SOLUTIONS MANUAL

Microeconomics

FIFTH EDITION

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Chapter 2
Supply and Demand

■ Chapter Outline

■ Teaching Tips

This chapter reviews basic supply and demand concepts from the principles level. Your interactions with the class from the first session or two should give you a good indication of how much class time to spend on it. If it has been some time since their principles course, students may need fairly consistent prompting to recall the basic supply-and-demand model. For example, many will remember that there is a Law of Demand, but won't remember the law itself. Encourage students in the strongest terms to read the chapter carefully. It is well worth the time spent at this stage to make sure everyone has solid recognition of these basic tools and concepts.

When reviewing demand, be sure students are clear on the difference between movement along the curve and a shift of the entire curve. Two points should be helpful. First, note to them that both in Equation 2.3 and on the graph in Figure 2.1, price is the only independent variable present. Thus, only price can cause a movement along the curve. Second, underscore the role of other variables. After compiling a list of the factors that can shift the demand curve (once they get started, the class as a group should be able to provide you with this list), I ask what factors are held constant along a single demand curve. Surprisingly, this question is often greeted by a protracted silence. By realizing that it is the same factors that shift the curve when they change, students develop a more solid understanding. The text makes this point well in Equations 2.2 and 2.3.

The introduction of demand curves and equations is a good opportunity to review the basic geometric concepts of slope and intercept. This doesn't take much time, as most students can recognize slope and intercept of a written equation, but there is sometimes a surprising lack of connection between what appears in an equation and the resulting graph. Draw a demand curve and tell the class that the slope of this curve is –2. Then ask the students what will happen in the graph if the slope increases to -4. Although it is likely that several, perhaps most students will know immediately, some will not. I try to use the simple algebra and geometry in these early chapters to help me to gauge what portion of the class is likely to struggle when the material gets tougher. Assigning some of the quantitative problems at the end of the chapter and collecting them (even if you don't intend to collect homework throughout the term) is another good diagnostic.

Be sure to review the inverse demand curve and the process of inversion. I usually motivate this review by noting that this process will be needed later when formulating a total revenue equation from a demand equation. I combine this with the discussion of the problem of the reversed axes.

I try to keep the discussion of supply parallel to that of demand. For factors that can shift the entire supply curve, note that they can all be lumped together under the broader heading of costs, government rules and regulations, and other variables (as is done in the text). The text notes that there is no "Law of Supply," and most students have learned this in their principles course. Be aware, however, that some principles instructors refer to the upward slope of supply curves in the short run as the "Law of Supply." Adopting a uniform taxonomy and vocabulary reduces confusion. This includes uniformity with the text with respect to symbols and upper- versus lower-case labeling.

When combining supply and demand in the discussion of equilibrium, press the students for a usable definition of the term. You will likely receive the suggestion of "where supply equals demand." Though incorrect, this definition is useful in the introduction of price floors and ceilings where the quantity supplied does not equal demanded at the equilibrium quantity. An important point regarding equilibrium solutions of supply-and-demand problems is that they are typically stable and self-correcting. To illustrate this point, use examples of commonly purchased items such as discounted clothing and music CDs, where reduced prices reflect excess supply.

When discussing floors and ceilings, I stress the definitions using simple graphs as illustrations. While it seems counterintuitive to some students that an effective floor must be *above* the equilibrium price and an effective ceiling must be *below,* suggest that they use this as a mnemonic device. In this section, I try to engage the class in a discussion of unintended or secondary effects of government intervention. This issue deserves significant class discussion time. Most students have not thought much about the consequences of ceilings and floors beyond the simple price effects. The text has a good description of the unfortunate side effects of gasoline price controls. Another good example for discussing secondary effects is rent control. On the supply side, there are distortions of incentives of landlords to provide efficient levels of upkeep and safety measures in rent-controlled buildings. On the demand side, time spent searching and undesired doubling-up reduce consumer satisfaction. Secondary effects of floors are also worth noting. I recommend that you discuss the text's example of the possible negative effects of minimum wages. Again, students are likely to view minimum wages as strictly a benefit to workers because they have not considered that job loss will mean that some workers are harmed rather than helped by the establishment of minimums or increases in their level.

In the section on when to use the supply-and-demand model, be sure to define and discuss transaction costs. Most students will not be familiar with this term from principles, and it has important implications on the functioning of thin markets and markets where there is substantial uncertainty.

■ Discussion Questions

1. Can you think of any reasons why the Law of Demand might not hold?

2. Would you expect most supply curves to have an upward slope? Why or why not?

3. What are some examples of markets that are competitive?

4. In which markets that would otherwise be competitive would you expect transaction costs to be very high?

5. Can you think of situations where the government would want to take actions that cause shortages?

6. In what markets and situations would you expect that the quantity demanded would not equal the quantity supplied?

■ Additional Questions and Problems

1. Suppose you are planning to conduct a study of the running shoe market. List the factors that you believe would cause changes in the demand for running shoes. In each case, note whether the relationship would be positive (direct) or negative (inverse). Also list the factors that you believe would affect the supply, again noting the nature of the relationship.

2. In each case below, identify the effect on the market for steak.
    a.   An increase in the price of lamb.
    b.   A decrease in the population.
    c.   An increase in consumer income.
    d.   A decrease in the price of steak sauce.
    e.   An increase in advertising by chicken producers.

3. In each case below, identify the effect on the market for coal.
    a.   The development of a new, lower cost mining technique.
    b.   An increase in wages paid to coal miners.
    c.   The imposition of a $2 per ton tax on coal.
    d.   A widespread news report that demand for coal will be much lower next year.
    e.   A new government regulation requiring air purifiers in all work areas.

4. In a competitive labor market, demand for workers is $Q_D = 10{,}000 - 100W$, and supply is $Q_S = 2{,}000 + 1{,}900W$, where Q is the quantity of workers employed and W is the hourly wage. What is the initial equilibrium wage and employment level? Suppose that the government decides that $5 per hour is the minimum allowable wage in any market. How would this new minimum wage alter this market? What would the new employment level be? What would happen to total payments to labor? Would there be any excess supply of labor? If so, how much?

5. For each sentence below describing changes in the tangerine market, note whether the statement is true, false, or uncertain, and explain your answer. You will find it helpful to draw a graph for each case.

   a. If consumer income increases and worker wages fall, quantity will rise and prices will fall.

   b. If orange prices decrease and taxes on citrus fruits decrease, quantity will fall and prices will rise.

   c. If the price of canning machinery (a complement) increases and the growing season is unusually cold, quantity and price will both fall.

6. If demand for show tickets is described by the equation $Q_D = 100 - p$, and supply is $Q_S = 20 + p$, find the equilibrium price and quantity. How would your answer change if the supply curve shifted to $Q'_S = 10 + p$ due to increases in actor salaries?

7. Suppose the demand for onion ice cream was described by the equation $Q_D = 20 - p$, and the supply was described by $Q_S = -40 + p$. What are the equilibrium price and quantity? Show your answer using a graph.

8. If demand for toy drums is described by the equation $Q_D = 300 - 5p$, and supply is $Q_S = 60 + 3p$, find the equilibrium price and quantity. How would your answer change if a decrease in consumer income shifted the demand curve to $Q'_D = 220 - 5p$?

9. A new chemical cleaning solution is introduced to the market. Initially, demand is $Q_D = 1,000 - 2p$ and supply is $Q_S = 100 + p$. Determine the equilibrium price and quantity. The government then decides that no more than 300 units of this product should be sold per period, and imposes a quota at that level. How does this quota affect the equilibrium price and quantity? Show the solution using a graph and calculate the numerical answer.

10. Demand for park visits is $Q^*_0 = 10,000 - 100P$. If park visits are free, how many visitors will attend? How will your answer change if the park adds a $20.00 admission fee? Show using a graph.

11. A firm introduces a new model of MP3 player, which can play both audio and video files. The price is the same as that of a previous model that can only play audio files. What would happen to the market of the previous model? What if the new model is more expensive than the previous one?

12. In a competitive labor market, demand for workers is $Q_D = 9,900 - 100W$, and supply is $Q_S = 2,000 + 1,900W$, where Q is the quantity of workers employed and W is the hourly wage. Suppose the government decides to impose a wage ceiling of $3 per hour. What would the equilibrium in this labor market?

■ Answers to Additional Questions and Math Problems

1. Possible responses include:

   Demand: The price of running shoes (–)

   Sock prices (–)

   Prices of other sneaker types (+)

   Number of people who are regular runners (+)

   Income (+)

   Supply: Worker wages (–)

   Increases in leather prices (–)

   Removal of import tariffs (+)

   A unit tax on running shoes (–)

2. a.   The demand curve shifts to the right.
    b.   The demand curve shifts to the left.
    c.   The demand curve shifts to the right.
    d.   The demand curve shifts to the right.
    e.   The demand curve shifts to the left.

3. a.   The supply curve shifts to the right.
    b.   The supply curve shifts to the left.
    c.   The supply curve shifts to the left.
    d.   The supply curve shifts to the left.
    e.   The supply curve shifts to the left.

4. Without minimum wages, the equilibrium is

$$10,000 - 100W = 2,000 + 1,900W$$
$$W^* = 4$$
$$Q^* = 9,600.$$

With the new minimum wage of $5, employment will equal the amount of labor demanded at the minimum wage.

$$Q_d = 10,000 - 100(5) = 9,500.$$

Total payments to labor would increase from $38,400 to $47,500. Excess supply of labor would equal $2,000 = 2,000 + 1,900(5) - 9,500$. Thus, in addition to the 100 people who would lose jobs that they had before the minimum, an additional 1,900 would now want jobs that would be unobtainable at the higher wage rate.

5. In each case, you must draw a graph that shows the original supply and demand curves, plus the new curves after the changes. You must then consider whether it matters or not how far the curve shifts in response to the change in the parameter indicated.
    a.   Uncertain. In this case, both the supply and the demand curves shift to the right. Quantity will definitely increase, but whether prices rise, fall, or remain constant depends on the relative sizes of the supply and demand shifts. See Figure 2.1; because the demand shift is relatively larger than the shift in supply, prices increase.
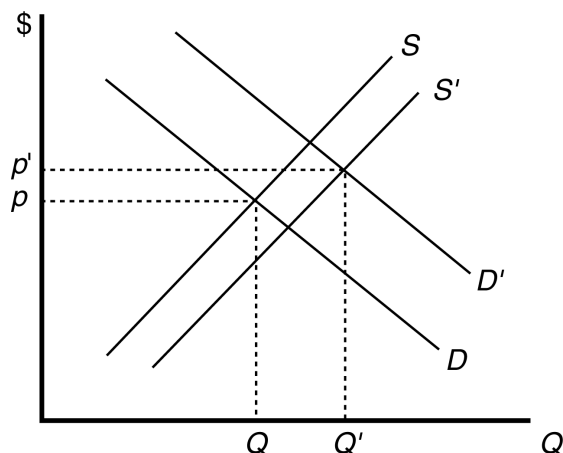

Figure 2.1

b. False. The supply curve shifts right due to the decrease in taxes, and the demand curve shifts left due to the decrease in orange prices. Prices will be lower, and the change in quantity depends on the magnitude of the shifts. See Figure 2.2. In the case of Figure 2.2, the large rightward shift in supply compared to the relatively small shift of the demand curve causes quantity to increase.
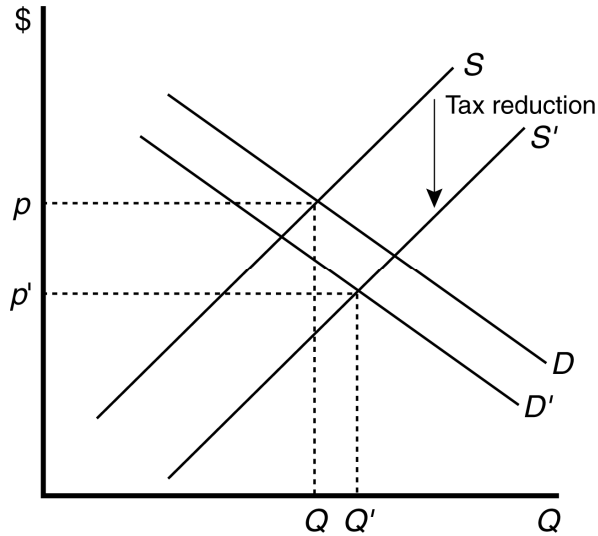

Figure 2.2

c. Uncertain. In this case, the demand and supply curves both shift to the left. Quantity decreases, but price may rise, fall, or remain unchanged depending on the relative magnitude of the shifts. See Figure 2.3. In this case, price remains unchanged.
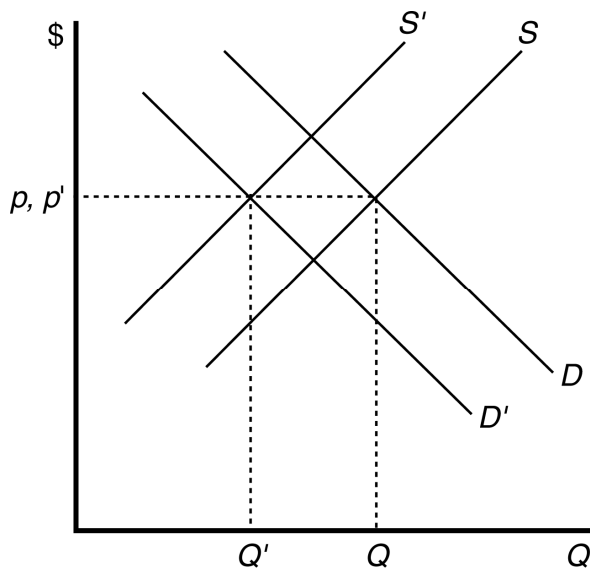

Figure 2.3

6. Set $Q_D = Q_S$ and solve.

For
$$Q_S = 20 + p$$
$$100 - p = 20 + p$$
$$p^* = 40$$
$$Q^* = 60$$

For
$$Q' = 10 + p$$
$$100 - p = 10 + p$$
$$p^* = 45$$
$$Q^* = 55$$

7. Set $Q_S = Q_D$ and solve.

$$P^* = 30$$
$$Q^* = -10$$

Equilibrium quantity is zero, because the demand curve lies below the supply curve at all prices where output is positive. See Figure 2.4.

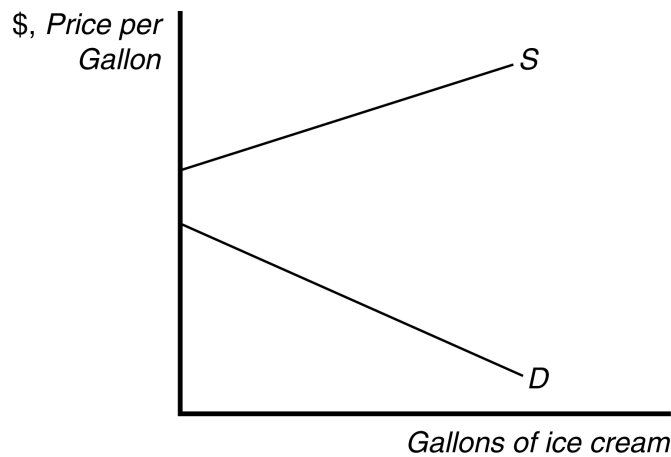*Figure 2.4*

8. Set $Q_D = Q_S$ and solve.

For
$$Q_D = 300 - 5p$$
$$300 - 5p = 60 + 3p$$
$$p^* = 30$$
$$Q^* = 150 \text{ units}$$

For
$$Q'_D = 220 - 5p$$
$$220 - 5p = 60 + 3p$$
$$p^* = 20$$
$$Q^* = 120$$

9. The equilibrium solution with no government intervention is

$$1000 - 2p = 100 + p$$
$$p^* = 300$$
$$Q^* = 400$$

When the quota is imposed at 300 units, supply cannot exceed that level, regardless of price. Thus, the supply curve becomes vertical at 300 units. The new equilibrium quantity is 300 and price is determined by where the supply curve with the quota (S_{quota}) intersects the demand curve (see Figure 2.5). To solve for the price, plug the quota value (300) into the demand equation.
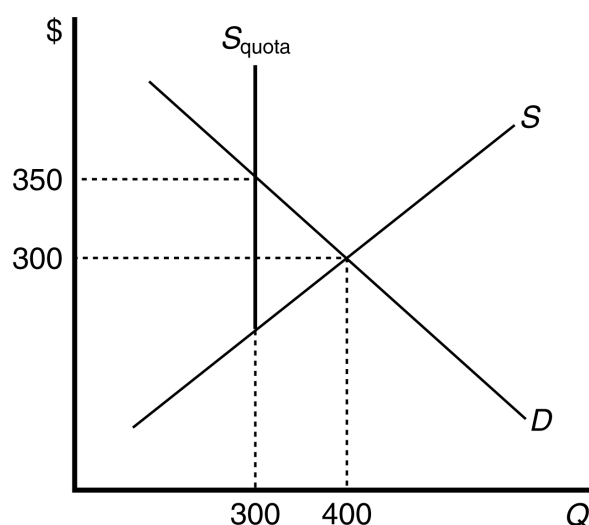
$$1000 - 2p = 300$$
$$p^* = 350$$

Figure 2.5

10. When park visits are free, the equilibrium quantity is 10,000 = 10,000 – 100(o). With a $20.00 entrance fee quantity falls to 8,000. See Figure 2.6.
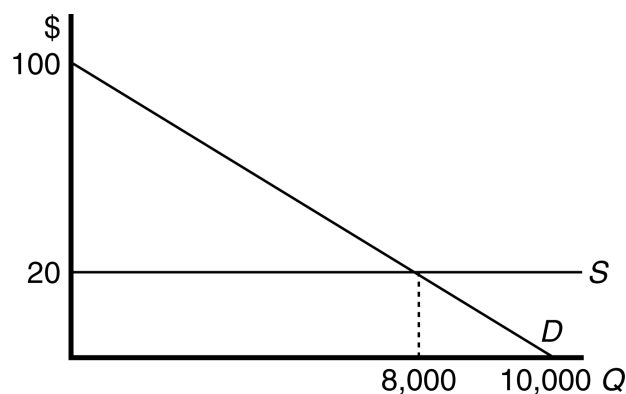

Figure 2.6

11. The demand curve of the previous model shifts to the right. If the new model is more expensive, the demand curve for the previous model still shifts to the right, but with a smaller magnitude.

12. Without the wage ceiling, the equilibrium is given by

$$10,000 - 100W = 2,000 + 1,900W,$$

where

$$W = 4 \quad \text{and} \quad Q = 9,600.$$

With the wage ceiling of $3 per hour, the market wage rate will be $W = 3$, and the amount of labor employed will be 7,700.