

Using Supply and Demand to Analyze Markets



Introduction (1/1)

- In this chapter, we put the tools learned in supply and demand analysis to work to:
 - measure the total benefits received by consumers and producers.
 - show how government interventions into markets affect these benefits.
- Chapter Outline:
 - 3.1 Consumer and Producer Surplus
 - 3.2 Price Regulations
 - 3.3 Quantity Regulations
 - 3.4 Taxes
 - 3.5 Subsidies
 - 3.6 Conclusion

Consumer and Producer Surplus

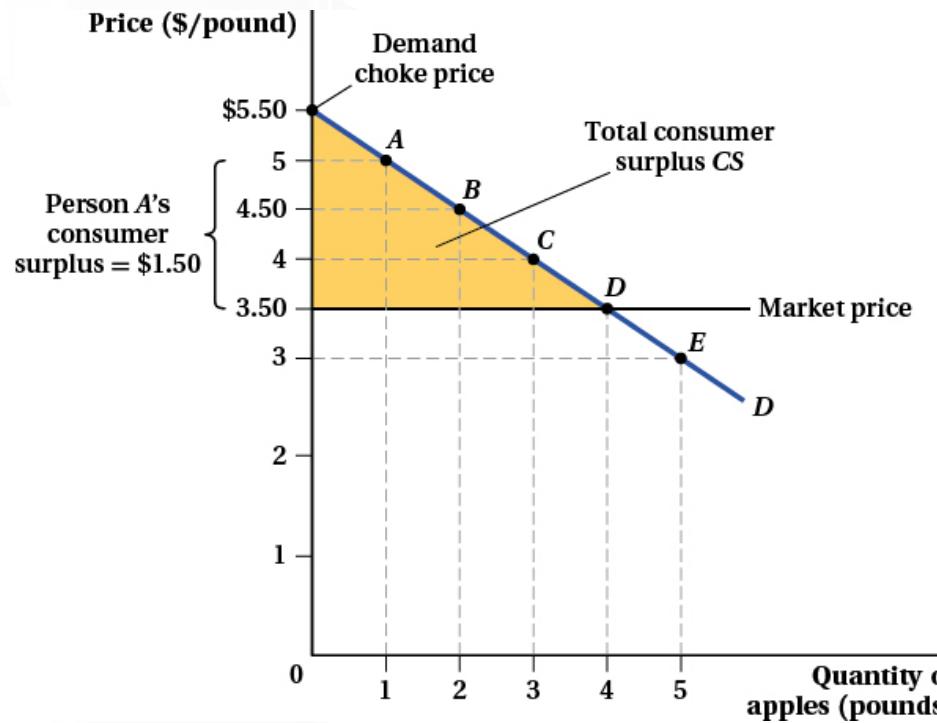
(1/12)

3.1

- Before we can analyze the market impact of any policy, we need a way to measure the benefits consumers and producers obtain from transacting in markets.
- Economists measure these benefits using consumer and producer surplus.
- **Consumer surplus:** the difference between the price consumers would be *willing* to pay for a good (as measured by the height of their demand curves) and the price they *actually* have to pay.

Consumer and Producer Surplus (2/12)

Figure 3.1 Consumer Surplus



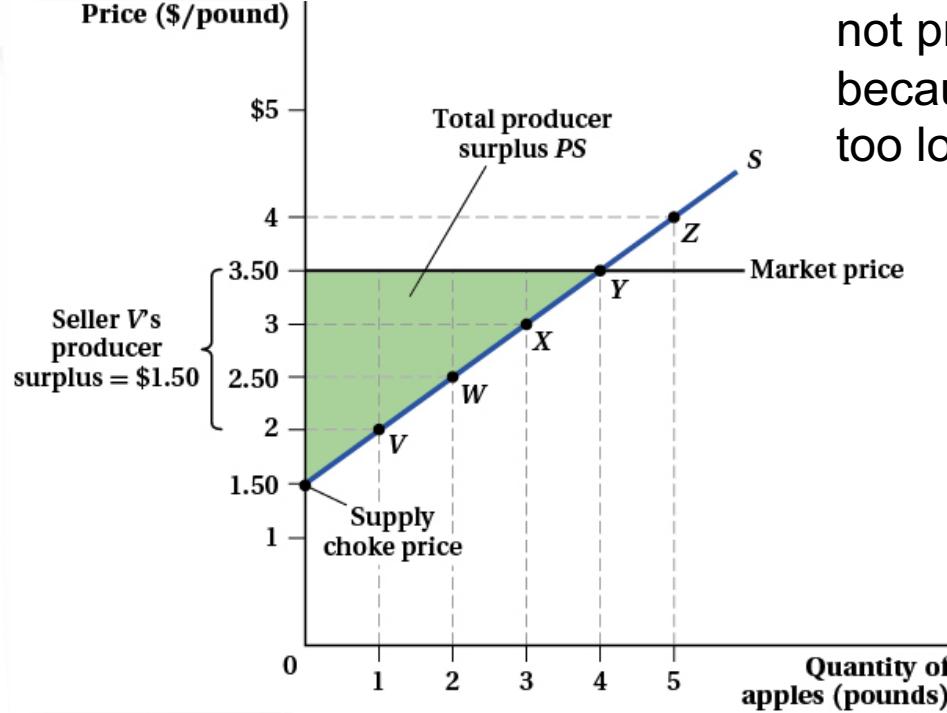
The consumer at point *E* will not buy any apples because the market price is too high.

Consumer and Producer Surplus (3/12)

- Producers also benefit from market exchange.
- **Producer surplus:** the difference between the price producers actually receive for their goods and the cost of producing them (measured by the height of the supply curve).
 - Producer surplus is *not* the same as profit, as we will see in later chapters.

Consumer and Producer Surplus (4/12)

Figure 3.2 Producer Surplus



The producer at point Z will not produce any apples because the market price is too low.

Consumer and Producer Surplus

(5/12): Question 1

Ryan would be willing to pay \$1 for a lollipop. Sarah would be willing to pay \$0.50. The price of the lollipop is \$0.75. What is Ryan and Sarah's combined consumer surplus?

- A. \$0
- B. \$0.25
- C. \$0.50
- D. \$0.75

Consumer and Producer Surplus

(5/12): Question 1 – Correct Answer

Ryan would be willing to pay \$1 for a lollipop. Sarah would be willing to pay \$0.50. The price of the lollipop is \$0.75. What is Ryan and Sarah's combined consumer surplus?

- A. \$0
- B. **\$0.25 (correct answer)**
- C. \$0.50
- D. \$0.75

Consumer and Producer Surplus

(6/12): Question 2

Tom would be willing to sell his yo-yo for \$1.75. Megan would be willing to sell her yo-yo for \$1.50. If the equilibrium price is \$2, what is the combined value of Tom and Megan's producer surplus?

- A. \$0
- B. \$0.25
- C. \$0.50
- D. \$0.75

Consumer and Producer Surplus

(6/12): Question 2 – Correct Answer

Tom would be willing to sell his yo-yo for \$1.75. Megan would be willing to sell her yo-yo for \$1.50. If the equilibrium price is \$2, what is the combined value of Tom and Megan's producer surplus?

- A. \$0
- B. \$0.25
- C. \$0.50
- D. **\$0.75 (correct answer)**

Consumer and Producer Surplus (7/12)

3.1

Using consumer and producer surplus, we can analyze the introduction of new products or *the value of innovation*.

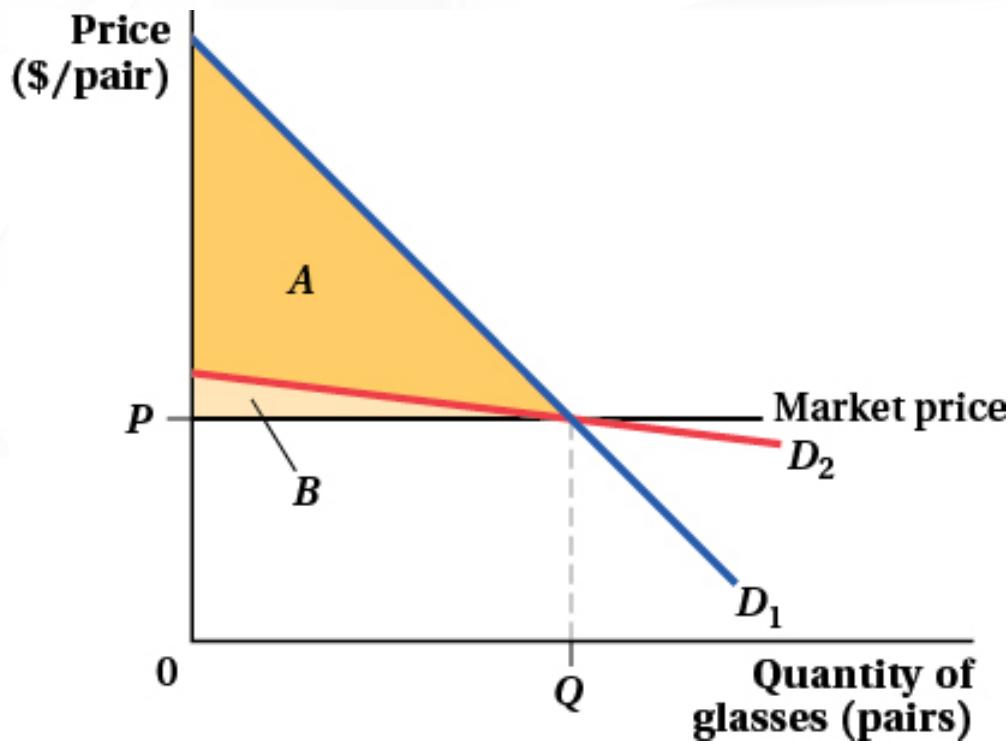
A key factor in determining the amount of potential consumer surplus in the market is the steepness of the demand curve.

Consumer and Producer Surplus

(8/12)

3.1

Figure 3.3 Consumer Surplus and the Elasticity of Demand



If the demand for glasses is D_2 ,
consumer surplus = B

If the demand for glasses is D_1 ,
consumer surplus = $A + B$

All else equal, the steeper the demand curve, the more the consumer surplus.

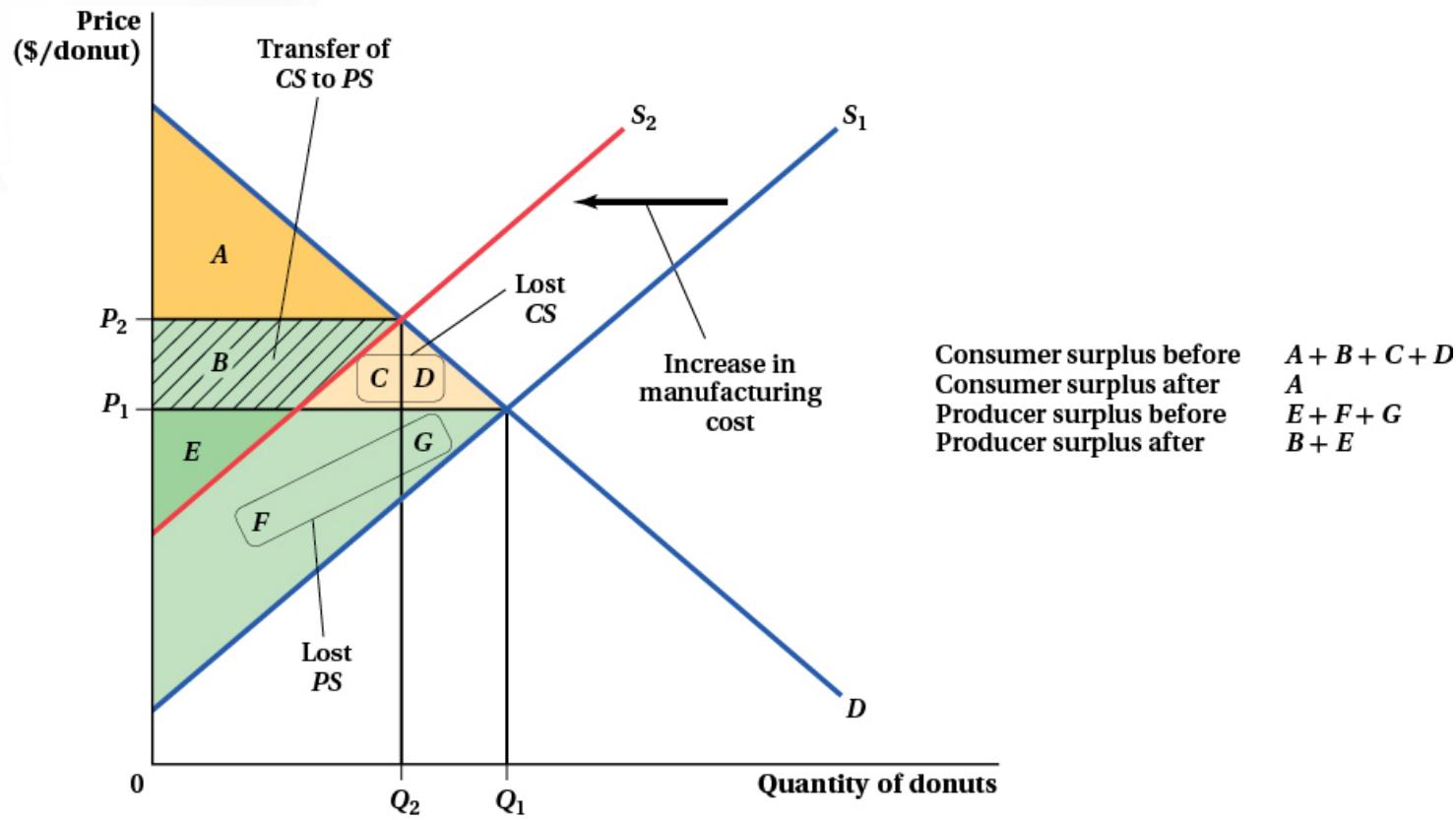
Consumer and Producer Surplus (9/12)

- The concepts of producer and consumer surplus can be used to analyze the impact of any change on either side of the market.
 - Shifts in the demand or supply curve
- We can show how these shifts affect the benefits that producers and consumers receive in a market.

Consumer and Producer Surplus (10/12)

3.1

Figure 3.4 Changes in Surplus from a Supply Shift



Consumer and Producer Surplus (11/12)

3.1

A **decrease** in the supply curve *increases the equilibrium price* and *decreases the equilibrium quantity* in the market. This causes:

- consumer surplus to decrease.
 - Both the increase in price and decrease in quantity decrease CS.
- producer surplus to also decrease.
 - The increase in price increases PS, but the decrease in quantity decreases PS. The net effect is negative due to the downward-sloping demand.

An **increase** in the supply curve *decreases the equilibrium price* and *increases the equilibrium quantity* in the market. This causes:

- consumer surplus to increase.
- producer surplus to increase.

Consumer and Producer Surplus (12/12)

A **decrease** in the demand curve *decreases the equilibrium price* and *decreases the equilibrium quantity* in the market. This causes:

- producer surplus to decrease.
 - Both the decrease in price and decrease in quantity decrease PS.
- consumer surplus to also decrease.
 - The decrease in price increases CS, but the decrease in quantity decreases CS. The net effect is negative due to the upward sloping supply.

An **increase** in the demand curve *increases the equilibrium price* and *increases the equilibrium quantity* in the market. This causes:

- producer surplus to increase.
- consumer surplus to increase.

Price Regulation (1/6)

Politicians often call for price regulations on products whose prices have risen sharply.

Price ceiling: the highest price that can be paid legally for a good or service

- Binding only when set *below* the equilibrium price
- Nonbinding price ceiling: a price ceiling set above the equilibrium market price

What are the effects of price ceilings on markets?

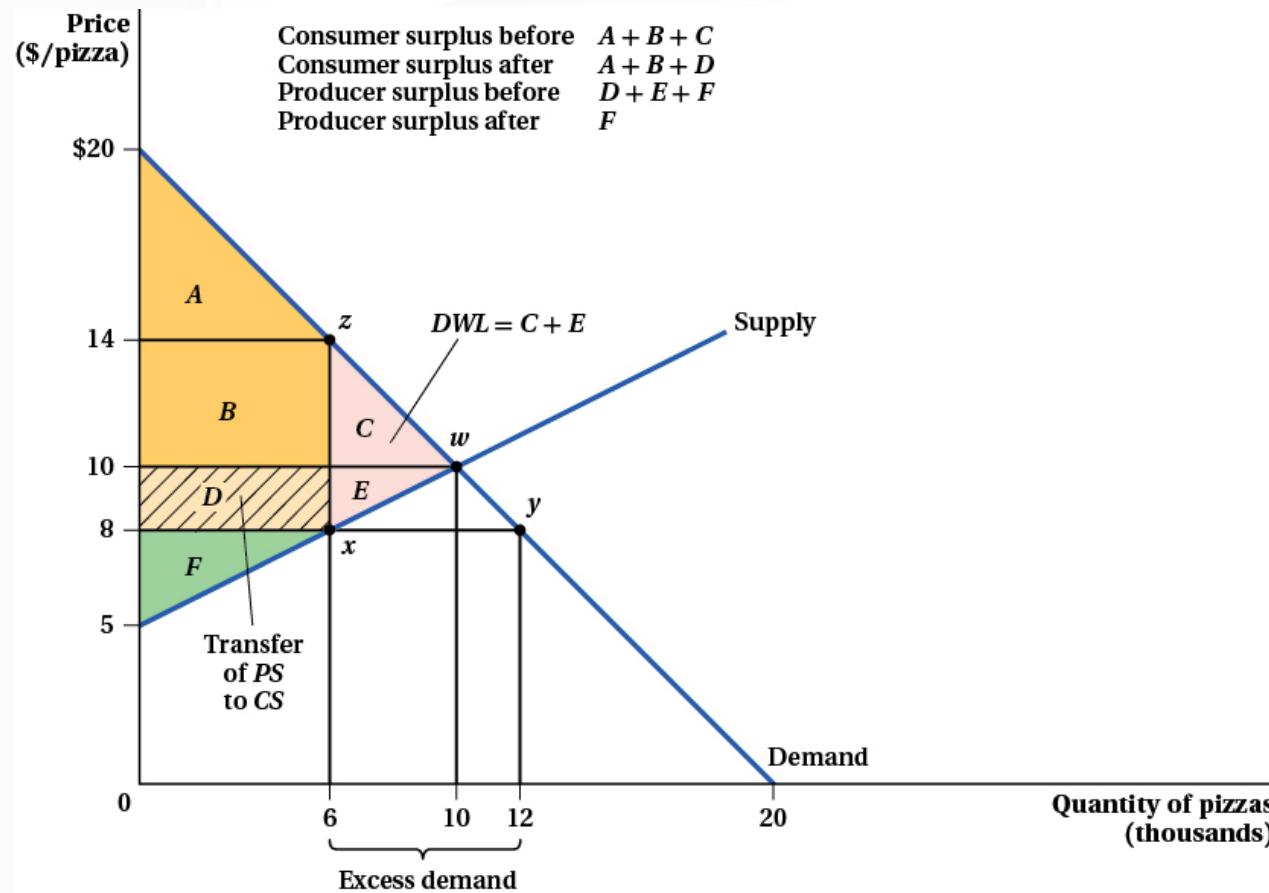
A few important terms:

Transfer: surplus that moves from producers to consumers, or vice versa, as a result of a regulation

Deadweight loss (DWL): the reduction in total surplus that occurs as a result of a market inefficiency

Price Regulation (2/6)

Figure 3.6 The Effects of a Price Ceiling



Price Regulation (3/6)

The supply and demand elasticities determine the relative sizes of the deadweight loss and the transfer.

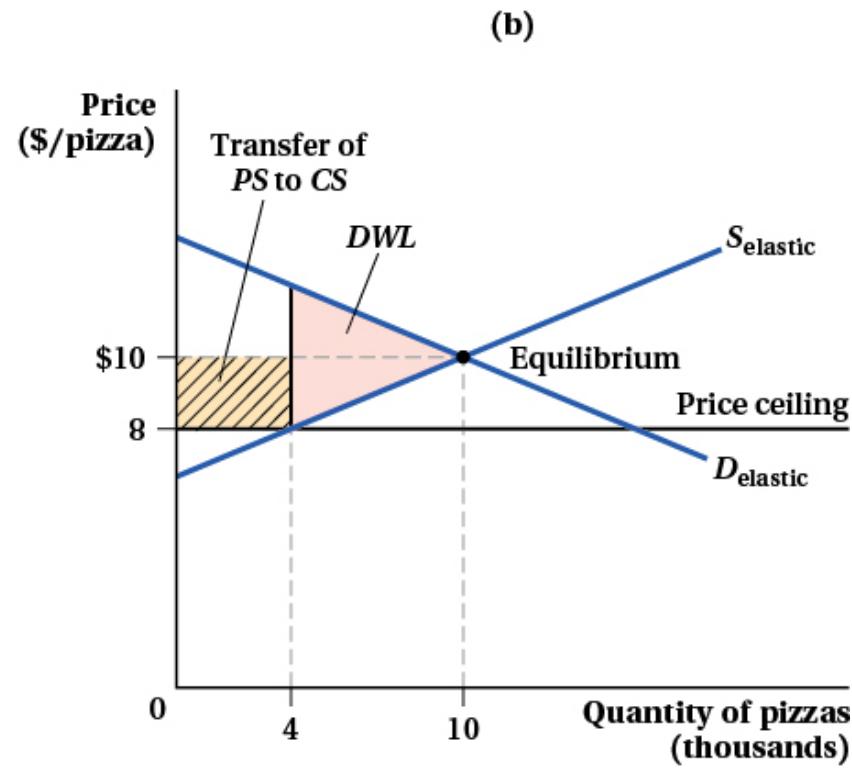
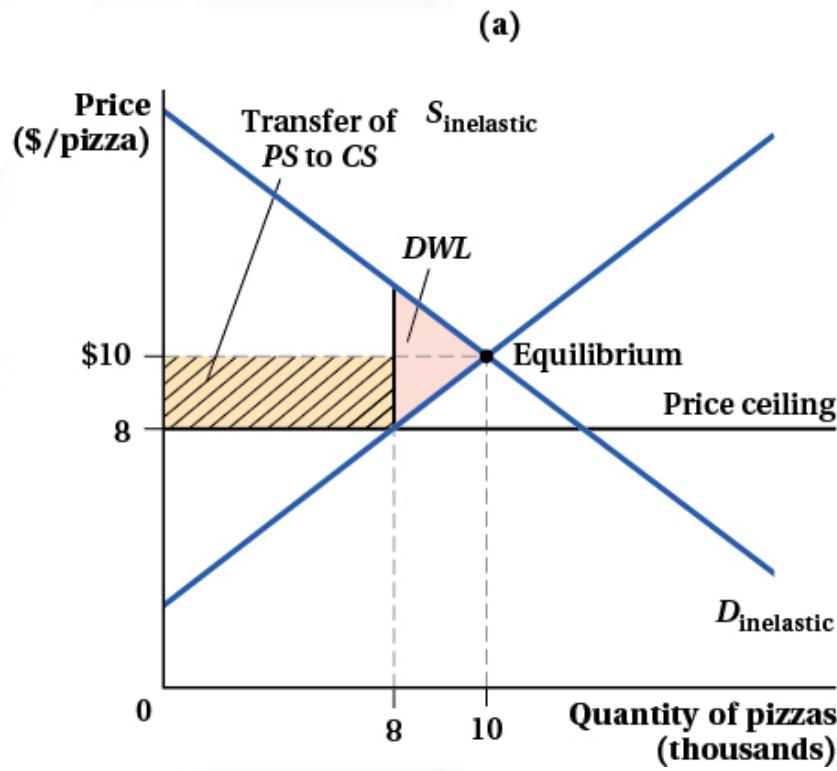
If demand and supply are relatively elastic, the deadweight loss is a larger and the transfer from producer surplus to consumer surplus is smaller.

- The more sensitive consumers and producers are to prices, the greater the change in quantity demanded and supplied.

Alternatively, if demand and supply are relatively inelastic, the deadweight loss is a smaller and the transfer from producer surplus to consumer surplus is larger.

Price Regulation (4/6)

3.7 Deadweight Loss and Elasticities



Price Regulation (5/6)

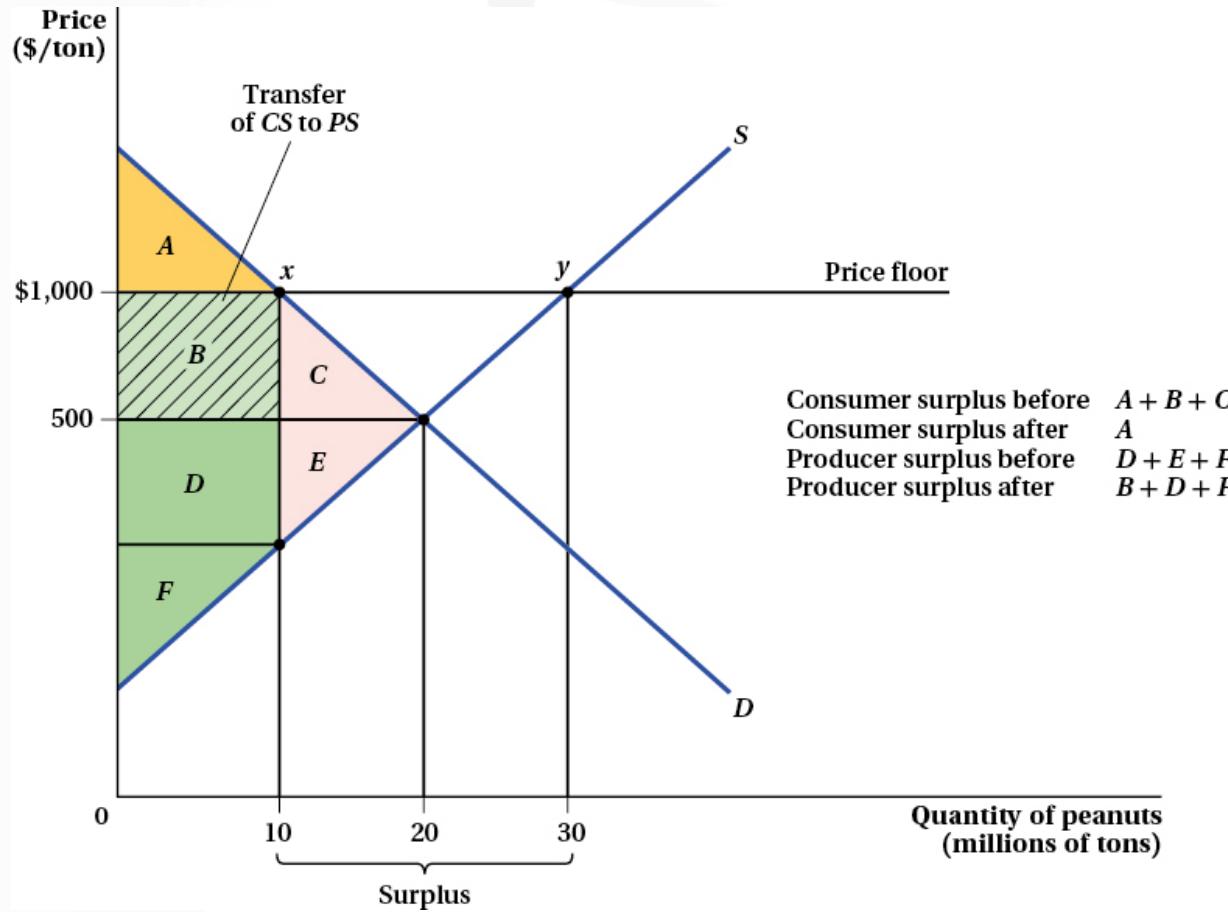
The other type of price regulation is a price floor.

- **Price floor:** a regulation that sets the minimum price that can be legally paid for a good or service (often called a *price support*)
 - Binding only when set *above* the equilibrium price
 - Nonbinding price floor: a price floor set below the equilibrium market price

What are the effects of price floors on markets?

Price Regulation (6/6)

Figure 3.8 The Effects of a Price Floor



Quantity Regulations (1/2)

Like price regulations, quantity regulations restrict the amount of a good or service provided to a market

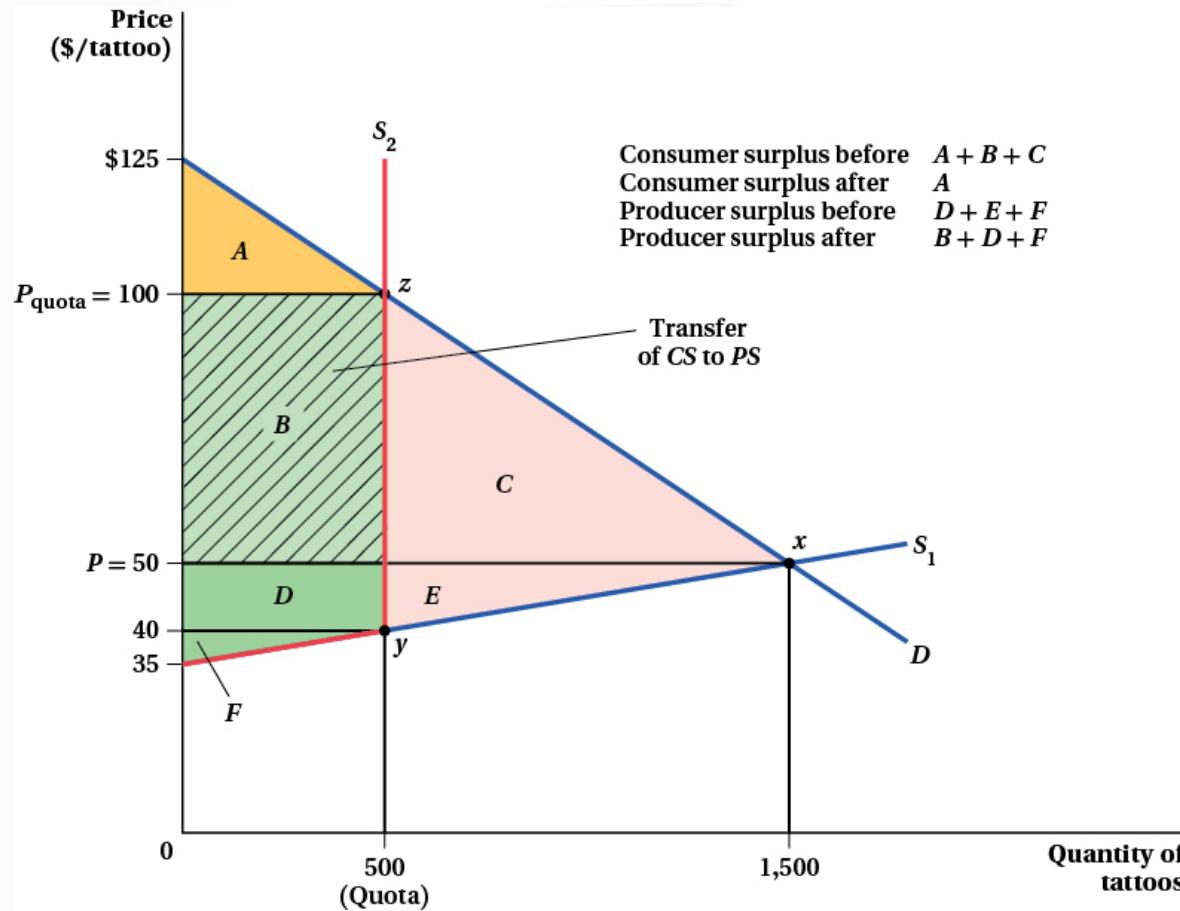
Quota: a regulation that sets the quantity of a good or service provided

- Often used to limit imports of certain goods
 - Why might a government pursue an import quota?
- Sometimes used to limit exports (e.g., China and rare earths)

What are the effects of quotas on markets?

Quantity Regulations (2/2)

Figure 3.9 The Effects of a Quota



Taxes (1/10)

Taxes are very prevalent in societies.

Examples:

1. Product markets (e.g., VAT, sales taxes)
2. Labor markets (e.g., income taxes, payroll taxes)
3. Capital markets (e.g., capital gains taxes)

How do taxes impact markets?

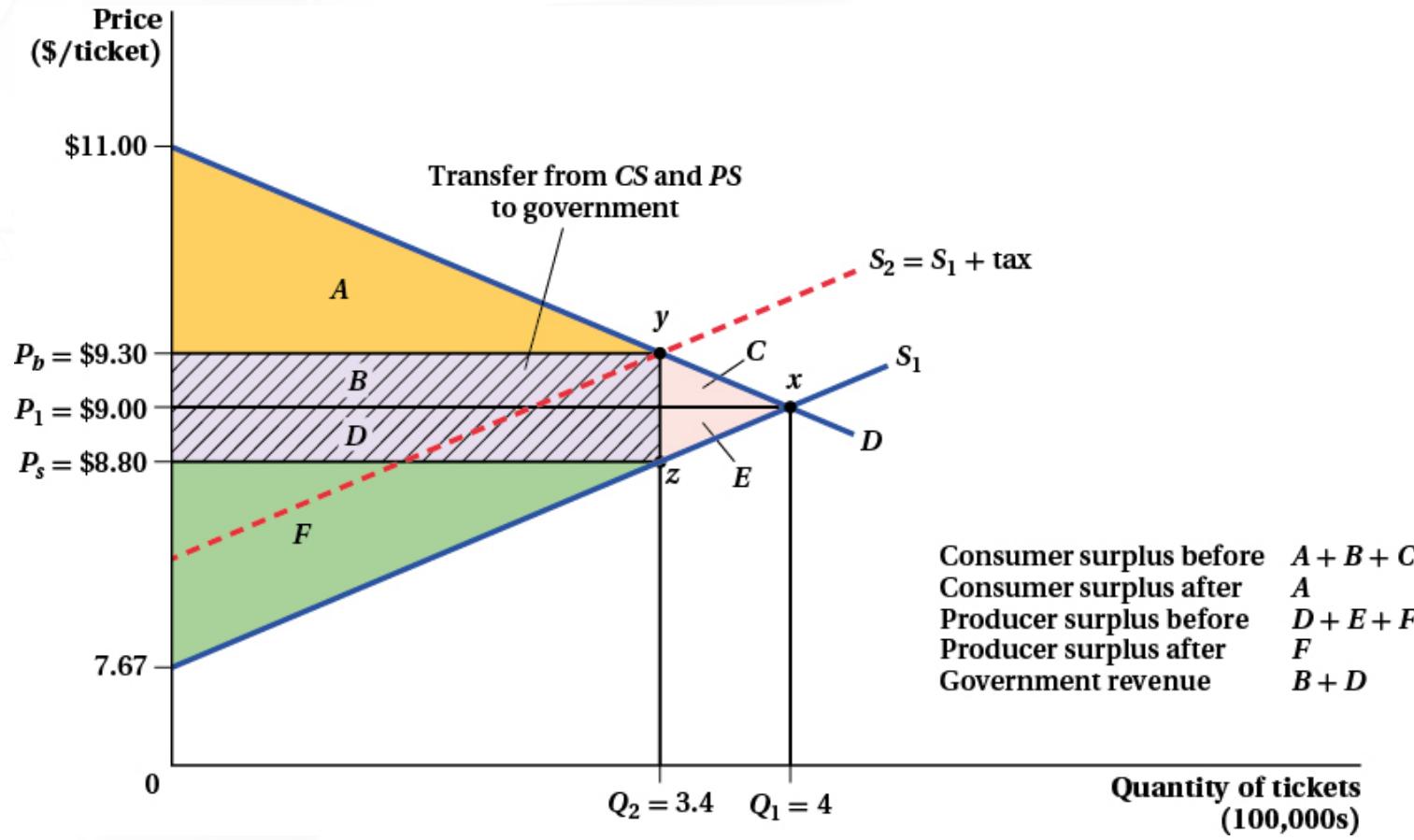
- Some taxes are imposed to correct market failures (see Chapter 16)
- In general, taxes distort market outcomes.

Example: In 2003, Boston's Mayor Tom Menino proposed a \$0.50 tax on movie tickets.

- How should this tax (which was ultimately not adopted by the legislature) affect the market for movie tickets?

Taxes (2/10)

Figure 3.10 The Effect of a Tax on Boston Movie Tickets



Taxes (3/10)

Taxes create a deadweight loss.

Why?

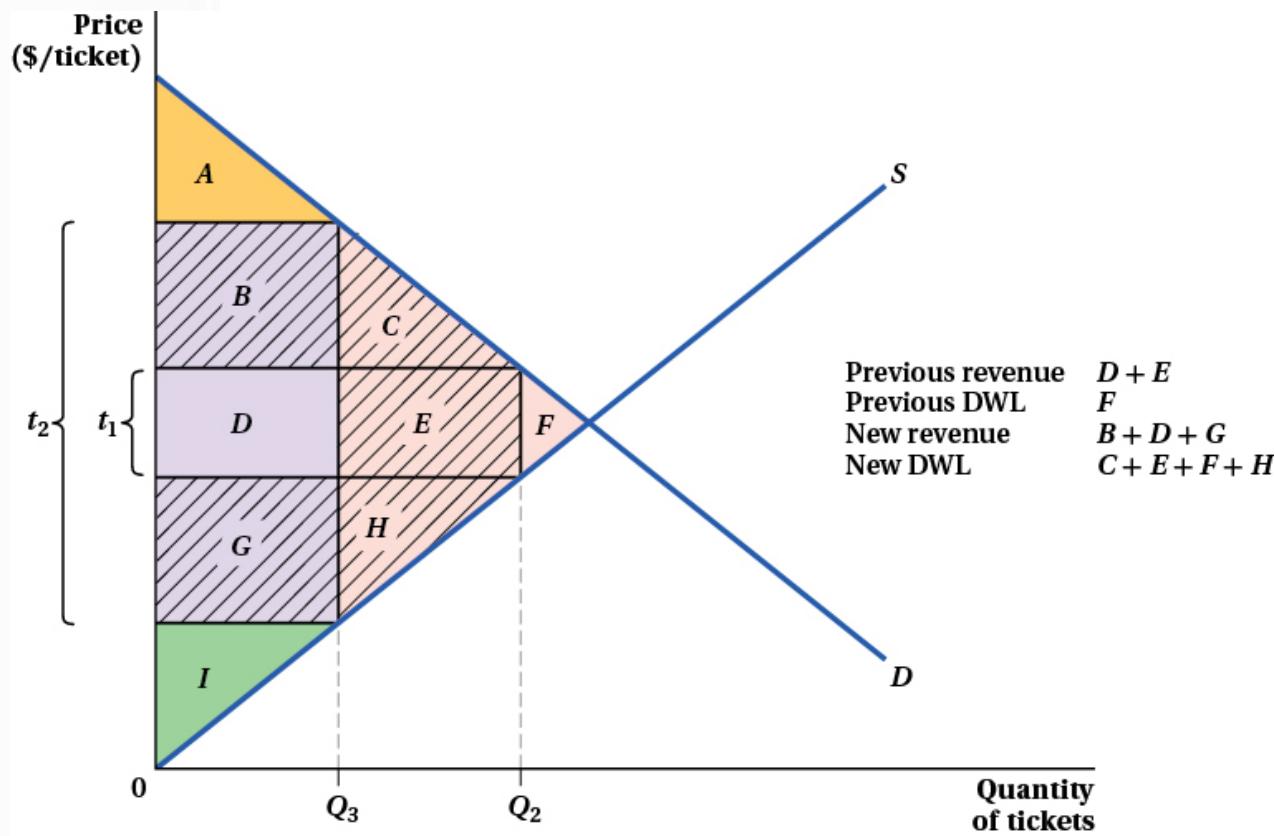
Taxes raise prices for consumers and lower the received price to producers.

- Some consumers who would have purchased at the lower, pre-tax price (and gained consumer surplus) do not purchase at the higher, after-tax price.
- Some firms that were producing (and gaining producer surplus) at the pre-tax price do not produce at the after-tax price.

The larger the tax, the larger the deadweight loss.

Taxes (4/10)

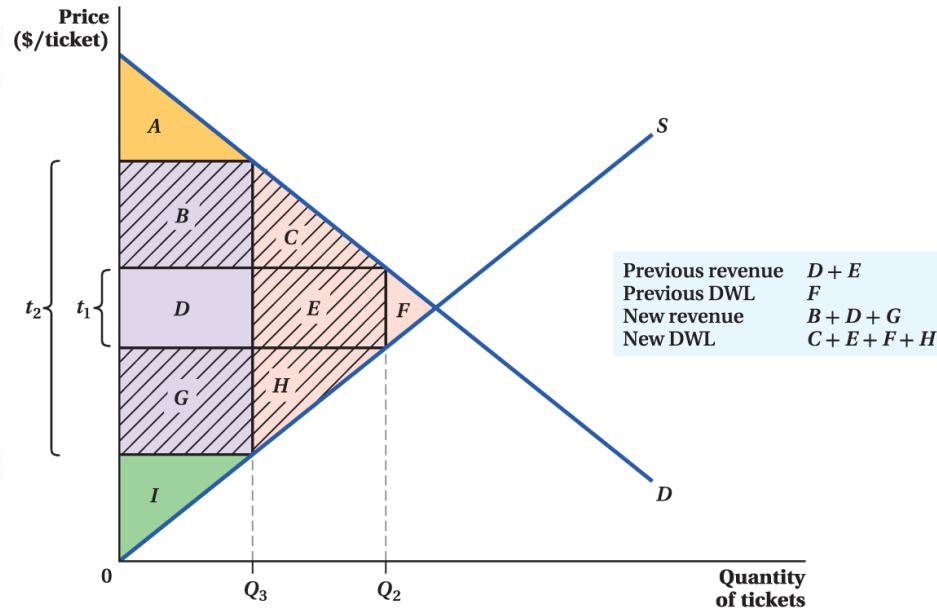
Figure 3.11 The Effect of a Larger Tax on Boston Movie Tickets



Taxes (5/10): Question 1

In Figure 3.11, area _____ represents the consumer surplus with the *smaller* tax, and area _____ represents the consumer surplus with the *larger* tax on Boston movie tickets.

- A. $A + B + C + F; A$
- B. $A + B + C + F; A + B$
- C. $A + B + C; A$
- D. $A + B + C; A + C$

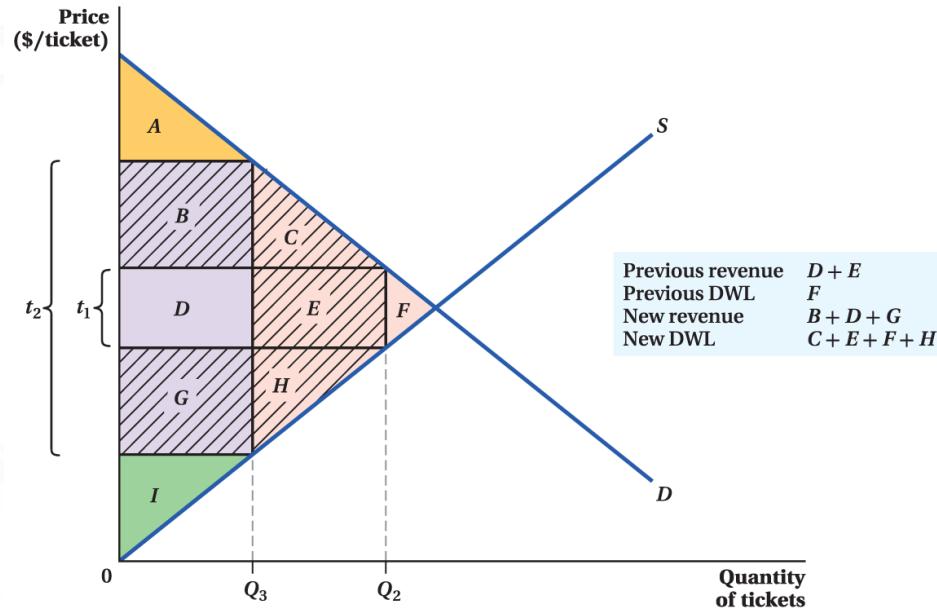


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Taxes (5/10): Question 1 – Correct Answer

In Figure 3.11, area _____ represents the consumer surplus with the *smaller* tax, and area _____ represents the consumer surplus with the *larger* tax on Boston movie tickets.

- A. $A + B + C + F; A$
- B. $A + B + C + F; A + B$
- C. **$A + B + C; A$ (correct answer)**
- D. $A + B + C; A + C$



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Taxes (6/10)

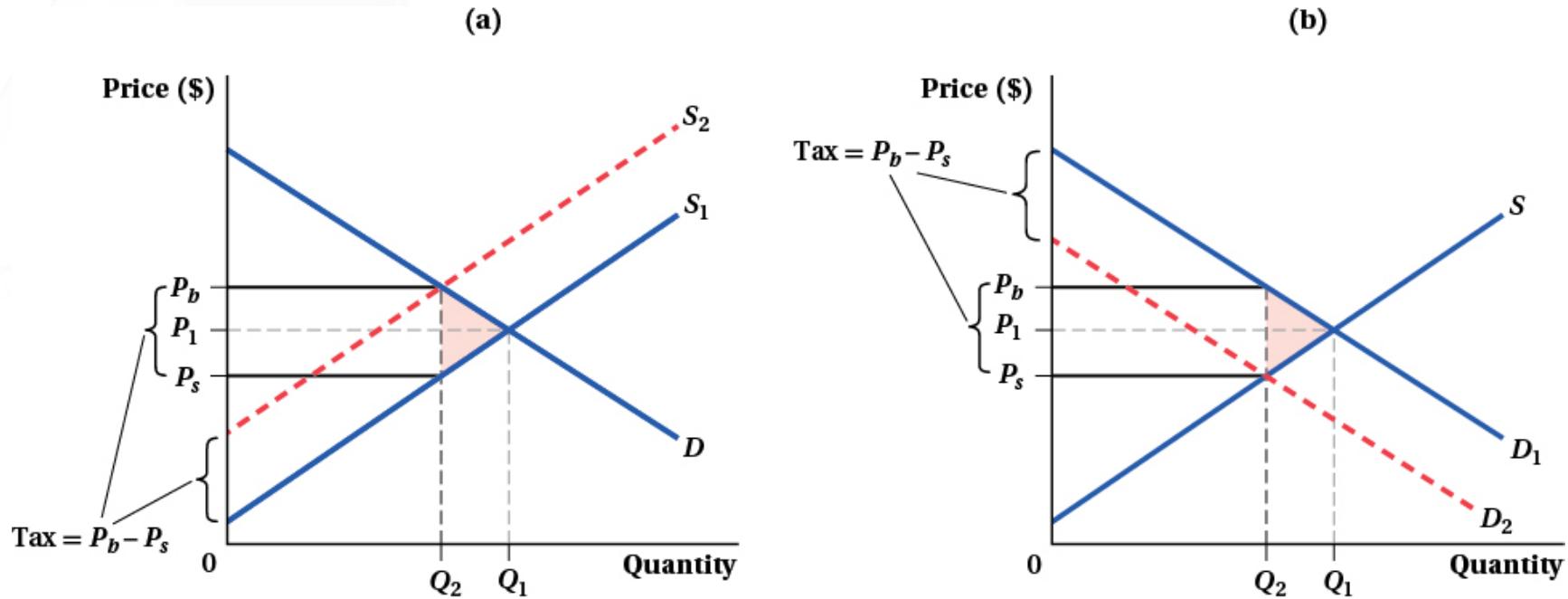
Tax incidence is a term describing who actually bears the burden of a tax.

In the supply and demand model, it ***does not matter*** who is required to pay the tax (e.g., a sales tax vs. a production tax).

The total tax incidence will be the same in each case!

Taxes (7/10)

Figure 3.12 Tax Incidence



Taxes (8/10)

Tax incidence and elasticities

- Elasticities of supply and demand are the major determinants of incidence.
- In general, when demand is relatively *more elastic*, consumers will experience *less burden*, and vice versa.
- Alternatively, when supply is relatively *more elastic*, producers will experience *less burden*, and vice versa.
- **Rule:** **The more elastic curve (supply or demand) bares the least burden (producer or consumer).**

Taxes (9/10)

Tax incidence and elasticities

General formula(s) for incidence as a function of elasticities:

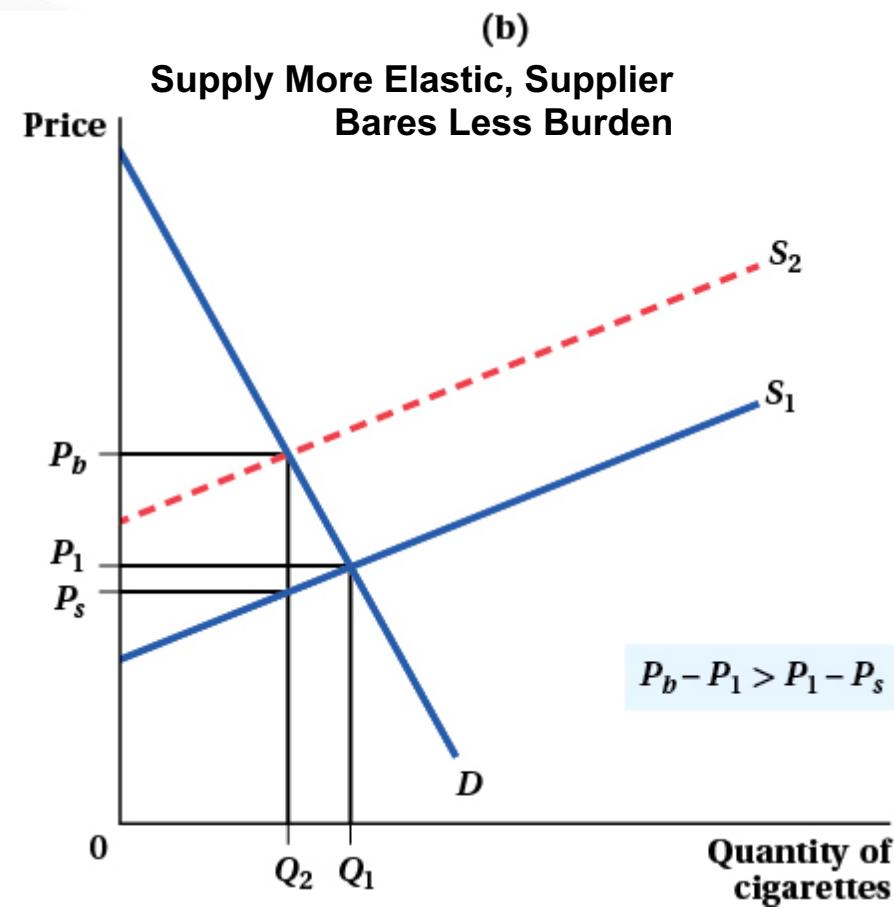
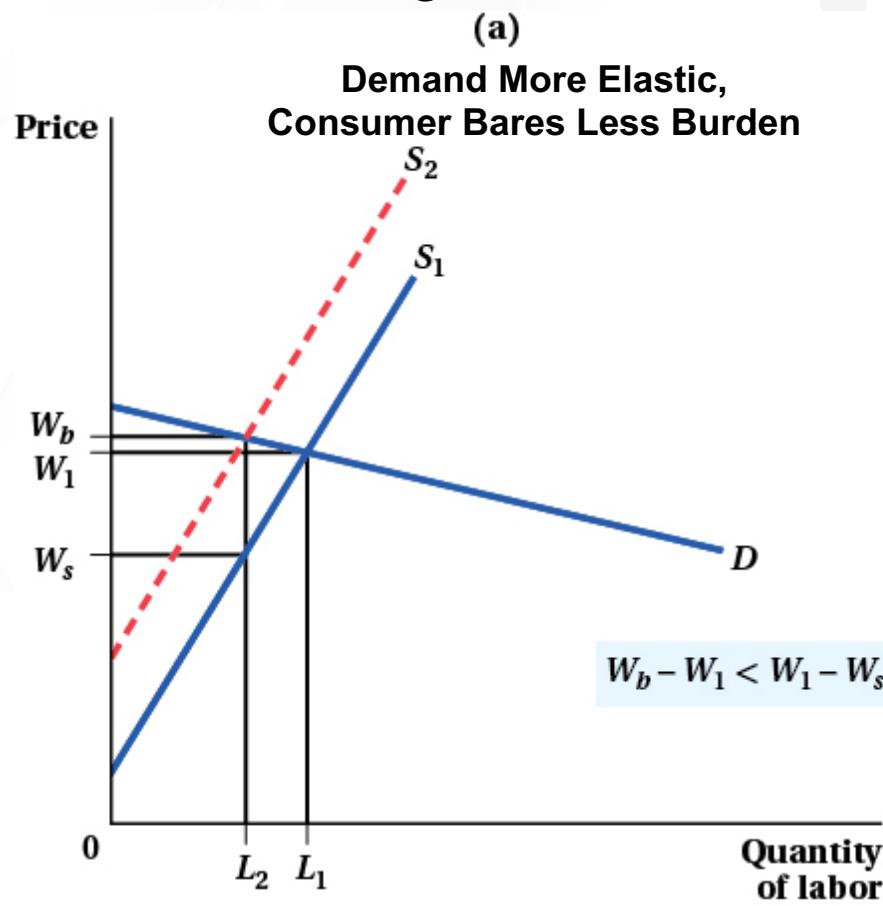
$$\text{Share born by consumer} = \frac{E^S}{E^S + |E^D|}$$

$$\text{Share born by producer} = \frac{|E^D|}{E^S + |E^D|}$$

- Notice, the share born by the consumer relies primarily on the elasticity of the supplier/producer, and vice versa.

Taxes (10/10)

Figure 3.13 Tax Incidence and Elasticities



Subsidies (1/2)

Subsidy: a payment by the government to a buyer or seller of a good or service

- Subsidies are simply the opposite of a tax.
- The price the buyer pays is lower than the price the supplier receives.

$$P_b + \text{subsidy} = P_s$$

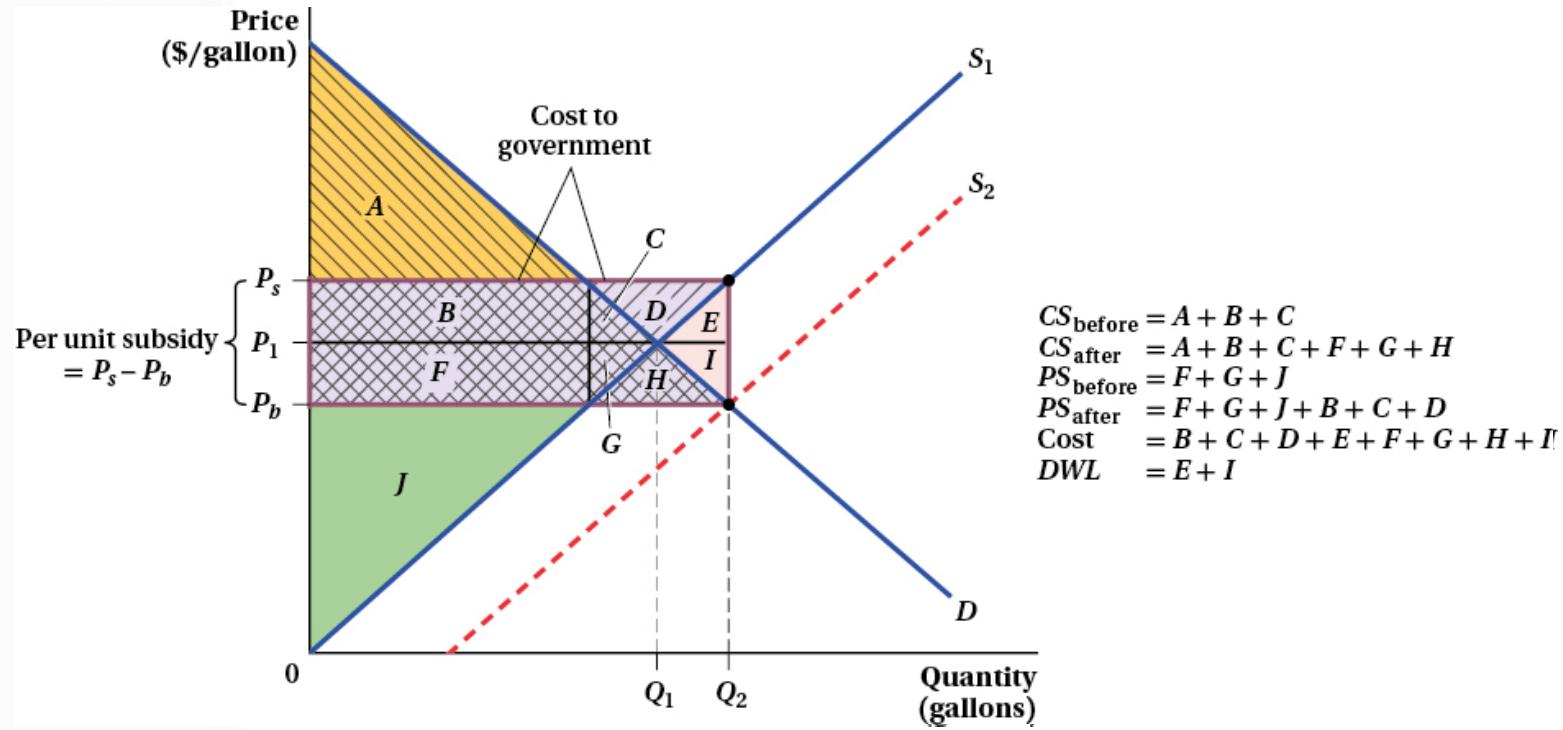
Governments subsidize many products and production processes.

Examples:

- Producer subsidies: ethanol production, research and development
- Consumer subsidies: education, public transportation

Subsidies (2/2)

Figure 3.14 The Impact of a Producer Subsidy



Conclusion (1/1)

This chapter examined the supply and demand model in more detail, and analyzed how government policies affect markets.

In the next few chapters, we examine the microeconomic underpinnings of demand and supply.

In **Chapter 4**, we introduce the concept of **utility**, which provides context for understanding how consumers make consumption decisions.