Demand-Supply Application and Government Policies

Xuemei Zheng

School of Economics, SWUFE

Semester I, 2020

Review

- 需求/供给的定义及表示（表、图、函数）
- 影响需求量/供给量的因素
- 需求量/供给量的变动和需求/供给的变动
- 均衡的定义
- 市场均衡的变动(需求变动、供给变动、需求供给同时变动)
- 弹性的定义
- 需求/供给的价格弹性计算（弧弹性、点弹性）及种类
- 影响需求/供给的价格弹性的因素
- 需求的收入弹性（计算；正常品、低档品）
- 需求的交叉价格弹性（计算；替代品、互补品）
- 弹性和收入

Applications of Supply, Demand, and Elasticity

Applications of Supply and Demand

1. Analyze various types of government policy using only the tools of supply and demand
2. When the government levies a tax on the amount that firms pay their workers, do the firms or the workers bear the burden of the tax?

Applications of Elasticity

3. Can good news for farming be bad news for farmers?
4. Why did OPEC fail to keep the price of oil high?
5. Does drug interdiction increase or decrease drug-related crime?

Controls on Prices

Price Controls (价格控制): Policymakers control prices because they view the market's outcome as unfair.

- Price ceiling (价格上限，限制价格):

  a legal maximum on the price at which a good can be sold
- Price floor (价格下限，支持价格):

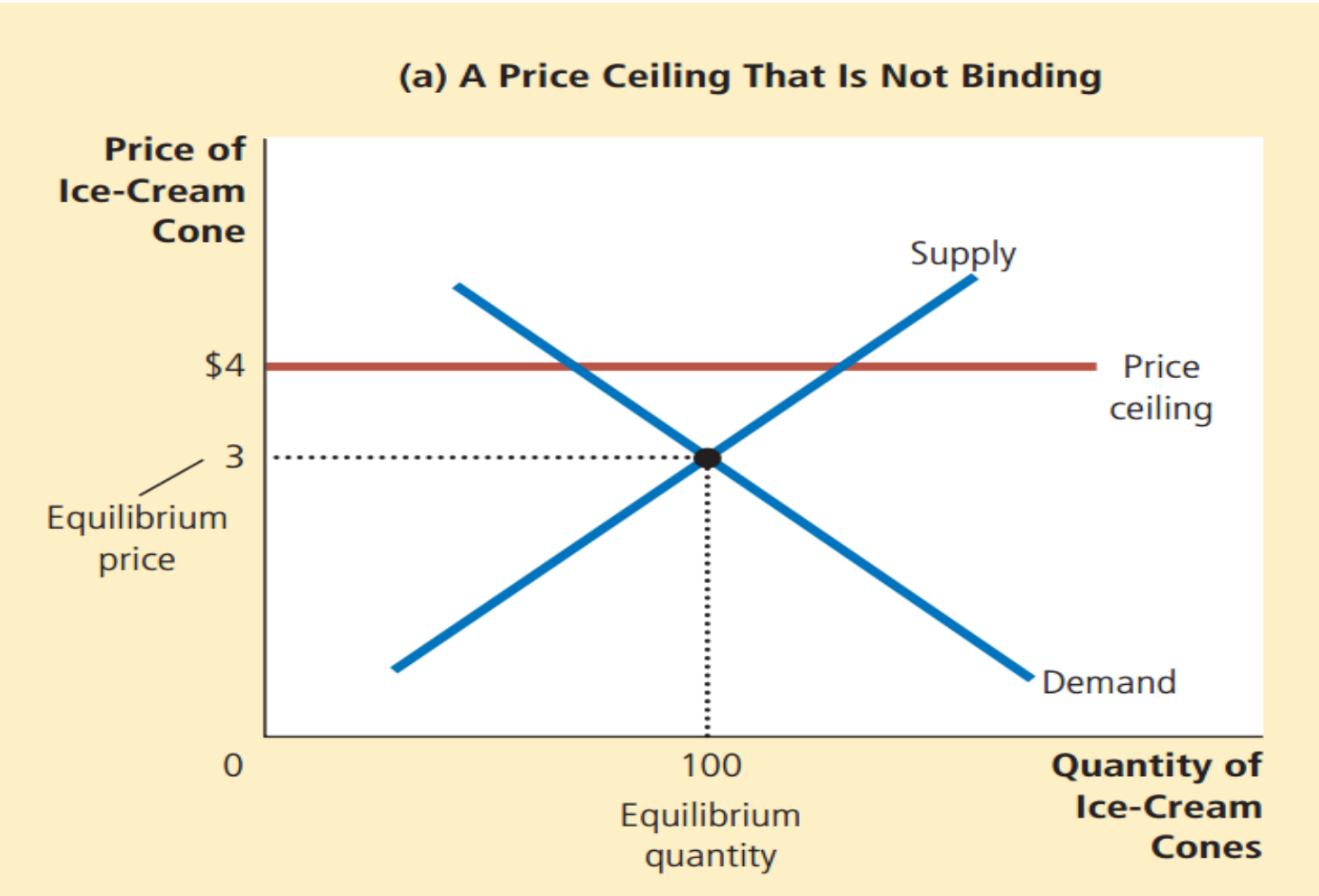
  a legal minimum on the price at which a good can be sold

How Price Ceiling Affect Market Outcomes

- If the price that balances supply and demand is below the ceiling, the price ceiling is not binding.
- If the equilibrium price is above the price ceiling, the ceiling is a binding constraint on the market.

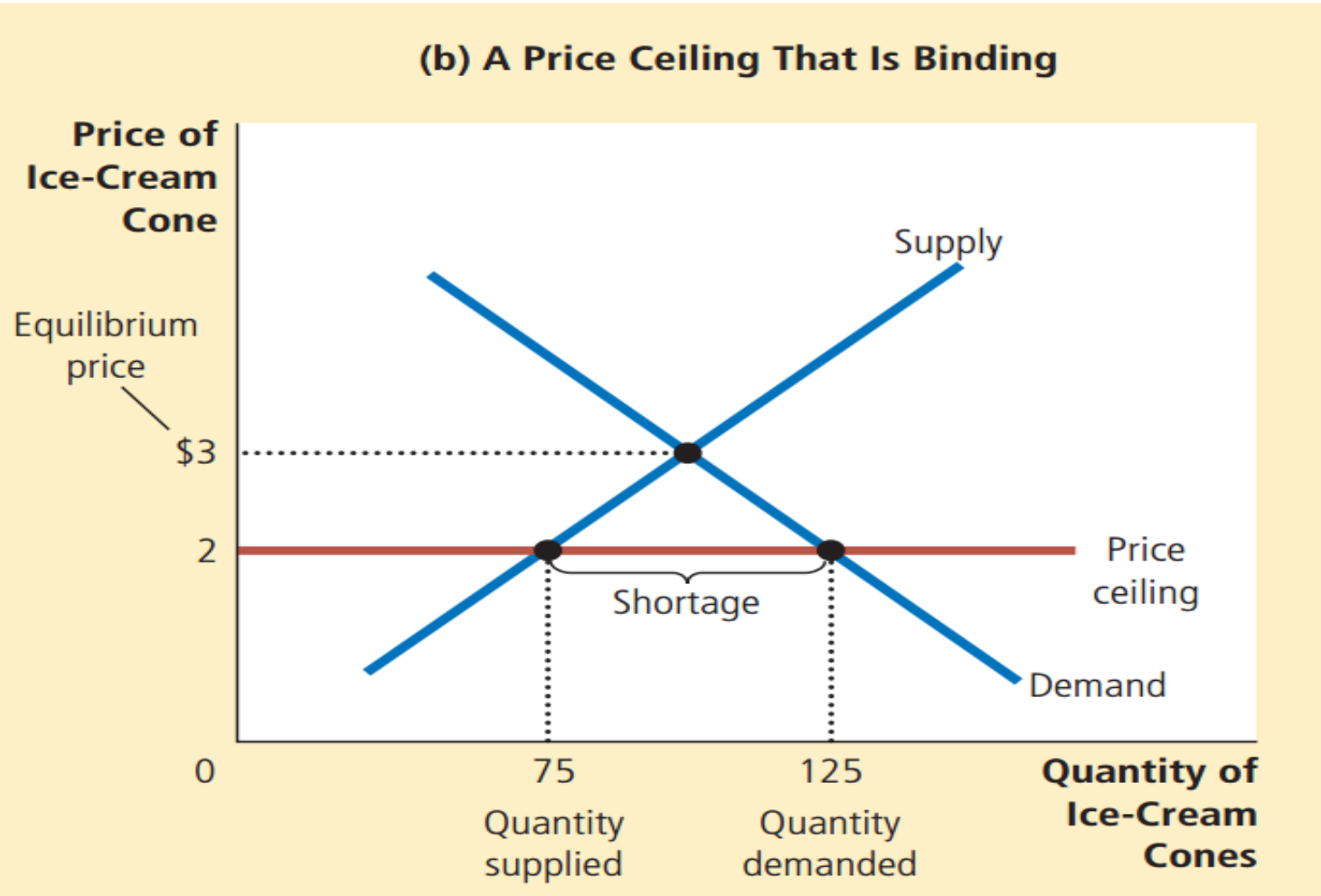
A Market with a Price Ceiling

- Market forces naturally move the economy to the equilibrium.
- The price ceiling has no effect on the price or the quantity sold.



A Market with a Price Ceiling (II)

- The market price equals the price ceiling.
- There is a *shortage* of goods or services.



Price Ceiling

When a binding price ceiling is imposed on a competitive market,

- *a shortage of the good arises*
- *sellers must ration the scarce goods*
  - e.g., long lines, discrimination according to seller bias
  - rarely desirable

By contrast,

- The rationing mechanism in a free, competitive market is both efficient and impersonal.
- Free markets ration goods with price.

Case Study: Lines at the Gas Pump

OPEC raised the price of crude oil in world oil markets
$\Longrightarrow$ long lines at gas stations

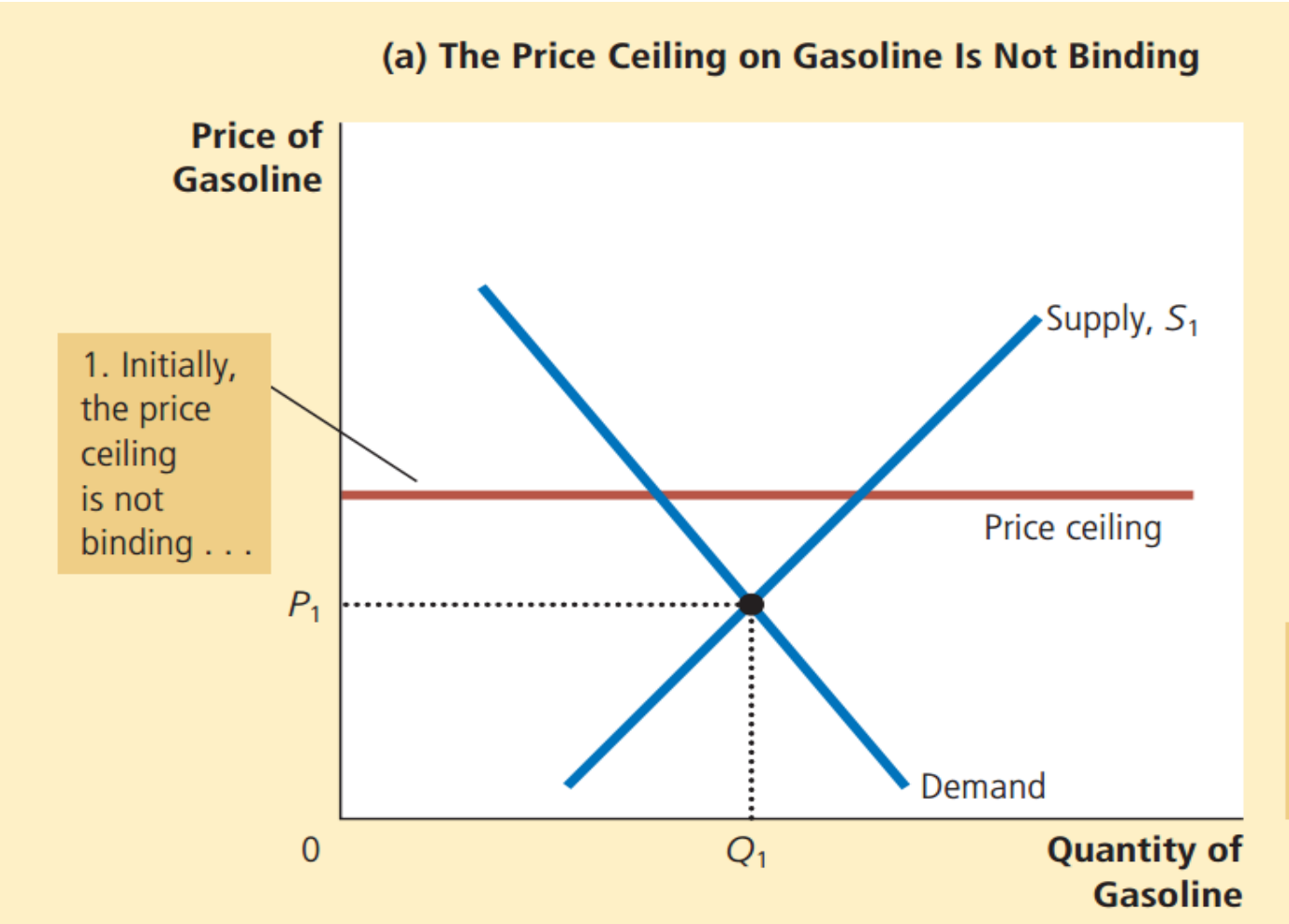
What was responsible for the long gas lines?

- OPEC?
- price ceiling for oil price set by U.S. government?

Eventually, the laws regulating the price of gasoline were repealed.

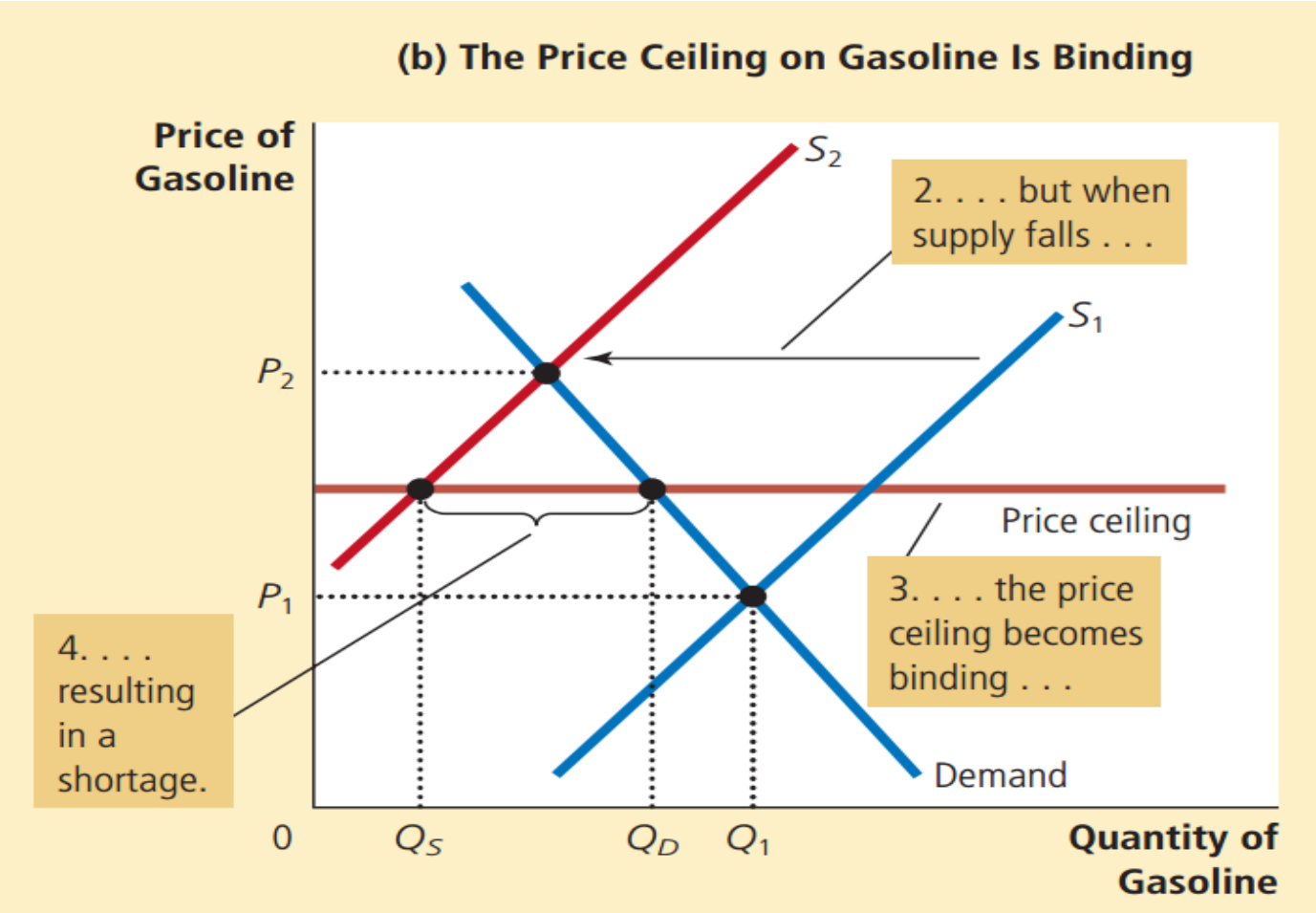
The Market for Gasoline with a Price Ceiling

Before OPEC raised the price of crude oil:



The Market for Gasoline with a Price Ceiling (II)

When the price of crude oil rose:



The shift in supply caused a severe shortage at the regulated price.

Case Study: Rent Control

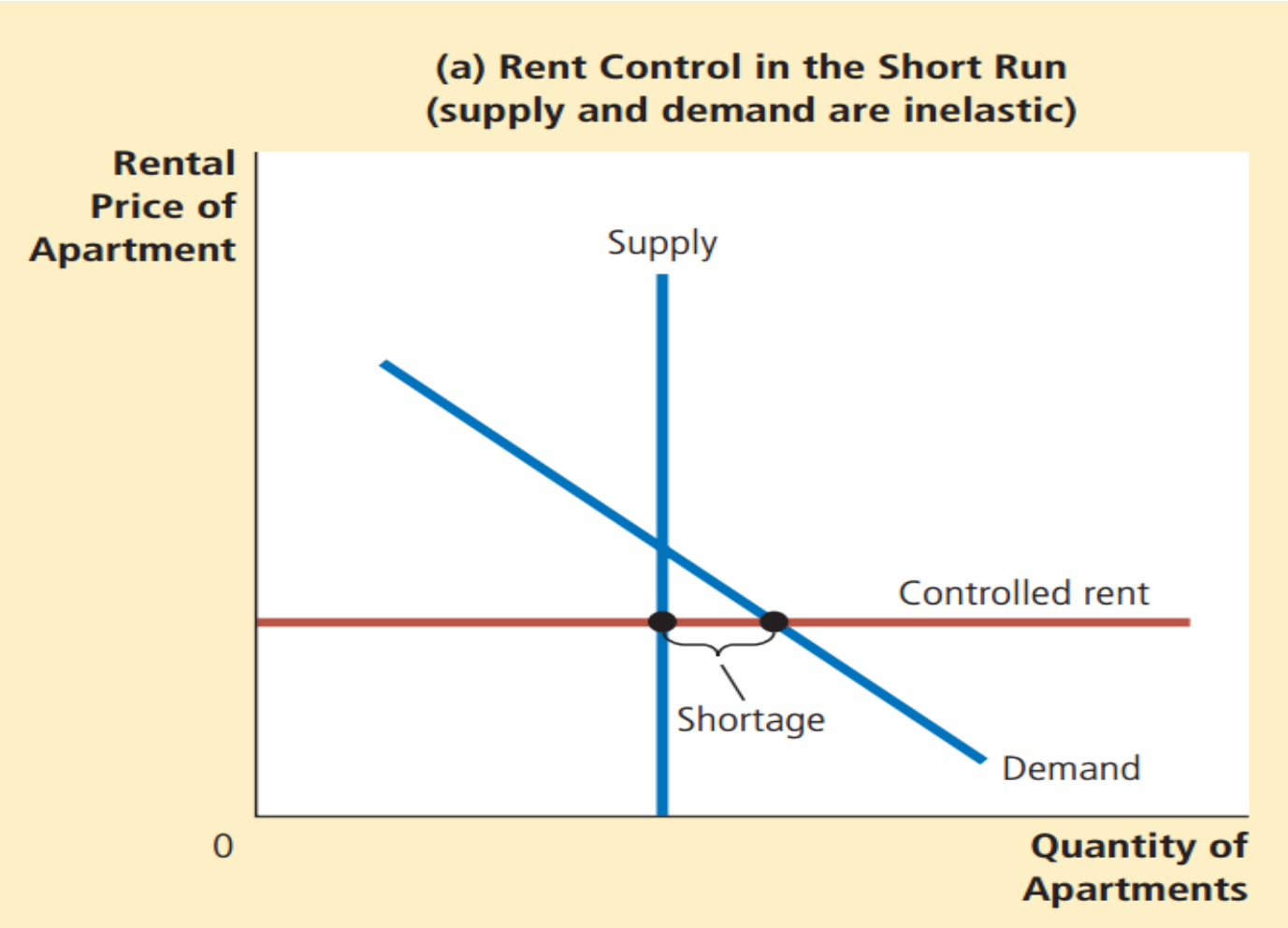
- Aim of rent control: make housing more affordable for the poor
- Outcome: inefficient, 'the best way to destroy a city, other than bombing'
- Reasons:

- In the short-run supply and demand are relatively inelastic.

  $\Rightarrow$ The primary effect in the short run is to reduce rents.
- In the long run, both supply and demand are more elastic.
  * **Supply side**: The landlords don't build new apartments and fail to maintain existing ones.
  * **Demand side**: more people find their own apartments and more into a city.

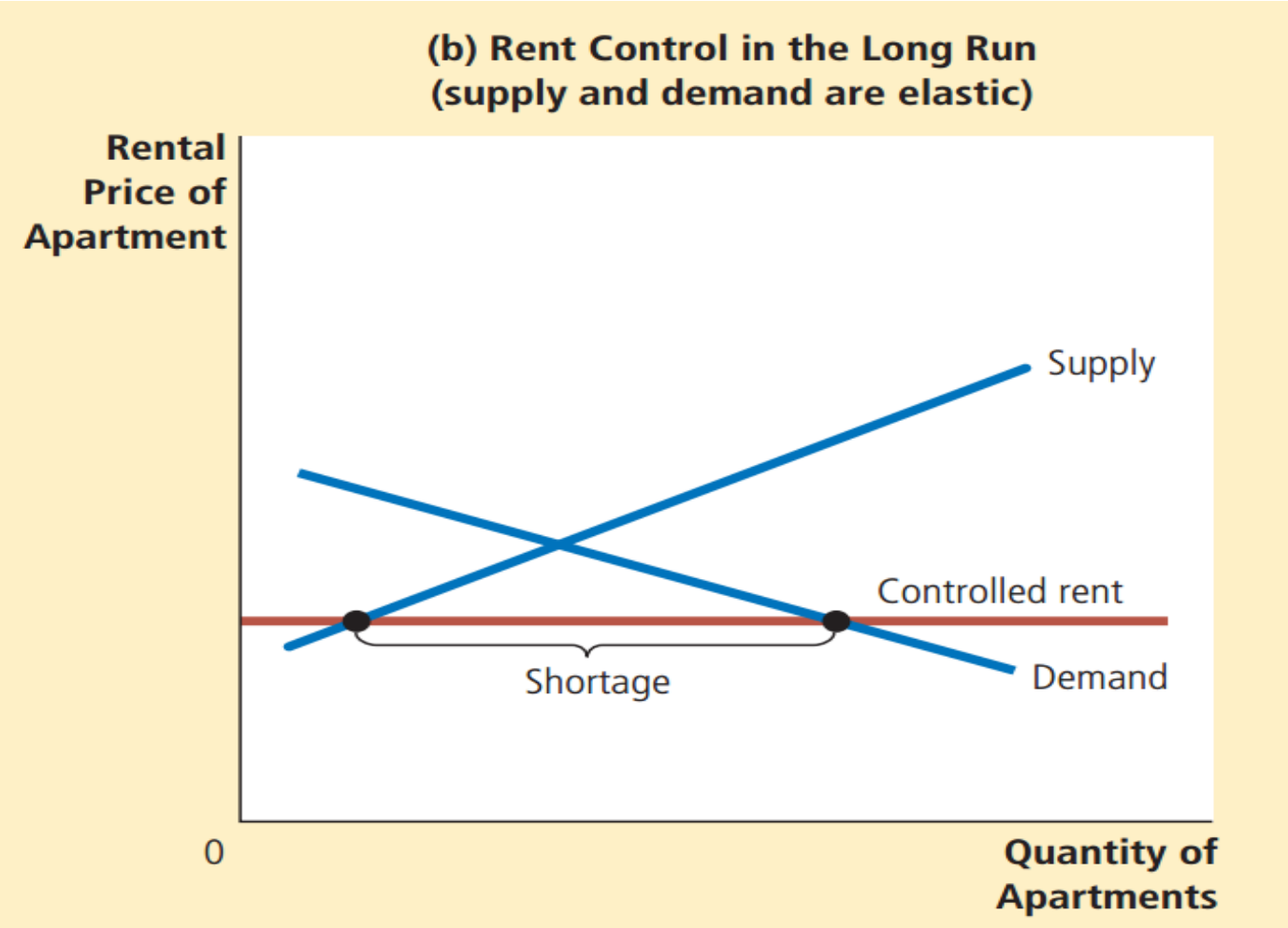
  $\Rightarrow$ The result is a large shortage of housing.

Rent Control in the Short Run



The supply and demand for apartments are relatively inelastic. The price ceiling causes only a small shortage of housing.

Rent Control in the Long Run



The supply and demand curves for apartments are more elastic, rent control causes a large shortage.

People respond to incentives

In a free market,

- The price of housing adjusts to eliminate the shortages.
- Landlords try to keep their buildings clean and safe.

When rent control is imposed,

- Shortages and waiting lists are created.
- Landlords lose their incentive to respond to tenants' concerns.
- Undisirable landlord behavior rises:
  - e.g., prefer tenants without children, discriminated on the basis of race, prefer those willing to offer under-the-table payments
- In the end, tenants get lower rents, but they also get lower-quality housing.

Controls on Prices: Price Floors

- Price floor:

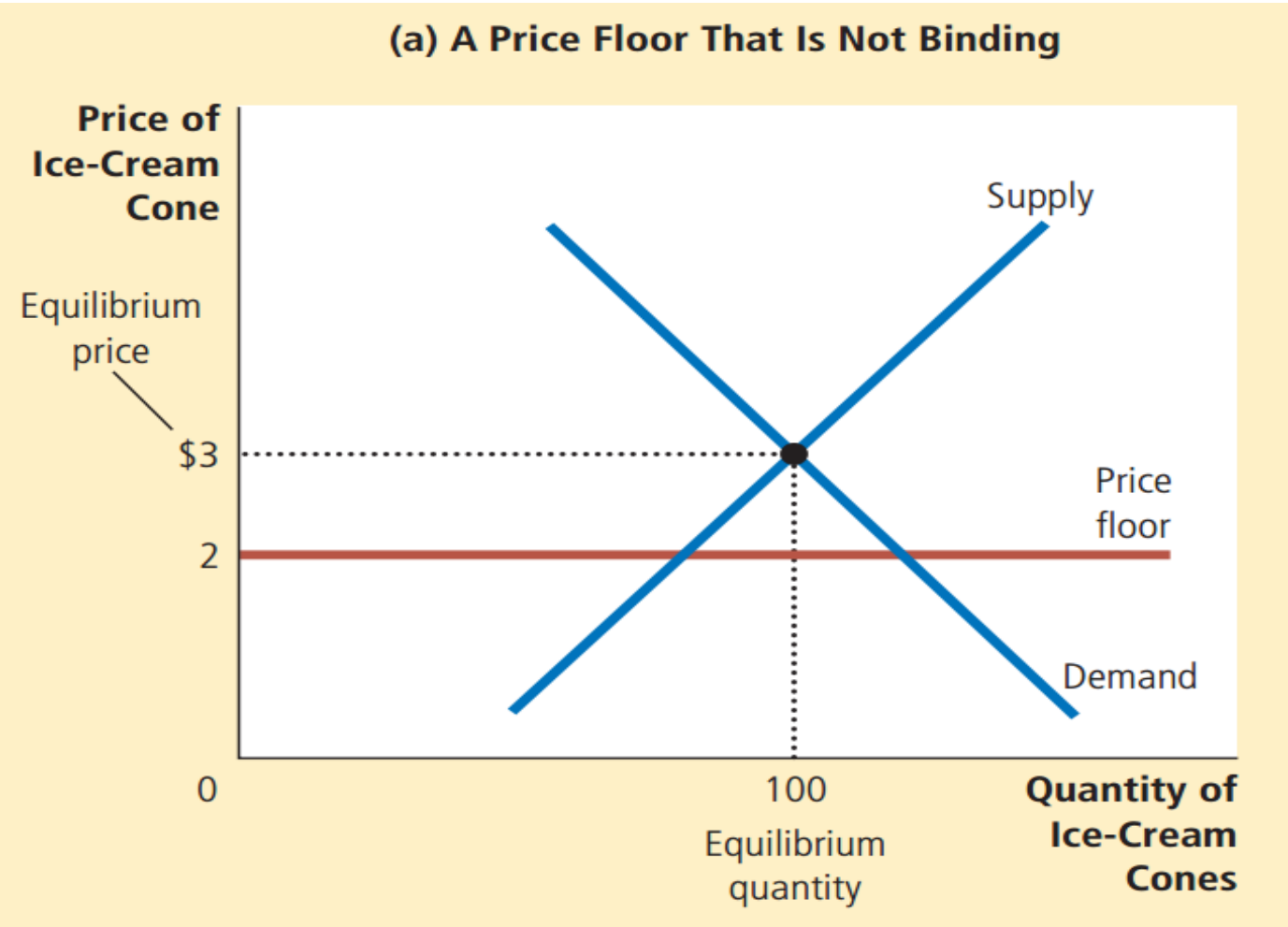
  a legal minimum on the price at which a good can be sold

  How Price Floor Affect Market Outcomes

- If the price that balances supply and demand is above the floor, the price floor is not binding.
- If the equilibrium price is below the price floor, the floor is a binding constraint on the market.

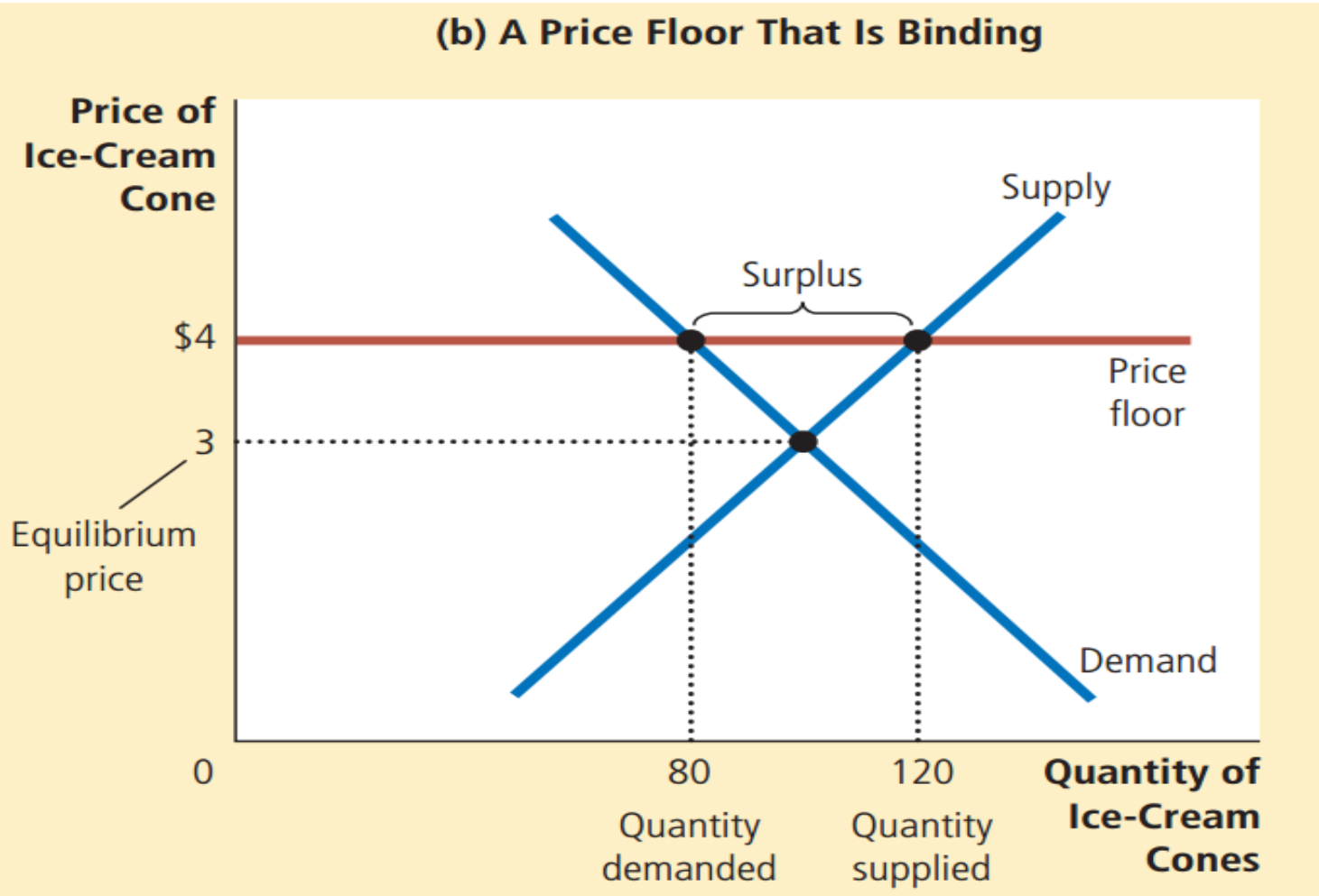
A Market with a Price Floor

- Market forces naturally move the economy to the equilibrium
- The price floor has no effect.



A Market with a Price Floor (II)

- The market price equals the price floor.
- A binding price floor causes a *surplus*.



Case Study: The Minimum Wage

Minimum wage:

- the lowest price for labor that any employer may pay
  - to ensure workers a minimally adequate standard of living
  - e.g., \$7.25/hour in the U.S., €9.4/hour in France ¥1500/month, and ¥15.7/hour for part-time job in Sichuan

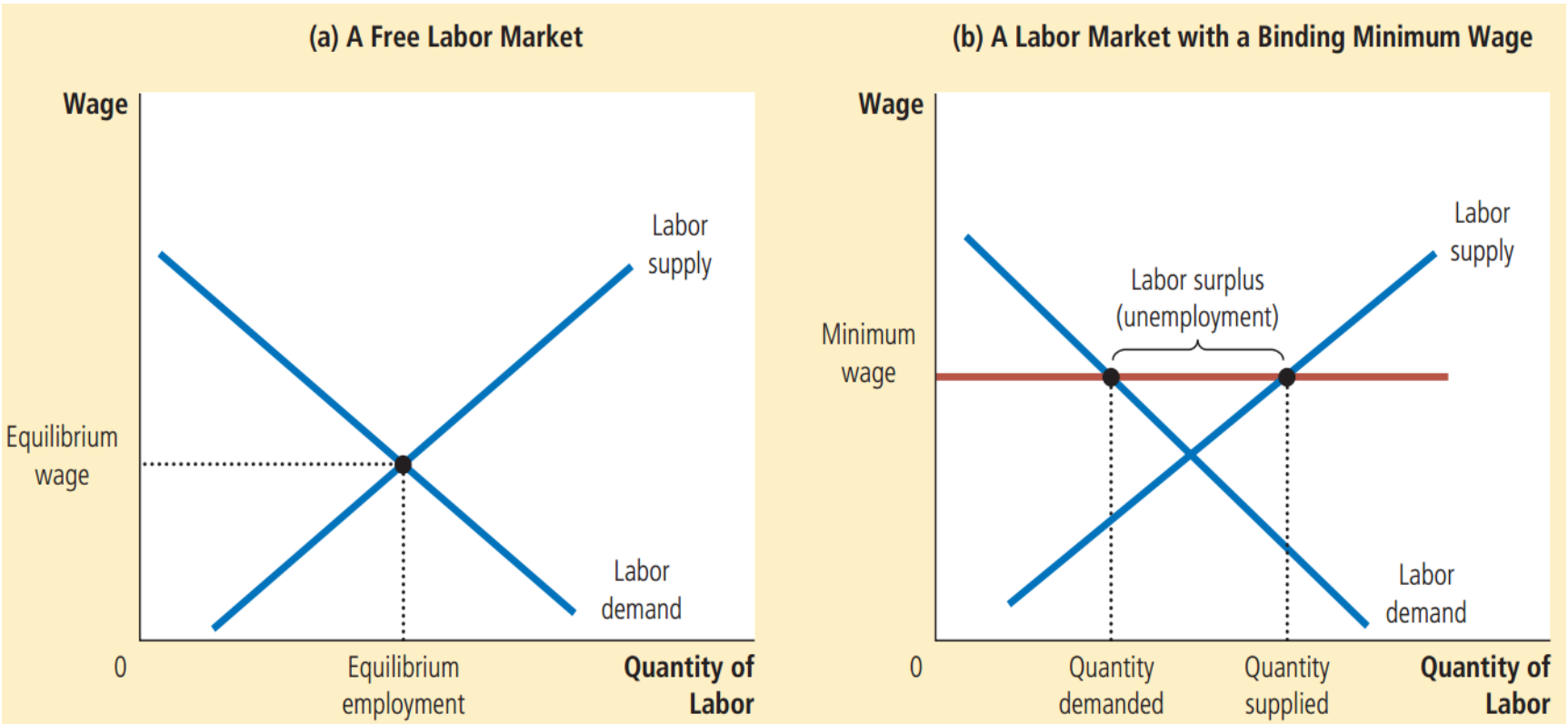
On job market,

- Workers determine the supply of labor.
- Firms determine the demand.

How the Minimum Wage Affects the Labor Market

If the minimum wage is above the equilibrium level,

- The minimum wage causes a surplus (i.e., the quantity of labor supplied exceeds the quantity demanded).
- The result is unemployment.



How the Minimum Wage Affects the Labor Market

- It raises the incomes of those workers who have jobs, but it lowers the incomes of workers who cannot find jobs.
- The impact of the minimum wage depends on the skill and experience of the worker.
  - Highly skilled and experienced workers are not affected.
  - Their equilibrium wages are well above the minimum. Hence, the minimum wage is not binding.
  - The minimum wage has its greatest impact on the market for teenage labor.
  - Teenagers are among the least skilled and least experienced members of the labor force and the equilibrium wages of them are low.
- As a result, the minimum wage is binding more often for teenagers than for other members of the labor force.

How Minimum-wage Laws Affect the Teenage Labor Market

- The minimum wage alters the quantity of labor demanded.
  - A 10% increase in the minimum wage depresses teenage employment between 1 and 3 percent.
- The minimum wage alters the quantity of labor supplied.
  - It increases the number of teenagers who choose to look for jobs (e.g., drop out and take jobs)

Evaluating Price Controls

- Markets are usually a good way to organize economic activity. (*Ten Principles of Economics*)
  - Prices are not the outcome of some haphazard process.
  - Prices are the result of business and consumer decisions.
  - Prices have the crucial job of balancing supply and demand and, thereby, coordinating economic activity.
- Governments can sometimes improve market outcomes. (*Ten Principles of Economics*)
  - They view the market's outcome as unfair and thus control prices.
  - Yet price controls often hurt those they are trying to help.
  - Helping those in need can be accomplished in ways other than controlling prices, e.g., rent subsidies, wage subsidies.

Taxes

All governments use taxes to raise revenue for public projects (e.g., roads, schools, and national defense)

Questions:

- When the government levies a tax on a good, who actually bears the burden of the tax?
  - The people buying the good? The people selling the good?
- If buyers and sellers share the tax burden, what determines how the burden is divided?
- Can the government simply legislate the division of the burden, or is the division determined by more fundamental market forces?

Tax incidence (税收归宿): the manner in which the burden of a tax is shared among participants in a market

How taxes on sellers Affect Market Outcomes

Three steps for the analysis:

1. Decide whether the law affects the supply curve or demand curve.
2. Decide which way the curve shifts.
3. Examine how the shift affects the equilibrium price and quantity.

Implications:

- Although sellers send the entire tax to the government, buyers and sellers share the burden.
- The tax makes both buyers and sellers worse off.

Two lessons

- Buyers and sellers share the burden of taxes.
- Taxes discourage market activity.

How taxes on sellers Affect Market Outcomes

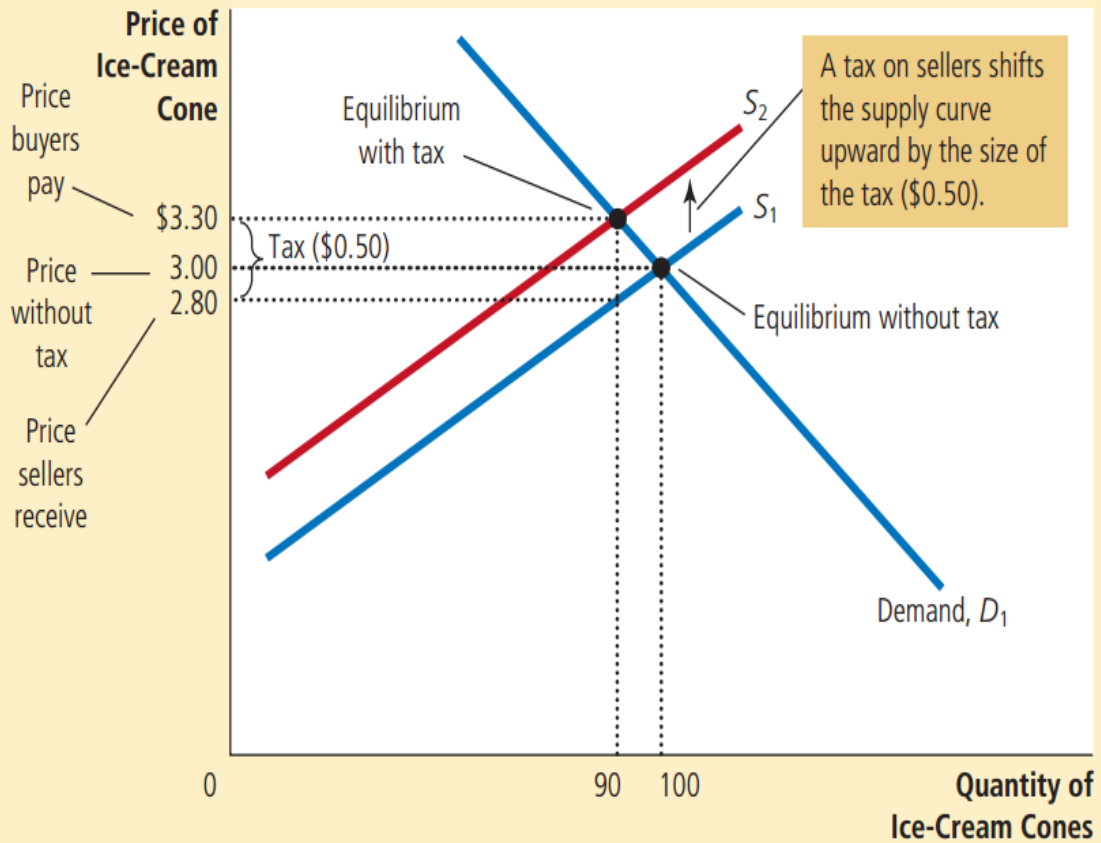


FIGURE 6

A Tax on Sellers

When a tax of $0.50 is levied on sellers, the supply curve shifts up by $0.50 from S_1 to S_2. The equilibrium quantity falls from 100 to 90 cones. The price that buyers pay rises from $3.00 to $3.30. The price that sellers receive (after paying the tax) falls from $3.00 to $2.80. Even though the tax is levied on sellers, buyers and sellers share the burden of the tax.

How taxes on Buyers Affect Market Outcomes

Three steps for the analysis:

1. The supply curve is not affected, but the demand curve shifts.
2. The demand curve shifts to the left (or, equivalently, downward).
3. The tax reduces the size of the market, and the effective price rises.

Implications:

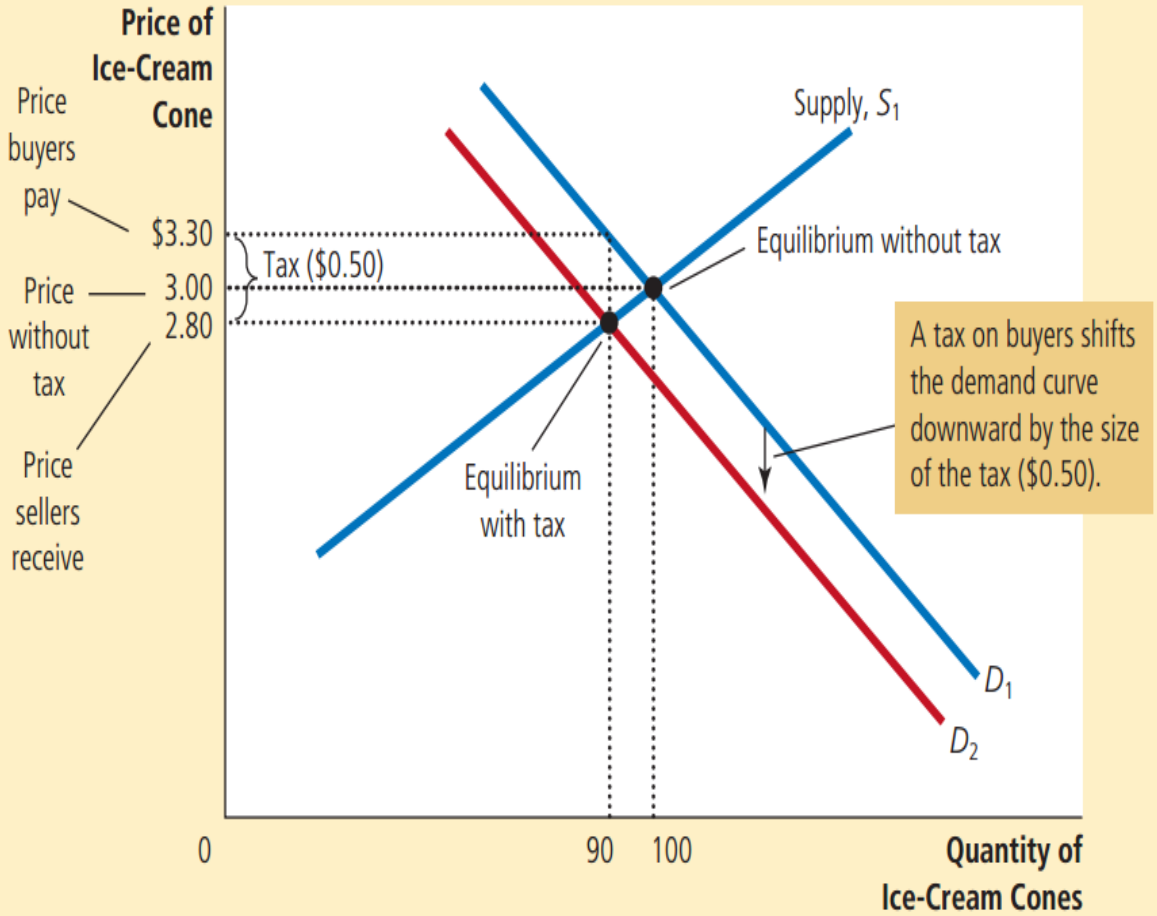
- *Taxes levied on sellers and taxes levied on buyers are equivalent.*
  - The wedge between the buyers' price and the sellers' price is the same, regardless of how the tax is levied.
  - The only difference between a tax levied on sellers and a tax levied on buyers is who sends the money to the government.
  - Once the market reaches its new equilibrium, buyers and sellers share the burden.

How taxes on Buyers Affect Market Outcomes

FIGURE 7

A Tax on Buyers

When a tax of \$0.50 is levied on buyers, the demand curve shifts down by \$0.50 from D_1 to D_2. The equilibrium quantity falls from 100 to 90 cones. The price that sellers receive falls from \$3.00 to \$2.80. The price that buyers pay (including the tax) rises from \$3.00 to \$3.30. Even though the tax is levied on buyers, buyers and sellers share the burden of the tax.



Case Study: Can Congress Distribute the Burden of a Payroll Tax?

Payroll tax: taxes deducted from the amount you earned.

According to the law,

- Half of the tax is paid by firms (out of firms' revenues).
- Half is paid by workers (from their paychecks).

Outcome: This division of the tax burden between workers and firms does not depend on

- whether the government levies the tax on workers,
- levies the tax on firms,
- or divides the tax equally between the two groups.

The most basic lesson of tax incidence:

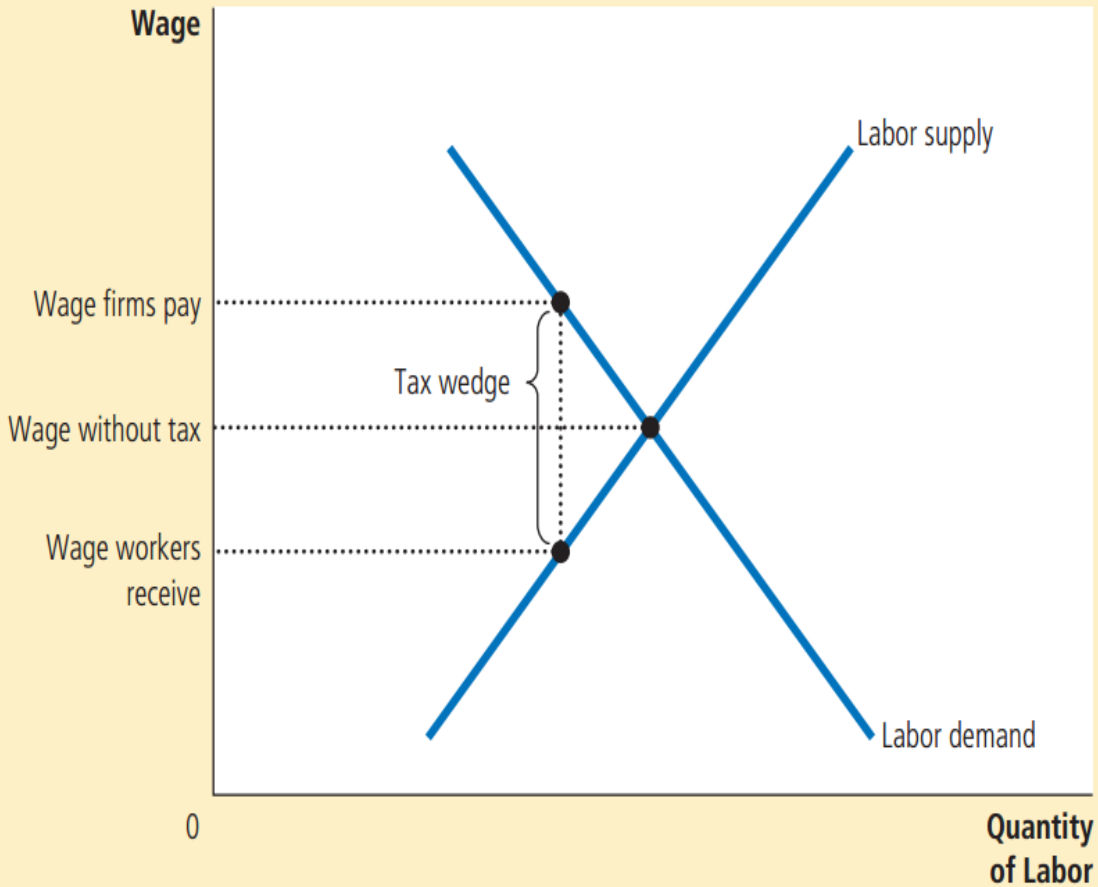
- Lawmakers cannot legislate the true burden of a tax.
- Tax incidence depends on the forces of supply and demand.

Case Study: Can Congress Distribute the Burden of a Payroll Tax?

FIGURE 8

A Payroll Tax

A payroll tax places a wedge between the wage that workers receive and the wage that firms pay. Comparing wages with and without the tax, you can see that workers and firms share the tax burden. This division of the tax burden between workers and firms does not depend on whether the government levies the tax on workers, levies the tax on firms, or divides the tax equally between the two groups.



Elasticity and Tax Incidence

How exactly is the tax burden divided?

- Only rarely will it be shared equally.
- *A tax burden falls more heavily on the side of the market that is less elastic.*

Why is this true?

- The elasticity measures the willingness of buyers or sellers to leave the market when conditions become unfavorable.
  - A small elasticity means that buyers/sellers do not have good alternatives to consuming/producing this particular good.
- The side of the market with fewer good alternatives is less willing to leave the market and thus bare more of the tax burden.

The supply of labor is much less elastic than the demand. Therefore, workers rather than firms bear most of the burden of the payroll tax.

How the Burden of a Tax Is Divided

The difference is the relative elasticity of supply and demand.

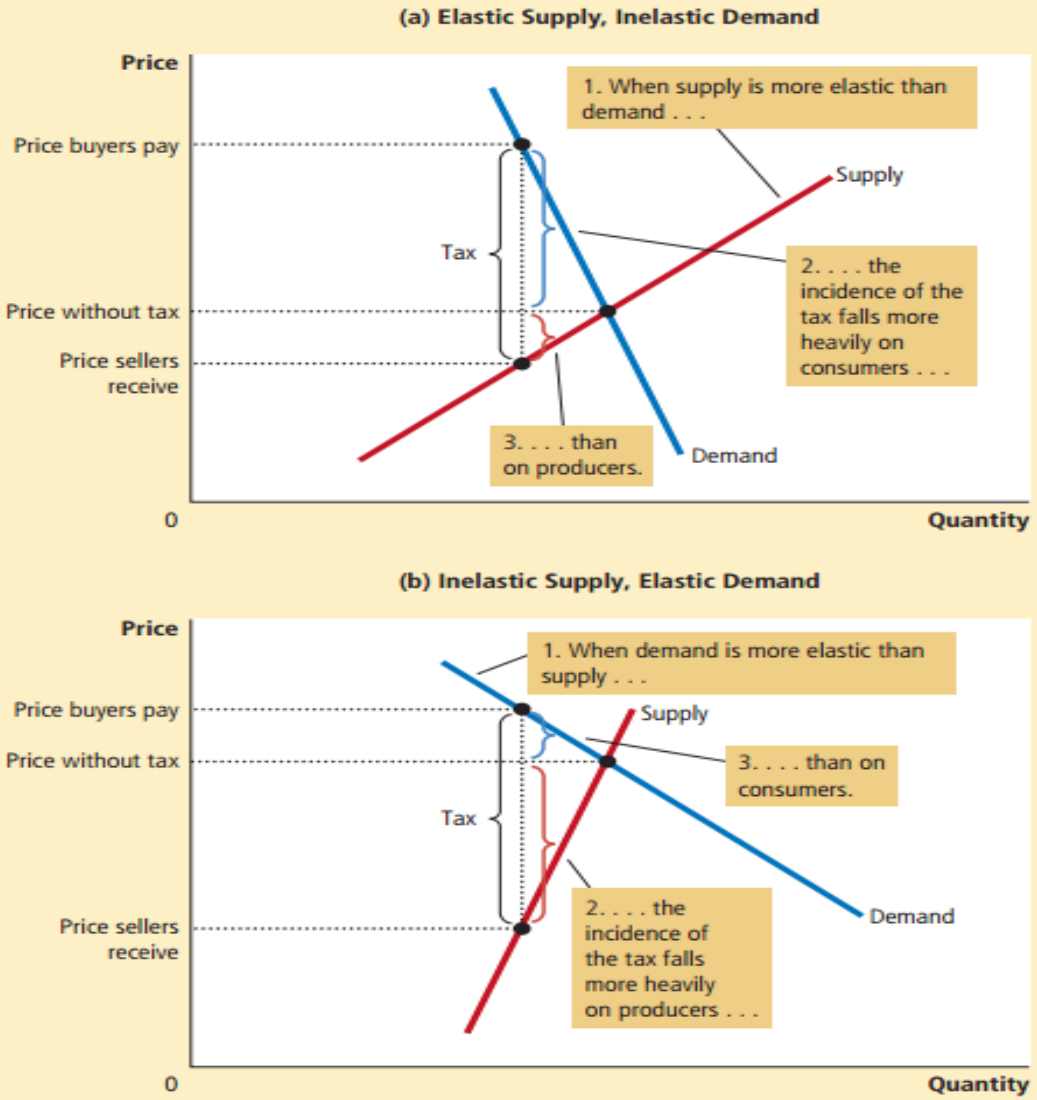


FIGURE 9

How the Burden of a Tax Is Divided

In panel (a), the supply curve is elastic, and the demand curve is inelastic. In this case, the price received by sellers falls only slightly, while the price paid by buyers rises substantially. Thus, buyers bear most of the burden of the tax. In panel (b), the supply curve is inelastic, and the demand curve is elastic. In this case, the price received by sellers falls substantially, while the price paid by buyers rises only slightly. Thus, sellers bear most of the burden of the tax.

Case Study: Who Pays the Luxury Tax?

© Ariel Skelley/Blend Images/Corbis

"If this boat were any more expensive, we'd be playing golf."

- In 1990, luxury tax on items such as yachts, furs and jewelry was adopted
- Goal: to raise revenue from those who could most easily afford to pay
- Outcome: Most of the luxury tax was repealed in 1993.
- Reason: The burden on a luxury tax falls more on the middle class than on the rich.
  - The demand for luxuries is quite elastic.
  - The supply of luxuries is relatively inelastic, at least in the short run.

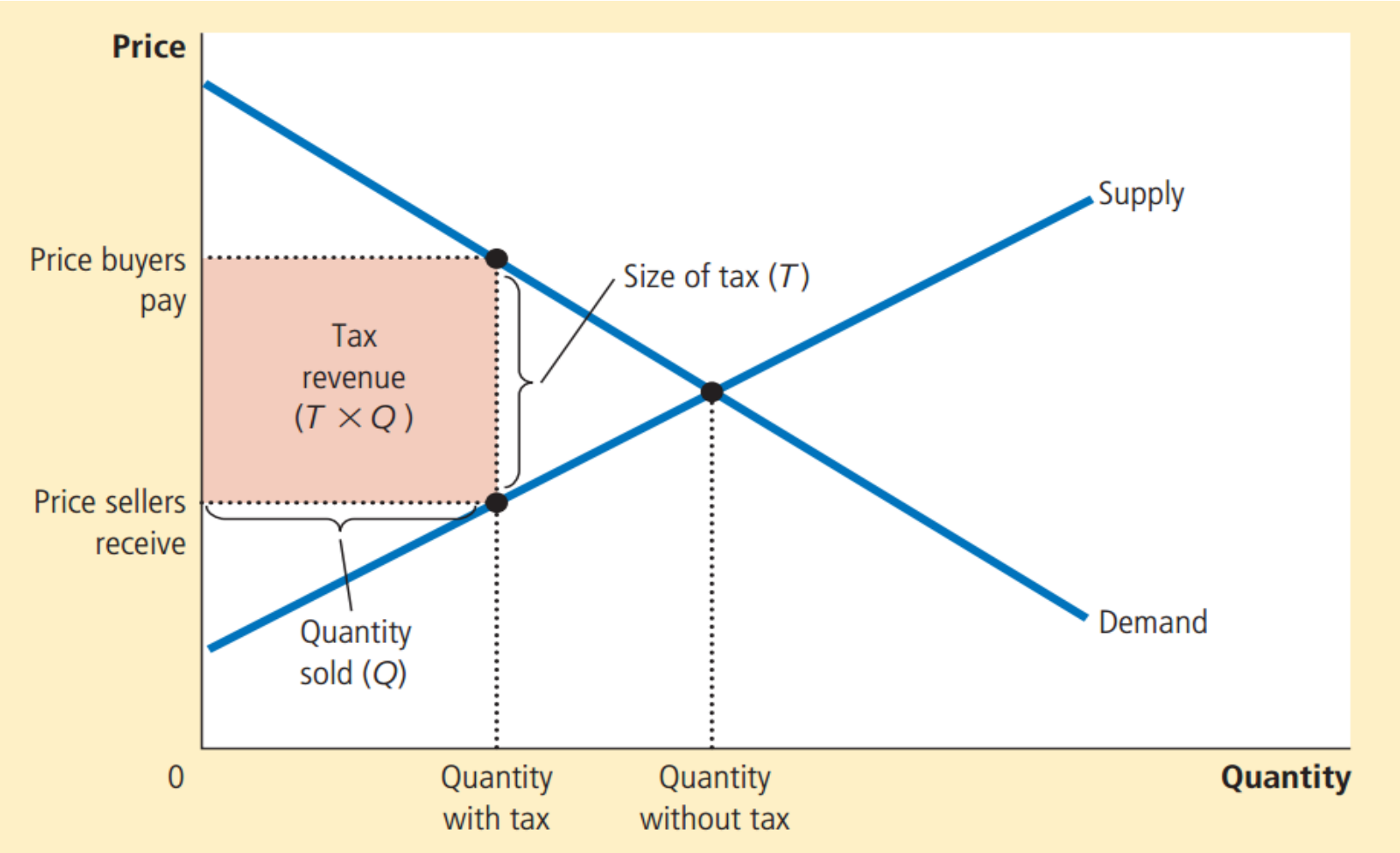
How a Tax Affects Market Participants

The tools to measure the gains and losses from a tax on a good:

- consumer surplus （消费者剩余）: CS
  - the amount buyers are willing to pay for the good minus the amount they actually pay for it
- producer surplus （生产者剩余）: PS
  - the amount sellers receive for the good minus their costs
- government's tax revenue:
  - the size of the tax (T) $\times$ the quantity of the good sold (Q)
  - to measure the public benefit from the tax
  - Note: this benefit actually accrues not to the government but to those on whom the revenue is spent

Tax Revenue

Tax revenue equals the area of the rectangle between the supply and demand curves.



How a Tax Affects Welfare

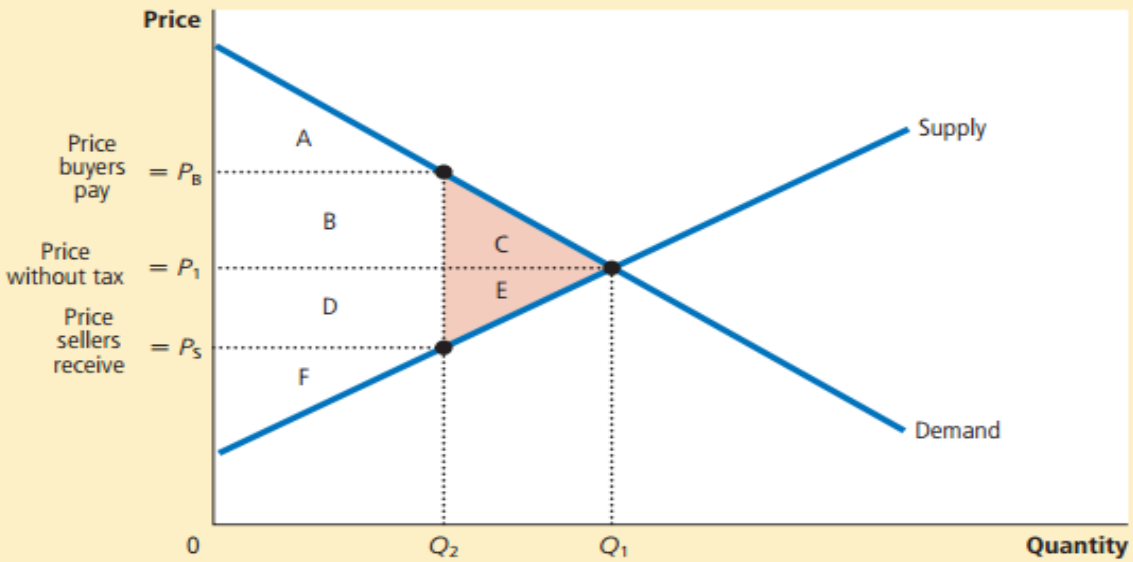
FIGURE 3

How a Tax Affects Welfare

A tax on a good reduces consumer surplus (by the area B + C) and producer surplus (by the area D + E). Because the fall in producer and consumer surplus exceeds tax revenue (area B + D), the tax is said to impose a deadweight loss (area C + E).

	Without Tax	With Tax	Change
Consumer Surplus	A + B + C	A	−(B + C)
Producer Surplus	D + E + F	F	−(D + E)
Tax Revenue	None	B + D	+(B + D)
Total Surplus	A + B + C + D + E + F	A + B + D + F	−(C + E)

The area C + E shows the fall in total surplus and is the deadweight loss of the tax.



- The tax makes buyers and sellers worse off and the government better off.
- The losses to buyers and sellers from a tax exceed the revenue raised by the government.
- deadweight loss（无谓损失）: the fall in total surplus that results from a market distortion, such as a tax.
- *People respond to incentives*
- When the government imposes a tax, it raises the price buyers pay and lowers the price sellers receive, giving buyers an incentive to consume less and sellers an incentive to produce less.

  $\Rightarrow$ the size of the market shrinks below its optimum.
- Thus, because taxes distort incentives, they cause markets to allocate resources inefficiently.

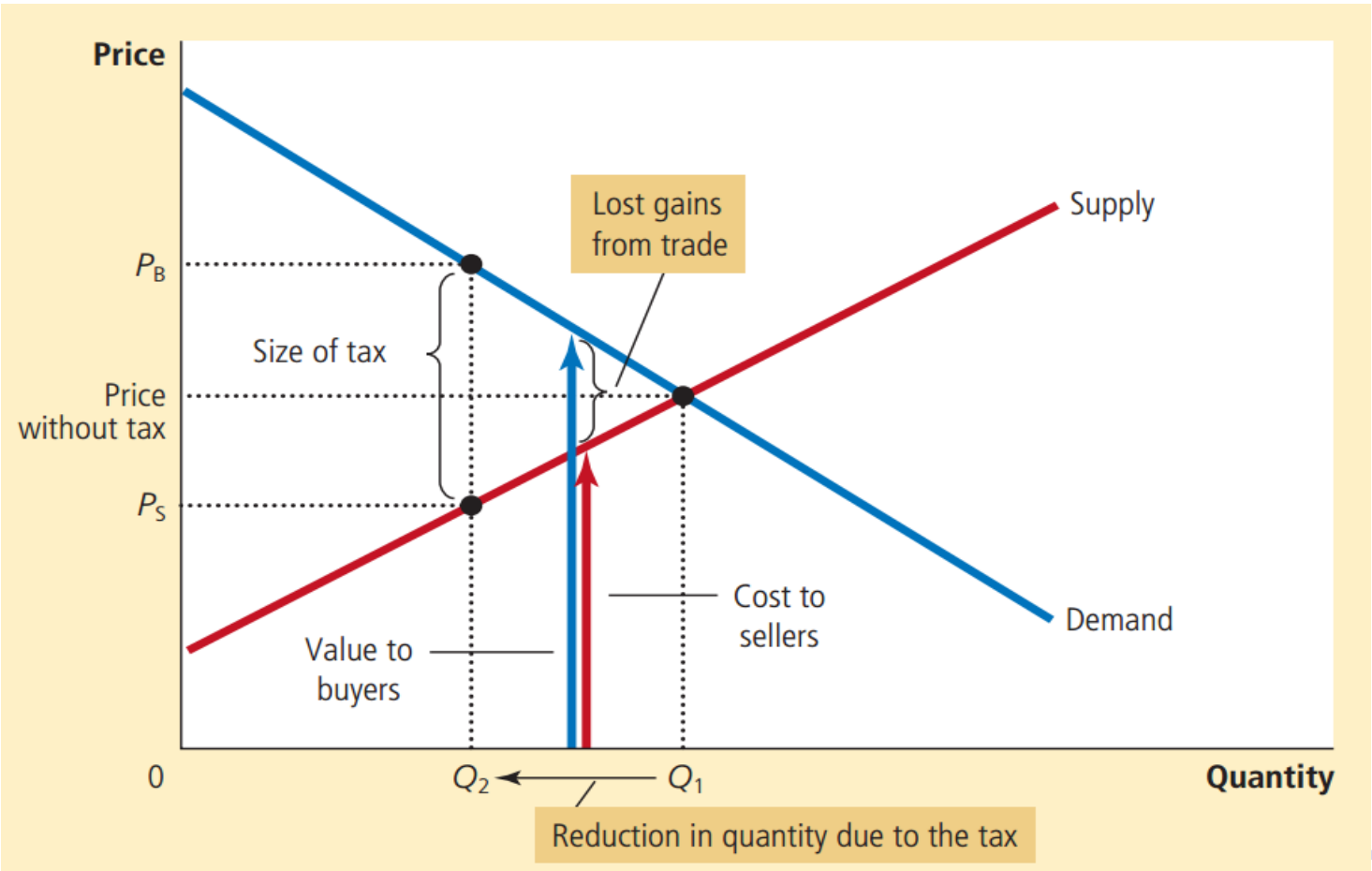
Deadweight Losses and the Gains from Trade

Example:

- Joe cleans Jane's house each week for \$100.
- The opportunity cost of Joe's time is \$80, and the value of a clean house to Jane is \$120.
- Thus, Joe and Jane each receive a \$20 benefit from their deal. (total surplus: \$40)
- Suppose that the government levies a \$50 tax on the providers of cleaning services.
- Jane and Joe cancel their arrangement.
- The tax has made Joe and Jane worse off by a total of \$40 (deadweight losses)
- Taxes cause deadweight losses because they prevent buyers and sellers from realizing some of the gains from trade.

The Source of a Deadweight Loss

- When the government imposes a tax on a good, $Q_1 \rightarrow Q_2$.
- At every quantity between Q_1 and Q_2, the potential gains from trade among buyers and sellers are not realized.
- These lost gains from trade create the deadweight loss.



- The demand curve reflects the value of the good to consumers and that the supply curve reflects the costs of producers.
- When the tax raises the price buyers pay to P_B and lowers the price sellers receive to P_S, the marginal buyers and sellers leave the market, so the quantity sold falls from Q_1 to Q_2.
- the value of the good to these buyers $>$ the cost to these sellers, but the gains from trade are less than the tax.

  $\Rightarrow$ these trades are not made once the tax is imposed.
- The deadweight loss is the surplus that is lost because the tax discourages these mutually advantageous trades.

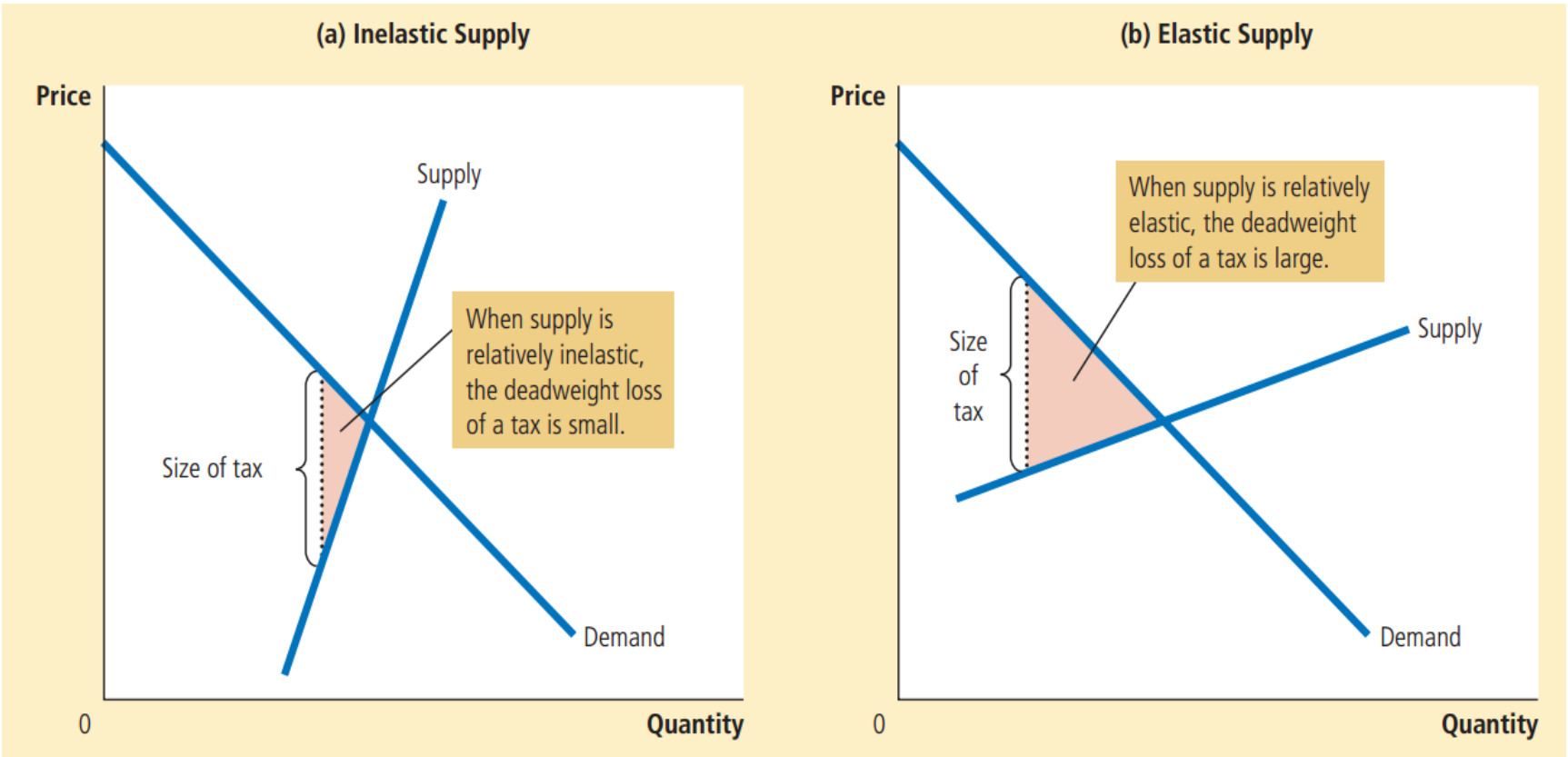
The Determinants of the Deadweight Loss

What determines whether the deadweight loss from a tax is large or small?

- **price elasticities of supply and demand**
  - which measure how much the quantity supplied and quantity demanded respond to changes in the price.

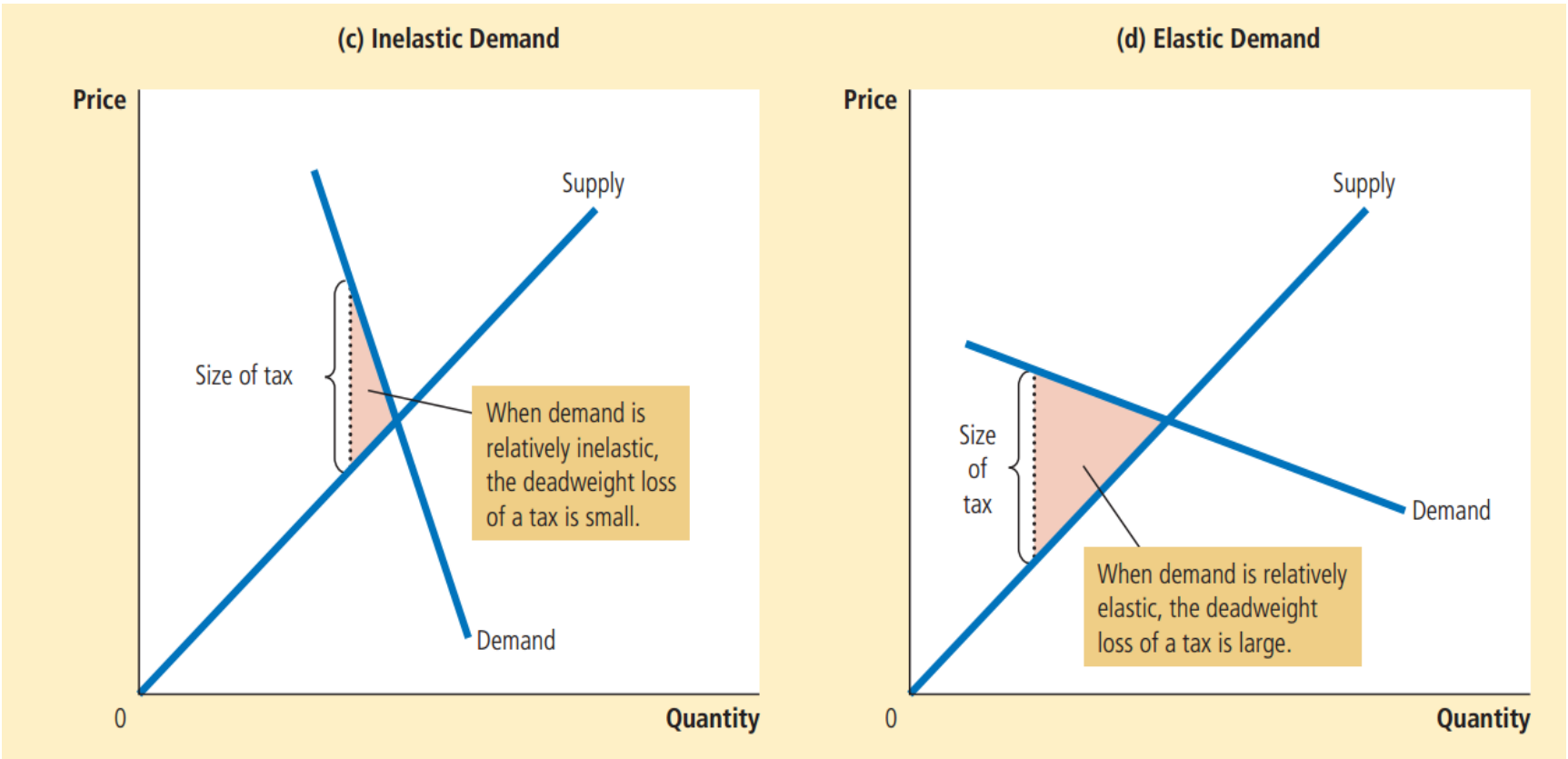
Tax Distortions (税收扭曲) and Elasticities

- The demand curve and the size of the tax are the same.
- The only difference: the elasticity of the supply curve.
- The more elastic the supply curve, the larger the deadweight loss of the tax.



Tax Distortions and Elasticities (II)

- The supply curve and the size of the tax are the same.
- But the price elasticity of demand is different.
- Notice that the more elastic the demand curve, the larger the deadweight loss of the tax.



Lessons:

- A tax has a deadweight loss because it induces buyers and sellers to change their behavior.
  - The tax raises the price paid by buyers, so they consume less.
  - The tax lowers the price received by sellers, so they produce less.
- Because of these changes in behavior, the equilibrium quantity in the market shrinks below the optimal quantity.
- The more responsive buyers and sellers are to changes in the price, the more the equilibrium quantity shrinks.
- Hence, the greater the elasticities of supply and demand, the greater the deadweight loss of a tax.

The Deadweight Loss Debate

How big should the government be?

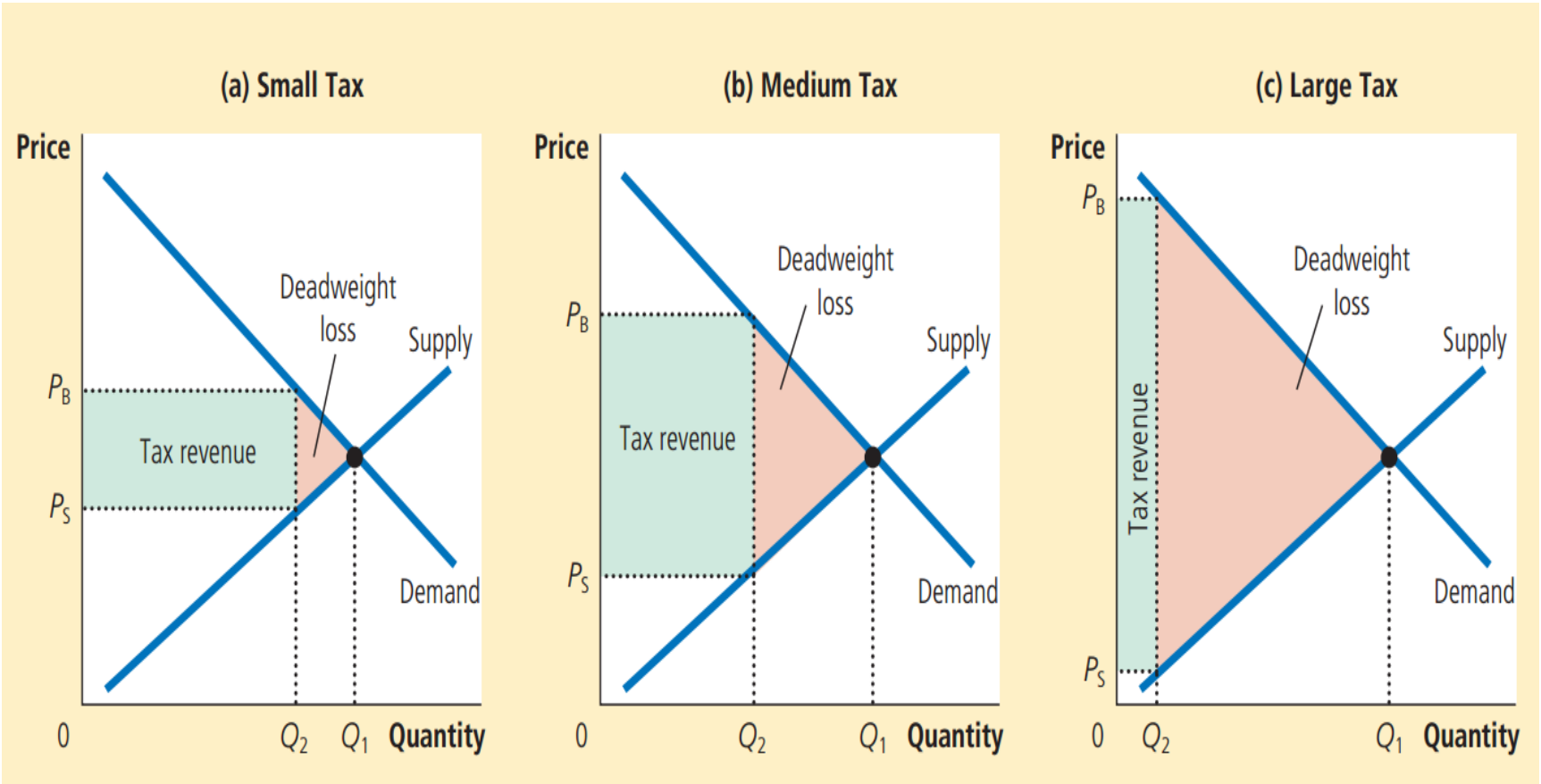
- The larger the deadweight loss of taxation, the larger the cost of any government program.
  - If taxation entails large deadweight losses, then these losses are a strong argument for a leaner government that does less and taxes less.
  - But if taxes impose small deadweight losses, then government programs are less costly than they otherwise might be.

Deadweight Loss and Tax Revenue as Taxes Vary

- Taxes rarely stay the same for long periods of time.
- What happens to the deadweight loss and tax revenue when the size of a tax changes.

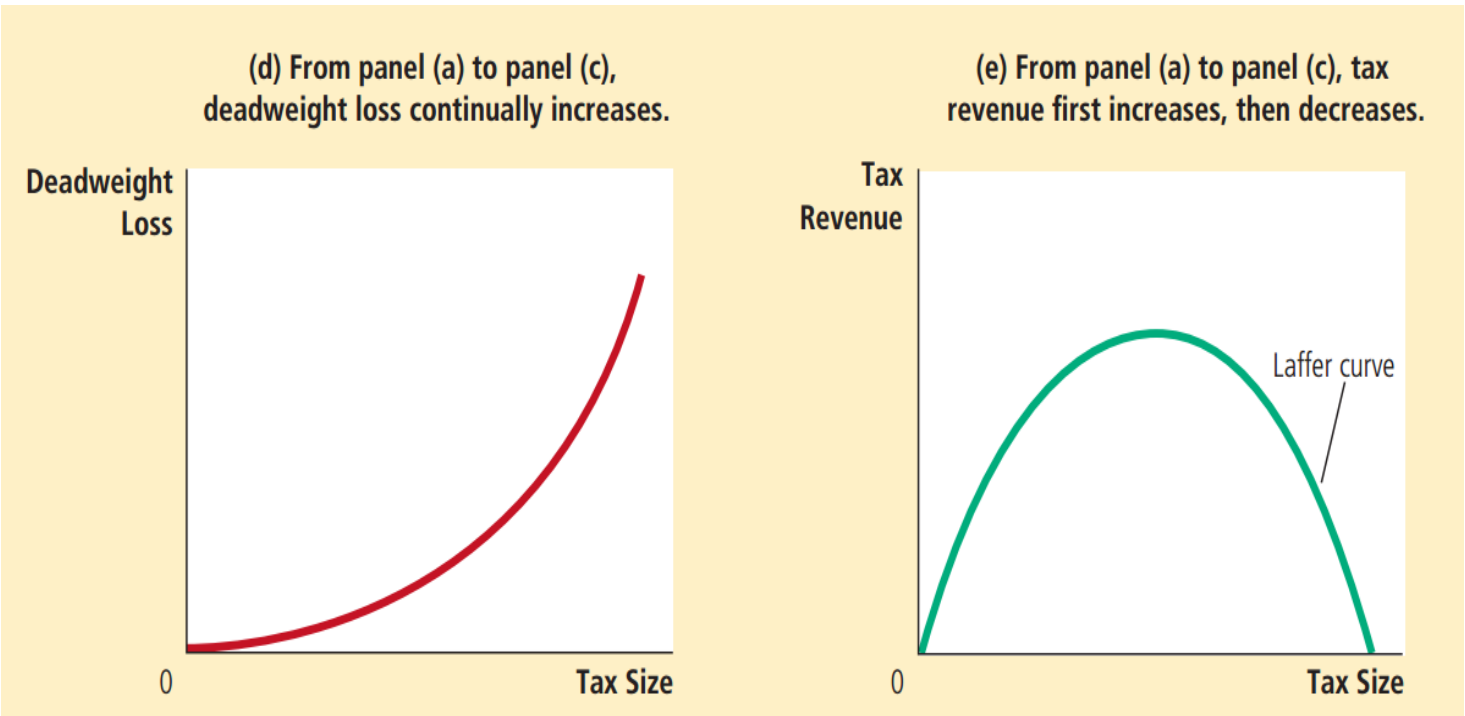
How Deadweight Loss and Tax Revenue Vary with the Size of a Tax

- As the size of a tax rises, the deadweight loss grows larger.
- The deadweight loss of a tax rises even more rapidly than the size of the tax.



How Deadweight Loss and Tax Revenue Vary with the Size of a Tax (II)

- As the size of a tax increases, tax revenue grows.
- But as the size of the tax increases further, tax revenue falls
  - because the higher tax drastically reduces the size of the market.
- For a very large tax, no revenue would be raised because people would stop buying and selling the good altogether.



The Laffer Curve and Supply-Side Economics

- *Laffer curve*（拉弗曲线）
  - Tax rates were so high that reducing them would actually increase tax revenue.
- *supply-side economics*
  - Ronald Reagan's experience: High tax rates caused less work. Low tax rates caused more.
  - He made cutting taxes part of his platform.
- Economists continue to debate Laffer's argument because there is no consensus about the size of the relevant elasticities.

Conclusion

There is no debate, however, about the general lesson:

- How much revenue the government receives depends on how the tax change affects people's behavior.
- Markets are usually a good way to organize economic activity.
- The concepts of producer and consumer surplus make this principle more precise.
- When the government imposes taxes on buyers or sellers of a good, society loses some of the benefits of market efficiency.
- Taxes are costly to market participants not only because taxes transfer resources from those participants to the government but also because they alter incentives and distort market outcomes.

Can Good News for Farming Be Bad News for Farmers?

Answer such questions in three steps:

1. The discovery of the new hybrid affects the supply curve.
2. The supply curve shifts to the right and demand curve remains the same.
3. The quantity of wheat sold increases and the price of wheat falls.

Consider what happens to the total revenue received by farmers.

The discovery affects farmers in two conflicting ways:

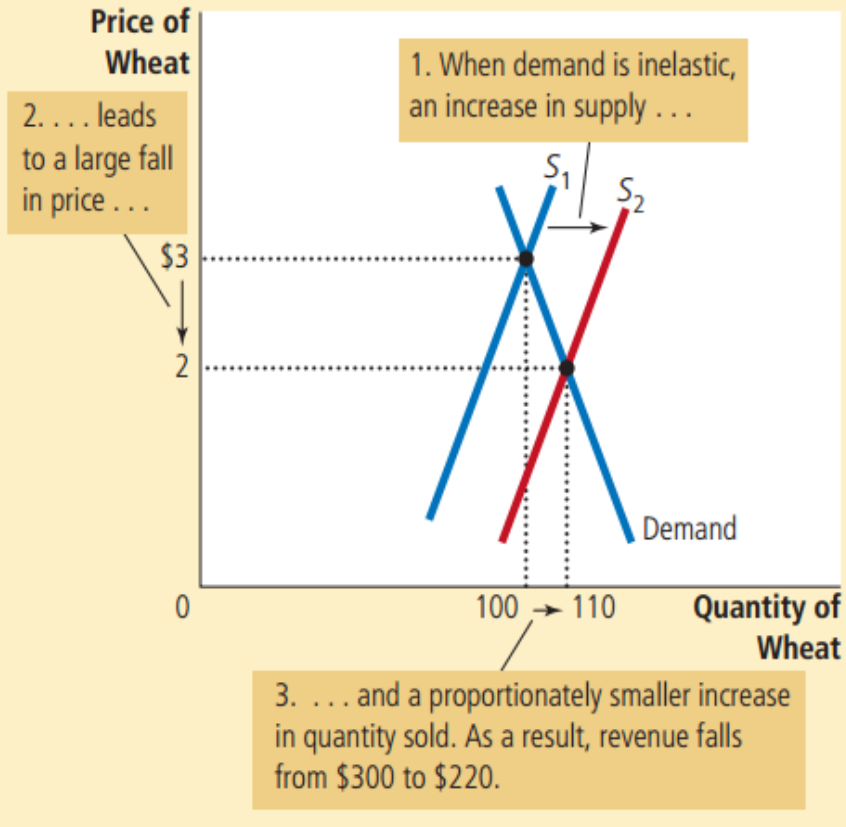
- The hybrid allows farmers to produce more wheat (Q rises),
- but now each bushel of wheat sells for less (P falls).

Can Good News for Farming Be Bad News for Farmers? (II)

Whether total revenue rises or falls depends on the elasticity of demand. When the demand curve is inelastic, a decrease in price causes total revenue to fall.

FIGURE 7

An Increase in Supply in the Market for Wheat
When an advance in farm technology increases the supply of wheat from S_1 to S_2, the price of wheat falls. Because the demand for wheat is inelastic, the increase in the quantity sold from 100 to 110 is proportionately smaller than the decrease in the price from \$3 to \$2. As a result, farmers' total revenue falls from \$300 (\$3 × 100) to \$220 (\$2 × 110).



Can Good News for Farming Be Bad News for Farmers? (III)

The increase in food supply, together with inelastic food demand, caused farm revenues to fall, which in turn encouraged people to leave farming.

Why Did OPEC Fail to Keep the Price of Oil High?

- 1973-1974, OPEC rose oil price by more than 50%
- 1979-1981, the price of oil approximately doubled
- Yet OPEC found it difficult to maintain such a high price.
- From 1982 to 1985, the price of oil steadily declined about 10% per year.
- In 1986, cooperation among OPEC members completely broke down, and the price of oil plunged 45 percent.
- In 1990, the price of oil (adjusted for overall inflation) was back to where it began in 1970, and
- it stayed at that low level throughout most of the 1990s.

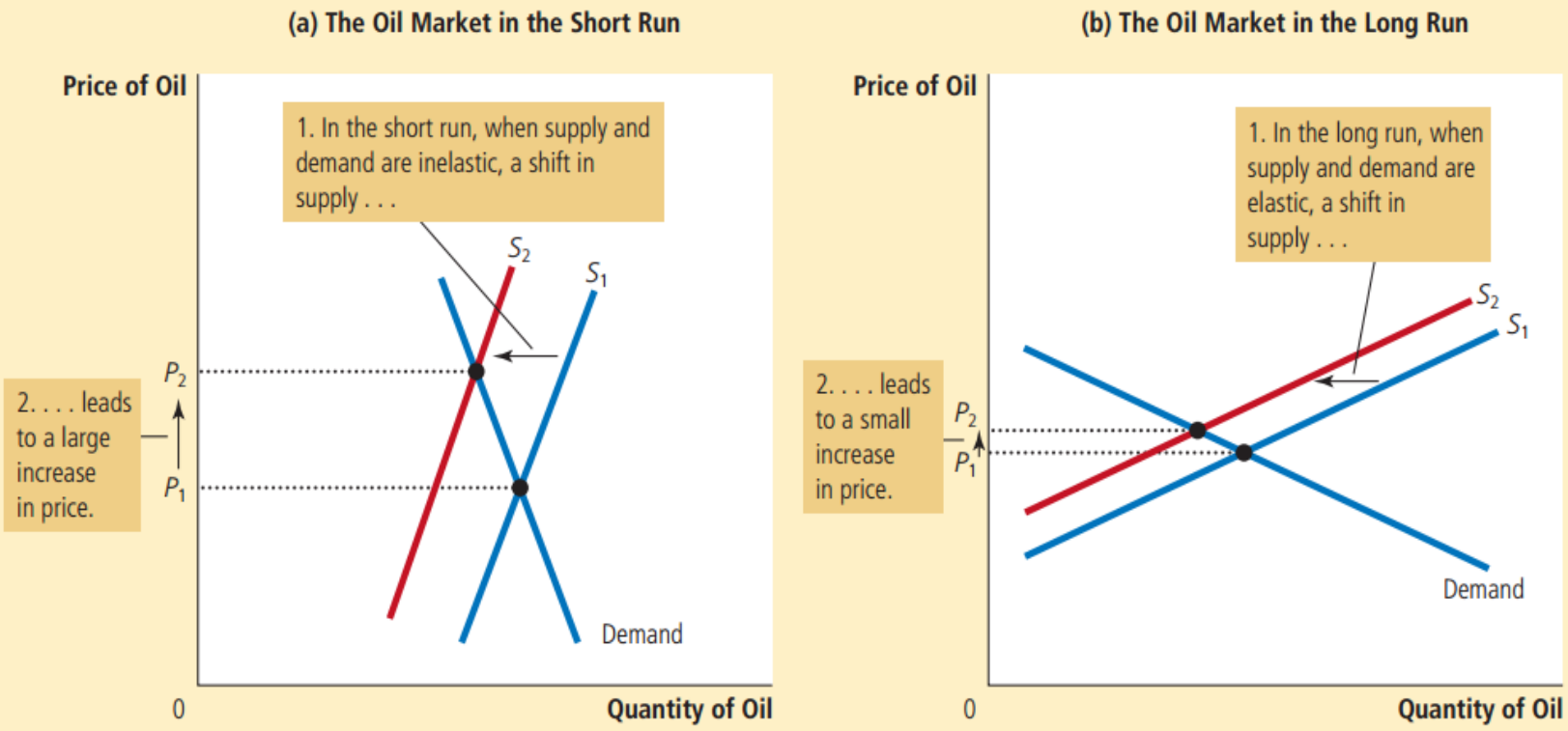
Why Did OPEC Fail to Keep the Price of Oil High? (II)

Raising prices is easier in the **short run** than in the **long run**.

When the supply of oil falls, the response depends on the time horizon. In the short run, supply and demand are relatively inelastic, as in panel (a). Thus, when the supply curve shifts from S_1 to S_2, the price rises substantially. By contrast, in the long run, supply and demand are relatively elastic, as in panel (b). In this case, the same size shift in the supply curve (S_1 to S_2) causes a smaller increase in the price.

FIGURE 8

A Reduction in Supply in the World Market for Oil



Does Drug Interdiction Increase or Decrease Drug-Related Crime?

- The purpose of drug interdiction is to reduce drug use.
- **Its direct impact is on drug sellers rather than the buyers**.
- It shifts the supply curve to the left and leaves the demand curve the same.
  - the cost of selling drugs$\uparrow \Longrightarrow$ the quantity of drugs supplied at any given price$\downarrow$
  - The demand for drugs is not changed at any given price.
- The equilibrium price rises, and the equilibrium quantity falls.

Does Drug Interdiction Increase or Decrease Drug-Related Crime? (II)

But what about the amount of drug-related crime?

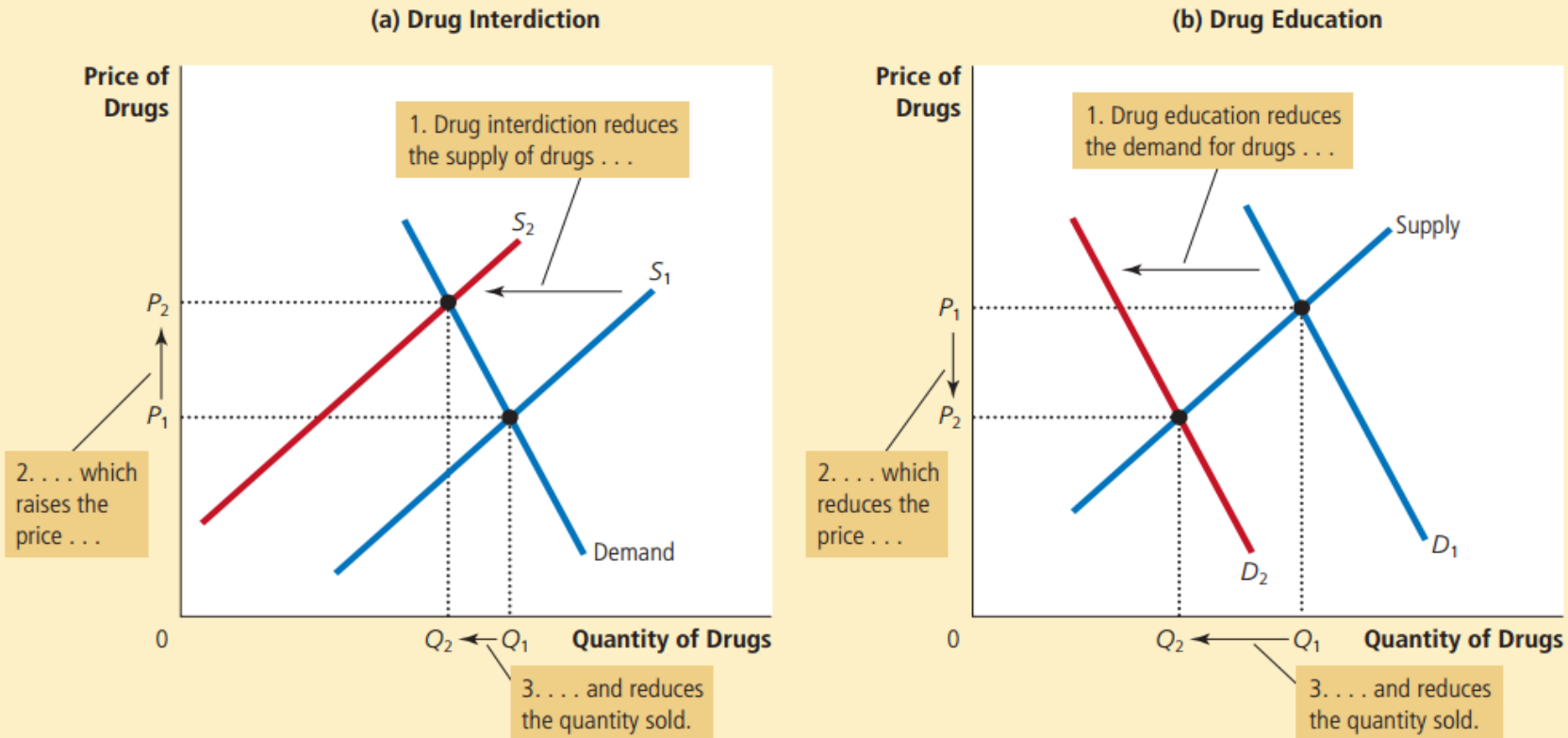
- Drug interdiction raises the total amount of money that drug users pay for drugs.
  - It raises the price of drugs proportionoately more than it reduces drug use (as the demand for drug is inelastic).
- Thus, drug interdiction could increase drug-related crime.
- In contrast, drug education could reduce both drug use and drug-related crime.
- Advocates of drug interdiction argues that drug interdiction would increase drug-related crime in the short run while decreasing it in the long run.
  - As the long-run elasticity of demand for drugs is more elastic.

Policies to Reduce the Use of Illegal Drugs

FIGURE 9

Policies to Reduce the Use of Illegal Drugs

Drug interdiction reduces the supply of drugs from S_1 to S_2, as in panel (a). If the demand for drugs is inelastic, then the total amount paid by drug users rises, even as the amount of drug use falls. By contrast, drug education reduces the demand for drugs from D_1 to D_2, as in panel (b). Because both price and quantity fall, the amount paid by drug users falls.



Willingness to Pay

- Willingness to pay（支付意愿）: the maximum amount that a buyer will pay for a good.
- Each buyer would be eager/refuse to buy the album at a price less/greater than his willingness to pay.
- At a price equal to his willingness to pay, the buyer would be **indifferent** about buying the good.
  - If the price is exactly the same as the value he places on the album, he would be equally happy buying it or keeping his money.

Willingness to Pay (II)

TABLE 1

Four Possible Buyers' Willingness to Pay

Buyer	Willingness to Pay
John	$100
Paul	80
George	70
Ringo	50

- The bidding stops when John bids $80 (or slightly more).
- At this point, Paul, George, and Ringo have dropped out of the bidding because they are unwilling to bid any more than $80.
- The album has gone to the buyer who values it most highly.

Willingness to Pay (III)

What benefit does John receive from buying the album?

- John receives consumer surplus of \$20.
- Consumer surplus: the amount a buyer is willing to pay for a good minus the amount the buyer actually pays for it.
- Consumer surplus measures the benefit buyers receive from participating in a market.
- Paul, George, and Ringo get no consumer surplus from participating in the auction because they left without the album and without paying anything.

Willingness to Pay (IV)

Example with two identical albums

- Assumption:
  - both albums are to be sold for the same price, and
  - no buyer is interested in buying more than one album.
- In this case, the bidding stops when John and Paul bid \$70 (or slightly higher).
- John and Paul each receive consumer surplus equal to his willingness to pay minus the price.
  - John's consumer surplus is \$30 (higher now than in the previous example), and Paul's is \$10.
- The total consumer surplus in the market is \$40.

Using the Demand Curve to Measure Consumer Surplus

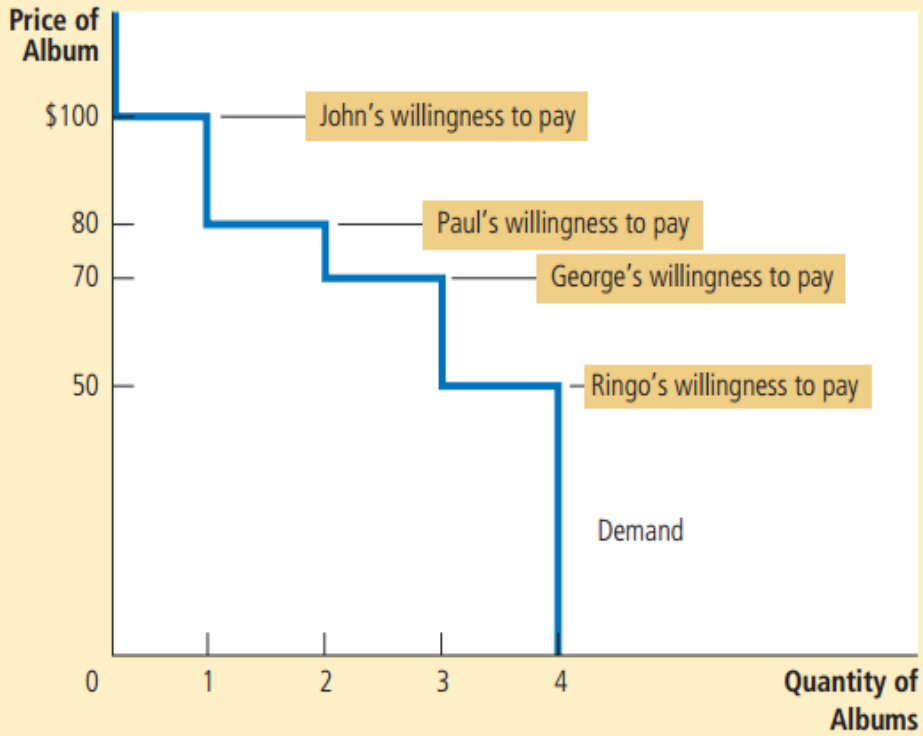
The demand schedule is derived from the willingness to pay of the four possible buyers.

FIGURE 1

The Demand Schedule and the Demand Curve

The table shows the demand schedule for the buyers (listed in Table 1) of the mint-condition copy of Elvis Presley's first album. The graph shows the corresponding demand curve. Note that the height of the demand curve reflects the buyers' willingness to pay.

Price	Buyers	Quantity Demanded
More than $100	None	0
$80 to $100	John	1
$70 to $80	John, Paul	2
$50 to $70	John, Paul, George	3
$50 or less	John, Paul, George, Ringo	4



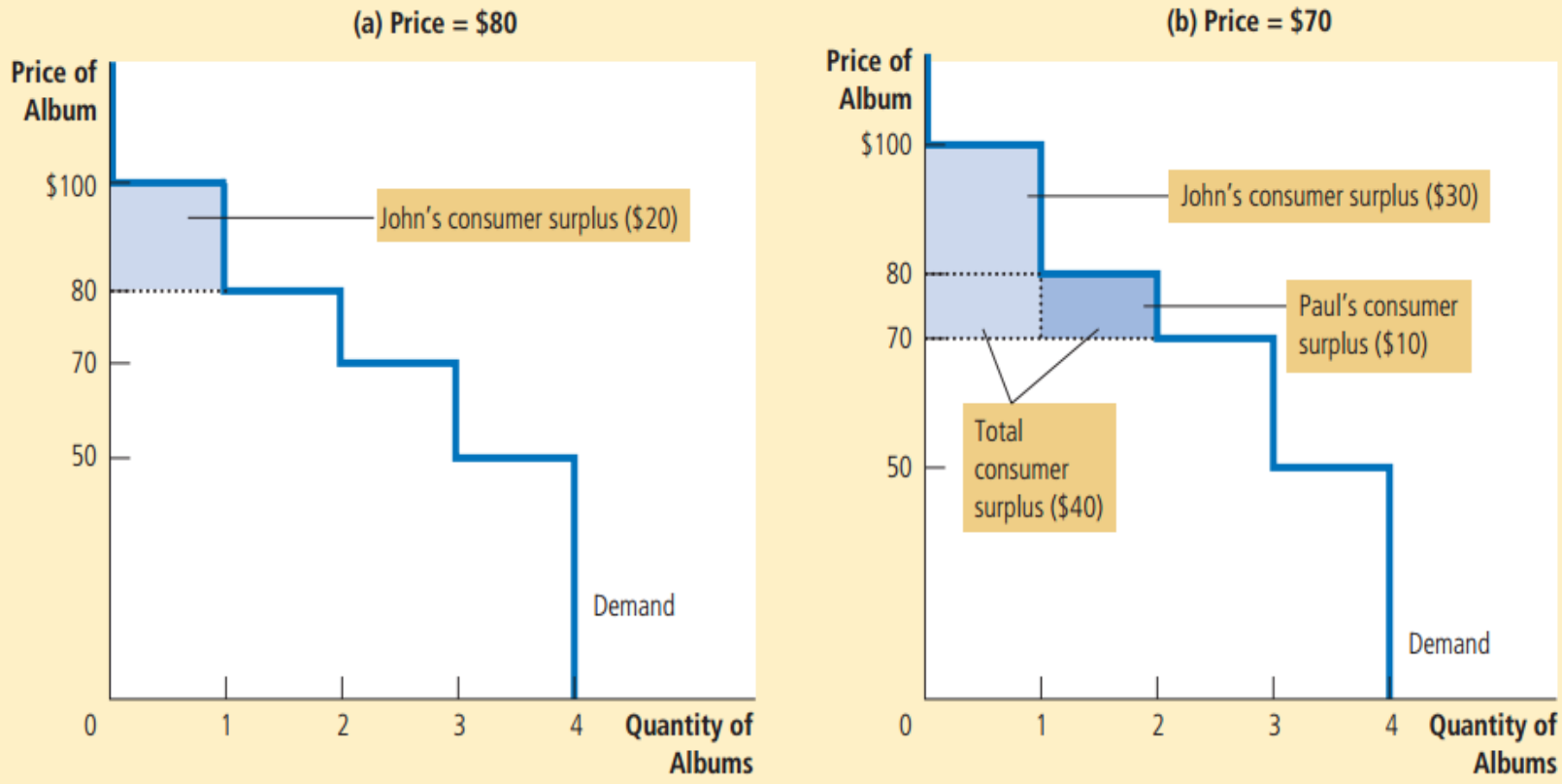
- The height of the demand curve is related to the buyers' willingness to pay.
- At any quantity, the price given by the demand curve shows the willingness to pay of the marginal buyer, the buyer who would leave the market first if the price were any higher.
  - e.g., at a quantity of 4 albums, the demand curve has a height of \$50, the price that Ringo (the marginal buyer) is willing to pay for an album.
  - At a quantity of 3 albums, the demand curve has a height of \$70, the price that George (who is now the marginal buyer) is willing to pay.
- Because the demand curve reflects buyers' willingness to pay, it can also be used it to measure consumer surplus.

Using the Demand Curve to Measure Consumer Surplus (II)

In panel (a), the price of the good is $80 and the consumer surplus is $20. In panel (b), the price of the good is $70 and the consumer surplus is $40.

FIGURE 2

Measuring Consumer Surplus with the Demand Curve



- The area below the demand curve and above the price measures the consumer surplus in a market.
  - Because the height of the demand curve measures the value buyers place on the good, as measured by their willingness to pay for it.
  - The difference between this willingness to pay and the market price is each buyer's consumer surplus.
- Thus, the total area below the demand curve and above the price is the sum of the consumer surplus of all buyers in the market for a good or service.

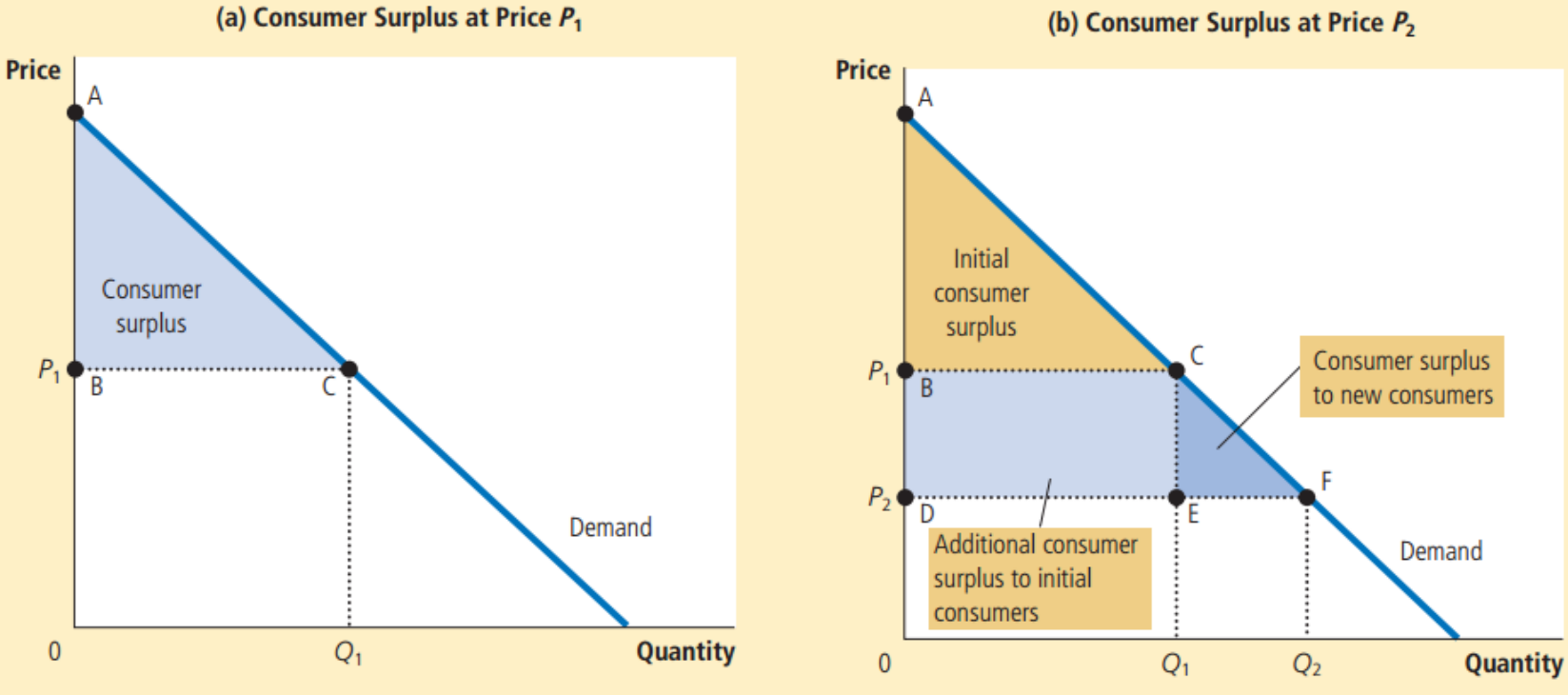
How a Lower Price Raises Consumer Surplus

- A lower price makes buyers of a good better off. But how much does buyers' well-being rise in response to a lower price?

FIGURE 3

How Price Affects Consumer Surplus

In panel (a), the price is P_1, the quantity demanded is Q_1, and consumer surplus equals the area of the triangle ABC. When the price falls from P_1 to P_2, as in panel (b), the quantity demanded rises from Q_1 to Q_2 and the consumer surplus rises to the area of the triangle ADF. The increase in consumer surplus (area BCFD) occurs in part because existing consumers now pay less (area BCED) and in part because new consumers enter the market at the lower price (area CEF).



How a Lower Price Raises Consumer Surplus (II)

The increase in consumer surplus is composed of two parts:

1. Those buyers who were already buying the good at the higher price are better off because they now pay less.
   - The increase in consumer surplus of existing buyers is the reduction in the amount they pay.
2. Some new buyers enter the market because they are willing to buy the good at the lower price.

What Does Consumer Surplus Measure?

Is consumer surplus a good measure of economic well-being?

- Consumer surplus measures the benefit that buyers receive from a good as the buyers themselves perceive it.
- Thus, it is a good measure of economic wellbeing if policymakers want to respect the preferences of buyers.
- In some circumstances, policymakers might choose to disregard consumer surplus.
  - e.g., drug addicts
- However, in most markets, consumer surplus does reflect economic well-being.
  - Economists normally assume that buyers are rational when they make decisions.

back

Producer Surplus

Cost and the Willingness to Sell

- Cost: the value of everything a seller must give up to produce a good.
- Cost is a measure of the seller's willingness to sell her services.
  - Each seller would refuse to/be eager to sell her services at a price less/greater than her cost.
- At a price exactly equal to her cost, she would be indifferent about selling her services.

Cost and the Willingness to Sell

Seller	Cost
Mary	$900
Frida	800
Georgia	600
Grandma	500

- Once Grandma has bid $600 (or slightly less), she is the sole remaining bidder. Mary, Frida, and Georgia are unwilling to do the job for less than $600.
- Note: The job goes to the painter who can do the work at the lowest cost.

Cost and the Willingness to Sell (II)

What benefit does Grandma receive from getting the job?

- Grandma receives producer surplus of \$100.
- Producer surplus: the amount a seller is paid for a good minus the seller's cost of providing it.
- Producer surplus measures the benefit sellers receive from participating in a market.

Cost and the Willingness to Sell (III)

Example with two houses that need painting

- Assumption:
  - no painter is able to paint both houses
  - you will pay the same amount to paint each house.
- Therefore, the price falls until two painters are left.
- In this case, the bidding stops when Georgia and Grandma each offer to do the job for a price of \$800 (or slightly less).
- At a price of \$800, Grandma receives producer surplus of \$300 and Georgia receives producer surplus of \$200.
- The total producer surplus in the market is \$500.

Using the Supply Curve to Measure Producer Surplus

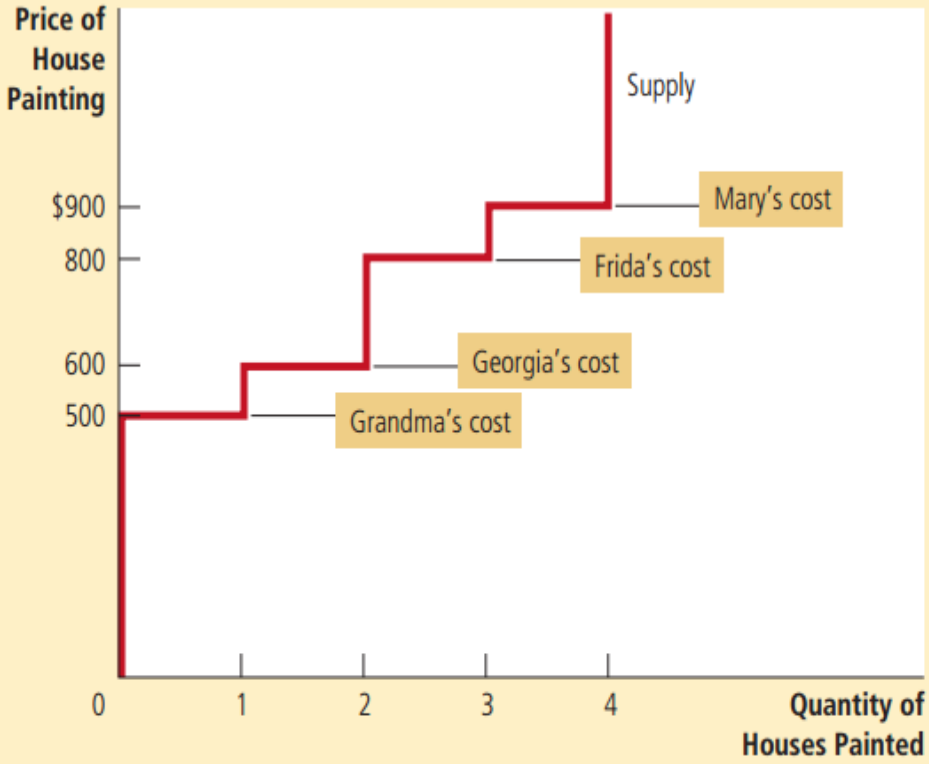
The supply schedule is derived from the costs of the four painters.

FIGURE 4

The Supply Schedule and the Supply Curve

The table shows the supply schedule for the sellers (listed in Table 2) of painting services. The graph shows the corresponding supply curve. Note that the height of the supply curve reflects the sellers' costs.

Price	Sellers	Quantity Supplied
$900 or more	Mary, Frida, Georgia, Grandma	4
$800 to $900	Frida, Georgia, Grandma	3
$600 to $800	Georgia, Grandma	2
$500 to $600	Grandma	1
Less than $500	None	0



Using the Supply Curve to Measure Producer Surplus (II)

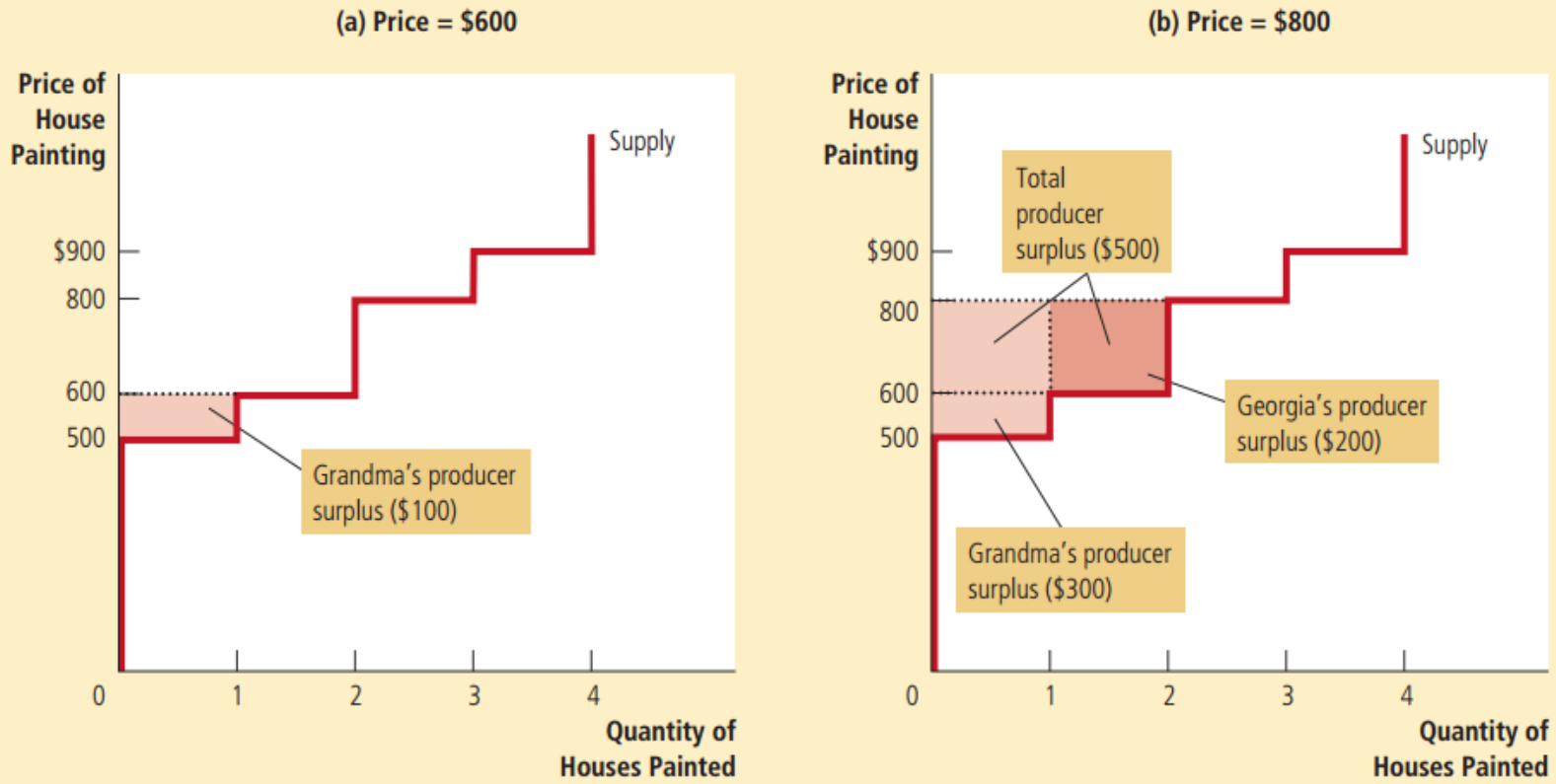
- The height of the supply curve is related to the sellers' costs.
- At any quantity, the price given by the supply curve shows the cost of the marginal seller, the seller who would leave the market first if the price were any lower.
  - e.g., at a quantity of 4 houses, the supply curve has a height of \$900, the cost that Mary (the marginal seller) incurs to provide her painting services.
  - At a quantity of 3 houses, the supply curve has a height of \$800, the cost that Frida (who is now the marginal seller) incurs.
- Because the supply curve reflects sellers' costs, it can be used to measure producer surplus.

Using the Supply Curve to Measure Producer Surplus (III)

In panel (a), the price of the good is \$600 and the producer surplus is \$100. In panel (b), the price of the good is \$800 and the producer surplus is \$500.

FIGURE 5

Measuring Producer Surplus with the Supply Curve



- The area below the price and above the supply curve measures the producer surplus in a market.
  - The height of the supply curve measures sellers' costs, and the difference between the price and the cost of production is each seller's producer surplus.
- Thus, the total area is the sum of the producer surplus of all sellers.

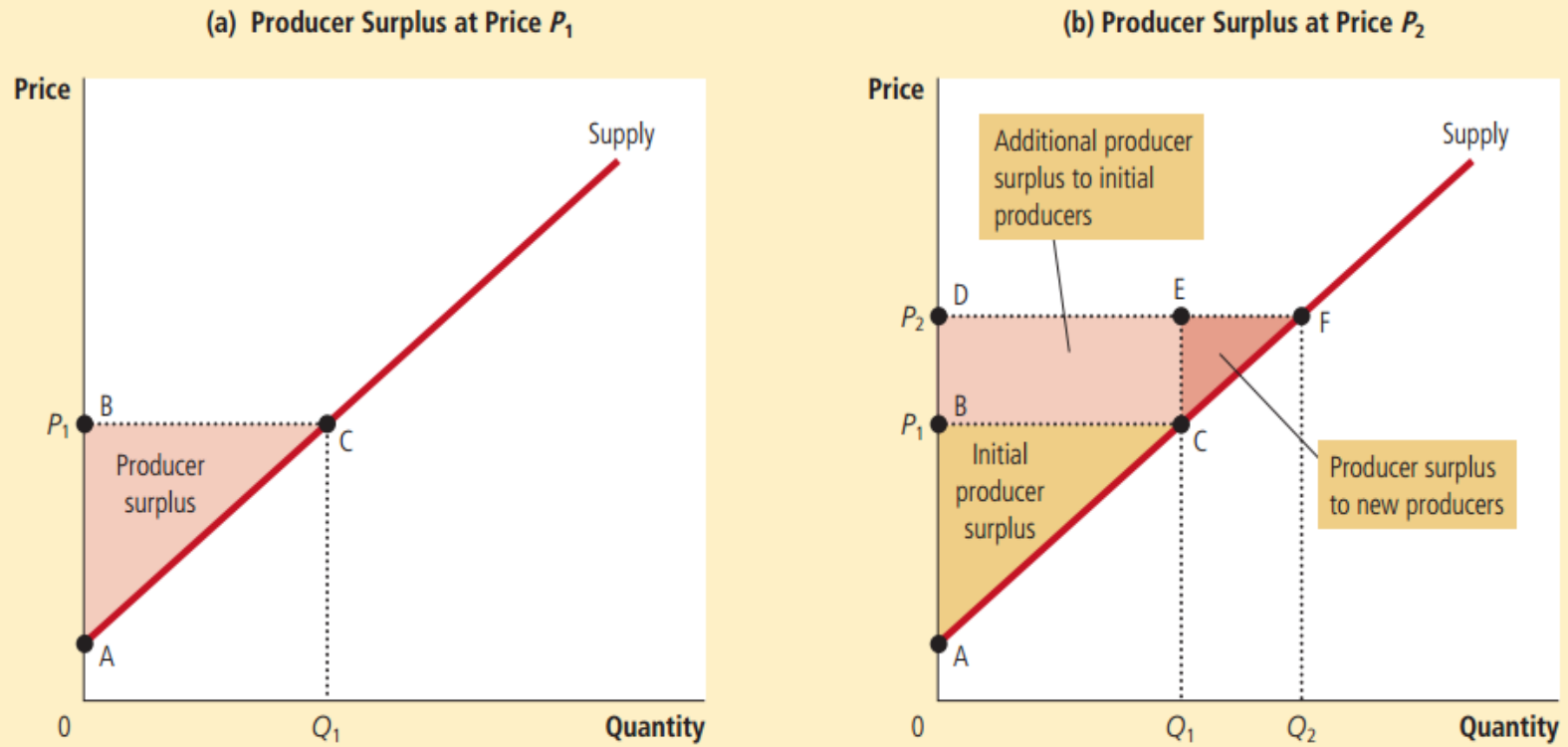
How a Higher Price Raises Producer Surplus

How much does sellers' well-being rise in response to a higher price?

FIGURE 6

How Price Affects Producer Surplus

In panel (a), the price is P_1, the quantity demanded is Q_1, and producer surplus equals the area of the triangle ABC. When the price rises from P_1 to P_2, as in panel (b), the quantity supplied rises from Q_1 to Q_2 and the producer surplus rises to the area of the triangle ADF. The increase in producer surplus (area BCFD) occurs in part because existing producers now receive more (area BCED) and in part because new producers enter the market at the higher price (area CEF).



How a Higher Price Raises Producer Surplus (II)

The increase in producer surplus has two parts:

1. Those sellers who were already selling the good at the lower price are better off because they now get more for what they sell.
2. Some new sellers enter the market because they are willing to produce the good at the higher price, resulting in an increase in the quantity supplied.

back