Demand

Agents

Economics is about the behaviour of people. Much that we observe in the world, and that we assume in our theories, can be traced back to decisions taken by millions of individuals. Any person who makes decisions relevant to our theory is called an **agent**.

To make the study of their behaviour more manageable, agents are consolidated into three groups: individuals, firms, and government. These are the *dramatis personae* of economic theory, and the stage on which their play is enacted is the market. In this chapter you will encounter both individuals (here) and firms (later); while in Chapter 6 you will first meet the government.

INDIVIDUALS

Individuals play two major roles in economic theory. First, those who are employed sell their services to employers and receive incomes in return. Others, such as spouses and children who do not work, share in the incomes of those members of their household who do work. Yet others receive income transfers from the government in such forms as unemployment benefits, student grants, and old age pensions. Second, individuals spend their incomes purchasing goods and services. In this capacity they are often referred to as **consumers**.

Microeconomic theory is inhabited by adult individuals who earn income by selling factor services (the services of their labour, land, or capital) and spend this income purchasing goods and services. When one applies the theory to real-world observations, however, the spending unit that can be studied is often not the individual but the household.

A **household** is defined as all the people who live under one roof and who make joint financial decisions or are subject to others who make such decisions for them. Some economists have studied resource allocation within households. This field of study was pioneered by University of Chicago economist and Nobel Prize winner Gary Becker, and is covered in specialized labour economics courses. For purposes of developing the elementary theory of market behaviour, however, we stick to individuals, who obtain income through their own work or the work of others and who spend that income purchasing goods and services for consumption.

MOTIVATION

Economists assume that each individual consumer seeks maximum *satisfaction*, or *well-being*, or *utility*, as the concept is variously called. The consumer does this within the limits set by his or her available resources.

The nature of demand

The amount of a product that consumers wish to purchase is called the **quantity demanded**. Notice two important things about this concept. First, quantity demanded is a *desired* quantity. It is how much consumers *wish* to purchase, not necessarily how much they actually succeed in purchasing. We use phrases such as **quantity actually purchased**, or **quantity actually bought and sold**, to distinguish actual purchases from quantity demanded. Second, note that quantity demanded is a *flow*. (See p. 31 for the distinction between stocks and flows.) We are concerned not with a single isolated purchase, but with a continuous flow of purchases, and we must, therefore, express demand as so much per period of time—e.g. one million oranges *per day*, or seven million oranges *per week*, or 365 million oranges *per year*.

The concept of demand as a flow appears to raise difficulties when we deal with the purchases of durable consumer goods (often called consumer durables). It makes obvious sense to talk about a person consuming oranges at the rate of 30 per month, but what can we say of a consumer

that buys a new television set every five years? This apparent difficulty disappears if we measure the demand for the *services* provided by the consumer durable. Thus, at the rate of a new set every five years, the television purchaser is using the service (viewing TV programmes) at the rate of 1/60 of a set per month.

The determinants of quantity demanded: the demand function

Five main variables influence the quantity of each product that is demanded by each individual consumer:

1. The price of the product
2. The prices of other products
3. The consumer's income and wealth
4. Various 'sociological' factors
5. The consumer's tastes

Making use of the functional notation that was introduced in Chapter 3, the above list is conveniently summarized in what is called a **demand function:**

$$q_n^d = \mathrm{D}(p_n, p_1, \ldots, p_{n-1}, Y, S),$$

In the above expression, q_n^d stands for the quantity that the consumer demands of some product, which we call product n; p_n stands for the price of this product, where $p_1, \ldots, p_{n-1}$ is a shorthand notation for the prices of all other products; Y is the consumer's income; S stands for a host of sociological (and other) factors such as number of children, place of residence (e.g. big city, small town, country), and the state of the weather; and the form of the function D is determined by the tastes of the members of the consumer.[1] The demand function is just a shorthand way of saying that quantity demanded depends on the variables listed on the right-hand side, while the form of the function determines the sign and the magnitude of that dependence.

We will not be able to understand the separate influences of each of the above variables if we ask what happens when everything changes at once. To avoid this difficulty, we consider the influence of the variables one at a time. To do this, we use a device that is frequently employed in economic theory. We assume that all except one of the variables in the right-hand side of the above expression are held constant; we then allow this one variable, say p_n, to change, and we consider how the quantity demanded (q_n^d) changes. This means we study the effect of changes in one influence on quantity demanded, *assuming that all other influences remain unchanged*, or, as economists are fond of putting it, *ceteris paribus* (which means 'other things being equal').

We can do the same for each of the other variables in turn, and in this way we can come to understand the effect of each variable. Once this is done, we can add up the separate influences of each variable to discover what will happen when several variables change at the same time—as they usually do in practice.

Demand and price

We are interested in developing a theory of how products get priced. To do this, we need to study the relation between the quantity demanded of each product and that product's own price. This requires that we hold all other influences constant and ask: how will the quantity of a product demanded vary as its own price varies?

A basic economic hypothesis is that the lower the price of a product, the larger the quantity that will be demanded, other things being equal.[2]

Why might this be so? A major reason is that there is usually more than one product that will satisfy any given desire or need. Hunger may be satisfied by meat or vegetables; a desire for green vegetables may be satisfied by broccoli or spinach. The need to keep warm at night may be satisfied by several woollen blankets, or one electric blanket, or a sheet and a lot of oil burned in the boiler. The desire for a holiday may be satisfied by a trip to the Scottish Highlands or to the Swiss Alps, the need to get there by an aeroplane, a bus, a car, or a train; and so on. Name any general desire or need, and there will usually be several products that will satisfy it.

Now consider what happens if we hold income, tastes, population, and the prices of all other products constant and vary the price of only one product.

First, let the price of the product rise. The product then becomes a more expensive way of satisfying a want. Some consumers will stop buying it altogether; others will buy smaller amounts; still others may continue to buy the same amount; but no rational consumer will buy more of it. Because many consumers will switch wholly, or partially, to other products to satisfy the same want, less will be bought of the product whose price has risen. For example, as meat becomes more expensive, consumers may switch some of their expenditure to meat substitutes; they may also forgo meat at some meals and eat less meat at others.

[1] Where these other factors are important, they are often included explicitly in empirical measurements. For example, equations predicting the monthly demand for fuel oil usually contain a term for the state of the weather. In other cases, they will be included in the error term, which covers 'all other unmeasured influences'. In theoretical work, no harm is done by including these other factors under tastes and thinking of them as determining the form of the function. When this is done, however, tastes are exogenous, in the sense that they are not determined by economic variables but are subject to change when any of these other influencing forces, such as weather, changes.

[2] In this chapter we introduce the hypothesis as an assumption; in Chapters 7 and 8 we derive it from more basic assumptions.

Second, let the price of a product fall. This makes the product a cheaper method of satisfying any given want. Consumers will thus buy more of it. Consequently, they will buy less of similar other products whose prices have not fallen and which, as a result, have become expensive *relative to* the product in question. When a bumper tomato harvest drives prices down, shoppers buy more tomatoes and fewer alternative vegetables, which are now relatively more expensive.

THE DEMAND SCHEDULE AND THE DEMAND CURVE

An individual's demand A **demand schedule** is one way of showing the relationship between quantity demanded and price. It is a numerical tabulation that lists some selected prices and shows the quantity that will be demanded at each.

Table 4.1 is an individual's hypothetical demand schedule for carrots. It shows the quantity of carrots that the individual would demand at six selected prices. For example, at a price of £0.40 per kilogram, the quantity demanded is 10.25 kg per month. Each of the price–quantity combinations in the table is given a letter for easy reference. We can now plot the data from Table 4.1 in Figure 4.1, with price on the vertical and quantity on the horizontal axis.[3]

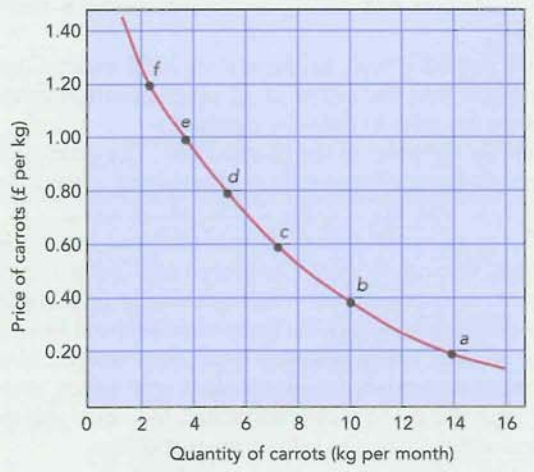

Figure 4.1 An individual consumer's demand curve

An individual consumer's demand curve relates the price of a commodity to the amount that the consumer wishes to purchase. The curve is drawn from the data in Table 4.1, each point on the figure relating to a row on the table. For example, when price is £1.20, 2.5 kg are bought per month (point *f*), while when the price is £0.20, 14 kg are bought each month (point *a*).

Table 4.1 An individual consumer's demand schedule for carrots

Reference letter	Price (£ per kg)	Quantity demanded (kg per month)
a	0.20	14.0
b	0.40	10.25
c	0.60	7.5
d	0.80	5.25
e	1.00	3.5
f	1.20	2.5

The table shows the quantity of carrots that one consumer would demand at each selected price, *ceteris paribus*. For example, at a price of £0.20 per kilogram the consumer demands 14 kg per month, while at a price of £1.20 per kilogram he demands only 2.5 kg.

Next, we draw a smooth curve through these points. This curve, also shown in Figure 4.1, is called the **demand curve** for carrots. It shows the quantity of carrots that the consumer would like to buy at every possible price; its *negative slope* indicates that the quantity demanded increases as the price falls.[4]

A single point on the demand curve indicates a single price–quantity relation. *The whole demand curve shows the complete relation between quantity demanded and price.* Economists often speak of the conditions of demand in a particular market as 'given' or as 'known'. When they do so they are referring not just to the particular quantity that is being demanded at the moment (i.e. not just to a particular point on the demand curve); they are referring rather to the

[3] Readers trained in other disciplines often wonder why economists plot demand curves with price on the vertical axis. The normal convention, which puts the independent variable (the variable that does the explaining) on the horizontal axis and the dependent variable (the variable that is explained) on the vertical axis, calls for price to be plotted on the horizontal axis and quantity on the vertical axis.

The axis reversal—now enshrined by a century of usage—arose as follows. The analysis of the competitive market that we use today stems from the French economist Leon Walras (1834–1910), in whose theory quantity was the dependent variable. Graphical analysis in economics, however, was popularized by the English economist Alfred Marshall (1842–1924), in whose theory *price* was the dependent variable. Economists continue to use Walras's theory and Marshall's graphical representation, and thus draw the diagram with the independent and dependent variables reversed—to the everlasting confusion of readers trained in other disciplines. In virtually every other graph in economics the axes are labelled conventionally, with the dependent variable on the vertical axis.

[4] Mathematicians refer to the slopes of curves as *positive* if both variables change in the same direction along the curve (i.e. if either they both increase or they both decrease) and as *negative* if the variables change in opposite directions along the curve (i.e. if one increases while the other decreases). Economists often read curves from left to right, calling negatively sloped curves 'downward-sloping' and positively sloped curves 'upward-sloping'. We stick mainly to the unambiguous terminology of positive and negative slopes.

whole demand curve, to the complete functional relation whereby desired purchases are related to all possible alternative prices of the product.

The market demand curve So far we have discussed how the quantity of a product demanded by one consumer depends on the product's price, other things being equal. To explain market behaviour, we need to know the total demand of all consumers. To obtain a market demand schedule, we sum the quantities demanded by each consumer at a particular price to obtain the total quantity demanded at that price. We repeat the process for each price to obtain a schedule of total, or market, demand at all possible prices. A graph of this schedule is called the *market demand curve*. Figure 4.2 shows the summation geometrically. It illustrates the proposition that the market demand curve is the horizontal sum of the demand curves of all the individual consumers in the market.[5]

We have illustrated the market demand curve by summing the demands for only two consumers. An actual market demand curve will represent the demands of all the consumers who buy in that market. In practice, our knowledge of market curves is usually derived by observing total quantities directly. The derivation of market demand curves by summing individual curves is a theoretical operation. We do it to understand the relation between curves for individual consumers and market curves.

In Table 4.2 we assume we have data for the market demand for carrots. The schedule tells us the total quantity that will be demanded by all buyers in that market at a selected set of market prices. The data are plotted in Figure 4.3, and the curve drawn through these points is the market demand curve.

Table 4.2 A market demand schedule for carrots

Reference letter	Price (£ per kg)	Quantity demanded ('000 kg per month)
U	0.20	110.0
V	0.40	90.0
W	0.60	77.5
X	0.80	67.5
Y	1.00	62.5
Z	1.20	60.0

The table shows the quantity of carrots that would be demanded by all consumers at various prices, *ceteris paribus*. For example, row *W* indicates that if the price of carrots were £0.60 per kilogram consumers would desire to purchase 77,500 kg of carrots per month, given the values of the other variables that affect quantity demanded, including average consumers' income.

[5] When summing curves, students sometimes become confused between vertical and horizontal summation. Such a confusion can only result from the application of memory rather than common sense to one's economics. *Consider what would be meant by vertical summation*: measure off equal quantities, say 2 kg in parts (i) and (ii) of Figure 4.2. Now add the price on each household's demand curve to which this quantity corresponds. This is £0.50 + £0.60 = £1.10. If we now plot the point corresponding to £1.10 and 2 kg, we have related a given quantity of the commodity to the sum of the prices which the households are separately prepared to pay for this commodity. Clearly, this information is of no interest to us in the present context. *Every graphical operation can be translated into words.* The advantage of graphs is that they make proofs easier; the disadvantage is that they make it possible to make silly errors. To avoid error, you should always translate into words any graphical operation you have performed and ask yourself: 'Does this make sense and is this what I meant to do?'

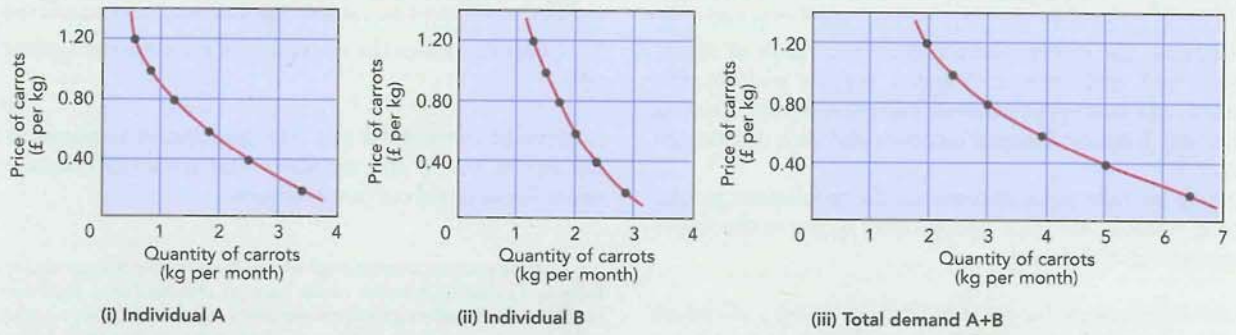

Figure 4.2 The relation between individual and market demand curves

The market demand curve is the horizontal sum of the individual demand curves of all consumers in the market. The figure illustrates aggregation over two individuals. For example, at a price of £0.80 per kilogram, consumer A purchases 1.2 kg and consumer B purchases 1.8 kg. Thus, together they purchase 3 kg. No matter how many individuals are involved, the process is the same.

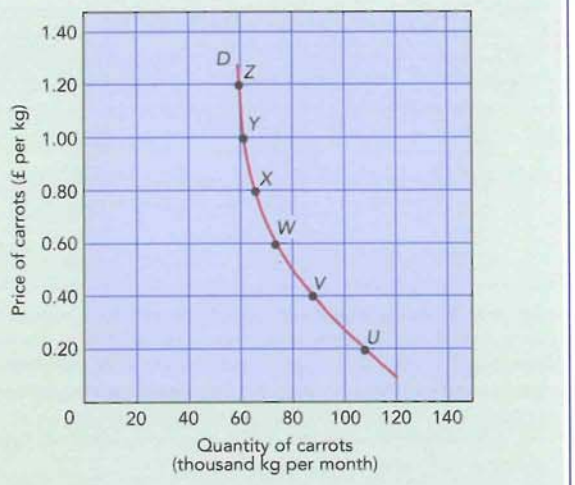

Figure 4.3 A market demand curve for carrots

This demand curve relates quantity of carrots demanded to their price; its negative slope indicates that quantity demanded increases as price falls. The six points correspond to the price–quantity combinations shown in Table 4.2. Each row in the table defines a point on the demand curve. The smooth curve drawn through all of the points and labelled *D* is the demand curve.

DETERMINANTS OF DEMAND ONCE AGAIN

When we go from the individual consumer's demand curve to the market demand curve, we must reconsider item 3 in our list of the determinants of demand. 'Consumer income' now refers to *the total income of all consumers.* If, for example, the population increases as a result of immigration and each new immigrant has an income, the demands for most products will rise even though existing consumers have unchanged incomes and face unchanged prices.

When we take total income of all consumers as our income variable, we must add another factor to the major determinants of demand.

A sixth determinant: income distribution among individuals

Consider two societies with the same total income. In one society there are some rich people, many poor people, but only a few in the middle-income range. In the second society, most of the people have incomes that do not differ much from the average income for all consumers. Even if all other variables that influence demand are the same, the two societies will have quite different patterns of demand. In the first there will be a large demand for Mercedes-Benz and Rolls-Royce cars and also for baked beans, bread, and chips. In the second, there will be a smaller demand for these products, but a large demand for ski holidays, medium-sized cars, and other middle-income consumption goods. Clearly, the distribution of income is a major determinant of market demand.

MARKET DEMAND: A RECAPITULATION

The total quantity demanded in any market depends on the price of the product being sold, on the prices of all other products, on the income of the individuals buying in that market, on the distribution of that income among the individuals, and on tastes.

To obtain the market demand curve, we hold constant all the factors that influence demand, other than the product's own price.

The market demand curve relates the total quantity demanded of a product to its own price on the assumption that all other prices, total income, its distribution among individuals, and tastes are held constant.

SHIFTS IN THE DEMAND CURVE

The demand schedule and the demand curve are constructed on the assumption of *ceteris paribus.* But what if other things change, as surely they must? What, for example, if consumers find themselves with more income? If they spend their extra income, they will buy additional quantities of many products *even though market prices are unchanged,* as shown in Table 4.3. But if consumers increase their purchases of any product whose price has not changed, the new purchases cannot be represented by the original demand curve. Thus, the rise in consumer income *shifts* the demand curve to the right as shown in Figure 4.4.[6] This shift illustrates the operation of an important general rule.

A demand curve shifts to a new position in response to a change in any of the variables that were held constant when the original curve was drawn.

[6] The conventions used throughout this book for shifts in curves are as follows. The initial position of the curve is indicated by a solid curve labelled with the subscript 0 where necessary. All shifted curves are drawn as broken lines and indicated by a subscript 1 for the first shift, 2 for the second shift, and so on. The equilibrium price and quantity associated with the initial curve are indicated by p_0 and q_0, those associated with the curve after one shift by p_1 and q_1, and so on. When there is no curve shift, and hence no room for ambiguity, the subscripts are often dropped. Thus, for example, there are no subscripts in Figure 4.3, but in Figure 4.4 the initial curve is labelled D_0 and the shifted curve D_1.

Where we wish to indicate two alternative curves rather than a shift of a curve, we use prime (') marks. Thus, for example, D_0 and D_1 refer to the curve that starts at D_0 and shifts to D_1 while D, D', and D'' refer to three alternative curves, any one of which might actually exist at any one time.

Table 4.3 Two alternative market demand schedules for carrots

(1)	Price of carrots (£ per kg) (2)	Quantity of carrots demanded at original level of personal income ('000 kg per month) (3)	Quantity of carrots demanded when personal income rises to new level ('000 kg per month) (4)	(5)
U	0.20	110.0	140.0	*U'*
V	0.40	90.0	116.0	*V'*
W	0.60	77.5	100.8	*W'*
X	0.80	67.5	90.0	*X'*
Y	1.00	62.5	81.3	*Y'*
Z	1.20	60.0	78.0	*Z'*

An increase in total consumers' income increases the quantity demanded at each price. When income rises, quantity demanded at a price of £0.60 per kilogram rises from 77,500 kg per month to 100,800 kg per month. A similar rise occurs at every other price. Thus, the demand schedule relating columns (2) and (3) is replaced by the one relating columns (2) and (4). The graphical representations of these two schedules are labelled D_0 and D_1 in Figure 4.4.

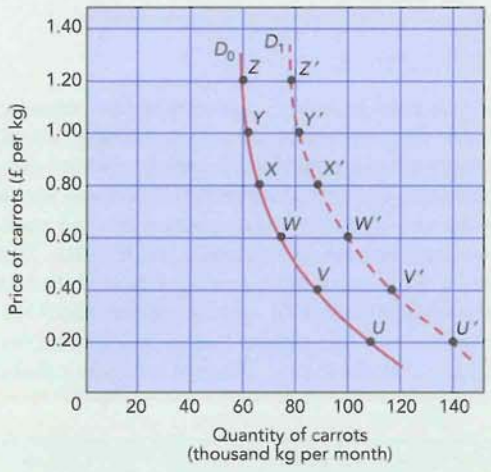

Figure 4.4 Two demand curves for carrots

The rightward shift in the demand curve from D_0 to D_1 indicates an increase in the quantity demanded at each price. The lettered points correspond to those in Table 4.3. A rightward shift in the demand curve indicates an increase in demand in the sense that more is demanded at each price and that a higher price would be paid for each quantity. For example at price £0.60, quantity demanded rises from 77.5 thousand kilograms (point *W*) to 100 (point *W'*); while the quantity of 90 thousand kilograms, which was formerly bought at a price of £0.40 (point *V*), will be bought at a price £0.80 after the shift (point *X'*).

Any change that increases the amount consumers wish to buy at each price will shift the demand curve to the right, and any change that decreases the amount consumers wish to buy at each price will shift the demand curve to the left.

Changes in other prices We saw that demand curves have negative slopes because the lower a product's price, the cheaper it becomes relative to other products that can satisfy the same needs. Those other products are called **substitutes**. A product becomes cheaper relative to its substitutes if its own price falls. This also happens if the substitute's price rises. For example, carrots can become cheap relative to cabbage, either because the price of carrots falls or because the price of cabbage rises. Either change will increase the amount of carrots consumers are prepared to buy.

A rise in the price of a product's substitute shifts the demand curve for the product to the right. More will be purchased at each price.

For example, a rise in the price of cabbage could shift the demand curve for carrots from D_0 to D_1 in Figure 4.4, just as did a rise in income.

Products that tend to be used jointly with each other are called **complements**. Cars and petrol are complements; so are golf clubs and golf balls, electric cookers and electricity, an aeroplane trip to Austria and lift tickets at St Anton. Since complements tend to be consumed together, a fall in the price of either will increase the demand for both. For example, a fall in the price of cars that causes more people to become car owners will, *ceteris paribus*, increase the demand for petrol.

A fall in the price of one product that is complementary to a second product will shift the second product's demand curve to the right. More will be purchased at each price.

Changes in total income If consumers receive more income, they can be expected to purchase more of most products even though product prices remain the same. Such a shift is illustrated in Table 4.3 and Figure 4.4. A product whose demand increases when income increases is called a **normal good.**

A rise in consumers' incomes shifts the demand curve for normal products to the right, indicating that more will be demanded at each possible price.

For a few products, called **inferior goods,** a rise in consumers' income leads them to reduce their purchases (because they can now afford to switch to a more expensive, but superior, substitute).

A rise in income will shift the demand for inferior goods to the left, indicating that less will be demanded at each price.

The distribution of income If total income and all other determinants of demand are held constant while the distribution of income changes, the demands for normal goods will rise for consumers gaining income and fall for consumers losing income. If both gainers and losers buy the good in similar proportions, these changes will tend to cancel out. This will not, however, always be the case.

When the distribution of income changes, demands will rise for those goods favoured by those gaining income and fall for those goods favoured by those losing income.

Sociological variables Changes in the many sociological variables that influence demand will cause demand curves to shift. For example, a reduction in the typical number of children per consumer, as has happened in this century, will reduce the demands for many of the things used by children. If the typical age of retirement falls significantly, there will be a rise in the demands for goods consumed during leisure times and a fall in the demands for goods required while working.

Changes in tastes If there is a change in tastes in favour of a product, more will be demanded at each price, causing the demand curve to shift to the right. In contrast, if there is a change in tastes away from a product, less will be demanded at each price, causing the entire demand curve to shift to the left.

Figure 4.5 summarizes our discussion of the causes of shifts in the demand curve. Notice that, since we are generalizing beyond our example of carrots, we have relabelled our axes 'price' and 'quantity', dropping the qualification 'of carrots'. The term *quantity* should be understood to mean quantity per period in whatever units the goods are measured. The term *price* should be understood to mean the price measured as £ per unit of quantity for the same product.

MOVEMENTS ALONG DEMAND CURVES VERSUS SHIFTS

Suppose you read in today's newspaper that carrot prices have soared because more carrots are being demanded. Then tomorrow you read that the rising price of carrots is greatly reducing the typical consumer's demand for carrots as shoppers switch to potatoes, courgettes, and peas. The two statements appear to contradict each other. The first associates a rising price with a rising demand; the second associates a rising price with a declining demand. Can both statements be true? The answer is that they can be, because they refer to different things. The first refers to a *shift* in the

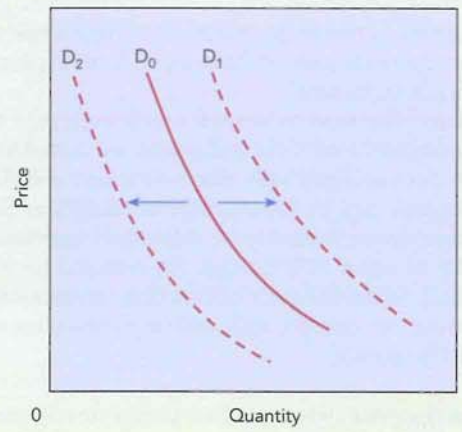

Figure 4.5 Shifts in the demand curve

A shift in the demand curve from D_0 to D_1 indicates an increase in demand; a shift from D_0 to D_2 indicates a decrease in demand. An increase in demand means that more is demanded at each price. Such a rightward shift can be caused by a rise in the price of a substitute, a fall in the price of a complement, a rise in income, a redistribution of income toward groups who favour the commodity, or a change in tastes that favours the commodity.
A decrease in demand means that less is demanded at each price. Such a leftward shift can be caused by a fall in the price of a substitute, a rise in the price of a complement, a fall in income, a redistribution of income away from groups who favour the commodity, or a change in tastes that disfavours the commodity.

demand curve; the second refers to a movement *along a* demand curve in response to a change in price.

Consider first the statement that the increase in the price of carrots has been caused by an increased demand for carrots. This statement refers to a shift in the demand curve for carrots. In this case, the demand curve must have shifted to the right, indicating more carrots demanded at each price. This shift will, as we shall see later in this chapter, increase the price of carrots.

Now consider the statement that fewer carrots are being bought because carrots have become more expensive. This refers to a movement along a given demand curve and reflects a change between two specific quantities being bought, one before the price rose and one afterwards.

So what lay behind the two stories might have been something like the following.

1. A rise in the population shifts the demand curve for carrots to the right as more and more are demanded at each price. This in turn is raising the price of carrots (for reasons we will soon study in detail). This was the first newspaper story.
2. The rising price of carrots is causing each individual consumer to cut back on his or her purchase of carrots. This causes a movement upward to the left along any particular demand curve for carrots. This was the second newspaper story.

To prevent the type of confusion caused by our two newspaper stories, economists have developed a specialized vocabulary to distinguish shifts of curves from movements along curves. **Demand** refers to one *whole* demand curve. **Change in demand** refers to a *shift* in the whole curve, that is, a change in the amount that will be bought at *every* price.

An increase in demand means that the whole demand curve has shifted to the right; a decrease in demand means that the whole demand curve has shifted to the left.

Any one point on a demand curve represents a specific amount being bought at a specified price. It represents, therefore, a particular quantity demanded. A movement along a demand curve is referred to as a **change in the quantity demanded.**[7]

A movement down a demand curve is called an increase (or a rise) in the quantity demanded; a movement up the demand curve is called a decrease (or a fall) in the quantity demanded.

To illustrate this terminology, look again at Table 4.3. First, at the original level of income, a decrease in price from £0.80 to £0.60 increases *the quantity demanded* from 67.5 to 77.5 thousand kilograms a month. Second, the increase in average consumer income *increases demand* from what is shown by column (3) to what is shown by column (4). The same contrast is shown in Figure 4.4, where a fall in price from £0.80 to £0.60 increases the quantity demanded from the quantity shown by point x to the quantity shown by point w. An increase in total consumers' income increases demand from curve D_0 to curve D_1.

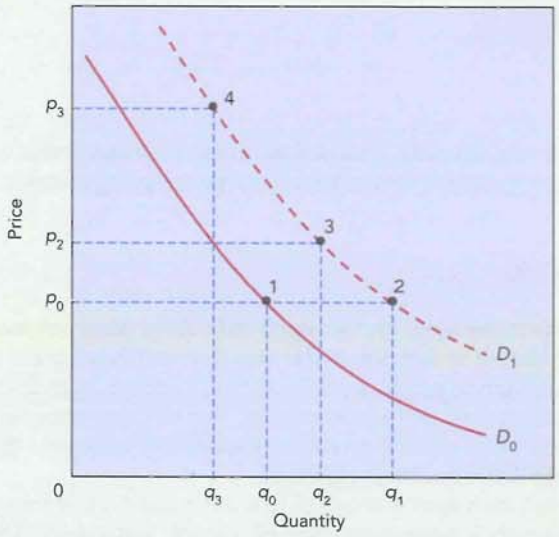

Figure 4.6 Shifts of and movements along the demand curve

A rise in demand means that more will be bought at each price, but it does not mean that more will be bought under all circumstances. The demand curve is originally D_0 and price is p_0, at which q_0 is bought (point 1). Demand then increases to D_1. At the old price of p_0, the quantity demanded is now q_1 (point 2). Next, assume that the price rises to above p_0. This causes quantity demanded to be reduced to below q_1. The net effect of these two shifts can be either an increase or decrease in the quantity demanded. If the price rises to p_2, the quantity demanded of q_2 still exceeds the original quantity q_0 (point 3); while a rise in price to p_3 leaves the final quantity of q_3 (point 4) below the original quantity of q_0.

Figure 4.6 illustrates the combined effect of (1) a rise in demand, and (2) a fall in the quantity demanded. The first of these is shown by a rightward shift in the whole demand curve. The second is shown by a movement upward, along a given demand curve.

[7] Sometimes a movement along a demand curve is referred to as an *expansion* or a *contraction* of demand, an expansion referring to what we have called an increase in the quantity demanded and a contraction to a decrease in the quantity demanded.