PART 2

How Markets Function

PRINCIPLES OF

Microeconomics

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Chapter 7: Elasticity and Its Applications

Chapter 7: Elasticity and Its Applications

- **There's an interesting saying: "Teach a parrot to say 'supply and demand,' and you've got an economist."**

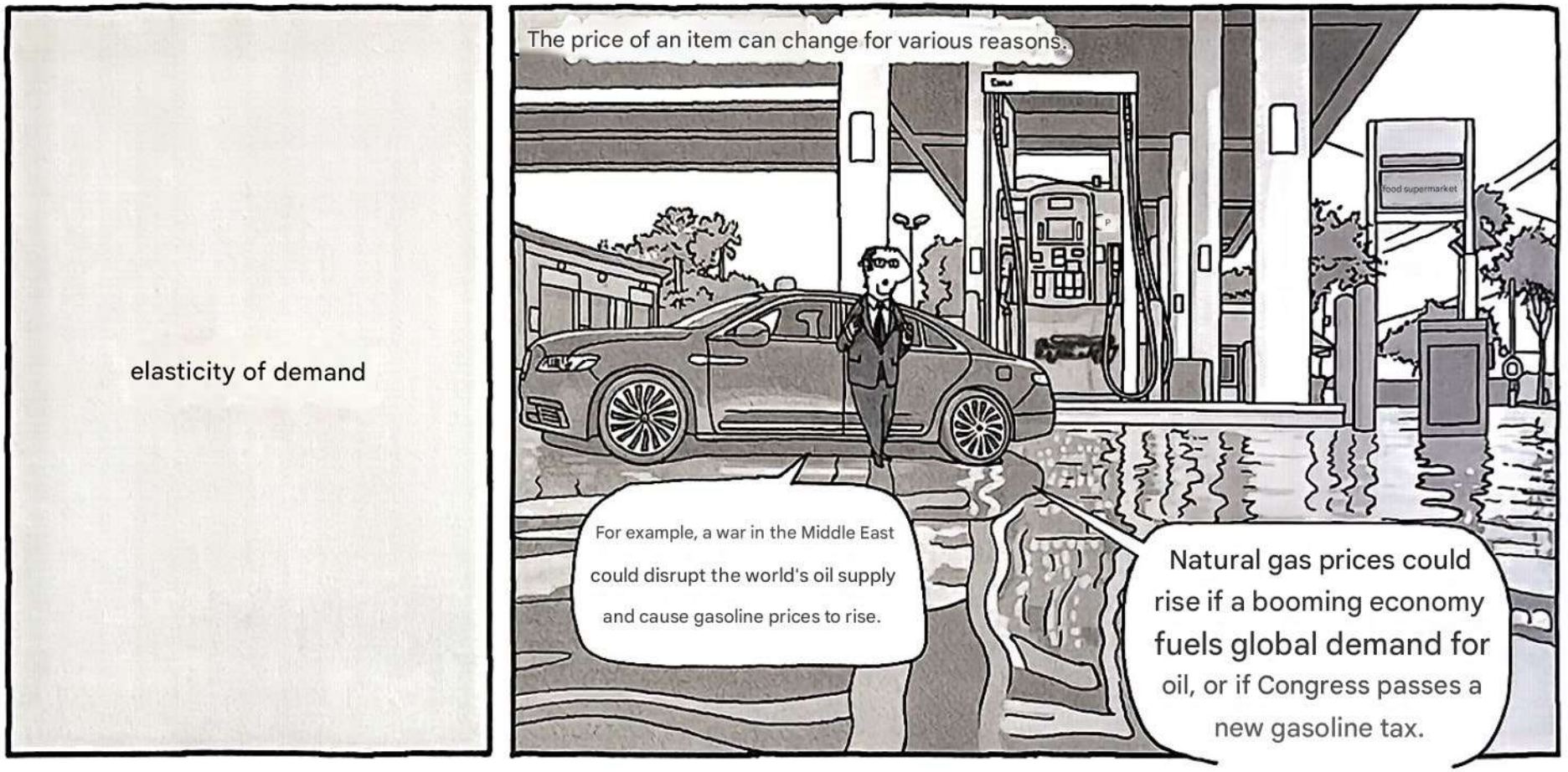
- **In Chapter 2, "Elasticity and Its Applications," you will find out why this saying makes sense. You will be able to use the supply and demand model to analyze essential economic phenomena and policy outcomes.**

- **Now, you're on your way to becoming an economist (or at least a well-trained parrot).**

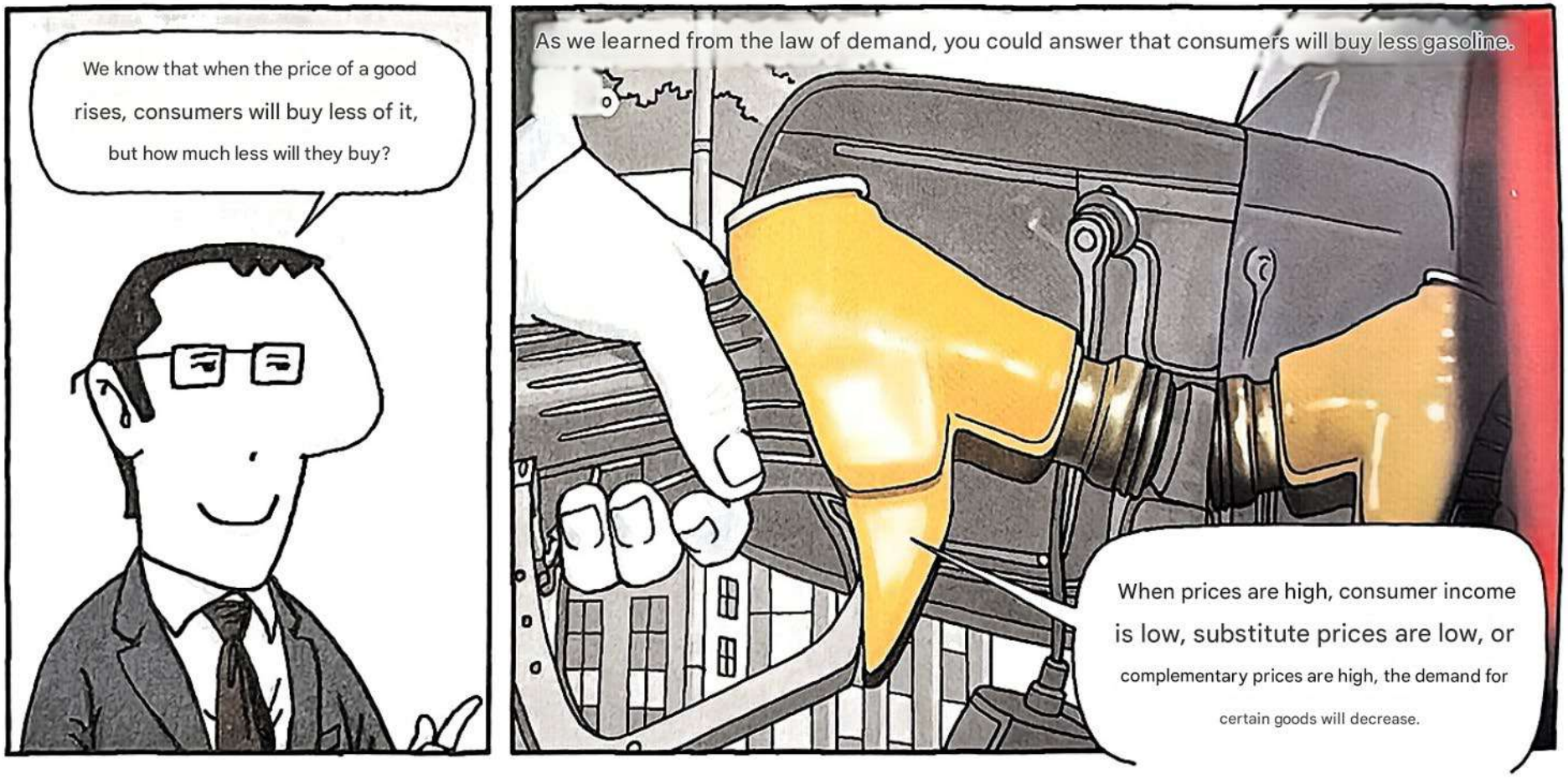
Chapter 7: Elasticity and Its Applications

- **Demand elasticity**
- Supply elasticity
- Three applications of supply, demand, and elasticity

Demand Elasticity



Demand Elasticity



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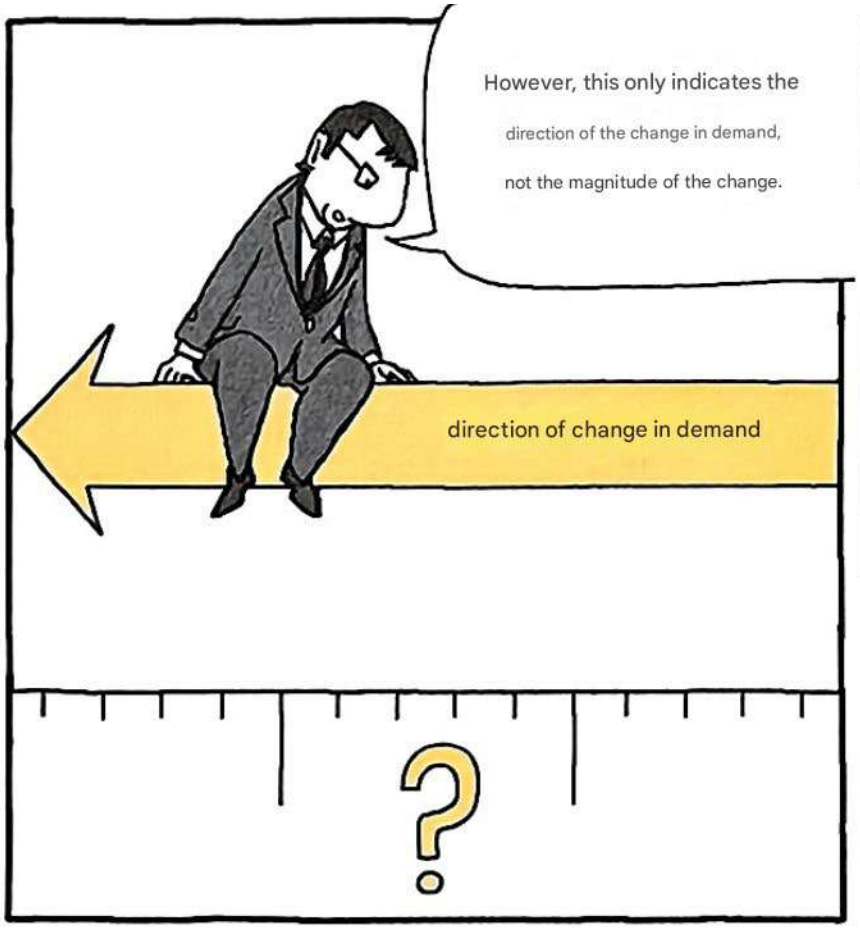
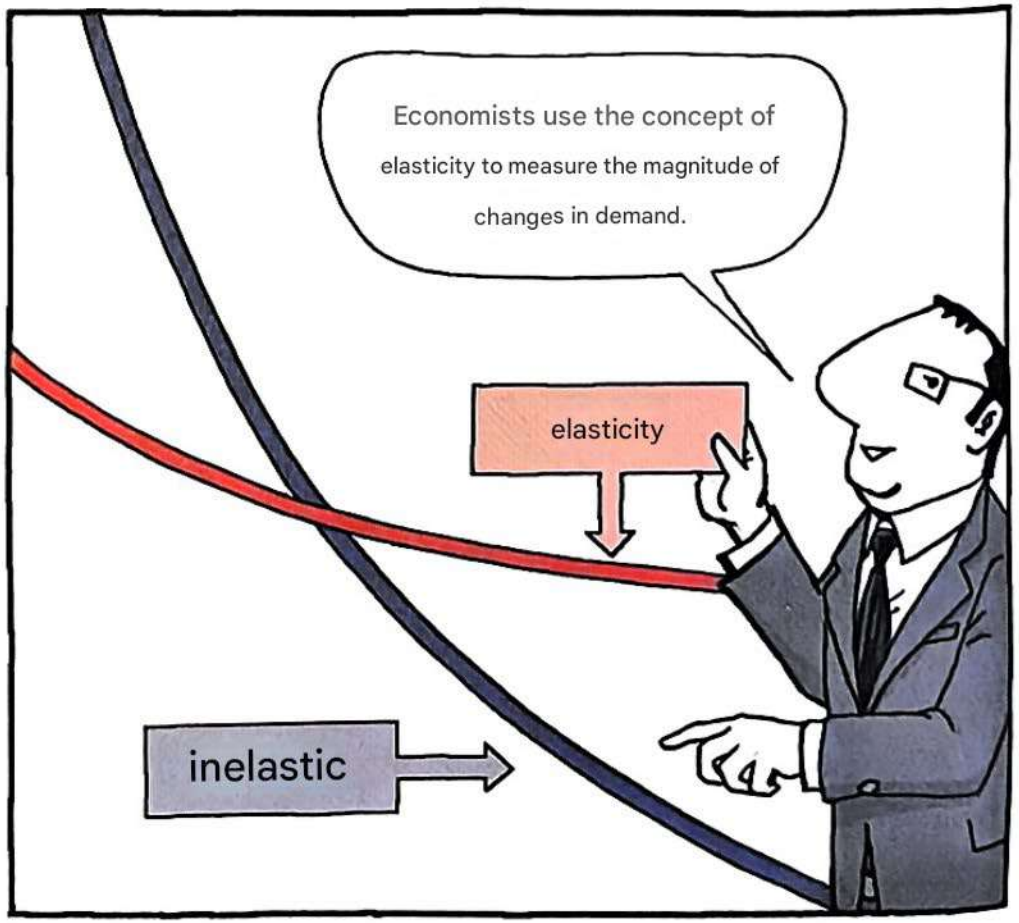
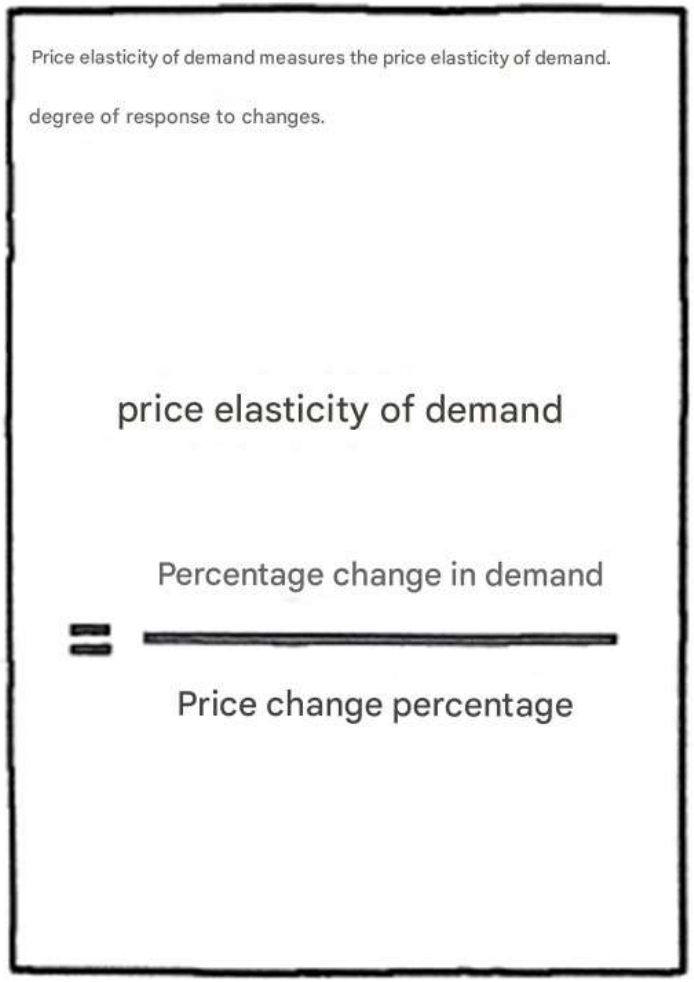


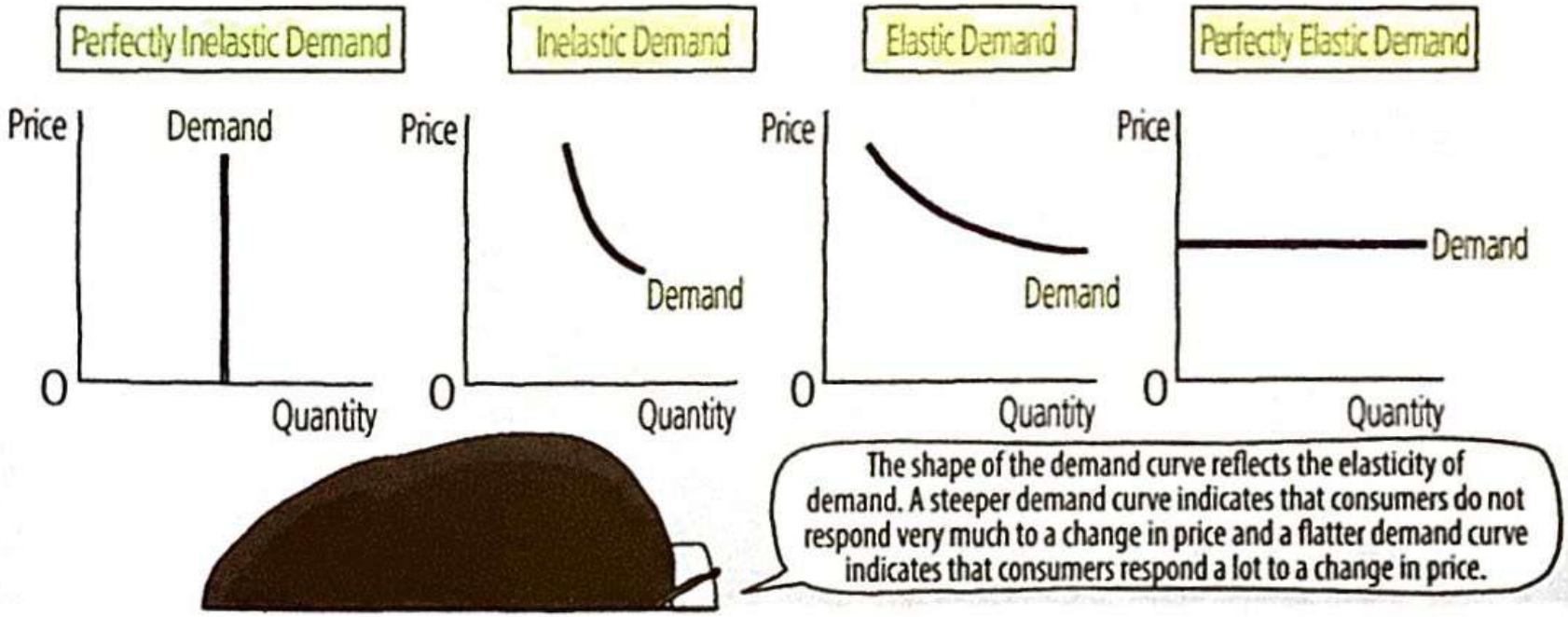


Demand Elasticity



Demand Elasticity

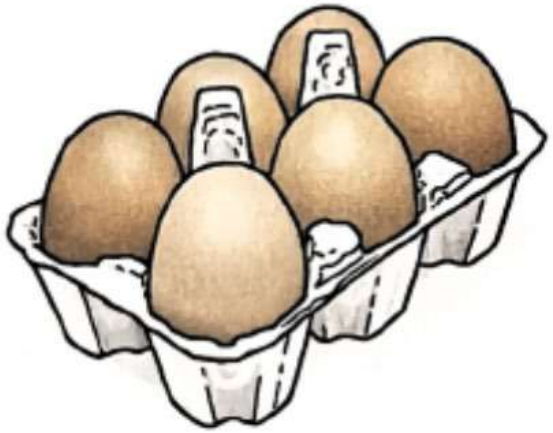
Demand for a good is said to be elastic if the quantity demanded responds substantially to changes in price, and demand is said to be inelastic if the quantity demanded responds only slightly to changes in price.



Demand Elasticity

Demand Elasticity

In contrast, since eggs are a food with no close substitutes, a slight increase in egg prices will not cause a significant decrease in egg sales.



Demand Elasticity

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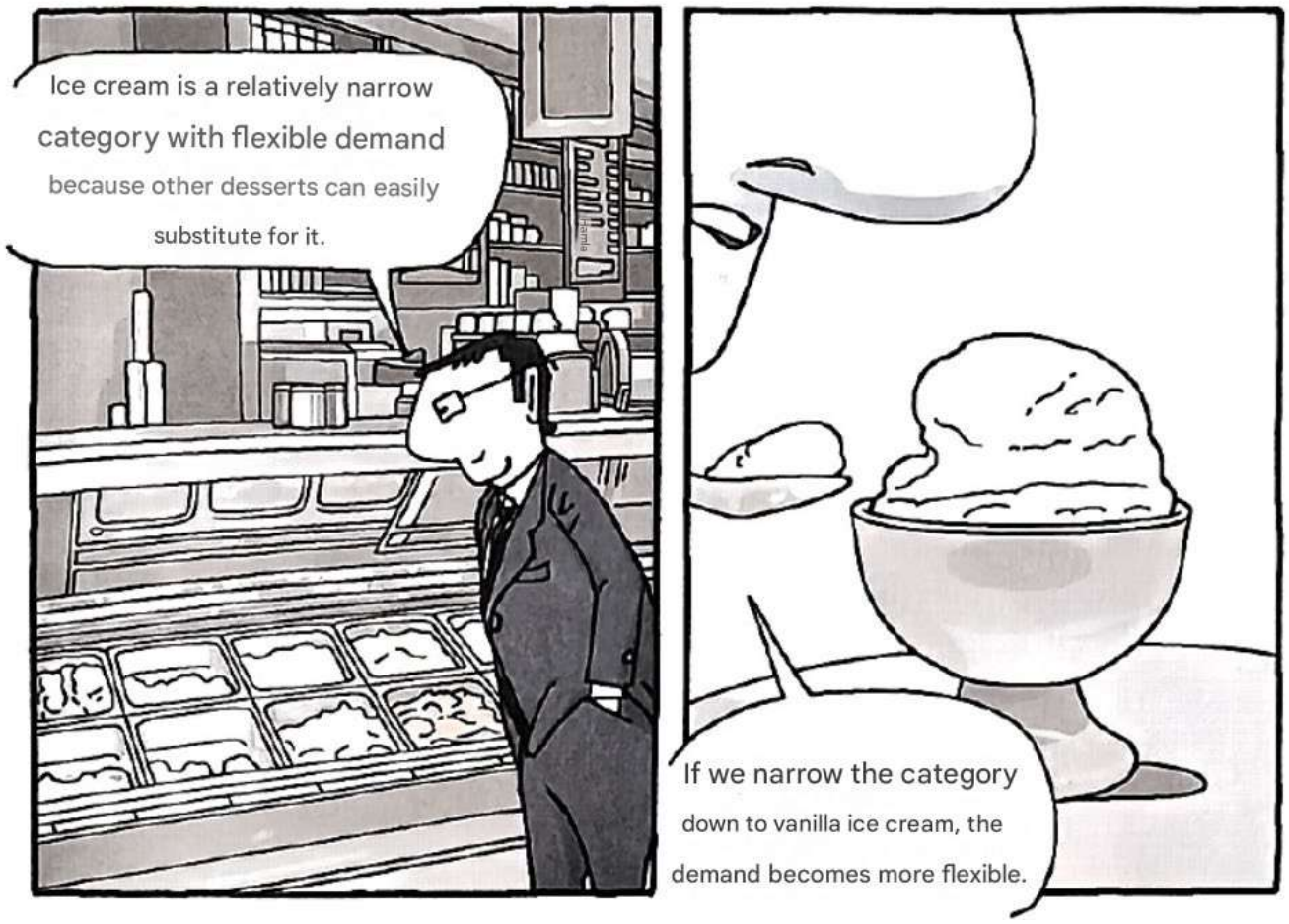

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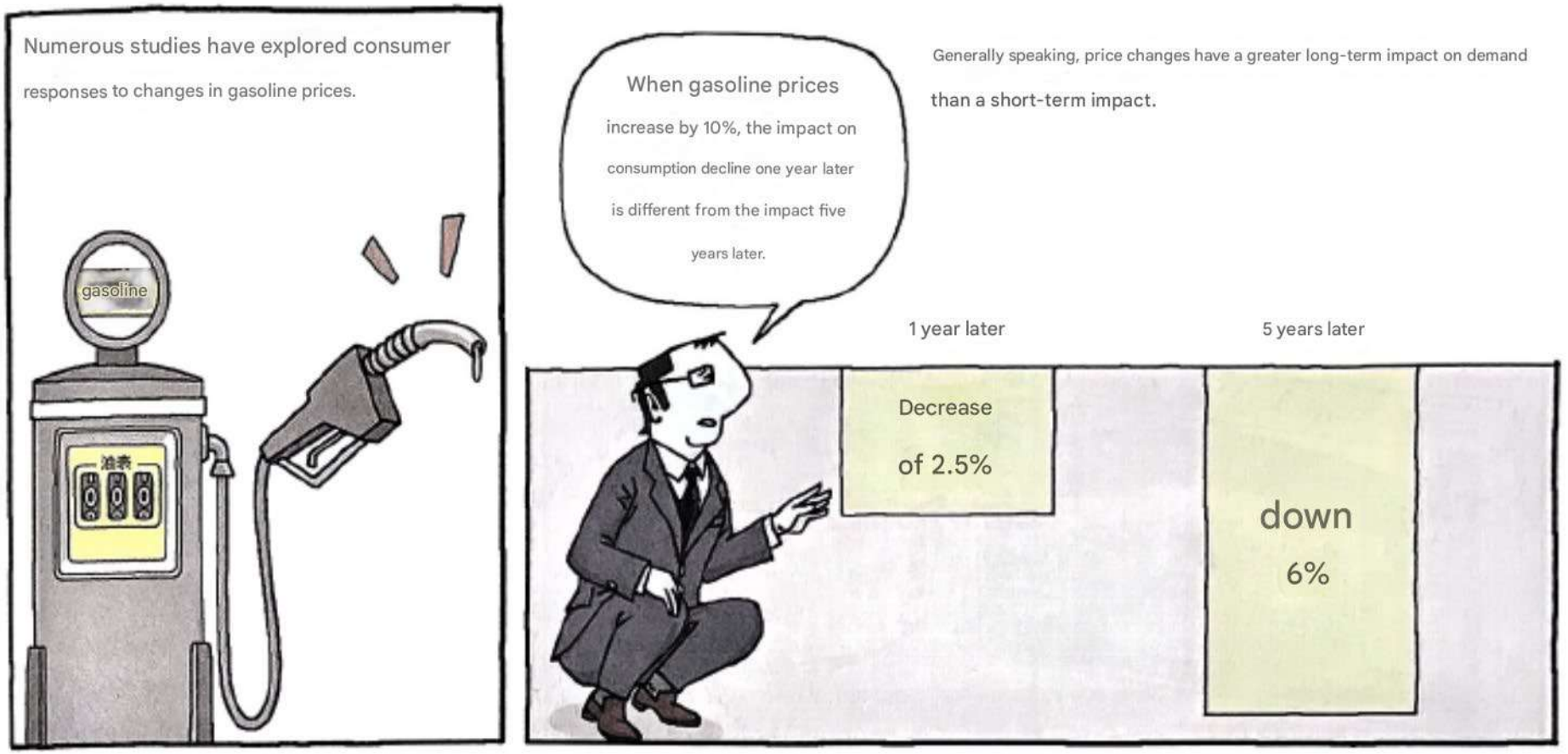
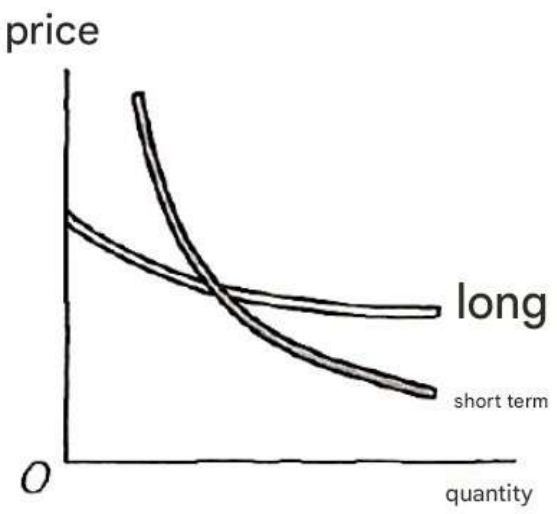


Demand Elasticity

As we have seen before, time also affects the elasticity of demand: the impact of rising gasoline prices on reduced consumption changes over time.



Demand Elasticity

In addition to the price elasticity of demand, economists use other elasticities to describe the behavior of buyers in a market.

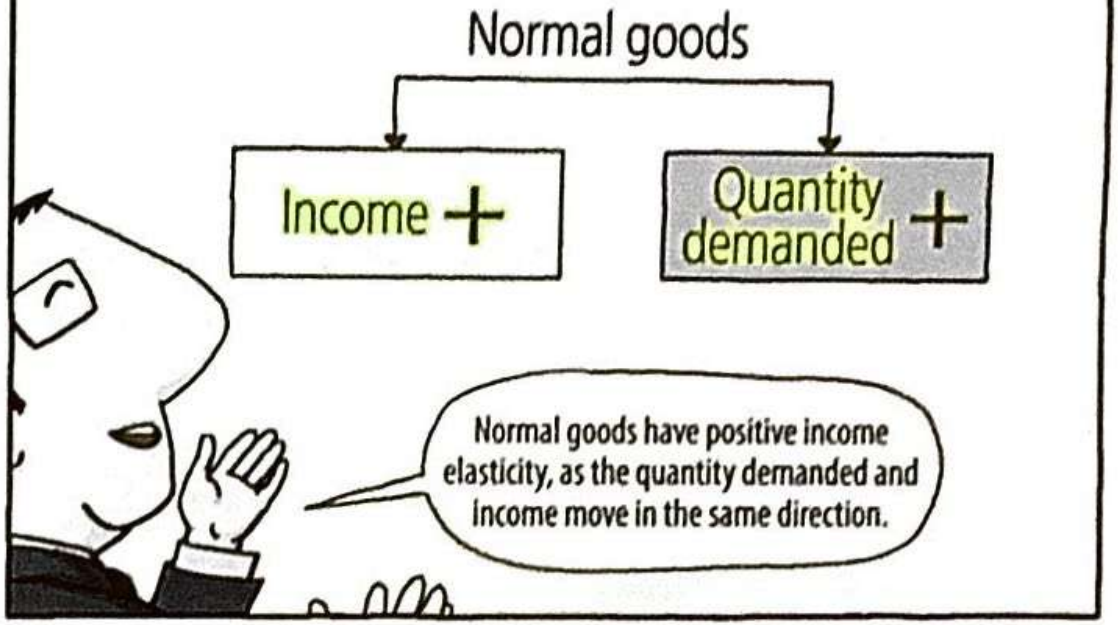
Income elasticity of demand

$$= \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in income}}$$

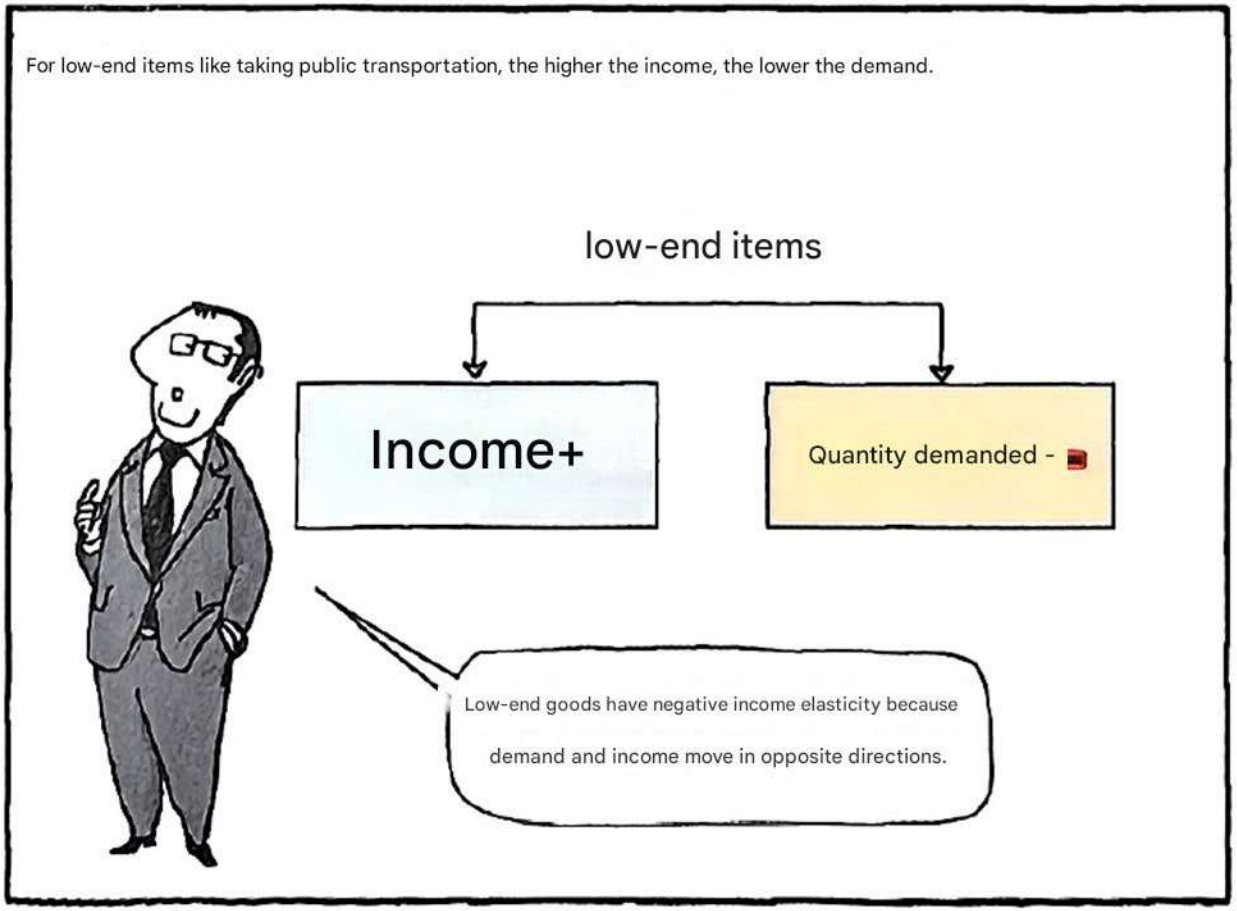
Cross-price elasticity of demand

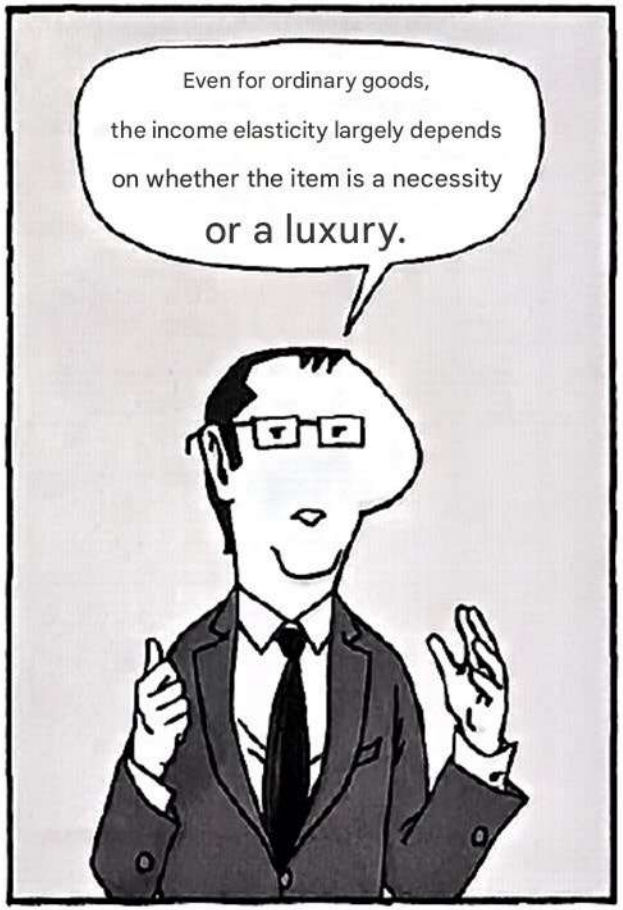
$$= \frac{\text{Percentage change in quantity demanded of good 1}}{\text{Percentage change in the price of good 2}}$$

To measure how the quantity demanded changes as consumer income changes, the income elasticity of demand is used.



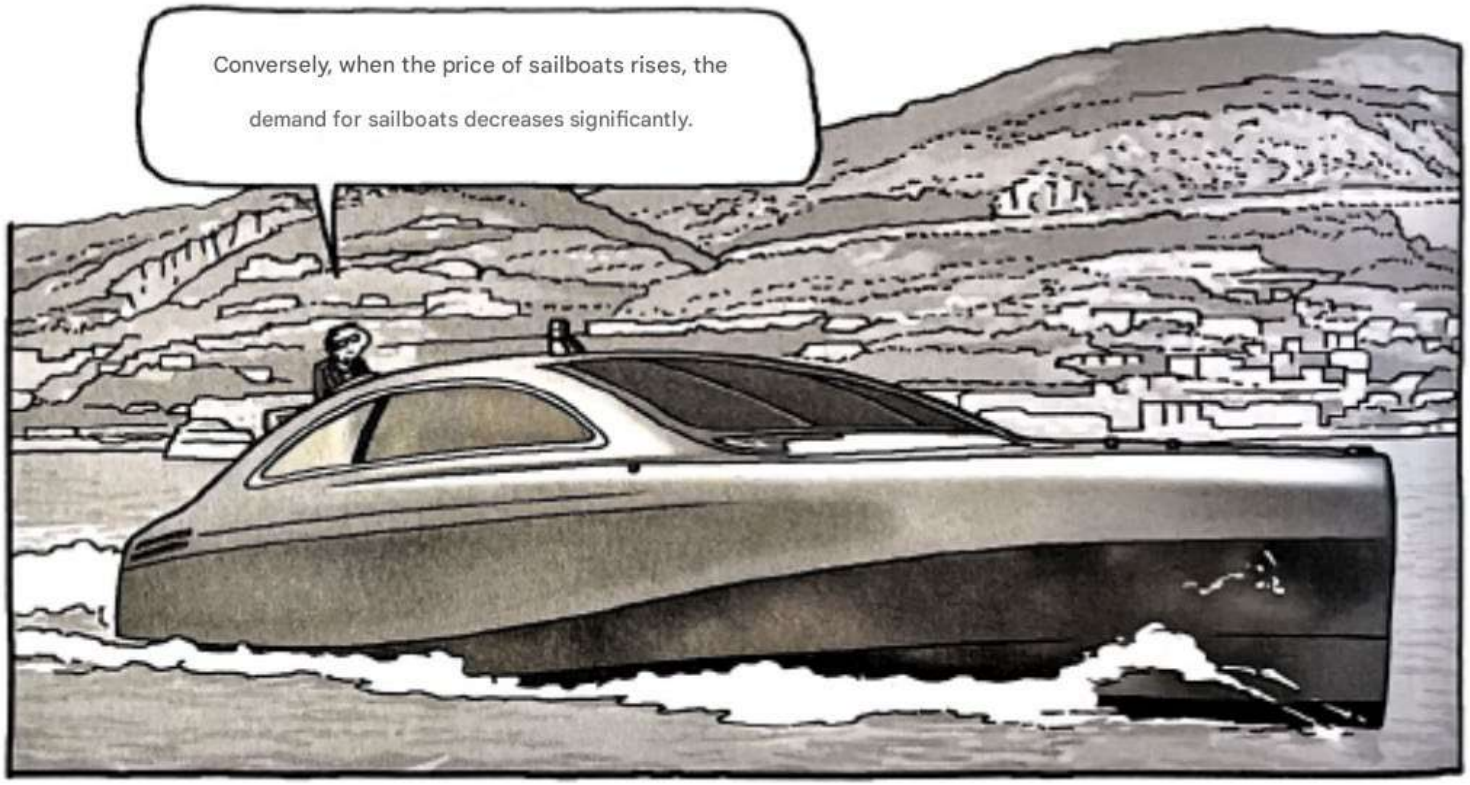
Demand Elasticity



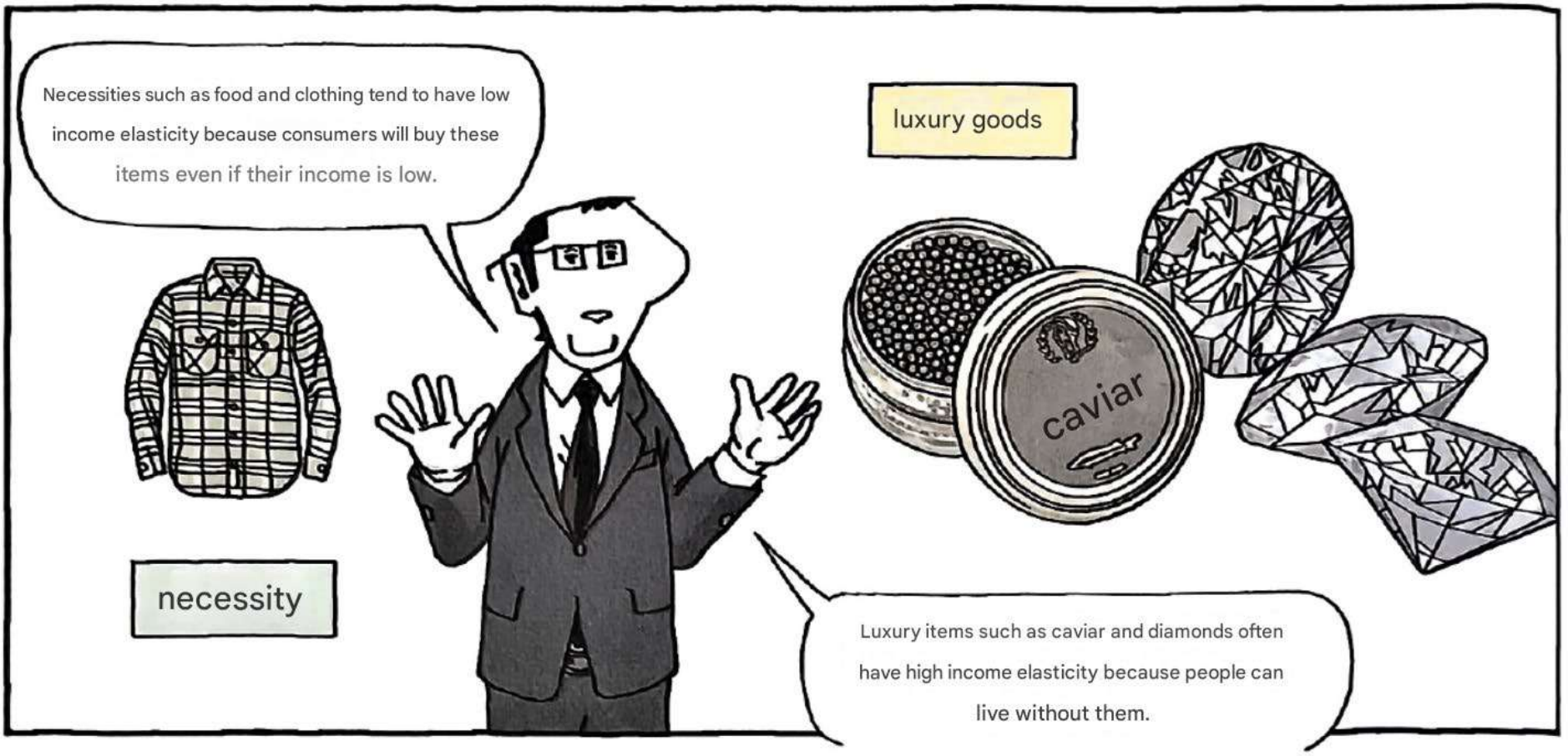


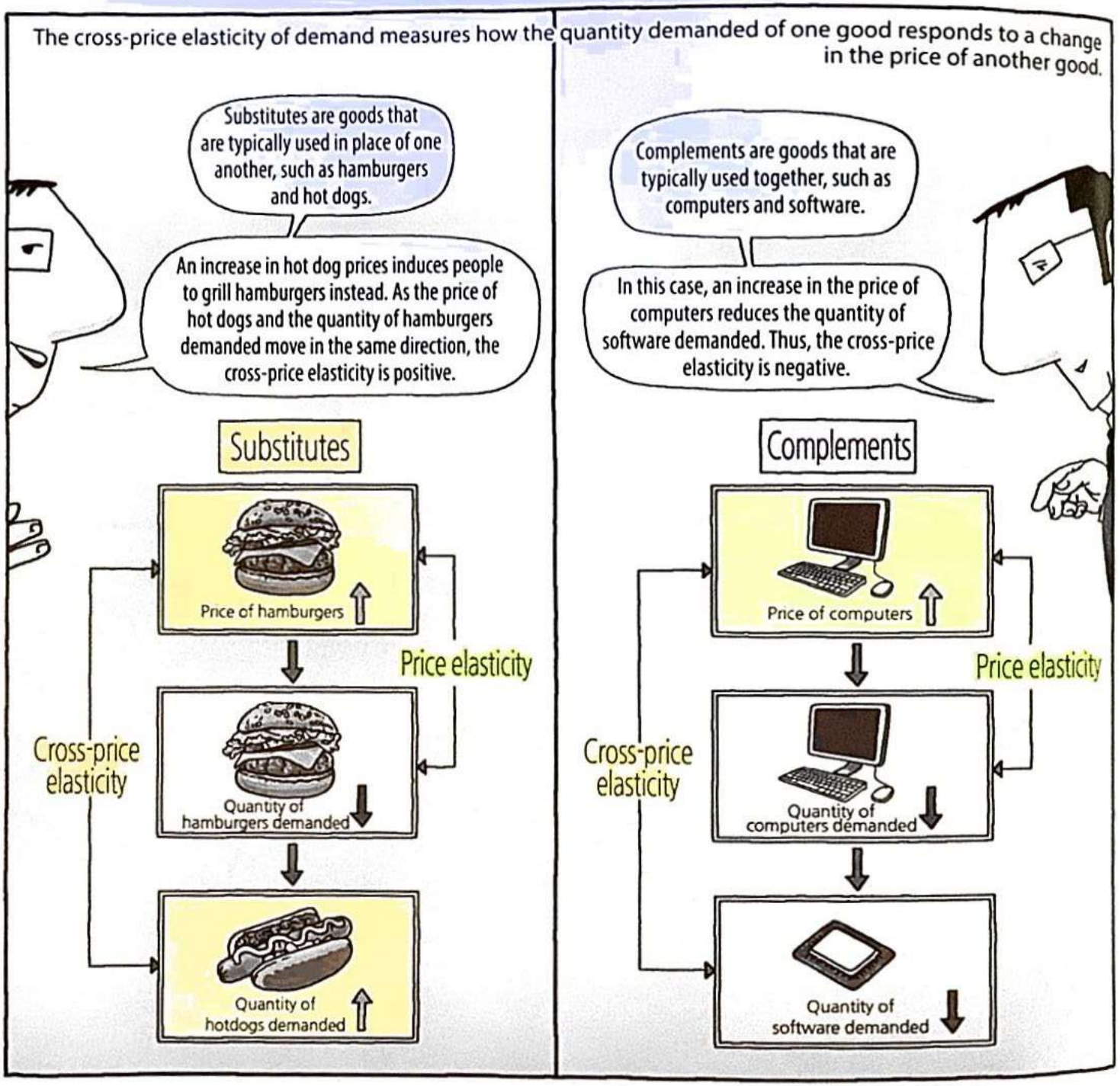
Demand Elasticity

Demand for necessities is often inelastic, while demand for luxuries is often elastic. When the price of medical care increases, people may visit the doctor slightly less often than usual, but not significantly.



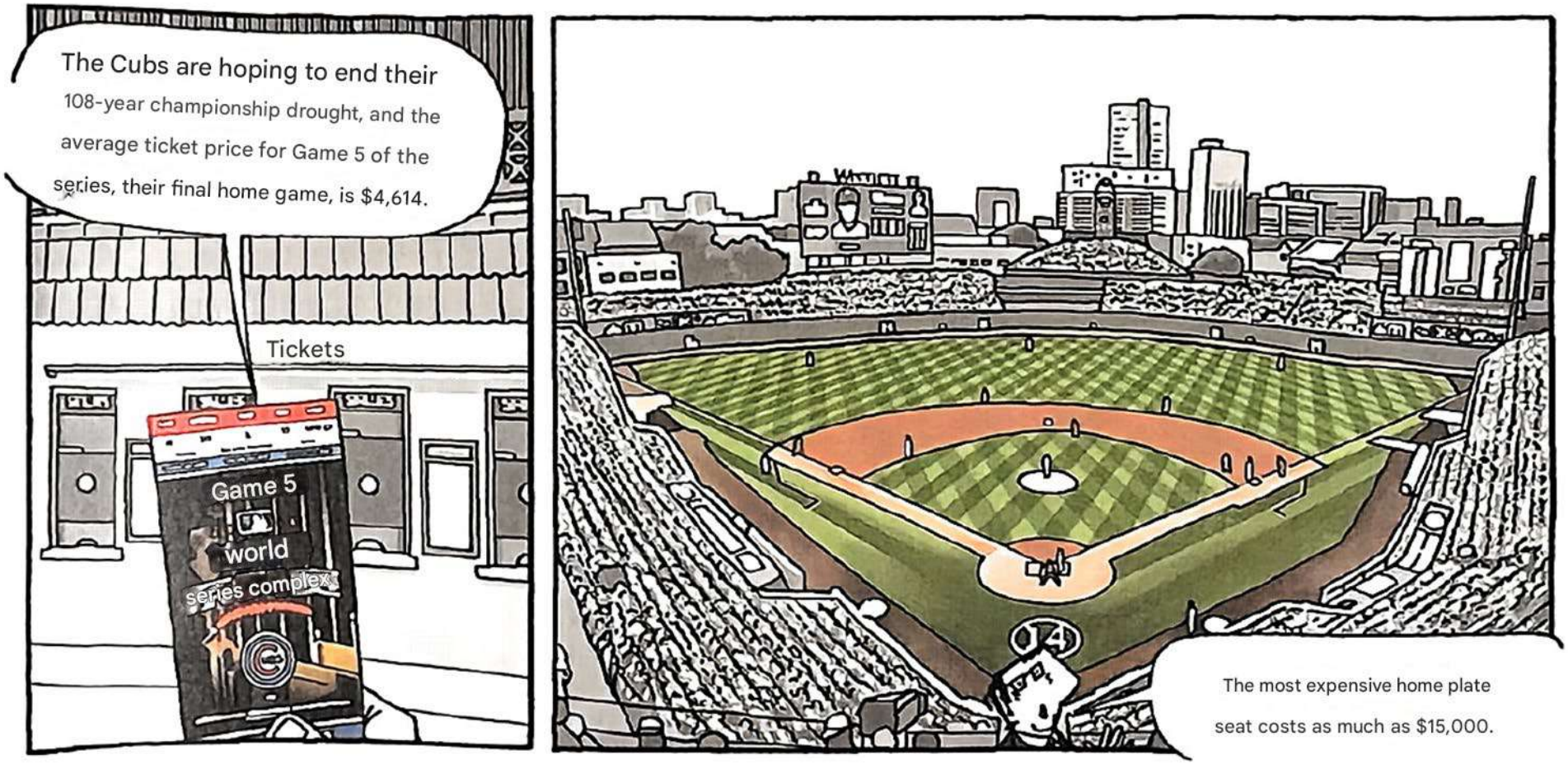
Demand Elasticity




The cross-price elasticity of demand measures how the quantity demanded of one good responds to a change in the price of another good.
Substitutes are goods that are typically used in place of one another, such as hamburgers and hot dogs.
An increase in hot dog prices induces people to grill hamburgers instead. As the price of hot dogs and the quantity of hamburgers demanded move in the same direction, the cross-price elasticity is positive.
Substitutes
Price of hamburgers
Price elasticity
Cross-price elasticity
Quantity of hamburgers demanded
Quantity of hotdogs demanded
Complements are goods that are typically used together, such as computers and software.
In this case, an increase in the price of computers reduces the quantity of software demanded. Thus, the cross-price elasticity is negative.
Complements
Price of computers
Price elasticity
Cross-price elasticity
Quantity of computers demanded
Quantity of software demanded

Discrimination in Major League Baseball

Discrimination in Major League Baseball



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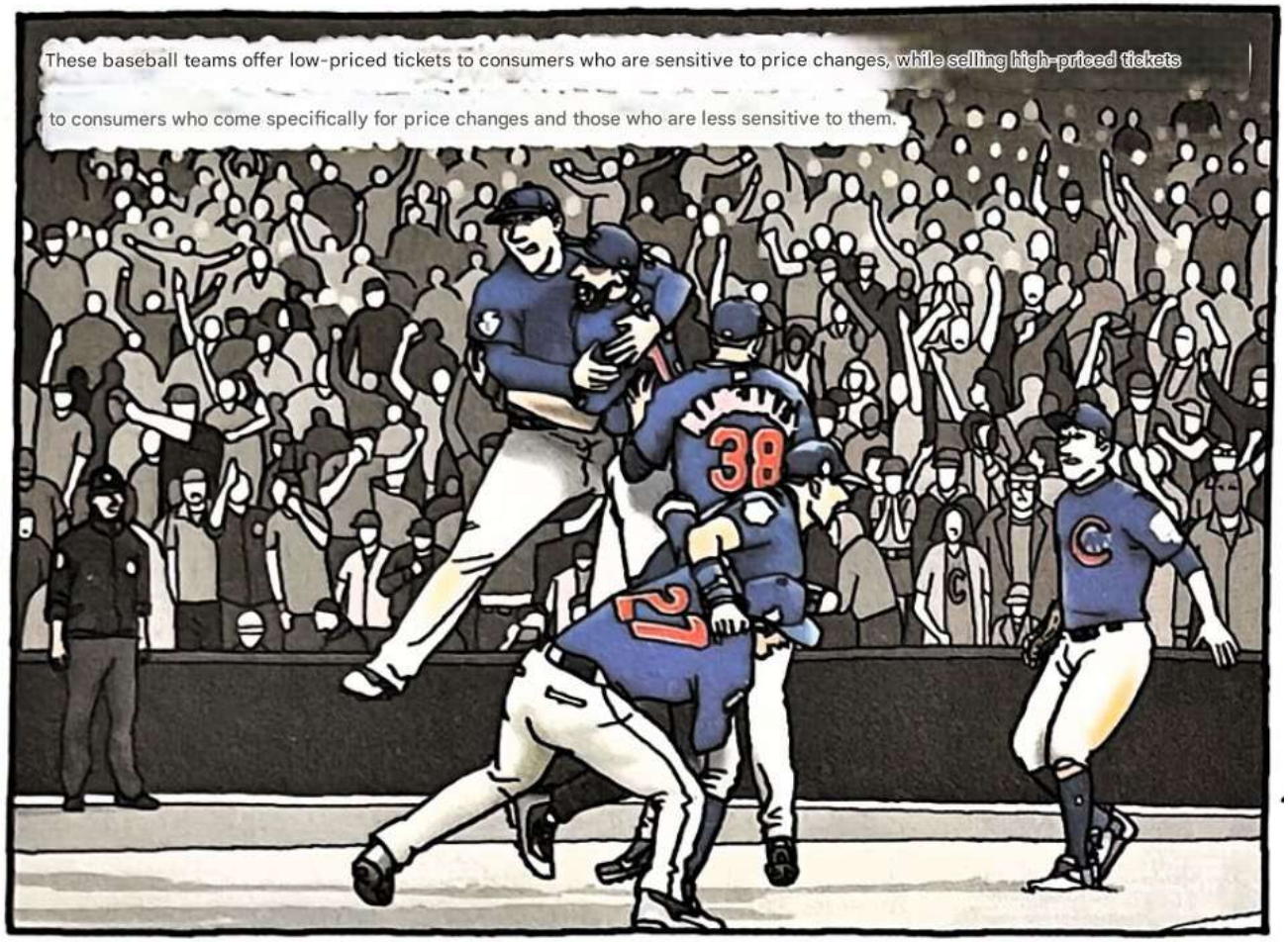

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SUMMARY

- The Law of Demand states that a decrease in the price of a good will lead to an increase in the quantity demanded. The price elasticity of demand measures how much the quantity demanded responds to a change in price.
  - If the quantity demanded responds substantially to a price change, the demand for that good is said to be elastic.
  - If the quantity demanded responds only slightly to a price change, the demand is said to be inelastic.
  - Demand tends to be more elastic when the good is a luxury rather than a necessity, when close substitutes are available, when the market is narrowly defined, and when consumers have more time to adjust to the price change.

SUMMARY

- The price elasticity of demand is calculated as the percentage change in quantity demanded divided by the percentage change in price.

$$\text{Price elasticity of demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

SUMMARY

$$\text{Price elasticity} = \frac{20\%}{10\%} = 2$$

- For example, suppose a 10% increase in the price of ice cream causes the quantity demanded to fall by 20%. In this case, the price elasticity of demand would be calculated as follows:
  - When the elasticity is greater than 1, demand is considered elastic, meaning that the change in quantity demanded is proportionally larger than the change in price.
  - When the elasticity is less than 1, demand is considered inelastic, meaning that the change in quantity demanded is proportionally smaller than the change in price.
  - If the elasticity is exactly 1, the percentage change in quantity demanded equals the percentage change in price, which is called unit elastic demand.

SUMMARY

- Since the price elasticity of demand measures the responsiveness of quantity demanded to changes in price, it is closely related to the slope of the demand curve.
  - In general, the flatter the tangent line to the demand curve at a given point, the greater the price elasticity of demand.
  - Conversely, the steeper the tangent line to the demand curve at a given point, the smaller the price elasticity of demand.
- Total revenue, which is the amount paid by buyers and received by sellers for a good, is calculated as the price of the good multiplied by the quantity sold. If demand is inelastic, a price increase will raise total revenue. If demand is elastic, a price increase will reduce total revenue.

SU

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

- Demand Income Elasticity measures how the quantity demanded changes when consumer income changes. It is calculated as the percentage change in quantity demanded divided by the percentage change in income.
  - The income elasticity for normal goods is positive because as income increases, the demand for these goods also rises.
  - However, the income elasticity for inferior goods, such as public transportation, is negative because demand and income move in opposite directions.
  - Necessities like food and clothing tend to have a low-income elasticity, while luxuries like caviar and diamonds tend to have a high-income elasticity.

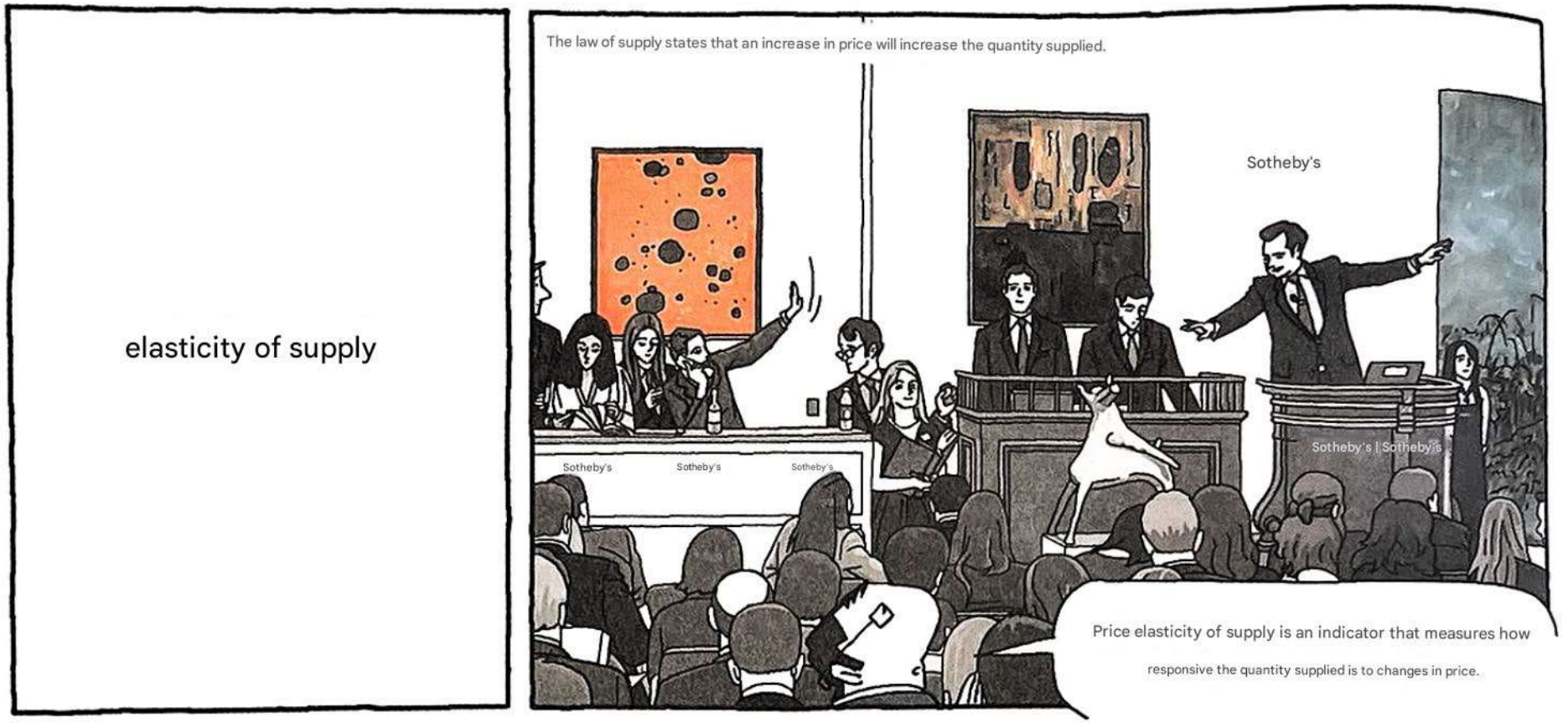
$$\text{Cross-price elasticity of demand} = \frac{\text{Percentage change in quantity demanded of good 1}}{\text{Percentage change in the price of good 2}}$$

- The cross-price elasticity of demand measures how the quantity demanded of one good responds to a change in the price of another good. It is calculated as
  - Substitutes are goods that can typically replace each other in use, such as hamburgers and hot dogs. Since the price of hot dogs and the quantity demanded of hamburgers move in the same direction, their cross-price elasticity is positive.
  - Complements are goods that are usually used together, such as computers and software. Since an increase in the price of computers reduces the quantity demanded of software, their cross-price elasticity is negative.

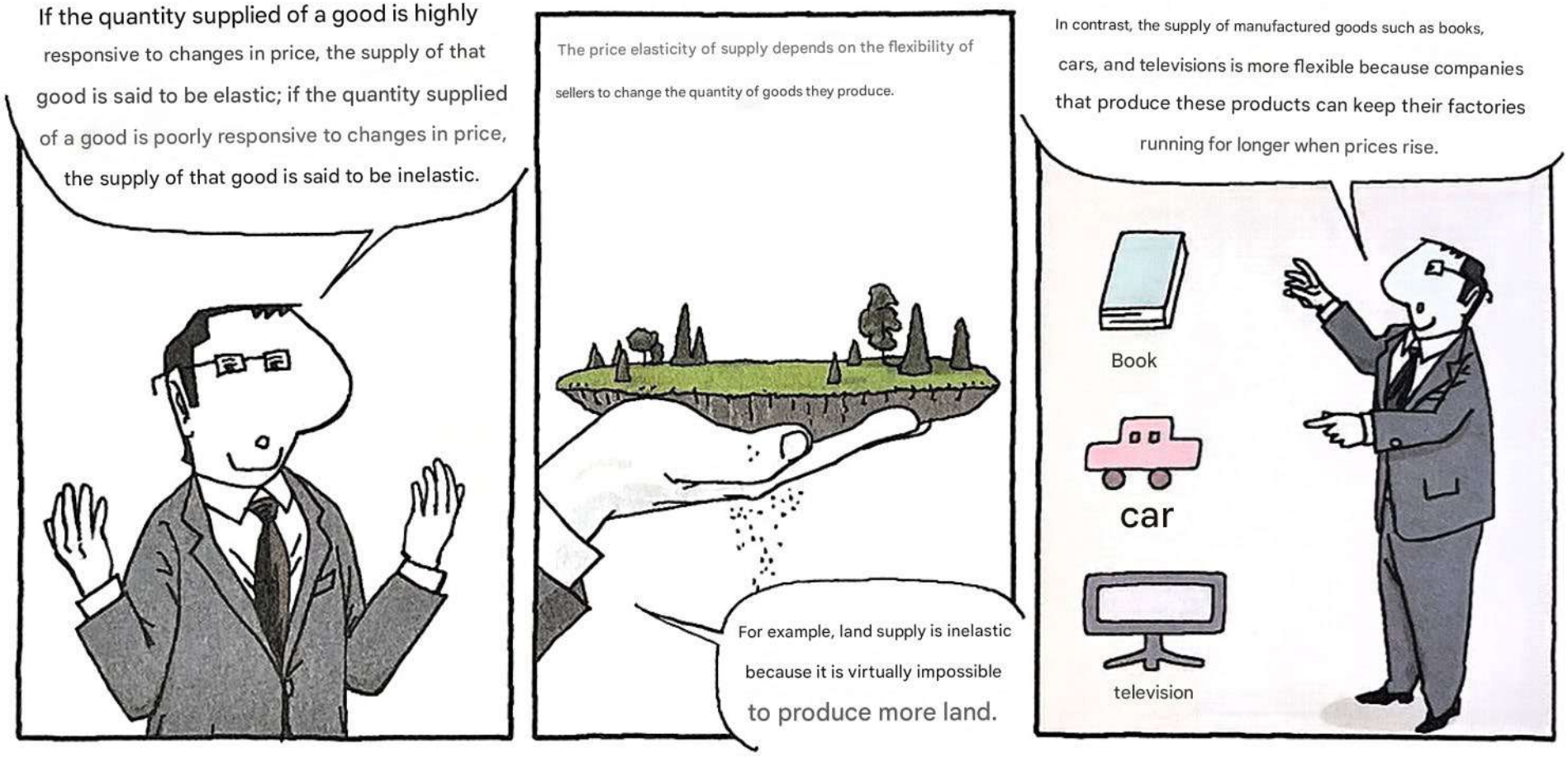
Chapter 7: Elasticity and Its Applications

- Demand elasticity
- **Supply elasticity**
- Three applications of supply, demand, and elasticity

Supply Elasticity



Supply Elasticity



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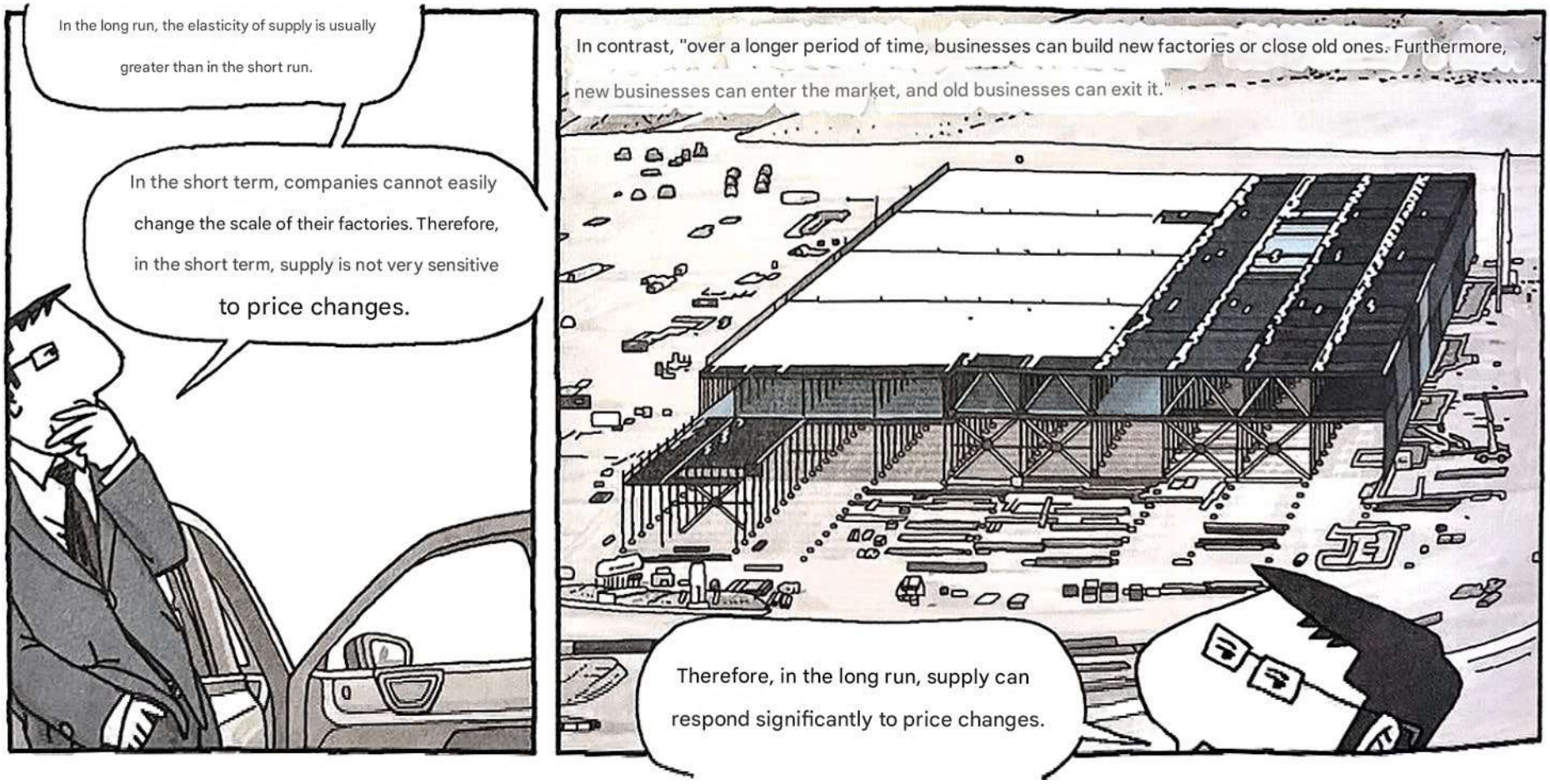
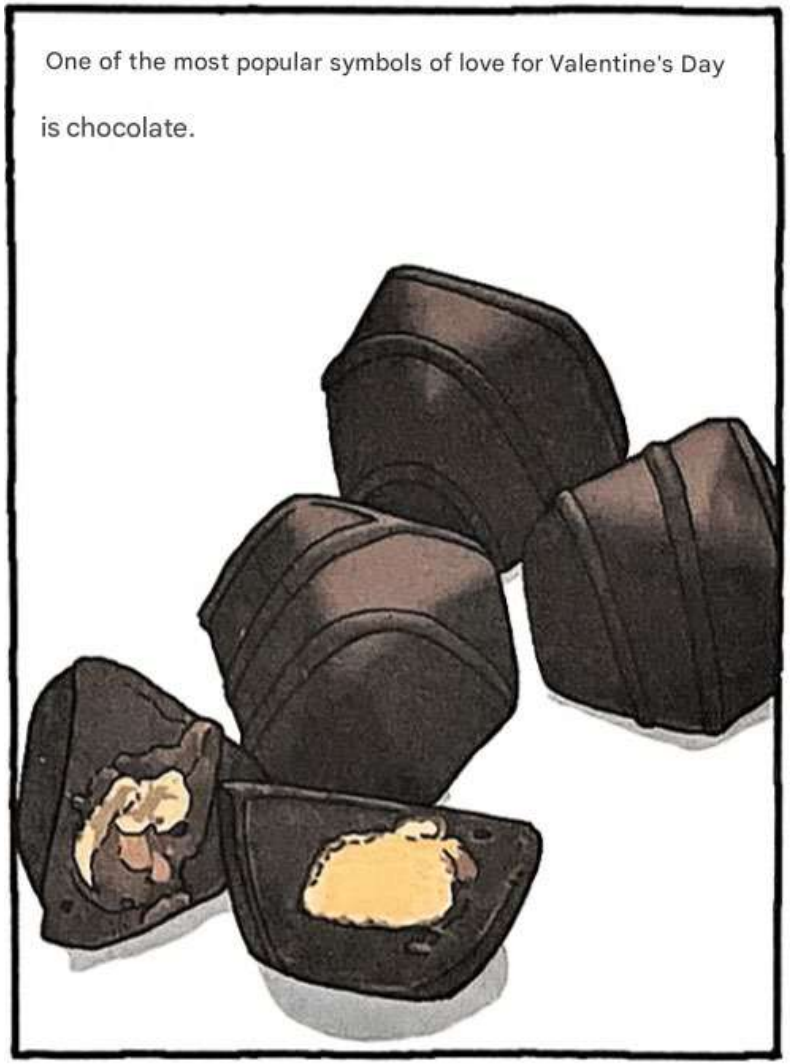


Valentine's Day chocolates and flowers



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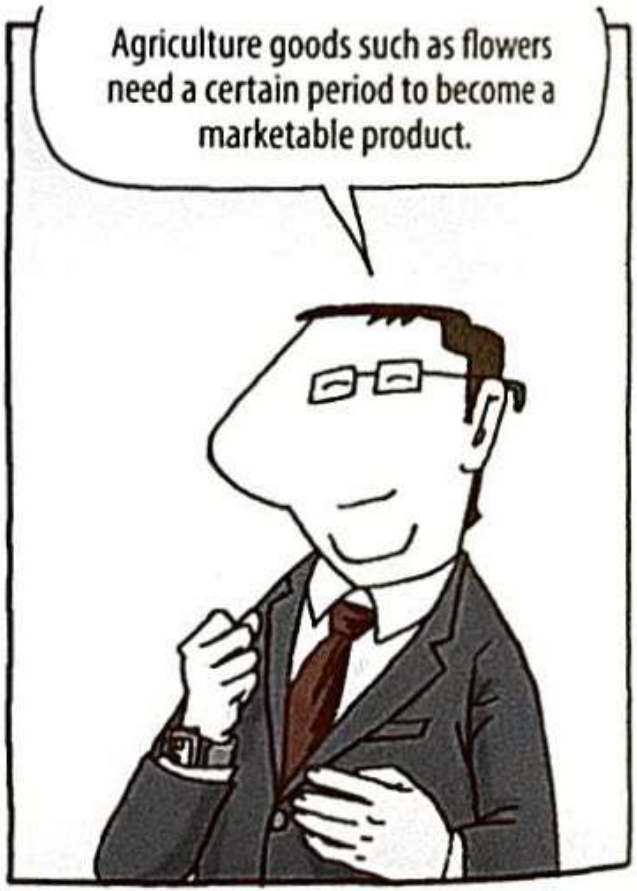

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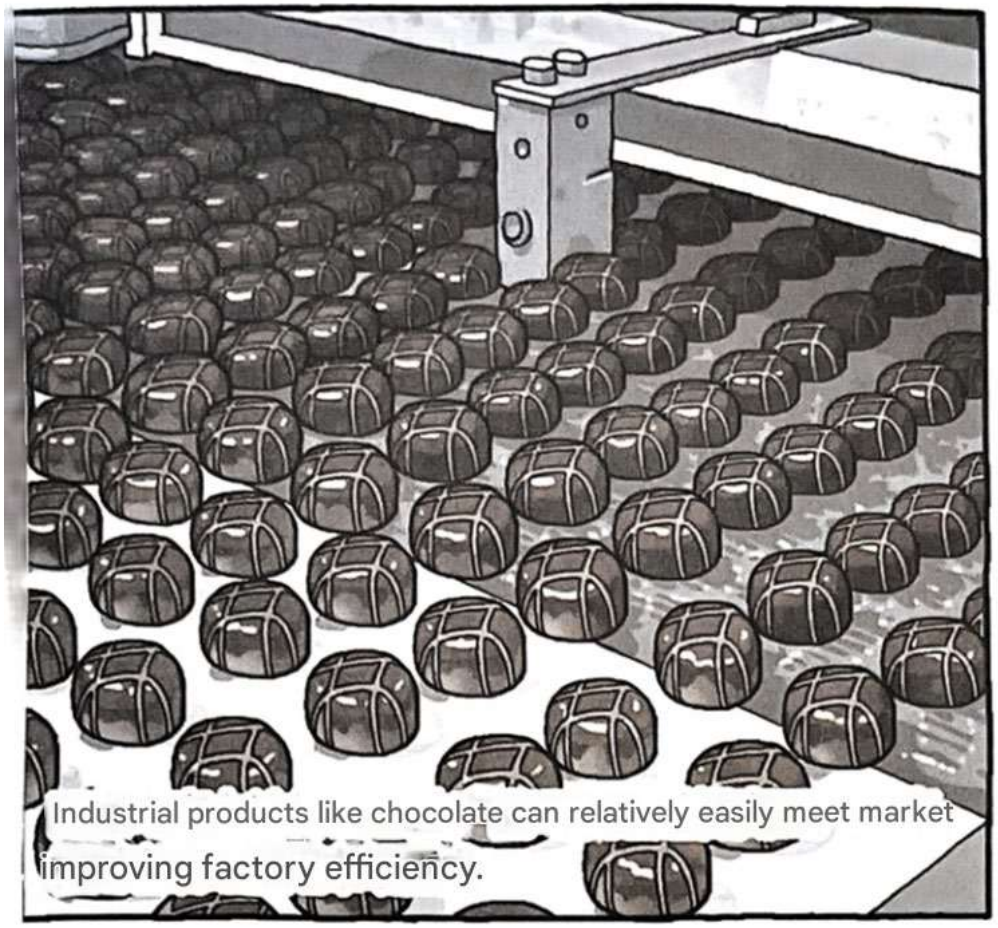

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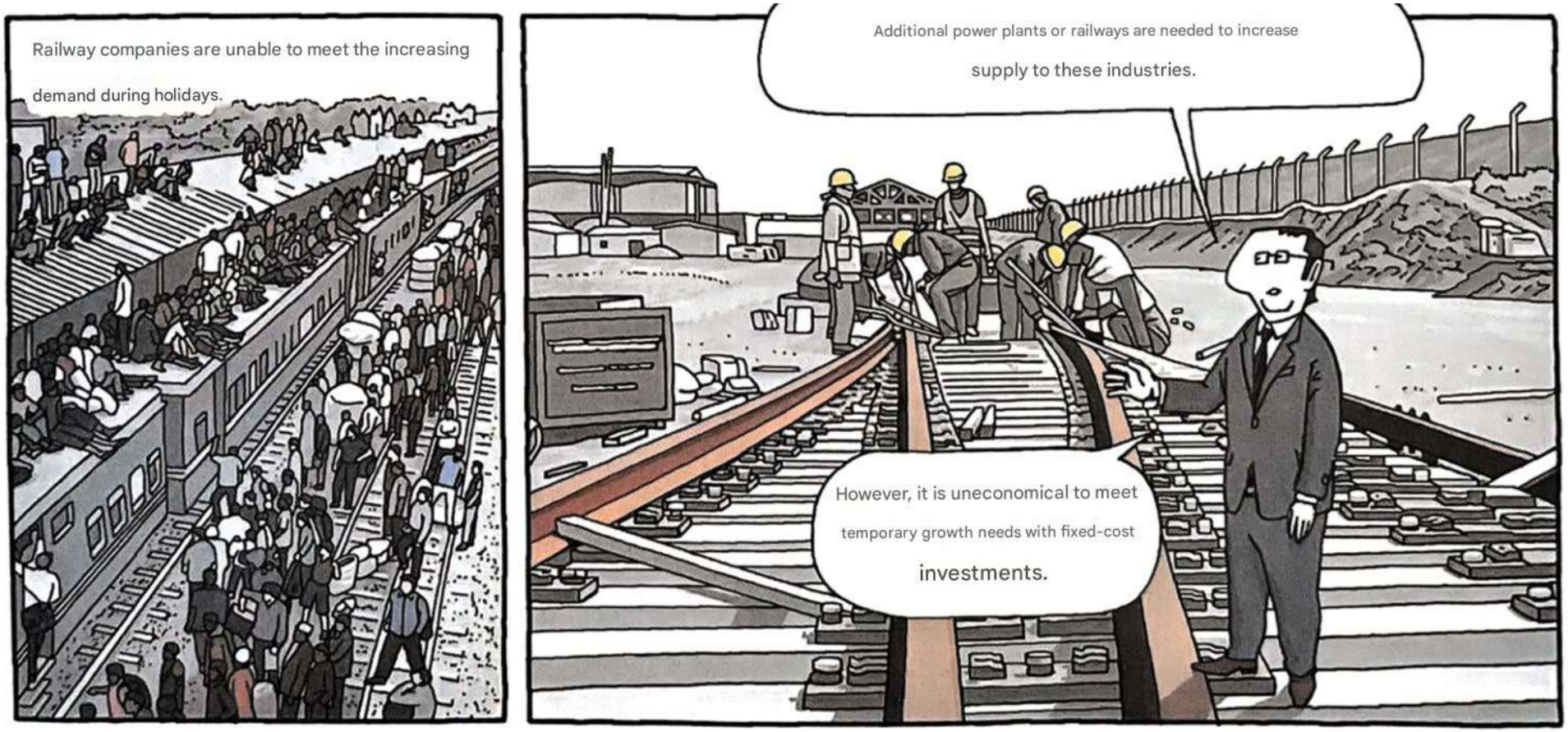
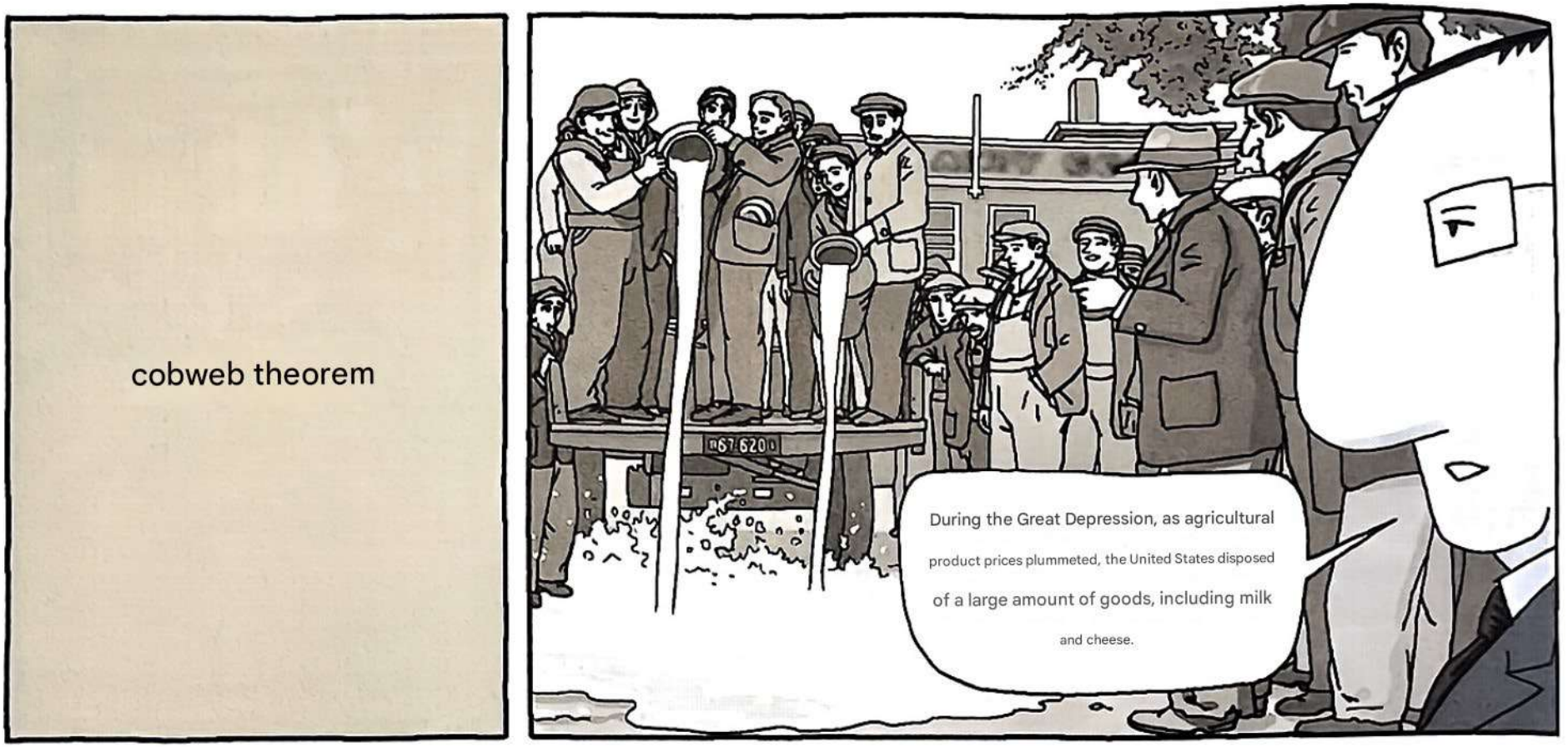


Cobweb Theorem



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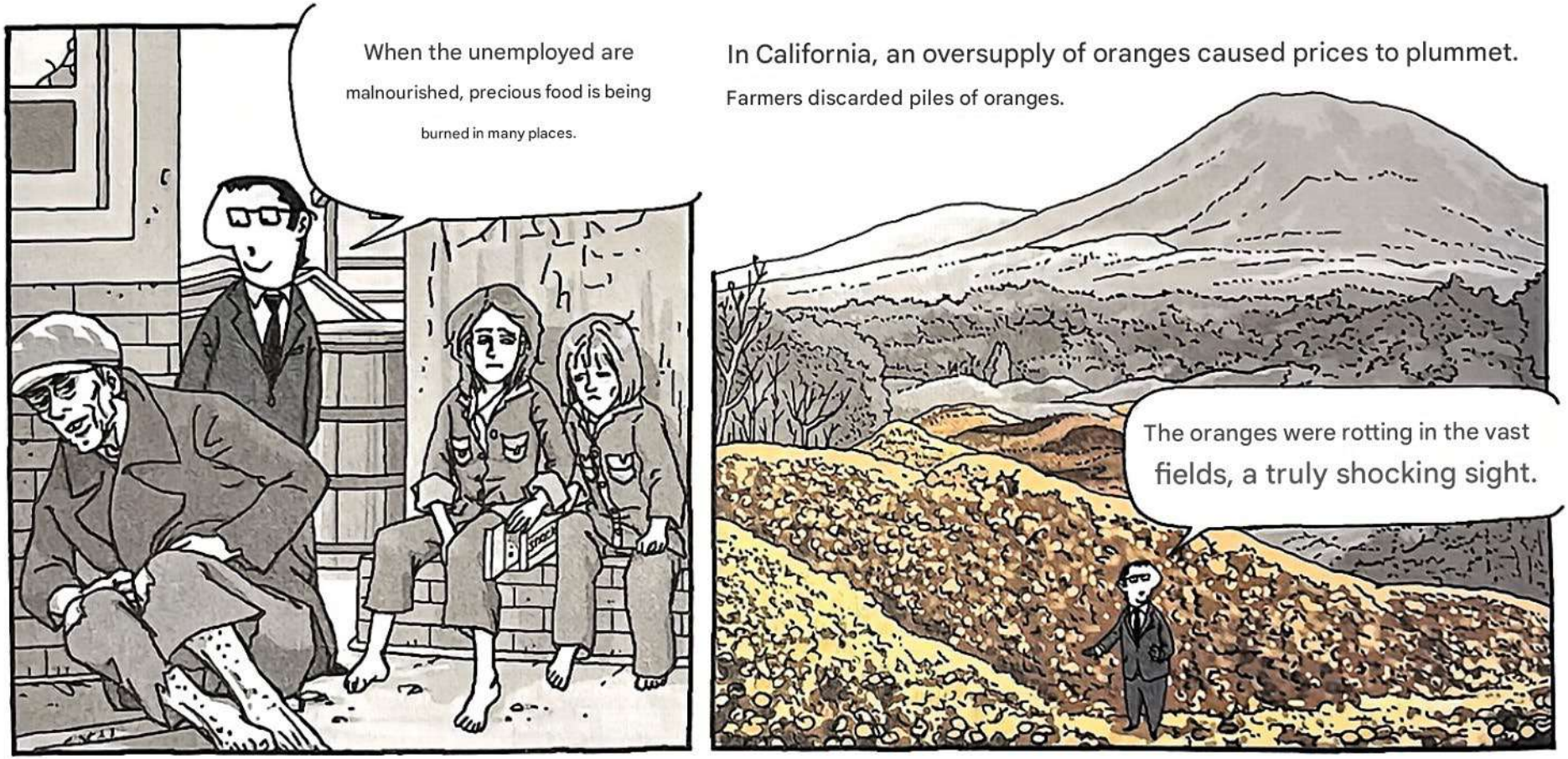

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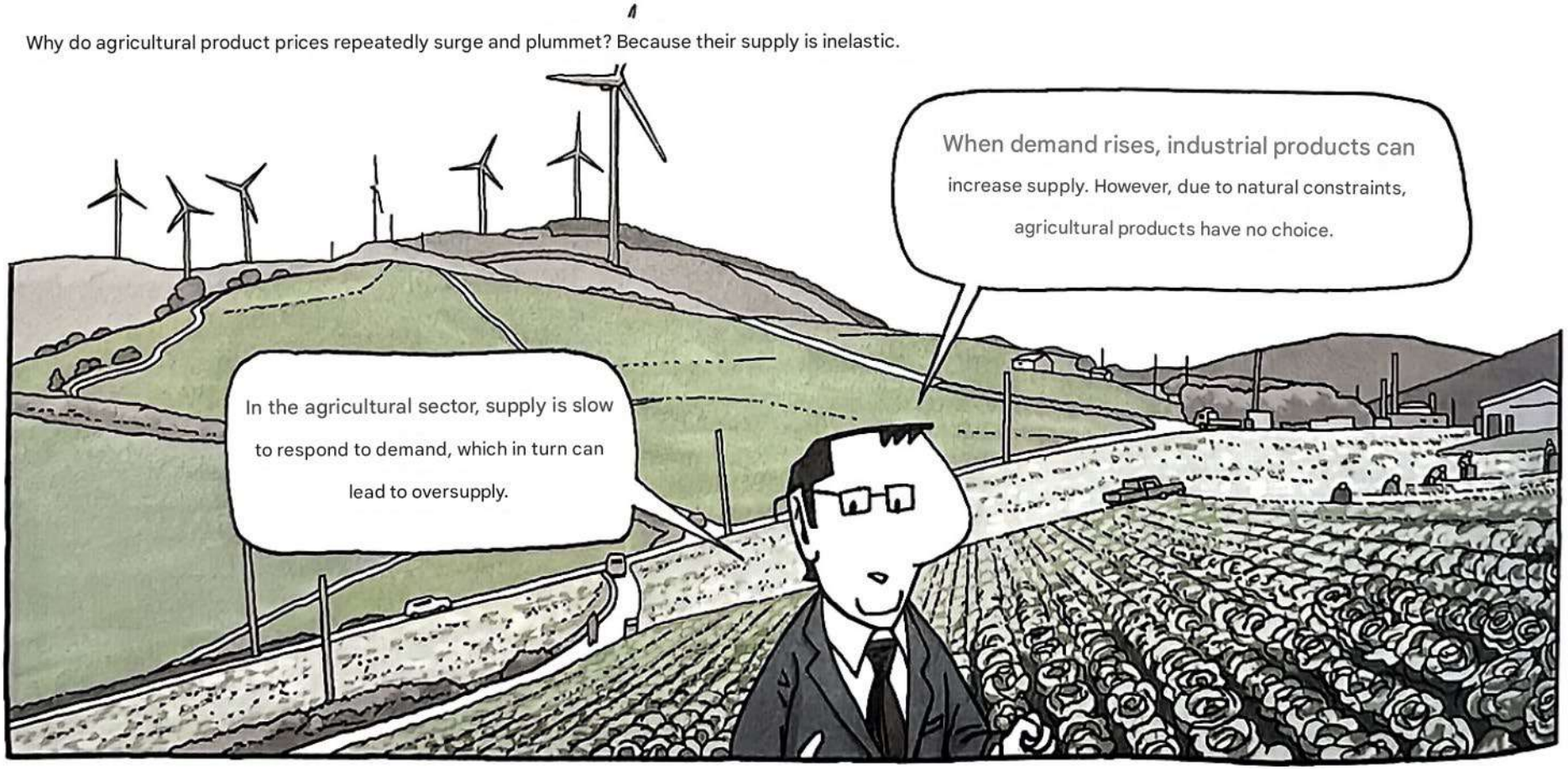

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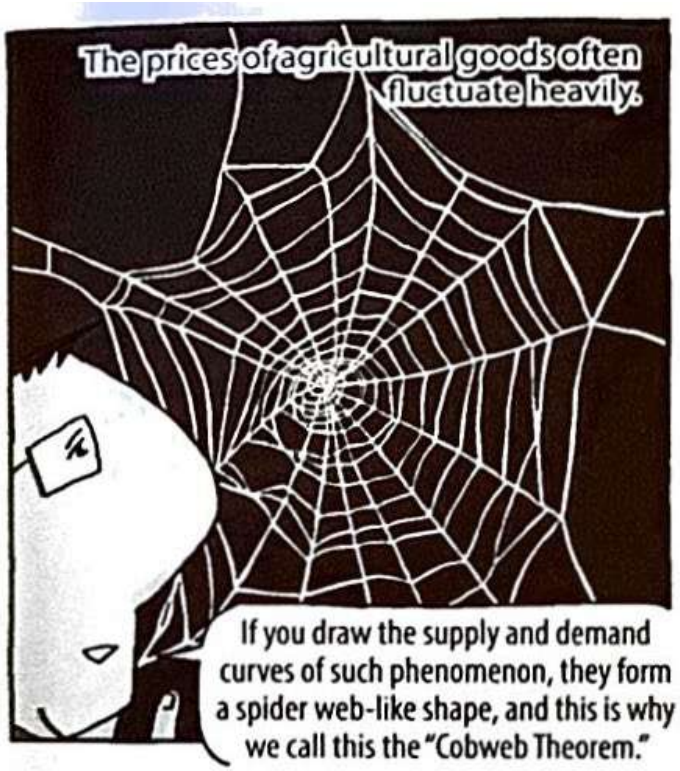
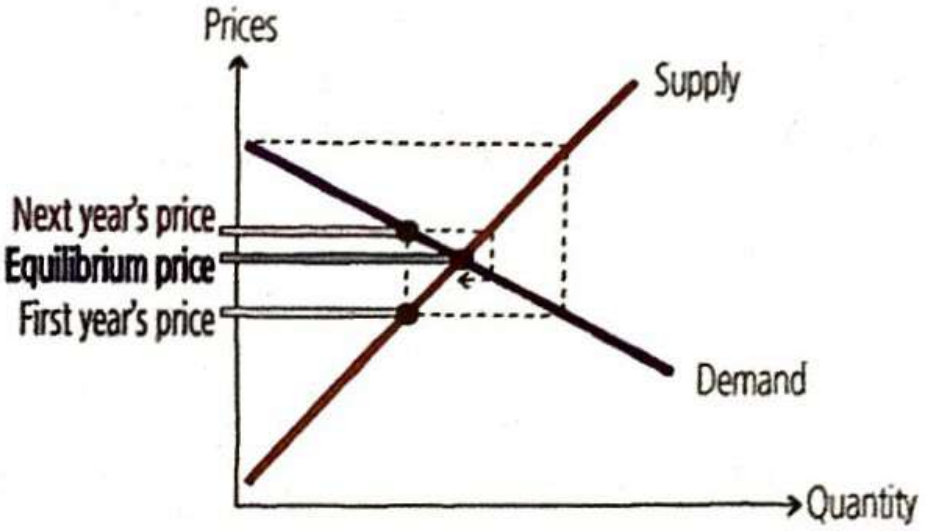
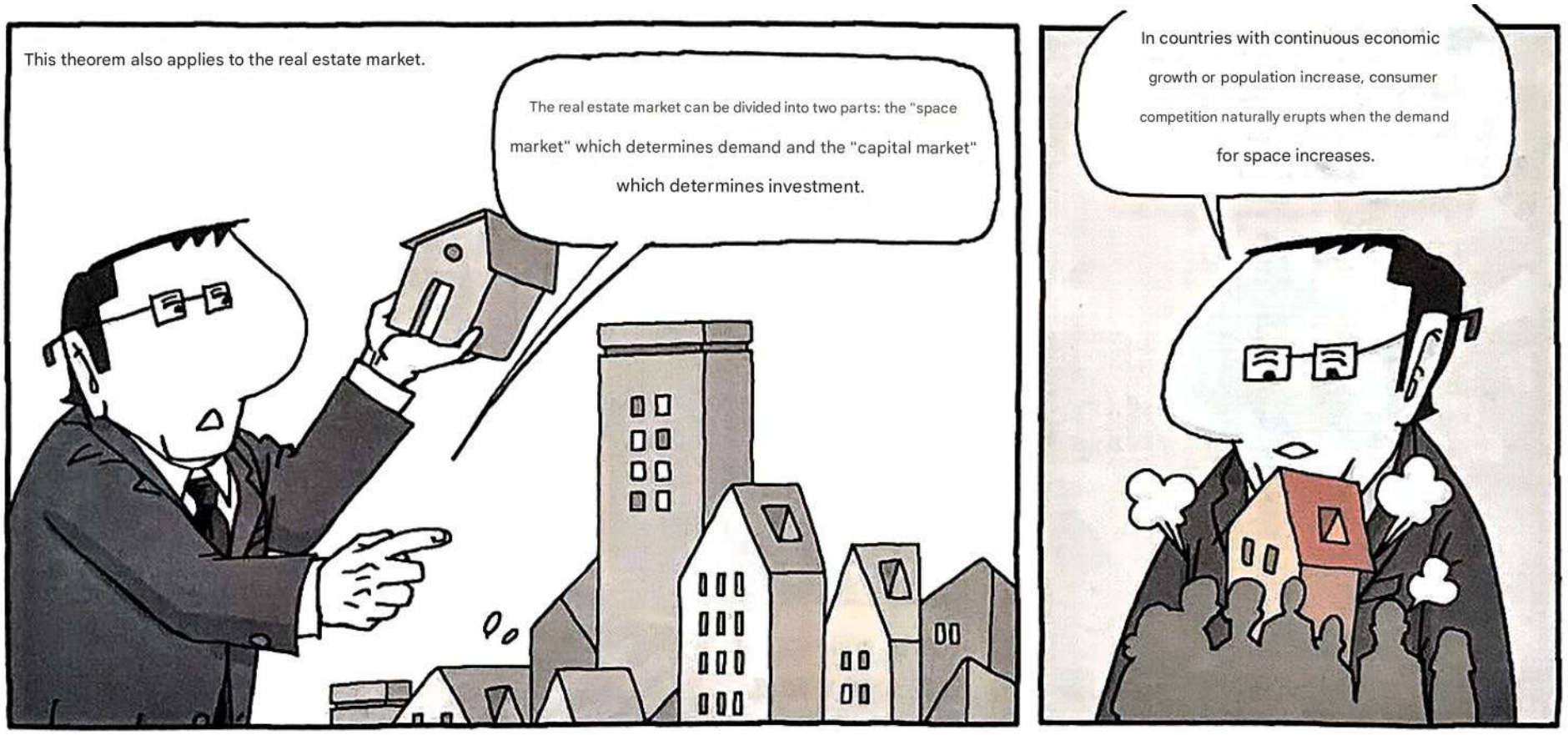


The cobweb theorem is an economic model that explains why prices might be subject to periodic fluctuations in certain types of markets.



Because of the time lag in production, producers can only decide on future output based on past prices. This "misaligned" decision-making causes market prices and output to fluctuate cyclically around the equilibrium point.

Cobweb Theorem



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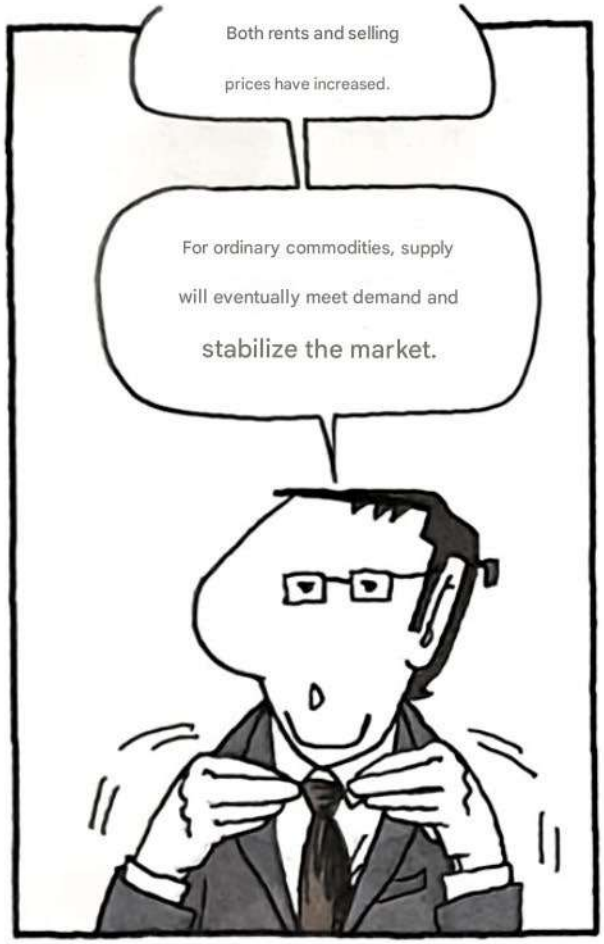

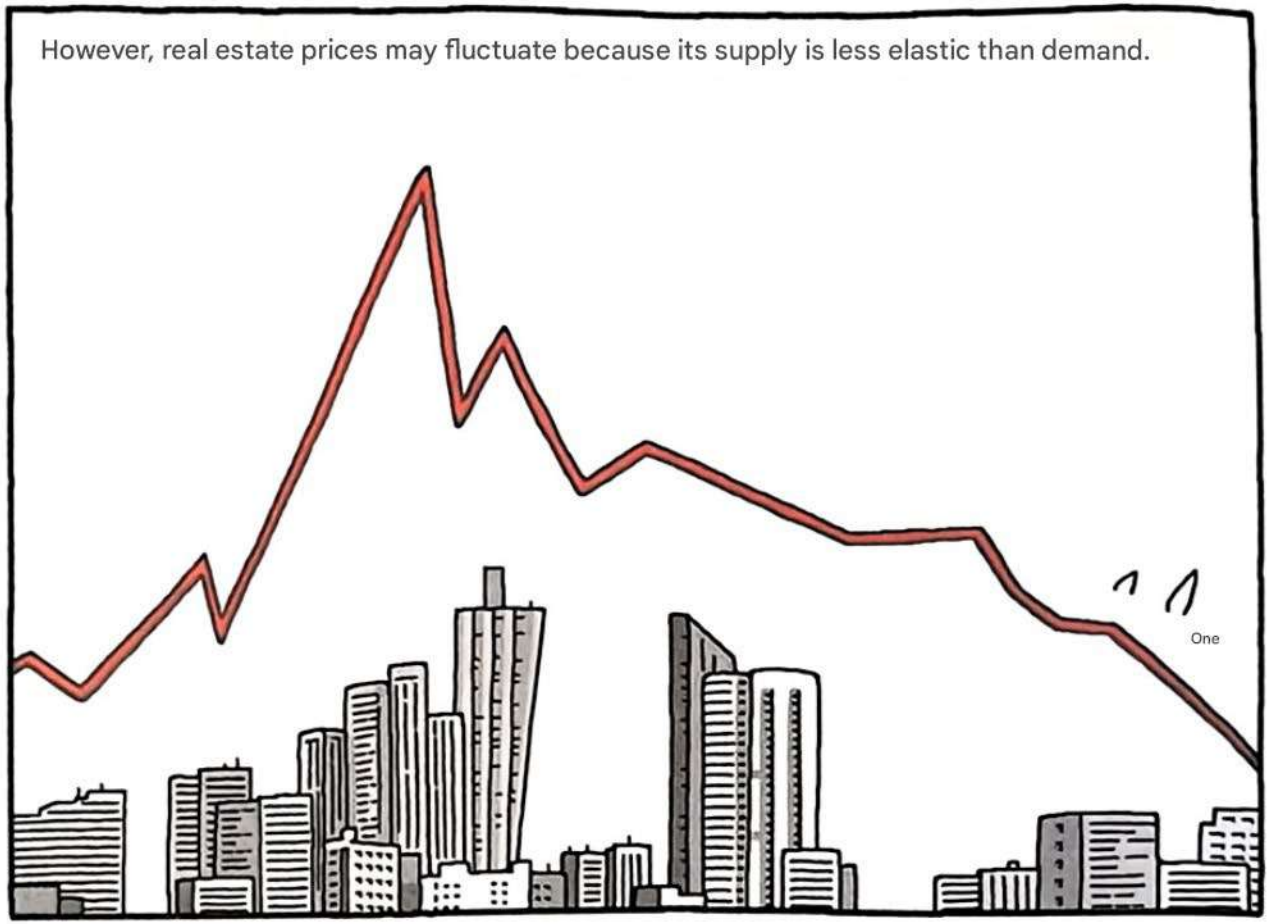

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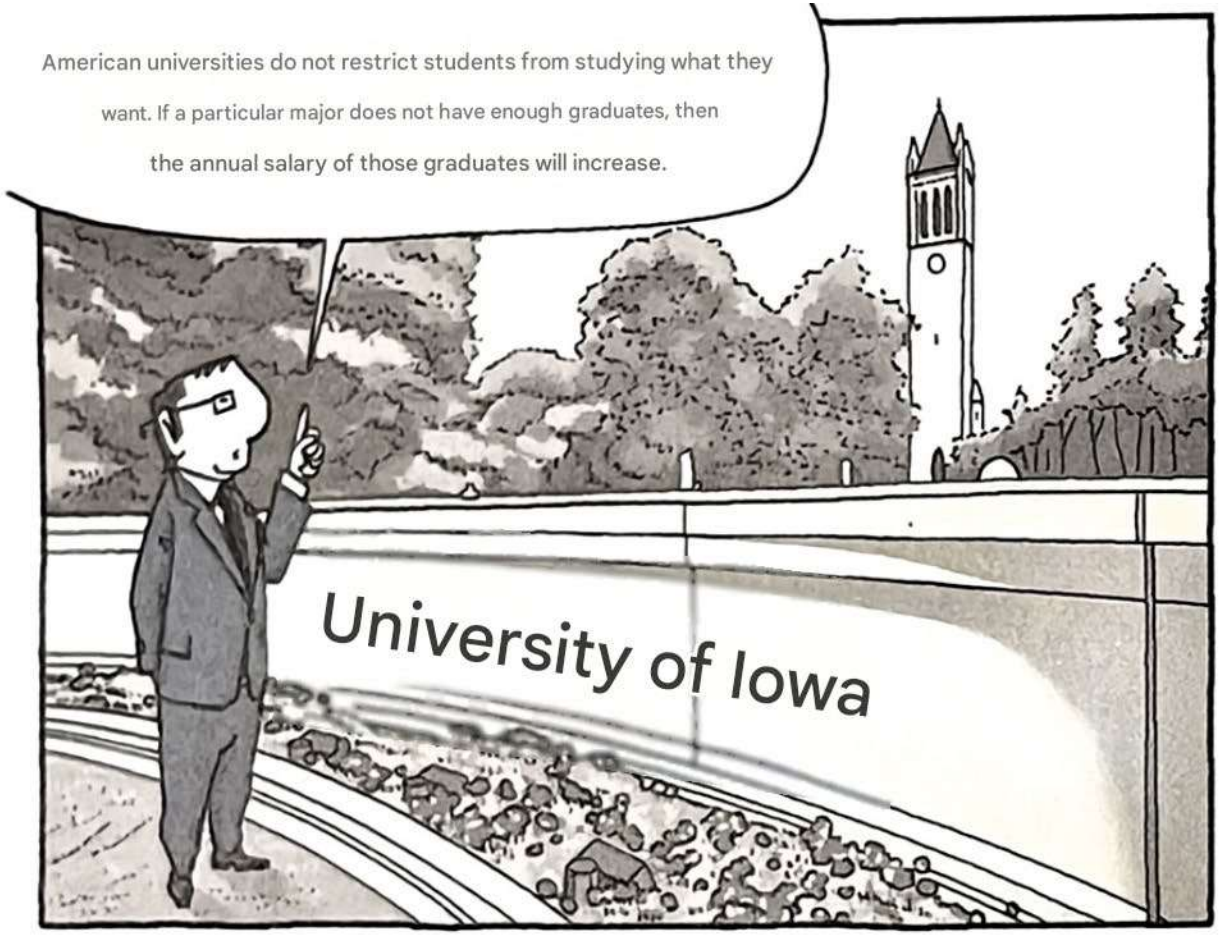

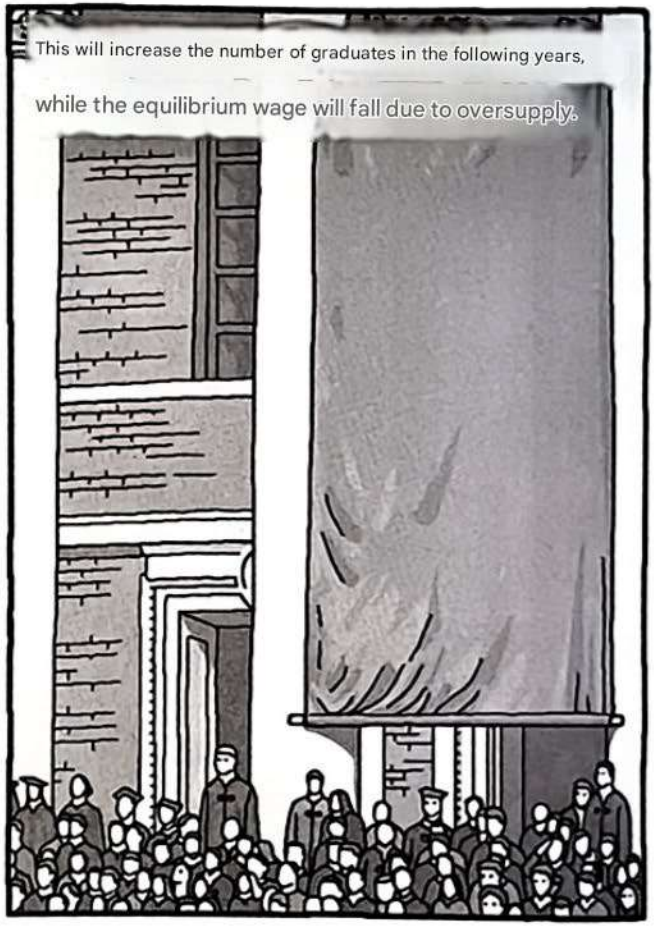

Cobweb Theorem

SUMMARY

- The Law of Supply states that an increase in price will lead to an increase in the quantity supplied.
  The **price elasticity of supply** measures how much the quantity supplied responds to a change in price.

$$\text{Price elasticity of supply} = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in price}}$$

SUMMARY

$$\text{Price elasticity} = \frac{20\%}{10\%} = 2$$

- For example, a 10% increase in the price of ice cream causes the quantity supplied to increase by 20%. In this case, the price elasticity of supply is calculated as follows:
- When the elasticity is greater than 1, supply is considered elastic, meaning the change in quantity supplied is proportionally larger than the change in price. Conversely, when the elasticity is less than 1 and the quantity supplied changes less than the price, supply is considered inelastic. If the elasticity is exactly 1, meaning the percentage change in quantity supplied equals the percentage change in price, then in this case, the supply is said to have unit elasticity.

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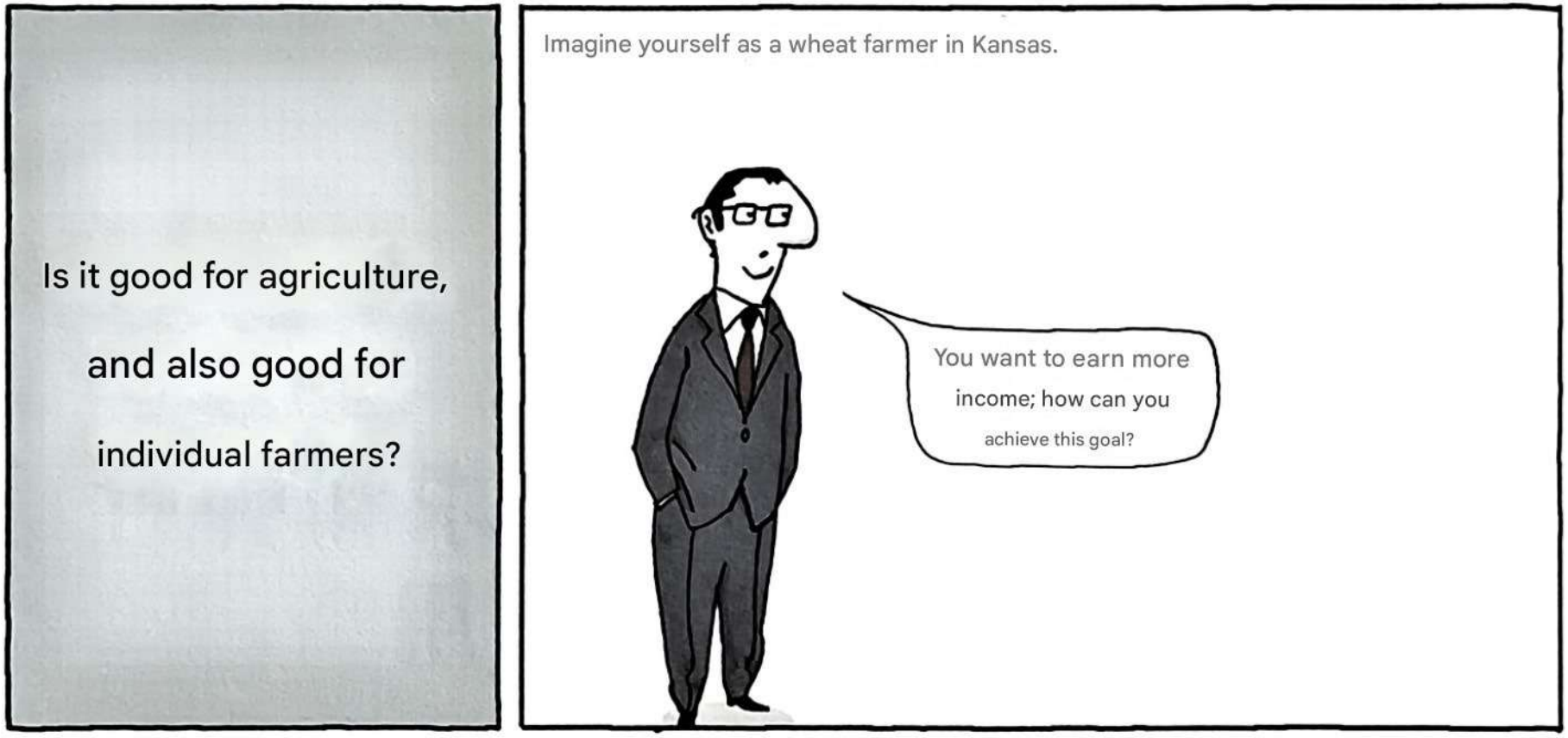
- Supply elasticity
- **Three applications of supply, demand, and elasticity**

Is it good for agriculture, and also good for individual farmers?



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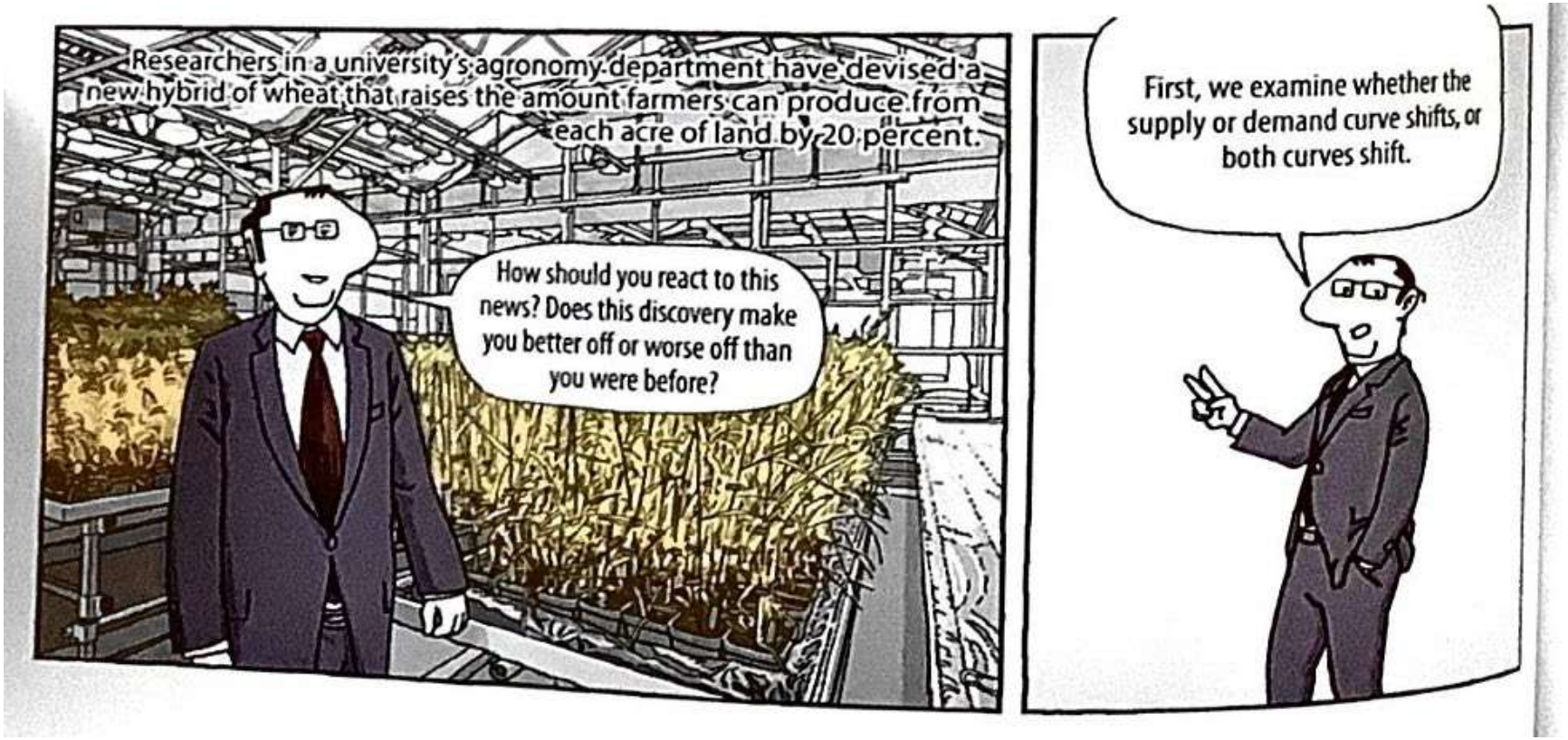

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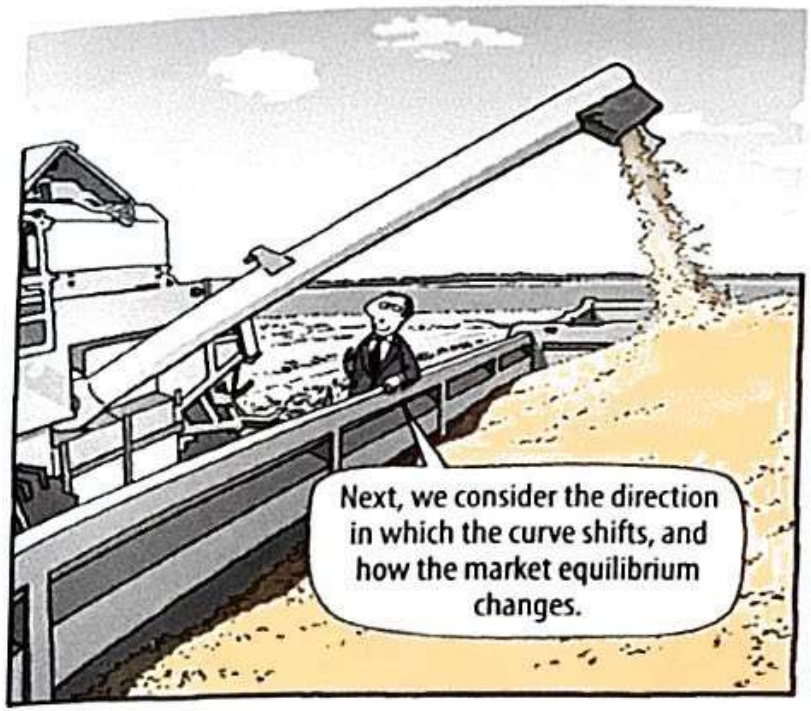

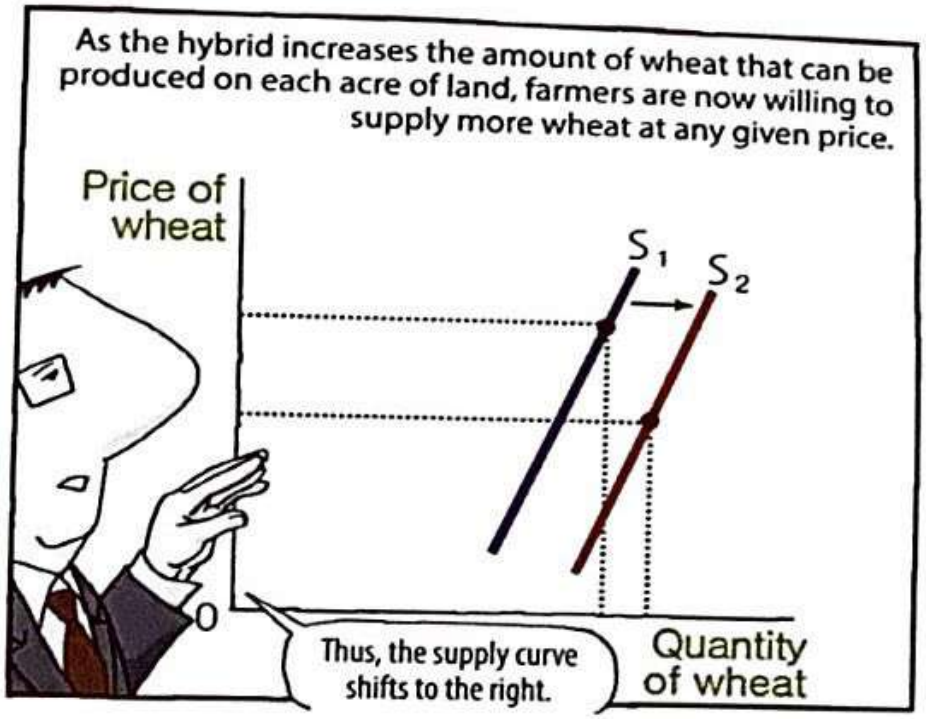

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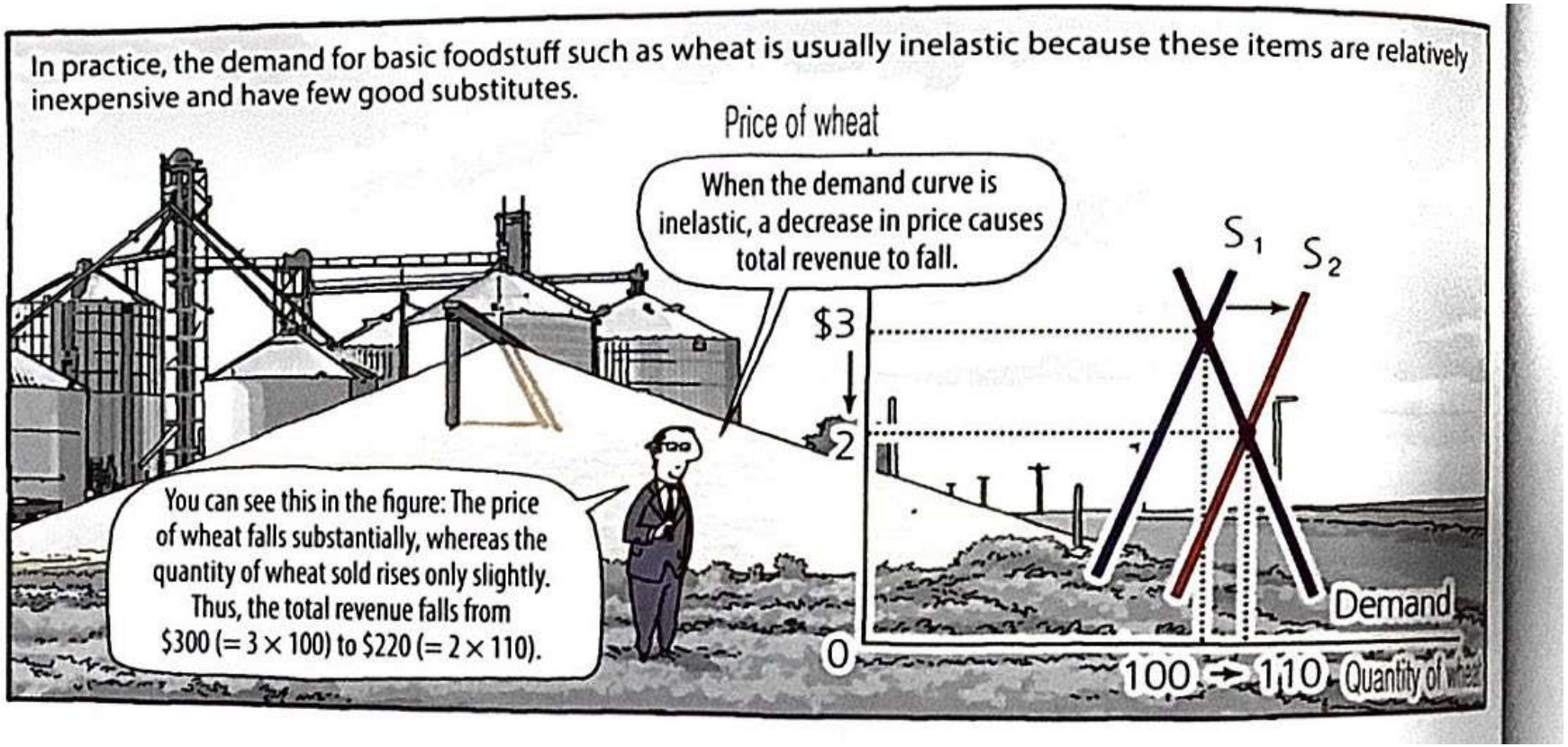

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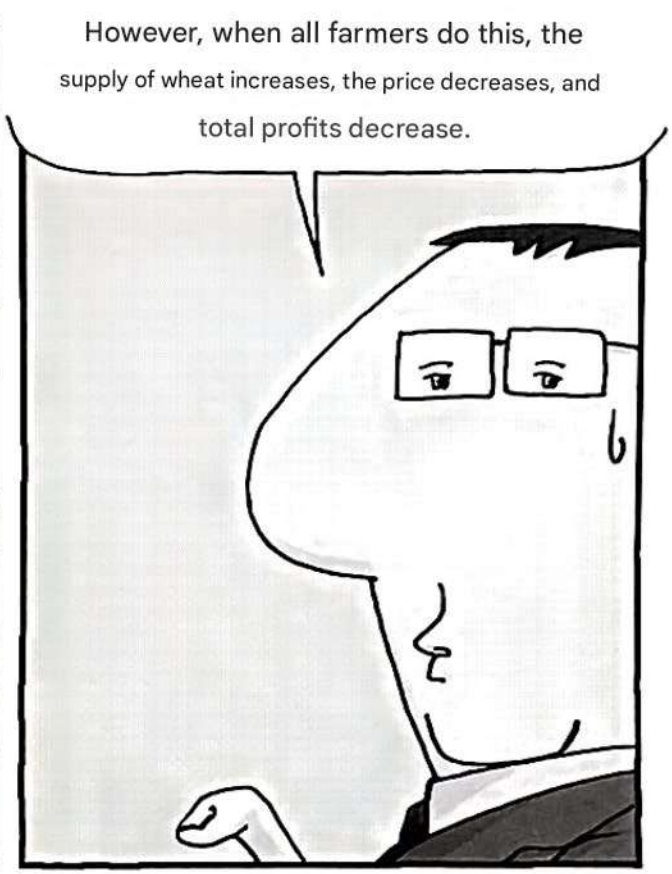

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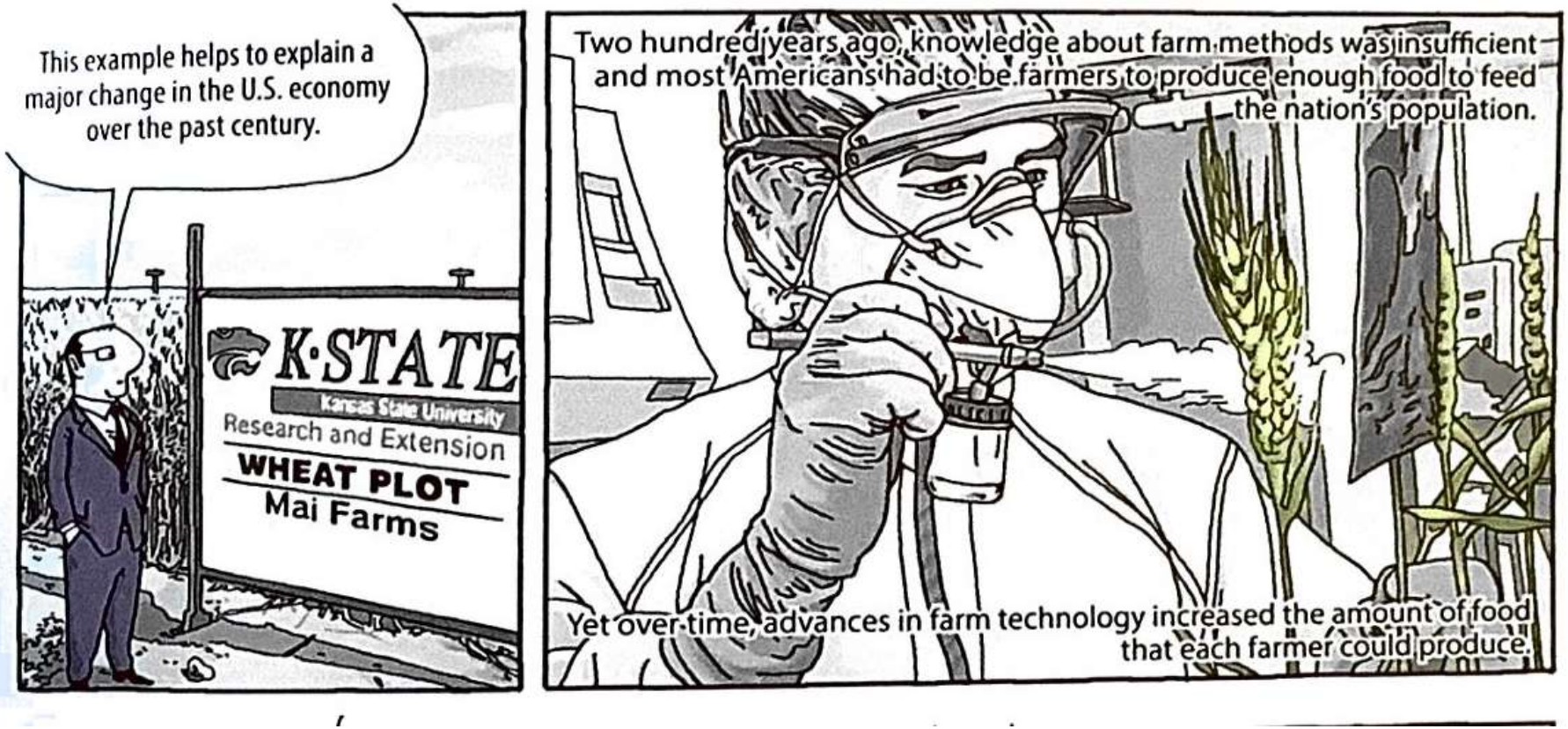

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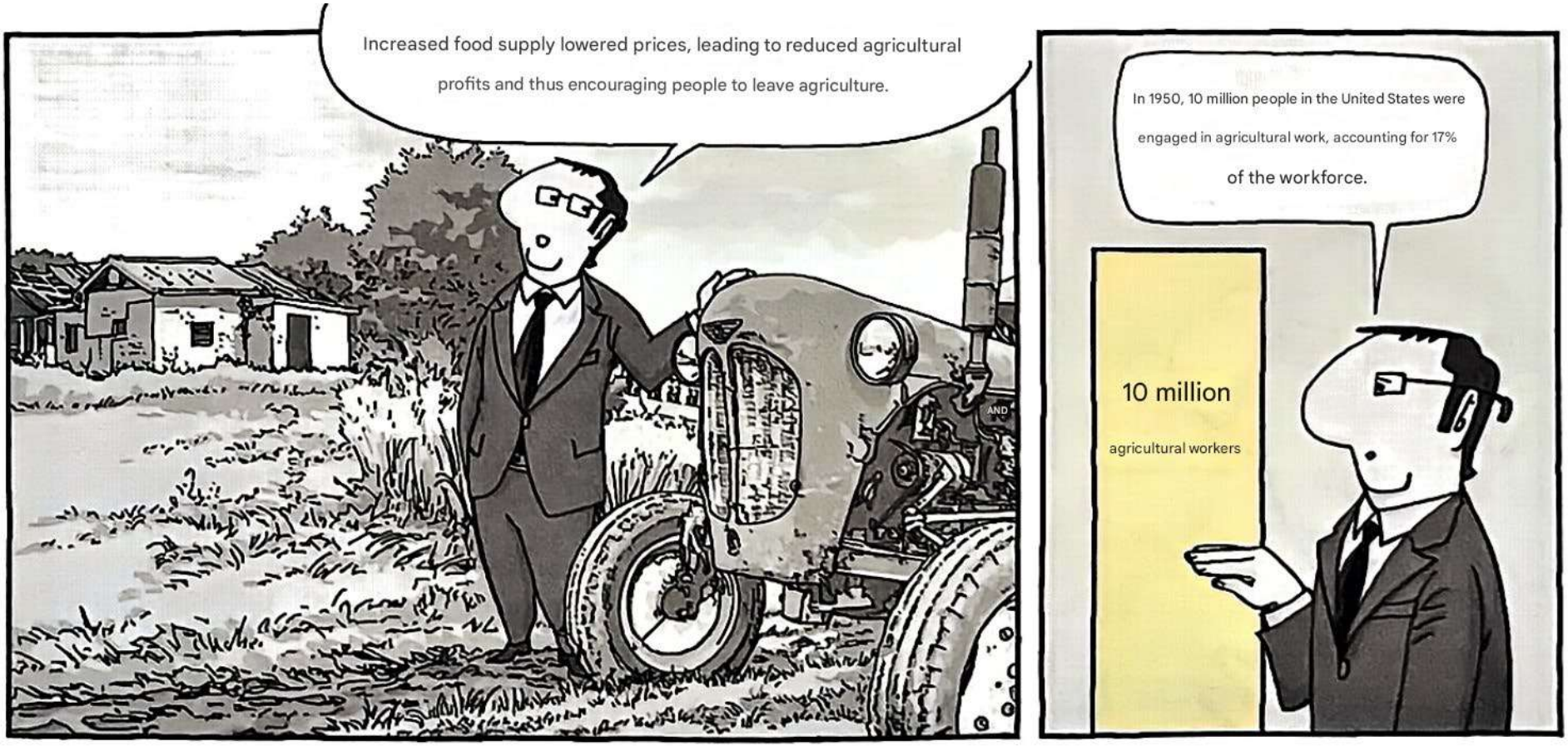

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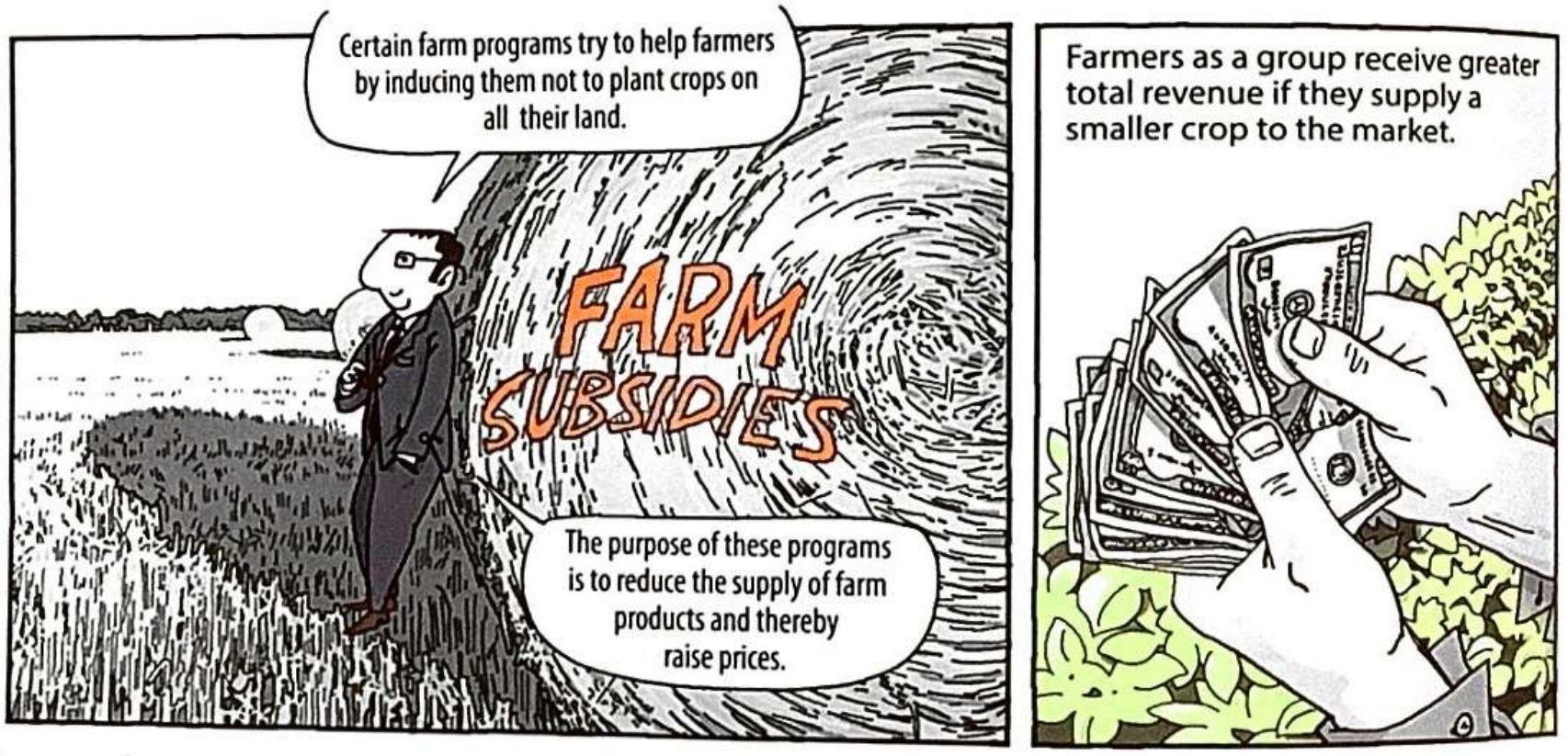

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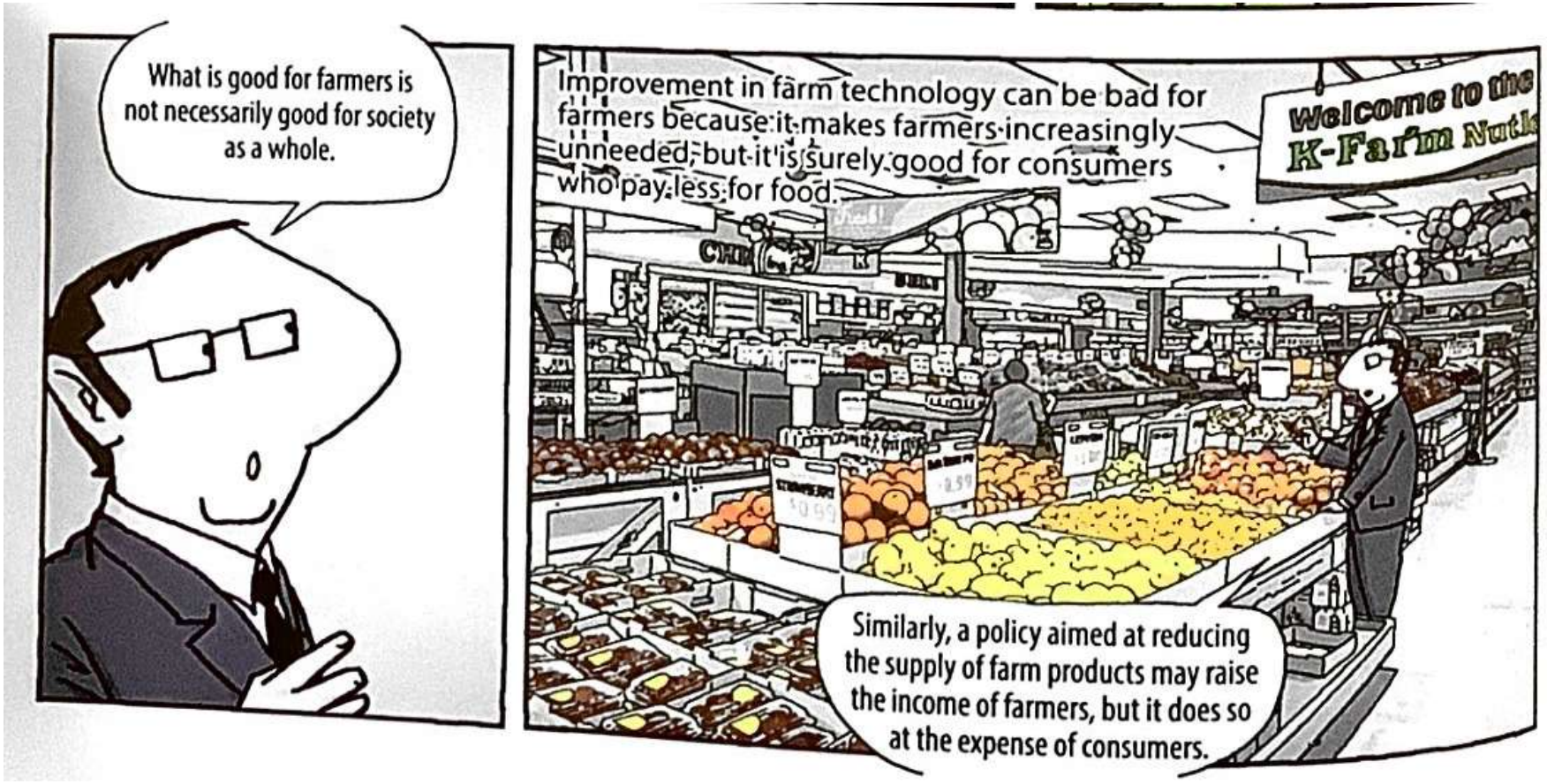
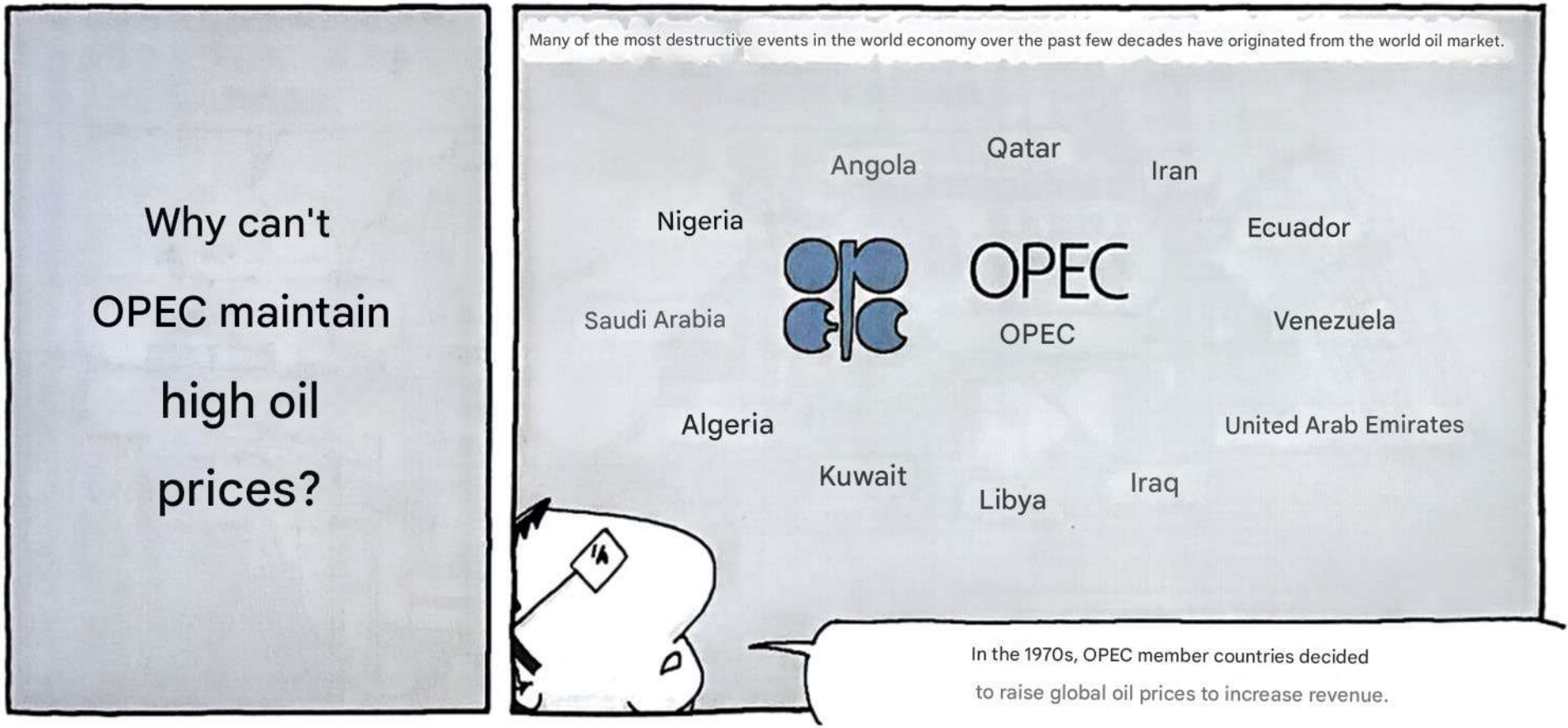


Why can't OPEC maintain high oil prices?



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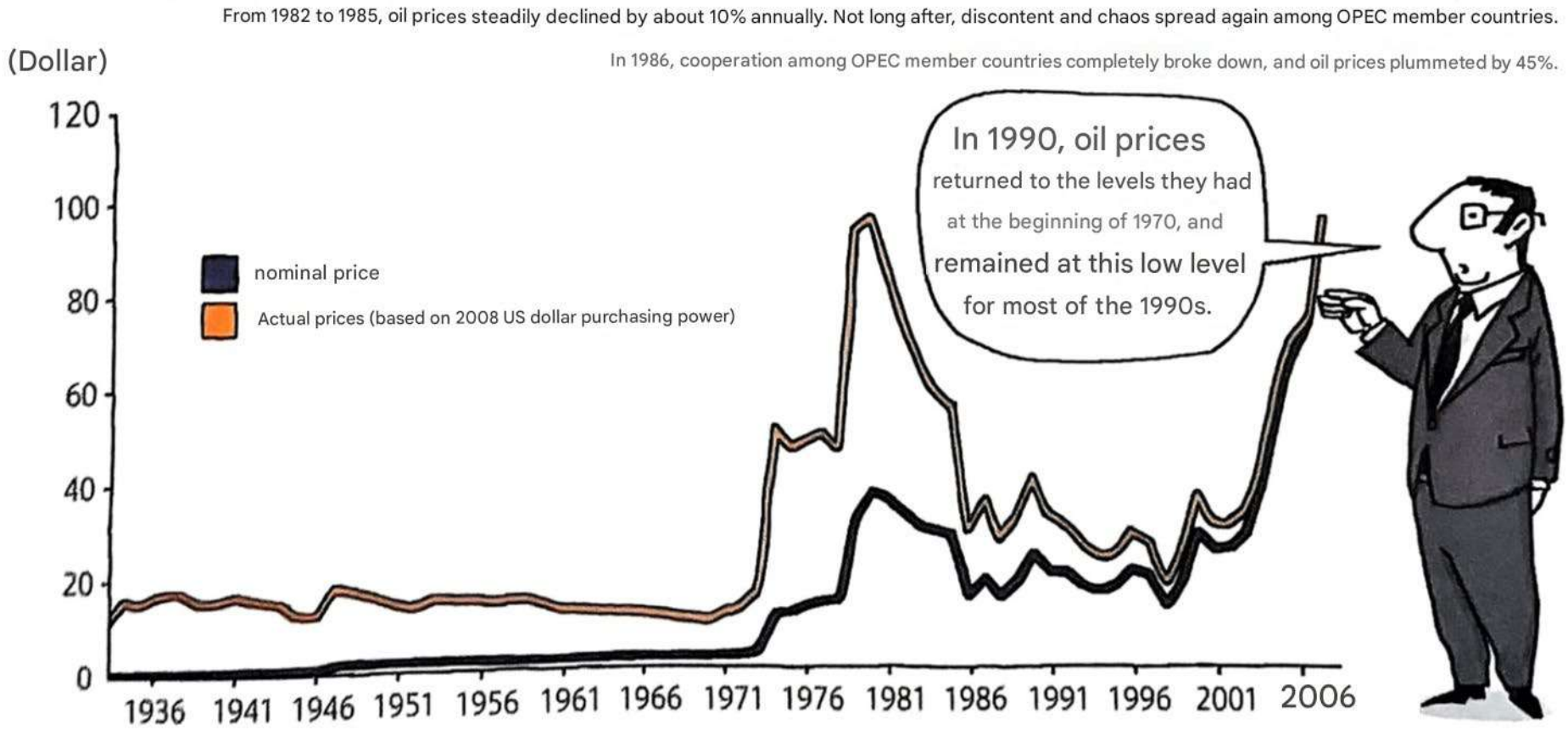

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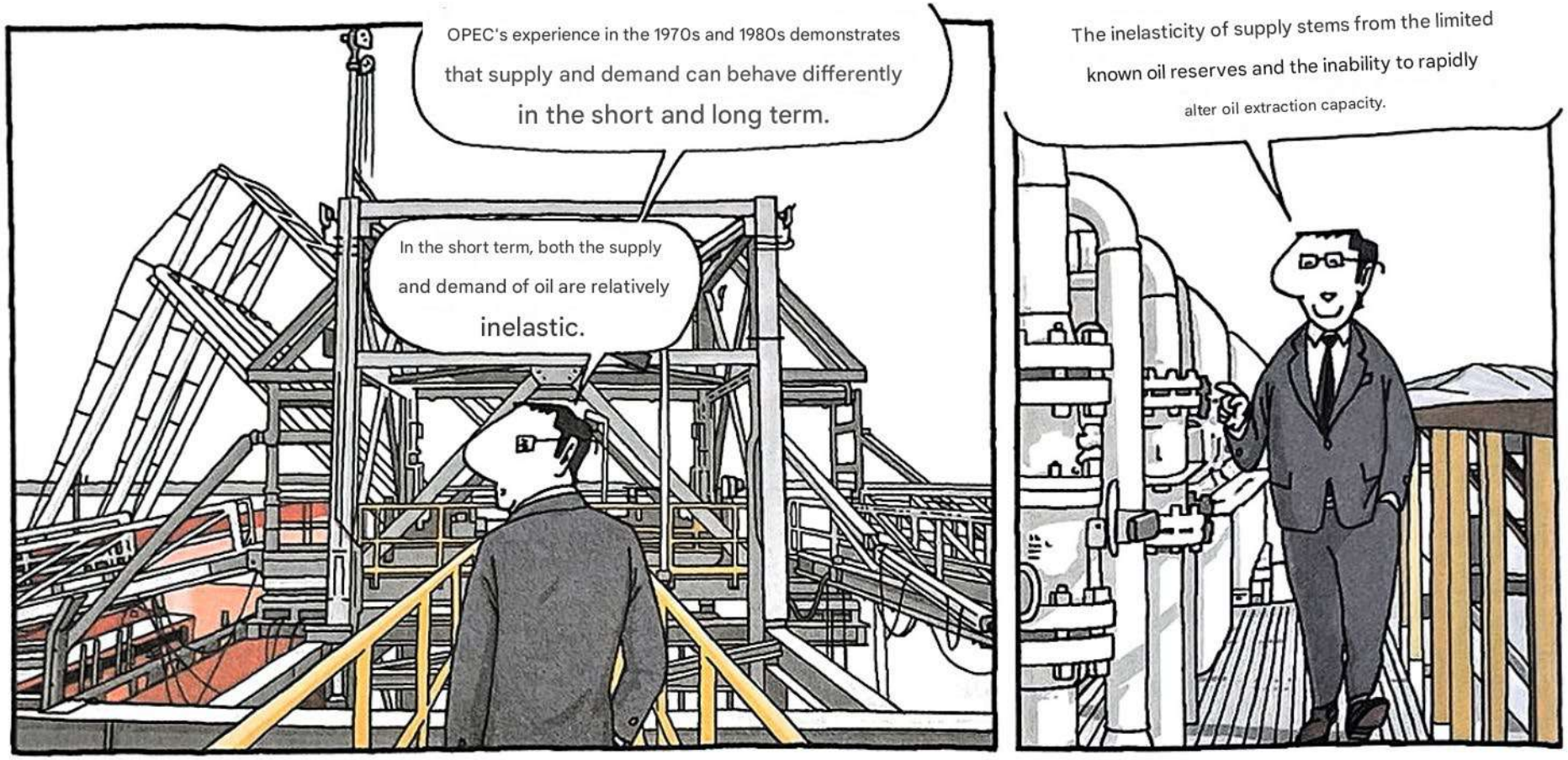

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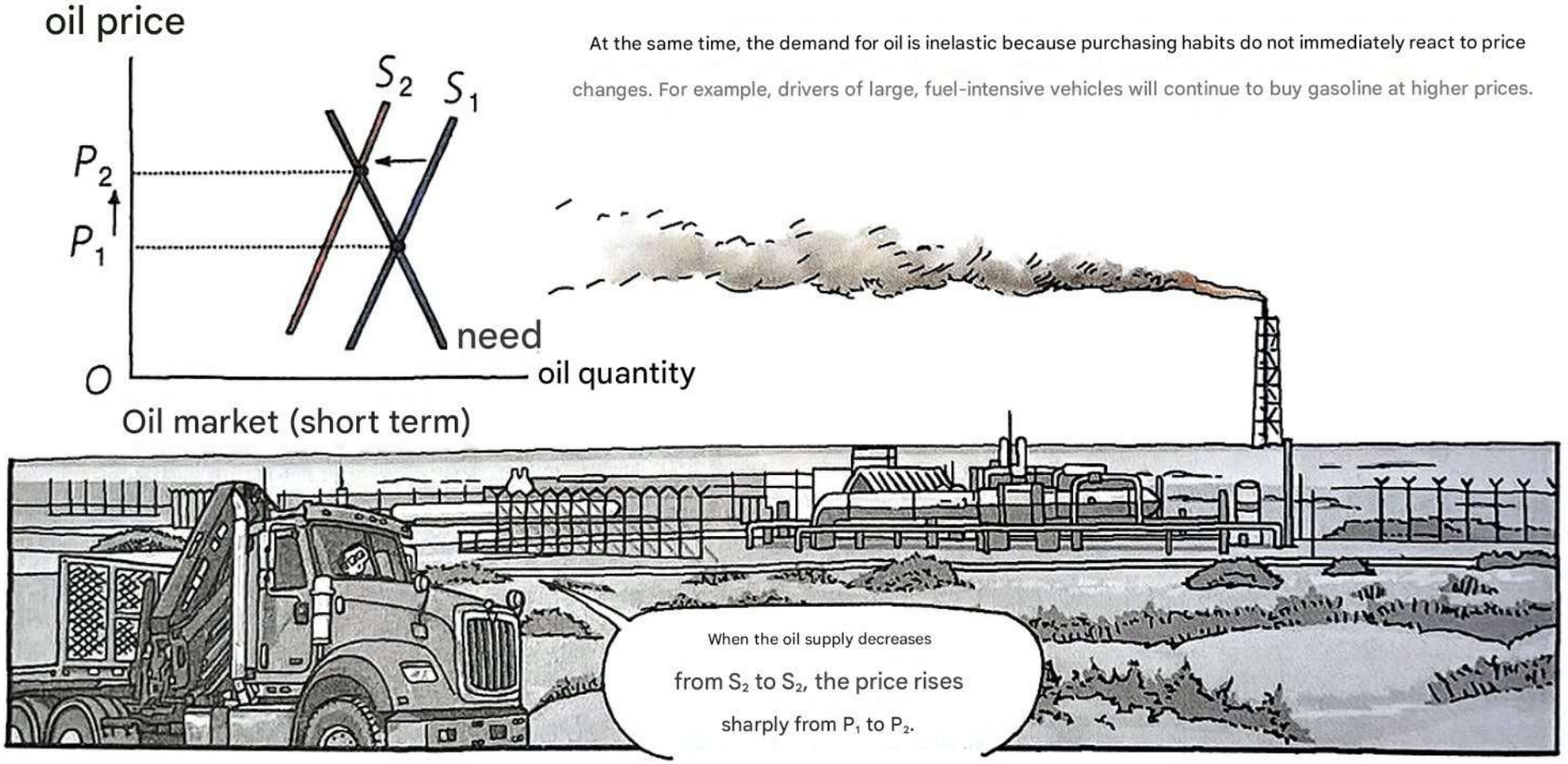

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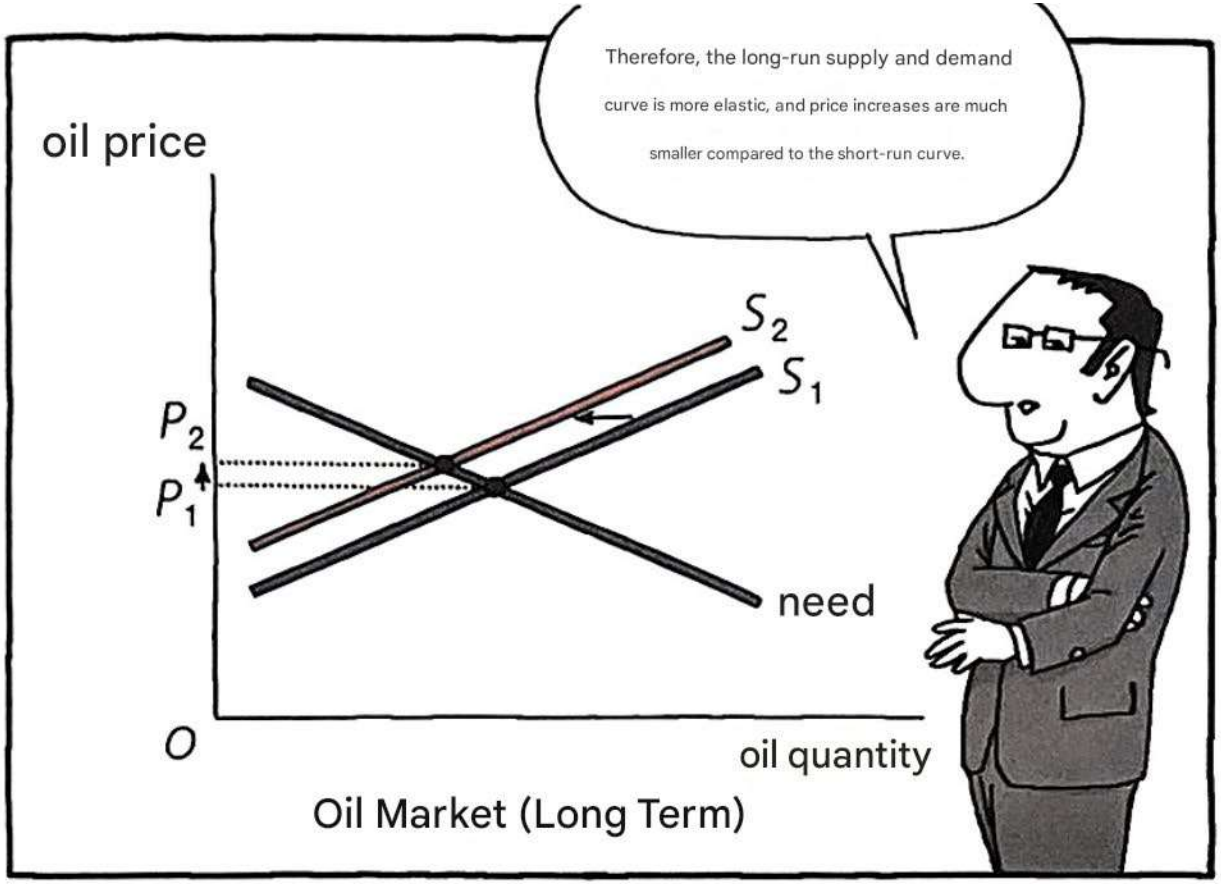

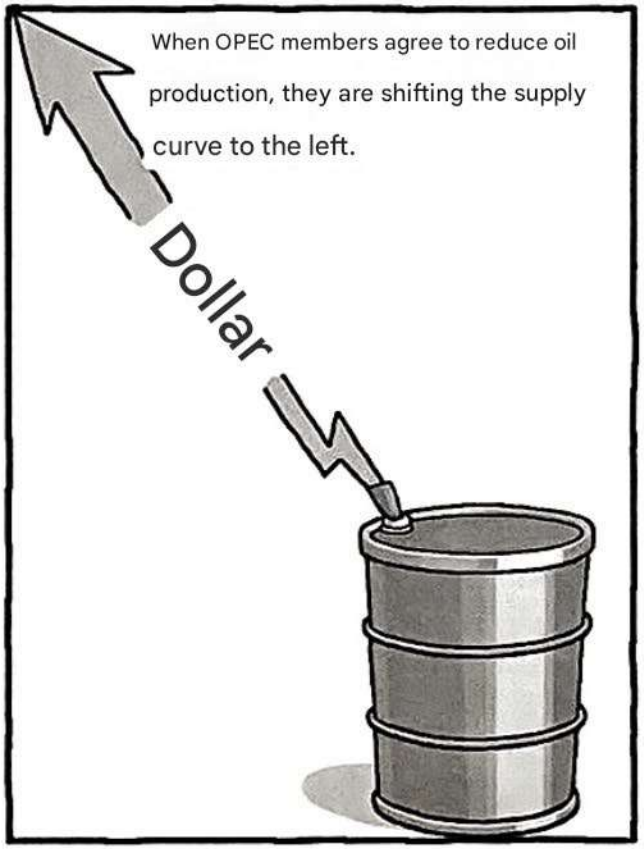

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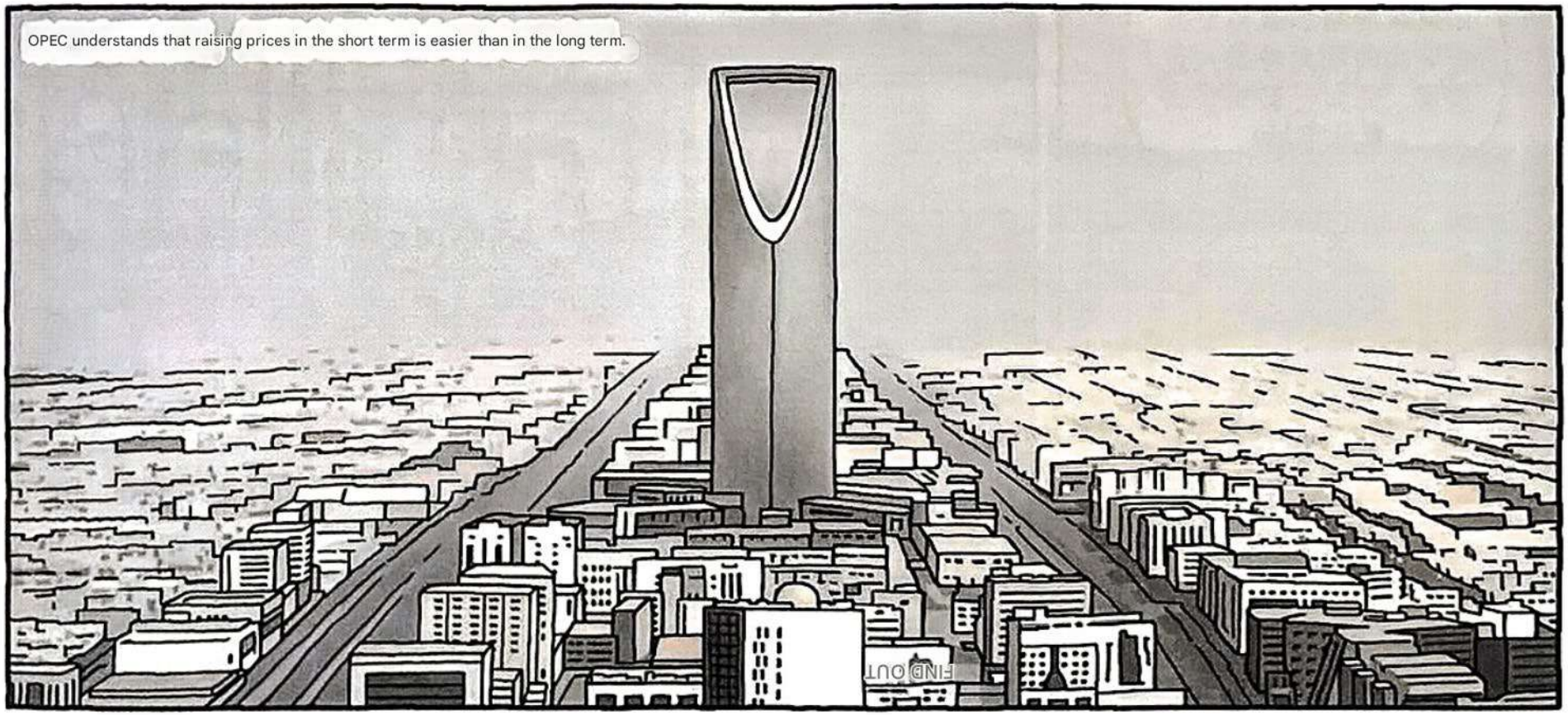
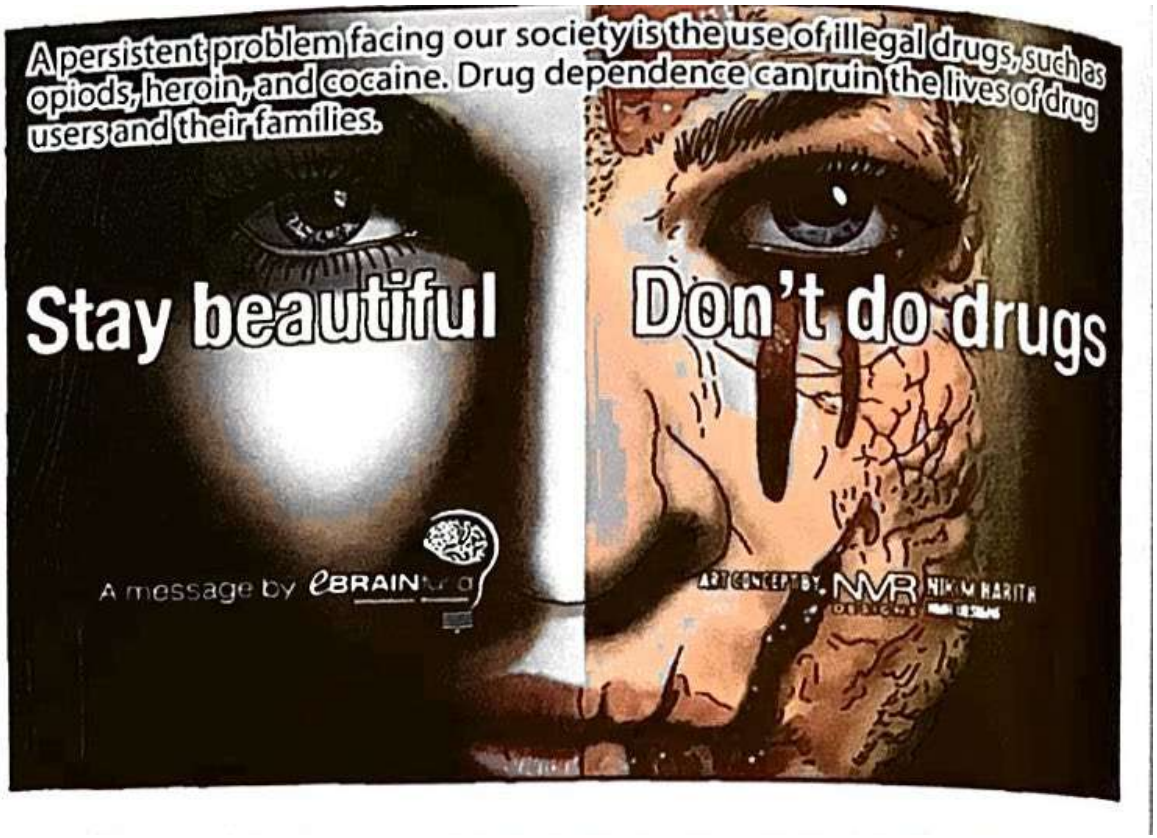


Has drug control increased or decreased drug-related crimes?

Does Drug Interdiction Increase or Decrease Drug-Related Crimes?



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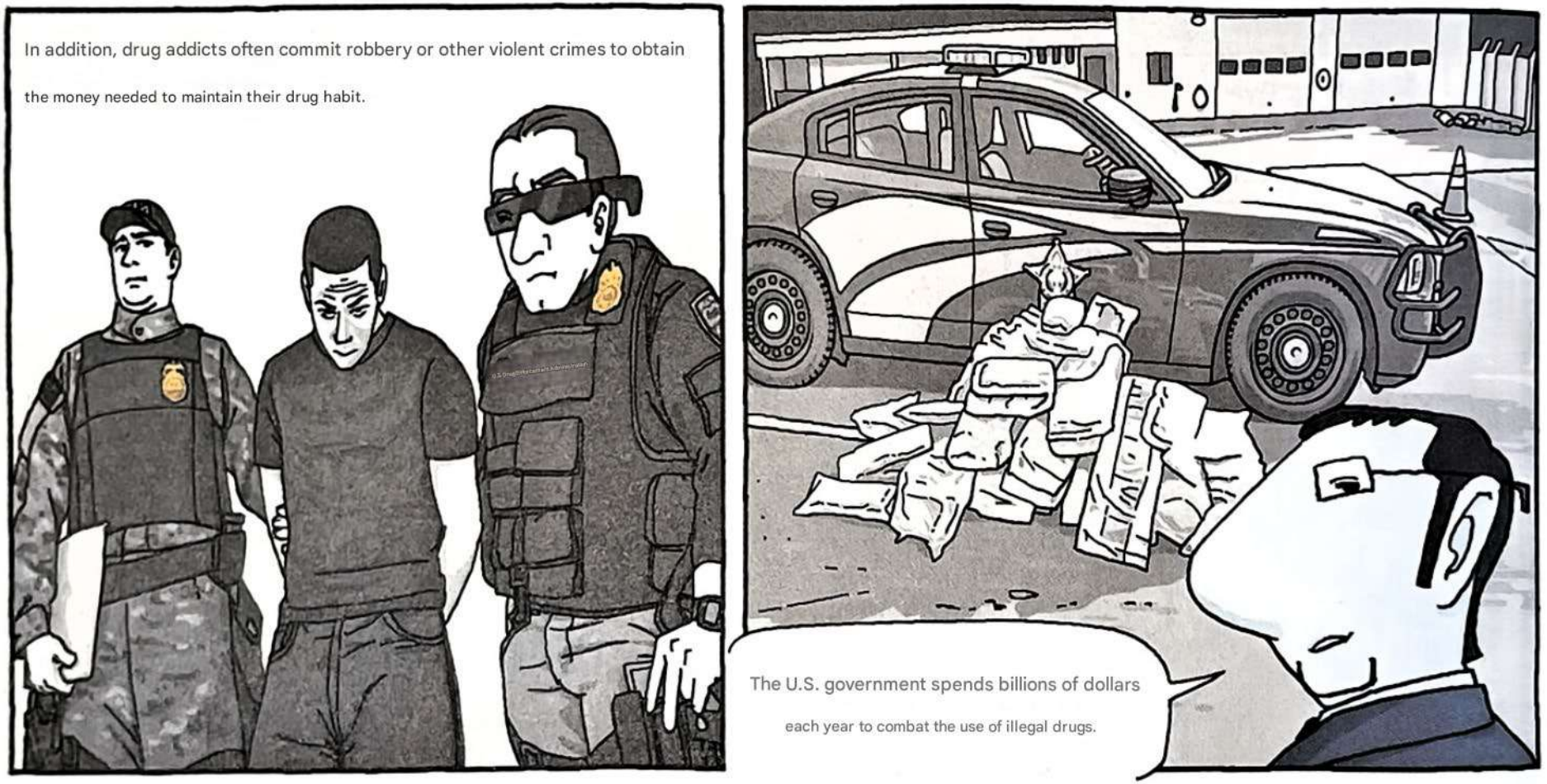

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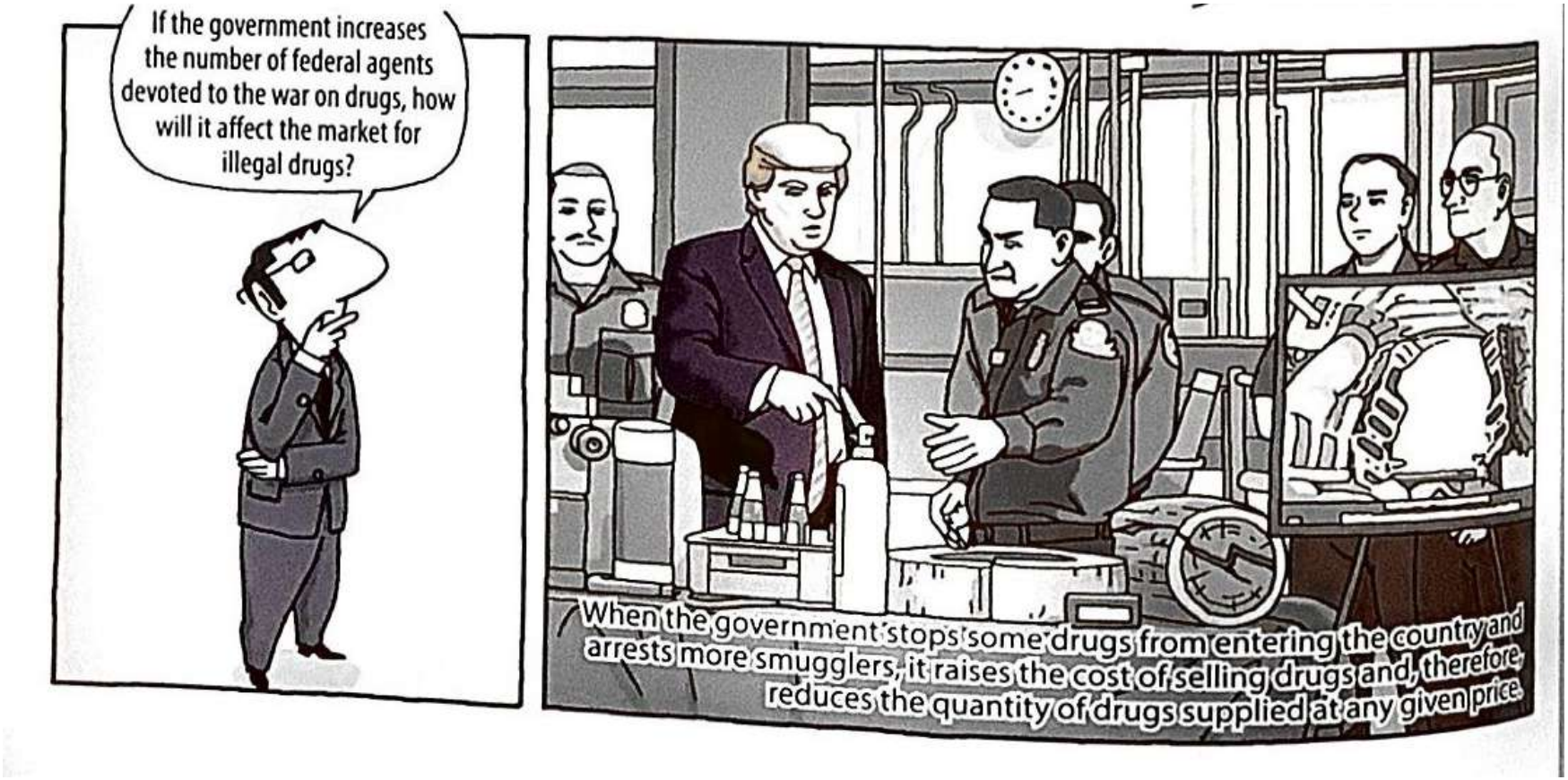

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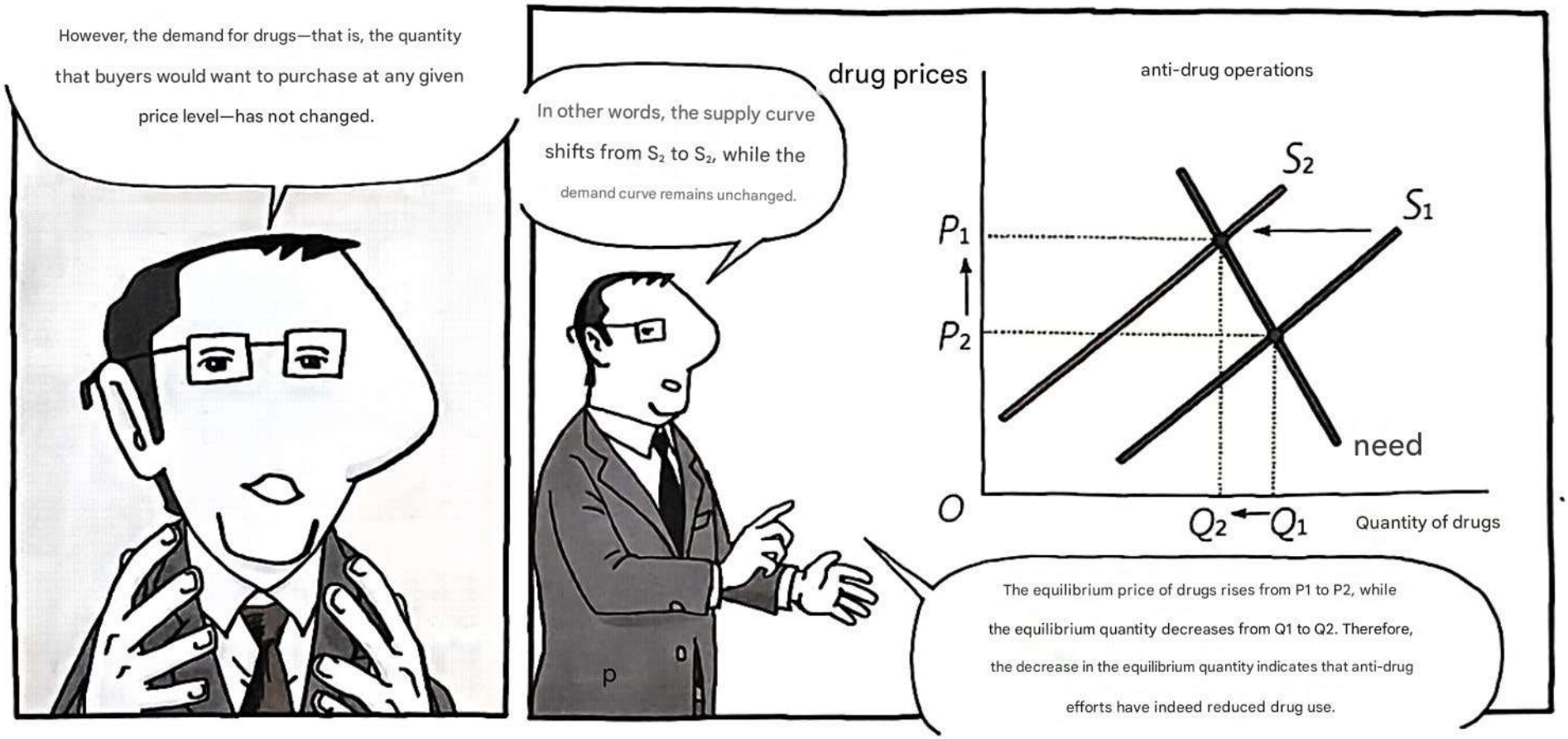

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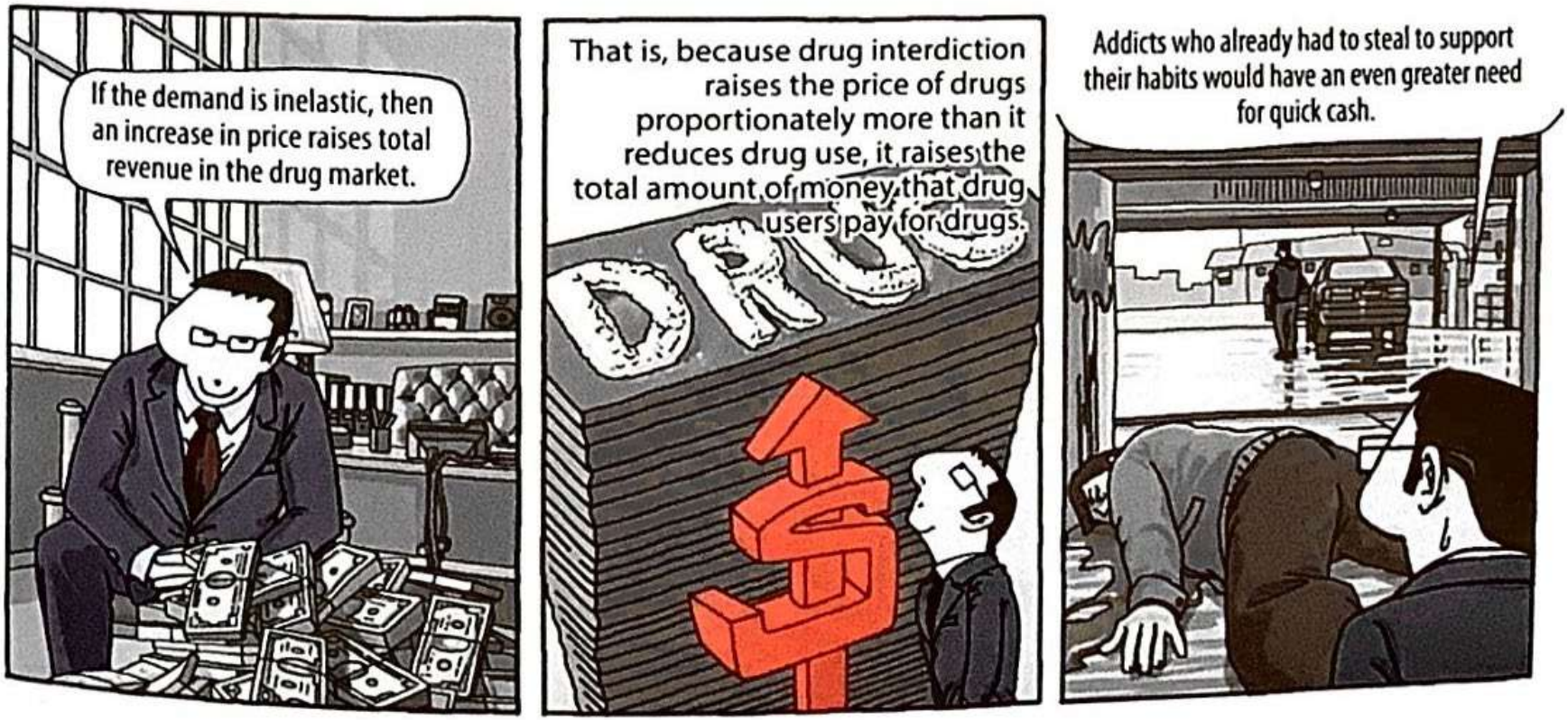

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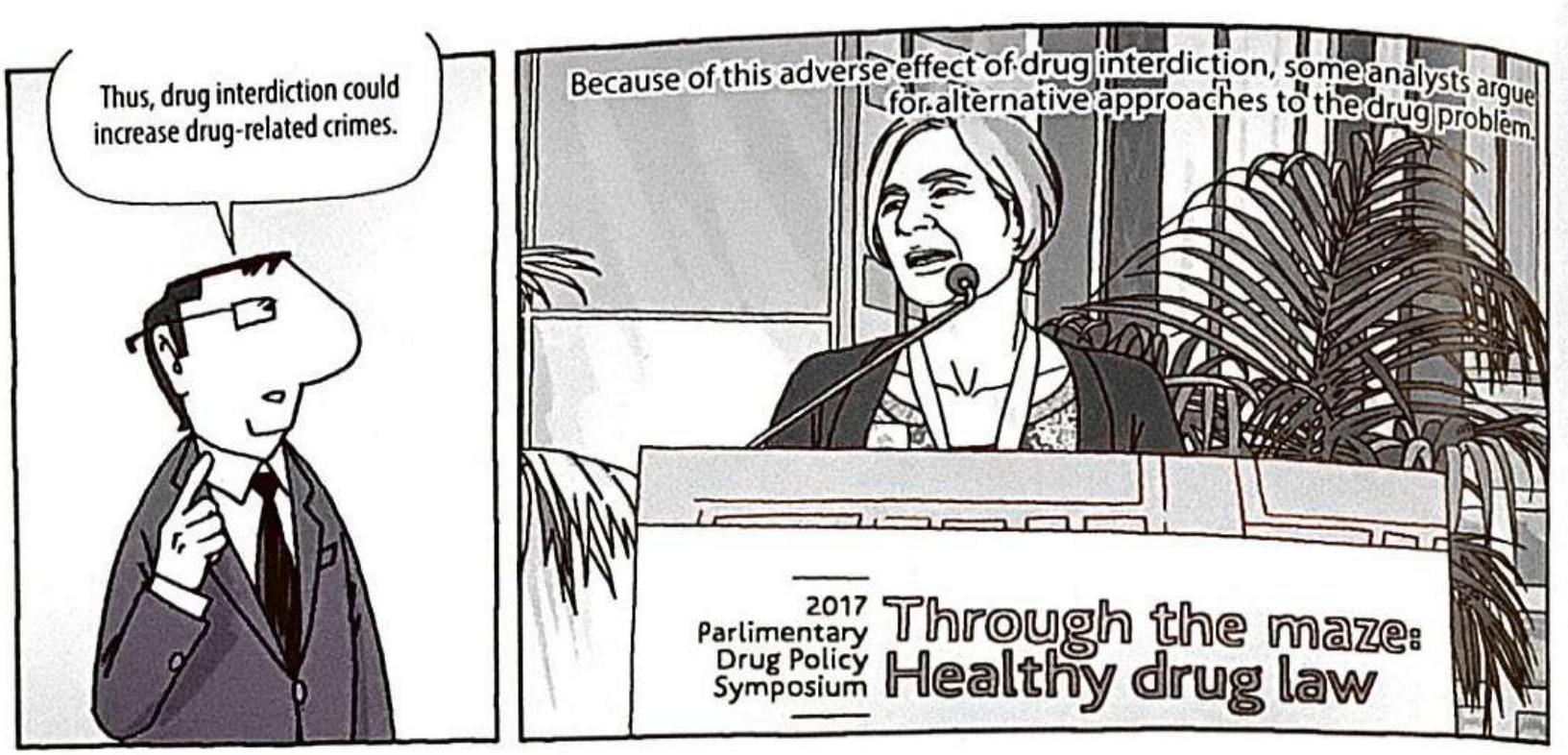

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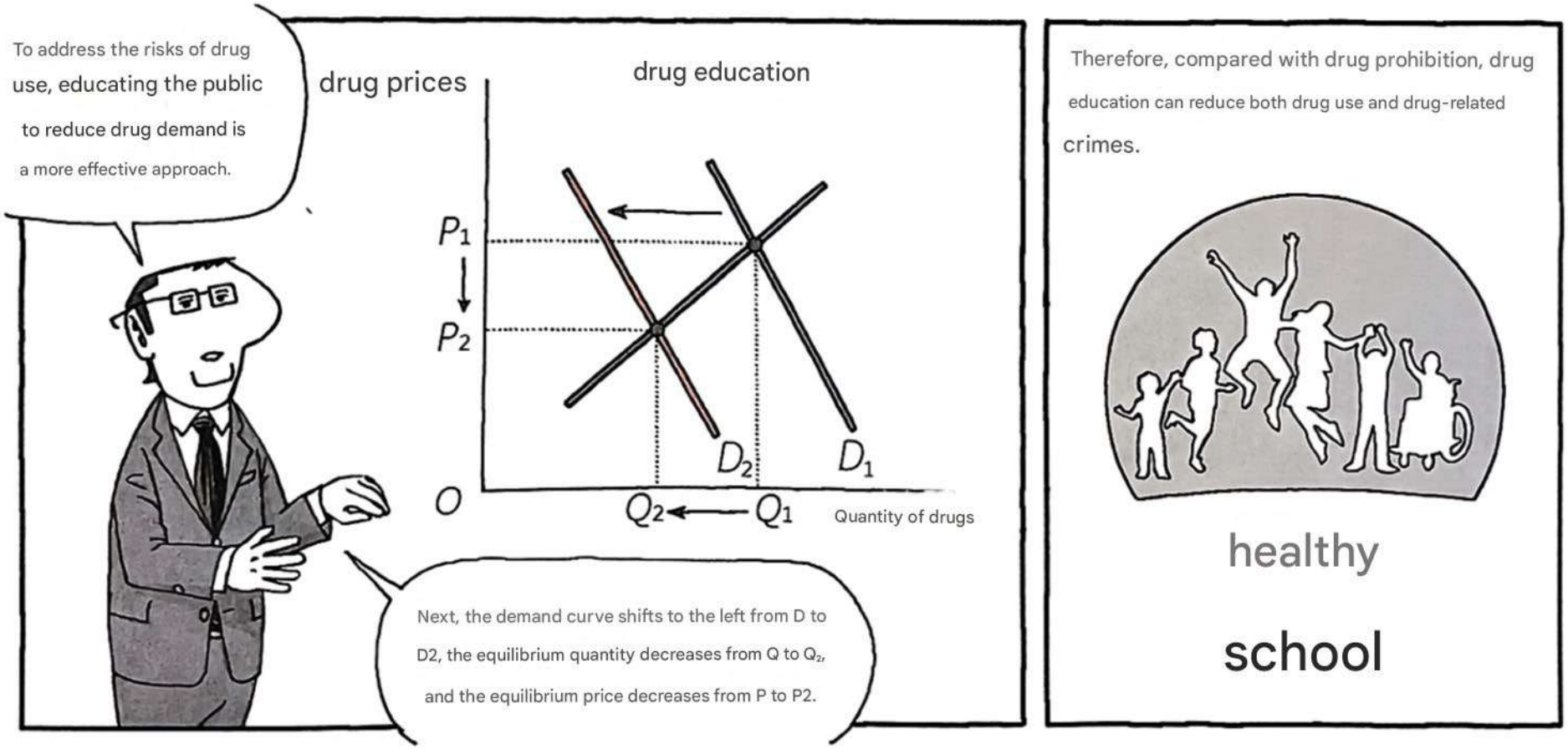

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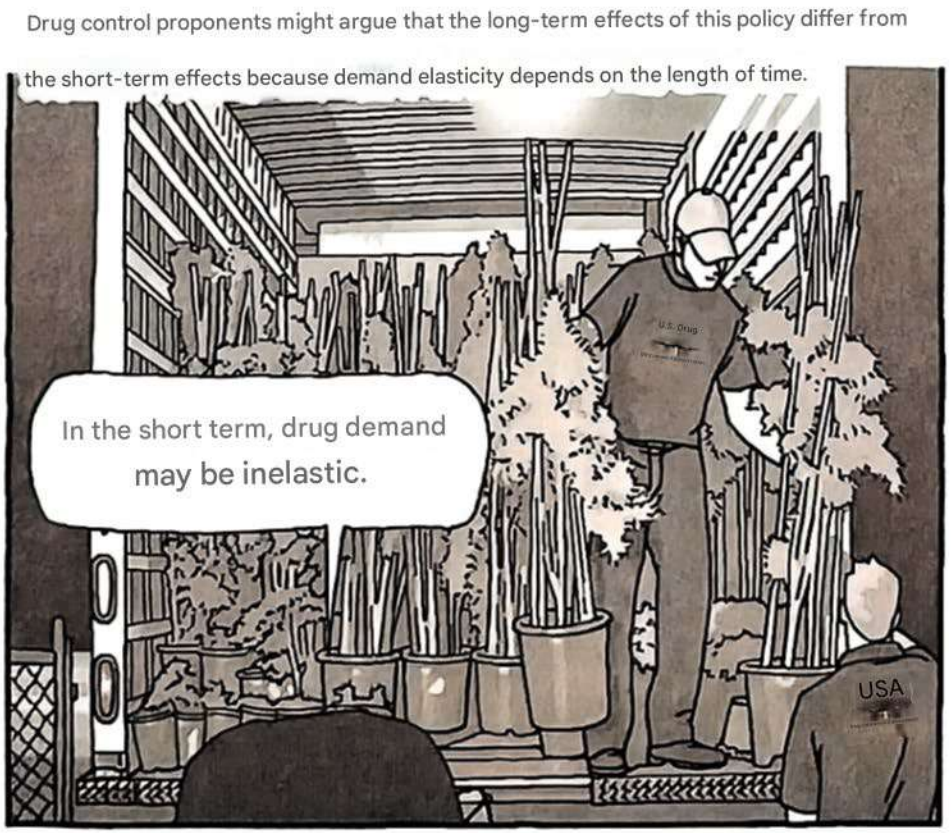

SUMMARY

- Is good news for agriculture bad news for farmers?
  - The discovery of new wheat hybrids shifts the supply curve to the right, but the demand curve remains unchanged. Therefore, at any given price level, consumer willingness to buy wheat products is unaffected. Because wheat demand is inelastic, the increase in supply is less than the decrease in price, thus reducing farmers' total revenue.

SUMMARY

- Why couldn't OPEC, the international oil cartel, maintain high oil prices?
  - The impact of reduced oil supply on the oil market can differ in the short and long run. In the short run, both oil supply and demand are relatively inelastic. Supply is inelastic because known oil reserves and extraction capacity cannot be changed rapidly; demand is also inelastic because purchasing habits do not immediately respond to price changes. Therefore, the short-run supply and demand curves are inelastic, and when oil supply shifts to the left, it causes a sharp price increase.
  - In the long run, the situation is quite different. For a long time, oil producers outside OPEC have responded to high oil prices by increasing oil exploration and building new extraction capacity. Consumers have responded by becoming more frugal, such as replacing old, inefficient cars with new, more efficient ones. Therefore, in the long run, the oil supply and demand curves are more elastic, and changes in the supply curve result in minimal price increases.

SUMMARY

- Does drug control increase or decrease drug-related crime?
  - When governments prevent certain drugs from entering the country and arrest smugglers, this increases the cost of drug sales, thus reducing the supply of drugs at any given price level. However, drug demand—the quantity buyers want to purchase at any given price level—remains unchanged. Addicts who quit due to rising drug prices are relatively rare, so drug demand is likely inelastic. If drug demand is inelastic, a price increase will increase the total revenue of the drug market.
- At first glance, these questions seem unrelated. However, all three questions relate to markets, and all markets are governed by the forces of supply and demand. Here, we use the versatile tools of supply, demand, and elasticity to answer these seemingly complex questions.

思考题

1. A life-saving drug with no close substitutes tends to have:

a. low demand elasticity

b. high demand elasticity

c. low supply elasticity

d. high supply elasticity

思考题

2. When the price of an item rises from $8 to $12, the quantity demanded falls from 110 units to 90 units. Using the midpoint method, the elasticity is:

a. 1/5

b. 1/2

c. 2

d. 5

思考题

3. A linear, downward-sloping demand curve is:

a. inelastic

b. unit elastic

c. elastic

d. inelastic at some points and elastic at others

思考题

4. The ability of firms to enter and exit a market over time means that in the long run,

a. the demand curve becomes more elastic

b. the demand curve becomes less elastic

c. the supply curve becomes more elastic

d. the supply curve becomes less elastic

思考题

5. If the supply of a good increases, the total revenue received by producers will decrease if _____.

a. the demand curve is inelastic

b. the demand curve is elastic

c. the supply curve is inelastic

d. the supply curve is elastic

思考题

6. Last month, the price of coffee increased sharply, but its quantity sold remained unchanged. Five people each gave the following explanations. Who is correct?

Tom: Demand increased, but supply is perfectly inelastic.

Dick: Demand increased, but it is perfectly inelastic.

Harry: Demand increased, but supply decreased at the same time.

Larry: Supply decreased, but demand is unit elastic.

Mary: Supply decreased, but demand is perfectly inelastic.

a. Tom, Dick, and Harry

b. Tom, Dick, and Mary

c. Tom, Harry, and Mary

d. Dick, Harry, and Larry

e. Dick, Harry, and Mary

思考题

7. A February 17, 1996 report in *The New York Times* stated that subway ridership declined after the fare increase: “In December 1995, the first full month after the token fare increased by 25 cents to $1.50, ridership decreased by nearly 4 million from the previous December, a drop of 4.3%.”

(1) Use these data to estimate the price elasticity of demand for subway rides.

(2) What happens to the Transit Authority’s revenue when fares increase?

(3) Why might estimates of elasticity be unreliable?

思考题

8. Consider public policies targeting smoking.

(1) Research shows that the price elasticity of demand for cigarettes is 0.4. If a pack of cigarettes currently costs $2, and the government wants to reduce smoking by 20%, by how much should the price increase?

(2) If the government permanently raises cigarette prices, will this policy have a greater impact on smoking one year or five years from now?

(3) Research also found that the price elasticity of demand is higher for teenagers than for adults. Why is this?