Part II: Foundation of Microeconomics

5. Consumers and Incentives
6. Sellers and Incentives
7. Perfect Competition and the Invisible Hand
8. Trade
9. Externalities and Public Goods
10. The Government in the Economy: Taxation and Regulation
11. Markets for Factors of Production

Chapter 7
Perfect Competition and the Invisible Hand

2015.10.16.

KEY IDEAS

- The invisible hand efficiently allocates goods and services to buyers and sellers.
- The invisible hand leads to efficient production within an industry.
- The invisible hand efficiently allocates resources across industries.

KEY IDEAS

- Prices direct the invisible hand.
- There are trade-offs between making the economic pie as big as possible and dividing the pieces equally.

Evidence-Based Economics

Q: Can markets composed of only self-interested people maximize the overall well-being of society?

- Adam Smith, the father of economics, conjectured that self interest was a necessary ingredient for an economy to function efficiently.
- This view is put forth most elegantly in his treatise *The Wealth of Nations* (國富論) (1776):

  It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest.

- This insight has become known as the power of the "invisible hand."

7.1 Perfect Competition and Efficiency

- **Reservation value** is the price at which a trading partner is indifferent between making the trade and not doing so.

Buyers	Reservation Value ($)	Sellers	Reservation Value ($)
Madeline	70	Tom	10
Katie	60	Mary	20
Sean	50	Jeff	30
Dave	40	Phil	40
Ian	30	Adam	50
Kim	20	Matt	60
Ty	10	Fiona	70

Exhibit 7.1 Reservation Values of Buyers and Sellers in the iPod Market

- Reservation values for buyers (willingness-to-pay values) can be combined to form the market demand curve.
- Reservation values for sellers (willingness-to-sell values, or marginal cost) can be combined to make up the market supply curve.
- What is the equilibrium price? And quantity trade in equilibrium?

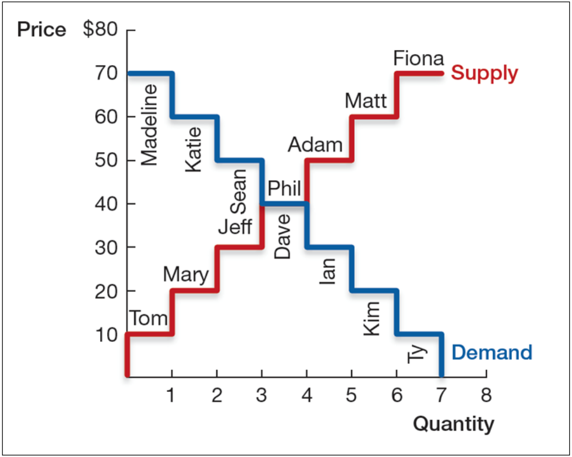

Exhibit 7.2 Demand and Supply Curves in the iPod Market

- Equilibrium price is determined by the intersection of market demand and market supply curves— $40.
- Equilibrium quantity is 4 iPods.

Social Surplus

- **Social surplus** is the sum of *consumer surplus* and *producer surplus*.
- An important outcome from buyers and sellers optimizing in perfectly competitive markets is that *social surplus* is maximized.
- For social surplus to be maximized, the highest-value buyers are making a purchase and the lowest-cost sellers are selling.

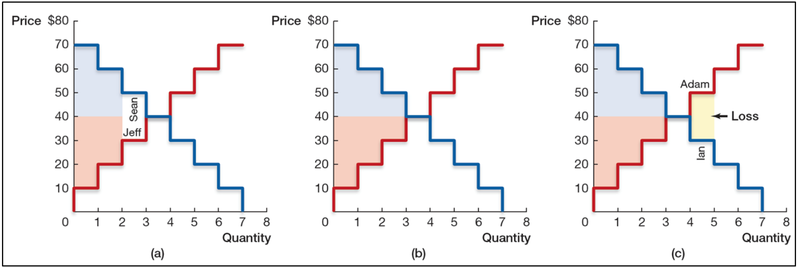

Exhibit 7.3 Maximizing the Social Surplus

- The competitive market equilibrium is efficient in the sense that all mutually advantageous trades take place: no more, no less.
- The competitive market equilibrium maximizes social surplus.
- This is the best that society as a whole can do if it is simply interested in maximizing the total size of the economic pie.

Pareto Efficiency

- In the competitive market equilibrium, can we make any individual better off without harming someone else?
- The answer is no. This concept is called Pareto efficiency.
- An outcome is Pareto efficient if no individual can be made better off without making someone else worse off.
- Besides maximizing social surplus, the competitive market equilibrium is also Pareto efficient.
- In a perfectly competitive market, the first distinct function for the equilibrium price is that it efficiently allocates goods and services to buyers and sellers.

7.2 Extending the Reach of the Invisible Hand: From the Individual to the Firm

- Consider a firm that owns two manufacturing plants, each of which produces microchips to sell in a perfectly competitive market.

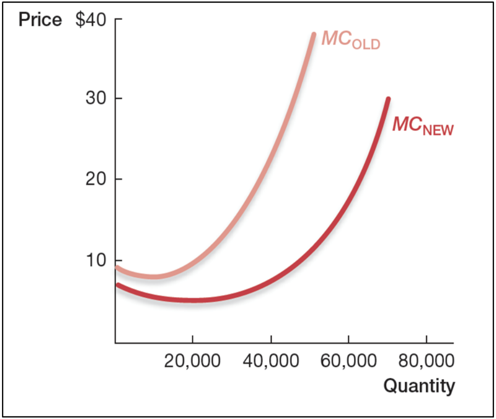

Exhibit 7.4 Marginal Costs for Two Manufacturing Plants

- The two plants are quite different, with one being built in the late 1970s and the other in 2010.
- At each production level, the newer plant can produce microchips at a lower marginal cost than the older plant.

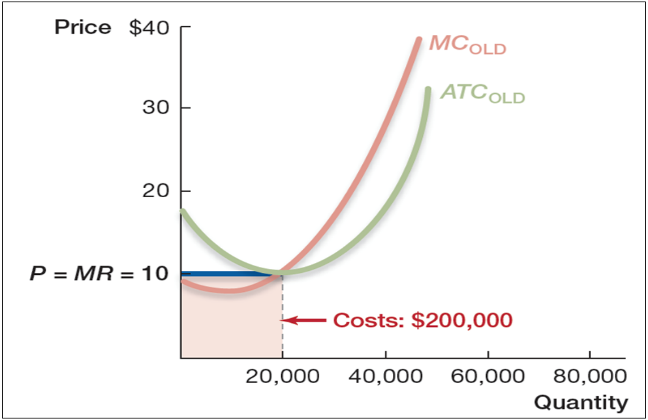

Exhibit 7.5 Optimal Production Quantity at the Old Manufacturing Plant

- The firm has historically allowed both plant managers to maximize their own plant's profits.
- With $P = 10$, the old plant produced 20,000 microchips, with total cost of $200,000 and zero profit.

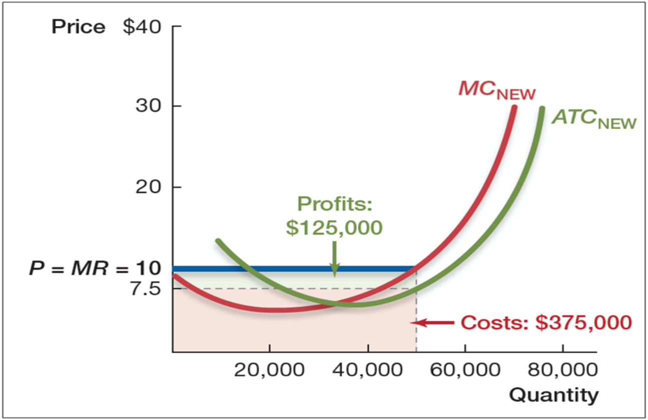

Exhibit 7.6 Optimal Production Quantity at the New Manufacturing Plant

- With $P = 10$, the new plant produced 50,000 microchips, with total cost of $375,000 and $125,000 profit.

- A new CEO announces that

  "*it is time to move to the 21st century; we must immediately move all the production to the new plant. This plant will produce to entire 70,000 (20,000 + 50,000) microchips itself because of its better technology; in this way, we will demonstrate to the world how our firm is moving progressively forward to make our shareholders better off.*"

- What will happen to the firm's total profits?

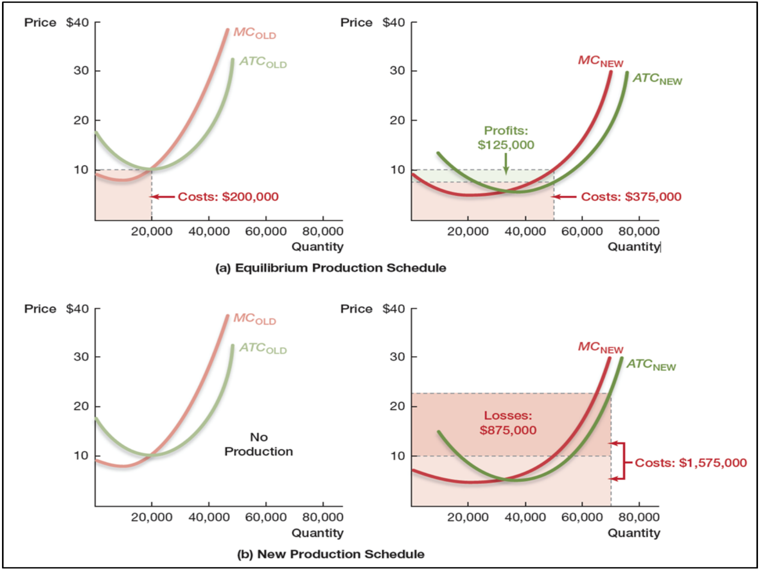

Exhibit 7.7 The Impact of Enforced Production Schedules

- Under the new production schedule, the marginal cost is \$30, much higher than the price (and marginal revenue) of \$10.
- The firm has negative profits of \$875,000.
- The firm can reduce the loss by moving production from the new plant to the old plant until marginal costs are equalized across plants.

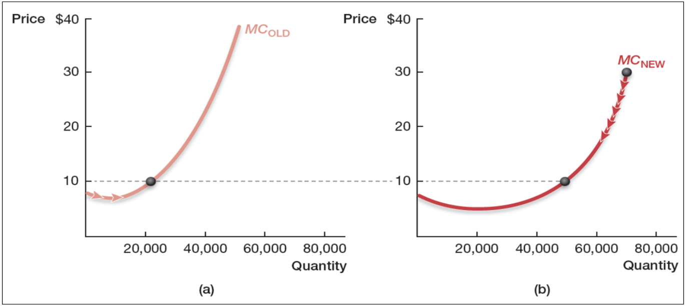

Exhibit 7.8 Marginal Cost Curves for the Old Plant and the New Plant

- Allowing the market to operate freely not only permits each plant manager to maximize his own plant's profits by producing where $MR = MC$ but in so doing the plants minimize total costs of production because $MC_{OLD} = MC_{NEW}$.
- When the competitive market is allowed to operate efficiently, we do not need a central planner (or a CEO) dictating for the betterment of society.
- Plant managers are willing to do that on their own, without even knowing it.
- In a competitive market, the second distinct function of the equilibrium price is that it efficiently allocates the production of goods within an industry.

7.3 Extending the Reach of the Invisible Hand: Allocation of Resources Across Industries

- How can we determine if any specific industry is producing too much or too little?
- Does the invisible hand have the power in allocating scarce resources across industries?

- Consider another perfectly competitive market— the delivery of paper products for publishing houses— with identical sellers making positive economic profits in the short run, at a price of $25 per ton.

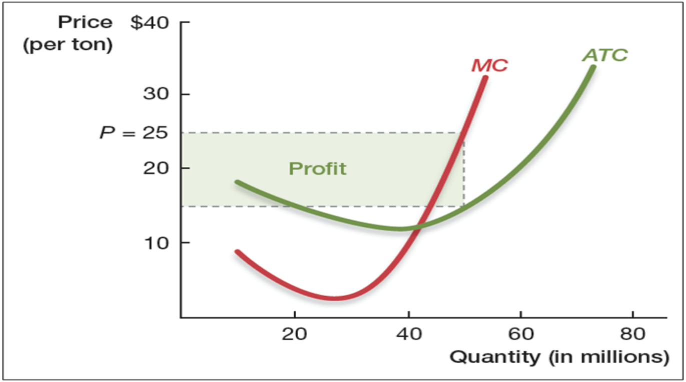

Exhibit 7.9 Economic Profits in the Paper Delivery Business

- Positive economic profits are a powerful force that attracts entrants.
- Supply increases, price decreases to $12, until reaches zero economic profit.
- When positive economic profits exist in an industry: resources flow from industry with less productive uses to industry with more productive uses.

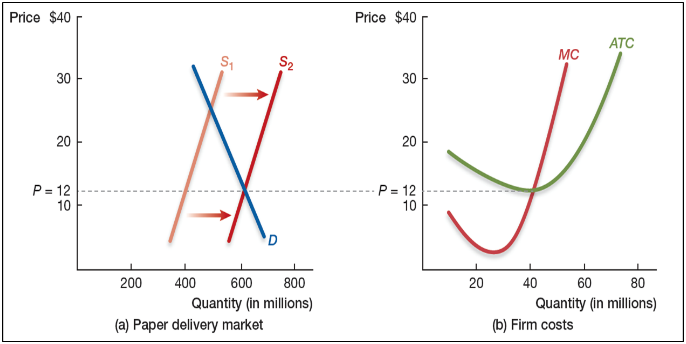

Exhibit 7.10 Firm Entry and Its Effect on the Market

- What happens if the equilibrium price lies below the ATC curve?
- Truckers should exit because they are earning negative economic profits, or losses.

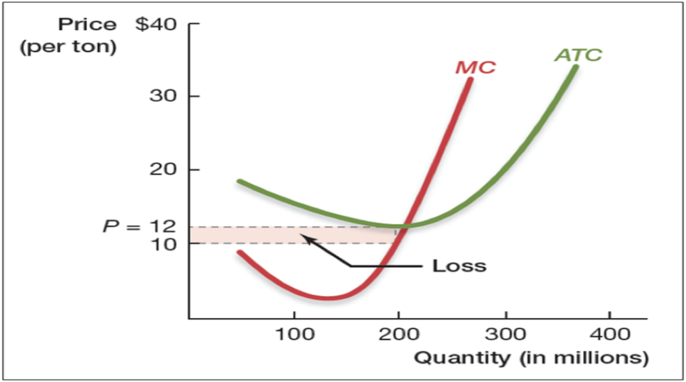

Exhibit 7.11 Economic Losses in the Trucking Market

- Exit of truckers shifts the supply leftward, until the price rises to the minimum of the ATC curve., $12.

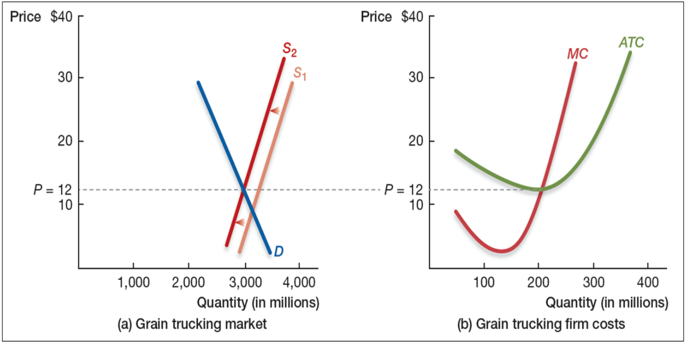

Exhibit 7.12 Firm Exit and Its Effect on the Market

- Competitive markets provide strong incentives for profit-seeking entrepreneurs to shift their resources from unprofitable industries to profitable ones.
- The market price is acting as an incentive for sellers to promote the greatest good for the society— move scarce resources to their highest possible use— even though sellers are solely attempting to maximize their own profits.
- The <u>third</u> distinct function of equilibrium prices in a competitive market is that they allocate scarce resources across industries in an optimal manner.
- Entry and exit of firms is a good sign that the market is working, not a sign that something has run afoul.

7.4 Prices Guide the Invisible Hand

- When right conditions are in place, self-interest and the social interest are perfectly aligned.
- This is what led Adam Smith to comment that when markets are functioning well, those who are promoting their self-interest are also promoting the interests of society more broadly, as if led by an "invisible hand" to do so.
- Market prices act as the most important piece of information, leading the high-value buyers to buy and the low-cost sellers to sell.

- No one has knowledge of all of the links between timber markets in Canada, corn markets in Iowa, fishing markets on Cape Cod, tea markets in China, and the tourism market in Costa Rica, but the fact that the pricing system can order behavior across such a vast array of markets, individuals, and groups, highlights the power of incentives within the market system.
- Nobel Laureate Vernon Smith a pioneer in experimental economics:
  "The pricing system $\cdots$ is a scientific mystery $\cdots$ to understand it is to understand something about how the human species got from hunter-gathering through the agricultural and industrial revolutions to a state of affluence."

One example illustrates how market works.

What would happen if the demand for bottled water suddenly increases because of hurricane warnings?

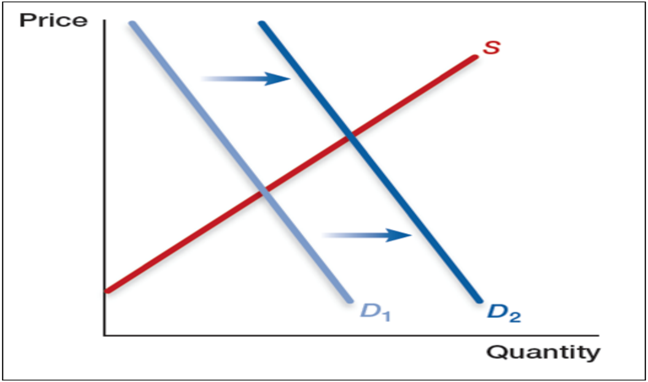

Exhibit 7.13 An Outward Shift of the Demand for Bottled Water

- The increase in price would reverberate through the economy, incentivizing water distributors to make special trips to fill the increased demand.

- Respond to the complaints about price gouging, the government restricts the price a store can charge for the bottled water. This is called **price control**.
- Restricting the price to its old level does not give entrepreneurs an incentive to supply their product.

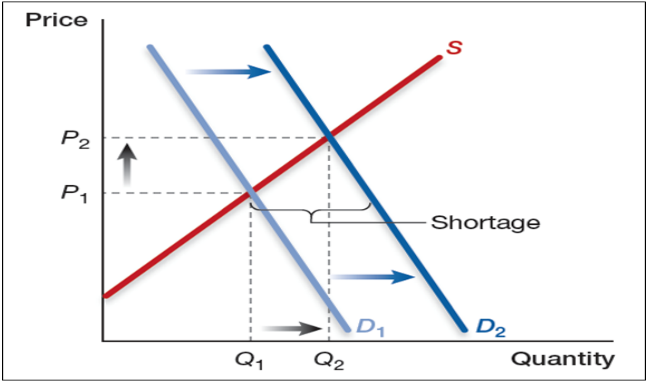

Exhibit 7.14 Shortages: Quantity Demanded Exceeds Quantity Supplied

- By artificially limiting quantity, the price control creates another problem: how do we allocate the bottled water that is available (Q_1 in Exhibit 7.14)?
- Free markets ration goods with prices. The market is efficient because those who are willing to pay the most receive the good.
- But when price controls are imposed the market is no longer free to operate efficiently.
- In cases like this, long lines of people waiting to purchase the water is a typical outcome.
- This is not only frustrating but inefficient, because our time is valuable and the water does not always go to those who value it the most.

Deadweight Loss

- Economists call the decrease in social surplus that results from a market distortion **deadweight loss**.

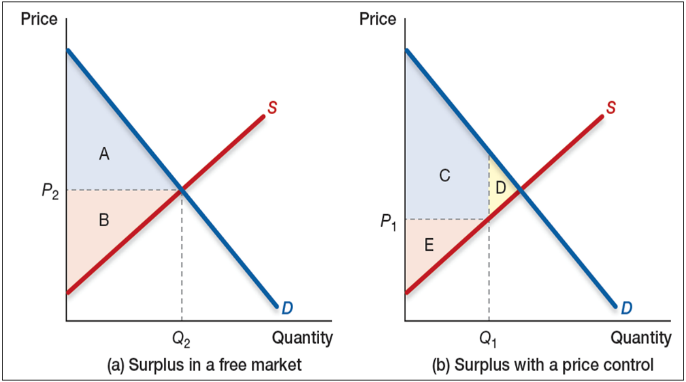

Exhibit 7.15 Deadweight Loss from Price Controls

Binding price controls have three effects:

- They lower social surplus because the number of trades decreases.
- They redistribute surplus from one side of the market to the other. In the case of price ceiling, surplus is transferred from producers to consumers.
- For people who benefit, there is a reallocation of surplus, which occurs through non-price mechanisms such as waiting the longest, the most connected, or simple the strongest.

The Command Economy

- The economic system implemented in North Korea remains today as one of the few remaining command economies, where a centralized authority determines the good and service produced.
- South Korea established a market economy based upon price signals and strong economic incentives.

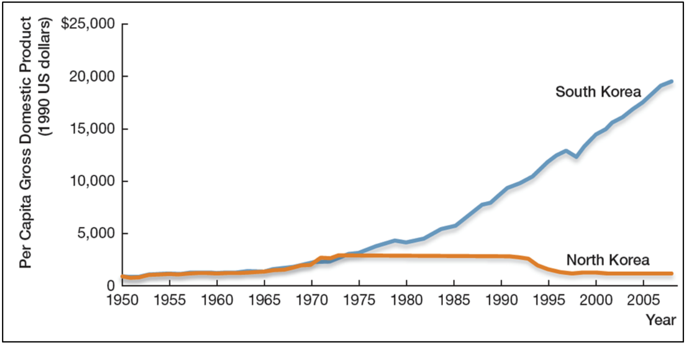

Exhibit 7.16 Per Capita GDP of North Korea and South Korea, 1950-2008

	South Korea	North Korea
2008 GDP	$1,344 billion	$40 billion
2008 GDP rank	13th	95th
2008 exports value	$355,100 million	$2,062 million
2008 imports value	$313,400 million	$3,574 million
% of GDP Industrial	39.5%	43.1%
% of GDP Services	57.6%	33.6%
% of GDP Agricultural	3%	23.3%

Exhibit 7.17 North Korea and South Korea Compared along a Variety of Dimensions

Exhibit 7.18 The Story of Two Different Economies

The Central Planner

- Why is it difficult for command economies to operate effectively and experience significant, sustained GDP growth?
  - Coordination problem of bringing agents together to trade.
  - Incentive problem of aligning the interests of the agents.
- The central planner does not fully understand consumer wants and needs and the production capabilities of every sector of the economy and it is difficult to incentivize workers if prices are not utilized.

7.5 Equity and Efficiency

- A market economy has features that are remarkable at providing price signals that guide resources in a way that maximizes social surplus and makes the economy efficient.
- Market forces act to eliminate waste and provide incentives for all market participants to promote their own interests, which in turn promote the broader interests of society.
- Maximizing efficiency directs us toward making the societal pie as large as possible.

- **Equity** is concerned with how the pie is allocated to the various economic agents.
- Just because the competitive market equilibrium maximizes social surplus, and is efficient, does not mean that the resulting distribution is morally satisfactory.
- In a perfectly competitive equilibrium, Pareto efficiency holds.
- This means that it is not possible to make a starving person better off without making someone else worse off.
- Government intervention presents an important trade-off between efficiency and equity. Society continually has choices over efficiency and equity.

Evidence-Based Economics

Q: Can markets composed of only self-interested people maximize the overall well-being of society?

- Simulate the New York Stock Exchange via a small experiment.
- You participate in the experiment and are given a note card that tells you:
  - whether you are a buyer or seller.
  - your reservation value.
- Buy or sell one unit per period. There will be 5 periods.
- Your earnings will be determined by the difference between the trade price and the reservation value.
- The prices that the buyers submit are called *bid prices* and the prices that sellers submit are called *ask prices*.

Double Oral Auction

- A auction where both bids and asks are orally stated is called *double oral auction*, and was first experimentally studied by Vernon Smith.
- Initially, the market is below the market equilibrium, but by the third trading period, the price is very close to the equilibrium prediction.

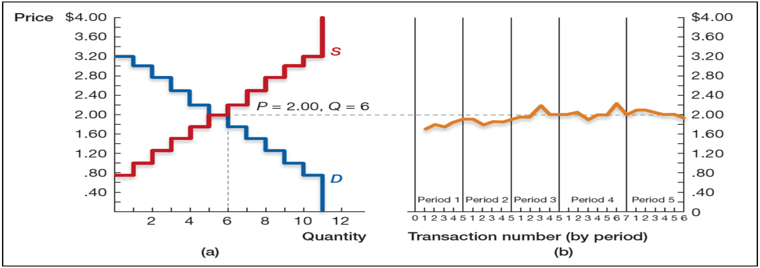

Exhibit 7.19 One Example from Smith's (1962) Experiments

Bilateral Negotiations

- Like Smith, List gave buyers and sellers reservation values and recorded prices publicly after transactions.
- Unlike Smith, List had actual buyers and sellers engaging in **bilateral negotiations** in which a single buyer and a single seller confront each other with bids and asks.
- These data indicate that the market converges to the intersection of supply and demand, which is between $13 and $14 in Exhibit 7.20.

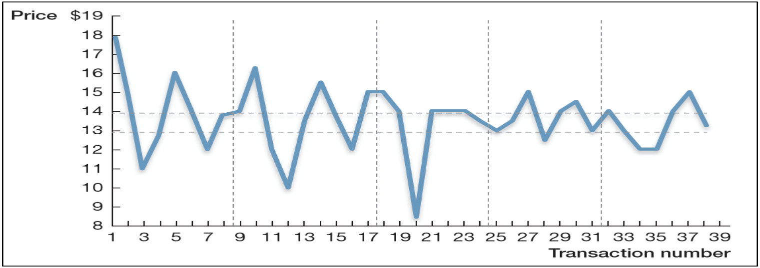

Exhibit 7.20 One Example from List's Field Experiments