chapter three

Where Prices Come From: The Interaction of Demand and Supply

價格如何決定：需求與供給的互相影響

How Hewlett-Packard Manages the Demand for Printers

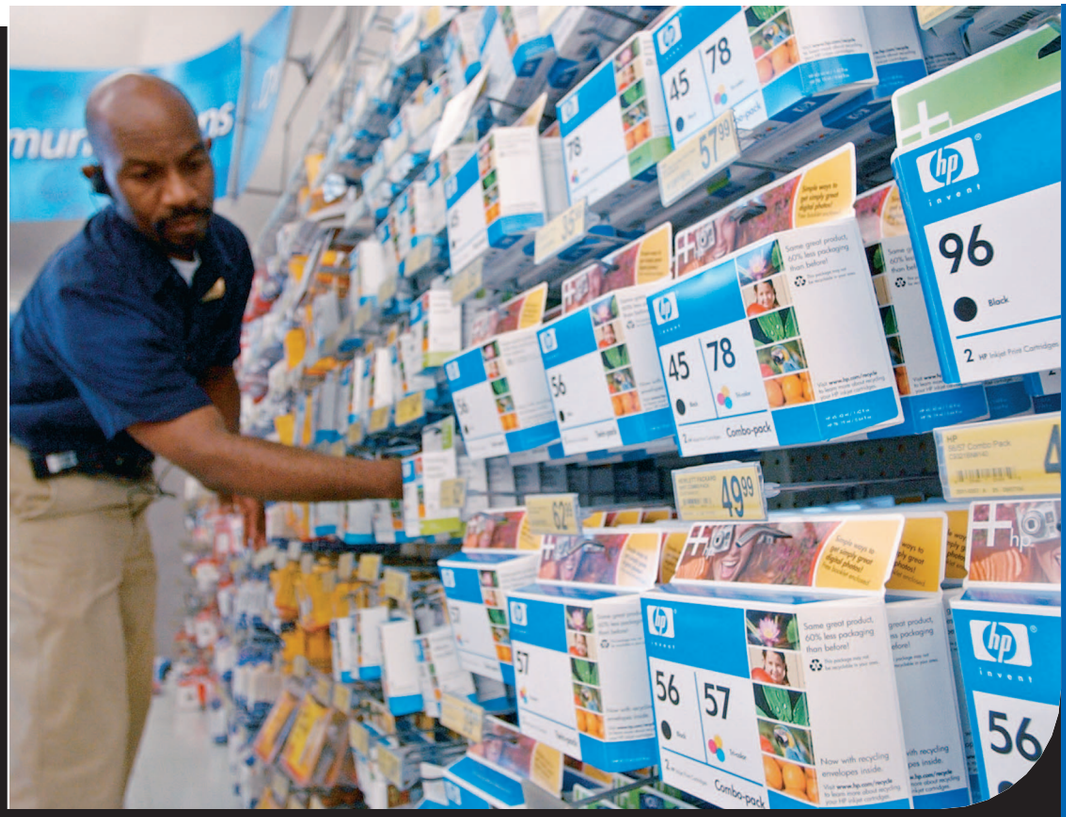
➤ In early 2005 the board of directors at Hewlett-Packard (H-P) ousted chief executive officer Carly Fiorina and replaced her with Mark Hurd, then the chief executive officer of NCR Corporation. What happened?

Carly Fiorina had been a business celebrity for many years. In July 1999 she became H-P's chief executive officer, which made her the first woman to head one of the 100 largest firms in the United States. In 2002, she brought about the largest merger of two technology firms in U.S. history when H-P purchased Compaq Computer Corporation. By 2004, she presided over a firm that employed 150,000 workers and had total sales of $80 billion. Fiorina's ouster in 2005 from H-P reflected the relatively weak performance of the firm during her time as chief executive officer. In particular, the merger with Compaq had failed to improve H-P's performance in the personal computer market.

Printers, and not personal computers, are H-P's most successful product. Although printers account for only about 30 percent of the firm's sales, they account for 70 percent of its profits. In fact, as *An Inside Look* at the end of this chapter discusses, to increase the demand for printers the firm is willing to sell its personal computers at low prices.

Hewlett-Packard's success, like that of any firm, depends on its ability to analyze changes in demand and supply. Because of the importance of printers to H-P, the firm devotes significant resources to monitoring and forecasting consumer demand. Its forecasts of demand, however, are not always successful. In 2001, for example, Carly Fiorina announced that sales of H-P printers had declined sharply in the first half of that year compared to the first half of 2000. Two events caused this decline: First, many individuals and small businesses unexpectedly decided not to upgrade their existing computers to faster and more powerful machines. Purchasers of new PCs are a key part of the market for printers. Second, the U.S. economy moved into recession, lowering the incomes of many consumers and reducing the profits of many businesses. Fiorina admitted she had been taken by surprise by this decline in sales: "Stuff happens that you're not able to see even with a ton of information, and the downturn in the economy was a clear case of that. Everybody had loads of information, and everybody missed it."

H-P did a better job anticipating changes in the types of printers con-



sumers would demand. For example, increasing sales of digital cameras have had an important impact on the market for printers. During 2003, 50 million digital cameras were sold, and many people bought both a camera and a new printer designed to print digital photos. Printers aimed at the digital photo market usually include a slot for memory cards from the cameras, and an LCD (liquid crystal display) screen for previews of photos. Many of these printers are multifunction devices (MFD) that combine printing, scanning, copying, and faxing. These MFDs sell for higher prices—and are more profitable—than basic printers. In 2004, H-P had a 58 percent share of the MFD market in the United States. Lexmark was second but far behind with a 21 percent share.

Unfortunately for Carly Fiorina, H-P's success with MFDs was not matched by success with personal computers. Some members of the firm's board of directors were particularly concerned that H-P had relied too heavily on selling personal computers in retail stores, rather than building up direct sales to consumers through the Internet as Dell Computer had done so successfully. The board gave Mark Hurd, the new chief executive officer, the responsibility of increasing the firm's competitiveness in the personal computer market. *An Inside Look* on page 88 discusses HP's strategy for competing with Dell.

Sources: Olga Kharif, "Printing a Record of Growth," Business Week Online, February 17, 2004; Pui-Wing Tam, "Copy Machine: H-P, Post-Compaq, Looks Like Its Old Self," Wall Street Journal, May 7, 2004; quote from Carly Fiorina: "A Conversation with Carly Fiorina—Forbes 5th Annual CIO Forum," December 2, 2003, Dallas, Texas.

LEARNING OBJECTIVES

After studying this chapter, you should be able to:

① Discuss the variables that influence demand.

② Discuss the variables that influence supply.

③ Use a graph to illustrate market equilibrium.

④ Use demand and supply graphs to predict changes in prices and quantities.

讀完本章，你應該具有下列能力：

① 討論影響需求的變數。

② 討論影響供給的變數。

③ 使用圖形解釋市場均衡。

④ 使用需求與供給的圖形去預測價格及數量的改變。

ch3 5/18/2007 10:49 AM 頁面 64

➤ In Chapter 1, we learned how economists use models to predict human behavior. In Chapter 2, we used the model of production possibilities frontiers to analyze scarcity and trade-offs. In this chapter and the next, we explore the model of demand and supply, which is the most powerful tool in economics, and use it to explain how prices are determined. We begin by discussing consumers and the demand side of the market, then we turn to firms and the supply side. As you will see, we will apply the model of demand and supply again and again throughout this book to understand business and the economy.

① **LEARNING OBJECTIVE**
Discuss the variables that influence demand.

學習目標 ①
討論影響需求的變數。

The Demand Side of the Market

Chapter 2 explained that in a market system consumers ultimately determine which goods and services will be produced. The most successful businesses are the ones that respond best to consumer demand. But what determines consumer demand for a product? Certainly, many factors influence the willingness of consumers to buy a particular product. For example, consumers who are considering buying a printer will make their decisions based on, among other factors, the income they have available to spend, whether they have recently purchased a personal computer or digital camera, and the effectiveness of the advertising campaigns of the companies that sell printers. The main factor in consumer decisions, though, will be the price of the printers. Thus, it makes sense to begin with price when analyzing the decisions of consumers to buy a product. It is important to note that when we discuss demand, we are considering not what a consumer *wants* to buy, but what the consumer is both willing and *able* to buy.

The Demand of an Individual Buyer

Households, firms, and government agencies all buy printers. Suppose the Prudential Insurance Company intends to purchase printers for a number of its employees. We might determine the relationship between the price of printers and the number of printers the company would be willing to buy during a particular period of time by asking Kate, the company's purchasing manager, "If the price of a printer were $125, how many printers would you be willing to buy over the next month?"

Suppose Kate responds that she would be willing to purchase 5 printers over the next month at a price of $125 each. The amount of a good or a service that a consumer is willing and able to purchase at a particular price is referred to as the **quantity demanded**. Figure 3-1 shows Kate's quantity demanded at a price of $125. On the vertical axis, we measure the price of printers, and on the horizontal axis we measure the number of printers demanded during the next month.

Quantity demanded The amount of a good or service that a consumer is willing and able to purchase at a given price.

需求量 在既定價格下，消費者願意且有能力購買的商品或服務之數量稱之。

Demand Schedules and Demand Curves

We can repeat our question using different prices. The table in Figure 3-2 shows the number of printers Kate would be willing to buy at five different prices. Tables that show the relationship between the price of a product and the quantity of the product demanded are called **demand schedules**. The graph in Figure 3-2 plots the numbers from the table as a **demand curve**, a curve that shows the relationship between the price of a product and the quantity of a product demanded.

Although we have asked Kate only about her willingness to buy printers at five different prices, we can connect the points in Figure 3-2 to form a continuous downward-sloping demand curve. The demand curve slopes downward because Kate

Demand schedule A table showing the relationship between the price of a product and the quantity of the product demanded.

需求表 將產品價格與其需求量之關係用表格的形式呈現，稱之為需求表。

Demand curve A curve that shows the relationship between the price of a product and the quantity of the product demanded.

需求曲線 將產品價格與其需求量之關係用圖形的形式呈現，稱之需求曲線。

ch3 5/18/2007 10:49 AM 頁面 65

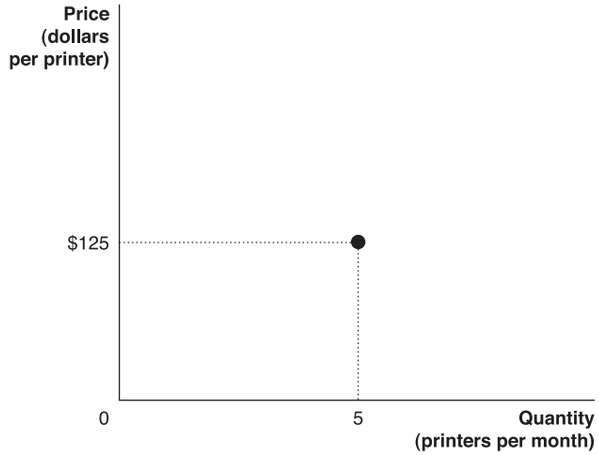


FIGURE 3-1

將價格與數量之組合畫在圖上

當印表機每台 $125 時，Kate 下個月將願意買五台印表機。

will buy more printers as the price falls. When the price of a printer is $175, Kate buys 3 printers. When the price of a printer falls to $150, Kate buys 4 printers. Buyers demand a larger quantity of a product as the price falls because the product becomes cheaper relative to other products and because they can afford to buy more at a lower price.

Individual Demand and Market Demand

Figure 3-2 shows an individual demand curve. To understand how a market works, however, we need to examine **market demand**, or the demand by all the consumers of a given good or service. We can determine market demand by asking additional consumers how many printers they would purchase at various prices. Ordinarily, the market that we would be interested in would include at least all of the consumers of the product in a city and might include all of the consumers in the world. To keep things simple, let's assume that the market for printers consists of Kate from the Prudential Insurance Company and two individual consumers: Sam and Paul. Figure 3-3 shows that we can find the market demand for printers by adding the number of printers demanded by Kate, Sam, and Paul at each price. The table shows the demand schedules for printers of these three consumers. We plot the numbers from the demand schedule in graphs 3-3(a), 3-3(b), and 3-3(c).

Market demand The demand by all the consumers of a given good or service.

市場需求 所有消費者對某產品或服務之需求量總和。

需求表

Demand Schedule	
Price (dollars per printer)	Quantity (printers per month)
$175	3
150	4
125	5
100	6
75	7

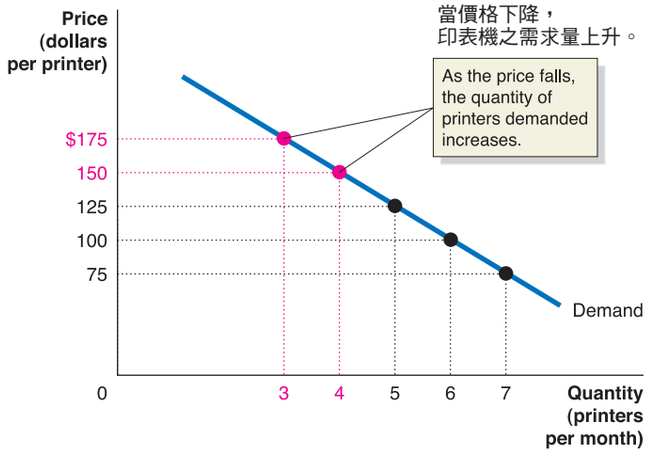


FIGURE 3-2

Kate的需求表及需求曲線

當價格變動時，Kate 改變她願意購買的印表機數量。我們可以將這個情況用表的形式或用圖的形式表示，前者稱為需求表，後者稱為需求曲線。表和圖皆展現當印表機價格下降時，其需求量會增加。當印表機一台$175時，Kate買3台。當印表機價格降到一台$150時，Kate買4台。因此，Kate的需求曲線是負斜率的。

ch3 5/18/2007 10:49 AM 頁面 66

Figure 3-3(d) on page 67 shows the market demand curve for printers. The market demand curve tells us how many units of the product consumers in this market would be willing to buy at each price during a certain period of time. For instance, consumers in this market would be willing to buy a total of 26 printers during the next month at a price of $100 per printer: Kate is willing to buy 6, Sam is willing to buy 11, and Paul is willing to buy 9.

The Law of Demand

The market demand curve for printers shown in Figure 3-3(d) is downward sloping: As the price of printers falls, the quantity of printers demanded increases. The inverse relationship between the price of a product and the quantity of the product demanded is known as the **law of demand**: Holding everything else constant, when the price of a product falls, the quantity demanded of the product will increase, and when the price of a product rises, the quantity demanded of the product will decrease. The law of demand holds for any market demand curve. Economists have never found an exception to it. In fact, Nobel Prize–winning economist Paul Samuelson once remarked that the surest way for an economist to become famous would be to discover a market demand curve that sloped upward rather than downward.

Law of demand Holding everything else constant, when the price of a product falls, the quantity demanded of the product will increase, and when the price of a product rises, the quantity demanded of the product will decrease.

需求法則 其他條件不變下，當某產品的價格下降時，它的需求量會增加；當它的價格上漲時，其需求量會減少。

What Explains the Law of Demand?

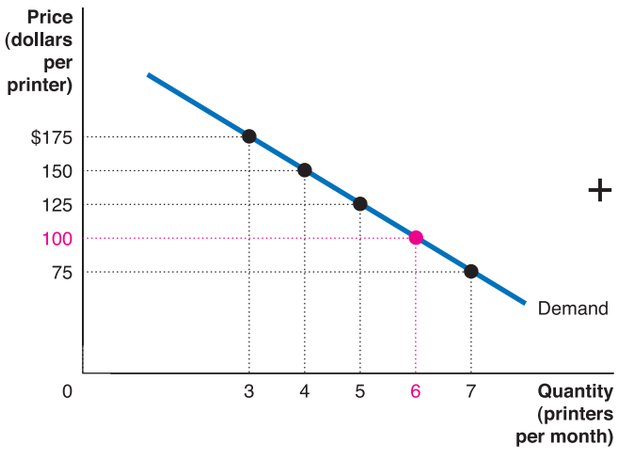
It makes sense that consumers will buy more of a good when the price falls and less of a good when the price rises, but let's look more closely at why this is true. When the price of printers falls, consumers buy a larger quantity of printers because of the *substitution effect* and the *income effect*.

FIGURE 3-3 由個人需求曲線導出市場需求曲線

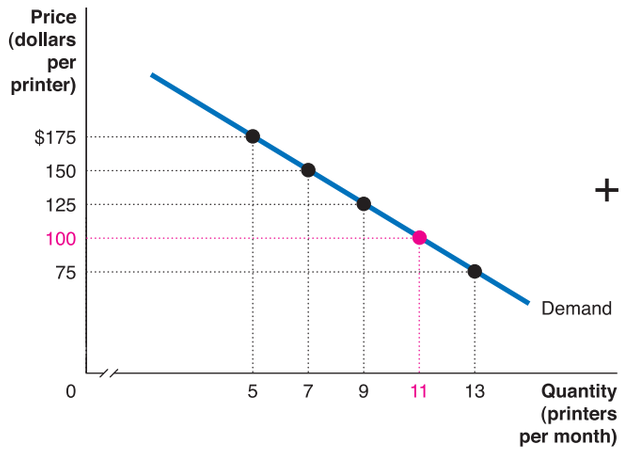
這個表顯示出，市場總需求量為每一個價格下每一個購買者需求量的加總。我們將圖(a)(b)(c)之個人需求曲線水平加總即可得市場需求曲線。在價格為$100之下，Kate的需要量為6台印表機，Sam的需要量為11台印表機， Paul的需要量為9台印表機。因此，圖(d)表示的是，價格$100與需要量26台是市場需求曲線上的一點。

數量（每個月印表機）

Quantity (printers per month)				
Price (dollars per printer)	Kate	Sam	Paul	Market
$175	3	5	6	14
150	4	7	7	18
125	5	9	8	22
100	6	11	9	26
75	7	13	10	30



(a) Kate's demand curve（Kate 的需求曲線）



(b) Sam's demand curve（Sam 的需求曲線）