Economics in Action

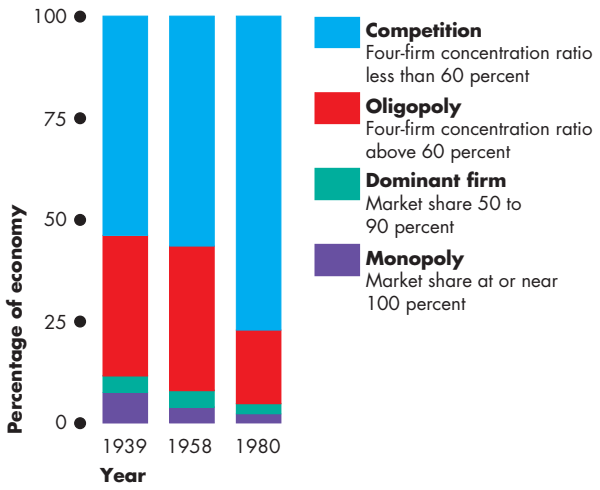
A Competitive Environment

How competitive are markets in the United States? Do most U.S. firms operate in competitive markets, in monopolistic competition, in oligopoly, or in monopoly markets?

The data needed to answer these questions are hard to get. The last attempt to answer the questions, in a study by William G. Shepherd, an economics professor at the University of Massachusetts at Amherst, covered the years from 1939 to 1980. The figure shows what he discovered.

In 1980, three quarters of the value of goods and services bought and sold in the United States was traded in markets that are essentially competitive—markets that have almost perfect competition or monopolistic competition. Monopoly and the dominance of a single firm accounted for about 5 percent of sales. Oligopoly, which is found mainly in manufacturing, accounted for about 18 percent of sales.

Over the period studied, the U.S. economy became increasingly competitive. The percentage of output sold by firms operating in competitive markets (blue bars) has expanded most, and has shrunk most in oligopoly markets (red bars).



The Market Structure of the U.S. Economy

William G. Shepherd, "Causes of Increased Competition in the U.S. Economy, 1939–1980," *Review of Economics and Statistics*, 64:4 (November, 1982), pp. 613–626. © 1982 by the President and Fellows of Harvard College. Reprinted with permission.

But also during the past decades, the U.S. economy has become much more exposed to competition from the rest of the world. The data used by William G. Shepherd don't capture this international competition, so the data probably understate the degree of true competition in the U.S. economy.

show up in the concentration numbers for the plywood market.

Third, firms switch from one market to another depending on profit opportunities. For example, Motorola, which today produces cellular telephones and other communications products, has diversified from being a TV and computer chip maker. Motorola no longer produces TVs. Publishers of newspapers, magazines, and textbooks are today rapidly diversifying into Internet and multimedia products. These switches among markets show that there is much scope for entering and exiting a market, and so measures of concentration have limited usefulness.

Despite their limitations, concentration measures do provide a basis for determining the degree of competition in a market when they are combined with information about the geographical scope of the market, barriers to entry, and the extent to which large, multiproduct firms straddle a variety of markets.

REVIEW QUIZ

1. What are the four market types? Explain the distinguishing characteristics of each.
2. What are the two measures of concentration? Explain how each measure is calculated.
3. Under what conditions do the measures of concentration give a good indication of the degree of competition in a market?
4. Is our economy competitive? Is it becoming more competitive or less competitive?

You can work these questions in Study Plan 10.4 and get instant feedback. myeconlab

You now know the variety of market types and how we identify them. Our final question in this chapter is: What determines the things that firms decide to buy from other firms rather than produce for themselves?

Produce or Outsource? Firms and Markets

To produce a good or service, even a simple one such as a shirt, factors of production must be hired and their activities coordinated. To produce a good as complicated as an iPhone, an enormous range of specialist factors of production must be coordinated.

Factors of production can be coordinated either by firms or markets. We'll describe these two ways of organizing production and then see why firms play a crucial role in achieving an efficient use of resources.

Firm Coordination

Firms hire labor, capital, and land, and by using a mixture of command systems and incentive systems (see p. 233) organize and coordinate their activities to produce goods and services.

Firm coordination occurs when you take your car to the garage for an oil change, brake check, and service. The garage owner hires a mechanic and tools and coordinates all the activities that get your car serviced. Firms also coordinate the production of cornflakes, golf clubs, and a host of other items.

Market Coordination

Markets coordinate production by adjusting prices and making the decisions of buyers and sellers of factors of production and components consistent. Markets can coordinate production.

Market coordination occurs to produce a rock concert. A promoter books a stadium, rents some stage equipment, hires some audio and video recording engineers and technicians, engages some rock groups, a superstar, a publicity agent, and a ticket agent. The promoter sells tickets to thousands of rock fans, audio rights to a recording company, and video and broadcasting rights to a television network. All these transactions take place in markets that coordinate this huge variety of factors of production.

Outsourcing, buying parts or products from other firms, is another example of market coordination. Dell outsources the production of all the components of its computers. Automakers outsource the production of windshields, windows, transmission systems, engines, tires, and many other auto parts. Apple outsources the entire production of iPods and iPhones.

Why Firms?

What determines whether a firm or a market coordinates a particular set of activities? How does a firm decide whether to buy an item from another firm or manufacture it itself? The answer is cost. Taking account of the opportunity cost of time as well as the costs of the other inputs, a firm uses the method that costs least. In other words, it uses the economically efficient method.

If a task can be performed at a lower cost by markets than by a firm, markets will do the job, and any attempt to set up a firm to replace such market activity will be doomed to failure.

Firms coordinate economic activity when a task can be performed more efficiently by a firm than by markets. In such a situation, it is profitable to set up a firm. Firms are often more efficient than markets as coordinators of economic activity because they can achieve

- Lower transactions costs
- Economies of scale
- Economies of scope
- Economies of team production

Transactions Costs Firms eliminate transactions costs. **Transactions costs** are the costs that arise from finding someone with whom to do business, of reaching an agreement about the price and other aspects of the exchange, and of ensuring that the terms of the agreement are fulfilled. Market transactions require buyers and sellers to get together and to negotiate the terms and conditions of their trading. Sometimes, lawyers have to be hired to draw up contracts. A broken contract leads to still more expense. A firm can lower such transactions costs by reducing the number of individual transactions undertaken.

Imagine getting your car fixed using market coordination. You hire a mechanic to diagnose the problems and make a list of the parts and tools needed to fix them. You buy the parts from several dealers, rent the tools from ABC Rentals, hire an auto mechanic, return the tools, and pay your bills. You can avoid all these transactions and the time they cost you by letting your local garage fix the car.

Economies of Scale When the cost of producing a unit of a good falls as its output rate increases, **economies of scale** exist. An automaker experiences economies of scale because as the scale of production increases, the firm can use cost-saving equipment and

Economics in Action

Apple Doesn't Make the iPhone!

Apple designed the iPhone and markets it, but Apple doesn't manufacture it. Why? Apple wants to produce the iPhone at the lowest possible cost. Apple achieves its goal by assigning the production task to more than 30 firms, some of which are listed in the table opposite. These 30 firms produce the components in Asia, Europe, and North America and then the components are assembled in the familiar case by Foxconn and Quanta in Taiwan.

Most electronic products—TVs, DVD players, iPods and iPads, and personal computers—are produced in a similar way to the iPhone with a combination of firm and market coordination. Hundreds of little-known firms compete fiercely to get their components into well-known consumer products.

Altus-Tech	Taiwan
Balda	Germany
Broadcom	United States
Cambridge Silicon Radio	UK
Catcher	Taiwan
Cyntec	Taiwan
Delta Electronics	Taiwan
Epson	Japan
Foxconn	Taiwan
Infineon Technology	Germany
Intel	United States
Largan Precision	Taiwan
Lite On	Taiwan
Marvell	United States
Micron	United States
National Semiconductor	United States
Novatek	Taiwan
Primax	Taiwan
Quanta	Taiwan
Samsung	Korea
Sanyo	Japan
Sharp	Japan
Taiwan Semiconductor	Taiwan
TMD	Japan

highly specialized labor. An automaker that produces only a few cars a year must use hand-tool methods that are costly. Economies of scale arise from specialization and the division of labor that can be reaped more effectively by firm coordination rather than market coordination.

Economies of Scope A firm experiences **economies of scope** when it uses specialized (and often expensive) resources to produce a *range of goods and services*. For example, Toshiba uses its designers and specialized equipment to make the hard drive for the iPod. But it makes many different types of hard drives and other related products. As a result, Toshiba produces the iPod hard drive at a lower cost than a firm making only the iPod hard drive could achieve.

Economies of Team Production A production process in which the individuals in a group specialize in mutually supportive tasks is *team production*. Sports provide the best examples of team activity. In baseball, some team members specialize in pitching and others in fielding. In basketball, some team members specialize in defense and some in offense. The production of goods and services offers many examples of team activity. For example, production lines in a TV manufacturing plant work most efficiently when individual activity is organized in teams, each worker specializing in a few tasks. You can also think of an entire firm as being a team. The team has buyers of raw materials and other inputs, production workers, and salespeople. Each individual member of the team specializes, but the value of the output of the team and the profit that it earns depend on the coordinated activities of all the team's members.

Because firms can economize on transactions costs, reap economies of scale and economies of scope, and organize efficient team production, it is firms rather than markets that coordinate most of our economic activity.

REVIEW QUIZ

1. What are the two ways in which economic activity can be coordinated?
2. What determines whether a firm or markets coordinate production?
3. What are the main reasons why firms can often coordinate production at a lower cost than markets can?

You can work these questions in Study Plan 10.5 and get instant feedback. myeconlab

Reading Between the Lines on pp. 244–245 explores the market for Internet advertising. In the next four chapters, we continue to study firms and their decisions. In Chapter 11, we learn about the relationships between cost and output at different output levels. These relationships are common to all types of firms in all types of markets. We then turn to problems that are specific to firms in different types of markets.

Battling for Markets in Internet Advertising

Facebook Makes Gains in Web Ads

http://online.wsj.com
May 12, 2010

Facebook Inc. is catching up to rivals Yahoo Inc. and Microsoft Corp. in selling display ads.

In the first quarter, Facebook pulled ahead of Yahoo for the first time and delivered more banner ads to its U.S. users than any other Web publisher, according to market-research firm comScore Inc. ...

By revenue, Facebook has a long way to go to catch up to its more established rivals. The social-networking site earned more than $500 million in revenue in 2009 and is forecasting revenue of more than $1 billion in 2010, according to people familiar with the matter. Yahoo earned $6.5 billion in revenue in 2009, mostly from advertising. ...

Nielsen Co., another measurement firm, found that Facebook's share of the U.S. display-ad market grew to 20% in April 2010, up from 2% in April 2009. Nielsen still shows Yahoo in the lead, with 34% of all display ads in April 2010, compared with 35% in April 2009. ...

Facebook's rise could help fuel an already rebounding online-advertising market, which shrank during the recession. Display ads have recently shown strong growth as budgets have returned and technology companies have developed new ways to measure the effectiveness of graphical ads. Overall display impressions grew to 1.1 trillion in the first quarter of 2010, up from 944 billion in the first quarter of 2009, according to comScore.

ESSENCE OF THE STORY

- Facebook is catching up to rivals in selling display ads and according to comScore Facebook sold more ads than Yahoo in the first quarter of 2010.
- Facebook's total revenue was more than $500 million in 2009 and is forecast to exceed $1 billion in 2010.
- Yahoo's total revenue, mostly from advertising, was $6.5 billion in 2009.
- Nielsen says that Facebook's share of U.S. display-ads grew from 2 percent to 20 percent in the year to April 2010 while Yahoo's shrank slightly from 35 percent to 34 percent in the same period.
- Display ads are growing because technology companies have developed new ways to measure the effectiveness of graphical ads.

ECONOMIC ANALYSIS

- Like all firms, Facebook and Yahoo aim to maximize profit.
- Facebook provides social networking services and Yahoo provides an Internet search service.
- Facebook and Yahoo face constraints imposed by the market and technology.
- People who use social networks and search engines demand these services, and Facebook and Yahoo supply them.
- MySpace is Facebook's biggest competitor and Wikipedia lists 189 other social networking sites.
- Google is Yahoo's largest competitor but another 58 search engines compete for attention.
- The equilibrium price of social-networking services and search engine services to their users is zero.
- But social networks and Internet search providers enjoy economies of scope: They produce advertising services as well as their other service.
- To generate revenue and profit, social networks and Internet search providers sell advertising services.
- To attract advertising revenue, a social network or search site must be able to offer the advertiser access to a large potential customer base and target the people most likely to buy the advertised product or service.
- Facebook and Yahoo are attractive to advertisers because they are able to deliver both of these features: hundreds of millions of users, identified by their interests and likely buying patterns.
- To maximize the use of their services, Facebook and Yahoo offer a variety of enticements to users.
- One enticement is the quality of the primary service: social networking or search. Facebook innovates to make its social networking services better than those of MySpace; and Yahoo tries to make its search technology as good as those of Google.
- Another enticement is a variety of related attractions. Yahoo's photo-sharing service is an example.
- Facebook aims to attract even more users and to offer advertisers the most effective return on the marketing dollar.
- Although Facebook has seen explosive growth in users, Fig. 1 shows that it is not generating revenues on the scale of the leading search engines. (No data are available for Facebook profit.)
- Figures 1 and 2 show that Yahoo is not maintaining its position in the market for Internet search.
- The data shown in Figs 1 and 2 suggest that Internet search is a more effective tool for generating revenue and profit than social networking.
- The data also suggest that Google's expansion is tightening the market constraint that Yahoo faces.

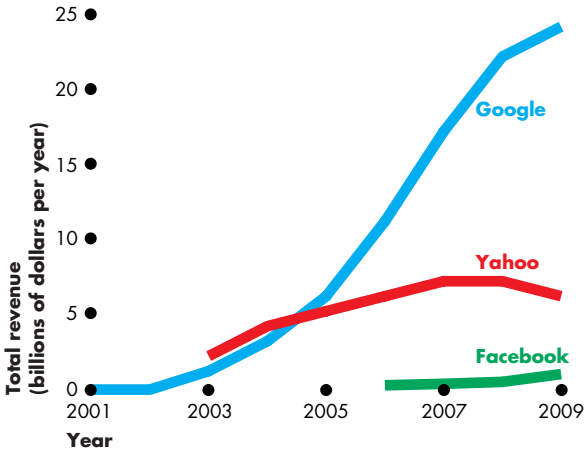


Figure 1 Total revenue comparison

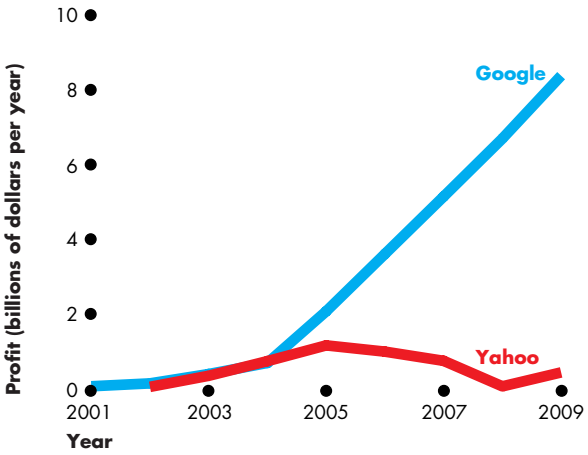


Figure 2 Profit comparison

SUMMARY

Key Points

The Firm and Its Economic Problem (pp. 228–230)

- Firms hire and organize factors of production to produce and sell goods and services.
- A firm's goal is to maximize economic profit, which is total revenue minus total cost measured as the opportunity cost of production.
- A firm's opportunity cost of production is the sum of the cost of resources bought in the market, using the firm's own resources, and resources supplied by the firm's owner.
- Normal profit is the opportunity cost of entrepreneurship and is part of the firm's opportunity cost.
- Technology, information, and markets limit the economic profit that a firm can make.

Working Problems 1 and 2 will give you a better understanding of the firm and its economic problem.

Technological and Economic Efficiency (pp. 231–232)

- A method of production is technologically efficient when a firm uses the least amount of inputs to produce a given output.
- A method of production is economically efficient when the cost of producing a given output is as low as possible.

Working Problems 3 and 4 will give you a better understanding of technological and economic efficiency.

Information and Organization (pp. 233–236)

- Firms use a combination of command systems and incentive systems to organize production.
- Faced with incomplete information and uncertainty, firms induce managers and workers to perform in ways that are consistent with the firms' goals.
- Proprietorships, partnerships, and corporations use ownership, incentive pay, and long-term contracts to cope with the principal–agent problem.

Working Problems 5 to 8 will give you a better understanding of information and organization.

Markets and the Competitive Environment

(pp. 237–241)

- In perfect competition, many sellers offer an identical product to many buyers and entry is free.
- In monopolistic competition, many sellers offer slightly different products to many buyers and entry is free.
- In oligopoly, a small number of sellers compete and barriers to entry limit the number of firms.
- In monopoly, one firm produces an item that has no close substitutes and the firm is protected by a barrier to entry that prevents the entry of competitors.

Working Problems 9 and 10 will give you a better understanding of markets and the competitive environment.

Produce or Outsource? Firms and Markets

(pp. 242–243)

- Firms coordinate economic activities when they can perform a task more efficiently—at lower cost—than markets can.
- Firms economize on transactions costs and achieve the benefits of economies of scale, economies of scope, and economies of team production.

Working Problems 11 and 12 will give you a better understanding of firms and markets.

Key Terms

Command system, 233
Economic depreciation, 229
Economic efficiency, 231
Economic profit, 228
Economies of scale, 242
Economies of scope, 243
Firm, 228
Four-firm concentration ratio, 238
Herfindahl-Hirschman Index, 238
Implicit rental rate, 228
Incentive system, 233
Monopolistic competition, 237
Monopoly, 237
Normal profit, 229
Oligopoly, 237
Perfect competition, 237
Principal–agent problem, 234
Product differentiation, 237
Technological efficiency, 231
Technology, 230
Transactions costs, 242

STUDY PLAN PROBLEMS AND APPLICATIONS

myeconlab You can work Problems 1 to 13 in MyEconLab Chapter 10 Study Plan and get instant feedback.

The Firm and Its Economic Problem (Study Plan 10.1)

1. One year ago, Jack and Jill set up a vinegar-bottling firm (called JJVB). Use the following information to calculate JJVB's opportunity cost of production during its first year of operation:
   - Jack and Jill put $50,000 of their own money into the firm.
   - They bought equipment for $30,000.
   - They hired one employee to help them for an annual wage of $20,000.
   - Jack gave up his previous job, at which he earned $30,000, and spent all his time working for JJVB.
   - Jill kept her old job, which paid $30 an hour, but gave up 10 hours of leisure each week (for 50 weeks) to work for JJVB.
   - JJVB bought $10,000 of goods and services from other firms.
   - The market value of the equipment at the end of the year was $28,000.
   - Jack and Jill have a $100,000 home loan on which they pay interest of 6 percent a year.
2. Joe, who has no skills, no job experience, and no alternative employment, runs a shoeshine stand at the airport. Operators of other shoeshine stands earn $10,000 a year. Joe pays rent to the airport of $2,000 a year, and his total revenue from shining shoes is $15,000 a year. Joe spent $1,000 on a chair, polish, and brushes, using his credit card to buy them. The interest on a credit card balance is 20 percent a year. At the end of the year, Joe was offered $500 for his business and all its equipment. Calculate Joe's opportunity cost of production and his economic profit.

Technological and Economic Efficiency (Study Plan 10.2)

3. Alternative ways of laundering 100 shirts are

Method	Labor (hours)	Capital (machines)
A	1	10
B	5	8
C	20	4
D	50	1

   a. Which methods are technologically efficient?
   b. Which method is economically efficient if the hourly wage rate and the implicit rental rate of capital are as follows:
   (i) Wage rate $1, rental rate $100?
   (ii) Wage rate $5, rental rate $50?
   (iii) Wage rate $50, rental rate $5?
4. **John Deere's Farm Team**

   Deere opened up the Pune [India] center in 2001. Deere's move was unexpected: Deere is known for its heavy-duty farm equipment and big construction gear whereas many of India's 300 million farmers still use oxen-pulled plows.

   Source: *Fortune*, April 14, 2008

   a. Why do many Indian farmers still use oxen-pulled plows? Are they efficient or inefficient? Explain.
   b. How might making John Deere farm equipment available to Indian farmers change the technology constraint they face?

Information and Organization (Study Plan 10.3)

5. **Here It Is. Now, You Design It!**

   The idea is that the most successful companies no longer invent new products and services on their own. They create them along with their customers, and they do it in a way that produces a unique experience for each customer. The important corollary is that no company owns enough resources—or can possibly own enough—to furnish unique experiences for each customer, so companies must organize a constantly shifting global web of suppliers and partners to do the job.

   Source: *Fortune*, May 26, 2008

   a. Describe this method of organizing and coordinating production: Does it use a command system or incentive system?
   b. How does this method of organizing and coordinating production help firms achieve lower costs?
6. **Rewarding Failure**

   Over the past 25 years CEO pay has risen faster than corporate profits, economic growth, or average wages. A more sensible alternative to the current compensation system would require CEOs to own a lot of company stock. If the stock is given to the boss, his salary and bonus should be docked to reflect its value. As for bonuses, they

should be based on improving a company's cash earnings relative to its cost of capital, not to more easily manipulated measures like earnings per share. Bonuses should not be capped, but they should be unavailable to the CEO for some period of years.

Source: *Fortune*, April 28, 2008

a. What is the economic problem that CEO compensation schemes are designed to solve?
b. How do the proposed changes to CEO compensation outlined in the news clip address the problem you described in part (a)?

Use the following news clip to work Problems 7 and 8.

Steps to Creating a Super Startup

Starting a business is a complicated and risky task. Just two-thirds of new small businesses survive at least two years, and only 44 percent survive at least four years. Most entrepreneurs start their businesses by dipping into their savings, borrowing from the family, and using the founder's credit cards. Getting a bank loan is tough unless you have assets—and that often means using your home as collateral.

Source: CNN, October 18, 2007

7. When starting a business, what are the risks and potential rewards identified in the news clip that are associated with a proprietorship?
8. How might (i) a partnership and (ii) a corporation help to overcome the risks identified in the news clip?

Markets and the Competitive Environment (Study Plan 10.4)

9. Sales of the firms in the tattoo industry are

Firm	Sales (dollars per year)
Bright Spots	450
Freckles	325
Love Galore	250
Native Birds	200
Other 15 firms	800

Calculate the four-firm concentration ratio. What is the structure of the tattoo industry?

10. **GameStop Racks Up the Points**

No retailer has more cachet among gamers than GameStop. For now, only Wal-Mart has a larger market share—21.3% last year. GameStop's share was 21.1% last year, and may well overtake Wal-Mart this year. But if new women gamers prefer shopping at Target to GameStop, Wal-Mart and Target might erode GameStop's market share.

Source: *Fortune*, June 9, 2008

a. According to the news clip, what is the structure of the U.S. retail video-game market?
b. Estimate a range for the four-firm concentration ratio and the HHI for the game market in the United States based on the information provided in this news clip.

Produce or Outsource? Firms and Markets (Study Plan 10.5)

11. American automakers buy auto parts from independent suppliers rather than produce the parts themselves. In the 1980s, Chrysler got about 70 percent of its auto parts from independent suppliers, while Ford got about 60 percent and General Motors got 25 percent. A decade earlier, the proportions were 50 percent at Chrysler, 5 percent at Ford, and 20 percent at General Motors.

Source: The Cato Institute Policy Analysis, 1987

a. Why did American automakers decide to outsource most of their parts production?
b. Explain why independent producers of auto parts are more efficient than the automakers.

12. Federal Express enters into contracts with independent truck operators who offer FedEx service and who are rewarded by the volume of packages they carry. Why doesn't FedEx buy more trucks and hire more drivers? What incentive problems might arise from this arrangement?

Economics in the News (Study Plan 10.N)

13. Lego, the Danish toymaker, incurred economic losses in 2003 and 2004. Lego faced competition from low-cost copiers of its products and a fall in demand. In 2004, to restore profits, Lego fired 3,500 of its 8,000 workers; closed factories in Switzerland and the United States; opened factories in Eastern Europe and Mexico; and introduced performance-based pay for its managers. Lego returned to profit in 2005.

Based on **Picking Up the Pieces**, *The Economist*, October 28, 2006

a. Describe the problems that Lego faced in 2003 and 2004, using the concepts of the three types of constraints that all firms face.
b. Which of the actions that Lego took to restore profits addressed an inefficiency? How did Lego seek to achieve economic efficiency?
c. Which of Lego's actions addressed an information and organization problem? How did Lego change the way in which it coped with the principal–agent problem?
d. In what type of market does Lego operate?

ADDITIONAL PROBLEMS AND APPLICATIONS

myeconlab These problems are available in MyEconLab if assigned by your instructor.

The Firm and Its Economic Problem

Use the following information to work Problems 14 and 15.

Lee is a computer programmer who earned $35,000 in 2009. But on January 1, 2010, Lee opened a body board manufacturing business. At the end of the first year of operation, he submitted the following information to his accountant:

- He stopped renting out his cottage for $3,500 a year and used it as his factory. The market value of the cottage increased from $70,000 to $71,000.
- He spent $50,000 on materials, phone, etc.
- He leased machines for $10,000 a year.
- He paid $15,000 in wages.
- He used $10,000 from his savings account, which earns 5 percent a year interest.
- He borrowed $40,000 at 10 percent a year.
- He sold $160,000 worth of body boards.
- Normal profit is $25,000 a year.

14. Calculate Lee's opportunity cost of production and his economic profit.
15. Lee's accountant recorded the depreciation on his cottage during 2010 as $7,000. According to the accountant, what profit did Lee make?
16. In 2009, Toni taught music and earned $20,000. She also earned $4,000 by renting out her basement. On January 1, 2010, she quit teaching, stopped renting out her basement, and began to use it as the office for her new Web site design business. She took $2,000 from her savings account to buy a computer. During 2010, she paid $1,500 for the lease of a Web server and $1,750 for high-speed Internet service. She received a total revenue from Web site designing of $45,000 and earned interest at 5 percent a year on her savings account balance. Normal profit is $55,000 a year. At the end of 2010, Toni could have sold her computer for $500. Calculate Toni's opportunity cost of production and her economic profit in 2010.
17. **The Colvin Interview: Chrysler**

    The key driver of profitability will be that the focus of the company isn't on profitability. Our focus is on the customer. If we can find a way to give customers what they want better than anybody else, then what can stop us?

    Source: *Fortune*, April 14, 2008

    a. In spite of what Chrysler's vice chairman and co-president claims, why is Chrysler's focus actually on profitability?
    b. What would happen to Chrysler if it didn't focus on maximizing profit, but instead focused its production and pricing decisions to "give customers what they want"?
18. **Must Watches**

    Stocks too volatile? Bonds too boring? Then try an alternative investment—one you can wear on your wrist. … [The] typical return on a watch over five to ten years is roughly 10%. [One could] do better in an index fund, but … what other investment is so wearable?

    Source: *Fortune*, April 14, 2008

    a. What is the cost of buying a watch?
    b. What is the opportunity cost of owning a watch?
    c. Does owning a watch create an economic profit opportunity?

Technological and Economic Efficiency

Use the following information to work Problems 19 and 20.

Four methods of completing a tax return and the time taken by each method are: with a PC, 1 hour; with a pocket calculator, 12 hours; with a pocket calculator and paper and pencil, 12 hours; and with a pencil and paper, 16 hours. The PC and its software cost $1,000, the pocket calculator costs $10, and the pencil and paper cost $1.

19. Which, if any, of the methods is technologically efficient?
20. Which method is economically efficient if the wage rate is
    (i) $5 an hour?
    (ii) $50 an hour?
    (iii) $500 an hour?
21. **A Medical Sensation**

    Hospitals are buying da Vinci surgical robots. Surgeons, sitting comfortably at a da Vinci console, can use various robotic attachments to perform even the most complex procedures.

    Source: *Fortune*, April 28, 2008

    a. Assume that performing a surgery with a surgical robot requires fewer surgeons and nurses.

Is using the surgical robot technologically efficient?

b. What additional information would you need to be able to say that switching to surgical robots is economically efficient for a hospital?

Information and Organization

22. Wal-Mart has more than 3,700 stores, more than one million employees, and total revenues of close to a quarter of a trillion dollars in the United States alone. Sarah Frey-Talley runs the family-owned Frey Farms in Illinois and supplies Wal-Mart with pumpkins and other fresh produce.
    a. How does Wal-Mart coordinate its activities? Is it likely to use mainly a command system or also to use incentive systems? Explain.
    b. How do you think Sarah Frey-Talley coordinates the activities of Frey Farms? Is she likely to use mainly a command system or also to use incentive systems? Explain.
    c. Describe, compare, and contrast the principal–agent problems faced by Wal-Mart and Frey Farms. How might these firms cope with their principal–agent problems?
23. **Where Does Google Go Next?**
    Google gives its engineers one day a week to work on whatever project they want. A couple of colleagues did what many of the young geniuses do at Google: They came up with a cool idea. At Google, you often end up with a laissez-faire mess instead of resource allocation.

    Source: *Fortune*, May 26, 2008

    a. Describe Google's method of organizing production with their software engineers.
    b. What are the potential gains and opportunity costs associated with this method?

Markets and the Competitive Environment

24. Market shares of chocolate makers are

Firm	Market share (percent)
Mayfair, Inc.	15
Bond, Inc.	10
Magic, Inc.	20
All Natural, Inc.	15
Truffles, Inc.	25
Gold, Inc.	15

    a. Calculate the Herfindahl-Hirschman Index.
    b. What is the structure of the chocolate industry?

Produce or Outsource? Firms and Markets

Use the following information to work Problems 25 to 27.

Two leading design firms, Astro Studios of San Francisco and Hers Experimental Design Laboratory, Inc. of Osaka, Japan, worked with Microsoft to design the Xbox 360 video game console. IBM, ATI, and SiS designed the Xbox 360's hardware. Three firms—Flextronics, Wistron, and Celestica—manufacture the Xbox 360 at their plants in China and Taiwan.

25. Describe the roles of market coordination and coordination by firms in the design, manufacture, and marketing of the Xbox 360.
26. a. Why do you think Microsoft works with a large number of other firms, rather than performing all the required tasks itself?
    b. What are the roles of transactions costs, economies of scale, economies of scope, and economies of team production in the design, manufacture, and marketing of the Xbox?
27. Why do you think the Xbox is designed in the United States and Japan but built in China?

Economics in the News

28. After you have studied *Reading Between the Lines* on pp. 244–245 answer the following questions.
    a. What products do Facebook and Yahoo sell?
    b. In what types of markets do Facebook and Yahoo compete?
    c. How do social networks and Internet search providers generate revenue?
    d. What is special about social networking sites that make them attractive to advertisers?
    e. What is special about Internet search providers that make them attractive to advertisers?
    f. What technological changes might increase the profitability of social networks and Internet search providers?
29. **Long Reviled, Merit Pay Gains Among Teachers**
    School districts in many states experiment with plans that compensate teachers partly based on classroom performance, rather than their years on the job and coursework completed. Working with mentors to improve their instruction and getting bonuses for raising student achievement encourages efforts to raise teaching quality.

    Source: *The New York Times*, June 18, 2007

    How does "merit pay" attempt to cope with the principal–agent problem in public education?

After studying this chapter, you will be able to:

- Distinguish between the short run and the long run
- Explain the relationship between a firm's output and labor employed in the short run
- Explain the relationship between a firm's output and costs in the short run and derive a firm's short-run cost curves
- Explain the relationship between a firm's output and costs in the long run and derive a firm's long-run average cost curve

11

OUTPUT AND COSTS

What does a big electricity supplier in Pennsylvania, PennPower, and Campus Sweaters, a small (fictional) producer of knitwear have in common? Like every firm, they must decide how much to produce, how many people to employ, and how much and what type of capital equipment to use. How do firms make these decisions?

PennPower and the other electric utilities in the United States face a demand for electricity that fluctuates across the day and that fluctuates from day to day depending on the temperature. How do electric utilities cope with these demand fluctuations?

We are going to answer these questions in this chapter. To explain the basic ideas as clearly as possible, we focus on the economic decisions of Campus Sweaters, Inc. Studying the way this firm copes with its economic problems will give us a clear view of the problems faced by all firms. We'll then apply what we learn in this chapter to the real-world costs of producing cars and electricity. In *Reading Between the Lines*, we'll look at the effects of a new generation of 'smart' meters that encourage users to even out electricity consumption across the day.