Chapter 6

Outline

- The Elasticity of Demand
- Applications of Demand Elasticity
- The Elasticity of Supply
- Applications of Supply Elasticity

Introduction

- In this chapter, we develop the tools of demand and supply elasticity.
- Estimating elasticity is the first step in *quantifying* how changes in demand and supply will affect prices and quantities.

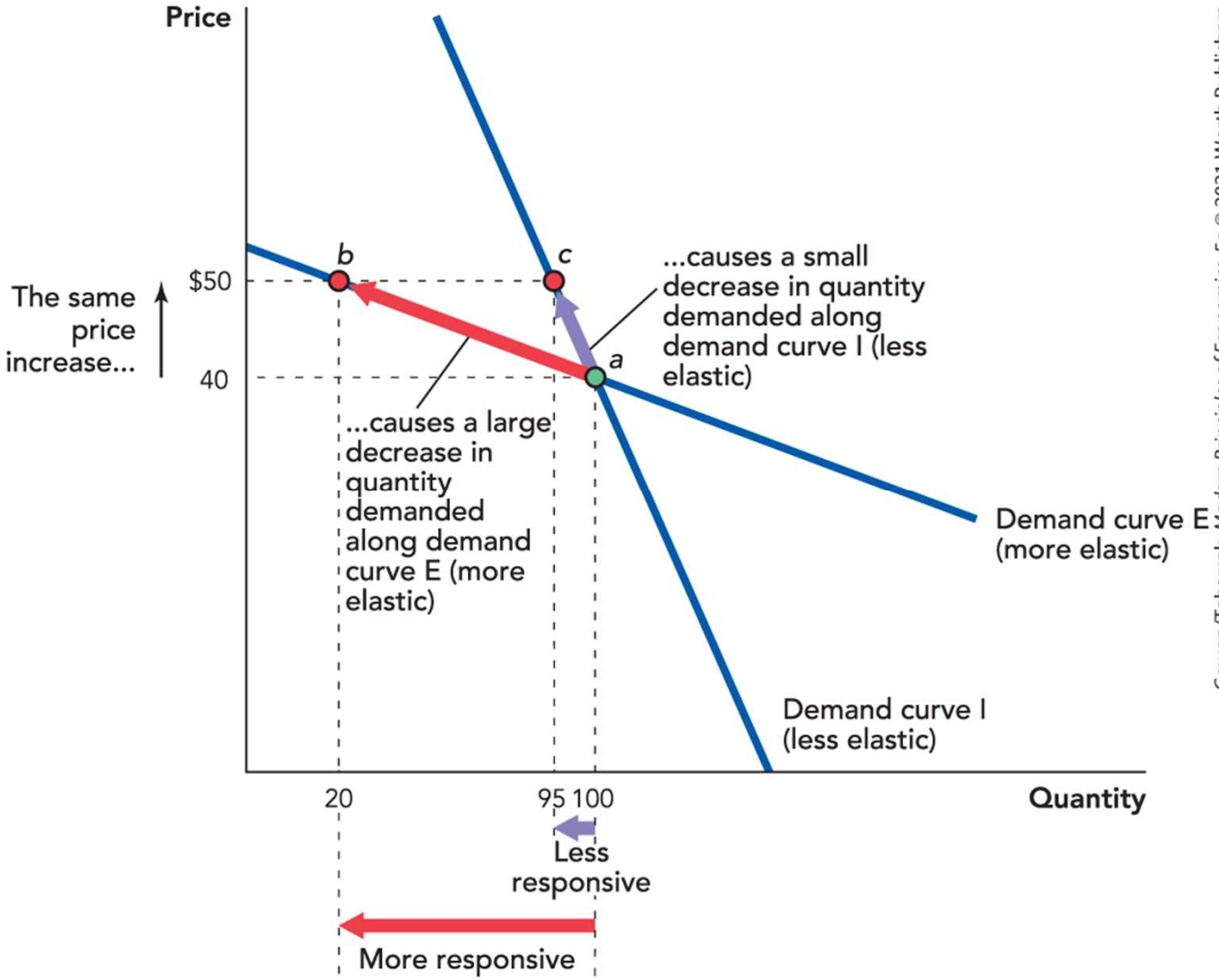
Definition

- **Elasticity of Demand:**
  - *Measures how responsive the quantity demanded is to a change in price.*
  - *More responsive = more elastic.*

Elasticity of Demand

- Elasticity is not the same as slope, but they are related.

- **Elasticity rule:** If two linear demand (or supply) curves run through a common point, then the curve that is flatter is more elastic.



Determinants of Elasticity of Demand

Less Elastic	More Elastic
Fewer substitutes	More substitutes
Short run (less time)	Long run (more time)
Categories of product	Specific brands
Necessities	Luxuries
Small part of budget	Large part of budget

Calculating the Elasticity of Demand

Formula for elasticity of demand:

$$E_d = \frac{\text{Percentage change in quantity demand}}{\text{Percentage change in price}}$$

$$= \frac{\%\Delta\ Q_{\text{Demanded}}}{\%\Delta\ P}$$

Calculating the Elasticity of Demand

Usually interpreted using the absolute value (drop the minus sign)

$$|E_d| > 1 = \text{Elastic}$$

$$|E_d| < 1 = \text{Inelastic}$$

$$|E_d| = 1 = \text{Unit Elastic}$$

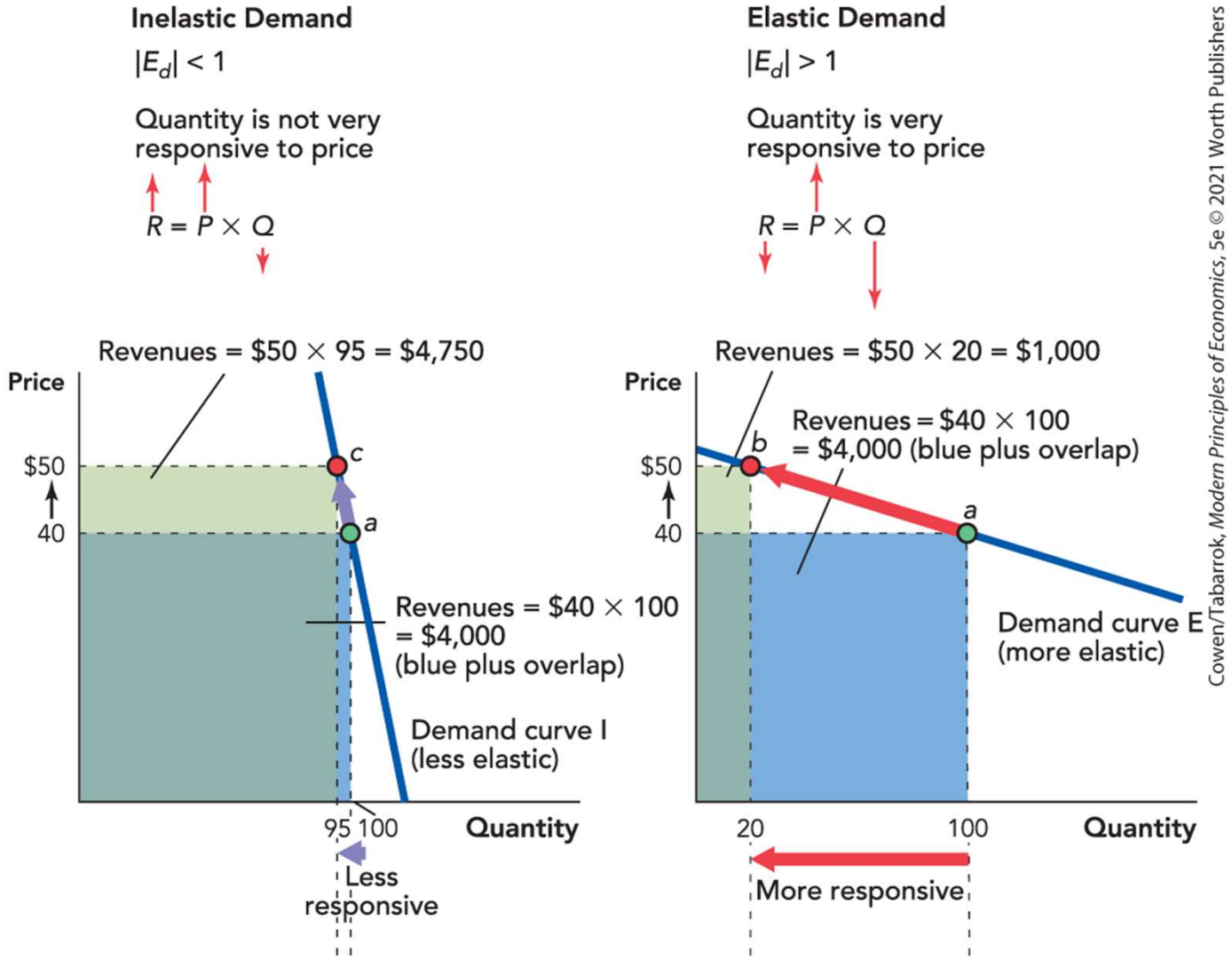
Total Revenues and Elasticity

- A firm's revenues = price per unit × quantity sold.

Revenue = Price × Quantity, or $R = P \times Q$

- Elasticity measures how much Q goes down when P goes up.

Total Revenues and Elasticity



Total Revenues and Elasticity

Summary: Absolute Value of E_d	Summary: Elasticity	Summary: Total Revenue and Price
$\|E_d\| < 1$	Inelastic	*TR* and *P* move together
$\|E_d\| > 1$	Elastic	*TR* and *P* move in opposite directions
$\|E_d\| = 1$	Unit elastic	*P* changes but *TR* remains the same

Self-Check

If the price elasticity of demand for wine is 1.2, and the price of wine increases, the total revenues of the wine industry would:

a. increase.

b. decrease.

c. remain the same.

Self-Check (Answer)

If the price elasticity of demand for wine is 1.2, and the price of wine increases, the total revenues of the wine industry would:

a. increase.

b. decrease.

c. remain the same.

Answer:

b. Demand is elastic, so a price increase would cause revenues to decrease.

Applications of Demand Elasticity

- Productivity has increased in both farming and computer chips.
- Farming revenues have declined, while revenues for computer chips have increased.
- Demand for food is inelastic, while demand for computer chips is elastic.

Self-Check

If demand for iPhones is inelastic, an increased supply of iPhones would result in:

a. increased revenues.

b. decreased revenues.

c. unchanged revenues.

Self-Check

If demand for iPhones is inelastic, an increased supply of iPhones would result in:

a. increased revenues.

b. decreased revenues.

c. unchanged revenues.

Answer:

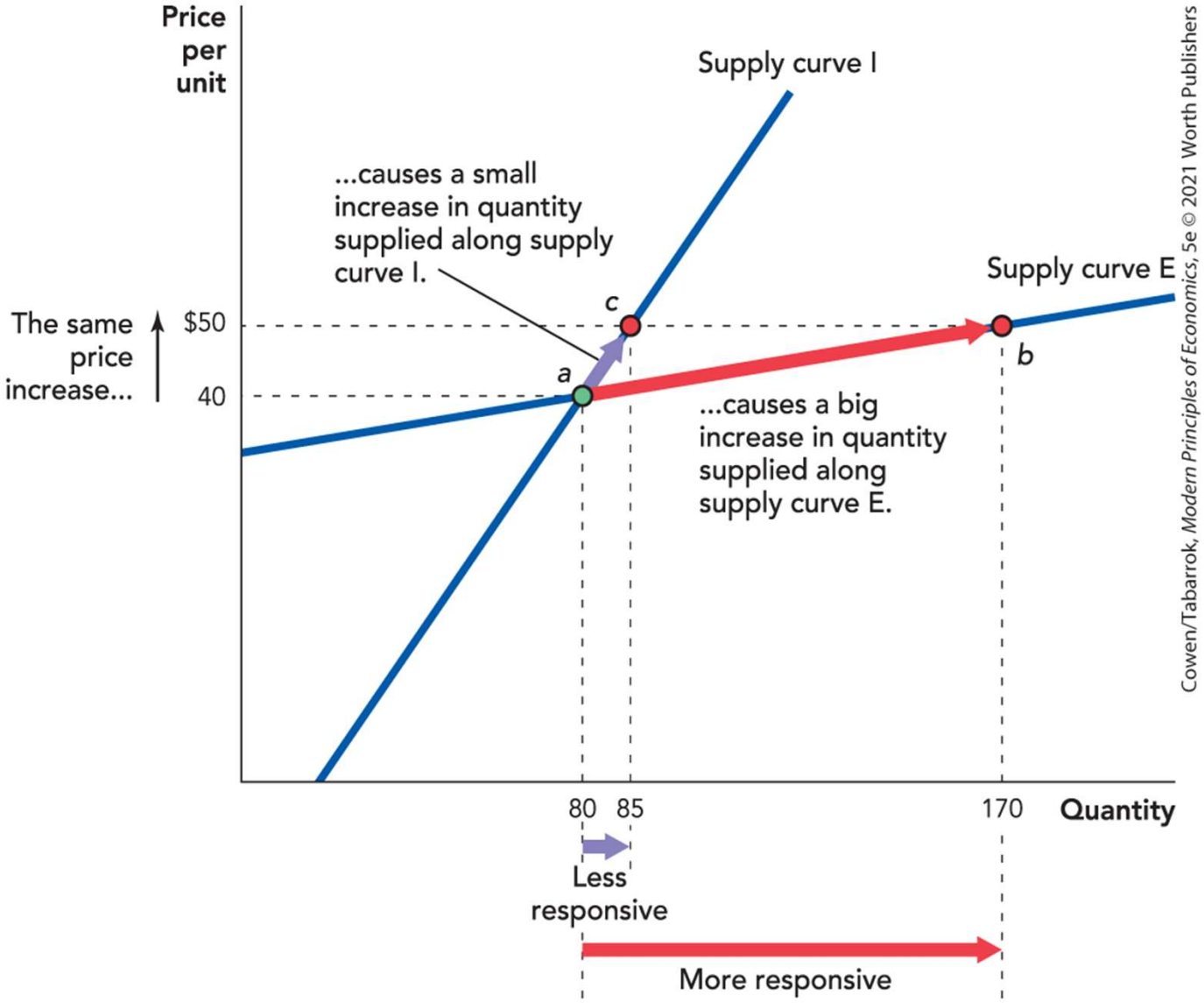
b. The increase in quantity sold would be offset by a much larger decrease in price.

Definition

- **Elasticity of Supply:**
  - *Measures how responsive the quantity supplied is to a change in price.*

Elasticity of Supply

When price increases from $40 to $50:



Determinants of the Elasticity of Supply

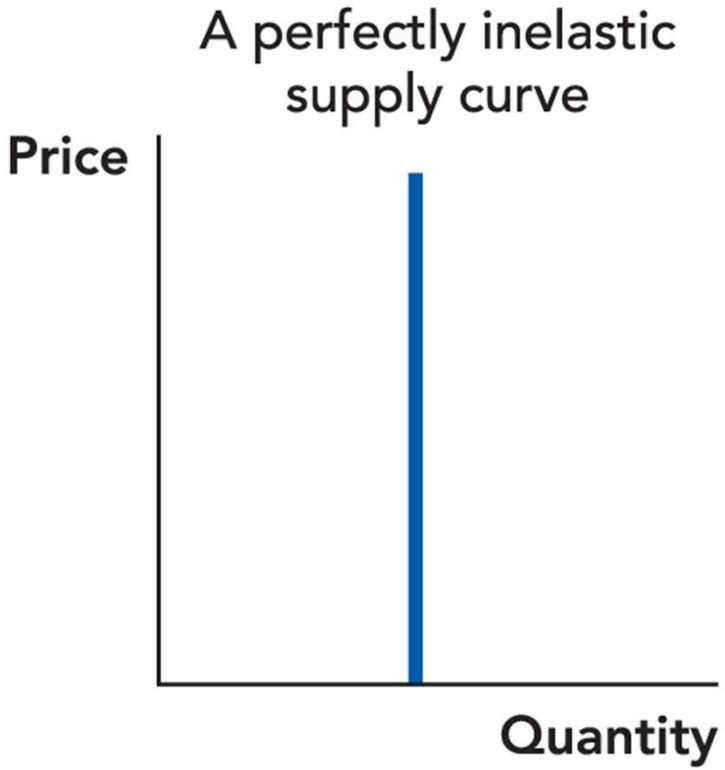
- The fundamental determinant is how quickly per-unit costs increase with an increase in production.
  - If increased production requires much higher per-unit costs, then supply will be inelastic.
  - If production can increase without increasing per-unit costs very much, then supply will be elastic.

Determinants of the Elasticity of Supply

Less Elastic	More Elastic
Difficult to increase production at constant unit cost (e.g., some raw materials)	Easy to increase production at constant unit cost (e.g., some manufactured goods)
Large share of market for inputs	Small share of market for inputs
Global supply	Local supply
Short run	Long run

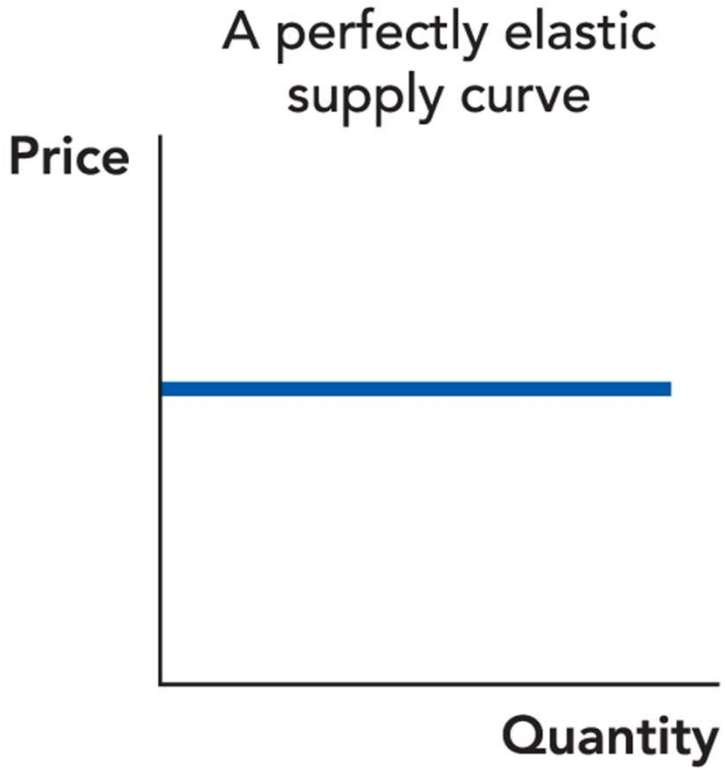
Determinants of the Elasticity of Supply

Picasso painting



The supply of Picasso paintings is very inelastic.

Toothpicks



The supply of toothpicks is very elastic.

Self-Check

Would the supply of roofing nails in Fargo, North Dakota, be relatively elastic or inelastic?

a. elastic

b. inelastic

Self-Check (Answer)

Would the supply of roofing nails in Fargo, North Dakota, be relatively elastic or inelastic?

a. elastic

b. inelastic

Answer:

a. It would be easy to increase production at constant unit cost; nails are a small share of the market for galvanized steel; and the local supply in Fargo is more elastic than the global supply.

Calculating the Elasticity of Supply

Formula for elasticity of supply:

$$E_s = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in price}}$$

$$= \frac{\%\Delta Q_{\text{Supplied}}}{\%\Delta P}$$

Using Elasticities for Quick Predictions

Two useful price-change formulas:

$$\%\Delta \text{ Price from a shift in demand} = \frac{\Delta\%\text{Demand}}{|E_d| + E_s}$$

$$\%\Delta \text{ Price from a shift in supply} = \frac{\Delta\%\text{Supply}}{|E_d| + E_s}$$

Using Elasticities for Quick Predictions

Drilling for oil in the Arctic National Wildlife Refuge:

- Estimated ↑ in production = 800,000 barrels/day
- Equals a 1% ↑ in world production
- $E_d = -0.5$; $E_s = 0.3$