

1. What do you know about the principle of equi-marginal utility? _____ 10

2. Distinguish between substitution effect and income effect of a price change 10

Class test 1# Hum : Time 20 minutes

COMMON– What do you know about the main challenges of Economics? _____ 10

Set A– Graphically explain the law of diminishing marginal utility and explain the conditions for consumer equilibrium . _____ 10

Set B– What is a market demand curve? Distinguish between change in demand and change in quantity demanded. _____ 10

What is Economics

Some Definitions:

It is a science of scarcity. Economics deals with unlimited wants and alternative usable limited resources. --- *L. Robbins*

Economics is the study of mankind in the ordinary business of life.--- *Marshall*

@'If there were no scarcity, there would be no economic system and no economics'. -- *Stainer and Hague*

Economics is the study of the administration of the scarce resources and of the determinants of income and employment (i.e., how the level of income and employment in a society are determined) ---- Lord John Menard Keynes

Economics is the study of how a society chooses to use its alternative-usable and limited resources to produce, exchange and consume goods and services for achieving and maintaining growth and stability.

THE MAIN CHALLENGES

Scarcity, Efficiency and Equity are the main challenges

Scarcity is a universal problem. Where ever you are you find scarcity Except in **the paradise**

Efficiency refers to the most effective use of a society's resources in satisfying people's wants and needs. In economics, we say that an economy is producing efficiently when it cannot make anyone economically better off without making someone else worse off.

Equity refers to fair distribution of goods and services

In order to ensure efficiency and equity we make

Choice: Which one of the alternatives to be taken up/implemented

Allocation: How much resources to be invested to different projects/sectors

Why Should you study Economics:

You cannot be, in any real sense a citizen unless you are also in some degree an economist. You need to know how the modern economy functions. Without a study of economics, you cannot be fully informed about international trade, the economic impact of the Internet, or the trade-off between inflation and unemployment.

Choosing your life's occupation is the most important economic decision you will make. Your future depends not only on your own abilities but also on how economic forces beyond your control affect your wages i.e., economic condition of your surroundings.

Father of Economics:

Adam Smith (1723-1790): An Enquiry into the Nature and Causes of Wealth of Nations

References

1. Economics : by John Sloman
2. Microeconomic Theory
By Dominick Salvator (Schaum's Outline Series)
3. Modern Microeconomic Theory
by A. Koutsoyannis

Fundamental Economic Problems

Q1. (a) Why is “**what to produce**” a problem in every economy? (b) How does the price mechanism solve this problem in a free-enterprise economy? (c) In a mixed enterprise economy? (d) In a centralized economy?

Ans:

(a) “**What to produce**” refers to those goods and services and the quantity of each that the economy should produce. Since resources are scarce or limited, no economy can produce as much of every good or service as desired by all members of society. More of one good or service usually means less of others. **Therefore, every society must choose exactly which goods and services to produce and how much of each to produce.**

(b) In a **free-enterprise economy**, the “what to produce” problem is solved by the **price mechanism**. Only those commodities for which consumers are willing to pay a price per unit sufficiently high to cover at least the full cost of producing them will be supplied by producers in the long run. By paying a higher price, consumers can normally induce producers to increase the quantity of a commodity that they supply per unit of time. On the other hand, a reduction in price will normally result in a reduction in the quantity supplied.

(c) In a **mixed-enterprise economy** such as ours, the government (through taxes, subsidies, etc.) **modifies** and, in some instances (through direct controls), **replaces the operation of the price mechanism** in its function of determining what to produce.

(d) In a **completely centralized economy**, the dictator, or more likely a **planning committee** appointed by the dictator or the party, determines what to produce. We in the West believe that this is inefficient. Even the Soviet Union (never a completely centralized economy) has been moving recently toward more decentralized control of the economy and toward greater reliance on the price mechanism to decide what to produce.

2. (a) Why is “**how to produce**” a problem in every economy? (b) How does the price mechanism solve this problem in a free-enterprise economy? (c) In a mixed-enterprise economy? (d) In a centralized economy?

(a) “**How to produce**” refers to the choice of the **combination of factors** and the particular **technique** to use in producing a good or service. Since a good or service can normally be produced with different factor combinations and different techniques, the problem arises as to which of these to use. **Since resources are limited in every economy, when more of them are used to produce some goods and services, less are available to produce others.** Therefore, society faces the problem of **choosing the technique which results in the least possible cost** (in terms of resources used) to produce each unit of the good or service it wants.

(b) In a **free-enterprise economy**, the “how to produce” problem is solved by the **price mechanism**. Because the price of a factor normally represents its relative scarcity, the best technique to use in producing a good or service is the one that results in the least dollar cost of production. If the price of a factor rises in relation to the price of others used in the production of the good or service, producers will switch to a technique which uses less of the more expensive factor in order to minimize their costs of production. The opposite occurs when the price of a factor falls in relation to the price of others.

(c) In a **mixed-enterprise economy**, the operation of the price mechanism in solving the “how to produce” problem is **modified and sometimes replaced by a government action**.

(d) In a **centralized economy**, this problem is solved by a **planning committee**.

3. (a) Why is “for whom to produce” a problem in every economy? (b) How does the price mechanism solve this problem? (c) Why does the government in a mixed-enterprise economy modify the operation of the price mechanism in its function of determining for whom to produce?

(a) “For whom to produce” refers to how the total output is to be divided among different consumers. Since resources and thus goods and services are scarce in every economy, no society can satisfy all the wants of all its people. Thus, a problem of choice arises.

(b) In the absence of government regulation or control of the economy, the problem of “for whom to produce” is also solved by **the price mechanism**. The economy will produce those commodities that satisfy the wants of those people who have the money to pay for them. The higher the income of an individual, the more the economy will be geared to produce the commodities the consumers want (if they are also willing to pay for them).

(c) In the name of **equity and fairness**, governments usually modify the workings of the price mechanism by taking from the rich (through **taxation**) and redistributing to the poor (through **subsidies** and **welfare payments**). They also raise taxes in order to provide for certain “**public**” **goods, such as education, law and other, and defense.**

Branches of ECONOMICS

Every field of study has its own language and its own way of thinking. ***Economics is no different.***

Many subjects are studied on various levels. Consider biology, for example. Molecular biologists study the chemical compounds that make up living things. Cellular biologists study cells, which are made up of many chemical compounds and, at the same time, are themselves the building blocks of living organisms. Evolutionary biologists study the many varieties of animals and plants and how species change gradually over the centuries.

Economics is also studied on various levels. We can study the decisions of individual households and firms. Or we can study the interaction of households and firms in markets for specific goods and services. Or we can study the operation of the economy as a whole, which is just the sum of the activities of all these decision makers in all these markets.

The field of economics is traditionally divided into two broad subfields.

Microeconomics is the study of how households and firms make decisions and how they interact in specific markets.

Macroeconomics is the study of economy wide phenomena

The field of economics is divided into two subfields: microeconomics and macroeconomics. Microeconomists study decision making by households and firms and the interaction among households and firms in the marketplace. Macroeconomists study the forces and trends that affect the economy as a whole.

Distinguish between (a) a hypothesis, (b) a theory, and (c) a law.

(a) A hypothesis is an **“if-then” proposition** usually constructed from a casual observation of a real-world event which represents a tentative and yet untested explanation of the event.

(b) A theory implies that some successful tests of the corresponding hypothesis have already been undertaken. **Thus, a theory implies a greater likelihood of truth than a hypothesis.** The greater the number of successful tests (and lack of unsuccessful ones), the greater the degree of confidence we have in the theory.

(c) **A law is a theory which is always true** under the same set of circumstances, as, for example, the law of gravity.

Theory of Demand: Utility Analysis

There are **TWO** approaches to Measure Utility: **CARDINAL** and **ORDINAL**

The **CARDINAL** Approach to Consumer Equilibrium

Utility is the property of a commodity that satisfies want or need of a consumer.

Util is an imaginary unit of satisfaction from the consumption of a good.

Total utility (TU) is the total satisfaction a person gains from all those units of a commodity consumed within a given time period.

Marginal utility (MU) is the additional satisfaction gained from consuming one extra unit within a given period of time. In other words, **Marginal utility (MU) is the change in the total utility per unit change in the quantity of a commodity consumed per unit of time.**

Principle of diminishing marginal utility: A concept stating that as an individual consumes more units of a commodity per unit of time, the total utility received increases, but the extra or marginal utility decreases. As more units of a good are consumed, additional units will provide less additional satisfaction than previous units.

Consumer surplus The excess of what a person would have been prepared to pay for a good (i.e. the utility) over what that person actually pays.

Rational consumer behaviour: The attempt to maximise total consumer surplus.

Saturation point The point where the total utility received by an individual from consuming a commodity is maximum and the marginal utility is zero.

The optimum level of consumption: the simplest case – one commodity Just how much of a good should people consume if they are to make the best use of their limited income/money? To answer this question we must tackle the problem of how to measure utility, given that in practice we cannot measure ‘utils’. One solution to the problem is to measure utility.

Assumptions of cardinal utility Analysis

1. Rationality :
2. Cardinal Utility
3. Diminishing MU
4. Constant Marginal Utility (MU) of Money
5. Total utility depends on quantities of commodities
6. Utilities are additive

1. Rationality: The consumer is rational. He aims at the maximisation of his utility subject to the constraint imposed by his given income.

2. Cardinal utility: The utility of each commodity is measurable. Utility is a cardinal concept. The most convenient measure is money: the utility is measured by the monetary units that the consumer is prepared to pay for another unit of the commodity.

3. Diminishing marginal utility: The utility gained from successive units of a commodity diminishes. In other words, the marginal utility of a commodity diminishes as the consumer acquires larger quantities of it. This is the axiom of diminishing marginal utility.

4. Constant marginal utility of money: This assumption is necessary if the monetary unit is used as the measure of utility. The essential feature of a standard unit of measurement is that it be constant. If the marginal utility of money changes as income increases (or decreases) the measuring-rod for utility becomes like an elastic ruler, inappropriate for measurement.

5. The total utility of a 'basket of goods' depends on the quantities of the individual commodities. If there are n commodities in the bundle with quantities $x_1, x_2, x_3, \dots, x_n$, the total utility is

$$U = f(x_1, x_2, x_3, \dots, x_n)$$

6. Utilities from different commodities can be summed up

Three Baskets of commodities



A = 1000 util



B = 700 util



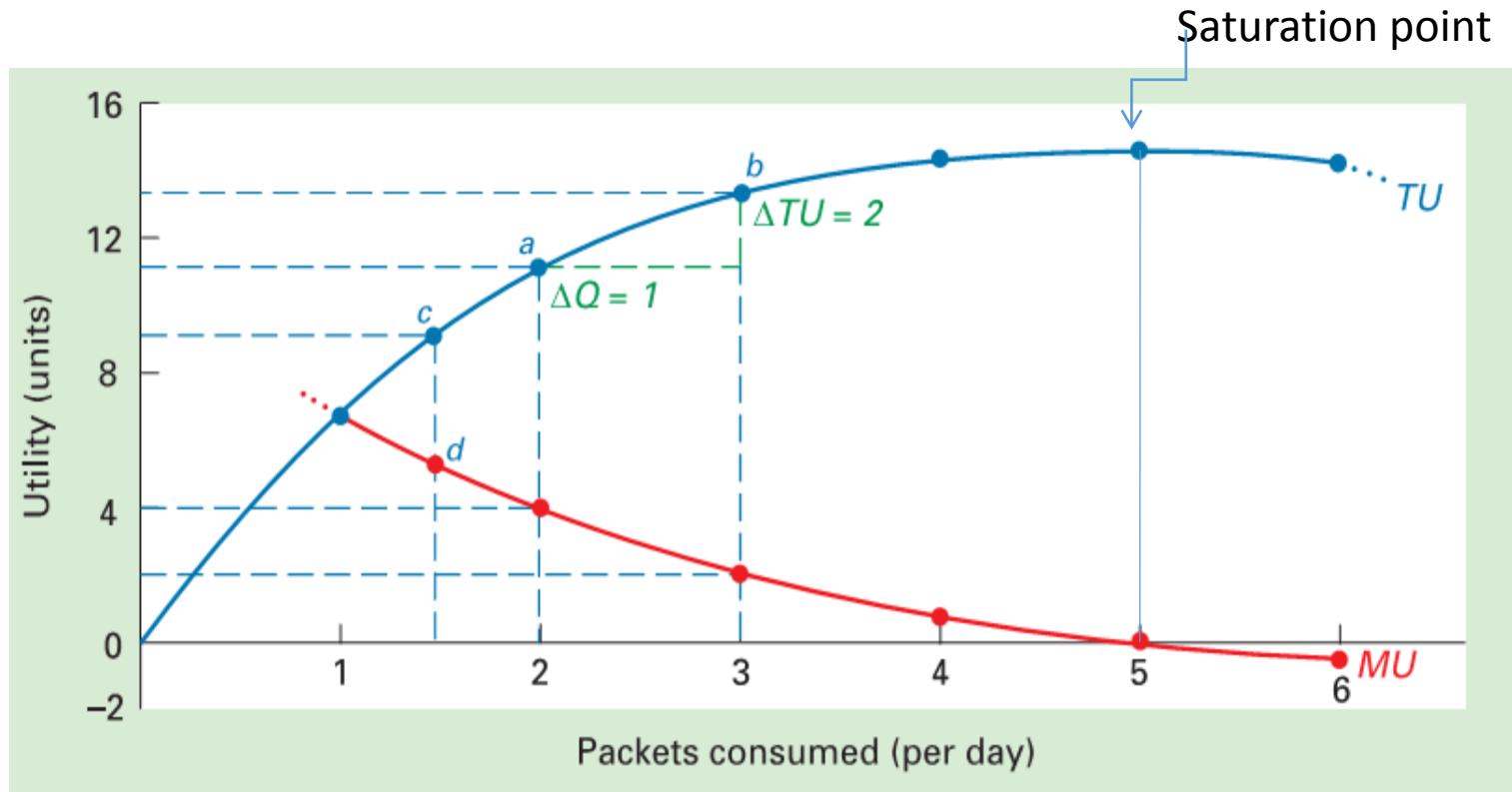
C = 500 util

ii) Utility is cardinal

Rifat's utility from consuming crisps (daily)

Packets of crisps consumed	<i>TU</i> in utils	<i>MU</i> in utils
0	0	–
1	7	7
2	11	4
3	13	2
4	14	1
5	14	0
6	13	–1

Graphical Presentation of TU and MU



The Total and Marginal Utility Functions

A consumer's typical utility function for a good might be of the form:

$$TU = 60Q - 4Q^2$$

where Q is the quantity of the good consumed.

This would give the figures shown in the following table.

Q	$60Q$	$-4Q^2$	=	TU
1	60	-4	=	56
2	120	-16	=	104
3	180	-36	=	144
4	240	-64	=	176
.	.	.		.

$$MU = \frac{dTU}{dQ} = 60 - 8Q$$

This gives the figures shown in the following table.

Q	60	$-8Q$	=	MU
1	60	-8	=	52
2	60	-16	=	44
3	60	-24	=	36
4	60	-32	=	28
.	.	.		.

Note that the marginal utility diminishes.

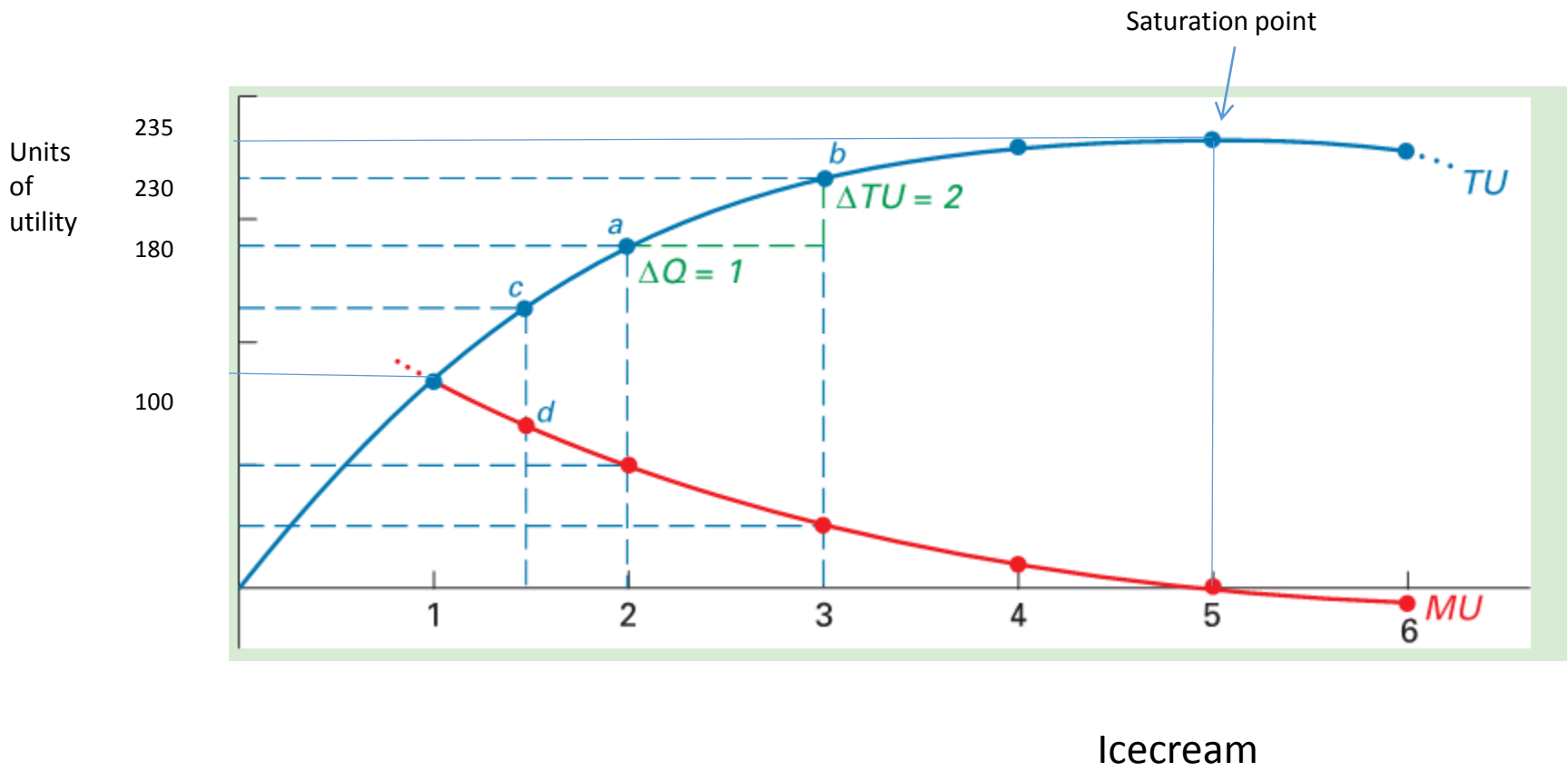
The MU function we have derived is a straight-line function. If, however, the TU function contained a cubed term (Q^3), the MU function would be a curve.

Utility table showing condition for Consumer Equilibrium

Quantity of Ice cream Q_x 1	Marginal Utility (MU_x) 2	Total Utility (TU) 3	Price of the good P_x / Disutility 4	Total cost/ disutility 5	Marginal Consumer Surplus (2-4)= 6	Total Consumer Surplus (3-5)=7
1st	100 (util)	100	50 (util)	50	50	50
2nd	80	180	50	100	30	80
3 rd	50	230	50	150	0	80 MU=Price
4th	5	235	50	200	-45	35
5 th	0	235	50	250	-50	30
6th	-20	215	50	300	-70	

Utility table showing condition for Consumer Equilibrium

Quantity of Hilsha Q_x 1	Marginal Utility (MU_x) 2	Total Utility (TU) 3	Price of hilsha P_x /Disutility 4	Total cost/ disutility 5	Marginal Consumer Surplus (2-4)= 6	Total Consumer Surplus (3-5)=7
1st	1900 (util)	1900	1000 Tk (util)	1000 tk	900	900
2nd	1700	2600	1000	2000	700	1600
3 rd	1400	4100	1000	3000	400	2000
4th	1000	5100	1000	4000	0	2000
5 th	550	5650	1000	5000	-450	1550
6th	0	5650	1000	6000	-1000	550
7th	-600	5000	1000	7000	-1600	-1050



CONSUMER EQUILIBRIUM

Rational consumer behaviour as the attempt to maximise consumer surplus.

Marginal consumer surplus

Marginal consumer surplus (MCS) is the difference between what you are willing to pay for one more unit of a good and what you are actually charged. If Darren were willing to pay 25p for another packet of crisps which in fact only cost him 20p, he would be getting a marginal consumer surplus of 5p.

$$\text{MCS} = \text{MU} - \text{P}$$

Total consumer surplus

Total consumer surplus (TCS) is the sum of all the marginal consumer surpluses that you have obtained from all the units of a good you have consumed. It is the difference between the total utility from all the units and your expenditure on them. If Darren consumes four packets of crisps, and if he would have been prepared to spend £1.20 on them and only had to spend 80p, then his total consumer surplus is 40p.

$$\text{TCS} = \text{TU} - \text{TE}$$

where TE is the total expenditure on a good: i.e. $\text{P} \times \text{Q}$.

Equilibrium of the consumer

We begin with the simple model of a single commodity x . The consumer can either buy x or retain his money income Y . **Under these conditions the consumer is in equilibrium when the marginal utility of x is equated to its market price.** Symbolically we have $MU_x = P_x$,

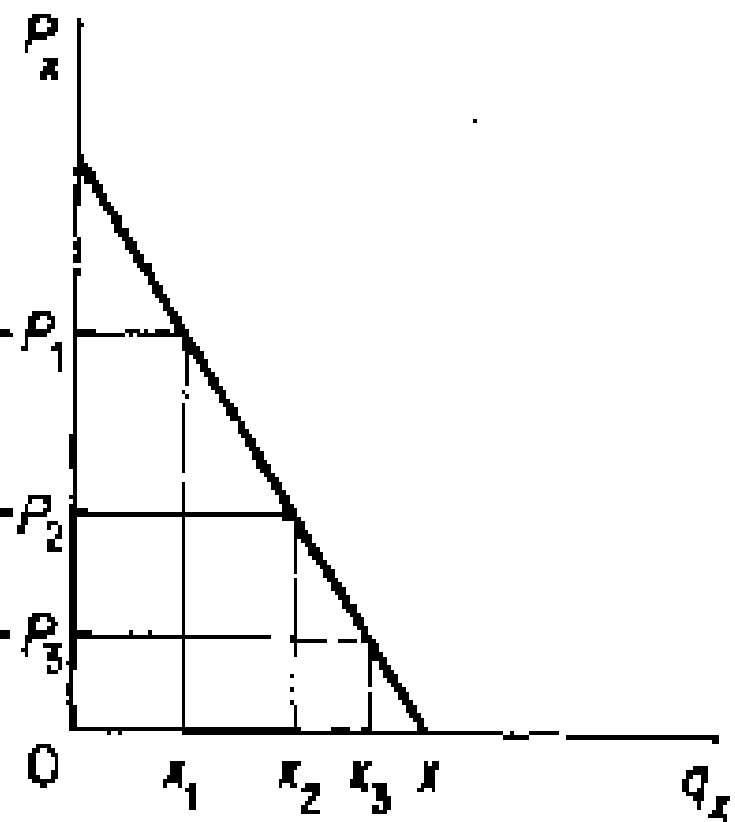
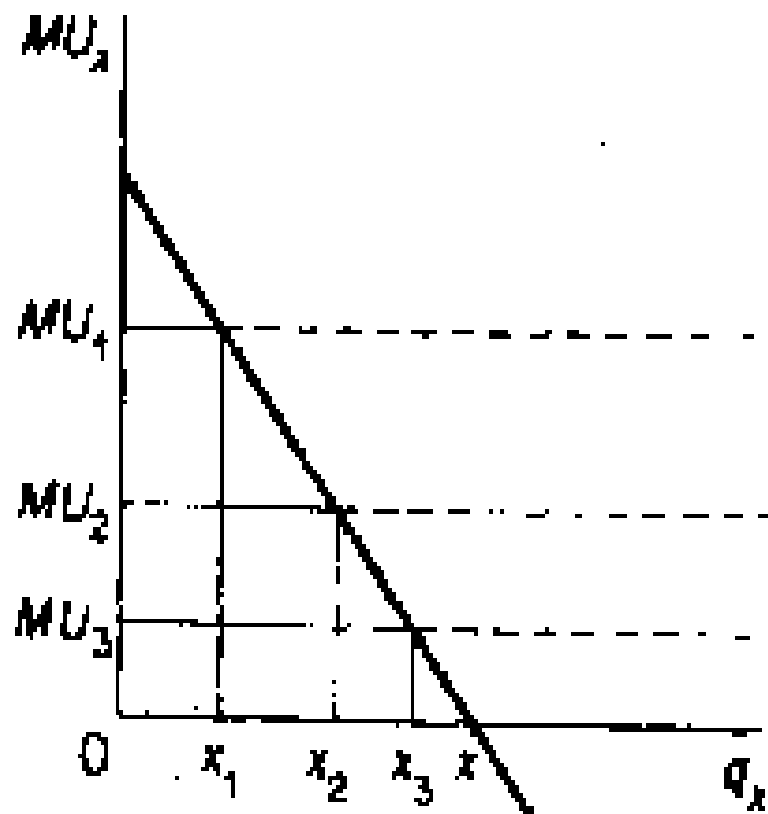
If the marginal utility of x is greater than its price, the consumer can increase his welfare by purchasing more units of x . Similarly if the marginal utility of x is less than its price the consumer can increase his total satisfaction by cutting down the quantity of x and keeping more of his income unspent. Therefore, he attains the maximisation of his utility when $MU_x = P_x$.

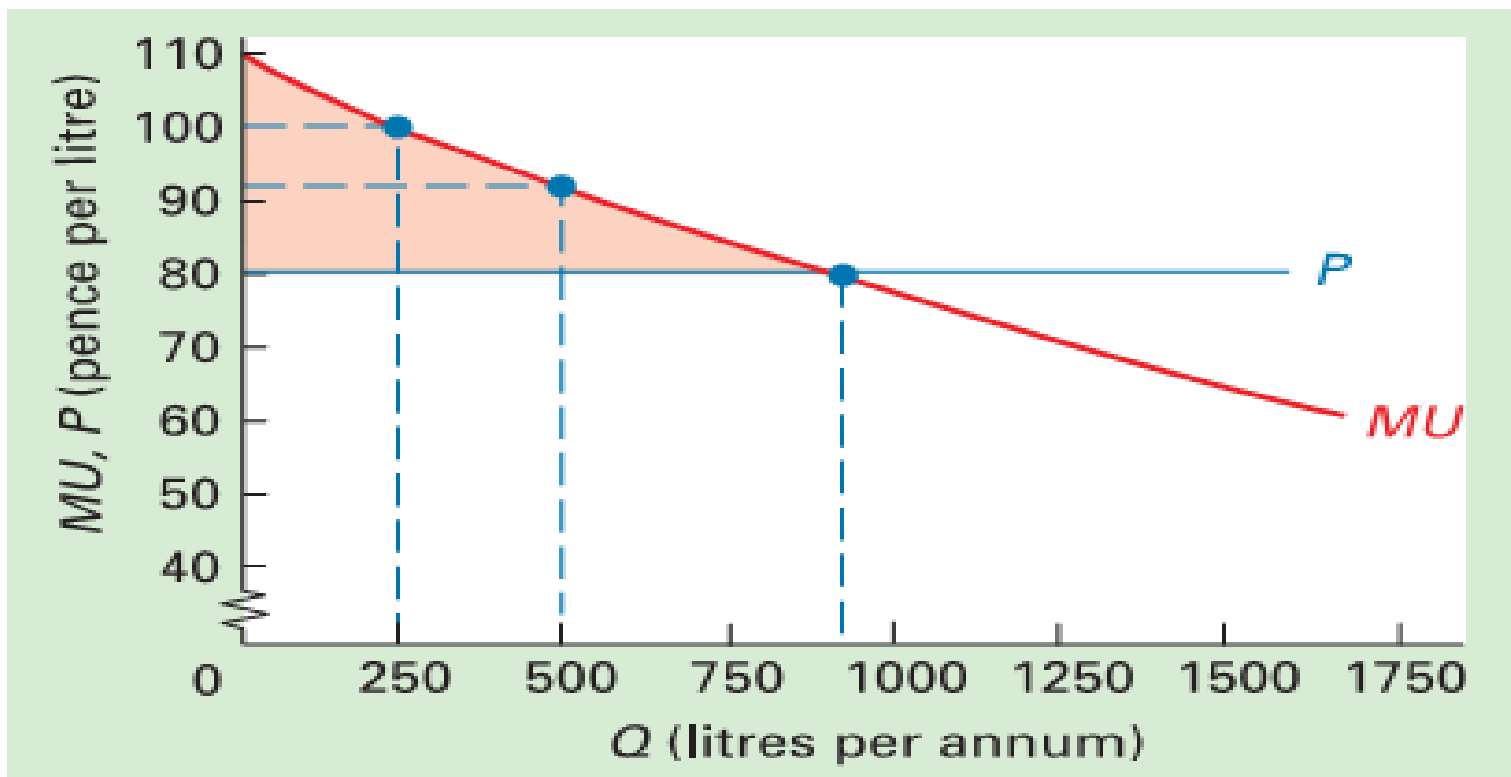
If there are more commodities, the condition for the equilibrium of the consumer is the equality of the ratios of the marginal utilities of the individual commodities to their prices.

Derivation of the demand of the consumer

The derivation of demand is based on the axiom of diminishing marginal utility. The marginal utility of commodity x may be depicted by a line with a negative slope (figure 2). Geometrically the marginal utility of x is the slope of the total utility function $U = f(q_x)$. The total utility increases, but at a decreasing rate, up to quantity x , and then starts declining (figure 2). Accordingly the marginal utility of x declines continuously, and becomes negative beyond quantity x . **If the marginal utility is measured in monetary units the demand curve for x is identical to the positive segment of the marginal utility curve.**

At x_1 the marginal utility is MU_1 (figure 2). This is equal to P_1 , by definition. Hence at P_1 the consumer demands x_1 quantity (figure 2). Similarly at x_2 , the marginal utility is MU_2 , which is equal to P_2 . Hence at P_2 the consumer will buy x_2 , and so on. The negative section of the MU curve does not form part of the demand curve, since negative quantities do not make sense in economics.

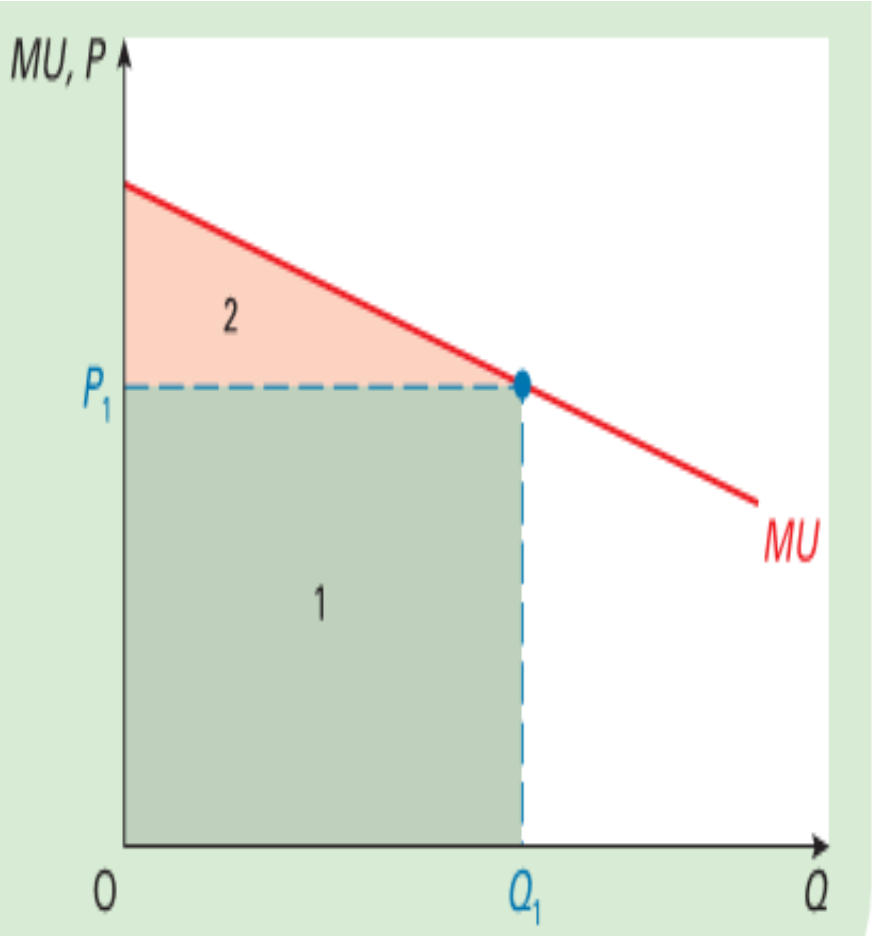




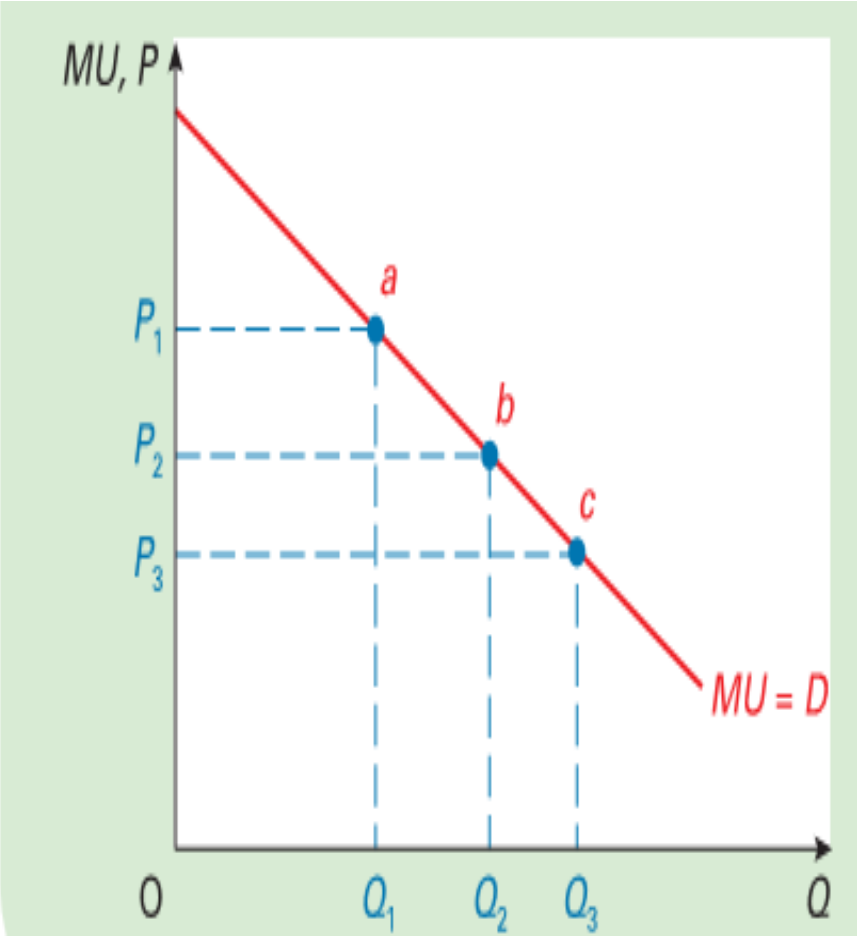
Definition

Consumer surplus The excess of what a person would have been prepared to pay for a good (i.e. the utility) over what that person actually pays.

Consumer surplus



An Individual's demand curve



Equi-marginal Principle in consumption

The rule for rational consumer behaviour is known as the equi-marginal principle. This states that a consumer will get the highest utility from a given level of income when the ratio of the marginal utilities is equal to the ratio of the prices. Algebraically, this is when, for any pair of goods, A and B, that are consumed:

$$MU_A / MU_B = P_A / P_B$$

To see the sense of this, say that the last unit of good **A** you consumed gave three times as much utility as the last unit of **B**. Yet good **A** only cost twice as much as good **B**. You would obviously gain by increasing your consumption of **A** and cutting your purchases of **B**. But as you switched from **B** to **A**, the marginal utility of **A** would fall due to diminishing marginal utility, and conversely



THE MARGINAL UTILITY REVOLUTION: JEVONS, MENGER, WALRAS

Solving the diamonds–water paradox

What determines the market value of a good? We already know the answer: demand and supply. So if we find out what determines the position of the demand and supply curves, we will at the same time be finding out what determines a good's market value.

This might seem obvious. Yet for years economists puzzled over just what determines a good's value.

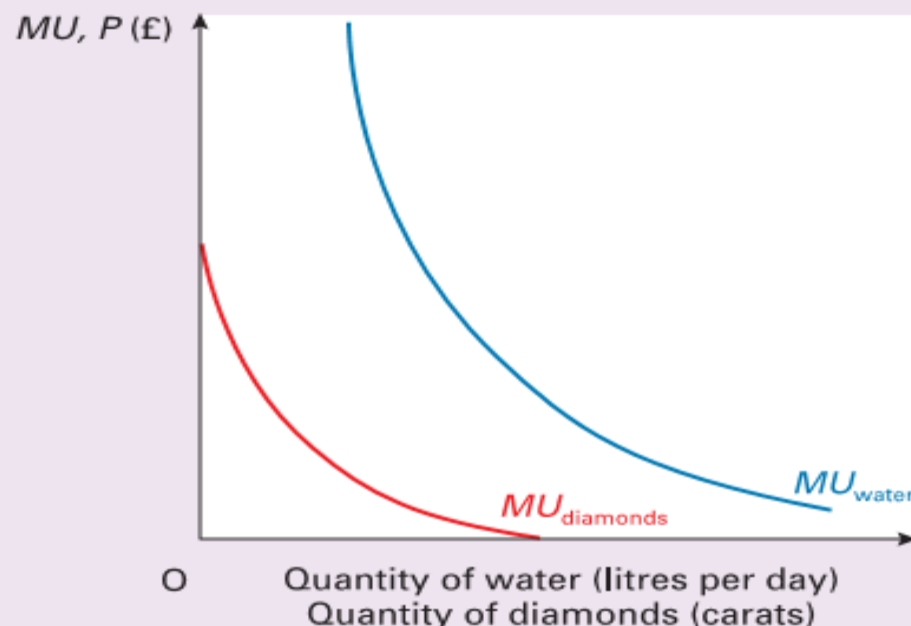
Some economists like Karl Marx and David Ricardo concentrated on the supply side. For them, value depended on the amount of resources used in producing a good. This could be further reduced to the amount of *labour* time embodied in the good. Thus, according to the *labour theory of value*, the more labour that was directly involved in producing the good, or indirectly in producing the capital equipment used to make the good, the more valuable would the good be.

Other economists looked at the demand side. But here they came across a paradox.

Adam Smith in the 1760s gave the example of water and diamonds. 'How is it', he asked, 'that water which is so essential to human life, and thus has such a high "value-in-use", has such a low market value (or "value-in-exchange")? And how is it that diamonds which are relatively so trivial have such a high market value?' The answer to this paradox had to wait over a hundred years until the marginal utility revolution of the 1870s. William Stanley Jevons (1835–82) in England, Carl Menger (1840–1921) in Austria, and Leon Walras (1834–1910) in Switzerland all independently claimed that the source of the market value of a good was its *marginal* utility, not its *total* utility.

utility, have a much higher marginal utility. There are so few diamonds in the world, and thus people have so few of them, that they are very valuable at the margin. If, however, a new technique were to be discovered of producing diamonds cheaply from coal, their market value would fall rapidly. As people had more of them, so their marginal utility would rapidly diminish.

Marginal utility still only gives the demand side of the story. The reason why the marginal utility of water is so low is that *supply* is so plentiful. Water is very expensive in Saudi Arabia! In other words, the full explanation of value must take into account both demand *and* supply.



This was the solution to the diamonds–water paradox. Water, being so essential, has a high total utility: a high ‘value in use’. But for most of us, given that we consume so much already, it has a very low marginal utility. Do you leave the cold tap running when you clean your teeth? If you do, it shows just how trivial water is to you *at the margin*. Diamonds, on the other hand, although they have a much lower total

Why is water, which is essential to life, so cheap while diamonds, which are not essential to life, so expensive?

Since water is essential to life, the TU received from water exceeds the TU received from diamonds. However, the price we are willing to pay for each unit of a commodity depends not on the TU but on the MU. That is, since we consume so much water, the MU of the last unit of water consumed is very low. Therefore, we are willing to pay only a very low price for this last unit of water consumed. Since all the units of water consumed are identical, we pay the same low price on all the other units of water consumed. On the other hand, since we purchase so few diamonds, the MU of the last diamond purchased is very high. Therefore, we are willing to pay a high price for this last diamond and for all the other diamonds purchased. Classical economists did not distinguish TU from MU and thus they were unable to resolve this so-called “water-diamond paradox.”

DEMAND Analysis

Defining demand:

Law of demand :

Exceptions to the law of demand:

Determinants of demand :

Demand function/ schedule/curve:

Market demand curve:

Change in quantity demanded :

Change in demand :

Substitution effect and income effect of a price change:

Why do people buy more when price falls and vice versa:

Defining Demand

What is the relationship between “need” or “want” and “demand”?

In economics, **want** is something desired, while **need** is something that is necessary for our survival (e.g., the five basic needs are food, shelter, medication, clothing and education).

The demand for a particular commodity arises because of its ability to satisfy a need or a want. However, the demand for a commodity, in an economic sense, arises when there is both a need for the commodity and consumers have the money to pay for it. Hence, demand refers to ***effective demand*** rather than to simple need.

Prerequisites for an effective demand

1. Desire to get the commodity
2. Purchasing power to buy the commodity
3. Willingness to pay for the commodity

Economic model: A formal presentation of an economic theory.

Induction: Constructing general theories on the basis of specific observations.

Deduction: Using a theory to draw conclusions about specific circumstances.

Ceteris paribus: Latin for 'other things being equal'. This assumption has to be made when making deductions from theories.

A positive Economics/ statement: is a statement of fact. It may be right or wrong, but its accuracy can be tested by appealing to the facts. 'Unemployment is rising.' 'Inflation will be over 6 per cent by next year.' 'If the government cuts taxes, imports will rise.' These are all examples of positive statements. i.e., **Positive Economics is a value-free statement which can be tested by an appeal to the facts.**

A normative Economics/statement: is a statement of value: *a statement about what ought or ought not to be, about whether something is good or bad, desirable or undesirable.* 'It is right to tax the rich more than the poor.' 'The government ought to reduce inflation.' 'Old-age pensions ought to be increased in line with inflation.' These are all examples of normative statements. They cannot be proved or disproved by a simple appeal to the facts. i.e., **Normative Economics is a value judgement**

THE INDIVIDUAL'S DEMAND FOR A COMMODITY

The quantity of a commodity that an individual is willing to purchase over a specific time period is a function of or depends on the **price of the commodity, the person's money income, the prices of other commodities, and individual tastes**. By varying the price of the commodity under consideration while keeping constant the individual's money income and tastes and the prices of other commodities (**the assumption of ceteris paribus**), we get the **individual's demand schedule** for the commodity. The graphic representation of the individual's demand schedule gives us that person's demand curve.

Law of Demand :

This is simply an illustration of the general relationship between price and consumption: when the price of a good rises, the quantity demanded will fall. This relationship is known as **the law of demand**.

Law of demand :: The quantity of a good demanded per period of time will fall as price rises and will rise as price falls, other things being equal (ceteris paribus)

There are two reasons for this law: The Income effect and the Substitution effect

- **People will feel poorer.** They will not be able to afford to buy so much of the good with their money. The purchasing power of their income (their real income) has fallen. This is called **the income effect** of a price rise.

- **The good will now cost more than alternative or 'substitute' goods,** and people will switch to these. This is called the **substitution effect** of a price rise.

Similarly, when the price of a good falls, the quantity demanded will rise. People can afford to buy more (the income effect), and they will switch away from consuming alternative goods (the substitution effect). Therefore, returning to our example of the increase in the price of coffee, we will not be able to afford to buy as ...

(ceteris paribus)

Assumptions of law of demand:

1. Income of the consumer is fixed
2. Prices of related goods are constant
3. Taste, habit etc. remain unchanged
4. Specific time period

Definition: Demand for anything is the amount of it which will be bought per unit of time at a given price.

Exceptions to the law of demand:

1. Socially prestigious goods/ conspicuous consumption
2. Giffen goods
3. Rising/ falling tendency of price

Other than price the following are the general determinants of demand

Tastes: Tastes are affected by advertising, by fashion, by observing other consumers, by considerations of health and by the experiences from consuming the good on previous occasions.

The number and price of substitute goods (i.e. competitive goods): The higher the price of substitute goods, the higher will be the demand for this good as people switch from the substitutes.

The number and price of complementary goods: The higher the price of complementary goods, the fewer of them will be bought and hence the less will be the demand for this good. cars and petrol, shoes and polish, fish and chips.

Income: As people's incomes rise, their demand for most goods will rise. Such goods are called normal goods. There are exceptions to this general rule, however. As people get richer, they spend less on inferior goods, such as cheap margarine, and switch to better quality goods.

Distribution of income: If national income were redistributed from the poor to the rich, the demand for luxury goods would rise. At the same time, as the poor got poorer they might have to turn to buying inferior goods, whose demand would thus rise too.

Expectations of future price changes: If people think that prices are going to rise in the future, they are likely to buy more now before the price does go up.

Substitute goods : A pair of goods which are considered by consumers to be alternatives to each other. As the price of one goes up, the demand for the other rises.

Complementary goods : A pair of goods consumed together. As the price of one goes up, the demand for both goods will fall.

Normal good : A good whose demand rises as people's incomes rise.

Inferior good : A good whose demand falls as people's incomes rise.

Demand function: An equation which shows the mathematical relationship between the quantity demanded of a good and the values of the various determinants of demand.

Econometrics: The science of applying statistical techniques to economic data in order to identify and test economic relationships.

Regression analysis: A statistical technique which allows a functional relationship between two or more variables to be estimated.

Simple demand functions. Demand equations are often used to relate quantity demanded to just one determinant. Thus an equation relating quantity demanded to price could be in the form:

$$Q_d = a - bP \quad (1)$$

For example, the actual equation might be:

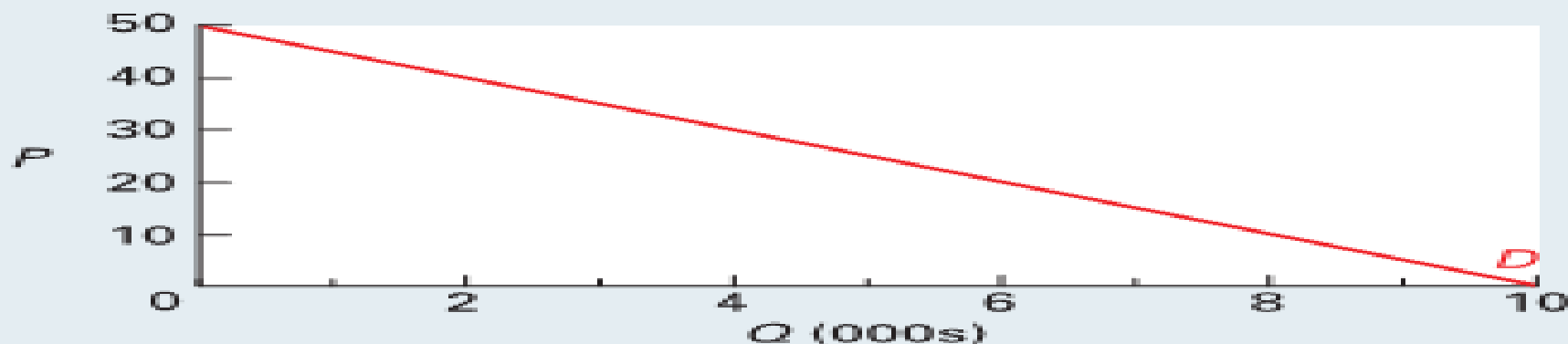
$$Q_d = 10\,000 - 200P \quad (2)$$

From this can be calculated a complete demand schedule or demand curve, as shown in the table and diagram. As price (P) changes, the equation tells us how much the quantity demanded (Q_d) changes.

Demand schedule for equation (2)

P	Q_d
5	9000
10	8000
15	7000
20	6000
25	5000

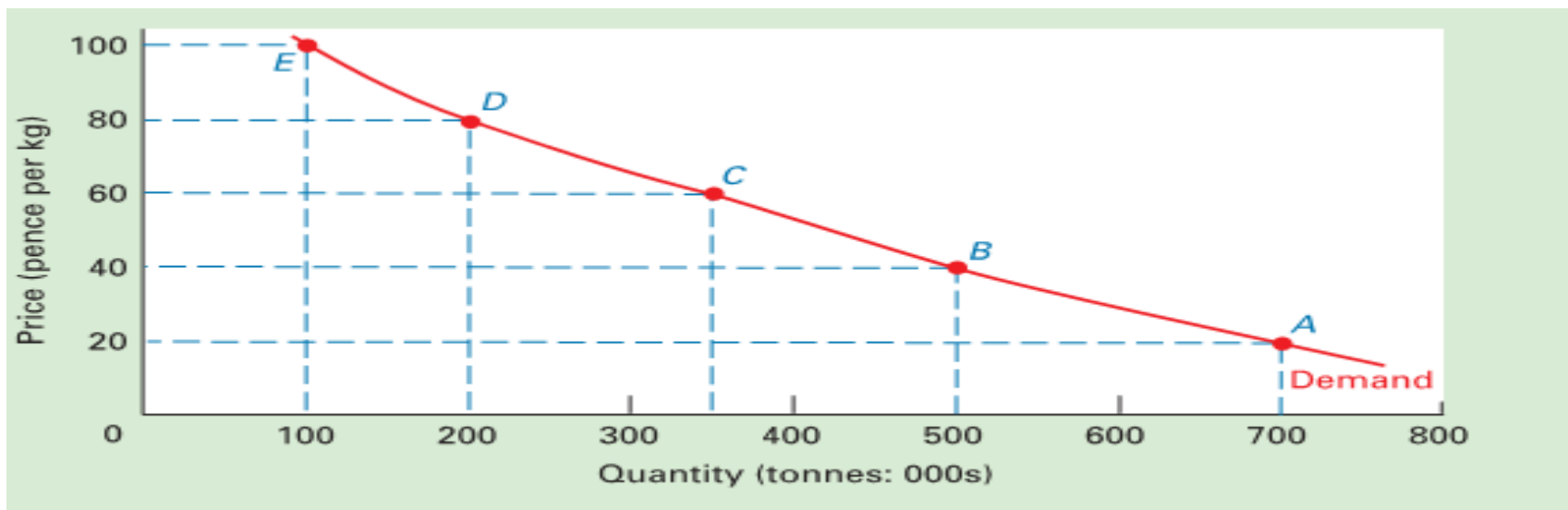
Demand curve for equation (2)



Demand Schedule and Market demand Curve

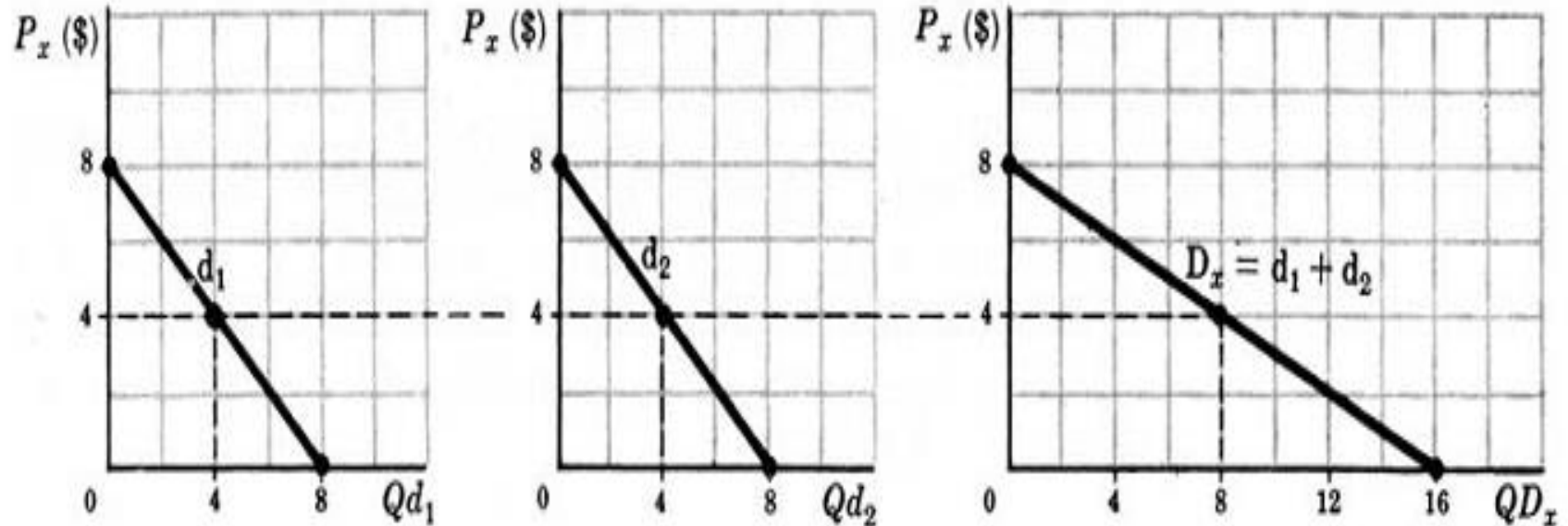
Table 2.1 The demand for potatoes (monthly)

	Price (pence per kg) (1)	Tracey's demand (kg) (2)	Darren's demand (kg) (3)	Total market demand (tonnes: 000s) (4)
A	20	28	16	700
B	40	15	11	500
C	60	5	9	350
D	80	1	7	200
E	100	0	6	100



The Market Demand For A Commodity

The market or aggregate demand for a commodity gives the alternative amounts of the commodity demanded per time period, at various alternative prices, by all the individuals in the market. The market demand for a commodity thus depends on all the factors that determine the individual's demand and, in addition, on the number of buyers of the commodity in the market. Geometrically, the market demand curve for a commodity is obtained by the horizontal summation of all the individuals' demand curves for the commodity.

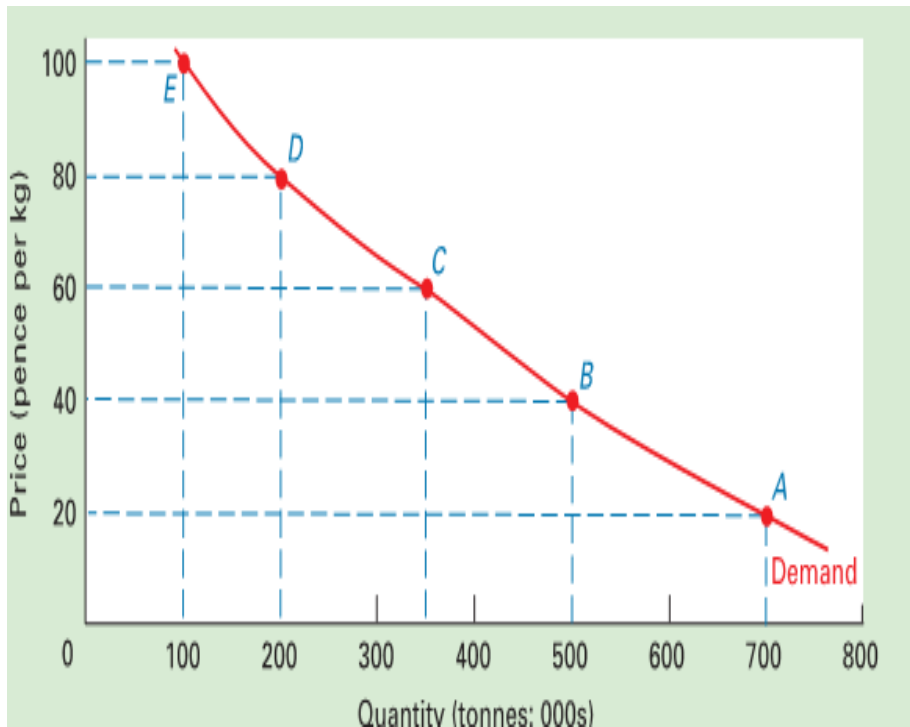


Movements along and shifts in the demand curve

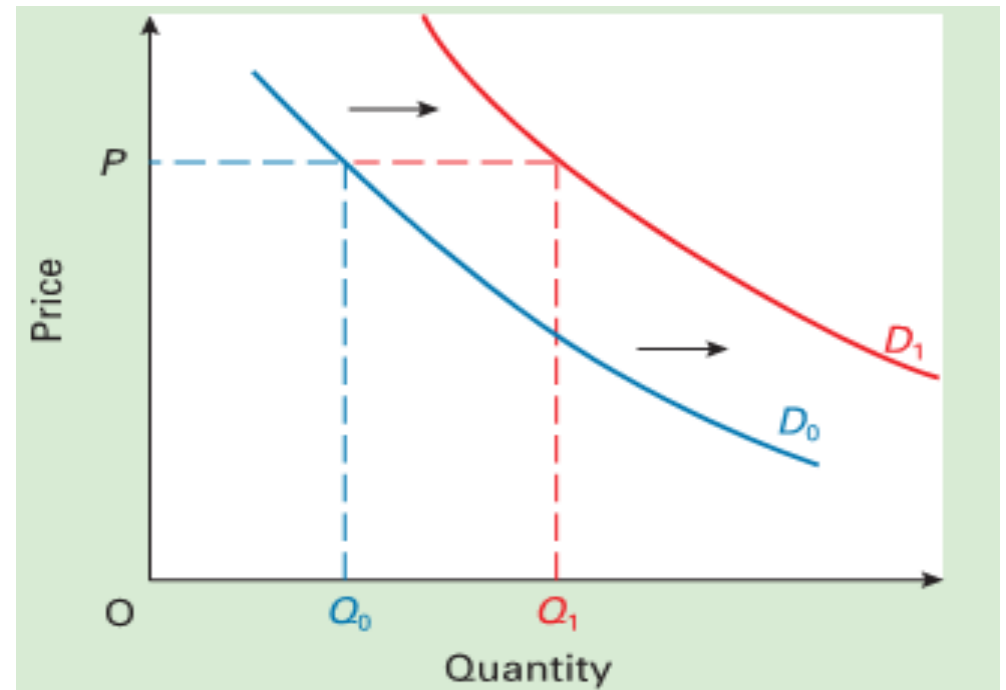
To distinguish between **shifts in** and **movements along demand curves**, it is usual to distinguish between a change in demand and a change in the quantity demanded. A shift in the demand curve is referred to as a **change in demand**, whereas a movement along the demand curve as a result of a change in price is referred to as a **change in the quantity demanded**.

Change in the quantity demanded :The term used for a movement along the demand curve to a new point. It occurs when there is a change in price.

Change in demand: The term used for a shift in the demand curve. It occurs when a determinant of demand other than price changes.



Change in the quantity demanded



Change in demand

The Effects of a Price Change

Income effect : The effect of a change in price on quantity demanded arising from the consumer becoming better ~~or worse~~ off as a result of the price change.

Substitution effect: The effect of a change in price on quantity demanded arising from the consumer switching ~~to or~~ from alternative (substitute) products.

Income effect + Substitution effect = Price effect

A Numerical Example

Let, the Market Prices of **Hilsa** and **mutton** are **tk. 1100/kg** and **tk. 700/kg** respectively, and the consumer has a **budget of tk. 6100** to buy 3-kg hilsa costing tk. 3300 and 4-kg mutton (or, mutton+ chicken) with tk. 2800.

If price of Hilsa falls to tk. 800/per kg , while price of mutton remains the same, the consumer redistributes his/her budget on the above commodities since hilsa is relatively cheaper.

Now the consumer can buy the same amount of hilsa (i.e., 3 kg) by tk. 2400, meaning he/she can save tk. 900 from hilsa budget; in other words, the shopkeeper has given him/her this tk. 900 as a free gift, which can be taken as an addition to the consumer's income.

Income Effect

Now the consumer would buy additional amount hilsa with this tk. 900. This is called **income effect**. The consumer can purchase at best 1.25 kg of hilsa with this money. Say, he/she actually purchases 1 kg more of hilsa.

Substitution effect

Meanwhile, consumer transfers some budget from mutton to hilsa. Say, he/she actually transfers tk. 1200 to buy 1.5 kg more of hilsa. This is substitution effect

Price effect = Income effect + substitution effect = 1.00 kg + 1.5 kg = 2.5 kg . That means, the consumer will buy a total of $(3+2.5)= 5.5$ kg hilsa after a fall in price.

Why do people buy more when price falls and vice versa ?

There are two reasons for this law: The Income effect and the Substitution effect

- **People will feel richer::** They will be able to afford to buy more of the good with their money. The purchasing power of their income (their real income) has risen. This is called **the income effect** of a price fall.
- **The good will now cost less than alternative or 'substitute' goods,** and people will switch away from these goods. This is called the **substitution effect** of a price fall.

Similarly, when the price of a good rises, the quantity demanded will fall. People can not afford to buy more (the income effect), and they will switch to consuming alternative goods (the substitution effect).

Therefore, returning to our example of the fall in the price of hilsa, consumers will be able to afford to buy more.

Why do people buy less when price rises and vice versa ?

- **People will feel poorer.** They will not be able to afford to buy so much of the good with their money. The purchasing power of their income (their real income) has fallen. This is called **the income effect** of a price rise.
- **The good will now cost more than alternative or 'substitute' goods,** and people will switch to these. This is called the **substitution effect** of a price rise.

Similarly, when the price of a good falls, the quantity demanded will rise. People can afford to buy more (the income effect), and they will switch away from consuming alternative goods (the substitution effect). Therefore, returning to our example of the increase in the price of coffee, we will not be able to afford to buy as

More complex demand functions. In a similar way, we can relate the quantity demanded to two or more determinants. For example, a demand function could be of the form:

$$Q_d = a - bP + cY + dP_s - eP_c \quad (4)$$

This equation says that the quantity demanded (Q_d) will fall as the price of the good (P) rises, will rise as the level of consumer incomes (Y) rises, will rise as the price of a particular substitute (P_s) rises and will fall as the price of a particular complement (P_c) rises, by amounts b , c , d and e respectively.

Estimated demand equations. Surveys can be conducted to show how demand depends on each one of a number of determinants, while the rest are held

constant. Using statistical techniques called *regression analysis*, a demand equation can be estimated.

For example, assume that it was observed that the demand for butter (measured in 250g units) depended on its price (P_b), the price of margarine (P_m) and total annual consumer incomes (Y). The estimated weekly demand equation may then be something like:

$$Q_d = 2\,000\,000 - 50\,000P_b + 20\,000P_m + 0.01Y \quad (5)$$

Thus if the price of butter were 50p, the price of margarine were 35p and consumer incomes were £200 million, and if P_b and P_m were measured in pence and Y was measured in pounds, then the demand for butter would be 2 200 000 units. This is calculated as follows:

$$\begin{aligned} Q_d &= 2\,000\,000 - (50\,000 \times 50) + (20\,000 \times 35) \\ &\quad + (0.01 \times 200\,000\,000) \\ &= 2\,000\,000 - 2\,500\,000 + 700\,000 + 2\,000\,000 \\ &= 2\,200\,000 \end{aligned}$$

The branch of economics that applies statistical techniques to economic data is known as *econometrics*. Econometrics is beyond the scope of this book. It is worth noting, however, that econometrics, like other branches of statistics, cannot produce equations and graphs that allow totally reliable predictions to be made. The data on which the equations are based are often incomplete or unreliable, and the underlying relationships on which they are based (often ones of human behaviour) may well change over time.



THE DEMAND FOR LAMB

A real-world demand function¹

The following is an estimate of the UK's market demand curve for lamb. It has been estimated (using a computer regression package) from actual monthly data for the years 1966–99.

$$Q_d = 217.1 - 0.112P_L + 0.125P_B - 0.0198Y$$

- where:
- Q_d is the quantity of lamb sold in grams per person per week.
 - P_L is the price of lamb (in pence per kg, at 1985 prices).
 - P_B is the price of beef (in pence per kg, at 1985 prices).
 - Y is annual personal disposable income per head (£, at 1995 prices).

From this, economists could forecast what would happen to the demand for lamb if any of three variables – the price of lamb, the price of beef or income – changed.

Supply Analysis

Defining supply:

Law of Supply:

Determinants of supply:

Supply function:

Market supply curve:

Change in quantity supplied:

Change in supply:

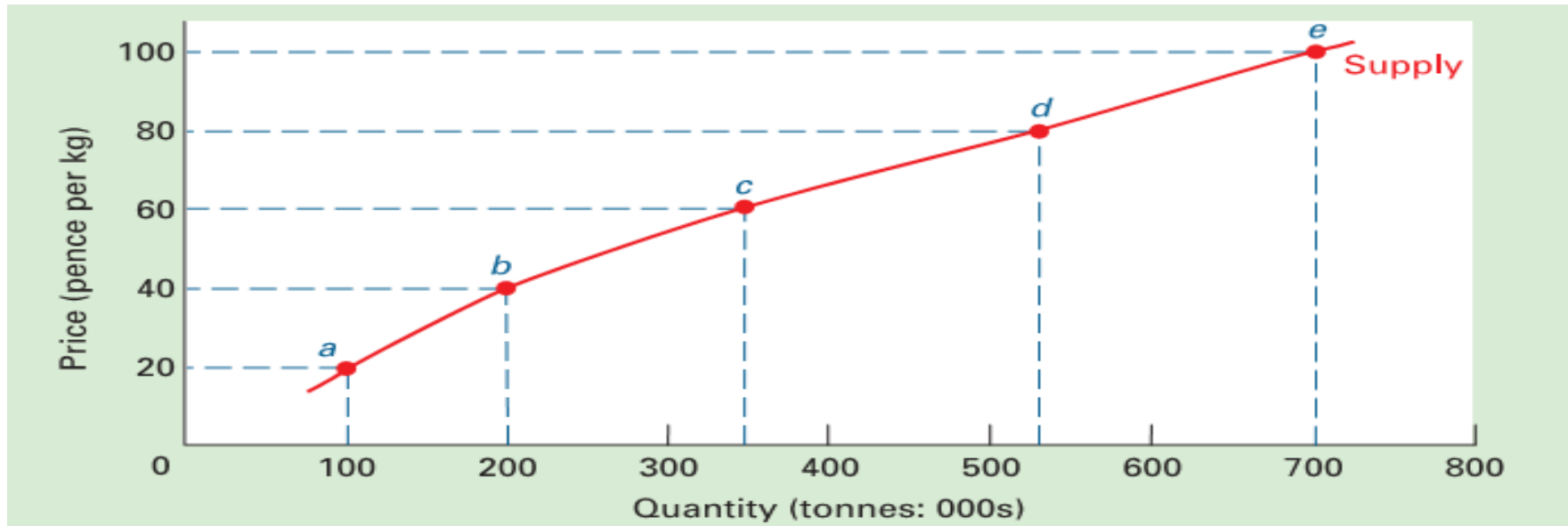
As firms supply more, they are likely to find that beyond a certain level of output, costs rise more and more rapidly. In the case of the farm just considered, if more and more potatoes are grown, then land progressively less suitable to potato cultivation has to be used. This raises the cost of producing extra potatoes. It is the same for manufacturers. Beyond a certain level of output, costs are likely to rise rapidly as workers have to be paid overtime and as machines approach capacity working. If higher output involves higher costs of producing each unit, producers will need to get a higher price if they are to be persuaded to produce extra output.

- **The higher the price of the good, the more profitable it becomes to produce. Firms will thus be encouraged to produce more of it by switching from producing less profitable goods.**
- **Given time, if the price of a good remains high, new producers will be encouraged to set up in production.**

Supply schedule and curve

Table 2.2 The supply of potatoes (monthly)

	Price of potatoes (pence per kg)	Farmer X's supply (tonnes)	Total market supply (tonnes: 000s)
<i>a</i>	20	50	100
<i>b</i>	40	70	200
<i>c</i>	60	100	350
<i>d</i>	80	120	530
<i>e</i>	100	130	700



Determinants of supply other than own price

The costs of production: The higher the costs of production, the less profit will be made at any price. As costs rise, firms will cut back on production, probably switching to alternative products whose costs have not risen so much. The main reasons for a change in costs are as follows:

- ***Change in input prices:*** costs of production will rise if wages, raw material prices, rents, interest rates or any other input prices rise.
- ***Change in technology:*** technological advances can fundamentally alter the costs of production. Consider, for example, how the microchip revolution has changed production methods and information handling in virtually every industry in the world.
- ***Organisational changes:*** various cost savings can be made in many firms by reorganising production.
- ***Government policy:*** costs will be lowered by government subsidies and raised by various taxes.

The profitability of alternative products (substitutes in supply): If a product which is a substitute in supply becomes more profitable to supply than before, producers are likely to switch from the first good to this alternative. Supply of the first good falls. Other goods are likely to become more profitable if:

- their prices rise;
- their costs of production fall.

The profitability of goods in joint supply. Sometimes when one good is produced, another good is also produced at the same time. These are said to be goods in joint supply. An example is the refining of crude oil to produce petrol. Other grade fuels will be produced as well, such as diesel and paraffin. If more petrol is produced, due to a rise in demand and hence its price, then the supply of these other fuels will rise too.

Nature, 'random shocks' and other unpredictable events: In this category we would include the weather and diseases affecting farm output, wars affecting the supply of imported raw materials, the breakdown of machinery, industrial disputes, earthquakes, floods and fire, etc.

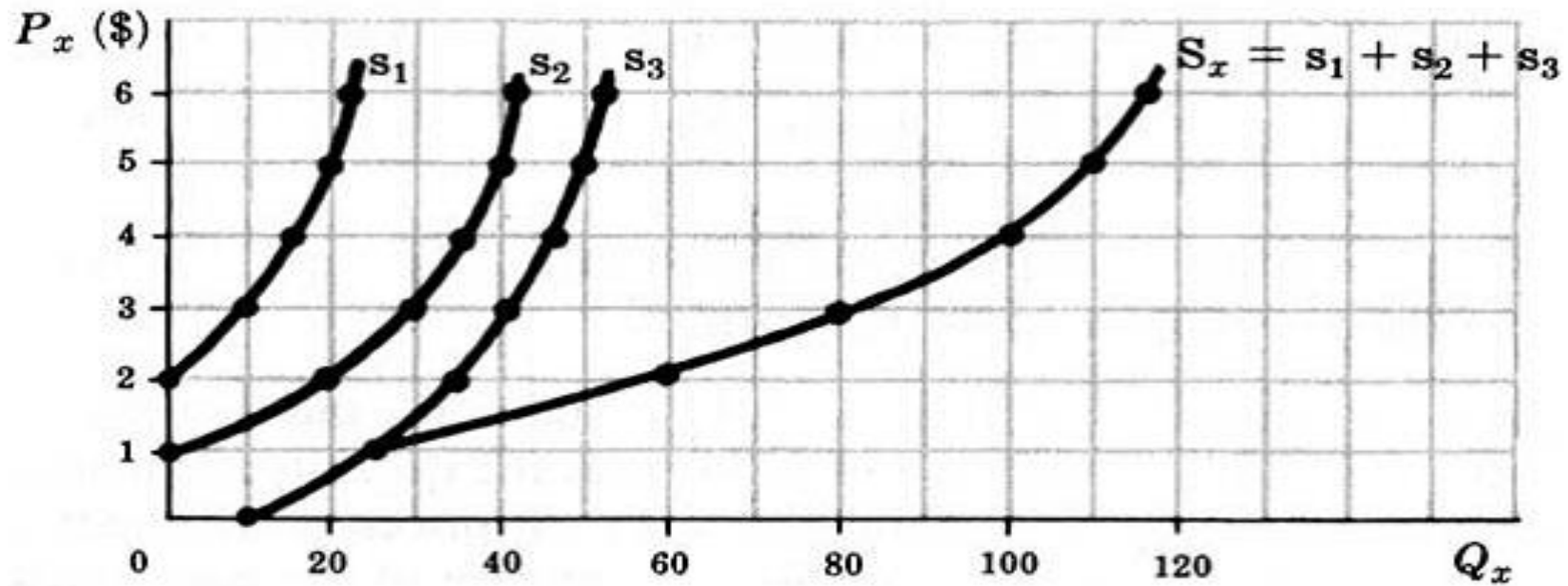
The aims of producers. A profit-maximising firm will supply a different quantity from a firm that has a different aim, such as maximising sales. For most of the time we shall assume that firms are profit maximisers.

Expectations of future price changes. If price is expected to rise, producers may temporarily reduce the amount they sell. Instead they are likely to build up their stocks and only release them on to the market when the price does rise. At the same time they may install new machines or take on more labour, so that they can be ready to supply more when the price has risen.

The number of suppliers. If new firms enter the market, supply is likely to increase.

The market supply curve for commodity X

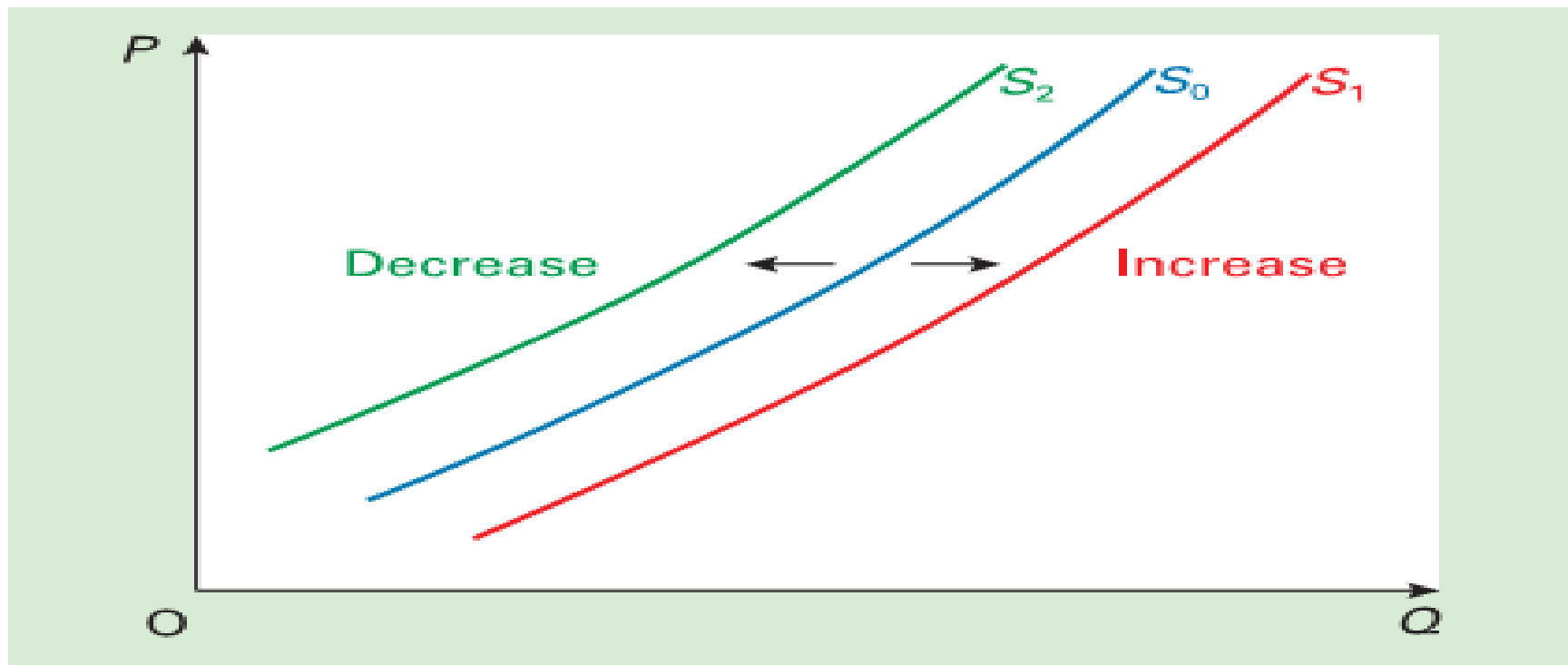
P_x (\$)	Quantity Supplied (per time period)		
	Producer 1	Producer 2	Producer 3
6	22	42	53
5	20	40	50
4	16	36	46
3	10	30	42
2	0	20	35
1	0	0	25
0	0	0	10



Movements along and shifts in the supply curve

Change in the quantity supplied The term used for a movement along the supply curve to a new point. It occurs when there is a change in price.

Change in supply The term used for a shift in the supply curve. It occurs when a determinant other than price changes



Using survey data and regression analysis, equations can be estimated relating supply to some of its determinants. Note that not all determinants can be easily quantified (e.g. nature and the aims of firms), and thus may be left out of the equation.

The simplest form of supply equation relates supply to just one determinant. Thus a function relating supply to price would be of the form:

$$Q_s = c + dP \quad (1)$$

Using regression analysis, values can be estimated for c and d . Thus an actual supply equation might be something like:

$$Q_s = 500 + 1000P \quad (2)$$

If any determinant other than price changed, a new equation would result. For example, if costs of production fall, the equation may now be:

$$Q_s = 1000 + 1500P \quad (3)$$

More complex supply equations would relate supply to more than one determinant. For example:

$$Q_s = 200 + 80P - 20a_1 - 15a_2 + 30j \quad (4)$$

where P is the price of the good, a_1 and a_2 are the profitabilities of two alternative goods that could be supplied instead, and j is the profitability of a good in joint supply.

Summary:

1. When the price of a good rises, the quantity supplied per period of time will usually also rise. This applies both to individual producers' supply and to the whole market supply.
2. There are two reasons in the short run why a higher price encourages producers to supply more: (a) they are now willing to incur the higher costs per unit associated with producing more; (b) they will switch to producing this product and away from now less profitable ones. In the long run, there is a third reason: new producers will be attracted into the market.
3. The relationship between price and quantity supplied per period of time can be shown in a table (or schedule) or as a graph. As with a demand curve, price is plotted on the vertical axis and quantity per period of time on the horizontal axis. The resulting supply curve is upward sloping (positively sloped).
4. Other determinants of supply include the costs of production, the profitability of alternative products, the profitability of goods in joint supply, random shocks and expectations of future price

changes.

5. If price changes, the effect is shown by a movement along the supply curve. We call this effect 'a change in the quantity supplied'.
6. If any determinant other than price changes, the effect is shown by a shift in the whole supply curve. We call this effect 'a change in supply'. A rightward shift represents an increase in supply; a leftward shift represents a decrease in supply.
- *7. The relationship between the quantity supplied and the various determinants of supply can be expressed in the form of an equation.

Movement to a new equilibrium

The equilibrium price will remain unchanged only so long as the demand and supply curves remain unchanged. If either of the curves shifts, a new equilibrium will be formed.

Figure 2.6 Effect of a shift in the demand curve

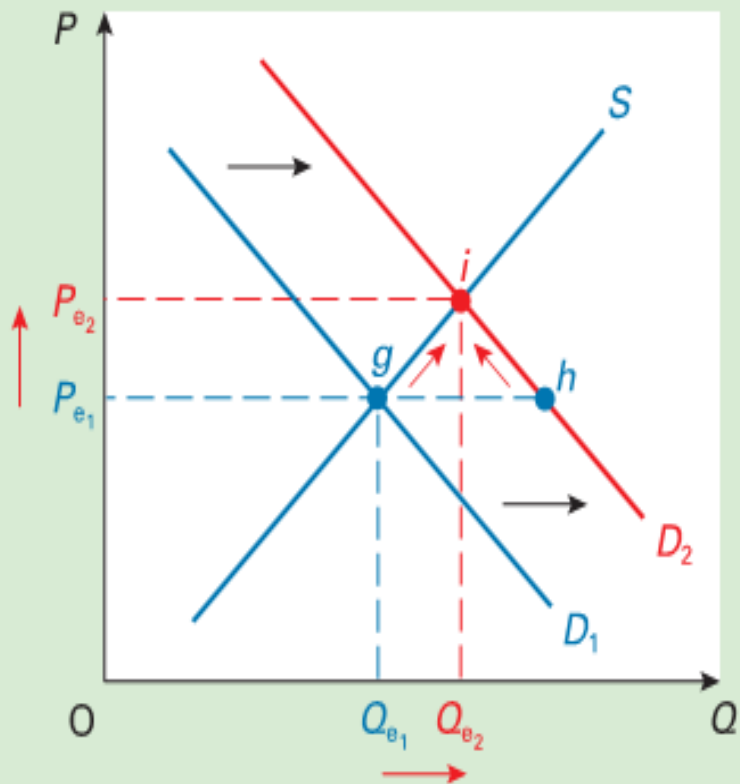
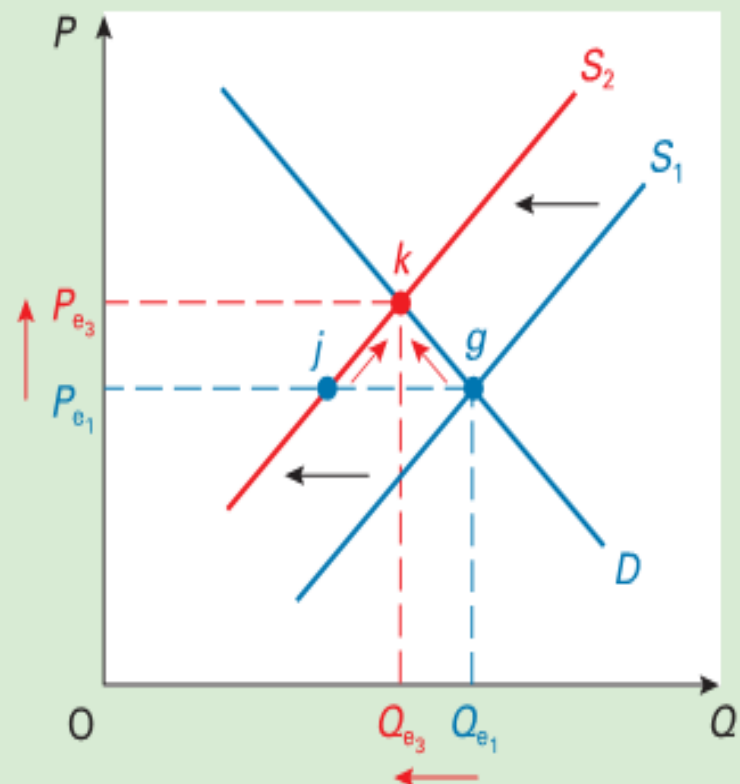


Figure 2.7 Effect of a shift in the supply curve



PRICE AND OUTPUT DETERMINATION

Equilibrium price and output:

We can now combine our analysis of demand and supply. This will show how the actual price of a product and the actual quantity bought and sold are determined in a free and competitive market.

EQUILIBRIUM

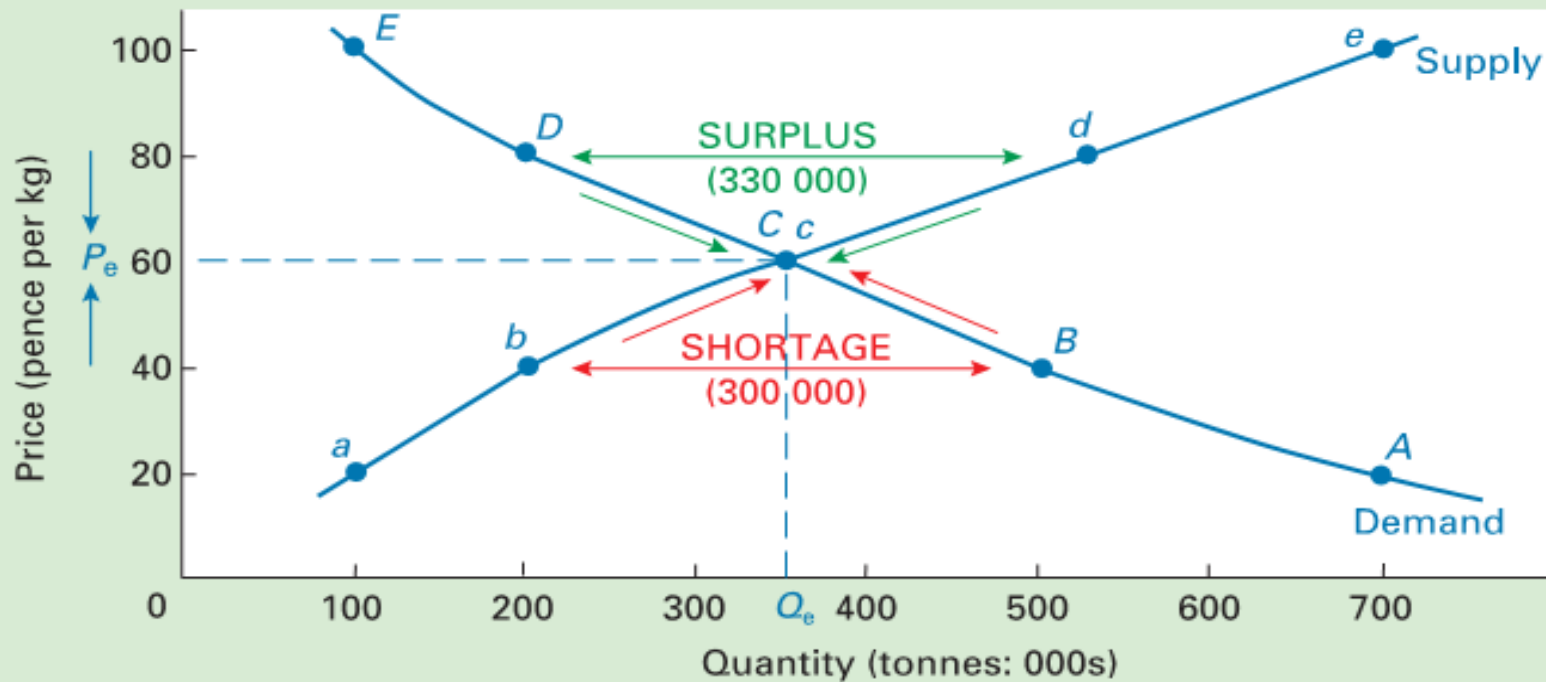
Equilibrium refers to the market condition which, once achieved, tends to persist. In economics this occurs when the quantity of a commodity demanded in the market per unit of time equals the quantity of the commodity supplied to the market over the same time period. Geometrically, equilibrium occurs at the intersection of the commodity's market demand curve and market supply curve. The price and quantity at which equilibrium exists are known, respectively, as the equilibrium price and the equilibrium quantity.

What will be the price and output that actually prevail?

The market demand and Supply

Price of potatoes (pence per kg)	Total market demand (tonnes: 000s)	Total market supply (tonnes: 000s)	State of Mkt	Pressure on Price
20	700 (A)	100 (a)		
40	500 (B)	200 (b)		
60	350 (C)	350 (c)		
80	200 (D)	530 (d)		
100	100 (E)	700 (e)		

The determination of market equilibrium (potatoes: monthly)



EXAMPLE 12 Since we know that at equilibrium $QD_x = QS_x$, we can determine the equilibrium price and the equilibrium quantity mathematically:

$$\begin{aligned}QD_x &= QS_x \\8000 - 1000P_x &= -4000 + 2000P_x \\12,000 &= 3000P_x \\P_x &= \$4 \quad (\text{equilibrium price})\end{aligned}$$

Substituting this equilibrium price either into the demand equation or into the supply equation, we get the equilibrium quantity.

$$\begin{aligned}QD_x &= 8000 - 1000(4) & \text{or} & & QS_x &= -4000 + 2000(4) \\&= 8000 - 4000 & & & &= -4000 + 8000 \\&= 4000 \quad (\text{units of } X) & & & &= 4000 \quad (\text{units of } X)\end{aligned}$$

If the government imposes a tax or provides a subsidy, it will affect the supplier at the first place and the supply function requires to be adjusted.

Let, the demand and supply functions of a commodity 'x' are given respectively by

$$Q_{dx} = a - bP_x \quad \text{AND} \quad Q_{sx} = c + dP_x$$

[here p_x refers to the price of the commodity, x]

In the of case of a tax, the supply function takes the following shape

$$Q_{sx}(t) = C + d(P_x - \text{tax per unit})$$

In the of case of a subsidy, the supply function takes the following shape

$$Q_{sx}(s) = C + d(P_x + \text{subsidy per unit}) .$$

However, in both of the cases the demand function remains the same.

Glossary

Change in demand: A shift in the entire demand curve of a commodity resulting from a change in the individual's money income or tastes, or prices of other commodities.

Change in the quantity demanded: A movement along a given demand curve for a commodity as a result of a change in its price.

Change in the quantity supplied: A movement along a given supply curve for a commodity as a result of a change in its price.

Change in supply: A shift in the entire supply curve of a commodity resulting from a change in technology, the prices of the inputs necessary to produce the commodity, and (for agricultural commodities) climate and weather conditions.

Equilibrium: The market condition which, once achieved, tends to persist. This occurs when the quantity of a commodity demanded equals the quantity supplied to the market.

Law of demand: The inverse relationship between price and quantity reflected in the negative slope of a demand curve.