Chapter Overview

CONTEXT AND PURPOSE

Chapter 7 is the first chapter in a three-chapter sequence on welfare economics and market efficiency. Chapter 7 employs the supply and demand model to develop consumer surplus and producer surplus as a measure of welfare and market efficiency. These concepts are then utilized in Chapters 8 and 9 to determine the winners and losers from taxation and restrictions on international trade.

The purpose of Chapter 7 is to develop welfare economics—the study of how the allocation of resources affects economic well-being. Chapters 4 through 6 employed supply and demand in a positive framework when we asked the question, "What is the equilibrium price and quantity in a market?" We now address the normative question, "Is the equilibrium price and quantity in a market the best possible solution to the resource allocation problem or is it simply the price and quantity that balance supply and demand?" We will discover that under most circumstances the equilibrium price and quantity is also the one that maximizes welfare.

CHAPTER REVIEW

Introduction In this chapter we address welfare economics—the study of how the allocation of resources affects economic well-being. We measure the benefits that buyers and sellers receive from taking part in a market and we discover that the equilibrium price and quantity in a market maximizes the total benefits received by buyers and sellers.

Consumer Surplus Consumer surplus measures the benefits received by buyers from participating in a market. Each potential buyer in a market has some willingness to pay for a good. This willingness to pay is the maximum amount that a buyer will pay for the good. If we plot the value of the greatest willingness to pay for the first unit followed by the next greatest willingness to pay for the second unit and so on (on a price and quantity graph) we have plotted the market demand curve for the good. That is, the height of the demand curve is the marginal buyers' willingness to pay. Since some buyers value a good more than other buyers, the demand curve is downward sloping.

Consumer surplus is a buyer's willingness to pay minus the amount the buyer actually pays. For example, if you are willing to pay $20 for a new CD of your favorite music artist and you are able to purchase it for $15, you receive consumer surplus on that CD of $5. In general, since the height of the demand curve maximizes total surplus in a market.
measures the value buyers place on a good measured by the buyer’s willingness to pay, consumer surplus is the area below the demand curve and above the price.

When the price of a good falls, consumer surplus increases for two reasons. First, existing buyers receive greater surplus because they are allowed to pay less for the quantities they were already going to purchase and, second, new buyers are brought into the market because the price is now lower than their willingness to pay.

Note that since the height of the demand curve is the value buyers place on a good measured by their willingness to pay, consumer surplus measures the benefits received by buyers as the buyers themselves perceive it. Therefore, consumer surplus is an appropriate measure of buyers’ benefits if policymakers respect the preferences of buyers. Economists generally believe that buyers are rational and that buyer preferences should be respected except possibly in cases of drug addiction, and so on.

**Producer Surplus** Producer surplus measures the benefits received by sellers from participating in a market. Each potential seller in a market has some cost of production. This cost is the value of everything a seller must give up to produce a good and it should be interpreted as the producers’ opportunity cost of production—actual out-of-pocket expenses plus the value of the producers’ time. The cost of production is the minimum amount a seller is willing to accept in order to produce the good. If we plot the cost of the least cost producer of the first unit, then the next least cost producer of the second unit, and so on (on a price and quantity graph), we have plotted the market supply curve for the good. That is, the height of the supply curve is the marginal sellers’ cost of production. Since some sellers have a lower cost than other sellers, the supply curve is upward sloping.

*Producer surplus* is the amount a seller is paid for a good minus the seller’s cost. For example, if a musician can produce a CD for a cost of $10 and sell it for $15, the musician receives a producer surplus of $5 on that CD. In general, since the height of the supply curve measures the sellers’ costs, *producer surplus is the area below the price and above the supply curve.*

When the price of a good rises, producer surplus increases for two reasons. First, existing sellers receive greater surplus because they receive more for the quantities they were already going to sell and, second, new sellers are brought into the market because the price is now higher than their cost.

**Market Efficiency** We measure economic well-being with total surplus—the sum of consumer and producer surplus.

\[
\text{Total surplus} = (\text{value to buyers} - \text{amount paid by buyers}) + (\text{amount received by sellers} - \text{cost to sellers})
\]

Graphically, total surplus is the area below the demand curve and above the supply curve. Resource allocation is said to exhibit efficiency if it maximizes the total surplus received by all members of society. Free market equilibrium is efficient because it maximizes total surplus. This efficiency is demonstrated by the following observations:

- Free markets allocate output to the buyers who value it the most—those with a willingness to pay greater than or equal to the equilibrium price. Therefore consumer surplus cannot be increased by moving consumption from a current buyer to any other non-buyer.
- Free markets allocate buyers for goods to the sellers who can produce at least cost—those with a cost of production less than or equal to the equilibrium price. Therefore producer surplus cannot be increased by moving production from a current seller to any other non-seller.

- Free markets produce the quantity of goods that maximizes the sum of consumer and producer surplus or total surplus. If we produce less than the equilibrium quantity, we fail to produce units where the value to buyers exceeds the cost to producers. If we produce more than the equilibrium quantity, we produce units where the cost to producers exceeds the value to buyers.

Economists generally advocate free markets because they are efficient. Since markets are efficient, many believe that government policy should be *laissez-faire* which means "allow them to do." Adam Smith's "invisible hand" of the marketplace guides buyers and sellers to an allocation of resources that maximizes total surplus.

In addition to efficiency, policymakers may also be concerned with *equity*—the fairness of the distribution of well-being among the members of society. The issue of equity involves normative judgements that go beyond the realm of economics.

**Conclusion: Market Efficiency and Market Failure** There are two main reasons a free market may not be efficient:

- A market may not be perfectly competitive. If individual buyers or sellers (or small groups of them) can influence the price, they have market power and they may be able to keep the price and quantity away from equilibrium.

- A market may generate side effects, or *externalities*, which affect people who are not participants in the market at all. These side effects, such as pollution, are not taken into account by buyers and sellers in a market so the market equilibrium may not be efficient for society as a whole.

Market power and externalities are the two main types of *market failure*—the inability of some unregulated markets to allocate resources efficiently.

**HELPFUL HINTS**

1. To better understand "willingness to pay" for the buyer and "cost" to seller, read both demand and supply "backward." That is, read both demand and supply from the quantity axis to the price or dollar axis. When we read demand from quantity to price, we find that the potential buyer for the first unit has a very high willingness to pay because that buyer places a great value on the good. As we move farther out along the quantity axis, the buyers for those quantities have a somewhat lower willingness to pay and, thus, the demand curve slopes negatively. When we read supply from quantity to price, we find that the potential seller for the first unit is extremely efficient and, accordingly, has a very low cost of production. As we move farther out along the quantity axis, the sellers for those quantities have somewhat higher costs and, thus, the supply curve slopes upward. At equilibrium between supply and demand, only those units are produced which generate a value to buyers that exceeds the cost to the sellers.

2. Consumer surplus exists, in part, because in a competitive market there is one price and all participants are price takers. With a single market price
determined by the interactions of many buyers and sellers, individual buy-
ers may have a willingness to pay that exceeds the price, and, as a result,
some buyers receive consumer surplus. If, however, sellers are aware of the
buyers' willingness to pay and the sellers engage in price discrimination,
that is, charge each buyer their willingness to pay, there would be no con-
sumer surplus. Each buyer would be forced to pay their individual willing-
ness to pay. This issue will be addressed in later chapters.

**TERMS AND DEFINITIONS**

Choose a definition for each key term.

**Key terms:**

1. Welfare economics
2. Willingness to pay
3. Consumer surplus
4. Cost
5. Producer surplus
6. Efficiency
7. Equity
8. Market failure

**Definitions:**

1. A buyer's willingness to pay minus the amount the buyer actually pays
2. The property of a resource allocation of maximizing the total surplus received by all members of society
3. The study of how the allocation of resources affects economic well-being
4. The inability of some unregulated markets to allocate resources efficiently
5. The fairness of the distribution of well-being among the members of society
6. The amount a seller is paid for a good minus the seller's cost
7. The maximum amount that a buyer will pay for a good
8. The value of everything a seller must give up to produce a good

**Problems and Short-Answer Questions**

**PRACTICE PROBLEMS**

1. The following information describes the value Lori Landlord places on hav-
ing her five apartment houses repainted. She values the repainting of each
apartment house at a different amount depending on how badly it needs repainting.

   Value of new paint on first apartment house $5000
   Value of new paint on second apartment house $4000
   Value of new paint on third apartment house $3000
   Value of new paint on fourth apartment house $2000
   Value of new paint on fifth apartment house $1000
a. Plot Lori Landlord's willingness to pay in Exhibit 1.

\[ \text{Exhibit 1} \]

\[ \begin{array}{c|cccccc}
\text{Price} & 7000 & 6000 & 5000 & 4000 & 3000 & 2000 & 1000 \\
\hline
\text{Quantity} & 0 & 1 & 2 & 3 & 4 & 5 & 6
\end{array} \]

b. If the price to repaint her apartments is $5000 each, how many will she repaint? What is the value of her consumer surplus?


c. Suppose the price to repaint her apartments falls to $2000 each. How many apartments will Lori choose to have repainted? What is the value of her consumer surplus?


d. What happened to Ms. Landlord's consumer surplus when the price of having her apartments repainted fell? Why?


2. The following information shows the costs incurred by Peter Painter when he paints apartments. Because painting is backbreaking work, the more he paints, the higher the costs he incurs in both pain and chiropractic bills.

- Cost of painting first apartment house: $1000
- Cost of painting second apartment house: $2000
- Cost of painting third apartment house: $3000
- Cost of painting fourth apartment house: $4000
- Cost of painting fifth apartment house: $5000
a. Plot Peter Painter's cost in Exhibit 2.

Exhibit 2

b. If the price of painting apartment houses is $2000 each, how many will he paint? What is the value of his producer surplus?

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c. Suppose the price to paint apartments rises to $4000 each. How many apartments will Peter choose to repaint? What is the value of his producer surplus?

________________________________________________________________________

________________________________________________________________________

d. What happened to Mr. Painter's producer surplus when the price to paint apartments rose? Why?

________________________________________________________________________

________________________________________________________________________

3. Use the information about willingness to pay and cost from (1) and (2) above to answer the following questions.

a. If a benevolent social planner sets the price for painting apartment houses at $5000, what is the value of consumer surplus? Producer surplus? Total surplus?

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Chapter 7 Consumers, Producers, and the Efficiency of Markets

b. If a benevolent social planner sets the price for painting apartment houses at $1000, what is the value of consumer surplus? Producer surplus? Total surplus?

c. If the price for painting apartment houses is allowed to move to its free market equilibrium price of $3000, what is the value of consumer surplus, producer surplus, and total surplus in the market? How does total surplus in the free market compare to the total surplus generated by the social planner?

4. In Exhibit 3, plot the linear supply and demand curves for painting apartments implied by the information in questions (1) and (2) above (draw them so that they contact the vertical axis). Show consumer and producer surplus for the free market equilibrium price and quantity. Is this allocation of resources efficient? Why?

5. Suppose Lori Landlord has difficulty renting her dilapidated apartments so she increases her willingness to pay for painting by $2000 per apartment.
Plot Lori’s new willingness to pay along with Peter’s cost in Exhibit 4. If the equilibrium price rises to $4000, what is the value of consumer surplus, producer surplus, and total surplus? Show consumer and producer surplus on the graph. Compare your answer to the answer you found in 3 (c) above.

SHORT-ANSWER QUESTIONS

1. What is the relationship between the buyers’ willingness to pay for a good and the demand curve for that good?

2. What is consumer surplus and how is it measured?

3. What is the value of consumer surplus for the marginal buyer? Why?
4. If the cost for Moe to mow a lawn is $5, for Larry to mow a lawn is $7, and for Curly to mow a lawn is $9, what is the value of their producer surplus if each mow a lawn and the price for lawn mowing is $10?

5. What is the relationship between the sellers' cost to produce a good and the supply curve for that good?

6. What is producer surplus and how is it measured?

7. When the price of a good rises, what happens to producer surplus? Why?

8. Can a benevolent social planner choose a quantity that provides greater economic welfare than the equilibrium quantity generated in a competitive market? Why?

9. What does an economist mean by "efficiency?"

10. Is a competitive market efficient? Why?

11. How does a competitive market choose which producers will produce and sell a product?