



Elasticity and Its Applications

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Elasticity and Its Applications

The elasticity of demand

The price elasticity of demand and its Determinants

- ✓ Availability of close substitutes
- ✓ Necessities versus Luxuries
- ✓ Definition of Market
- ✓ Time horizon

The price elasticity of demand

$$E_d = \frac{\Delta D / D}{\Delta P / P}$$

The variety of demand curves

Figure 1 The Price Elasticity of Demand

(a) Perfectly Inelastic Demand: Elasticity Equals 0

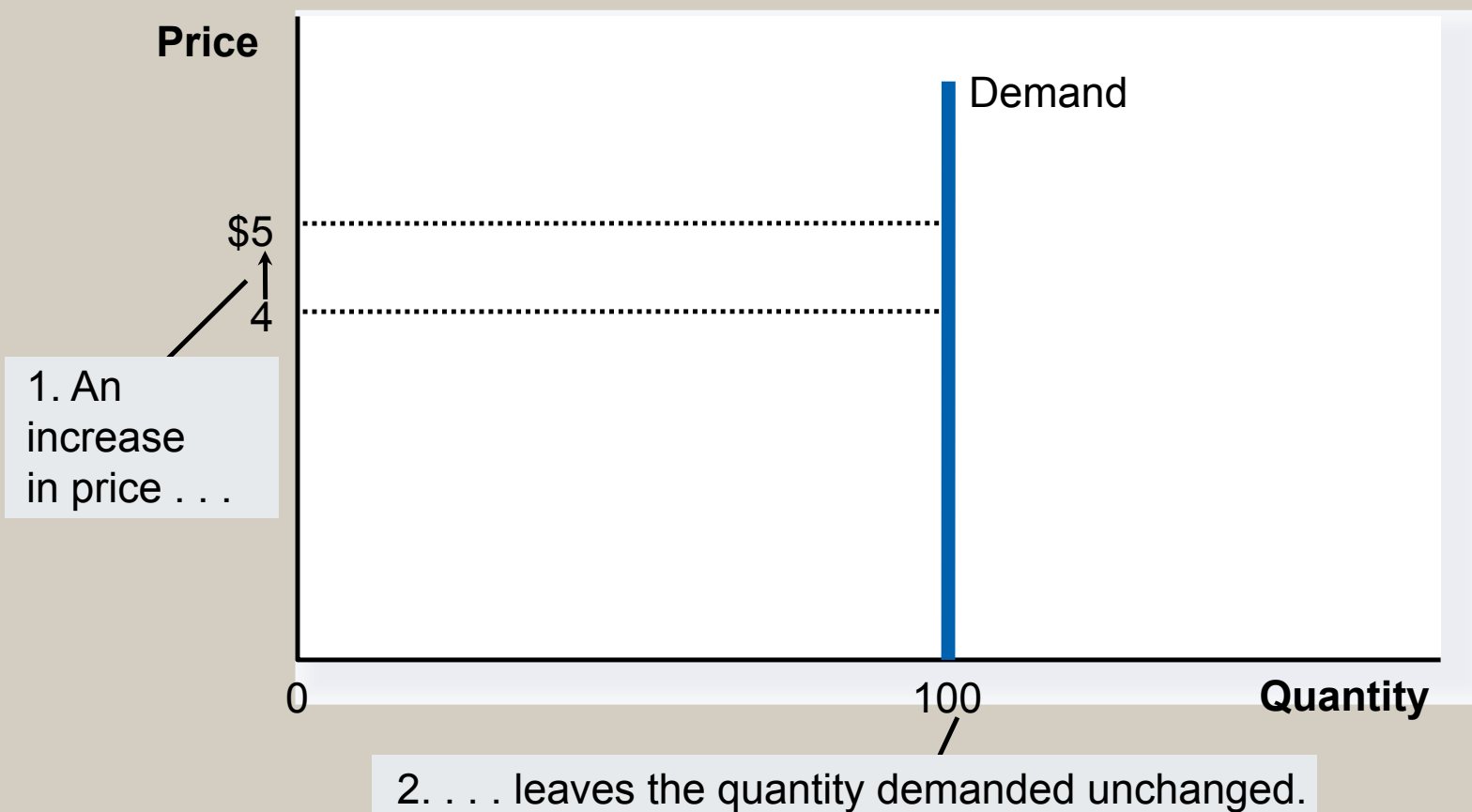


Figure 1 The Price Elasticity of Demand

(b) Inelastic Demand: Elasticity Is Less Than 1

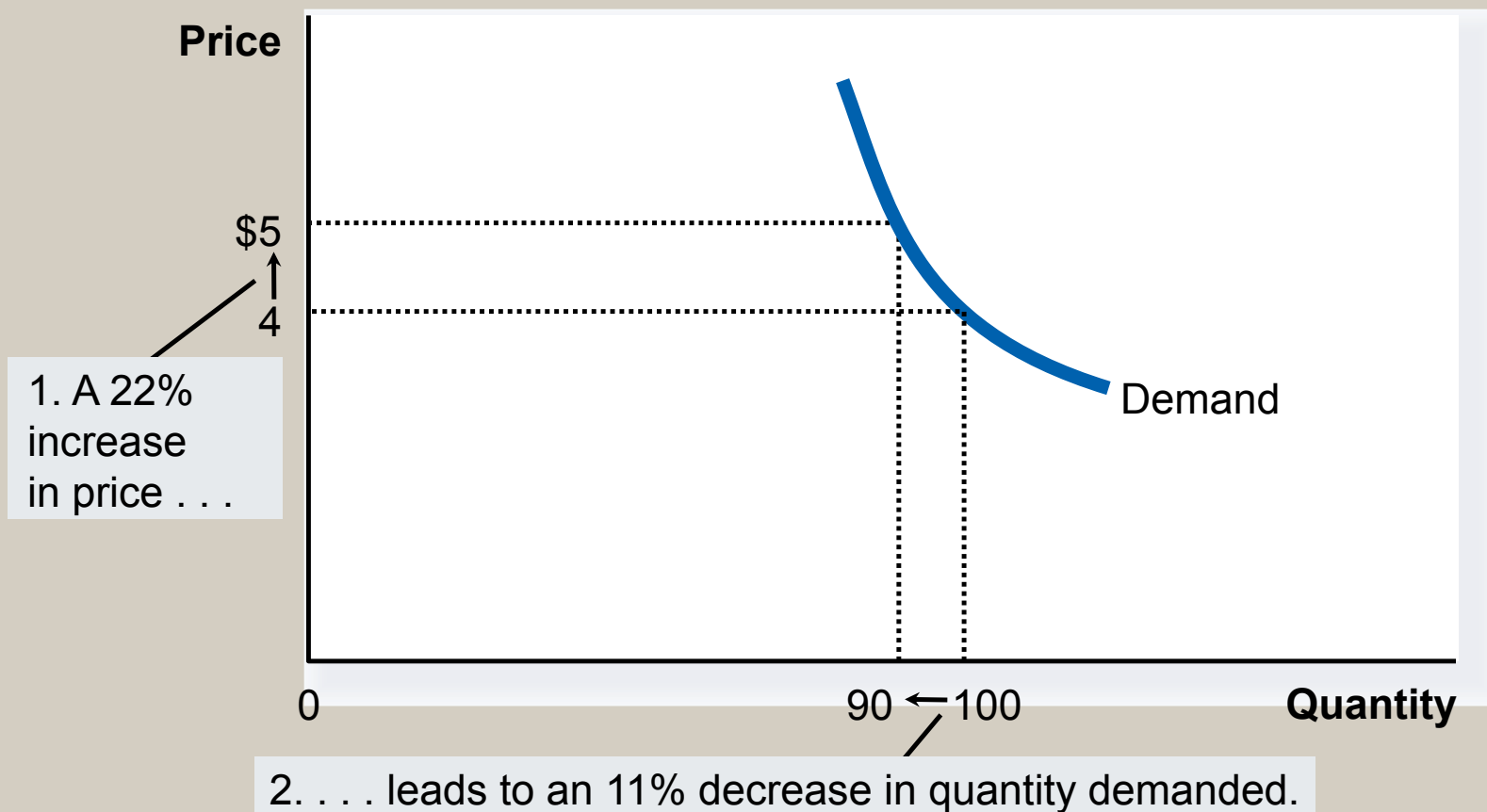


Figure 1 The Price Elasticity of Demand

(c) Unit Elastic Demand: Elasticity Equals 1

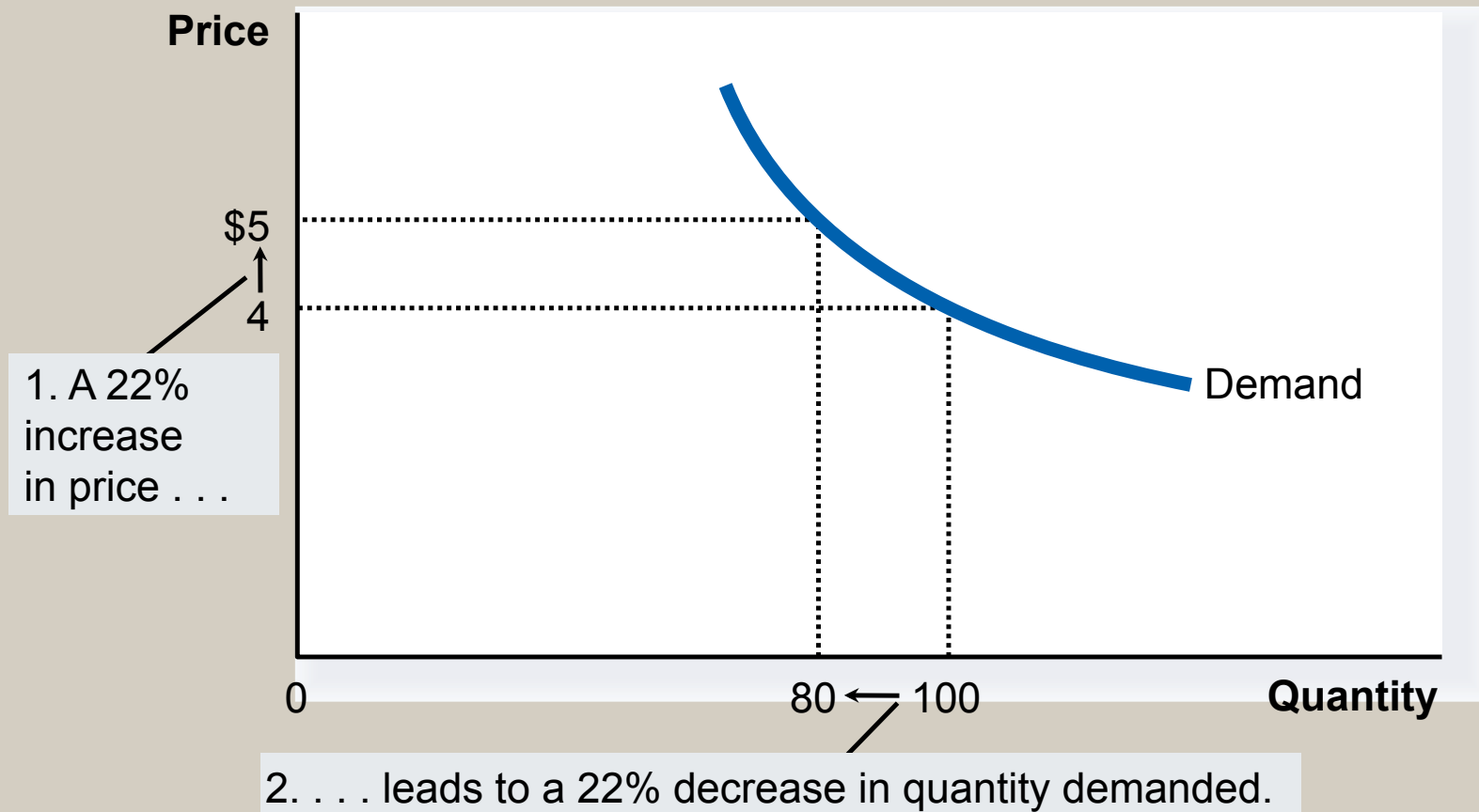


Figure 1 The Price Elasticity of Demand

(d) Elastic Demand: Elasticity Is Greater Than 1

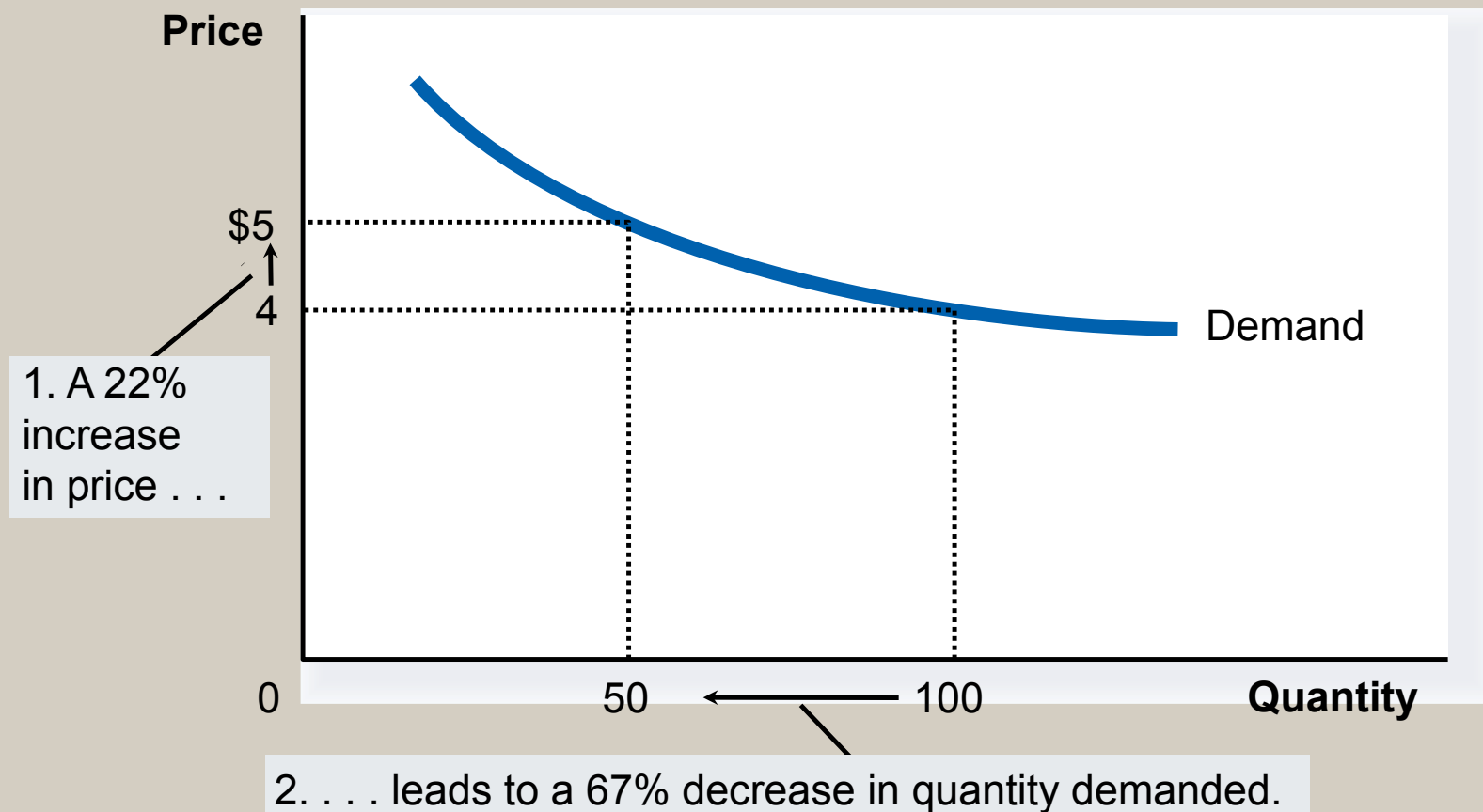
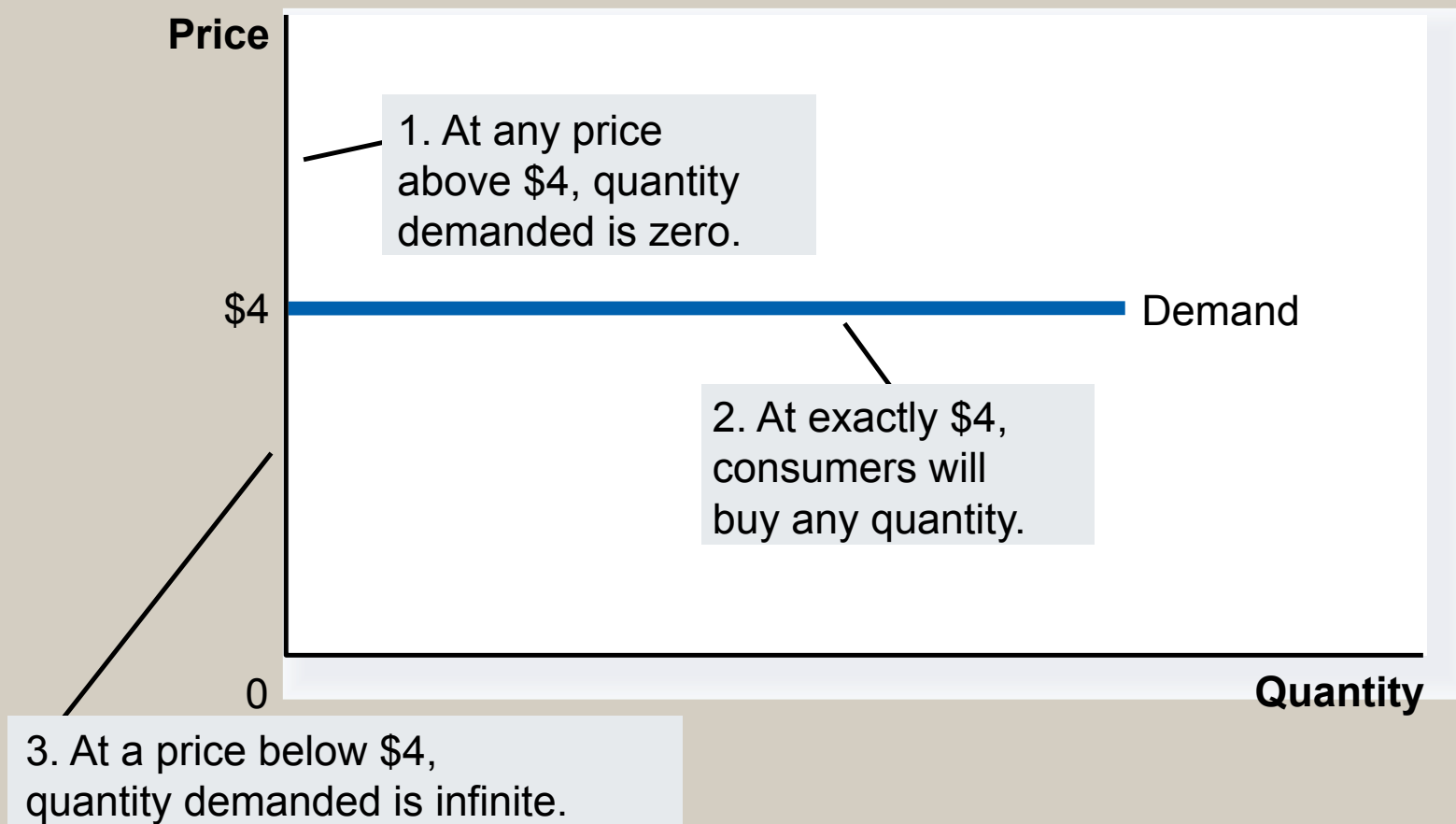


Figure 1 The Price Elasticity of Demand

(e) Perfectly Elastic Demand: Elasticity Equals Infinity



Total Revenue and the Price Elasticity of Demand

- *Total revenue* is the amount paid by buyers and received by sellers of a good.
- Computed as the price of the good times the quantity sold.

$$TR = P \times Q$$

Figure 2 Total Revenue

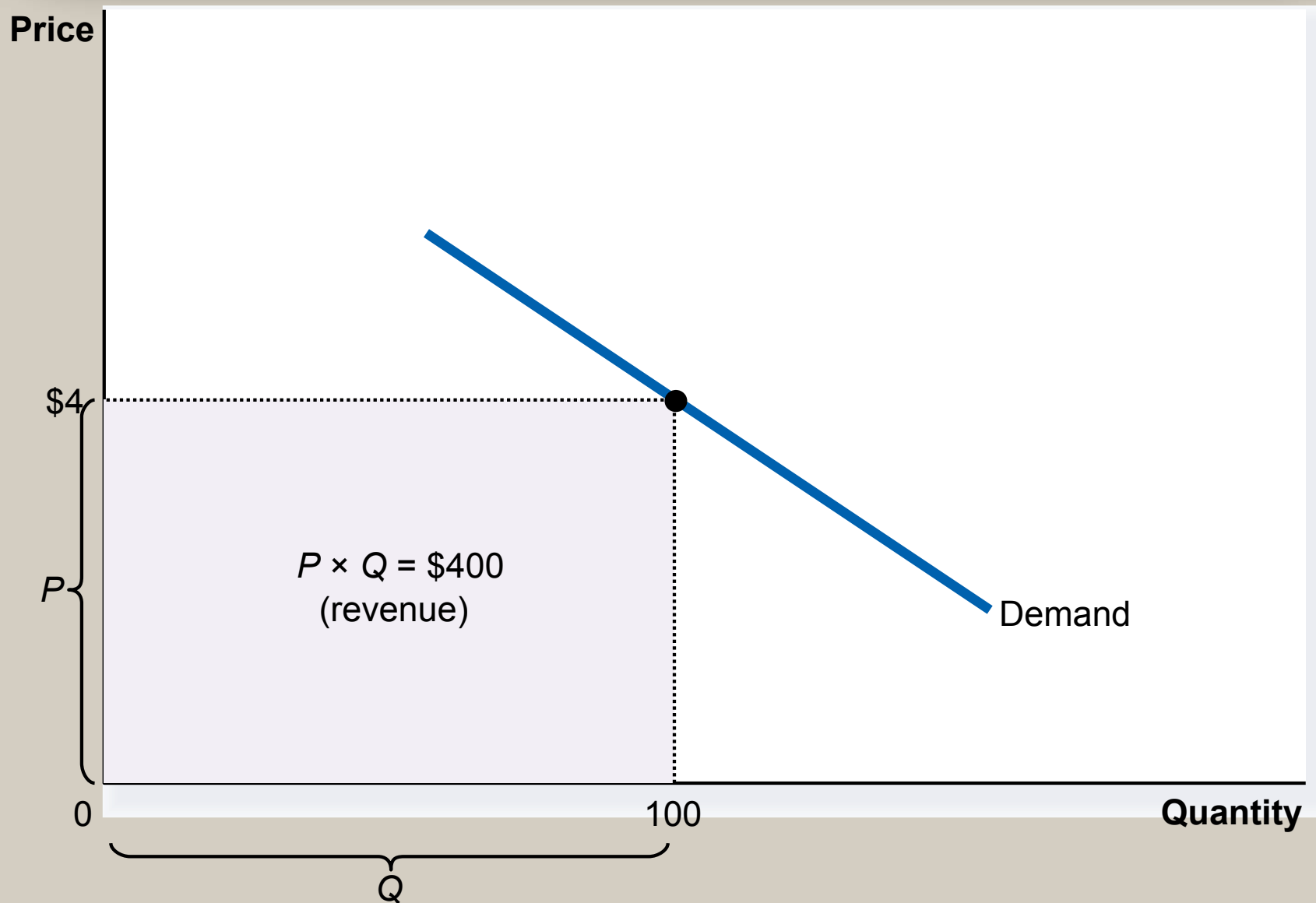
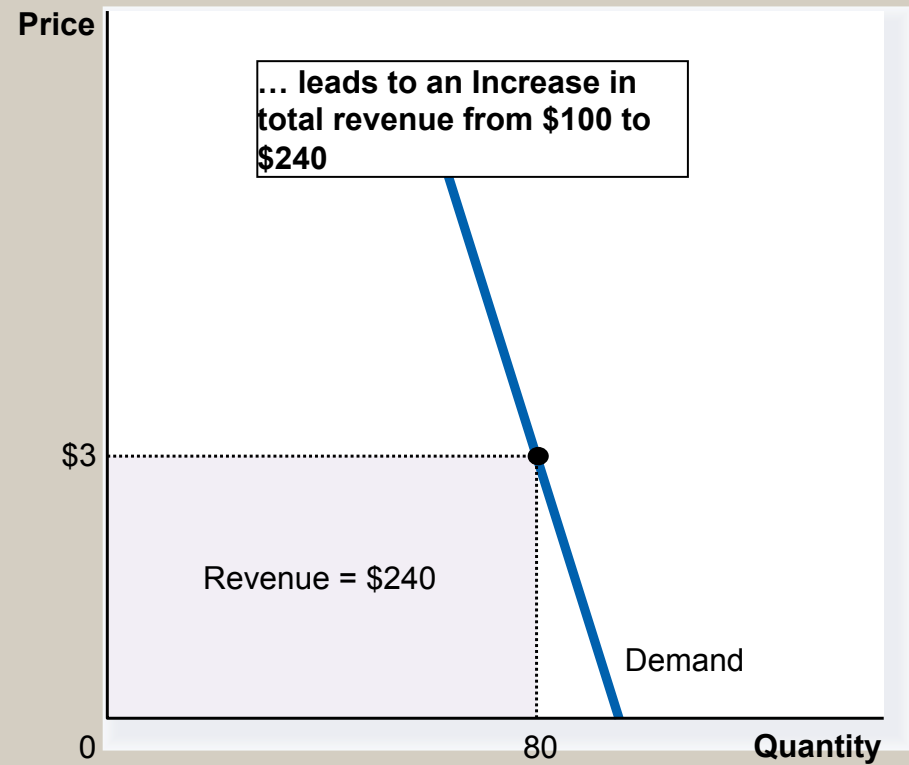
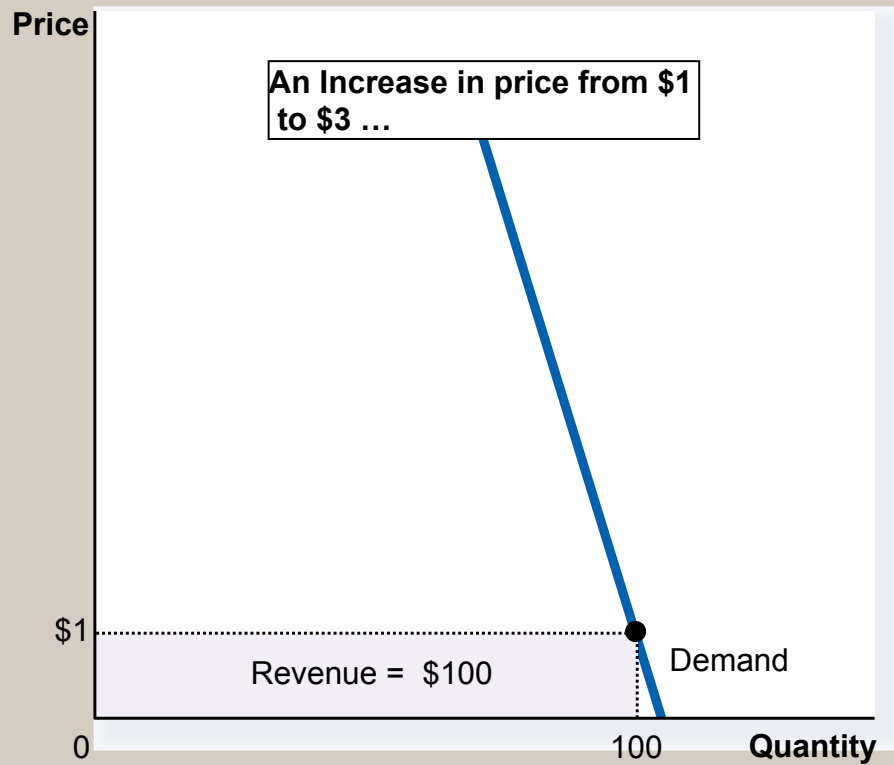


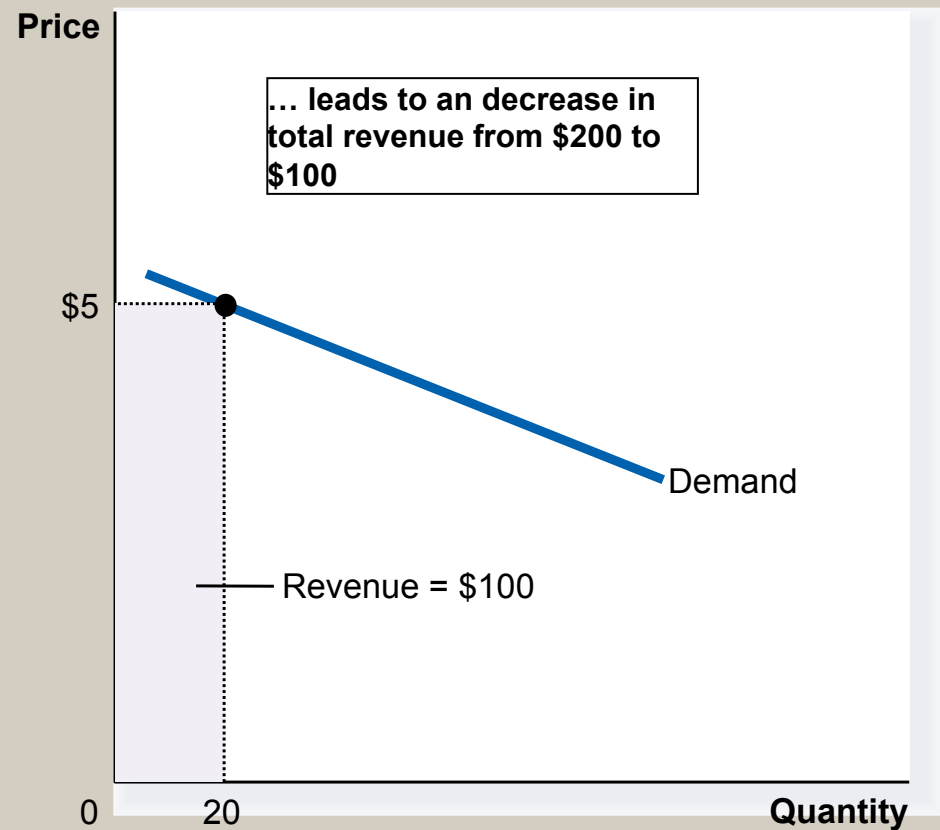
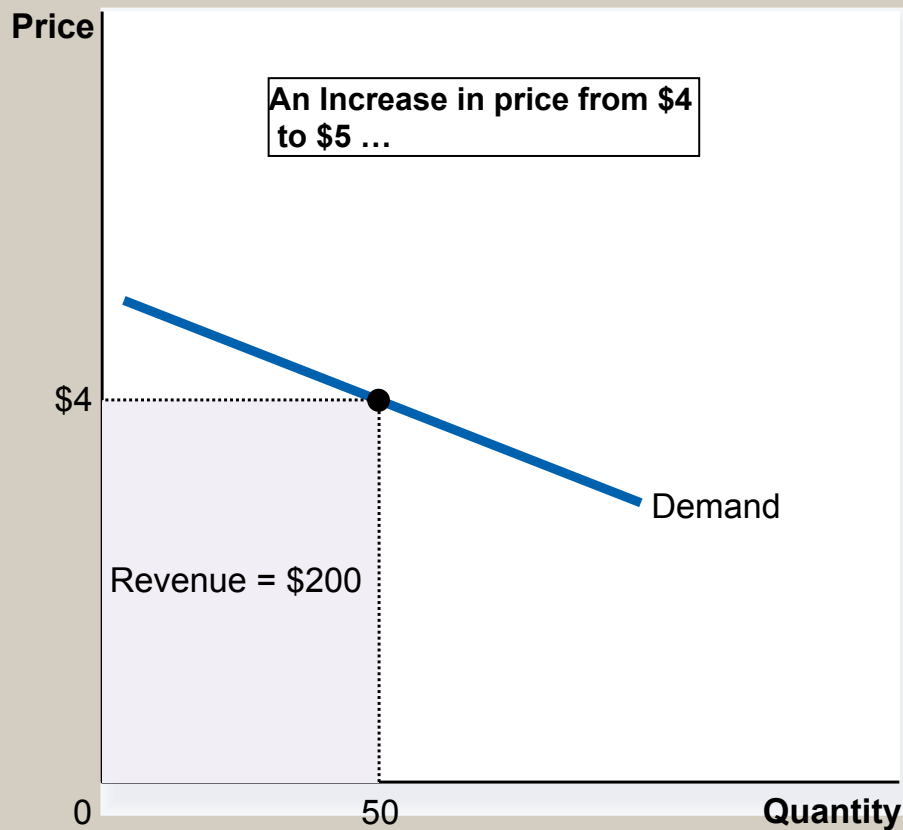
Figure 3 How Total Revenue Changes When Price Changes: Inelastic Demand



Elasticity and Total Revenue along a Linear Demand Curve

- With an elastic demand curve, an increase in the price leads to a decrease in quantity demanded that is proportionately larger. Thus, *total revenue decreases*.

Figure 4 How Total Revenue Changes When Price Changes: Elastic Demand



- The elasticity of Supply

The price elasticity of supply and its determinants

$$E_s = \frac{\Delta S / S}{\Delta P / P}$$

The variety of supply curves

Figure 6 The Price Elasticity of Supply

(a) Perfectly Inelastic Supply: Elasticity Equals 0

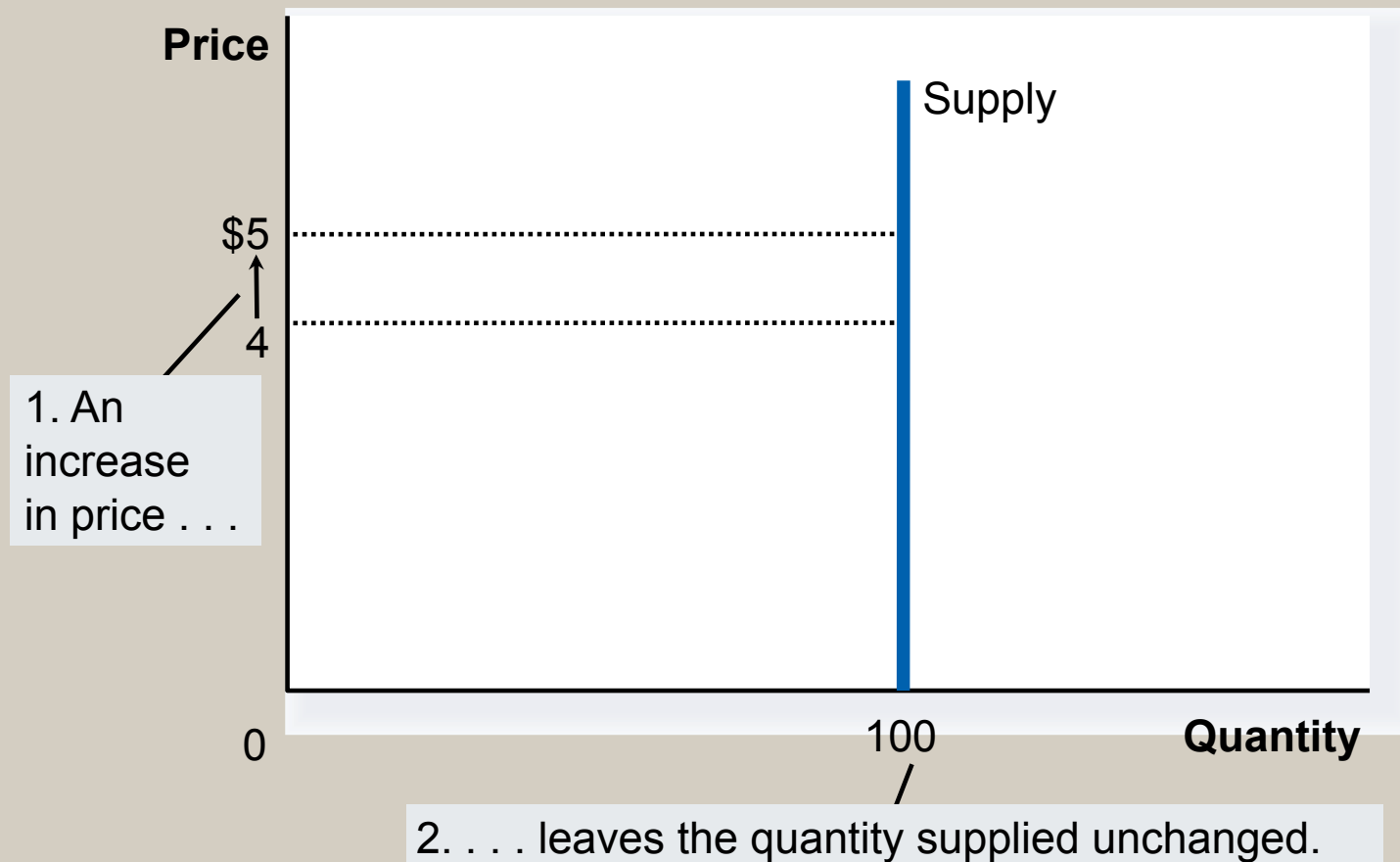


Figure 6 The Price Elasticity of Supply

(b) Inelastic Supply: Elasticity Is Less Than 1

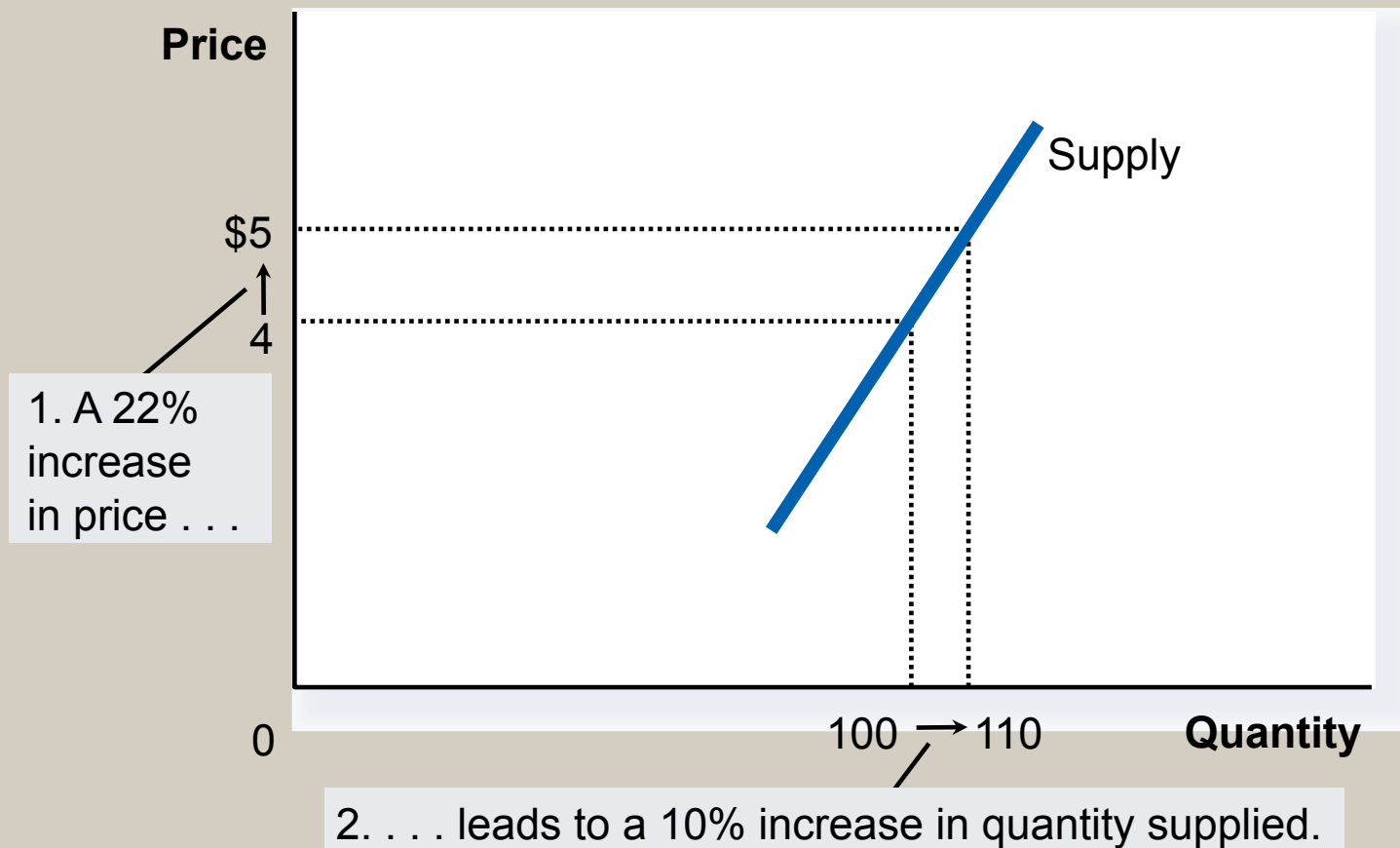


Figure 6 The Price Elasticity of Supply

(c) Unit Elastic Supply: Elasticity Equals 1

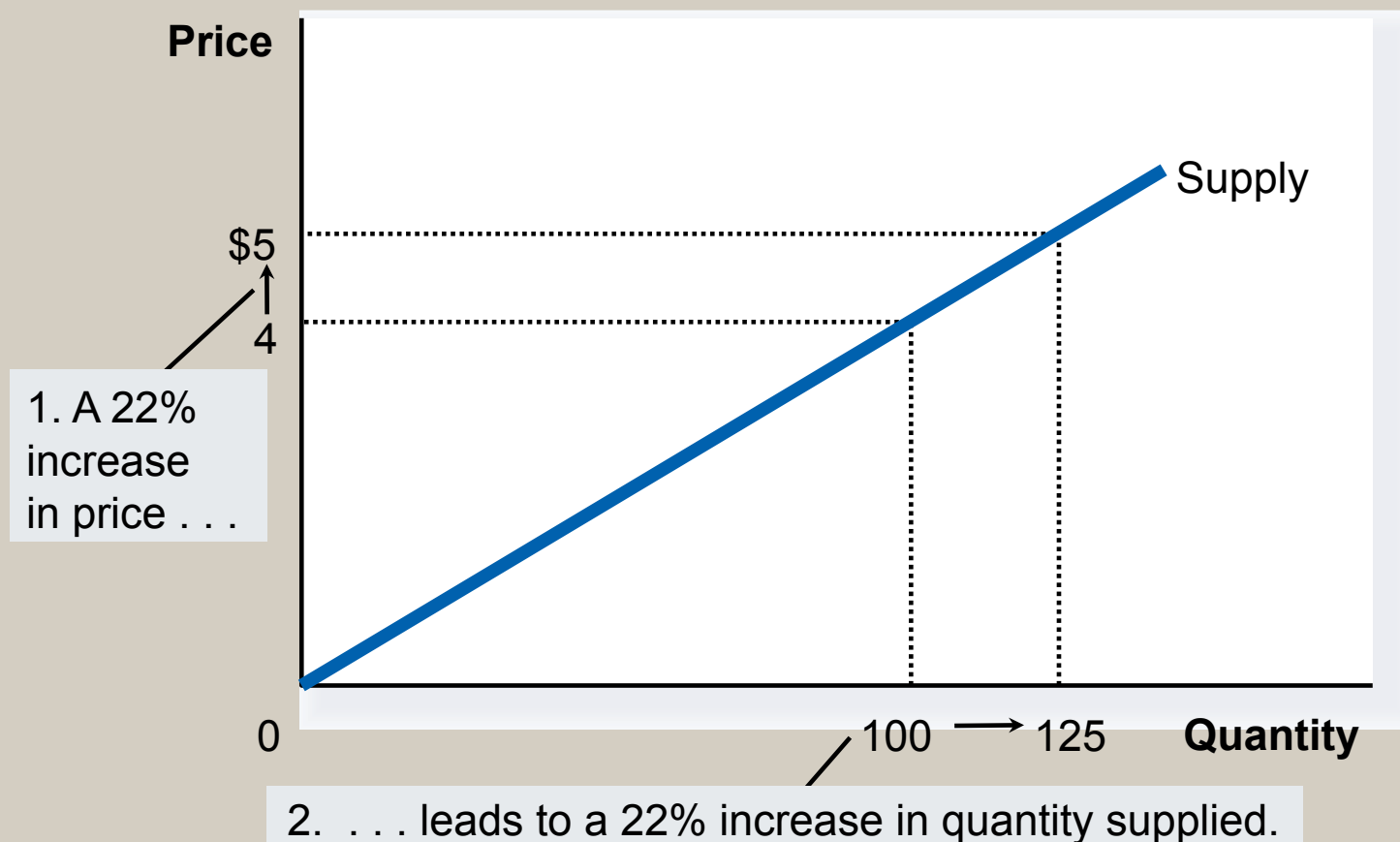


Figure 6 The Price Elasticity of Supply

(d) Elastic Supply: Elasticity Is Greater Than 1

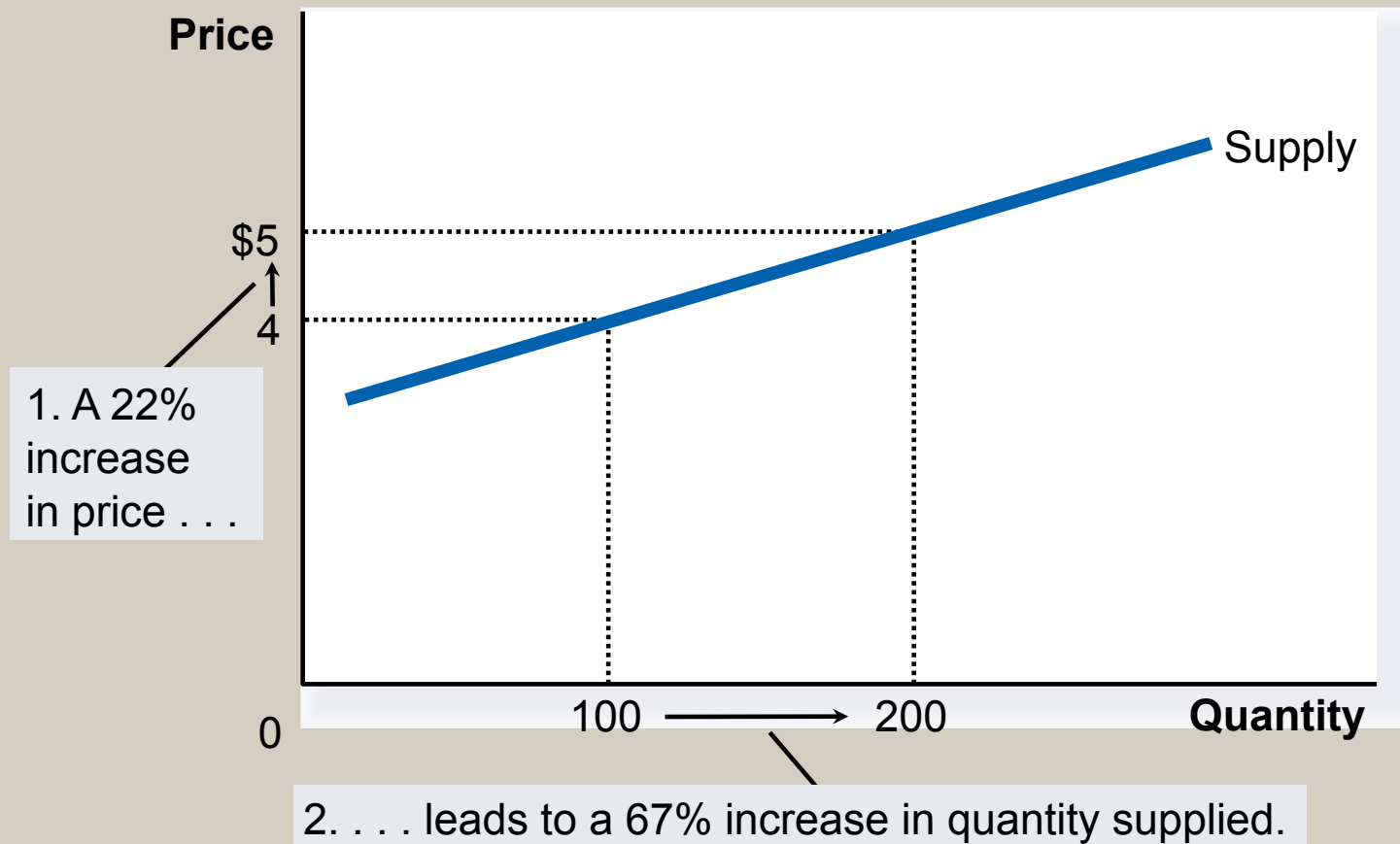
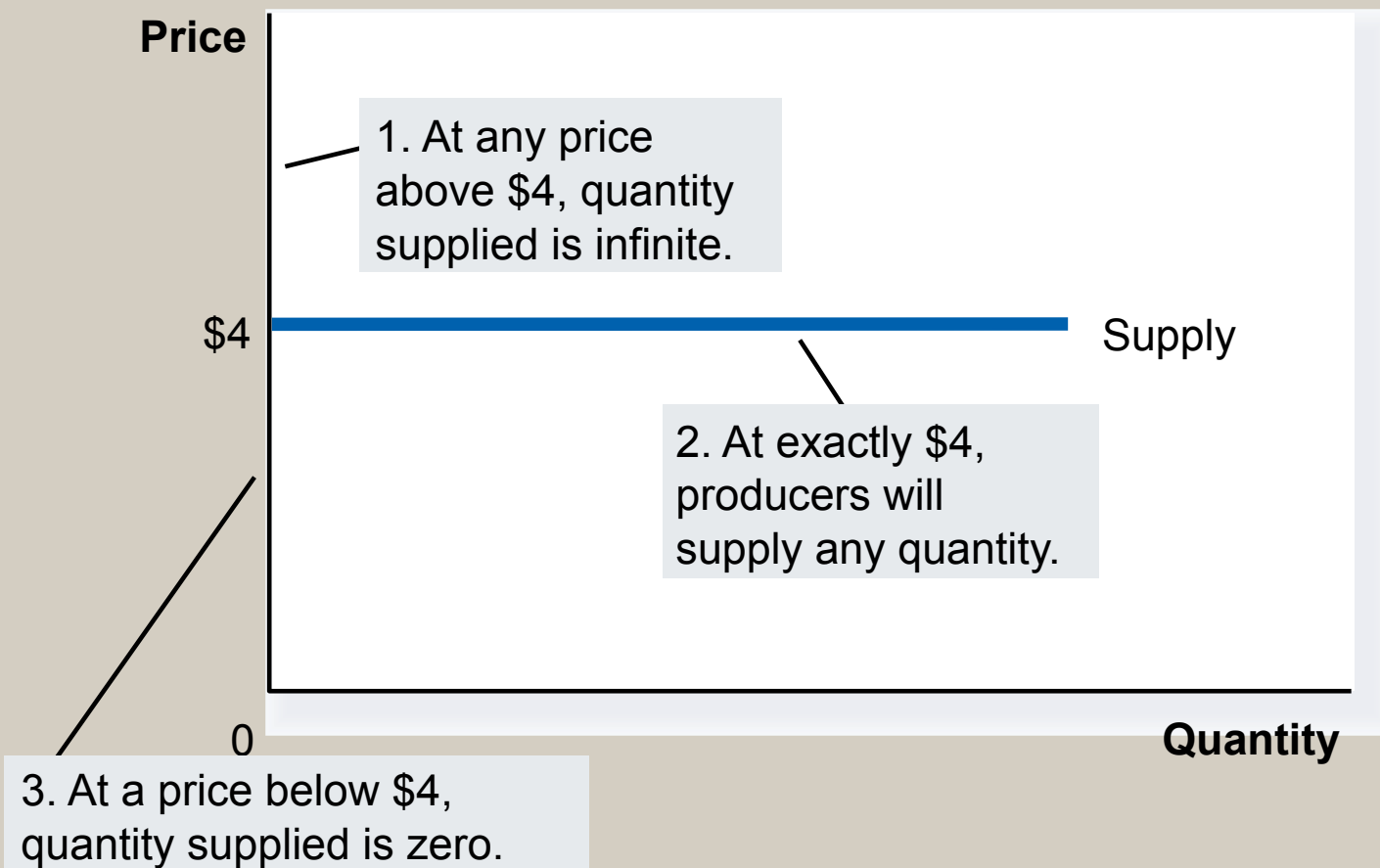


Figure 6 The Price Elasticity of Supply

(e) Perfectly Elastic Supply: Elasticity Equals Infinity



Determinants of Elasticity of Supply

- Ability of sellers to change the amount of the good they produce.
 - Beach-front land is inelastic.
 - Books, cars, or manufactured goods are elastic.
- Time period.
 - Supply is more elastic in the long run.

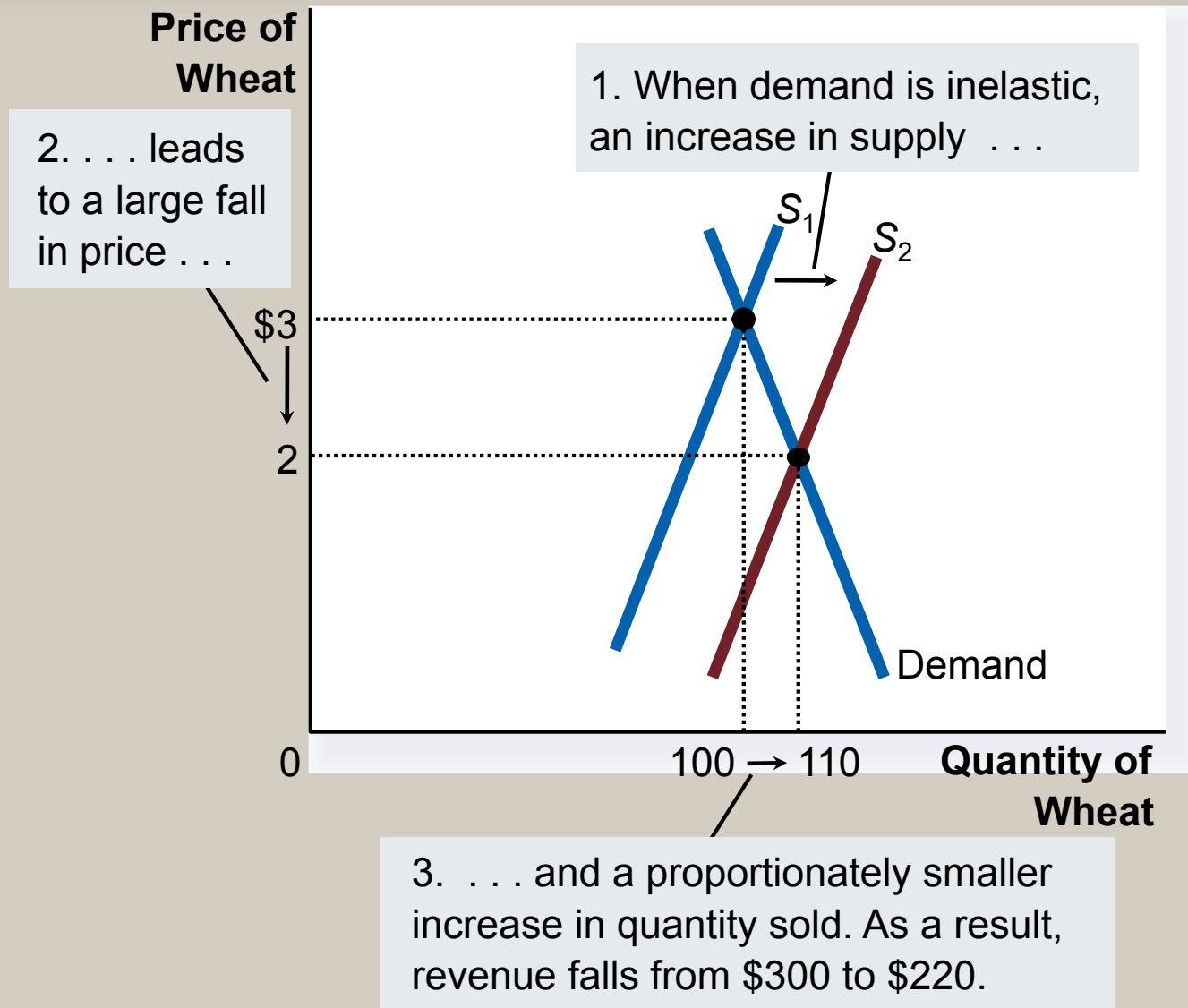
THREE APPLICATIONS OF SUPPLY, DEMAND, AND ELASTICITY

- Can good news for farming be bad news for farmers?
- What happens to wheat farmers and the market for wheat when university agronomists discover a new wheat hybrid that is more productive than existing varieties?

THREE APPLICATIONS OF SUPPLY, DEMAND, AND ELASTICITY

- Examine whether the supply or demand curve shifts.
- Determine the direction of the shift of the curve.
- Use the supply-and-demand diagram to see how the market equilibrium changes.

Figure 8 An Increase in Supply in the Market for Wheat



Compute the Price Elasticity of Supply

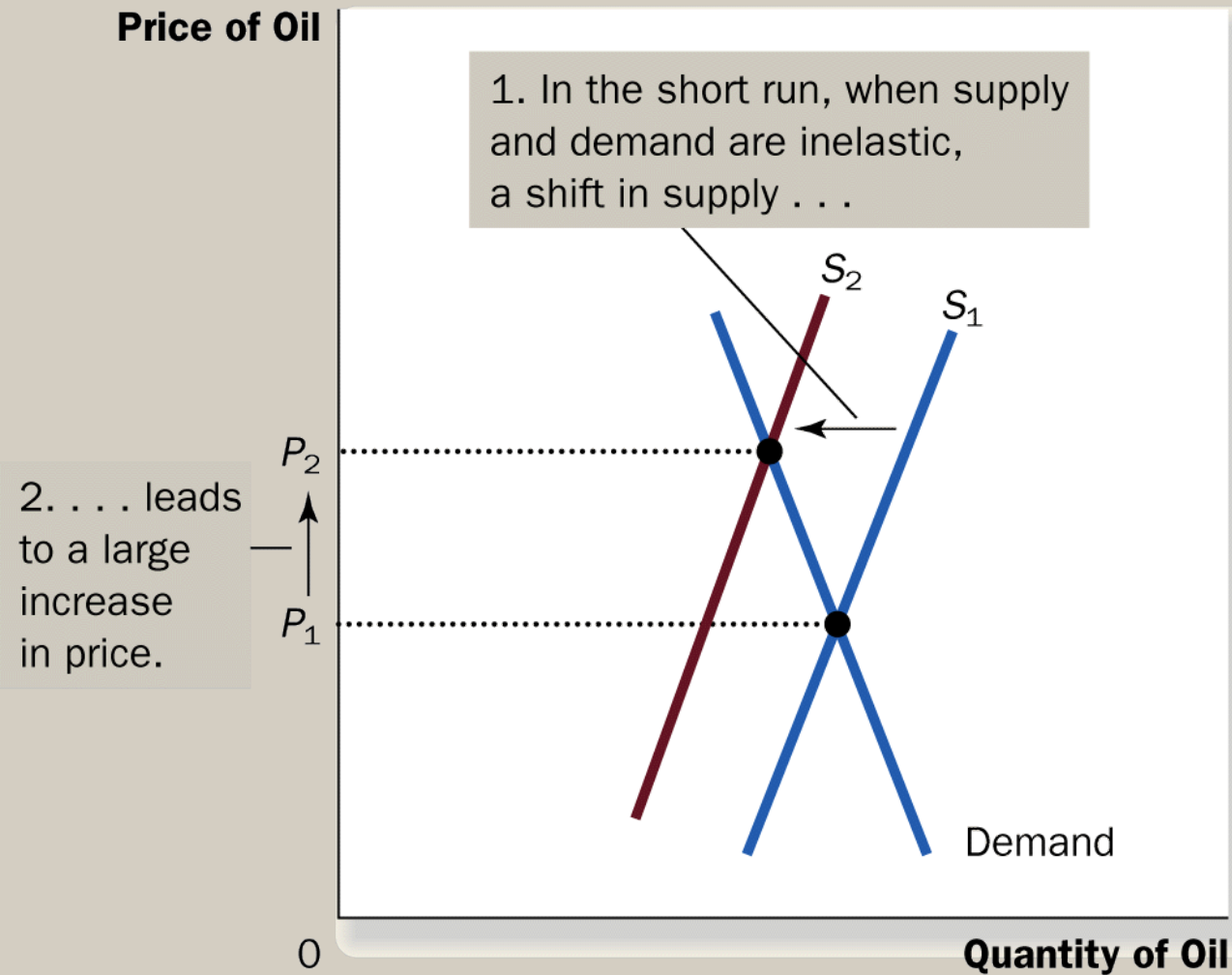
$$E_D = \frac{\frac{100 - 110}{(100 + 110) / 2}}{\frac{3.00 - 2.00}{(3.00 + 2.00) / 2}}$$

$$= \frac{-0.095}{0.4} \approx -0.24$$

Supply is inelastic

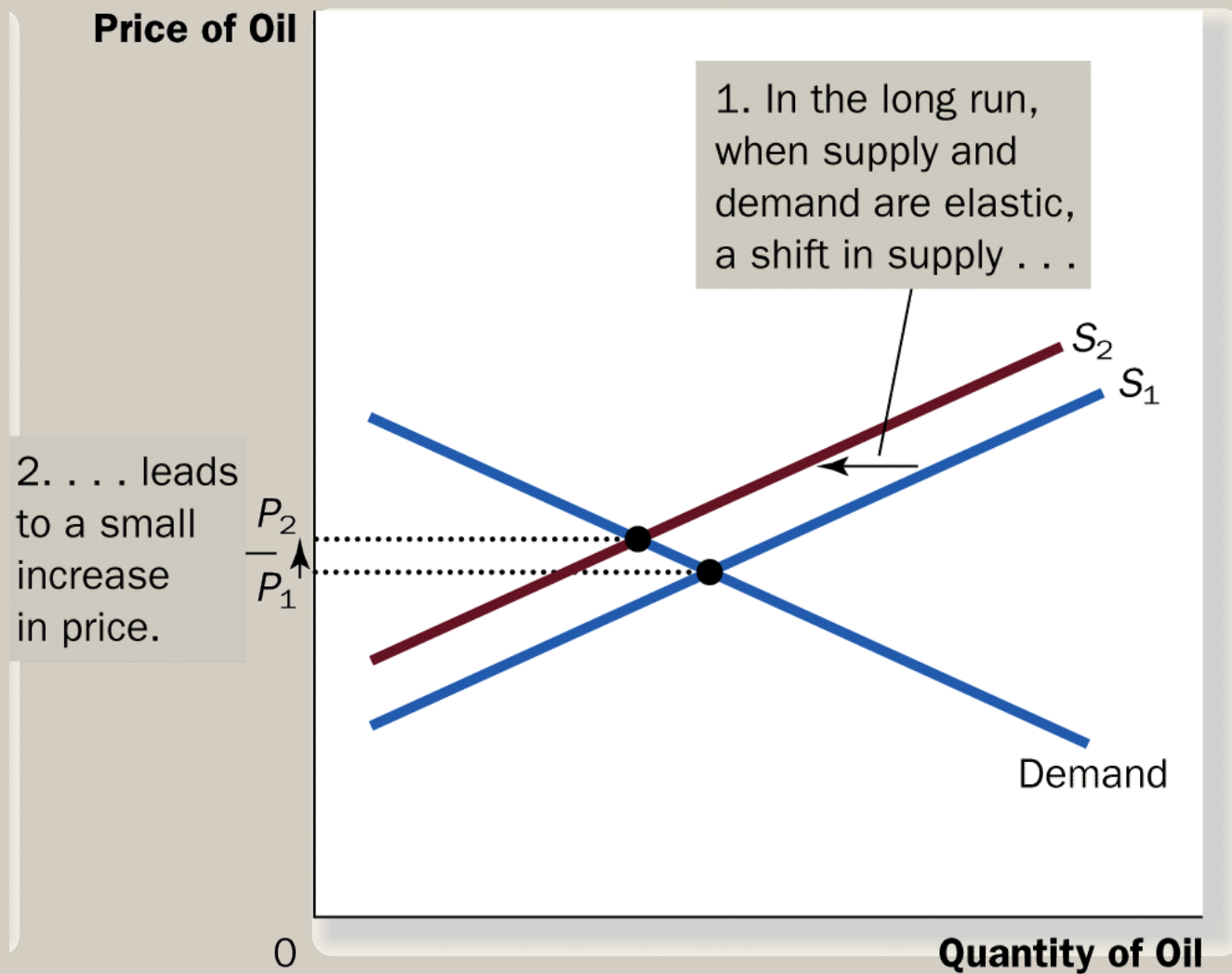
Why did OPEC fail to keep the price of oil high?

(a) The Oil Market in the Short Run



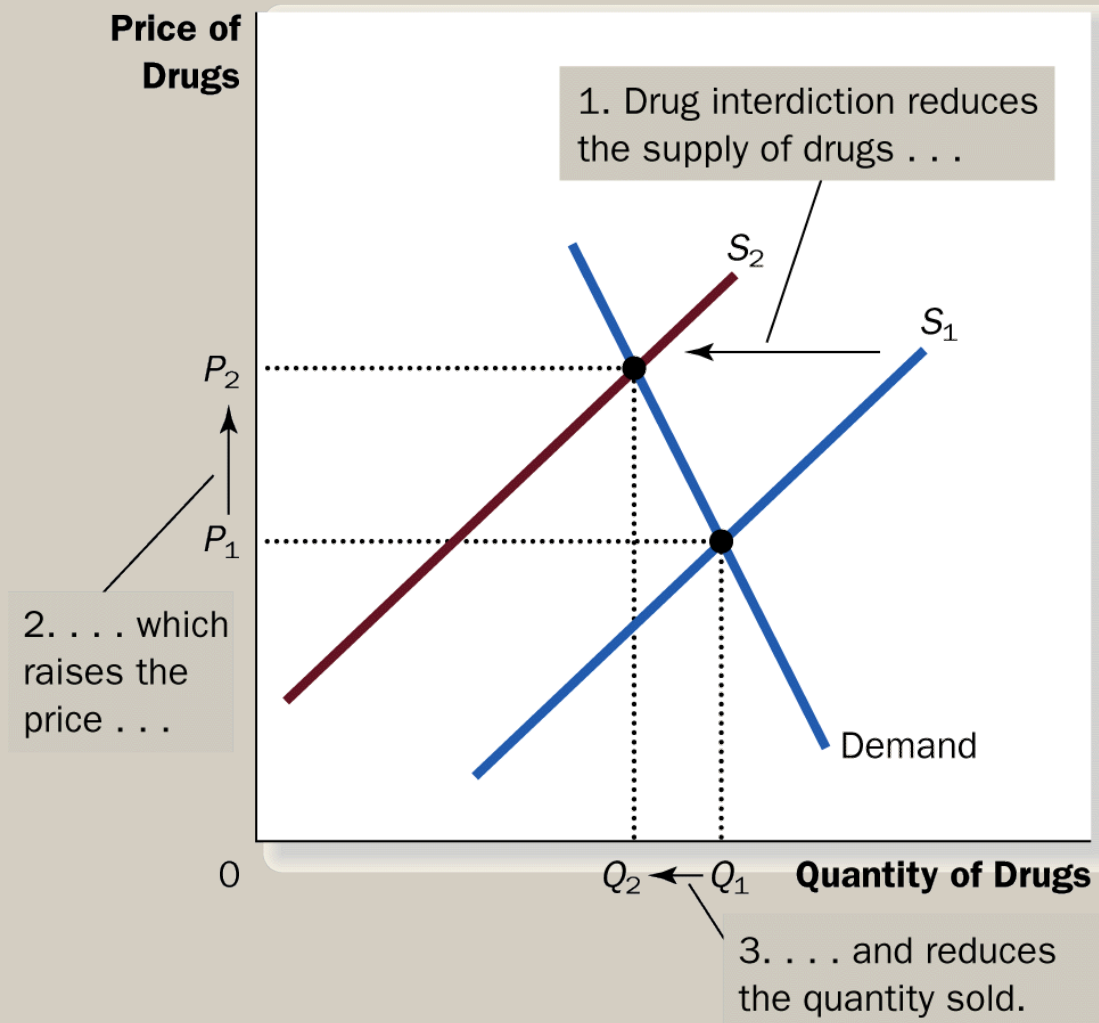
Why did OPEC fail to keep the price of oil high?

(b) The Oil Market in the Long Run



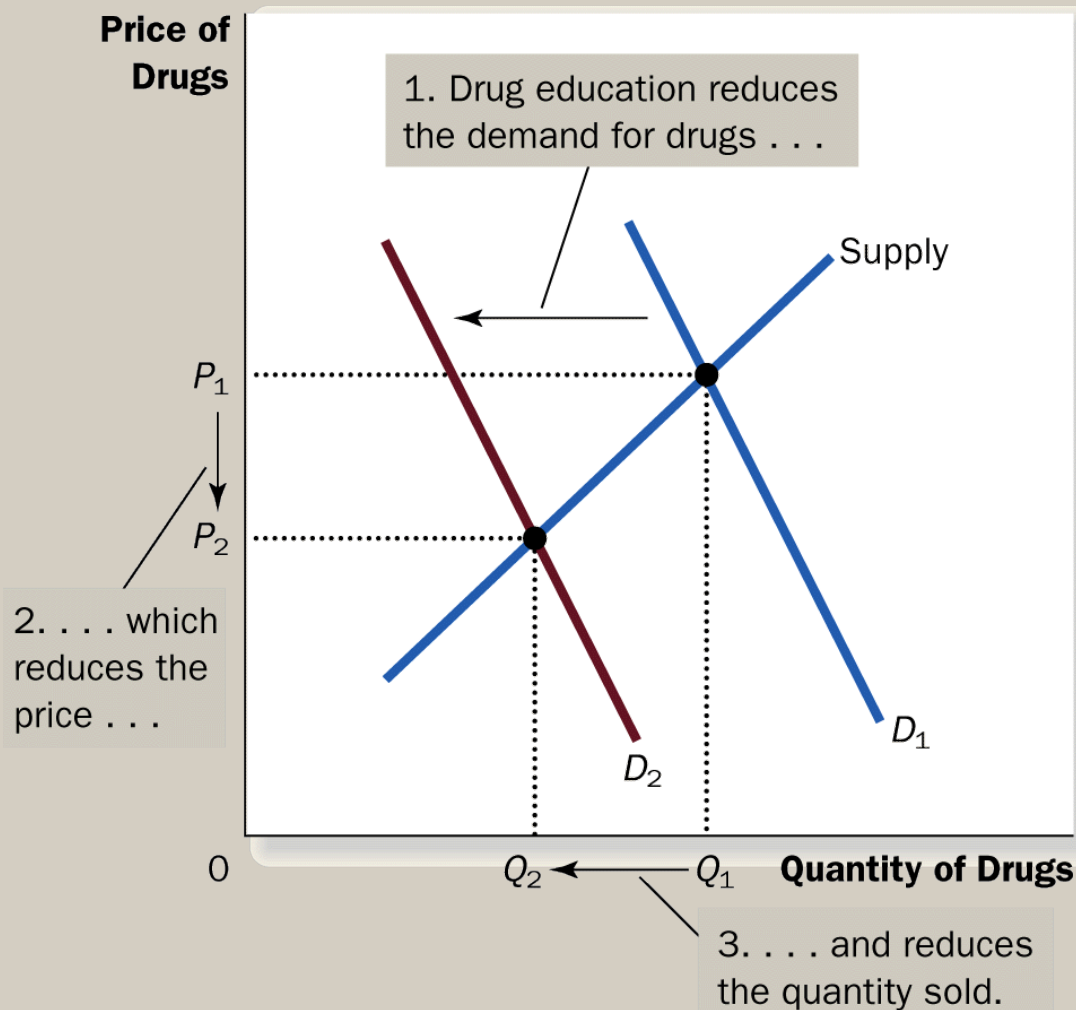
Does drug interdiction increase or decrease drug-related crime?

(a) Drug Interdiction



Policies to Reduce the Use of Illegal Drugs

(b) Drug Education





Supply, Demand, and Government Policies

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Supply, Demand, and Government Policies

- In a free, unregulated market system, market forces establish equilibrium prices and exchange quantities.
- While equilibrium conditions may be efficient, it may be true that not everyone is satisfied.
- One of the roles of economists is to use their theories to assist in the development of policies.

CONTROLS ON PRICES

- Are usually enacted when policymakers believe the market price is unfair to buyers or sellers.
- Result in government-created price ceilings and floors.

CONTROLS ON PRICES

- *Price Ceiling*
 - A legal *maximum* on the price at which a good can be sold.
- *Price Floor*
 - A legal *minimum* on the price at which a good can be sold.

How Price Ceilings Affect Market Outcomes

- Two outcomes are possible when the government imposes a price ceiling:
 - The price ceiling *is not* binding if set *above* the equilibrium price.
 - The price ceiling *is* binding if set *below* the equilibrium price, leading to a shortage.

Figure 1 A Market with a Price Ceiling

(a) A Price Ceiling That Is Not Binding

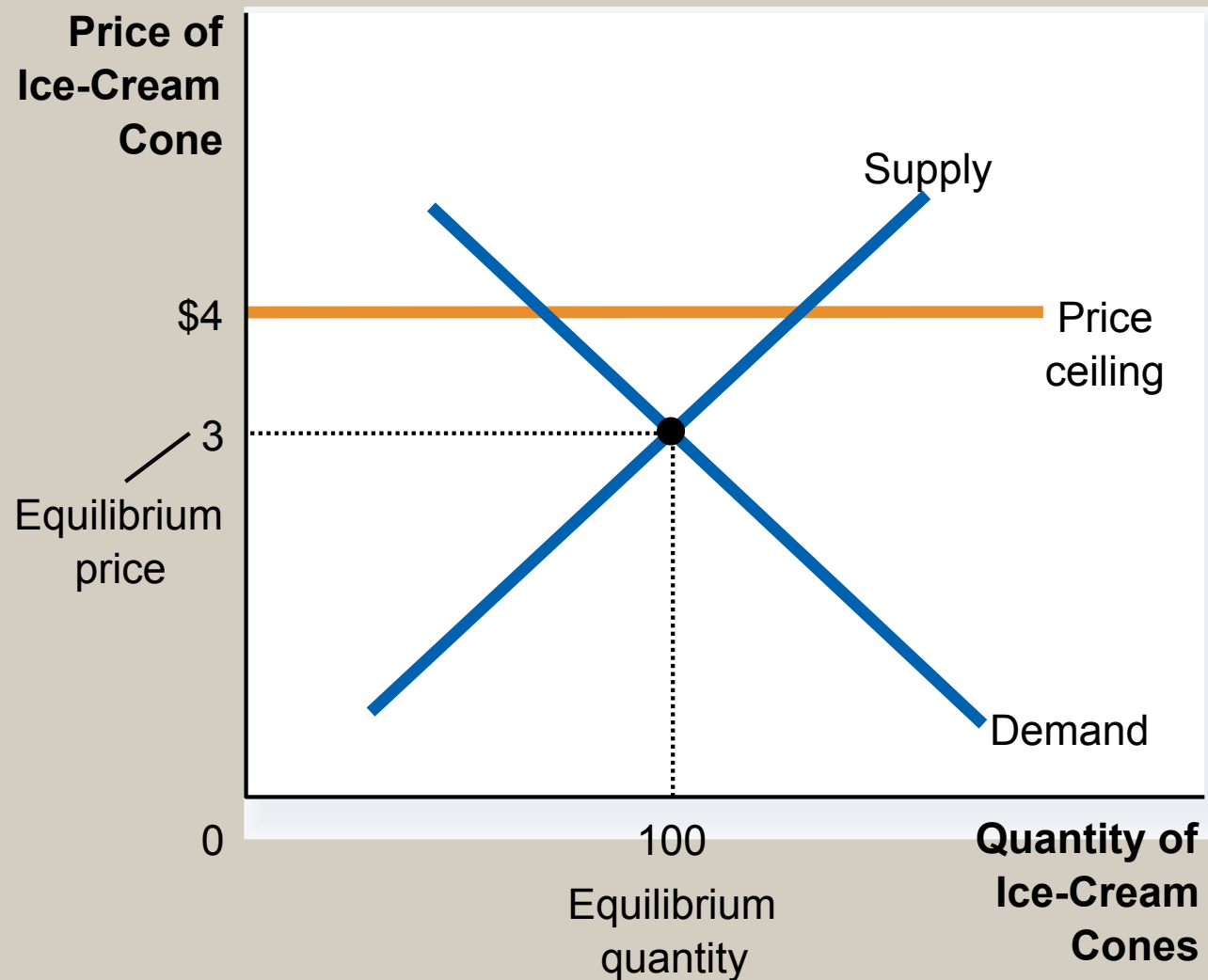
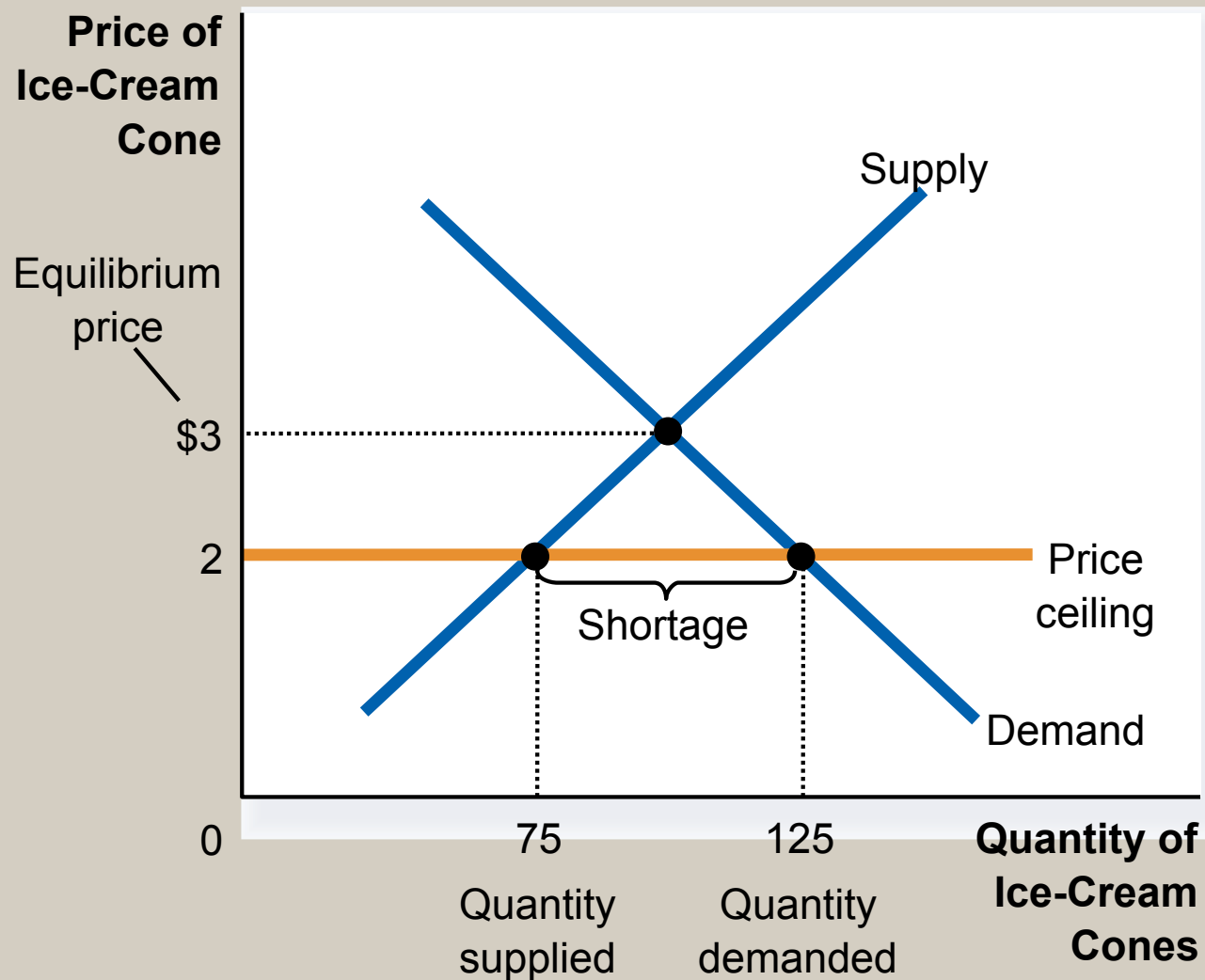


Figure 1 A Market with a Price Ceiling

(b) A Price Ceiling That Is Binding



How Price Ceilings Affect Market Outcomes

- Effects of Price Ceilings
- A binding price ceiling creates
 - shortages because $Q_D > Q_S$.
 - Example: Gasoline shortage of the 1970s
 - nonprice rationing
 - Examples: Long lines, discrimination by sellers

CASE STUDY: Lines at the Gas Pump

- In 1973, OPEC raised the price of crude oil in world markets. Crude oil is the major input in gasoline, so the higher oil prices reduced the supply of gasoline.
- What was responsible for the long gas lines?



- Economists blame government regulations that limited the price oil companies could charge for gasoline.

Figure 2 The Market for Gasoline with a Price Ceiling

(a) The Price Ceiling on Gasoline Is Not Binding

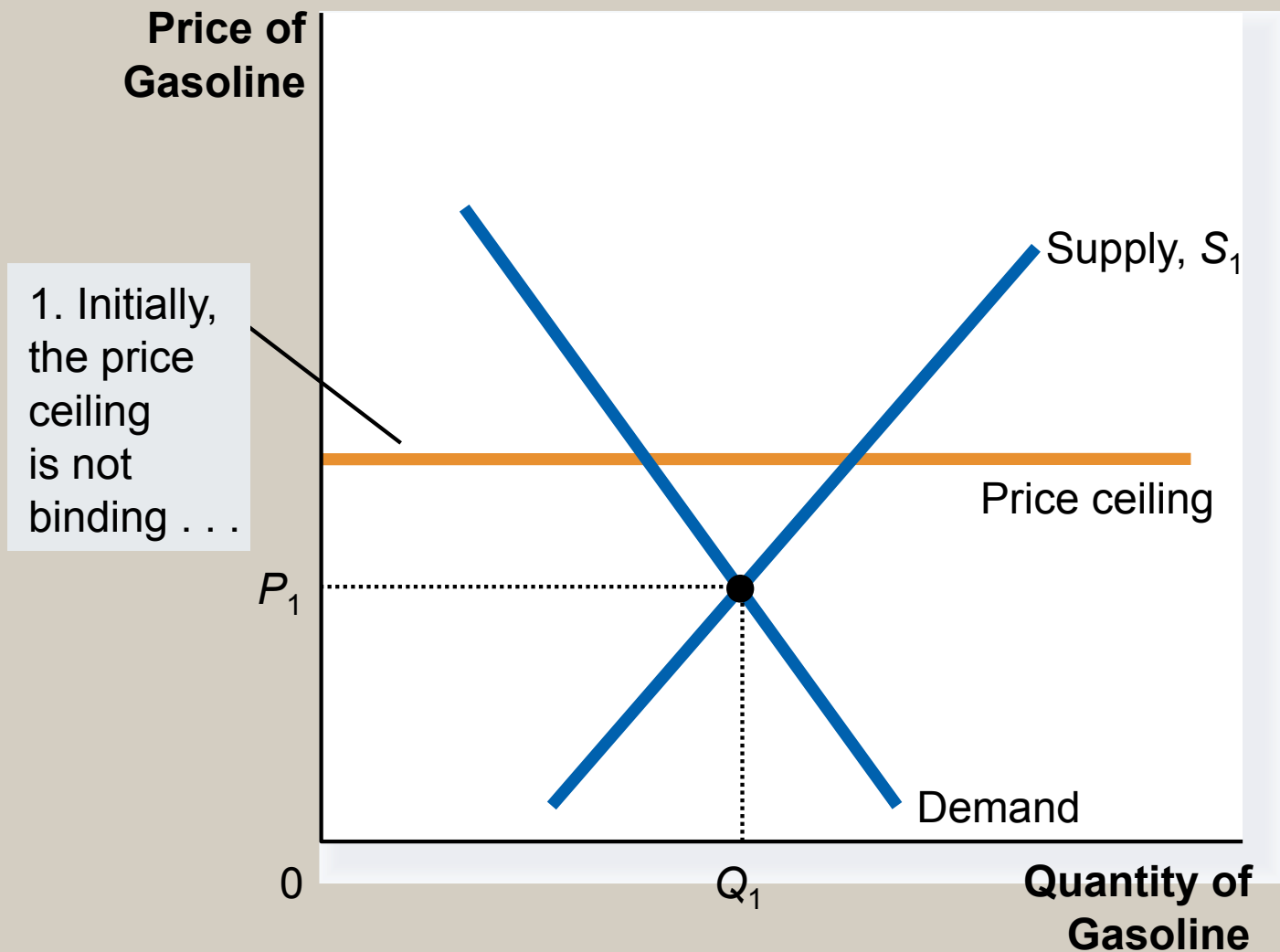
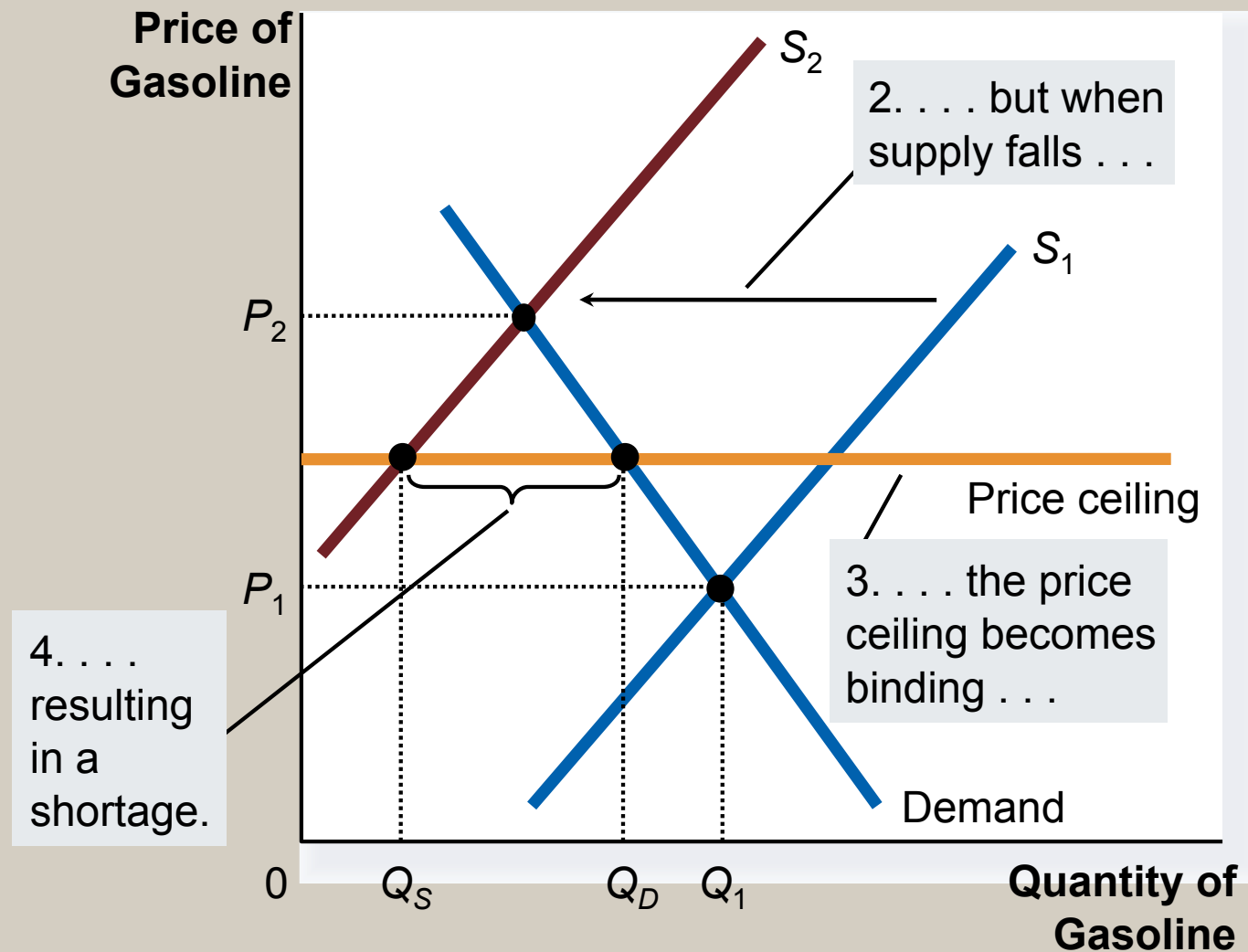


Figure 2 The Market for Gasoline with a Price Ceiling

(b) The Price Ceiling on Gasoline Is Binding



CASE STUDY: Rent Control in the Short Run and Long Run

- Rent controls are ceilings placed on the rents that landlords may charge their tenants.
- The goal of rent control policy is to help the poor by making housing more affordable.
- One economist called rent control “the best way to destroy a city, other than bombing.”

Figure 3 Rent Control in the Short Run and in the Long Run

(a) Rent Control in the Short Run
(supply and demand are inelastic)

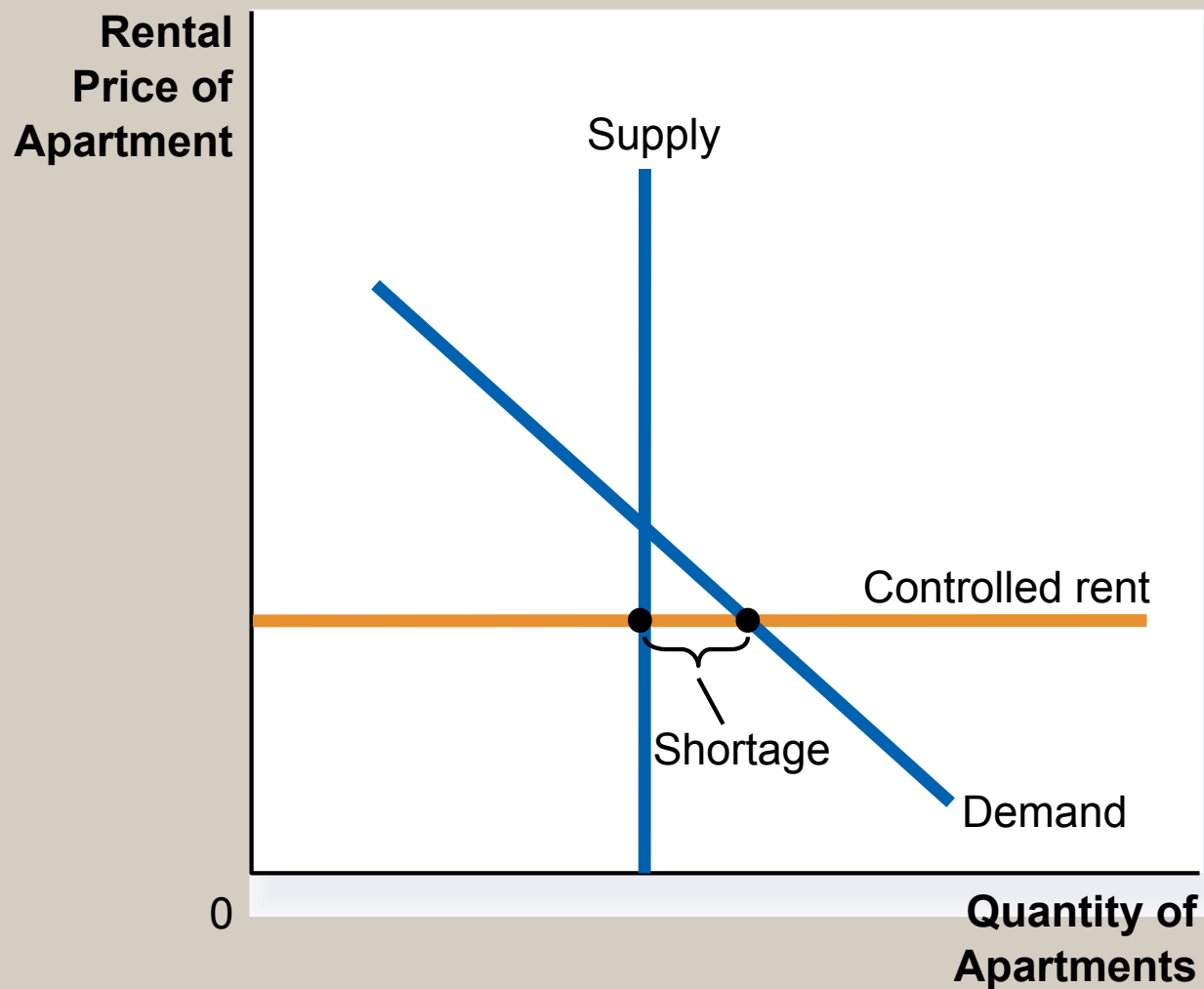
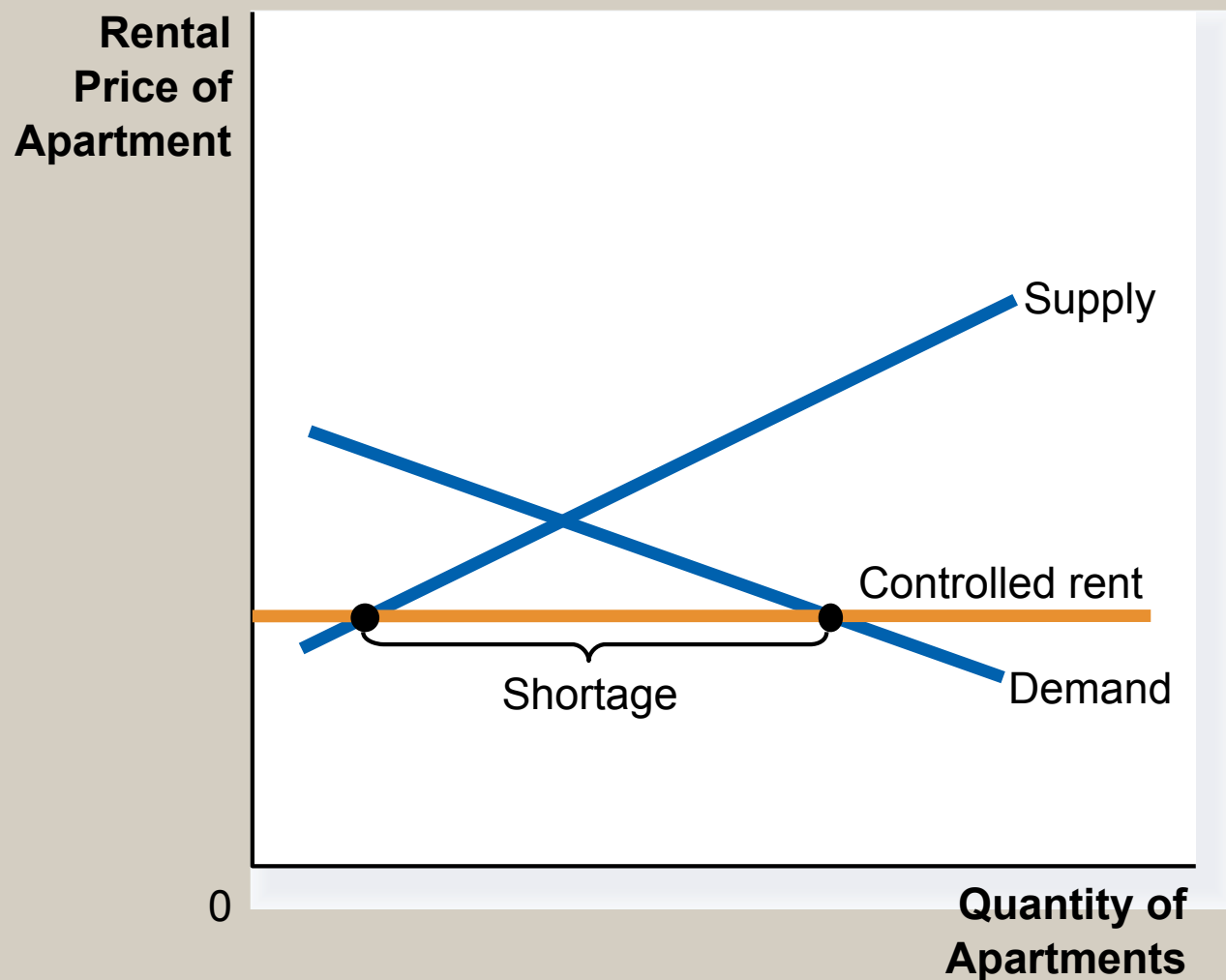


Figure 3 Rent Control in the Short Run and in the Long Run

(b) Rent Control in the Long Run
(supply and demand are elastic)



How Price Floors Affect Market Outcomes

- When the government imposes a price floor, two outcomes are possible.
- The price floor *is not* binding if set *below* the equilibrium price.
- The price floor *is* binding if set *above* the equilibrium price, leading to a surplus.

Figure 4 A Market with a Price Floor

(a) A Price Floor That Is Not Binding

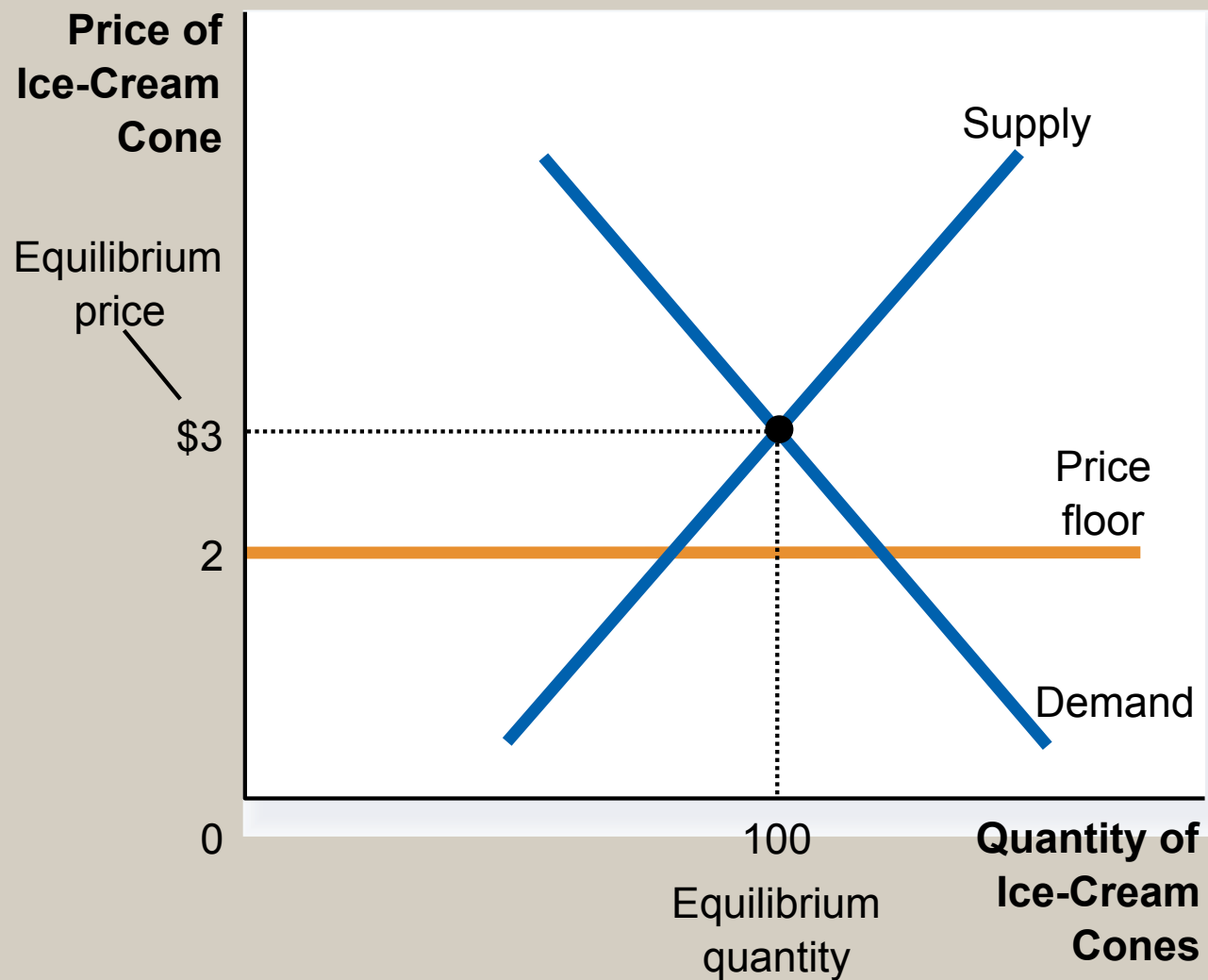
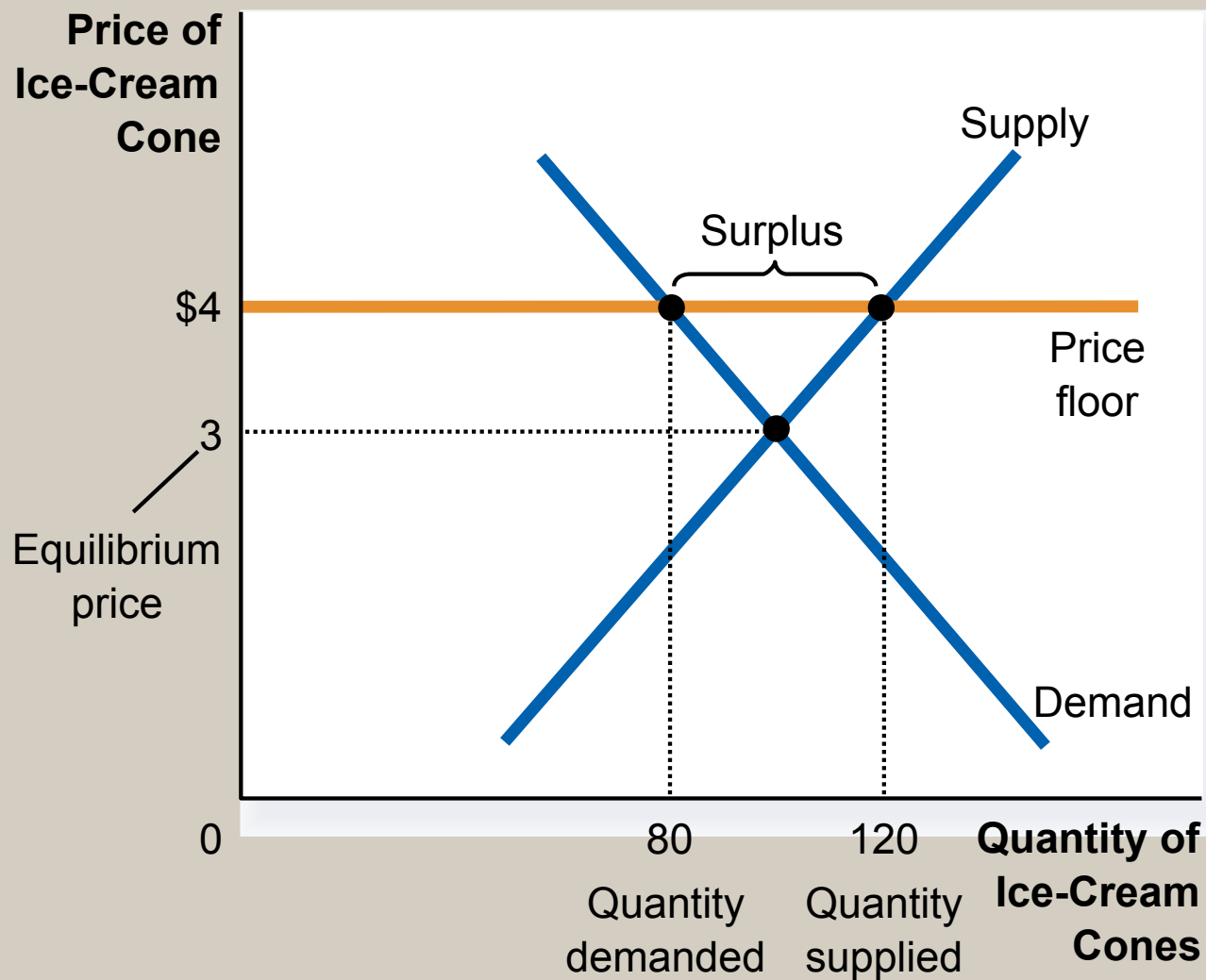


Figure 4 A Market with a Price Floor

(b) A Price Floor That Is Binding



How Price Floors Affect Market Outcomes

- A price floor prevents supply and demand from moving toward the equilibrium price and quantity.
- When the market price hits the floor, it can fall no further, and the market price equals the floor price.

How Price Floors Affect Market Outcomes

- A binding price floor causes . . .
 - a surplus because $Q_S > Q_D$.
 - *nonprice rationing* is an alternative mechanism for rationing the good, using discrimination criteria.
 - Examples: The minimum wage, agricultural price supports

The Minimum Wage

- An important example of a price floor is the minimum wage. Minimum wage laws dictate the lowest price possible for labor that any employer may pay.



Figure 5 How the Minimum Wage Affects the Labor Market

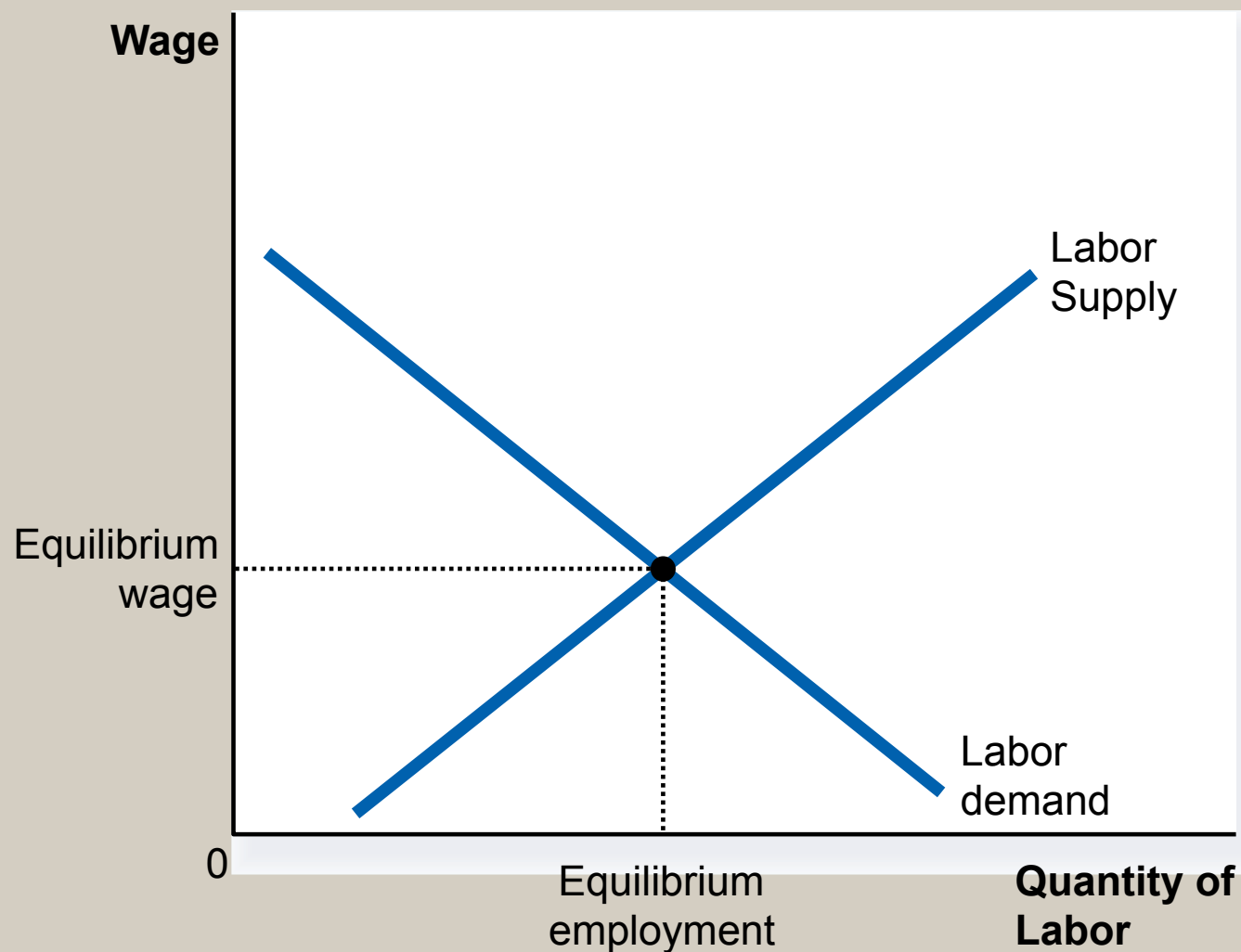
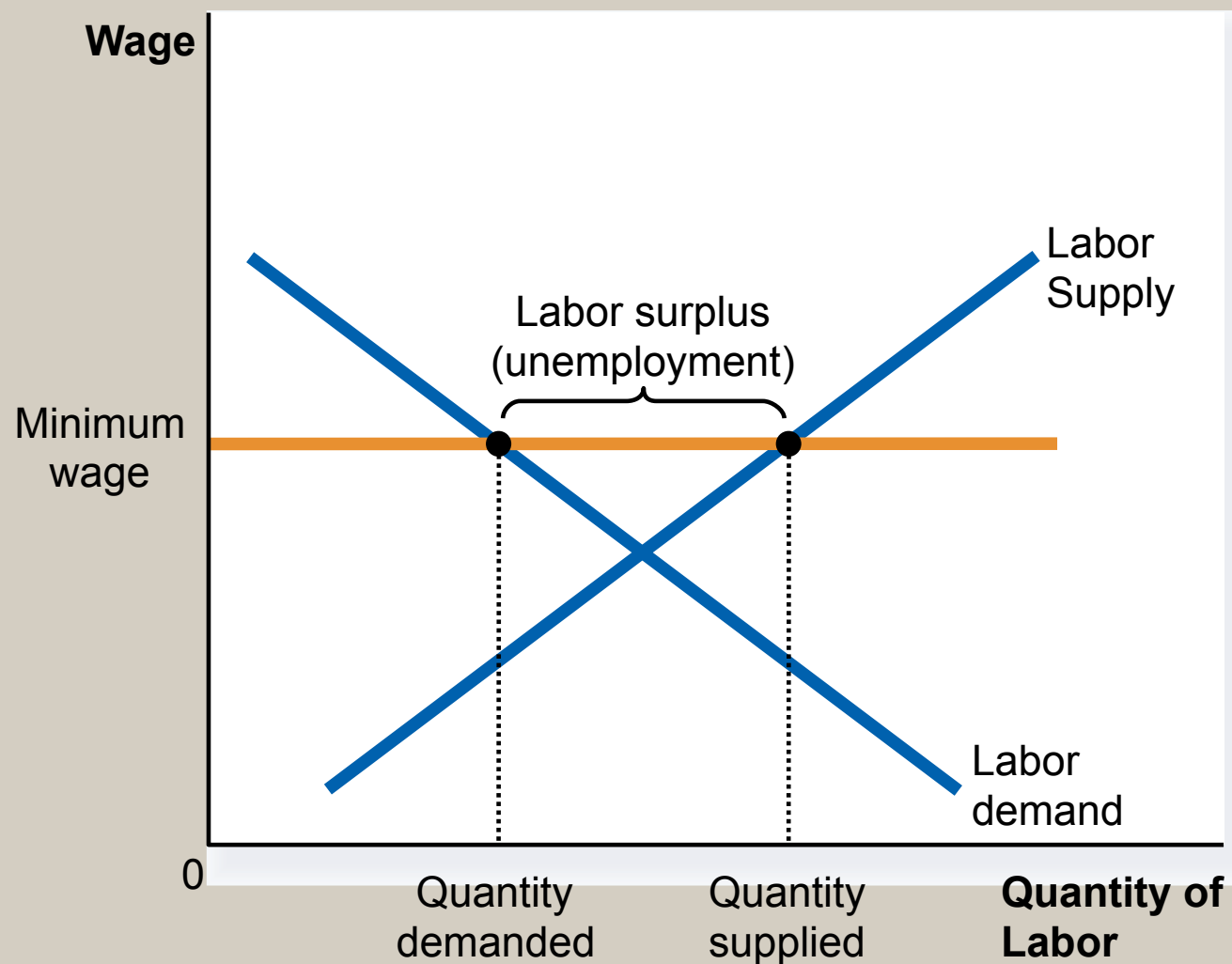


Figure 5 How the Minimum Wage Affects the Labor Market



TAXES

- Governments levy taxes to raise revenue for public projects.

How Taxes on Buyers (and Sellers) Affect Market Outcomes

- Taxes discourage market activity.
- When a good is taxed, the quantity sold is smaller.
- Buyers and sellers share the tax burden.



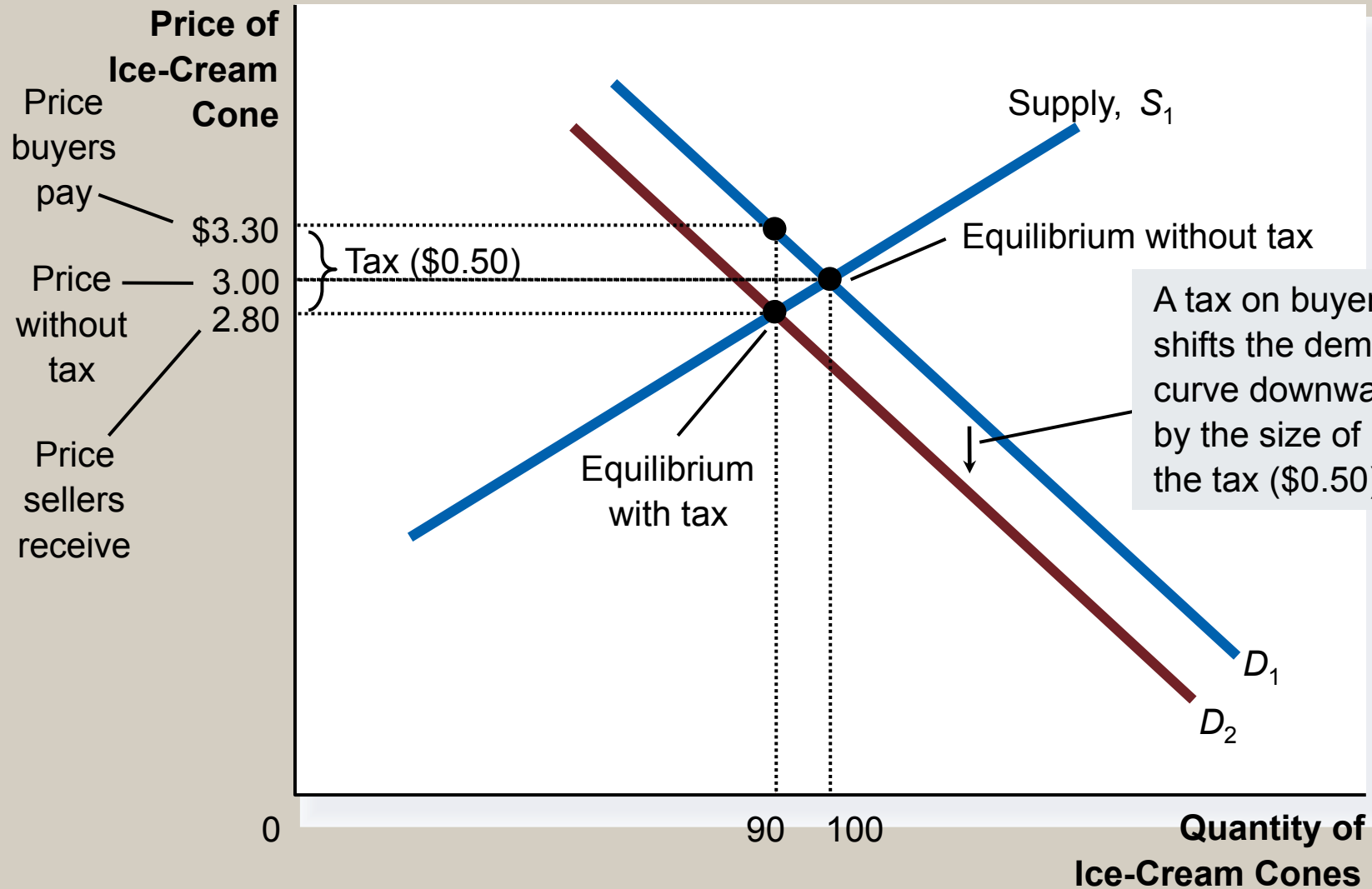
Elasticity and Tax Incidence

- *Tax incidence* is the manner in which the burden of a tax is shared among participants in a market.

Elasticity and Tax Incidence

- Tax incidence is the study of who bears the burden of a tax.
- Taxes result in a change in market equilibrium.
- Buyers pay more and sellers receive less, regardless of whom the tax is levied on.

Figure 6 A Tax on Buyers



Elasticity and Tax Incidence

- What was the impact of tax?
 - Taxes discourage market activity.
 - When a good is taxed, the quantity sold is smaller.
 - Buyers and sellers share the tax burden



Figure 7 A Tax on Sellers

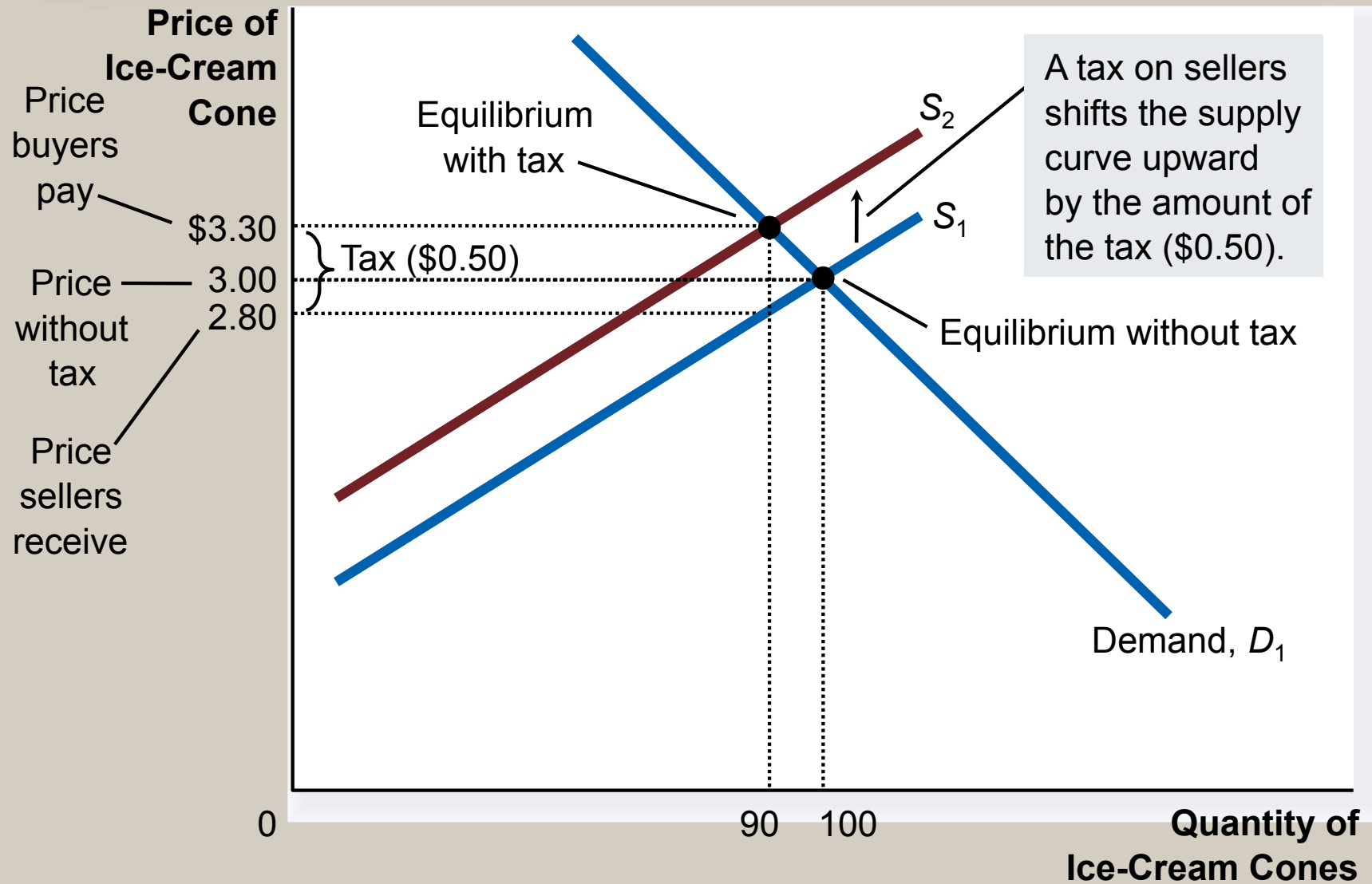
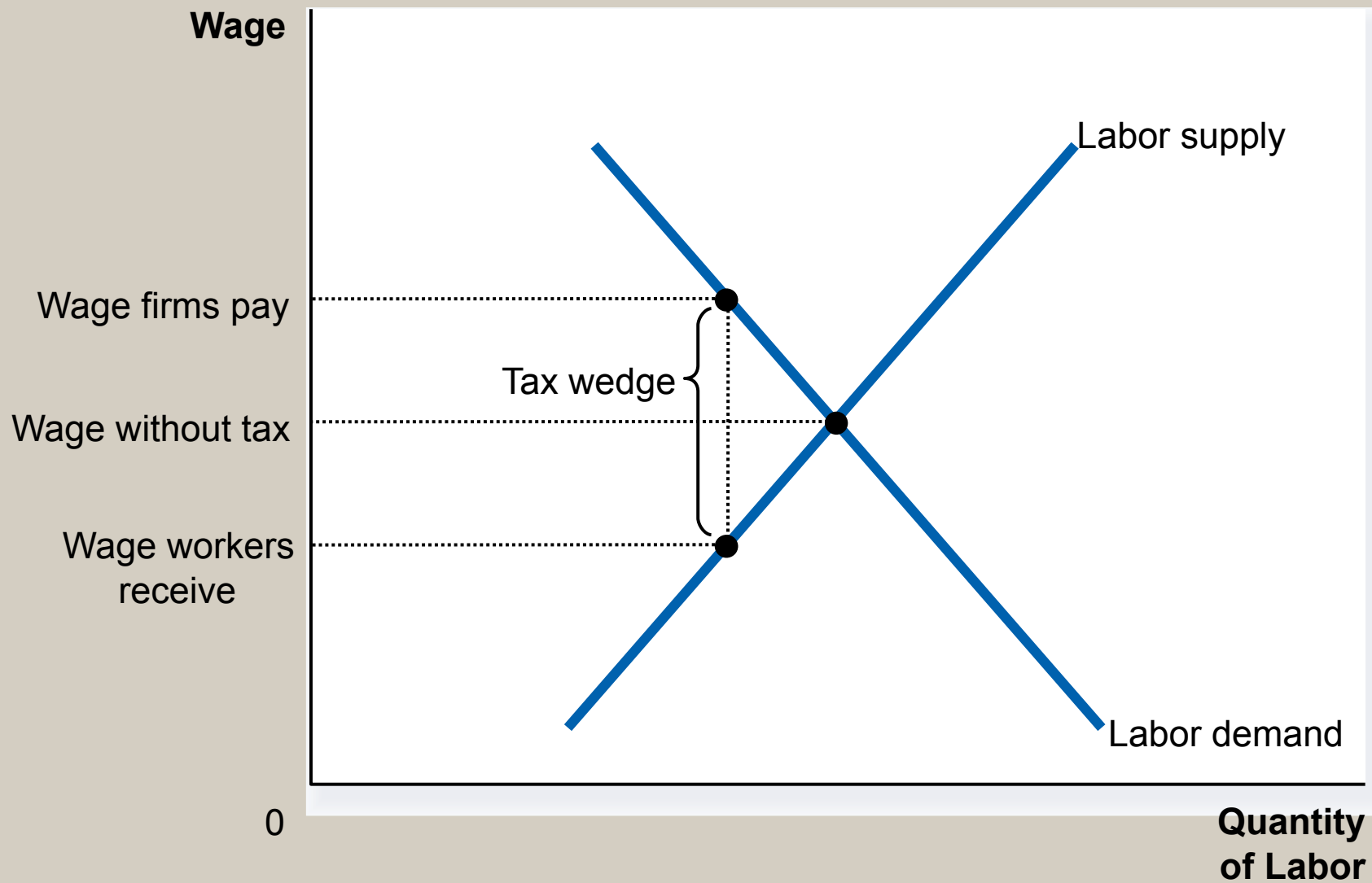


Figure 8 A Payroll Tax



Elasticity and Tax Incidence

- In what proportions is the burden of the tax divided?
- How do the effects of taxes on sellers compare to those levied on buyers?
- The answers to these questions depend on the elasticity of demand and the elasticity of supply.

Figure 9 How the Burden of a Tax Is Divided

(a) Elastic Supply, Inelastic Demand

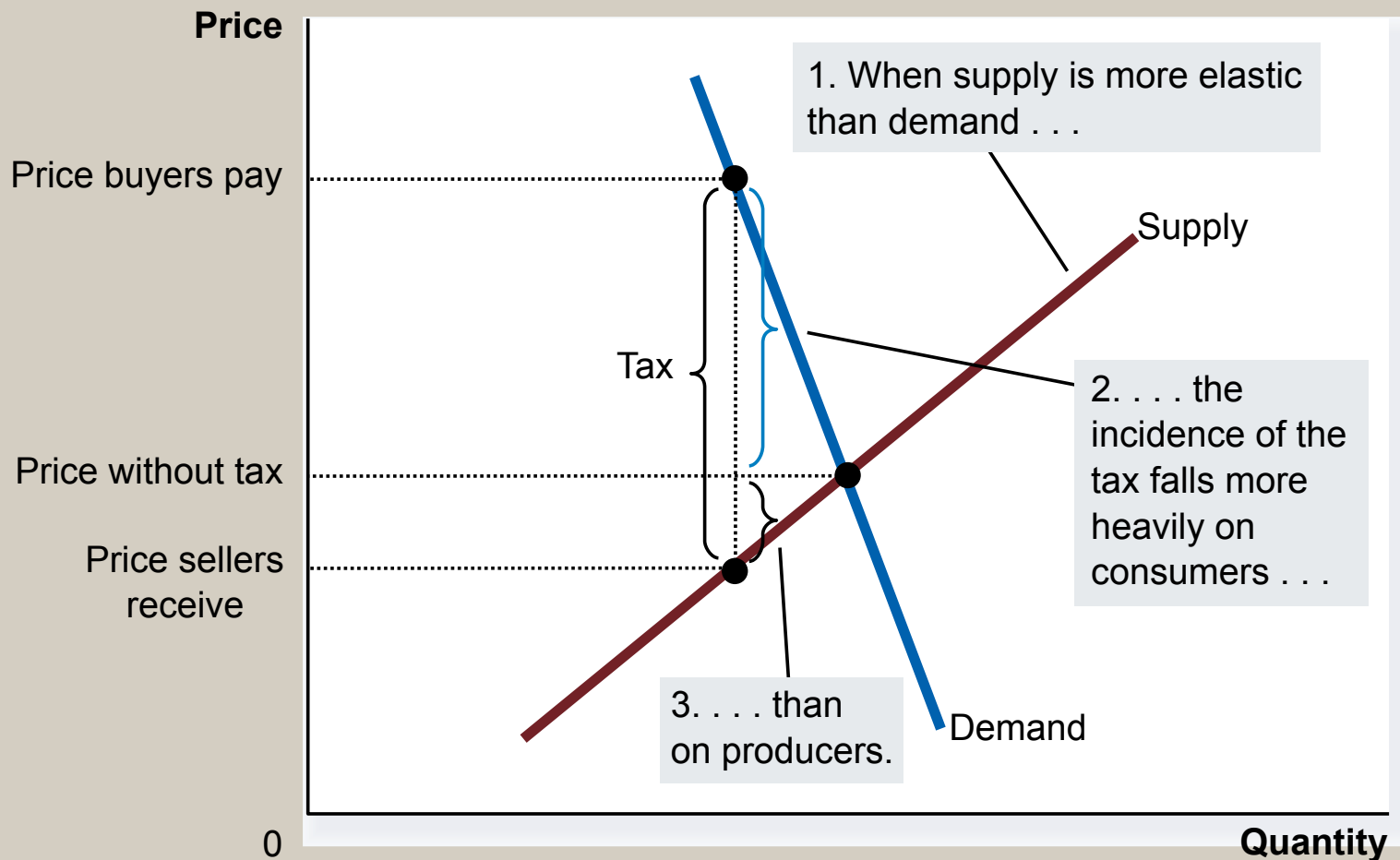
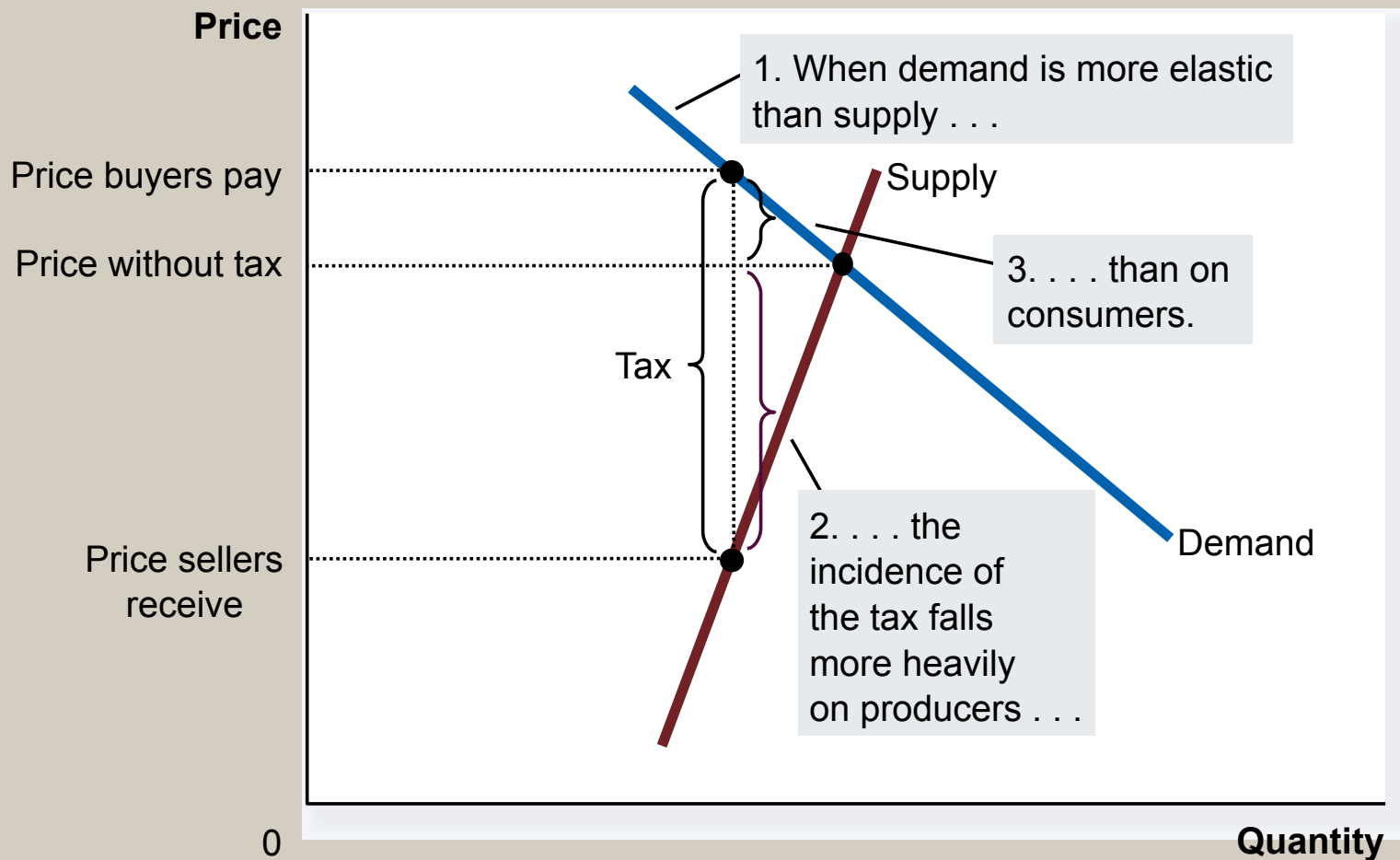


Figure 9 How the Burden of a Tax Is Divided

(b) Inelastic Supply, Elastic Demand



ELASTICITY AND TAX INCIDENCE

So, how is the burden of the tax divided?

- The burden of a tax falls more heavily on the side of the market that is less elastic.



Summary

- Price controls include price ceilings and price floors.
- A price ceiling is a legal maximum on the price of a good or service. An example is rent control.
- A price floor is a legal minimum on the price of a good or a service. An example is the minimum wage.

Summary

- Taxes are used to raise revenue for public purposes.
- When the government levies a tax on a good, the equilibrium quantity of the good falls.
- A tax on a good places a wedge between the price paid by buyers and the price received by sellers.

Summary

- The incidence of a tax refers to who bears the burden of a tax.
- The incidence of a tax does not depend on whether the tax is levied on buyers or sellers.
- The incidence of the tax depends on the price elasticities of supply and demand.
- The burden tends to fall on the side of the market that is less elastic.