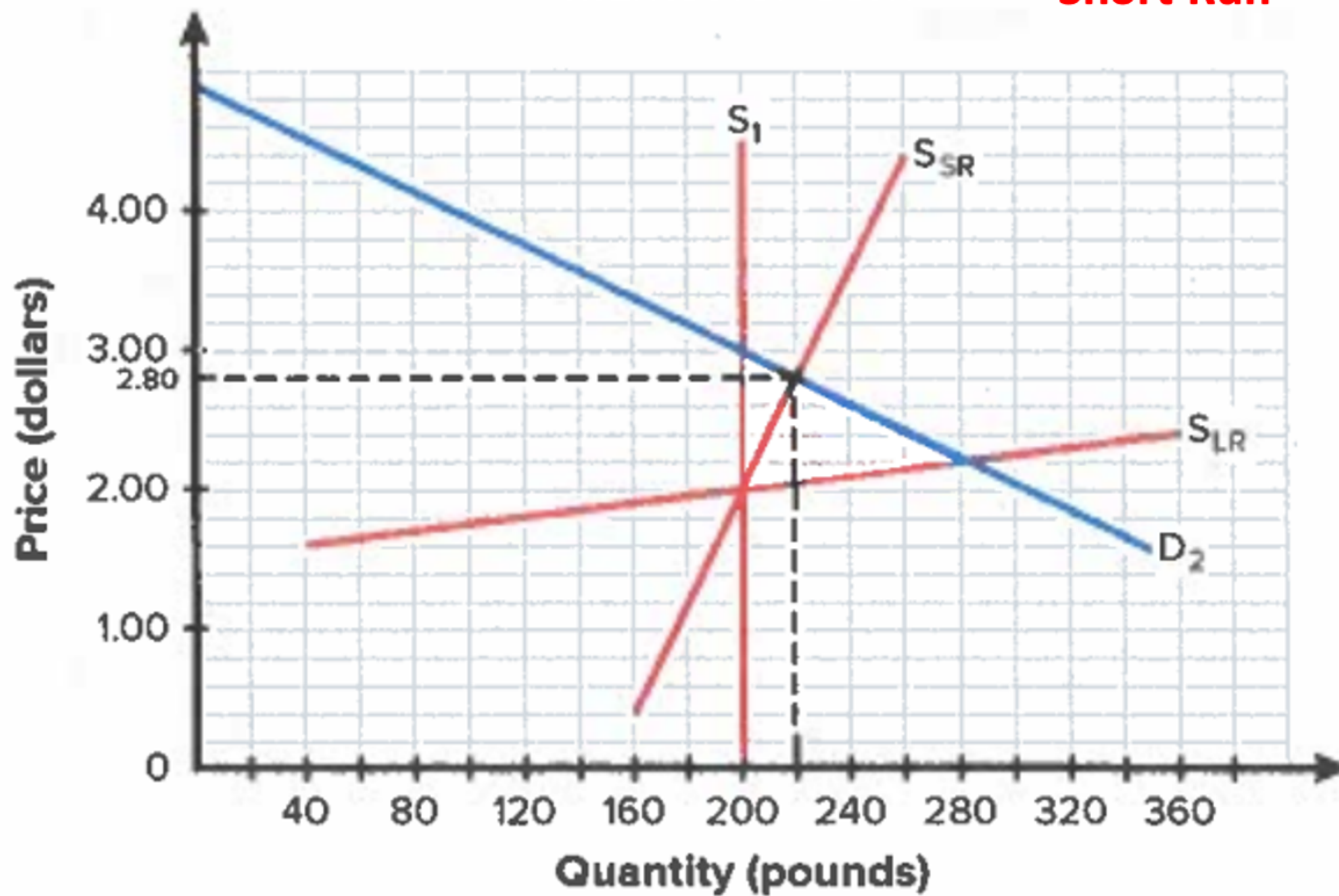


Market for Corn **Immediate Period**



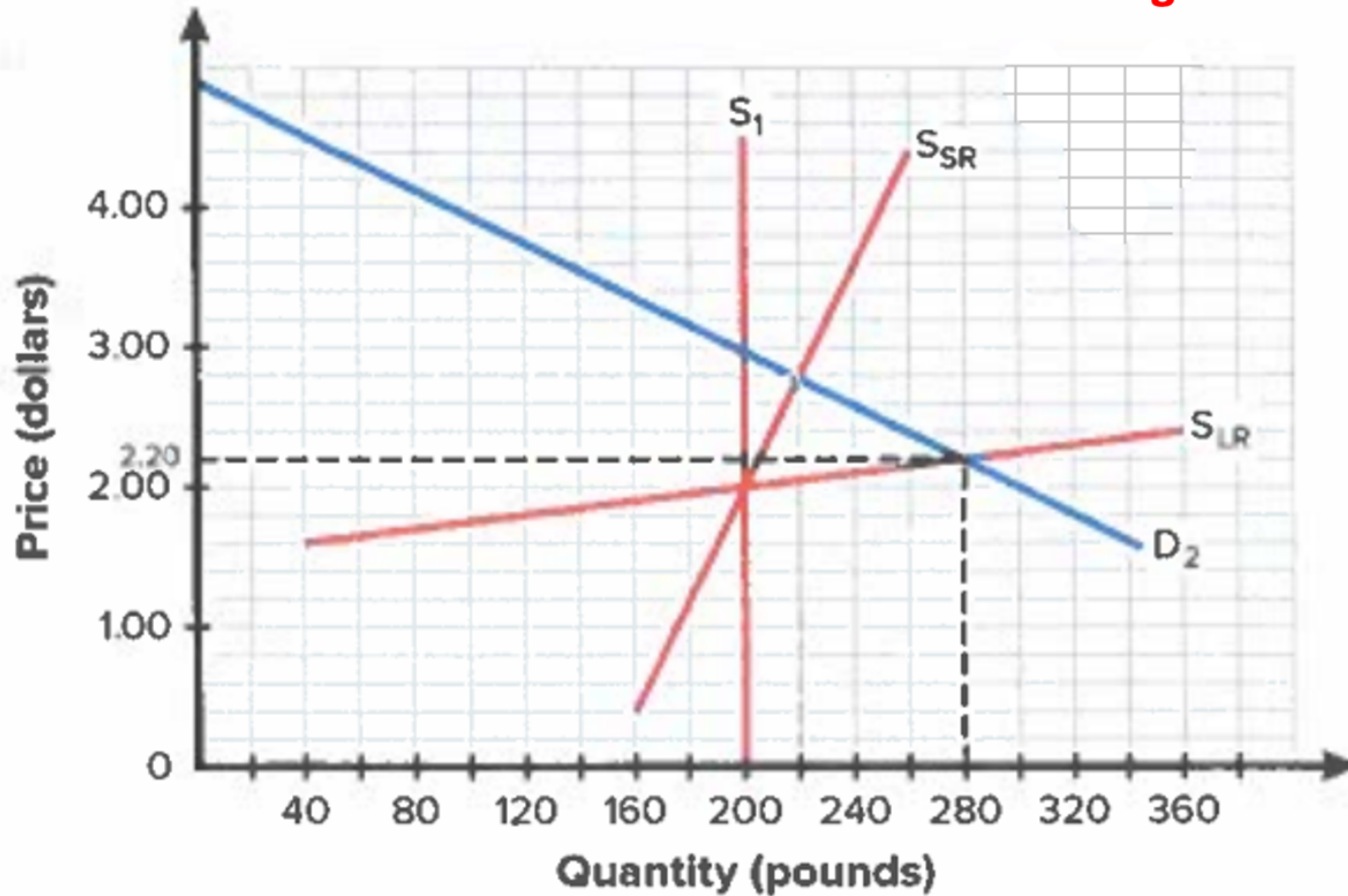
Market for Corn

Short-Run



Market for Corn

Long-Run





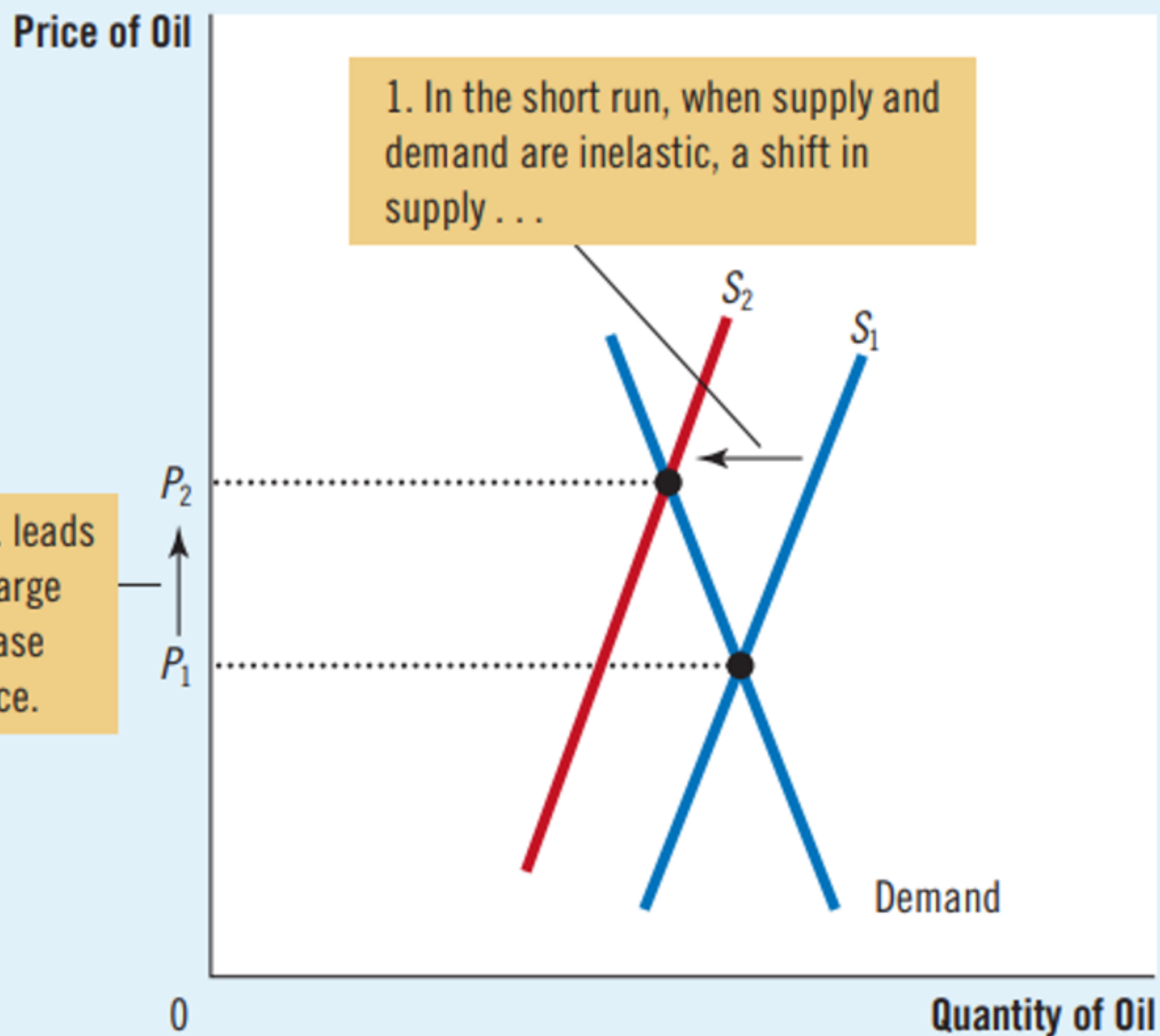
Elasticity Applications

Ex: OPEC & the Price of Oil

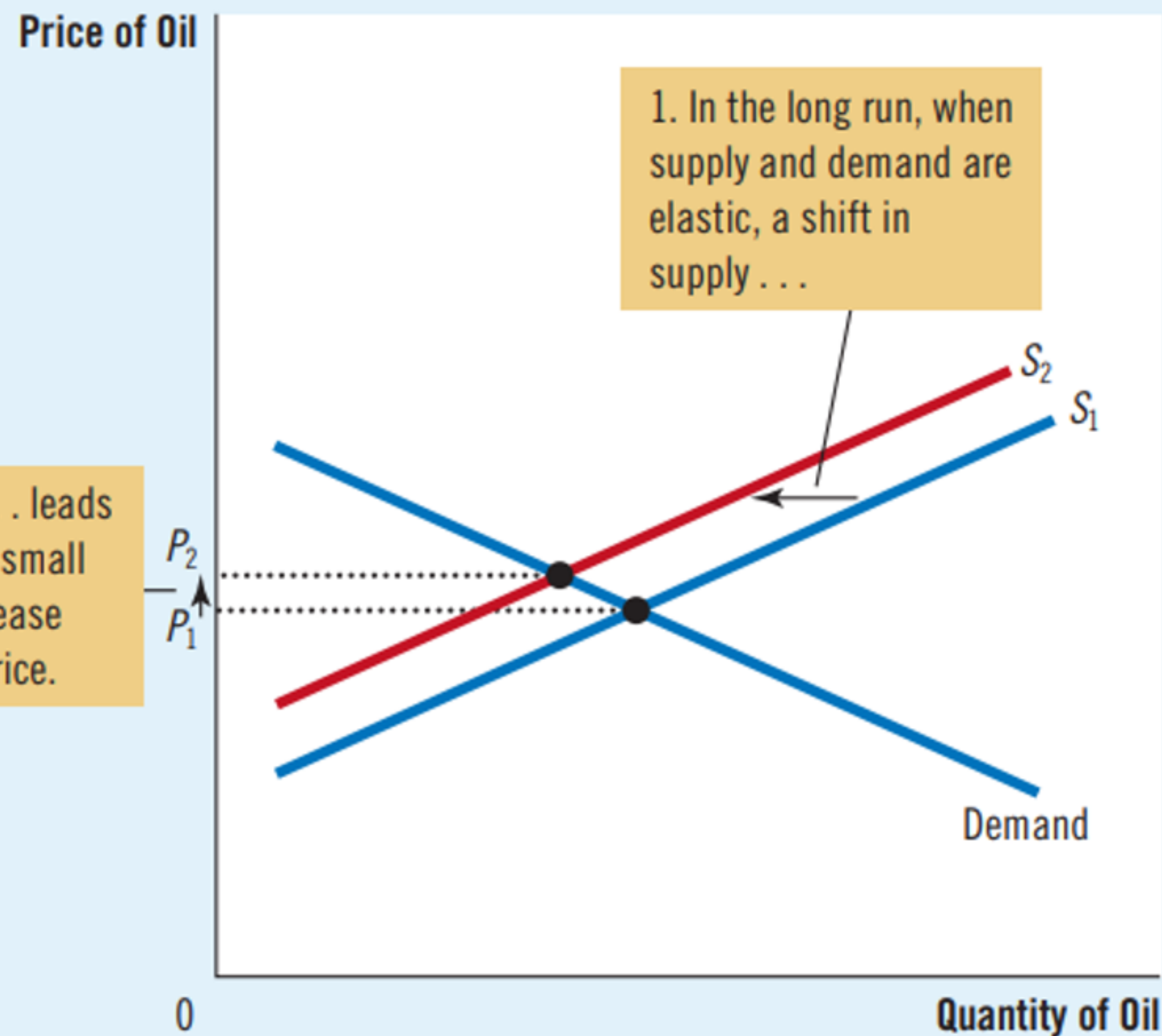


- Organization of Petroleum Exporting Countries
- In the 1970s, the cartel agreed to limit production to increase the price & raise total revenue, since demand for oil is inelastic.
- But in the 1980s, the price of oil plummeted, and revenues fell.
- Why?

(a) The Oil Market in the Short Run



(b) The Oil Market in the Long Run



Ex: OPEC & the Price of Oil



- The OPEC price hike failed because supply & demand are both elastic in the long-run.
 - More alternatives become available & switching becomes easier.
- What about incentives?
 - When total revenues increase, OPEC members have the incentive to produce more at a higher price, thus violating their agreement.
 - Other members follow suit, & the cartel breaks down.
 - You can't beat incentives!

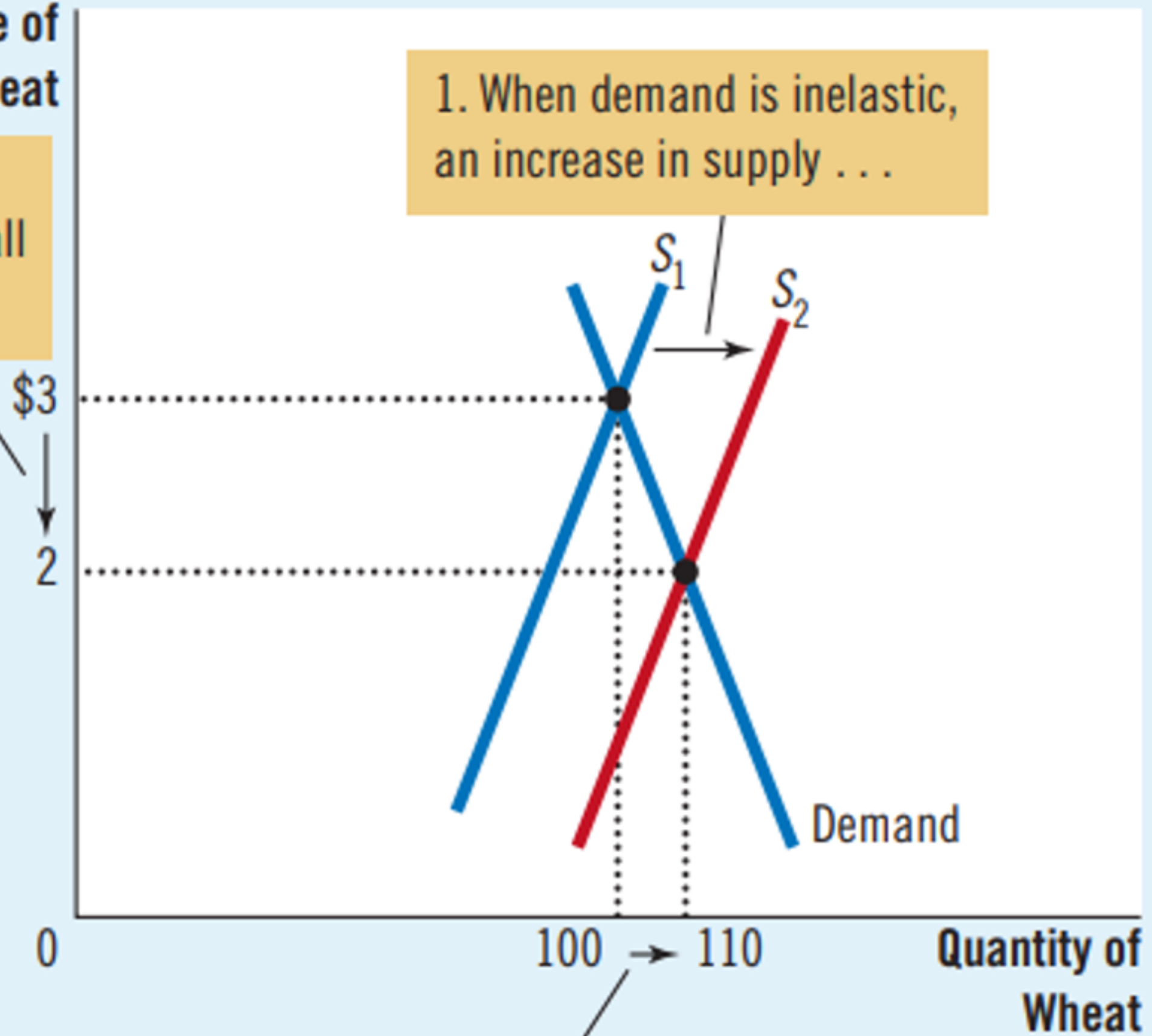
Ex: Wheat Farming



- A new wheat hybrid increased farming productivity per acre by 20%.
- Supply of wheat increases (shifts right).
- Is this good news for farmers?
 - What happens to total revenue when demand is inelastic?

Price of
Wheat

2. . . . leads
to a large fall
in price . . .



1. When demand is inelastic,
an increase in supply . . .

3. . . . and a proportionately smaller increase
in quantity sold. As a result, revenue falls
from \$300 to \$220.

Ex: Wheat Farming



- If this new technology is bad for farmers, why do they adopt it?
- In competitive markets, no one farmer has control over the price of wheat. They take it as given.
- For any given price of wheat, it is better for an individual farmer to use this new hybrid wheat than not.
- But when all farmers do this, farmers become worse off as a whole.

Ex: Wheat Farming



- **This example explains a big shift in U.S. history.**
- A lot of people were farmers, or working in some agricultural occupation, for much of American history.
- Now, it's not as economically feasible to do so, precisely because advancements in technology led farm revenues to fall.
- Only few farmers (hopefully the best) were able to survive.

Ex: Wheat Farming



- **This example explains the paradox of public policy.**
- Certain farm programs now exist to help farmers, by incentivizing them not to work. They get paid not to plant certain crops.
- These programs are meant to reduce the supply of farm products & raise prices, thereby, increasing farm revenues.
- It can be great for farmers, but it can be bad for consumers.

Elasticities & Economic Choices

- Economics studies decision-making under scarcity.
- Because of scarcity, we face tradeoffs.
- Often, these tradeoffs include time & the behavior of individuals surrounding a particular good... in other words, elasticities.

Elasticities & Policy

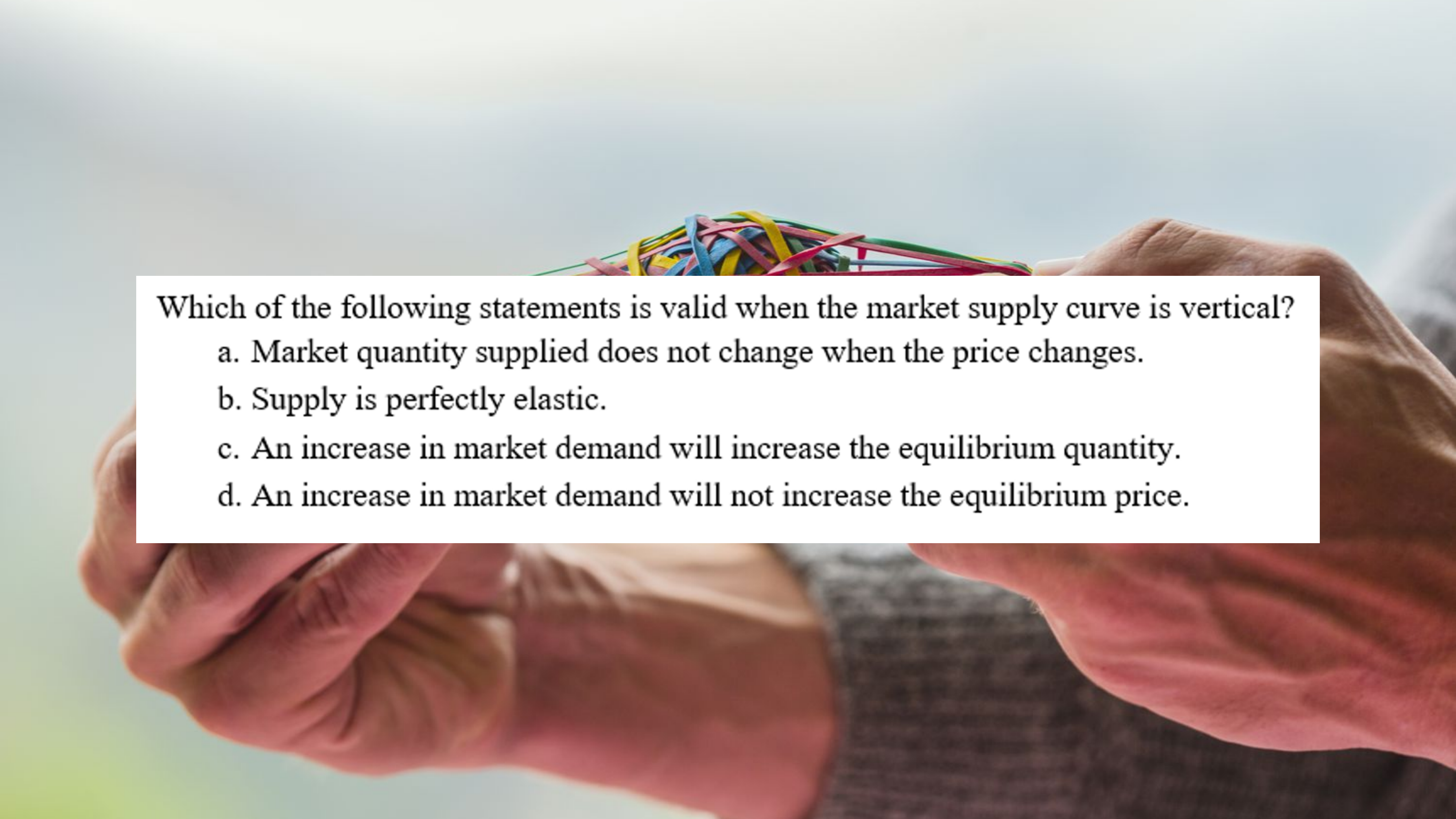
- Elasticities need to be considered when making policy choices.
- Think of taxes? Would the elasticity of the product affect tax revenue?
- Subsidies? Look at the wheat example. We may help farmers but hurt consumers.
- Drug example? How will elasticities affect our approach to solving drug-related problems?

Elasticities & Business

- Managers must assess the elasticities of demand for their product if they want to maximize profits.
- They must also assess the elasticities of supply for their products if they want to be able to sell them!
- When demand is inelastic, higher prices will (generally) increase revenue.
- Raising prices can be profit maximizing even when demand is elastic (when reduction in production costs is greater than reduction in revenues).

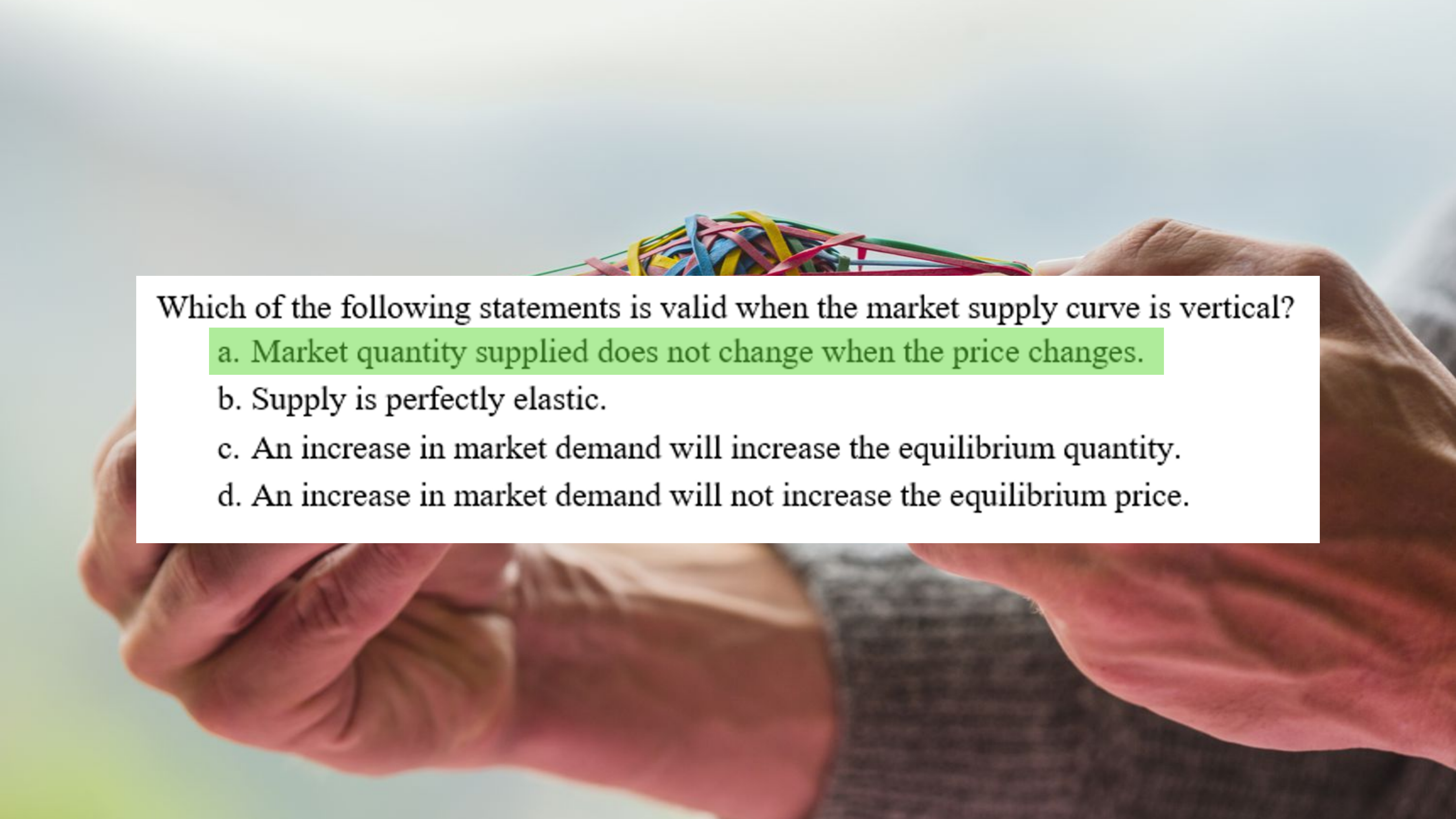
A close-up photograph of two hands holding a ball of colorful rubber bands. The ball is made of many interwoven rubber bands in various colors including red, yellow, blue, and green. The hands are positioned on either side of the ball, with fingers gripping the ends of the bands. The background is a soft, out-of-focus landscape with a blue sky and a dark, textured foreground. The word "Practice" is written in white text inside a black rectangular box, centered at the bottom of the image.

Practice

A close-up photograph of a hand holding a bundle of colorful rubber bands. The rubber bands are in various colors including yellow, blue, red, green, and pink. The hand is positioned at the top of the frame, and the background is a soft, out-of-focus landscape with a blue sky and some greenery. A white text box is overlaid on the image, containing a multiple-choice question.

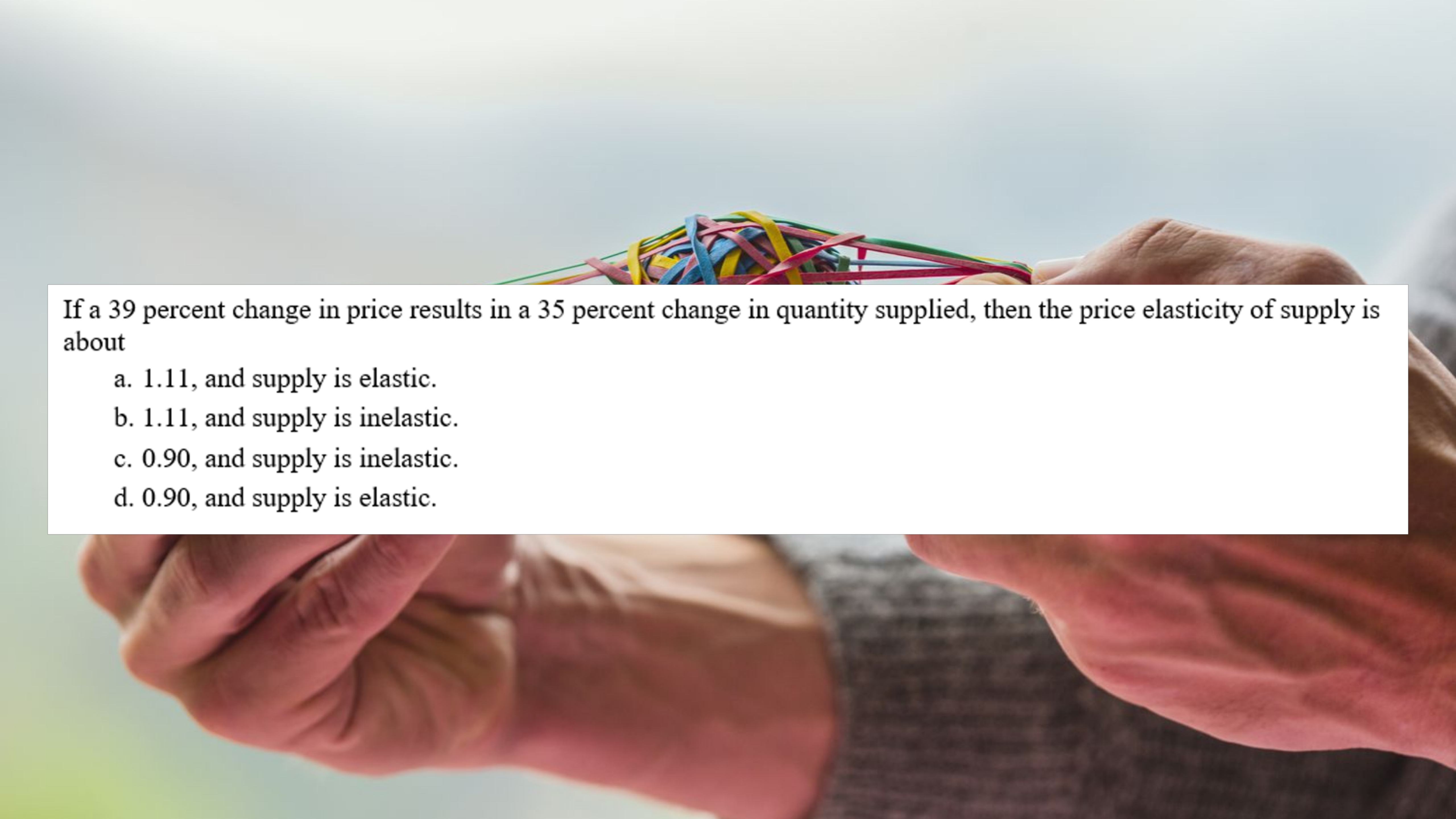
Which of the following statements is valid when the market supply curve is vertical?

- a. Market quantity supplied does not change when the price changes.
- b. Supply is perfectly elastic.
- c. An increase in market demand will increase the equilibrium quantity.
- d. An increase in market demand will not increase the equilibrium price.



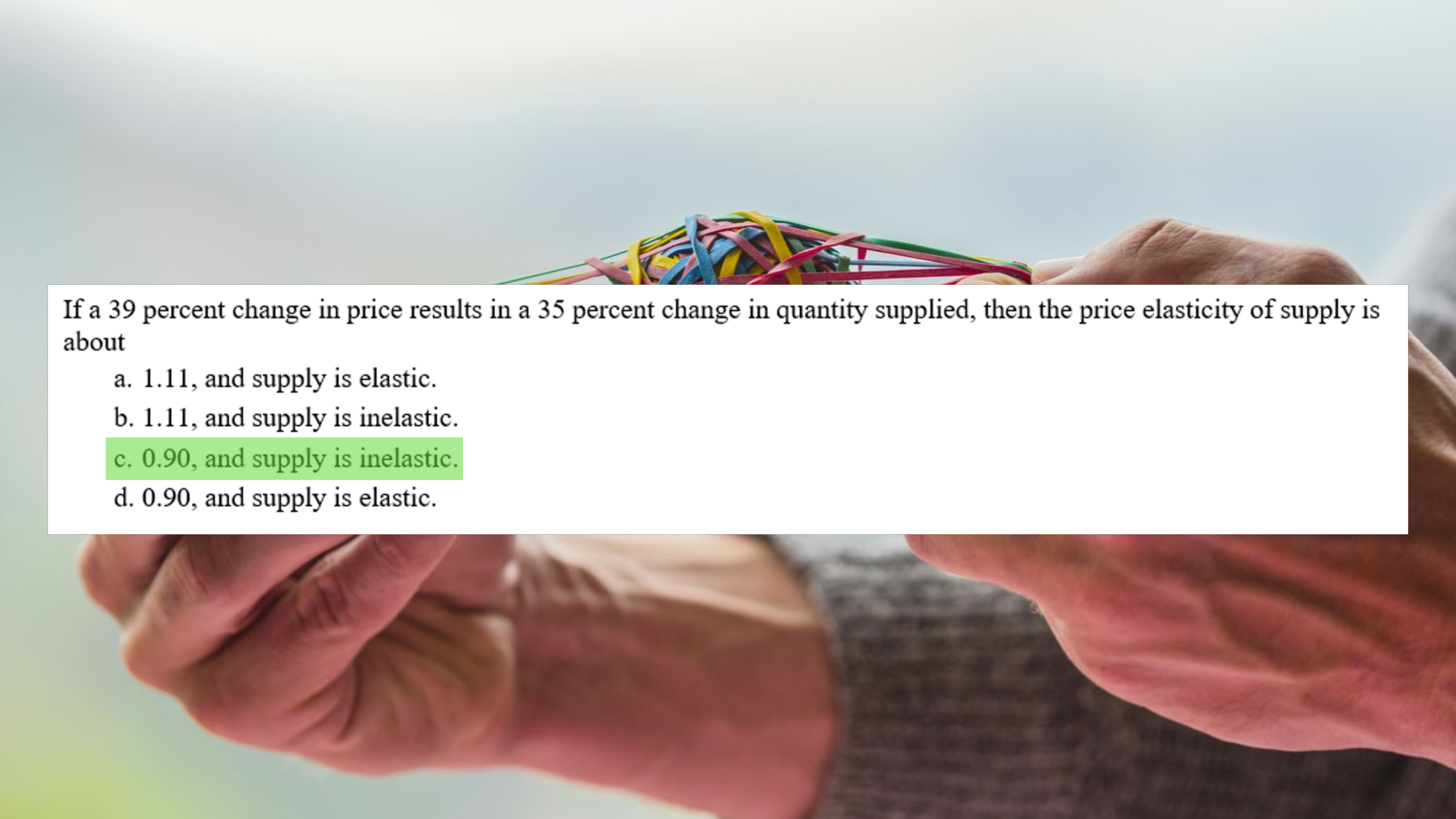
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A close-up photograph of a hand holding a bundle of colorful rubber bands. The rubber bands are in various colors including red, yellow, blue, and green. The hand is positioned on the right side of the frame, with the fingers gripping the bundle. The background is a soft, out-of-focus light blue and white, suggesting an outdoor setting. The overall composition is centered, with the hand and rubber bands being the primary focus.

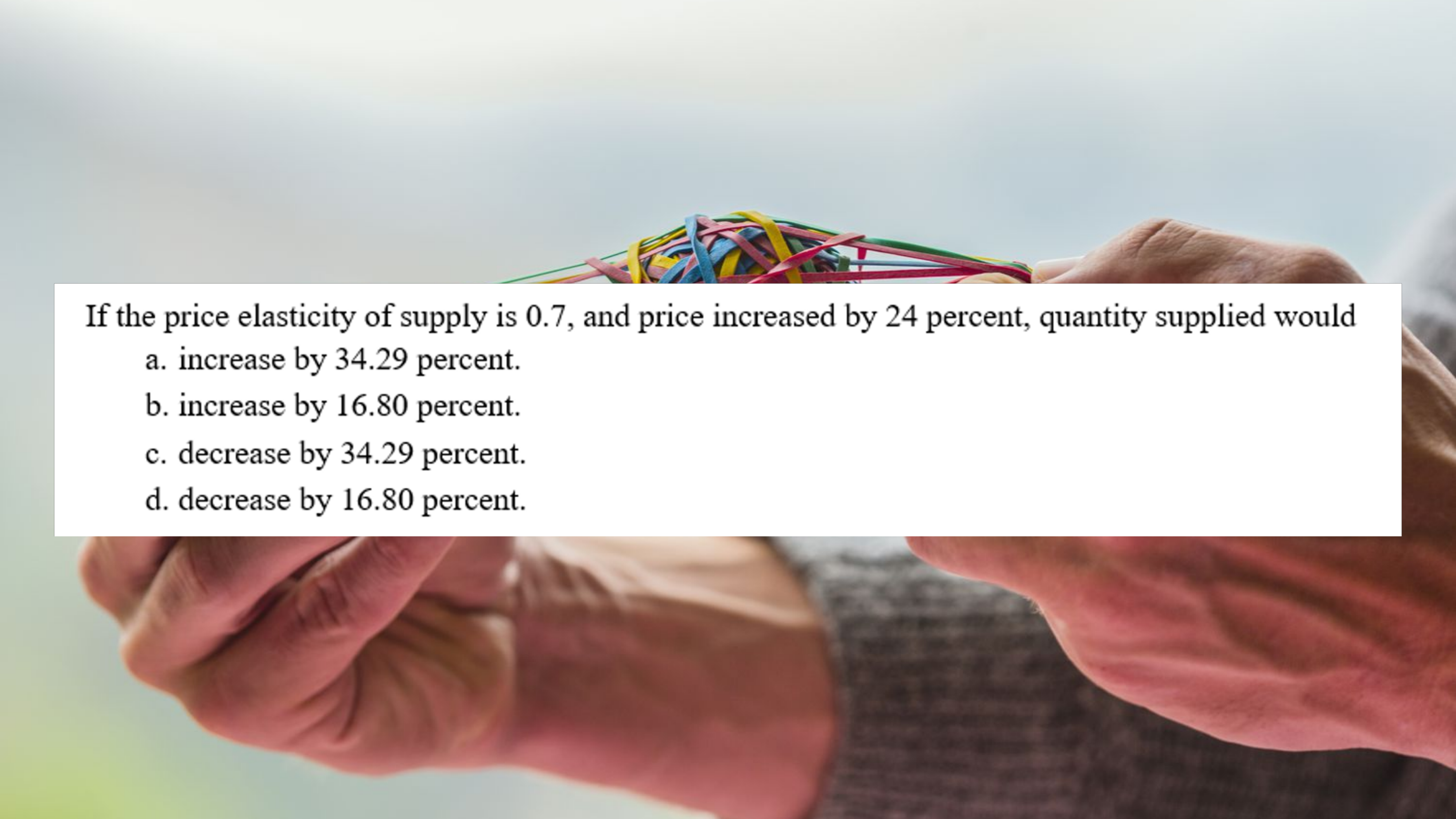
If a 39 percent change in price results in a 35 percent change in quantity supplied, then the price elasticity of supply is about

- a. 1.11, and supply is elastic.
- b. 1.11, and supply is inelastic.
- c. 0.90, and supply is inelastic.
- d. 0.90, and supply is elastic.



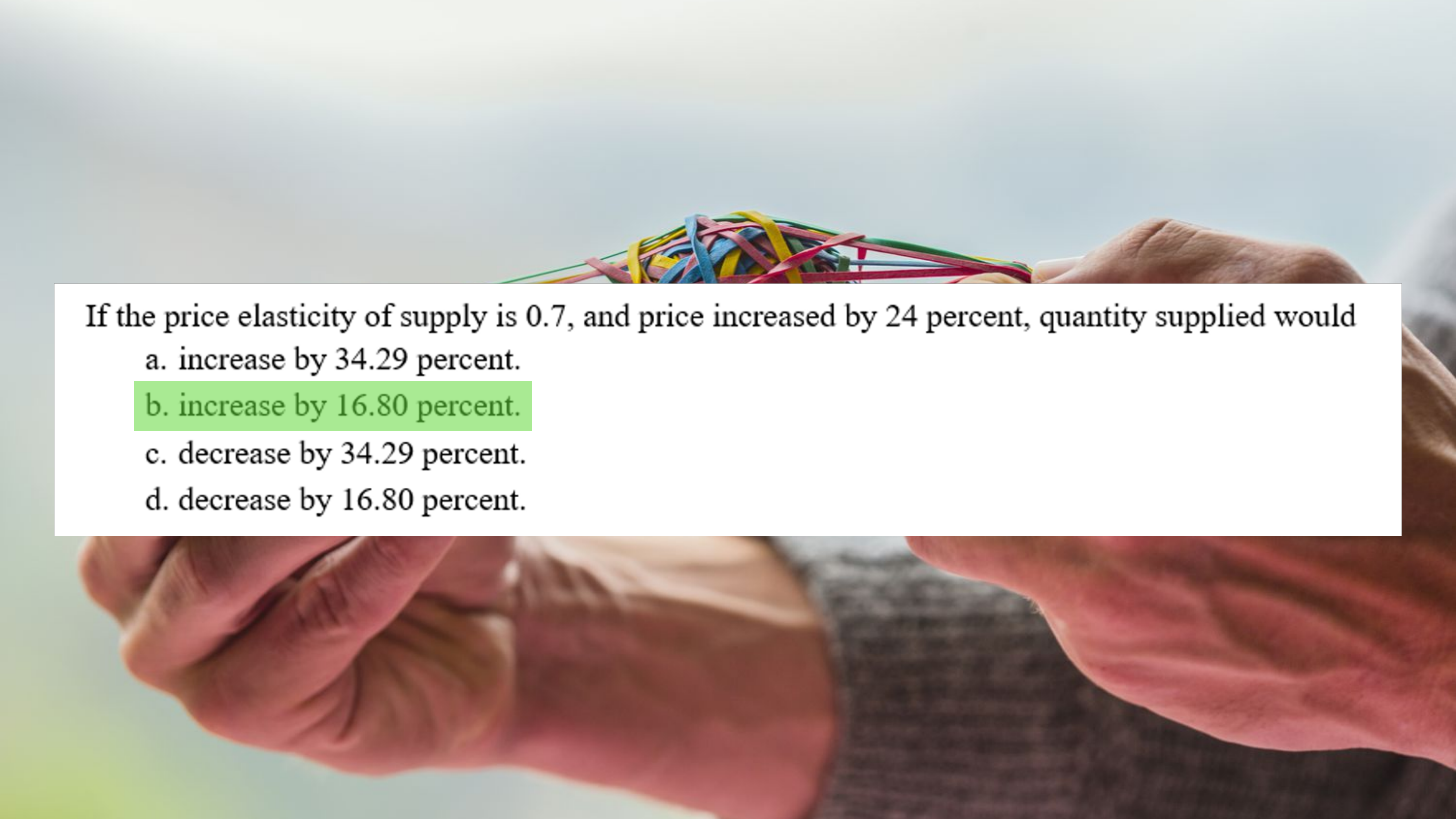
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A close-up photograph of a hand holding a bundle of colorful rubber bands. The background is a soft, out-of-focus landscape with a blue sky and greenery. The hand is positioned on the right side of the frame, with fingers gripping the ends of the rubber bands. The rubber bands are in various colors including red, yellow, blue, and green, and are tangled together in a small pile.

If the price elasticity of supply is 0.7, and price increased by 24 percent, quantity supplied would

- a. increase by 34.29 percent.
- b. increase by 16.80 percent.
- c. decrease by 34.29 percent.
- d. decrease by 16.80 percent.

A close-up photograph of a hand holding a bundle of colorful rubber bands. The rubber bands are in various colors including red, blue, yellow, and green. The hand is positioned on the right side of the frame, with the fingers gripping the bundle. The background is a soft, out-of-focus landscape with a light sky and some greenery.

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Thanks for your attention!
End of class.