

Key points

1. Economics is generally classified as a social science and uses the scientific method as the basis for its investigation.
2. Economics is the study of how groups of individuals make decisions about the allocation of scarce resources.
3. Economists build models and theories to explain economic interactions.
4. The ceteris paribus assumption is used in building models.
5. Positive economics deals with statements of 'fact' that can either be refuted or supported. Normative economics deals with value judgements, often in the context of policy recommendations.

IB SL/HL

OCR A1 and AS1 The basic economic problem

AQA 4.1.1.1, AS 3.1.1.1

WJEC/EDUQAS A and AS Introduction to economic principles

CCEA A and AS

Starter activity

'The UK should leave the European Union.' Is this a fact or is it a value judgement? If you wanted to argue for or against the UK leaving the European Union, what factual arguments could you use? And what emotional arguments could you put forward?

Which of these arguments are economic and which are non-economic?

The scientific method

There are many sciences covering a wide field of knowledge. What links them all is a particular method of work or enquiry called the **scientific method**. The scientific method at its most basic is relatively easy to understand. A scientist:

- postulates (puts forward) a **theory** - the scientist puts forward a hypothesis which is capable of refutation (e.g. the Earth travels round the Sun, the Earth is flat, a light body will fall at the same speed as a heavy body);
- gathers evidence to either support the theory or refute it - astronomical observation gives evidence to support the theory that the earth travels round the sun; on the other hand, data refute the idea that the Earth is flat; gathering evidence may be done through controlled experiments;
- accepts, modifies or refutes the theory - the Earth does travel round the Sun; a light body will fall at the same speed as a heavy body although it will only do so under certain conditions; the Earth is not flat.

Theories which gain universal acceptance are often called **laws**. Hence we have the law of gravity, Boyle's law, and in economics the laws of demand and supply.

Economics - the science

In natural sciences, such as physics or chemistry, it is relatively easy to use the scientific method. In physics, much of the work can take place in laboratories. Observations can be made with some degree of certainty. Control groups can be established. It then becomes relatively easy to accept or refute a particular hypothesis.

This is much more difficult in **social sciences** such as economics, sociology, politics and anthropology. In economics, it is often not possible to set up experiments to test hypotheses. It is often not possible to establish control groups or to conduct experiments in environments which enable one factor to be

varied whilst other factors are kept constant. The economist has to gather data in the ordinary everyday world where many variables are changing over any given time period. It then becomes difficult to decide whether the evidence supports or refutes particular hypotheses.

Economists sometimes come to very different conclusions when considering a particular set of data as their interpretations may vary. For example, an unemployment rate of six per cent in Scotland compared to a national average of three per cent may indicate a failure of government policy to help this area. Others may conclude that policy had been a success as unemployment may have been far greater without the use of policy.

It is sometimes argued that economics cannot be a science because it studies human behaviour and human behaviour cannot be reduced to scientific laws. There is an element of truth in this. It is very difficult to understand and predict the behaviour of individuals. However, nearly all economics is based on the study of the behaviour of groups of individuals. The behaviour of groups is often far more predictable than that of individuals. Moreover, we tend to judge a science on its ability to establish laws which are certain and unequivocal. But even in a hard science such as physics, it has become established that some laws can only be stated in terms of probabilities. In economics, much analysis is couched in terms of 'it is likely that' or 'this may possibly happen'. Economists use this type of language because they know they have insufficient data to make firm predictions. In part it is because other variables may change at the same time, altering the course of events. However, it is also used because economists know that human behaviour, whilst broadly predictable, is not predictable to the last £1 spent or to the nearest one penny of income.

Theories and models

The terms 'theory' and '**model**' are often used interchangeably. There is no exact distinction to be made between the two. However, an economic theory is generally expressed in looser terms than a model. For instance, 'consumption is dependent upon income' might be an economic theory.

' $C_t = 567 + 0.852Y_t$ ' where 567 is a constant, C_t is current consumption and Y_t current income would be an economic model. Theories can often be expressed in words. But economic models, because they require greater precision in their specification, are often expressed in mathematical terms.

Key points

1. Economic data are collected not only to verify or refute economic models but to provide a basis for economic decision making.
2. Data may be expressed at nominal (or current) prices or at real (or constant) prices. Data expressed in real terms take into account the effects of inflation.
3. Indices are used to simplify statistics and to express averages.
4. Data can be presented in a variety of forms such as tables or graphs.
5. All data should be interpreted with care given that data can be selected and presented in a wide variety of ways.

Starter activity

When your great grandparents started work, what did they earn? In 1950, average UK earnings were £350 per year. Is that £350 the same as £350 a year today? In 2013, average earnings were £26 500. What could you have bought with £26 500 in 1950?

In 2013, the average earnings of bar staff were £7 317, secretaries £16 384, teachers £32 547 and doctors £70 646. How many times more did a teacher earn than a secretary or a doctor more than bar staff? Is there an easy way to display the relative earnings of different workers?

Source: with information from www.ons.gov.uk.

The collection and reliability of data

Economists collect data for two main reasons.

- The scientific method requires that theories be tested. Data may be used to refute or support a theory. For instance, an economist might gather data to support or refute the hypothesis that 'Cuts in the marginal rate of income tax will increase the incentive to work', or that 'An increase in the real value of unemployment benefit will lead to an increase in the number of people unemployed'.
- Economists are often required to provide support for particular policies. Without economic data it is often difficult, if not impossible, to make policy recommendations. For instance, in his Budget each year the Chancellor of the Exchequer has to make a statement to the House of Commons outlining the state of the economy and the economic outlook for the next 12 months. Without a clear knowledge of where the economy is at the moment, it is impossible to forecast how it might change in the future and to recommend policy changes to steer the economy in a more desirable direction.

Collecting economic data is usually very difficult and sometimes impossible. Some macroeconomic data - such as the balance of payments figures or the value of national income - are collected from a wide variety of sources. The figures for the balance of payments on current account are compiled from returns made by every exporter and importer on every item exported and imported. Not surprisingly, the information is inaccurate. Some exporters and importers will conceal transactions to avoid tax. Others will not want to be bothered with the paperwork.

Other macroeconomic data such as the Consumer Prices Index (used to measure inflation) or the Labour Force Survey (used to measure employment and unemployment) are based

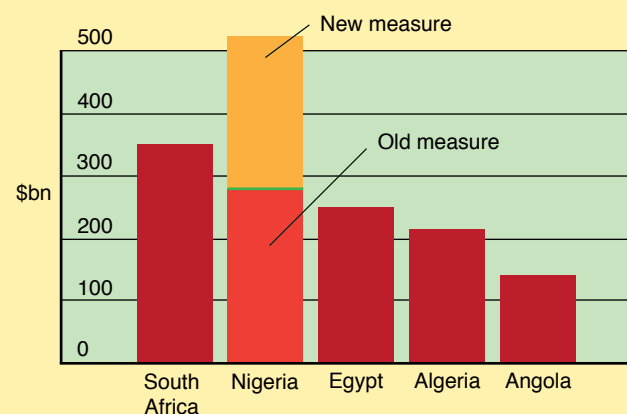
Question 1

How do you double the size of your economy overnight to become the largest economy in Africa? The answer is to revise your estimate of the output of the economy, called GDP (Gross Domestic Product). This is what Nigeria has done. Yesterday, it was reported that it announced its GDP for 2013 was \$509 billion, 89 per cent larger than previously stated. Previous estimates were based on a way of calculating GDP set in 1990 that failed to capture many of Nigeria's growth industries. For example, under the old method, telecoms including mobiles accounted for 0.8 per cent of GDP. Under the new method, it is 8.6 per cent of GDP. Under the old method, the film industry was not even measured. Under the new method, it accounts for 1.4 per cent of GDP.

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Figure 1

Top African countries by GDP, 2013



Source: adapted from IMF estimates.

- (a) Explain why the estimates of GDP in 2013 using the 1990 method of calculation were unreliable.
- (b) Suggest why a European company might be more prepared to invest in new facilities in Nigeria rather than South Africa in 2014 compared to 2012.

on surveys. Surveys are only reliable if there is accurate sampling and measuring and are rarely as accurate as a complete count.

Some macroeconomic data are very reliable statistically but do not necessarily provide a good measure of the relevant economic variable. In the UK, the unemployment Claimant Count is calculated each month at benefit offices throughout the country. It is extremely accurate but no economist would argue that the figure produced is an accurate measure of unemployment. There is general agreement that some people who claim benefit for being unemployed are not unemployed and conversely there are many unemployed people who are not claiming benefit.

In microeconomics use is again made of survey data, with the limitations that this implies. Economists also make use of more experimental data, gathering evidence for case studies. For instance, economists might want to look at the impact of different pricing policies on entry to sports centres. They might study a small number of sports centres in a local area. The evidence gathered would be unlikely decisively to refute or support a general hypothesis such as 'Cheap entry increases sports centre use'. But it would be possible to conclude that the evidence tended to support or refute the hypothesis.

In economics it is difficult to gather accurate data and, for that reason, academic economists mostly qualify their conclusions.

Real and nominal values

There are many different measures in use today such as tonnes, litres, kilograms and kilometres. Often, we want to be able to compare these different measures. For instance, an industrialist might wish to compare oil measured in litres, and coal measured in kilograms. One way of doing this is to convert oil and coal into therms using gross calorific values. In economics, by far the most important measure used is the value of an item measured

in monetary terms, such as pounds sterling, US dollars or euros. One problem in using money as a measure is that inflation (the general change in prices in an economy) erodes the purchasing power of money.

For instance, in 1948 the value of output of the UK economy (measured by gross domestic product at market prices) was £11.6 billion. In 2013, 65 years later, it was £1 713.3 billion. It would seem that output had increased about 148 times ($£1\ 713.3 \text{ billion} \div £11.6 \text{ billion}$) - an enormous increase. In fact, output increased by only a fraction of that amount. This is because most of the measured increase was an increase not in output but in prices. Prices over the period rose about 29 fold. Stripping the inflation element out of the increase leaves us with an increase in output of 5.2 times.

Values unadjusted for inflation are called **nominal values**. These values are expressed at **current prices** (i.e. at the level of prices existing during the time period being measured).

If data are adjusted for inflation, then they are said to be at **real values** or at **constant prices**. To do this in practice involves taking one period of time as the **base period**. Data are then adjusted assuming that prices were the same throughout as in the base period.

For instance, a basket of goods costs £100 in year 1 and £200 in year 10. Prices have therefore doubled. If you had £1 000 to spend in year 10, then that would have been equivalent to £500 at year 1 prices because both amounts would have bought five baskets of goods. On the other hand, if you had £1 000 to spend in year 1, that would be equivalent to £2 000 in year 10 prices because both would have bought you 10 baskets of goods.

Taking another example, the real value of UK output in 1948 at 1948 prices was the same as its nominal value (i.e. £11.6 billion). The real value of output in 2013 at 1948 prices was £57.8 billion. It is much lower than the nominal 2013 value because prices were much higher in 2013.

On the other hand, at 2013 prices, the real value of output in 1948 was £320.2 billion, much higher than the nominal value because prices in 2013 were much higher than in 1948. Further examples are given in Table 2.

UK government statistics expressed in real terms are adjusted to prices three or four years previously. In 2014, figures were expressed at 2011 prices.

Question 2

Table 1 Components of final demand at current prices

	Index of prices 2010=100	£ billion at current prices		
		Households' expenditure	Government expenditure	Fixed investment
2010	100.0	953.3	336.6	250.2
2011	104.5	985.8	337.3	260.8
2012	107.4	1022.1	343.9	268.8
2013	110.1	1059.1	346.8	281.5

Source: adapted from www.ons.gov.uk.

Using a calculator or a spreadsheet, work out for the period 2010-2013 (a) at constant 2010 prices and (b) at constant 2013 prices the values of:

- households' expenditure;
- government expenditure;
- fixed investment.

Present your calculations in the form of two tables, one for 2010 prices and the other for 2013 prices to one decimal place.

Table 2 Nominal and real values

Nominal value	Inflation between year 1 and 2	Real values	
		Value at year 1 prices	Value at year 2 prices
Example 1 £100 in year 1	10%	£100	£110
Example 2 £500 in year 1	50%	£500	£750
Example 3 £200 in year 2	20%	£166.66	£200
Example 4 £400 in year 2	5%	£380.95	£400
Note: £100 at year 1 prices is worth $£100 \times 1.1$ (i.e. $1 + 10\%$) in year 2 prices £200 at year 2 prices is worth $£200 \div 1.2$ in year 1 prices.			

Key points

1. The production possibility frontier (PPF) shows the maximum potential output of an economy.
2. Growth in the economy will shift the PPF outwards whilst a shift inwards of the PPF shows that the productive potential of an economy has declined.
3. Consuming more in the present at the expense of producing capital goods can lead to lower growth of the potential output of an economy in the future.
4. Production at a point inside the PPF indicates an underuse or an inefficient use of resources.
5. The PPF shows only what could be produced but not what should be produced.

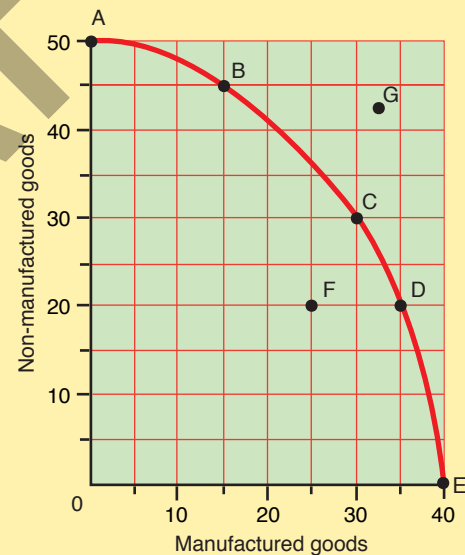
Starter activity

Your Economics A level group decided to raise money for charity. It took each person a day to take part and you raised £500. You can give the money to two charities. Which two charities would you chose? How much would you give to each? If you give £100 more to one charity, how much less do you give to the other? What would have been the likely outcome if half the group had given excuses and not taken part in the fund-raising activity? Answers to these questions illustrate opportunity cost, choice and production possibility frontiers.

Figure 1

The production possibility frontier

ABCDE is a production possibility frontier. It shows the different combinations of goods which can be produced if all resources are fully and efficiently utilised. The economy can produce at any point on the line. It cannot produce at G because the PPF shows the maximum that can be produced. It can produce within the PPF, such as at F, but less will be produced than the maximum possible.



The problem of scarcity

Over a period of time, resources are scarce and therefore only a finite amount can be produced. For example, an economy might have enough resources at its disposal to be able to produce 30 units of manufactured goods and 30 units of non-manufactured goods. If it were now to produce more manufactured goods, it would have to give up some of its production of non-manufactured items. This is because the production of a manufactured item has an opportunity cost - in this case the production of non-manufactured item. The more manufactured goods that are produced, the less non-manufactured goods can be produced.

This can be shown in Figure 1. The curved line is called the **production possibility frontier (PPF)** - other names for it include **production possibility curve** or **boundary**, and **transformation curve**. The PPF shows the different combinations of economic goods which an economy is able to produce if all resources in the economy are fully and efficiently employed. The economy therefore could be:

- at the point C on its PPF, producing 30 units of manufactured goods and 30 units of non-manufactured goods;
- at the point D, producing 35 units of manufactured goods and 20 units of non-manufactured goods;
- at the point A, devoting all of its resources to the production of non-manufactured goods;
- at the points B or E or anywhere else along the line.

Production cannot take place to the right of the PPF, such as at the point G. This is because the PPF shows the maximum output of the economy. It can operate within the boundary,

for example at F, but the economy is producing less than its maximum.

Opportunity cost

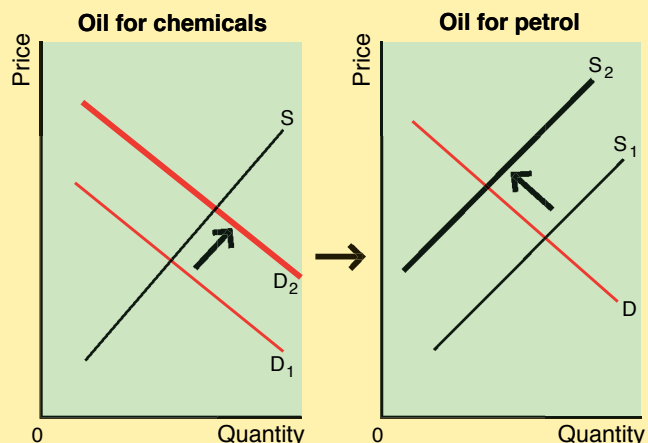
The production possibility frontier illustrates clearly the principle of opportunity cost. Assume that the economy is producing at the point C in Figure 1 and it is desired to move to the point D. This means that the output of manufactured goods will increase from 30 to 35 units. However, the opportunity cost of that (i.e. what has to be given up because of that choice) is the lost output of non-manufactured goods, falling from 30 to 20 units. The opportunity cost at C of increasing manufacturing production by five units is 10 units of non-manufactured goods.

Another way of expressing this is to use the concept of the **margin**. In economics, the margin is a point of possible

Figure 4

Composite demand

An increase in the demand for oil from chemical producers will result in a fall in the supply of oil to the petrol market because oil is in composite demand.



is shown by a shift upwards in the supply curve for petrol in Figure 4. The price of oil for petrol will rise and the quantity demanded will fall.

Economic theory therefore predicts that an increase in demand for a good will lead to a rise in price and a fall in quantity demanded for a good with which it is in composite demand.

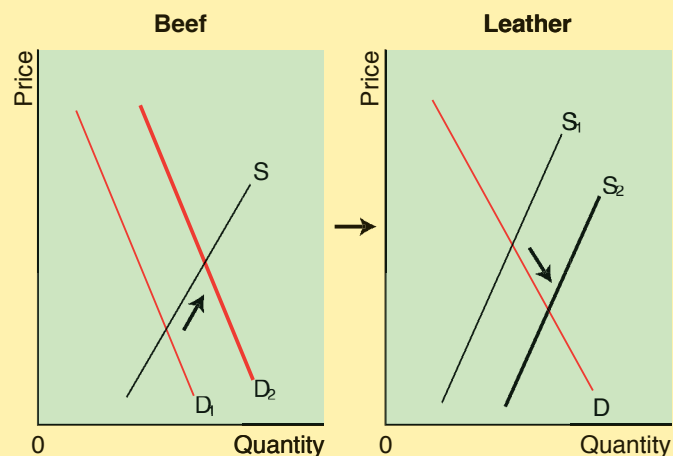
Joint supply

A good is in **joint supply** with another good when one good is supplied for two different purposes. For instance, cows are supplied for both beef and leather. An oil well may give both oil and gas.

Figure 5

Joint supply

An increase in the demand for beef, which leads to more beef being produced, results in an increase in the supply of leather. Beef and leather are said to be in joint supply.



Question 3



It is bad news if you like jelly-babies and wine gums. The price of gelatin, the base ingredient of these sweets, has risen about 50 per cent over the past 12 months. Tangerine, the UK's largest sugar confectionery manufacturer by volume, uses gelatin from cattle hide so that its products are halal-approved. However, the demand for cattle hides is being driven up by a large increase in world demand for leather handbags and leather upholstery in luxury cars, particularly in the Chinese market.

Tangerine could substitute gelatin made from pig skins, even though this would mean that its products could then not be eaten by Muslims. But equally the demand for pig skin is increasing. Chinese consumers are eating pig skin in ever larger quantities, as a meat replacement. Spaniards, Italians, Mexicans and Filipinos also like to eat pig skin. The result is that the price of pig skin is rocketing, like that of cattle hide. This, in turn, is feeding back into a rise in the price of cattle hides because cattle hides are a substitute for pig skins.

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- With the help of diagrams and the concept of joint supply, explain why the price of gelatin had increased 'about 50 per cent'.
- With the help of diagrams and the concept of competitive demand, explain why (i) a rise in the demand for leather handbags made from cattle hide has led to a rise in the price of pig skins and (ii) a rise in demand for pig skin to eat has led to a rise in the price of cattle hides.