4 Extensions of Demand and Supply Analysis

- **Learning Objectives**

After you have studied this chapter, you should be able to

1. define price system, voluntary exchange, transaction costs, price controls, price ceiling, price floor, nonprice rationing devices, black market, rent control, minimum wage, and import quota;
2. predict what happens to equilibrium price and equilibrium quantity when supply increases or decreases relative to demand, and when demand increases or decreases relative to supply;
3. predict what happens to the relative price of a good or resource if it becomes more or less scarce;
4. differentiate between the causes of short-run and long-run (prolonged) shortages;
5. recognize various methods of rationing goods and services;
6. recognize, from graphs, how a black market emerges;
7. enumerate several consequences of rent control;
8. recognize several consequences of government quantity restrictions; and
9. recognize the consequences of price floors and the causes of prolonged surpluses.

- **Outline**

1. In a price system (free enterprise) voluntary exchange typically determines price. Buyers and sellers transact with a minimum amount of governmental interference.
   a. Under a system of voluntary exchange, the terms of exchange (the terms, usually price, under which trade takes place) are set by the forces of supply and demand.
   b. Markets reduce transaction costs (all the costs associated with exchanging, including such costs associated with gathering information and enforcing contracts).
   c. Under voluntary exchange *both* buyers and sellers are presumed to benefit—otherwise the transactions would not continue.
2. Changes in demand and/or supply lead to changes in the equilibrium price and the equilibrium quantity.
   a. If demand shifts to the right (left), given supply, then the equilibrium price rises (falls) and the equilibrium quantity rises (falls).
   b. If supply shifts to the right (left), given demand, then the equilibrium price falls (rises) and the equilibrium quantity rises (falls).
   c. When both supply and demand change, it is not always possible to predict the effects on the equilibrium price and the equilibrium quantity.

3. Prices are not always perfectly flexible.
   a. If prices are inflexible, published prices will not change very much, but hidden price increases through quality reductions might occur.
   b. Markets do not always move to equilibrium (given a change in demand or supply) immediately. Hence, shortages or surpluses can emerge in the short run.

4. Price reflects relative scarcity and performs a rationing function.
   a. If an input or output becomes less scarce (more scarce), its relative price will fall (rise).
   b. If governments prevent prices from rising to their equilibrium level, via a price control or ceiling, then goods cannot (legally) be allocated to the highest bidders and prolonged shortages result. Other forms of rationing emerge.
   c. During prolonged shortages, such nonprice rationing devices as cheating, long lines, first-come first-served, political power, physical force, and other nonmarket forces arise.
   d. Governments also interfere in markets by putting price floors on price. For example, governments impose minimum wage rates, and they have put price floors on agricultural goods, which have caused surpluses.

5. Rent controls are governmentally imposed price ceilings on rental apartments, which lead to predictable results. Nonprice rationing for apartments results.

6. The government has put price floors in several markets.
   a. For many years, price supports created explicit minimum prices for agricultural goods, and in recent years some agricultural price supports have been explicitly created through mechanisms such as marketing loan programs.
   b. When the government sets minimum wages above the equilibrium, some unemployment is created.
   c. Governments sometimes restrict quantity directly through import quotas, which prohibit the importation of more than a specified quantity of a particular good in a one-year period.

■ Key Terms

Black market  Minimum wage  Price floor
Import quota  Price ceiling  Transaction costs
Key Concepts

Nonprice rationing devices  Price system
Price controls  Rent control  Voluntary exchange

Completion Questions

Fill in the blank, or circle the correct term.

1. Resources are scarce. Therefore, we cannot have all we want at a (zero, positive) price and there will be various ways in which people will __________________ for resources.

2. If demand shifts to the left, given supply, then the equilibrium price will (rise, fall) and the equilibrium quantity will ______________.

3. If supply shifts to the right, given demand, then the equilibrium price will __________________ and the equilibrium quantity will ____________________.

4. If both demand and supply shift to the right, then the equilibrium price (will rise, will fall, is indeterminate) and the equilibrium quantity (will rise, will fall, is indeterminate).

5. If both demand and supply shift to the left, then the equilibrium price (will rise, will fall, is indeterminate), and the equilibrium quantity (will rise, will fall, is indeterminate).

6. If the demand for good A or resource A rises relative to its supply, A has become relatively (less scarce, more scarce) and its relative price will (rise, fall). If the demand for good B or resource B falls relative to its supply, then B has become relatively __________________, and its relative price will __________________.

7. If the published price of good A remains constant, but its quality falls, then its relative price has actually (risen, fallen). If the published price of good A remains constant, but people have to wait in line to get it, then the relative price of good A has actually ________________, because people have an opportunity cost for their ____________________.

8. If the demand for a good rises relative to its supply, that good becomes (less scarce, more scarce) and its relative price will (rise, fall). This leads to (a decrease, an increase) in the quantity of the good supplied by producers of the item.

9. Price performs a(n) __________________________ function. Inputs or outputs go to the __________________ bidders, if people are free to exchange voluntarily in markets. If such economic freedoms do not exist, then other (price, nonprice) determinants will allocate goods and services.

10. Price controls that put a price ceiling on goods and services create (surpluses, shortages). Price floors create (surpluses, shortages).
11. If governments place price (floors, ceilings) on goods, then black markets might emerge.

12. Rent control is a form of price (floor, ceiling). Rent control (increases, reduces) the future supply of apartment construction, (increases, reduces) tenant mobility, (improves, causes a deterioration in) the quality of the existing stock of apartments, and hurts ________________________________.

13. By prohibiting the sale and use of tobacco products, the government would cause the supply of cigarettes to shift to the (left, right), make cigarettes (more, less) scarce, and cause their relative price to (rise, fall).

14. Import quotas, licensing arrangements, and outright bans on specific goods are forms of government (price, quantity) restrictions.

15. An import quota tends to (lower, raise) the price to consumers.

16. If governments put price floors on agricultural goods, a (shortage, surplus) will result.

■ True-False Questions

Circle the T if the statement is true, the F if it is false. Explain to yourself why a statement is false.

T  F  1. If supply shifts to the left, given demand, then the equilibrium price and the equilibrium quantity will rise.

T  F  2. If demand shifts to the left, given supply, then the equilibrium price and the equilibrium quantity will fall.

T  F  3. If both supply and demand shift to the right, then the equilibrium price and equilibrium quantity are indeterminate.

T  F  4. If the supply of good A increases relative to its demand, then good A is now more scarce, and its relative price will rise.

T  F  5. If the published price is constant, but it takes consumers longer to wait in lines, the total price has really risen.

T  F  6. If markets are flexible, and no market restrictions exist, then surpluses and shortages will not occur, even in the short run.

T  F  7. Minimum-wage laws are a form of price ceiling.

T  F  8. Rent controls help the poor who are looking for apartments because rents are lower.

T  F  9. Black markets, in effect, cause prices to rise for certain buyers.

T  F  10. Agricultural surpluses arise when governments put price ceilings on such goods.
Multiple Choice Questions

Circle the letter that corresponds to the best answer.

1. Because resources are scarce,
   a. buyers compete with buyers for outputs.
   b. there must be some method for rationing goods.
   c. people cannot have all they want at a zero price.
   d. All of the above.

2. If markets are free and prices are flexible,
   a. equilibrium price cannot be established.
   b. shortages and surpluses eventually disappear.
   c. shortages and surpluses cannot arise.
   d. equilibrium quantity cannot be established.

3. If demand shifts to the right (given supply), then equilibrium
   a. quantity will rise.
   b. price is indeterminate.
   c. price and equilibrium quantity are indeterminate.
   d. price will fall.

4. If supply shifts to the right (given demand), then equilibrium
   a. quantity will rise.
   b. price will rise.
   c. price and equilibrium quantity will fall.
   d. price and equilibrium quantity rises.

5. If both supply and demand shift to the left, then equilibrium
   a. price is indeterminate, and equilibrium quantity rises.
   b. price is indeterminate, and equilibrium quantity falls.
   c. price falls, and equilibrium quantity falls.
   d. price falls, and equilibrium quantity is indeterminate.

6. If the demand for good A falls relative to its supply, then
   a. good A is now relatively more scarce.
   b. good A is now relatively less scarce.
   c. the relative price of good A will rise.
   d. the total price of good A will rise, even if A is not price flexible.
7. If the demand for good B rises relative to its supply, then
   a. good B is now relatively more scarce.
   b. the relative price of good B will rise.
   c. the total price of good B will rise, even if good B is price inflexible.
   d. All of the above.

8. If the demand for good A rises relative to its supply, and markets are price flexible, then
   a. no shortage of A can exist in the long run.
   b. no shortage of A can exist in the short run.
   c. the published price of A remains constant, but its total price falls.
   d. the published price of A remains constant, but its total price rises.

9. If the demand for good A rises relative to its supply, and markets are price inflexible, then
   a. a shortage can exist in the short run.
   b. a shortage can exist in the long run.
   c. the published price of A might remain constant, but its total price rises.
   d. All of the above.

10. A simultaneous increase in the market clearing price of cheese and decrease in the equilibrium quantity of cheese could result from
    a. a higher price of beef that induces farmers to sell dairy cows for use in beef production, with the milk produced by dairy cows being a key input in cheese production.
    b. a higher price of hormones used to stimulate production of milk in dairy cows, with milk being a key input in the production of cheese.
    c. any factor that reduces the supply of cheese.
    d. All of the above.

11. Which one of the following can influence how a society rations a specific good?
    a. price system that rations to the highest bidder
    b. political power
    c. religion
    d. all of the above

12. Prolonged shortages arise if
    a. demand increases relative to supply.
    b. price floors are set by governments.
    c. prices are not allowed to rise to equilibrium.
    d. buyers are allowed to compete for goods.
13. Black markets may arise if
   a. price ceilings exist.
   b. price floors exist.
   c. governments do not intervene in the market.
   d. equilibrium price is too low.

14. Rent controls
   a. are a form of price floor.
   b. help the homeless who need apartments.
   c. make tenants less mobile.
   d. reduce litigation in society.

15. If an effective minimum wage is imposed, then
   a. more workers will be unable to find jobs.
   b. the quantity of labor demanded will fall.
   c. some workers will move to sectors not covered by minimum wages.
   d. All of the above.

16. Prolonged agricultural surpluses can arise if governments
   a. set price above equilibrium.
   b. institute price floors, or price supports.
   c. purchase the excess supply.
   d. All of the above.

Matching

Choose the item in Column (2) that best matches an item in Column (1).

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
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<tbody>
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<td>price floor</td>
<td>buyer competition</td>
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<td>price ceiling</td>
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<td>scarce resources</td>
<td>minimum-wage law</td>
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<td>nonprice rationing</td>
<td>black market, long lines</td>
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</table>
Working with Graphs

1. Consider the graph below, then answer the questions that follow.

![Graph Image]

a. The market clearing price is _________.

b. If the government imposes a price ceiling at \( P_1 \), what will be the quantity supplied? The quantity demanded? What exists at that price?

c. Given the quantity that will be forthcoming at the permitted price of \( P_1 \), what will the actual or black market price be?

d. Other than via a black market transaction, how can the actual price paid by buyers exceed the permitted price, \( P_1 \)?

e. If price had been permitted to rise to equilibrium, what would be the quantity supplied by sellers? Is that amount greater or less than the quantity at \( P_1 \)? Why?
2. Consider the following supply and demand curves for labor, and then answer the questions.

![Diagram of Supply and Demand Curves]

a. What is the equilibrium wage rate? The equilibrium quantity of labor?

b. If the government sets a minimum wage rate at \( W_1 \), what is the quantity of labor demanded by employers? The quantity of labor supplied by workers? What exists at the minimum-wage rate?

c. Is there a shortage or surplus of jobs? How might such jobs be allocated (that is, how will employers go about deciding who gets the jobs)?

3. During September 1989, the then-“Drug Czar” then-director of the Office of National Drug Control Policy, William T. Bennett, and Nobel Prize winning economist Milton Friedman debated the case for the prohibition of drugs in letters to the editor that appeared in the *Wall Street Journal*. Bennett, who favors prohibition, maintained that if drugs were legalized, then price would fall, and therefore the total amount of drug usage in the United States would rise. Friedman, who favors legalization of drugs (to adults) maintained that, once legalized, the demand for drugs would fall because (1) the appeal to people who want the excitement of doing something “taboo” would disappear, and (2) addicts who have only a $2 a day habit have less of an incentive to get other people hooked on drugs (to support their own habit) than if they had a $200 a day habit. Entering the 2010s, their perspectives continue to summarize arguments favoring prohibition versus legalization of drugs.

a. Is Bennett correct when he says that once legalized, price will fall? Why?

b. If the demand for drugs shifts to the left (Friedman), and the supply of drugs to the right (Bennett), what happens to the market clearing price of drugs?

c. If the demand for drugs shifts to the left (Friedman) and the supply of drugs shifts to the right (Bennett), what happens to the equilibrium quantity of drugs?

d. How does your answer to (c) help you decide whether drug usage will rise or fall if drugs are legalized? What information is necessary to resolve this issue?
# Problems

1. During the 2000s, New York City relaxed some rent controls by allowing landlords to charge higher rents, albeit at legally permissible levels that typically remained below market-clearing rents. Critics of these actions by the city contended that raising allowable apartment rents has harmed tenants. The critics have proposed that all previously prevailing controls should be reinstated to protect tenants from economic harm.

   a. How do you imagine that raising allowable rents has affected the shortage of luxury apartments that had prevailed before the relaxation of some of New York City’s rent controls?

   b. How were tenants affected by the relaxation of rent controls in New York City? How do you suppose that the relaxation of these controls affect people who previously experienced difficulties in finding apartments?

2. At various times during the 1990s and 2000s, people attending soccer matches around the world died when stadium gates were opened and crowds rushed in to get choice seats in “open seating” sections of the stadiums. What other method of allocating the scarce resource of choice seats would have prevented these tragic events?
Answers

Completion Questions

1. zero; compete
2. fall; fall
3. fall; rise
4. is indeterminate; will rise
5. is indeterminate; will fall
6. more scarce; rise; less scarce; fall
7. risen; risen; time
8. more scarce; rise; an increase
9. rationing; highest; nonprice
10. shortages; surpluses
11. ceilings
12. ceiling; reduces; reduces; causes a deterioration in; landlords and low income apartment hunters
13. left; more; rise
14. quantity
15. raise
16. surplus

True-False Questions

1. F The equilibrium quantity falls.
2. T
3. F Equilibrium quantity rises.
4. F Good A is now less scarce, and its relative price will fall.
5. T
6. F No, surpluses and shortages can exist—in the short run.
7. F They are a price floor.
8. F That group is hurt because they will be discriminated against and because the housing stock diminishes.
9. T

Multiple Choice Questions

1. (d) 9. (d)
2. (b) 10. (d)
3. (a) 11. (d)
4. (a) 12. (c)
5. (b) 13. (a)
6. (b) 14. (c)
7. (d) 15. (d)
8. (a) 16. (d)
Matching
(a) and (g) (c) and (e)
(b) and (f) (d) and (h)

Working with Graphs
1. a. \( P_e \)
b. \( Q_1; Q_2; \) shortage
c. \( P_4 \)
d. quality deterioration, long lines that increase opportunity costs
e. \( Q_e; \) greater; a higher price induces sellers to produce more

2. a. \( W_e; Q_e \)
b. \( Q_1; Q_s; \) surplus of labor, or unemployment
c. shortage; family influence, political power, bribes, racial or gender preference

3. a. He is correct because the supply curve will shift to the right as the costs and risks of drug-dealing fall.
b. The market-clearing price falls (Therefore, Bennett is correct.)
c. It is impossible to predict the net effect on the equilibrium quantity.
d. The real issue is an empirical one: Will supply rise by more than demand falls, or vice versa?

Problems
1. a. Under the controls, landlords have to set rents below the market-clearing levels, so the quantity of apartments demanded by prospective renters is greater than the quantity supplied by landlords. The result is a shortage of luxury apartments. The increase in legally permissible rents to levels closer to market-clearing rents has had the effect of reducing the size of this shortage.
b. People who were already tenants had to pay higher rents than before the relaxation of rent controls. Because landlords supplied more apartments in response to the increase in the legally allowed rental rates, more people who had previously experienced difficulties finding apartments were able to become tenants.

2. Instead of “first-come, first-served seating,” ticket sellers for soccer matches could have raised the price of choice seats and used assigned seating.
Glossary

Black market  A market in which goods are traded at prices above their legal maximum prices or in which illegal goods are sold.

Import quota  A physical supply restriction on imports of a particular good, such as sugar. Foreign exporters are unable to sell in the United States more than the quantity specified in the import quota.

Minimum wage  A wage floor, legislated by government, setting the lowest hourly rate that firms may legally pay workers.

Nonprice rationing devices  All methods used to ration scarce goods that are price-controlled. Whenever the price system is not allowed to work, nonprice rationing devices will evolve to ration the affected goods and services.

Price ceiling  A legal maximum price that may be charged for a particular good or service.

Price controls  Government-mandated minimum or maximum prices that may be charged for goods and services.

Price floor  A legal minimum price below which a good or service may not be sold. Legal minimum wages are an example.

Price system  An economic system in which relative prices are constantly changing to reflect changes in supply and demand for different commodities. The prices of those commodities are signals to everyone within the system about what is relatively scarce and what is relatively abundant.

Rent control  Price ceilings on rents.

Transaction costs  All of the costs associated with exchange, including the informational costs of finding out the price and quality, service record, and durability of a product, plus the cost of contracting and enforcing that contract.

Voluntary exchange  An act of trading, done on an elective basis, in which both parties to the trade expect to be better off after the exchange.