CHAPTER

6

Supply, Demand, and Government Policies

Goals

In this chapter you will

- Examine the effects of government policies that place price ceilings (maximum) on goods
- Examine the effects of government policies that put price floors (minimum) on goods
- Consider how a tax on a good affects the price of the good and the quantity sold
- Learn that taxes levied on sellers and taxes levied on buyers are equivalent
- See how the burden of a tax is split between buyers and sellers

Outcomes

After accomplishing these goals, you should be able to

- Describe the conditions necessary for a price ceiling to be a binding constraint
- Explain why a binding price floor creates a surplus
- Demonstrate why a tax placed on a good generally reduces the quantity of the good sold
- Demonstrate why the results are the same when a tax is placed on the sellers or buyers of a good
- Show whether the buyers or sellers of a good bear the burden of the tax when demand is inelastic and supply is elastic

Strive for a Five

Government policies found in Chapter 6 can be tested on both the AP macro- and microeconomics exams. On the macroeconomics exam, it has appeared in the section of basic economic concepts. For the microeconomics exam, it falls under the price and quantity control section of supply and demand. Specifically, the following topics are important:

- Price floor
- Price ceiling
- Tax incidence

Key Terms

- *Price ceiling*—A legal minimum on the price at which a good can be sold
- *Price floor*—A legal maximum on the price at which a good can be sold
- *Tax incidence*—The manner in which the burden of a tax is shared among participants in a market
- *Tax wedge*—The difference between what the buyer pays and the seller receives after a tax has been imposed.

Chapter Overview

Context and Purpose

Chapter 6 is the third chapter in a three-chapter sequence that deals with supply and demand and how markets work. Chapter 4 developed the model of supply and demand. Chapter 5 added precision to the model of supply and demand by developing the concept of elasticity—the sensitivity of the quantity supplied and quantity demanded to changes in economic conditions. Chapter 6 addresses the impact of government policies on competitive markets using the tools of supply and demand that you learned in Chapters 4 and 5.

The purpose of Chapter 6 is to consider two types of government policies: price controls and taxes. Price controls set the maximum or minimum price at which a good can be sold while a tax creates a wedge between what the buyer pays and the seller receives. These policies can be analyzed within the model of supply and demand. We will find that government policies sometimes produce unintended consequences.

Chapter Review

Introduction In Chapters 4 and 5, we acted as scientists because we built the model of supply and demand to describe the world as it is. In Chapter 6, we act as policy advisers because we address how government policies are used to try to improve the world. We address two policies: price controls and taxes. Sometimes these policies produce unintended consequences.

Controls on Prices

There are two types of controls on prices: price ceilings and price floors. A price ceiling sets a legal maximum on the price at which a good can be sold. A price floor sets a legal minimum on the price at which a good can be sold.

- **Price Ceilings** Suppose the government is persuaded by buyers to set a price ceiling. If the price ceiling is set above the equilibrium price, it is not binding. That is, it has no impact on the market because the price can move to equilibrium without restriction. If the price ceiling is set below the equilibrium price, it is a binding constraint because it does not allow the market to reach equilibrium. A binding price

ceiling causes the quantity demanded to exceed the quantity supplied, or a shortage. Because there is a shortage, methods develop to ration the small quantity supplied across a large number of buyers. Buyers willing to wait in long lines might get the good, or sellers could sell only to their friends, family, or members of the same race. Lines are inefficient, and discrimination is both inefficient and unfair. Free markets are impersonal and ration goods with prices.

Price ceilings are commonly found in the markets for gasoline and apartments. When OPEC restricted the quantity of petroleum in 1973, the supply of gasoline was reduced and the equilibrium price rose above the price ceiling and the price ceiling became binding. This caused a shortage of gas and long lines at the pump. In response, the price ceilings were later repealed. Price ceilings on apartments are known as rent controls. Binding rent controls create a shortage of housing. Both the demand and supply of housing are inelastic in the short run, so the initial shortage is small. In the long run, however, the supply and demand for housing become more elastic, and the shortage is more apparent. This causes waiting lists for apartments, bribes to landlords, unclean and unsafe buildings, and lower quality housing. Once established, however, rent controls are politically difficult to remove.

- **Price Floors** Suppose the government is persuaded by sellers to set a price floor. If the price floor is set below the equilibrium price, it is *not binding*. That is, it has no impact on the market because the price can move to equilibrium without restriction. If the price floor is set above the equilibrium price, it is a *binding constraint* because it does not allow the market to reach equilibrium. A binding price floor causes the quantity supplied to exceed the quantity demanded, or a surplus. In order to eliminate the surplus, sellers may appeal to the biases of the buyers and sell to buyers that are family, friends, or members of the same race. Free markets are impersonal and ration goods with prices.

  An important example of a price floor is the minimum wage. The minimum wage is a binding constraint in the market for young and unskilled workers. When the wage is set above the market equilibrium wage, the quantity supplied of labor exceeds the quantity demanded. The result is unemployment. Studies show that a 10 percent increase in the minimum wage depresses teenage employment by 1 to 3 percent. The minimum wage also causes teenagers to look for work and drop out of school.

  Price controls often hurt those they are trying to help—usually the poor. The minimum wage may help those who find work at the minimum wage but harm those who become unemployed because of the minimum wage. Rent controls reduce the quality and availability of housing.

Taxes

Governments use taxes to raise revenue. A tax on a good will affect the quantity sold and both the price paid by buyers and the price received by sellers. If the tax is collected from the sellers, supply shifts upward by the size of the tax per unit. As a result of the decrease in supply, the quantity sold decreases, the price paid by the buyer increases, and the price received by the seller decreases. If the tax is collected from the buyers, demand shifts downward by the size of the tax per unit. Because of the decrease in demand, the quantity sold decreases, the price paid by the buyer increases, and the price received by the seller decreases. Therefore, a tax levied on buyers has the same effect as a tax levied on sellers. After a tax has been placed on a good, the difference between what the buyer pays and the seller receives is the tax per unit and is known as the *tax wedge*. In summary:

- A tax discourages market activity. That is, the quantity sold is reduced.
- Buyers and sellers share the burden of a tax because the price paid by the buyers increases while the price received by the sellers decreases.
- The effect of a tax collected from buyers is equivalent to a tax collected from sellers.
- The government cannot legislate the relative burden of the tax between buyers and sellers. The relative burden of a tax is determined by the elasticity of supply and demand in that market.

Tax incidence is the manner in which the burden of a tax is shared among participants in a market. That is, it is the division of the tax burden. When a tax wedge is placed between buyers and sellers, the tax burden falls more heavily on the side of the market that is less elastic. That is, the tax burden falls more heavily on the side of the market that is less willing to leave the market when price movements are unfavorable to them. For example, in the market for cigarettes, because cigarettes are addictive, demand is likely to be less elastic than supply. Therefore, a tax on cigarettes tends to raise the price paid by buyers more than it reduces the price received by sellers, and as a result, the burden of a cigarette tax falls more heavily on the buyers of cigarettes. With regard to the payroll tax (Social Security and Medicare tax), because labor supply is less elastic than labor demand, most of the tax burden is borne by the workers as opposed to the 50–50 split intended by lawmakers.

Helpful Hints

1. Price ceilings and price floors only matter if they are binding constraints. Price ceilings do not automatically cause a shortage. A price ceiling only causes a shortage if the price ceiling is set below the equilibrium price. In a similar manner, a price floor only causes a surplus if the price floor is set above the equilibrium price.

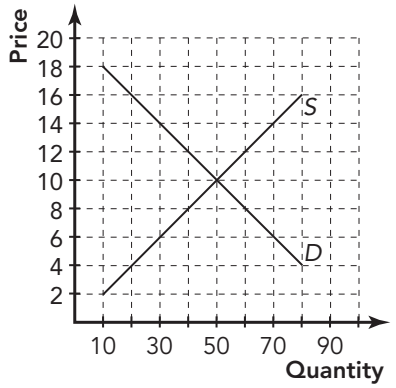
2. It is useful to think of taxes as causing vertical shifts in demand and supply. Because demand is the maximum buyers are willing to pay for each quantity, a tax imposed on the buyers in a market reduces or shifts downward the demand faced by sellers by precisely the size of the tax per unit. That is, the buyers now offer the sellers an amount that has been reduced by precisely the size of the tax per unit. Alternatively, because supply is the minimum sellers are willing to accept for each quantity, a tax imposed on the sellers in a market reduces or shifts upward the supply faced by buyers by precisely the size of the tax per unit. This is because the sellers now require an additional amount from the buyers that is precisely the size of the tax per unit.

Self-Test

Multiple-Choice Questions

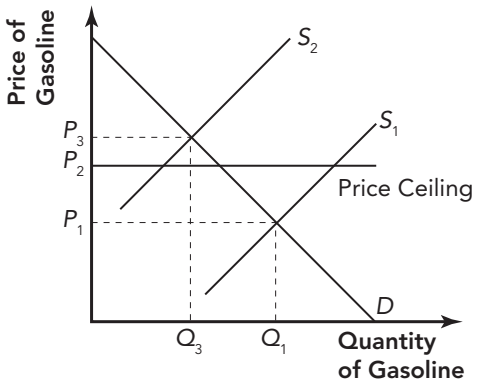
1. A shortage results when
   a. a price ceiling is set above equilibrium.
   b. a price ceiling is set below equilibrium.
   c. a price ceiling is set at equilibrium.
   d. a price floor is set above equilibrium.
   e. a price floor is set below equilibrium.

Figure 6-1



2. **Refer to Figure 6-1**. If the government imposes a price floor of $14 on this market, then there will be a
   a. surplus of 0.
   b. surplus of 20.
   c. surplus of 30.
   d. surplus of 40.
   e. a price of $10 and a quantity of $50, as a price floor of $14 would not be binding.

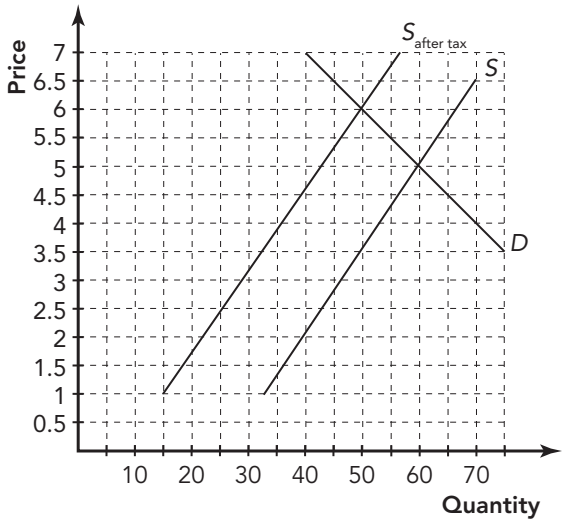
Figure 6-2



3. **Refer to Figure 6-2.** When the price ceiling applies in this market and the supply curve for gasoline shifts from S_1 to S_2,
   a. the market price will increase to P_3.
   b. a surplus will occur at the new market price of P_2.
   c. the market price will stay at P_1.
   d. a shortage will occur at the new market price of P_2.
   e. an equilibrium will occur at the new market price of P2.

4. An outcome that can result from either a price ceiling or a price floor is
   a. increased efficiency in that market.
   b. decreased efficiency in that market.
   c. a surplus in that market.
   d. a shortage in that market.
   e. increased consumer surplus in that market.

Figure 6-3



5. **Refer to Figure 6-3.** The equilibrium price in the market before the tax is imposed is a. $3.50.
   b. $4.00.
   c. $5.00.
   d. $6.00.
   e. $7.00.

6. **Refer to Figure 6-3**. The price buyers pay after the tax is imposed is
   a. $2.50.
   b. $3.50.
   c. $5.00.
   d. $6.00.
   e. $7.00.

7. **Refer to Figure 6-3**. The effective price sellers receive after the tax is imposed is
   a. $2.50.
   b. $3.50.
   c. $5.00.
   d. $6.00.
   e. $7.00.

8. **Refer to Figure 6-3**. The amount of the tax per unit is a. $1.00.
   b. $1.50.
   c. $2.50.
   d. $3.50.
   e. $5.00.

9. **Refer to Figure 6-3**. How much tax revenue does this tax generate for the government?
   a. $75
   b. $125
   c. $150
   d. $175
   e. $300

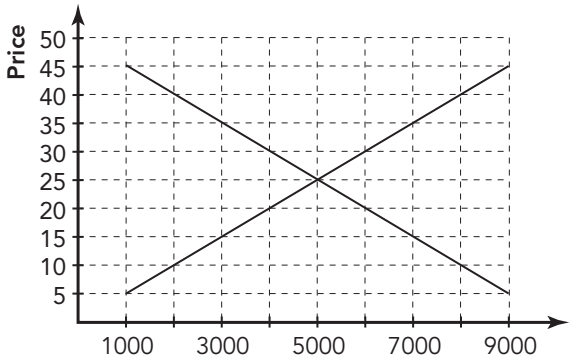
10. **Refer to Figure 6-3**. Buyers pay how much of the tax per unit?
    a. $1.00.
    b. $1.50.
    c. $2.50.
    d. $3.50.
    e. $5.00.

11. **Refer to Figure 6-3**. Sellers pay how much of the tax per unit?
    a. $1.00.
    b. $1.50.
    c. $2.50.
    d. $3.50.
    e. $5.00.

12. If a tax is imposed on a market with inelastic demand and elastic supply, then a. buyers will bear most of the burden of the tax.
    b. sellers will bear most of the burden of the tax.
    c. the burden of the tax will be shared equally between buyers and sellers.
    d. it is impossible to determine how the burden of the tax will be shared.
    e. the burden of the tax will fall entirely on the government.

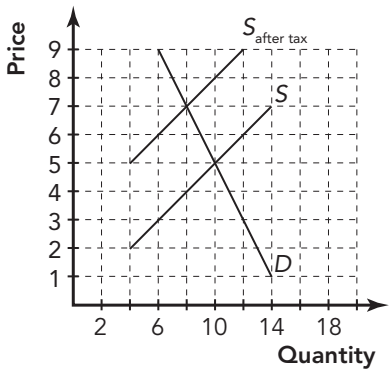
Free Response Questions

1. a. Using the following graph, analyze the impact a $300 price ceiling would have on the market for ten-speed bicycles. Would this be a binding price ceiling?



   b. Using the following graph, analyze the impact a $700 price floor would have on this market for ten-speed bicycles. Would this be a binding price floor?
   c. Would policymakers choose to impose a price ceiling or price floor? Why?

2. Using the following graph, answer these questions.



a. What was the equilibrium price in this market before the tax?
b. What is the amount of the tax?
c. How much of the tax will the buyers pay?
d. How much of the tax will the sellers pay?
e. How much will the buyer pay for the product after the tax is imposed?
f. How much will the seller receive after the tax is imposed?
g. As a result of the tax, what has happened to the level of market activity?

Solutions

Multiple-Choice Questions

1. b TOP: Price ceilings/ Shortages
2. d TOP: Price floors/ Surpluses
3. d TOP: Price ceilings/ Shortages
4. b TOP: Price ceilings/ Price floors
5. c TOP: Equilibrium price
6. d TOP: Taxes
7. b TOP: Taxes
8. c TOP: Taxes
9. b TOP: Tax revenue
10. a TOP: Tax incidence
11. b TOP: Tax incidence
12. a TOP: Tax incidence / Elasticity

Free Response Questions

1. a. For this example, a $300 price ceiling would cause a shortage of 4,000 bicycles. A price ceiling is binding if it is set at any price below equilibrium price. Because the equilibrium price in this market is $500, this would be a binding price ceiling.
   b. For this example, a $700 price floor would cause a surplus of 4,000 bicycles. A price floor is binding if it is set at any price above equilibrium price. Because the equilibrium price in this market is $500, this would be a binding price floor.
   c. More than one reason may exist for policymakers to impose a price ceiling or price floor in a market. Often, this is done in an attempt to increase equality; a price ceiling may be imposed if policymakers perceive the equilibrium price to be unfair to buyers, and a price floor may be imposed if policymakers perceive the equilibrium price to be unfair to sellers.

   TOP: Price ceilings/Price floors
2. a. $5
   b. $3
   c. $2
   d. $1
   e. $7
   f. $4
   g. As a result of the tax, the level of market activity has fallen from ten units bought and sold to just eight units bought and sold.

   TOP: Taxes/Tax incidence